

**DEVELOPMENT PROBLEMS  
AND  
ENVIRONMENTAL ISSUES IN WESTERN ASIA**

**Proceedings  
of the  
Regional Seminar on Alternative Patterns of  
Development and Life Styles in Western Asia  
convened jointly  
by**

**THE ECONOMIC COMMISSION FOR  
WESTERN ASIA  
AND  
THE UNITED NATIONS ENVIRONMENT PROGRAMME**



**ECONOMIC COMMISSION FOR  
WESTERN ASIA (ECWA)**



**UNITED NATIONS ENVIRONMENT  
PROGRAMME (UNEP)**

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**ECONOMIC COMMISSION FOR  
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PROGRAMME (UNEP)**

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The opinions expressed in the different chapters of this book are those of the authors and do not necessarily reflect the views of the United Nations.

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## **FOREWORD**

**The increasing concern with environmental issues since the Stockholm Conference of 1972 has been mainly attributed to the fact that man in his activities to satisfy his needs and his aspirations for further development and the achievement of better living conditions, has created an increasing number of environmental problems that could have been avoided through appropriate development planning and wise environmental management.**

**The initiative of the United Nations Programme in sponsoring a series of regional seminars on alternative patterns of development and life styles was, therefore, very timely.**

**The Regional Seminar for Western Asia which was the last in this series was convened from 21-25 January 1980 in Beirut, Lebanon. This Seminar brought into focus the need to examine, evaluate and eventually select appropriate development patterns and life styles. Admittedly, such an exercise is likely to be a difficult one, since it involves a large number of problems and disciplines.**

**The publication of this book which contains, *inter alia*, the seven main documents that were presented and discussed at the Seminar, provides an opportunity for the wider distribution of those documents for easy reference by all those concerned with development problems and environmental issues.**

**Special acknowledgment is due to Dr. M.K. Tolba, Executive Director of the United Nations Environment Programme, and his staff for their valuable and significant contributions to the Seminar.**

**M. S. Al-Attar  
Executive Secretary  
ECWA**

**PART ONE**

**Report of the  
REGIONAL SEMINAR ON ALTERNATIVE PATTERNS OF  
DEVELOPMENT AND LIFE STYLES IN WESTERN ASIA**

## **INTRODUCTION**

**The development patterns and life styles of the member States of ECWA vary according to the existing differences in resource endowment, size, population density, level of economic development and political and social structure of each country.**

**Accordingly, by its decision 89 (IV) UNEP's Governing Council requested the Executive Director to devote increased attention to the relationship between environment and development, including research into development of appropriate institutions, the implementation of relevant management techniques and the convening of regional and subregional intergovernmental meetings and seminars. In a later decision 6/6 the Governing Council invited Governments and international organizations to participate in the preparation, proceedings and follow-up of the regional seminars on alternative patterns of development and life styles and recommended that the results of these seminars serve, inter alia, as an input into the formulation of the international development strategy for the 1980s and beyond.**

## Attendance and Organization of the Seminar

1. The Regional Seminar on Alternative Patterns of Development and Life Styles in Western Asia was held in Beirut, Lebanon, between 21-25 January 1980. Sponsored jointly by UNEP and ECWA, its purpose was to provide a forum for development planners and decision-makers to examine the issues and prospects involved in the planning and implementation of sound developmental patterns that would satisfy both ecological and socio-economic exigencies. The seminar's deliberations and conclusions were also expected to contribute valuable input to the formulation of a development strategy for the Third United Nations Development Decade.

2. The seminar was attended by the following ECWA members\* : Democratic Yemen, Egypt, Iraq, Lebanon, PLO, Qatar, Saudi Arabia and Yemen. Representatives of the following United Nations organizations and specialized agencies also attended: ILO, UNCHS, UNDP and UNFPA.

Also attending were the representatives of two regional, inter-governmental organizations — the Arab Planning Institute and the Council of Arab Economic Unity — and of the American University of Beirut.

3. The Executive Secretary of ECWA, Mr. Mohamed Said Al-Attar greeted the assembly and introduced the representative of the President of the Lebanese Council of Ministers, Mr. Mohamed Atallah, who delivered the opening address in which he welcomed the distinguished participants. Mr. Atallah indicated that the topic of the seminar was a subject of great concern to governments and peoples today, when damage to the environment accompanying the drive for material development was beginning to threaten the very quality of life. The seminar was taking place in a region where the opportunities for causing environmental damage were considerable. The seminar would undoubtedly propose developmental guidelines for helping the countries of the region to avoid the necessity of sacrificing environmental values in the development process and to arrest the damage that had already taken place and that, in the absence of effective action, might produce harmful consequences.

4. The Executive Secretary of ECWA delivered an address in which he thanked the President of the Lebanese Council of Ministers for opening the seminar through his distinguished representative, Mr. Mohamed Atallah. The present seminar was the last of a series of regional meetings organized by UNEP in collaboration with the regional commissions of the United Nations as part of the preparations recommended by the General Assembly for the formulation of a development strategy for the United Nations Third Development Decade. That strategy was to reflect, *inter alia*, the need for the protection of the environment and for the consideration of environmental factors in the developmental plans and priorities of the developing countries. He stressed the important role that the present seminar could play in making specific recommendations which the Governments of the region could draw upon when adopting proposals for the formulation of the new development strategy.

5. The representative of UNEP, Mr. Ramses Mikhail, made an address in which he stated that the considerable discussion surrounding alternative patterns of development should be taken into account when the different phases of social and economic development were being planned. He hoped that the present seminar would provide the opportunity for an extensive and open-minded exchange of views and information among the participants and that it would prepare the way for concrete action at the national, regional and international levels. He indicated that the present seminar would be followed by an inter-regional meeting which was scheduled to take place in March 1980. The meeting, which would be attended by the executive secretaries of the regional commissions of the United Nations, would evaluate the results of the regional seminars and prepare a joint paper for presentation to the special session of the General Assembly on the new International Development Strategy.

6. At its first session, the seminar unanimously elected Mr. Joseph Najjar Chairman of the Board of the National Council for Scientific Research (Lebanon), chairman of the seminar; Mr. Mahmoud El-Kadi, the delegate of the PLO, vice-chairman; and Mr. Badry Abdel-Hady Jawad, the delegate of Iraq, rapporteur.

### Agenda

7. At its first session, the Seminar adopted the following agenda:

1. Opening of the seminar
2. Election of officers
3. Adoption of the agenda
4. Alternative Patterns of Development and Life Styles for the ECWA Region: A Keynote and Overview Paper
5. Agricultural Development and Land Management in Relation to Environment and Food Supply Needs in the ECWA Region
6. (a) Study of the Development and Management of Water Resources in the ECWA Region  
(b) Case Study on the Aswan High Dam (Egypt): Its Impact on the Environment and its Side-effects

\* Full list of participants in document E/ECWA/ENV/WG.16/INF.3/Rev.1

7. Present Trends of Industrialization and Urbanization and their Economic, Social and Environmental Implications
8. Environmental Implications of Oil and Alternative Sources of Energy in the ECWA Region
9. The Economic, Social and Environmental Implications for the ECWA Region of Present and Future Trends in International Relations
10. Country papers
11. Other matters
12. Adoption of the final report

**A Keynote and Overview Paper (E/ECWA/ENV/WG./16/8) (agenda item 4)**

8. The paper was divided into three chapters :

- (1) The environment imperative;
- (2) An overview of development trends in the region, with an emphasis on the prominent trends that can be gleaned from available data;
- (3) Viewpoints, proposals and ideas on alternative development strategies.

9. The author pointed out that concern with the environment was a relatively recent manifestation in development literature. In the industrialized countries it had emerged in the form of concern over environmental "pollution" and the depletion of non-renewable resources. The concept was later expanded to embrace the notion of the quality of life. Some people considered that concern with the environment was an expensive luxury. The developing countries which could not afford such luxuries ought to develop in any way they could until they reached the stage where they could afford to deal with the problems of pollution. That concept, however, was faulty: Poverty was in itself a pollution of the environment! Developing countries, by studying the mistakes of the more developed countries, could find ways of dealing with their environmental problems more efficiently.

10. The human environment included both the physical and social environment, either of which was capable of causing man good or evil. Nature did not provide man with unlimited resources. Nature consisted of a number of interrelated eco-systems, each of which had a threshold that could not be transgressed. For example, fishing beyond a certain limit could lead to the extinction of some fish species. Inherited concepts must be discarded and an awareness developed with regard to the importance of the different elements of nature.

11. The author's study of the main development trends in the ECWA region over the last quarter century was based on issues common to the region. The ECWA region was not, of course, a natural geographic unity; it comprised the countries of the Arab East, which formed only one part of the Arab nation. A review of development trends began with a description of the resource base of the region and the place of the countries of the region in the world system. At the center of the world system were the Western industrial countries, which exercised cultural hegemony; on the periphery of the system were the countries of the Third World, against whose interests the present system worked. The essence of development in the region was liberation from dependency and exploitation. The Arab East was characterized by desert conditions in the interior and fertile land along the periphery. That explained the uneven distribution of the population, which ranged from sparseness bordering on emptiness in the Ruba' Al-Khaali region to densities of astounding proportions, as in some areas of Egypt.

12. The region had considerable agricultural resources which justified the application of the most exact scientific methods of exploitation. The region had maintained the same pattern for centuries, until oil was discovered and new approaches to both development and the environment emerged. Because of its oil resources, the Arab East would not have to worry about the energy to fuel its development.

13. The oil boom resulted in an unprecedented wave of internal migration in the region. The study examined this phenomenon in terms of the increased contacts and intensified relations it generated among the countries and peoples of the region and the resulting flow of funds from one country to another in the form of workers' savings, grants, loans, investments, touristic expenditures and transfers.

14. On the question of trade, it was noted that three-quarters of the trade of the countries of the Arab East was with Western countries. Diversification in trade relations was taken to be a measure of a country's economic freedom where its absence signalled dependency.

15. Development programmes in the region were formulated within the framework of national development policies, while the realities called for a comprehensive strategy conceived at the regional level. Thus, in agriculture, a food deficit persisted despite land reform efforts. In industry, attempts at industrialization did not produce a comprehensive transformation of society; nor did they stimulate other sectors of the economy. In general, growth rates in the region remained mediocre. Social indicators proved to be disquieting, revealing stubborn illiteracy rates, low school capacities, poor health conditions, high infant mortality rates and low life-expectancy rates. While genuine development had been accompanied by income redistribution, imbalances remained in income distribution within individual countries and among the countries of the region.

16. The region faced the serious challenge of freeing itself from intellectual dependence on the industrial West. The historical development that the West had undergone could not be copied because circumstances were different. Attempts at blind imitation would make the price of development too high and could result in the loss of national identity. If man was truly both the end and the means of development, then a nation's seriousness of purpose and regard for the future should be reflected in democratic practices and popular participation in development. If that were the case, the positive impact would extend to the political authorities and decision-makers of the region.

17. The primary tool of development was knowledge of real conditions and not theories of development. Statistical data provided a clear picture of realities and constituted the best tool for evaluating the extent of progress. Data should not be limited to economic input; they should also focus on economic output, which gave a more realistic picture. A statistical plan should therefore be established for the collection of basic data, based on a co-ordinated Arab perspective; for the soundness of decisions depended on the quantity and quality of the data available to decision-makers. Concern for statistical priorities, however, should not divert attention from the basic obstacles to development, which were political and economic in nature. Priorities could only be ordered and changed in accordance with prevailing historical and political circumstances and the particular stage of development reached. Their establishment, therefore, called for a diversified, comprehensive and undivided effort.

18. Basic human needs included food, housing, clothing, freedom of movement, education and health. Man needed to enjoy mental and physical health so that he could freely go about his life's occupation. Non-material needs included self-fulfillment in society, the opportunity to be engaged in productive and useful work and a sense of community. Material and non-material needs must be organically related: The most productive individual was also the free individual.

19. The ultimate weapons of domination in the hands of the industrial world were food and technology. In order to correct a number of false notions about technology, it was necessary to point out that the ECWA region was not purchasing technology but only its "products" — i.e., ready-made techniques and solutions. However many of those products were accumulated, they did not add up to "technology"; nor was it certain that the techniques purchased were the most suitable for the circumstances of individual countries. Technology in essence was the ability of a given society, in specific circumstances, to apply specific methods to the solution of specific problems within the context of prevailing values. Technologies were suitable when they helped optimize the utilization of available resources without doing prejudice to the environment. The need for the adaptation and modification of technology in the light of individual circumstances could not be overstressed. Countries that continued to depend upon imported technology stifled the creative spirit of their people. The solution was for each country to adopt a national scientific research policy that would gradually build up a local technological base commensurate with its resources. The Arab world, which had begun to develop an awareness in that area, had the necessary human and financial resources to confront it. The ECWA countries should abandon all notions of up-dating traditional technologies and should not leave the selection of appropriate technologies to foreign consulting firms.

20. Several participants asked questions concerning the standards that should be used in defining underdevelopment, dependency and basic needs; the modalities of interaction with the prevailing international system; the meaning of self-reliant development, especially with respect to the smaller countries of the region; the difference between self-reliance and self-sufficiency; ways of regulating consumption patterns within the framework of self-reliant development, taking into account decisions made both in the world of the free market and the world of centralized economies. A question was asked regarding **who** was to determine the proper balance among individual, social and environmental needs and the specific pattern of consumption to be adopted in the development process. Participants discussed the need for the abolition of protective barriers which conflicted with the call for regional planning and asked if it was possible for development to take place in the context of political systems based on class or other forms of human exploitation. Doubts were expressed as to the ability of developing countries of modest resources to launch the development process alone without lowering their living standards. The absence of collective efforts in this regard was likely to increase the state of dependency. Several participants suggested some approaches to alternative patterns of development. True development should be founded on a historical study of the fundamental features and characteristics of each country. Objectives and methods should be derived from the historical heritage preserved in the mores of the common people; developmental models inherited from imperialism should not be used as bases for development.

21. In response to these questions, it was pointed out that true development was an internally generated process in which all members of society participated. The Arab intelligentsia was called upon to take the lead in reinterpreting Arab history in the light of modern realities. The common people were indeed the depository of civilized values; hence their close ties with the intelligentsia. The subject of democratic development was also raised. The essence of democracy was two-fold: pluralism and the peaceful transfer of political power. Conformity was the hallmark of totalitarianism and dictatorship, even in the most economically productive of regimes. Progress was the resultant of the interplay of different forces and pluralism had no meaning apart from the genuine possibility of peaceful change of government in accordance with the people's will and interests. With respect to popular participation, it was noted that the inhabitants of a village knew more about their village affairs than any planning minister or computer. Democratic education meant that education should be geared to the needs of manual labour since this was not only the most prevalent form of labour in society but also the most directly productive.

22. In response to the comments on class structure and exploitation and their relationship with development strategy, reference was made to the World Bank study on income redistribution and development. Classes were sometimes ignorant of their true interests because they were unaware of the realities of development and the course of world affairs and because of their tacit acceptance of the Western umbrella. Self-reliance was not the monopoly of the socialist solution; mixed economies could bring about a considerable degree of self-reliance. Self-reliance was to be practised at all sectoral levels if it were to be achieved at the national level. The level of dependency of a developing country was measured by the ratio of its interactions with other developing countries over its interactions with the countries of the West. The developing countries, and more particularly the ECWA countries, ought to produce and consume their goods jointly — thereby creating a market for mutual exchange. Finally, it was noted that it was contemporary practice for consumption patterns to be established not by the consumer, as was proper, but by the producer.

**Agricultural Development and Land Management in Relation to Environment and Food Supply Needs in the ECWA Region (E/ECWA/ENV/WG.16/3) (agenda item 5)**

23. As the major themes of this study were presented, the main features of agriculture in the region were described. These were said to be an inordinate dependence on rainfall, backward means of production, the continued use of primitive methods, the parcelling of land-holdings (with resultant crop waste), production for own consumption rather than for marketing, heavy reliance on manual labor and animal traction, the low utilization of aids such as fertilizers, insecticides, machines, etc. In addition, per capita land-ownership was no more than a quarter of a hectare and was steadily decreasing, the system of leaving land fallow still prevailed, cropping intensity coefficients were decreasing and productivity was low.

24. The study divided up the countries of the region as follows:

- (a) Countries with a relatively high present or potential agricultural capacity, which included Iraq, Syria and Egypt;
- (b) Countries with a medium agricultural capacity, such as Lebanon and Jordan;
- (c) Countries with a limited agricultural capacity, because of limited water resources and rainfall, which included Oman, Saudi Arabia, Yemen and Democratic Yemen;
- (d) Countries with a low agricultural capacity, such as the Gulf States of Bahrain, Qatar, Kuwait, in which no large-scale agricultural development could be envisaged.

25. The main obstacles to agricultural development were then summed up as follows: limited land and water resources and their misuse, the low productive capacity of the agricultural worker, the absence of auxiliary rural institutions such as agricultural co-operatives and credit institutions, the decline in the share of development investments going to agriculture the attempt of each country to pursue a go-it-alone policy, widespread soil salinity, erosion, desertification and the extension of agriculture to areas of marginal rainfall. Accordingly, the present and prospective food situation did not appear bright: present agricultural growth was incapable of meeting growing food needs.

26. In order to meet food needs, the area of irrigated land should be doubled, agricultural exploitation should be further intensified and chemicals should be more widely used in agriculture. It was also proposed that drainage projects to expanded to overcome the problem of salinity and that land exposed to erosion by water and wind be protected scientifically.

27. In the forties food production was abundant enough for export; but gradually population growth had outpaced agricultural production to transform the region into an importer. During the fifties the theory prevailed that agriculture had the primary role of creating surpluses to feed other sectors, such as industry. In the sixties there was a gradual evolution in development thinking which focussed on the development of available resources, including such projects as the dams on the Nile and the Euphrates. New areas of land were reclaimed at high cost and high-yield crops were introduced along with fertilizers and insecticides; but that effort was not enough. During the seventies, work started on the formulation of regional programmes for achieving self-sufficiency.

28. During the discussion that followed the presentation of the paper, a number of points were raised concerning obstacles to agricultural development in the region, including the presence of the Zionist entity and its supporters, the impact of land reform and its application in some countries and the emergence of a new class which did not properly utilize the land given to it. Reference was made to the fact that the United States had effectively ruined the agricultural sector of most developing countries through its huge production and control of prices. It was also pointed out that the preoccupation with industrialization and technology and the belief that these were indispensable to development had resulted in the neglect of agriculture. The suggestion was raised that a uniform Arab land reform law be adopted in order to avoid the pitfalls which some Arab countries had encountered. Questions were raised concerning the relationships of production and the forms of ownership and the impact of these factors on agricultural under-development in the region and the real reasons for the failure of land reform.

**Study of the Development and Management of Water Resources in the ECWA Region (E/ECWA/ENV/WG.16/4) (agenda item 6 a)**

29. In the presentation of this paper, the region's water resources were classified according to their different sources: rainfall, surface water, groundwater, recycled drainage water, fresh water and sewage water. The region was divided into hydrological sectors: the Arabian Peninsula, a "central" sector and a "western" sector (Egypt). In the first sector, annual rainfall was estimated at 231 billion m<sup>3</sup>, surface run-off at 5.2 billion m<sup>3</sup>, surface run-off 13 billion m<sup>3</sup> and groundwater 7 billion m<sup>3</sup>. In the western sector, annual rainfall was 15 billion m<sup>3</sup>, surface run-off 365 million m<sup>3</sup> and groundwater 3.7 billion m<sup>3</sup>.

30. The author then proceeded to an elaboration of the exploited, available and prospective water resources of each sector, pointing out that the total quantity currently utilized did not exceed 117 billion m<sup>3</sup>, of which 104 billion consisted of fluvial, 4 billion surface run-off, 9 billion underground and 143 million m<sup>3</sup> desalinated water. Possibilities for the development of existing water resources in the ECWA countries were discussed, with special reference to horizontal agricultural expansion. Cultivated areas under irrigation could be increased from 5.1 million hectares today to 7.3 million hectares by 1985 and to 12.5 million hectares by the year 2000. The water resources needed for that expansion would come mainly from the rivers of the region. The development of river water was a relatively simple task.

31. The study went on to describe the regional problems confronting water resource development projects. It identified the problems that would have to be overcome to pave the way for the integration of water and land studies, the unification, integration and co-ordination of water and land management; the strengthening of water administration, the determination of optimum water requirements; and integration of water use integrated.

32. The study also took up the environmental impact of these problems and the degree to which this fact should be taken into account in development planning. Examples of the environmental impact of development projects were given. These covered transformations in water basins, reservoir embankments, water quality, and public health; changes in society, social behaviour, social relationships and living patterns; regional migration; changes in the distribution of animal resources, in surface and groundwater levels, soil fertility... etc. All these factors should be duly weighed in studies, plans and project preparations prior to implementation.

**Case Study on the Aswan High Dam (Egypt): Its Impact on the Environment and its Side-effects (E/ECWA/ENV/WG.16/6) (agenda item 6 b)**

33. The presentation began with the observation that the Nile was the principal water source of the western sector (Egypt). Before the High Dam was built, the flow of the Nile was erratic and unpredictable and its level varied constantly. The High Dam was conceived as a project to replace the system of yearly storage then in force with a system of perennial storage. Studies on the High Dam project were reviewed in detail; in fact, the High Dam was the most intensely studied project of its kind in the world. Those studies covered, *inter alia*, the soundness of the project, the problems of sedimentation and losses (evaporation and reservoir seepage and absorption during replenishment) and the problems related to Nubia following its inundation under the waters of the Dam reservoir...

34. The paper presented extensive data on the technical specifications of the High Dam and its impact, indicating that it was one of the largest projects of its kind and that it created one of the biggest man-made lakes in the world. The benefits that Egypt had expected to derive from the High Dam and the benefits that actually accrued therefrom were examined in detail. The Dam produced returns many times the value of its cost; in fact, its returns for a single year approximated the total cost of the project.

35. The author went on to analyze the impact of the High Dam on the environment. He claimed that all possible side-effects had been considered before the Dam was constructed and that its actual side-effects, which had been monitored by scientists over the years, had proved to be less damaging than the planners had anticipated. The study indicated the changes that had taken place in over-all evaporation rates, sedimentation, soil fertility, and the availability of construction materials (resulting from silt deprivation); evaporation, seepage and absorption losses from the Dam reservoir; and water quality and shoreline erosion. It pointed out that doubts had been raised as to the feasibility of filling the reservoir to full capacity. It analyzed the impact of the Dam in terms of endemic diseases, the emergence of aquatic weeds, wasteful irrigation practices, the loss of the Nile's sardine schools, etc.

36. Egypt and the Sudan had reached agreement on a fair apportionment of the benefits of the High Dam project. That co-operative effort, which served the interests of the peoples of both countries, was an example of successful co-operation between neighbouring countries that should be drawn upon by other countries of the region.

**Present Trends in Industrialization and Urbanization and their Economic, Social and Environmental Implications (E/ECWA/ENV/WG.16/7) (agenda item 7)**

37. The author of this paper argued that the pattern of industrialization in the ECWA countries could not be identified on the basis of the objectives described in their development plans. Those often embodied a multiplicity of

major strategic industrialization objectives which seemed to be destined for simultaneous instead of alternative application. Examination of the structures of the manufacturing sector and of the protection systems in force revealed that the prevailing industrialization pattern was that of import substitution — more specifically, consumer import substitution.

38. The features of the prevailing industrialization pattern included a bias in favour of consumer industries, balance of payments pressures, resource allocation imbalances, inferior performance standards, the creation of imitative industrial sectors, and international marketing difficulties.

39. The major issues or problems in industrialization were identified as the semi-stagnation of existing industrial sectors, the limited size of markets and the location of industry.

40. In the discussion of urbanization and the urban environment it was pointed out that industrialization and urbanization were parallel, interacting processes. Urbanization in the ECWA region was growing rapidly, due to the high rates of rural-urban migration in the absence of proportionate decreases in natural urban growth rates.

41. In contrast with the experience of the more developed countries during and following their industrial expansion, urbanization in the ECWA countries was characterized by the influence of push factors. Urbanization in the region was producing two major adverse effects: persistent urban migration despite unemployment and over-employment in the tertiary (or service) sector. Conversely, it was producing no noticeable positive effect — for three major reasons: the growth of migrant ghettos in urban centres, the restricted nature of urban-rural interaction and the limited number of urban centres.

42. In discussing the main effects of industrialization and urbanization, the participants noted that even the relatively capital-poor countries employed high capital-intensive technology imported from the more advanced countries. This technology had been designed in accordance with the comparative advantage which the advanced countries enjoyed in the ratio of the factors of production. Experts and research centres in the ECWA region were urged to devote part of their efforts to the creation of a technology that accorded with their own factors availability patterns. Research could make use of two sources: national and traditional technological know-how and western technological know-how.

43. The industrialization policies of the ECWA countries did not help narrow existing gaps in income distribution. This was evident from the effects of current technology on income, the effects of inflation on the price of industrial goods and the terms of trade governing the exchange of industrial and agricultural products.

44. Proceeding to the impact of industrialization and urbanization on the environment, participants pointed out that the high rates of internal migration to the cities and the concentration of urban and industrial growth in limited areas had had an adverse effect on the environment: major cities expanded to encroach on agricultural lands, rural areas were deprived of a large proportion of their youth, the housing construction and service sectors failed to keep pace with the growth of urban centres, pollution increased due to the accumulation of industrial waste and investment costs in the public sector soared. The avoidance of adverse economic and environmental effects arising from urban-industrial concentration called for regional planning aimed at rationalizing the location of industries and, consequently, population distribution.

45. It was recommended that the countries of the region should pursue an industrialization policy that would simultaneously achieve the following two objectives: securing the essential needs of the population, especially low-income groups, and rationalizing resource allocation so as to increase national product.

#### **Environmental Implications of Oil and Alternative Sources of Energy in the ECWA Region (E/ECWA/ENV/WG.16/5) (agenda item 8)**

46. The main thrust of this study was that the vast wealth generated by oil had boosted per capita income to the point where it was one of the highest in the world. That created a consumer society **par excellence** bent on acquiring material goods. The pressure for immediate spending on different projects resulted in the emergence of numerous problems, such as inflation, congestion, social tension and illegal practices. Inflation was also exported to the non oil-producing countries of the region.

47. In view of the impossibility of avoiding pollution altogether, governments had to choose between protection of the environment and social needs. Pollution due to oil operations should be contained by avoidance of spillages and careful supervision during drilling. Countries of the region had a large number of off-shore wells which caused pollution due to operational and accidental spillages. Such spillages should be kept to a bare minimum. The production water injected into wells to maintain the pressure for steady oil flow, the ballast water of tankers and the rainwater drained off contaminated surfaces should all be treated. Marine transport was responsible for a full one-third of oil spillages at sea. Tanker accidents, resulting in massive oil spills which could cause very severe damage to the marine environment, were a major source of marine pollution. Efforts were being made to improve navigation procedures. There were a number of conventions for the prevention of marine pollution, but a number of ECWA countries had not yet signed or ratified them.

48. Leakage from oil pipelines on land created a number of hazards, such as fire, explosions, contamination of

groundwater supplies, damage to the environment and damage to underground utilities. Pollution problems were also caused by refineries, such as unpleasant sensory pollution, air pollution from refinery emissions and water pollution due to the dumping of effluents into rivers, lakes and seas without proper treatment. Noise suppression could be accomplished by silencers, noise barriers or by the redesign of equipment to reduce gas velocity and mechanical noise. Stringent laws and regulations governing environmental pollution should be enforced, with tougher standards regarding emission and allowable pollution. Motor vehicles were considered one of the main contributors to air and noise pollution, as well as a source of congestion and accidents. Petrochemical industries posed a serious health hazard.

49. There had been regional efforts to combat pollution, and three agreements for the protection of the Mediterranean had been signed. Lebanon had ratified those agreements and the Mediterranean Action Plan was being implemented in co-operation with the European Economic Community. Eight countries of the Gulf approved those agreements in 1978 in order to promote environmentally sound development through joint action. A Bahrain-based emergency aid centre was set up to co-ordinate action against oil spills by establishing a permanent pollution-monitoring system to identify the origin and size of oil spills and to police uncontrolled dumping and waste disposal into the waters of the Gulf. An action plan was also adopted to assess the state of the environment, develop guidelines and legal instruments and devise national and regional institutions.

50. The annual production of oil had increased steadily over the past twenty-five years and that upward trend was expected to continue. Oil was a scarce and depletable resource and its rate of depletion had been accelerated far beyond that need to meet the development needs of the exporting countries. This had been accomplished for the benefit and rapid growth of the world economy, particularly the industrialized countries whose consumption patterns involved much waste and were based on the irrational use of energy. The interests of the leading oil-producing countries demanded a conservationist approach in order to maintain oil prices and to limit the rate of depletion.

51. New patterns of development in the oil industry should take these environmental problems into consideration. It was proposed that oil-producing countries make the sale of crude oil and its derivatives contingent upon the transport of a specific proportion aboard tankers owned by the producers. The utilization of natural gas in the area could be increased and the huge reserves of unassociated gas could be exploited. Alternative sources of energy should be examined with the aim of identifying and promoting alternative patterns of development and life styles. The region was still in the experimental stage and only a few steps had been taken with regard to the practical application of solar and nuclear energy. There were good prospects in the region for the use of geothermal energy and biogas. The idea of creating an "Arab Solar Research Centre" or an "Arab Solar Energy Commission" had been advanced.

52. It was noted in the closing remarks that it was necessary for the ECWA countries to adhere to the relevant international conventions and to introduce anti-pollution legislation locally. An assessment of the state of the environment should be made in the light of the socio-economic needs of the region. The pitfalls of Western industrialized society, which had opted for purely material values based on consumption, increased urbanization and standardization, with the resulting loss of cultural and traditional values, should be avoided. It was important that development of oil resources should be geared to the legitimate needs of the region and to the interests of future generations. Oil-producing countries should play a more direct role in the marketing of their crude oil. They should move down-stream into the refining and shipping of their products, so that they would not remain mere exporters of crude. The Organization of Arab Petroleum Exporting Countries had accomplished much in that field.

#### **The economic, Social and Environmental Implications for the ECWA Region of Present and Future Trends in International Relations (E/ECWA/ENV/WG.16/2) (agenda item 9)**

53. This paper was based on the need for new approaches to development and life style patterns. That need stemmed from a growing realization, especially in the Third World, that the traditional concepts and patterns which still prevailed had failed to meet growing human needs and basic demands. Dissatisfaction had focussed on the prevailing world economic order and on the under-utilization of resources, with consequent, "distorted development", socio-economic problems and socio-political imbalances. The source of that dissatisfaction was in the relationship between the Third World and the advanced industrial countries which were the centre of gravity of the world economic order.

That relationship was characterized by the marginal position of the Third World, its inequality with the industrial world, the uneven distribution of the benefits of the international division of labour, the improper utilization of world resources and the serious inability of the Third World to translate into action its determination to rectify the distorted world order.

54. The ECWA region and the Arab region as a whole naturally shared that concern with the Third World (and with some enlightened sectors of the advanced industrial world as well). The paper, as evidenced by the title, dealt specifically with the international relations side of the issue and its implications for the social and economic life of the region and its physical environment.

55. The paper proposed to examine first of all those developments which were relevant to both the industrial countries and the ECWA region. Four major developments were evident: The first was the exaggerated emphasis which

the industrialized countries placed on growth rates on sustaining growth as an end in itself and as a prime indicator of development. This emphasis, which was copied by developing nations despite its drawbacks, led to the accelerated depletion of natural resources and to their utilization without adequate consideration of the impact of policy on the public interest. This applied to both the content of production and the content of consumption. The corporate giants of the "market economy" of the industrialized world and its marketing, advertising and publicity agencies together promoted goods and services that the consumer did not need and that he would not have demanded on his own accord. They lured him into buying things by convincing him that he wanted and even needed them. This practice resulted in the unnecessary depletion of natural resources. In the ECWA region this practice was most harmful in the area of its non-renewable hydro-carbon resources.

56. Secondly, the rapid technological progress of the industrial world was dissipating resources in the pursuit of technological innovations, modifications and inventions, many of which were unnecessary. Many goods and services could be used or drawn upon for many years without design innovation.

57. Thirdly, there was the relentless development of weaponry. Aside from the moral implications latent in a "technological explosion" in the arms industry and the danger it posed to mankind, there was the problem of the rapid obsolescence of armaments, which consequently ensured a steady flow of new weapons orders in the direction of the industrialized nations. Naturally, this trend squandered sizeable human and material resources which could have been used to meet much worthier needs and demands.

58. Fourthly and finally, there was the institutional problem of the growing power of multi-national companies. These companies, with their control of production and marketing, played a major role in the formation of the production and consumption patterns of the Arab world and the Third World as a whole. As a consequence, resources were being depleted ever more rapidly in response to a profit motive that excluded all considerations of social well-being. The increasing production demands also led to greater pollution of the environment. Pollution, in turn, led some giant companies to transfer many of their highly polluting industries to Third World countries. That was done under the cover of a brilliant tactic wherein those countries were made to welcome these industries in the name of increased employment opportunities and foreign currency earnings.

59. The four features outlined above had left their mark on the development patterns of the countries of Western Asia. The emphasis on growth, accompanied by an inadequate concern for genuine, balanced development (the first feature) led to the slowdown of agriculture and its increased inability to meet the food needs of the population. In addition, development not guided by carefully considered policies led to an imbalance in the population distribution between rural and urban areas, the congestion of cities and the failure of city services and utilities to meet the minimum service needs of the population. It also led to a spurious and sluggish industrial development and to the emergence of service sectors which had high growth rates but low or even negative social significance.

60. The imitation of the production and consumption patterns of the advanced industrial countries and the lack of creative vision and sound economic policies (the second feature) resulted in a failure to meet basic socio-economic needs and national and regional interests to the extent expected. Unhealthy conspicuous consumption patterns emerged, especially in the oil-producing countries. Only the oil sector, apparently, was merged into the national economies, while the dependence of these countries on the outside world in terms of imports, exports and investments had actually increased. Moreover, the volume of oil production gave the impression that that resource was being depleted at an unjustifiable pace.

61. The third feature was related to the anxiety of the countries of the region over the low level of local technology and a determination to remedy the situation as soon as possible. That determination, however, was coupled with a useless concept, that of the so-called "transfer of technology". In addition to being deceptive, this concept distracted attention from the proper approach to the issue of technology. The proper approach involved acquiring and adapting technology within a suitable framework. Social acceptance of technological change had to be increased such that technology would rest on an indigenous material and cultural foundation and that capacities would be developed so as to make the best use of a society's resources.

62. Finally, the fourth feature was the impact of international relations on the foreign trade of the region. While the value of the region's imports from and exports to the whole world had increased tremendously, the ratio of inter-regional trade to total trade had dropped sharply in recent years to fluctuate between five and nine per cent for both imports and exports. The trade pattern in which exports were generally confined to one basic commodity, whereas imports covered a wide range of goods, was maintained. The total value of the combined imports and exports of oil-producing countries during the seventies exceeded their national income but in non-oil countries it represented four-fifths of the national income. The ratio rose in both groups starting in 1974. In 1973, the value of non-oil exports of oil-producing countries was only 11 per cent of the value of imports, a development warranting serious concern.

63. Following an analysis of foreign aid and its evolution, the paper concluded with a summary of the implications of the current situation for regional development and co-operation policies. These are merely listed below, without

elaboration, but are formulated to indicate the policies entailed:

1. Defining the basic interests of society through study, orientation and intellectual mobilization and formulating development guidelines compatible with these interests.
2. Re-organizing the social structure to serve basic social needs, without this implying the adoption of any ideological stance. This new structure would be responsive to the conditions, needs and culture of society and its creative capacities.
3. Re-orientating education and training to make them compatible with development needs and with the regional need for greater self-reliance.
4. Acquiring appropriate technological capacity.
5. Expanding opportunities for gainful employment, a matter which should be given top priority in development.
6. Re-structuring consumption and production patterns in a manner compatible with actual needs and resources.
7. Increasing co-operation and economic integration among the different sections of the region in order to benefit from the economy of scale this would make possible in terms of development, foreign relations and optimum use of resources, notably oil and gas.
8. Participating in the re-organization of the world economic order so that it would provide for the more equitable distribution of work and benefits and the more effective use of resources. Lively and continued dialogue between the "North" and the "South" was important in avoiding a confrontation that would waste resources and threaten stability.

### Country Papers (agenda item 10)

64. The delegation of the Arab Republic of Egypt presented a paper on regional co-operation and development strategy. The paper noted that the subject of regional co-operation could only be discussed within the context of a clear vision of present socio-economic capacities and future socio-economic capacities and future socio-economic objectives. The primary objective should be the development of production through the establishment of joint projects and the optimum exploitation of regional resources. This should be accompanied by the co-ordination of plans and other efforts of member countries with a view to formulating a general co-operation, integration and development strategy. Such a unified development strategy should aim, *inter alia*, at the construction of modern economic infrastructures in all countries of the region, the full utilization of their human potential and financial surpluses, the intelligent application of technology to help accelerate growth rates, optimum investment in and exploitation of natural resources to meet the food crisis the promotion of social development and the formulation of a new world economic order.

65. The delegation of the Palestine Liberation Organization made an oral presentation of the destructive consequences of the Zionist occupation of Palestine: the damage to the environment, the expulsion of the Palestinian population and the deprivation of rural areas of health, educational and cultural services. The diversion of the River Jordan had inflicted damage on the farmers of the area. Israel's take-over of the waters of the Auja in the Jericho area and their diversion to its own settlements had resulted in the destruction of numerous orchards and the squandering of natural resources. The historic identity of the city of Jerusalem was being effaced through the construction of concrete buildings that formed a belt of monstrosities around it and through the constant expulsions of its original inhabitants and their replacement with foreigners. The danger that water resources would be gradually diverted to the benefit of the Zionists was pointed out. Member countries were urged to condemn these policies, which were fraught with negative environmental consequences.

66. The Lebanese delegation presented a brief report on environment-related activities in Lebanon. The report began with an historical review of the long-standing Government policy of rationalizing the utilization of agricultural and construction land, the provision of preventive health care and the drafting of environmental protection legislation. The National Council of Scientific Research had been charged with the task of drafting a position paper on the constitutive elements of the environment and taking the necessary action through appropriate government departments. The Council had participated at numerous international meetings and conferences on the environment at which several international conventions had been adopted. The council had studied the state of the environment in Lebanon and its current trends. Those studies included the problem of atmospheric pollution in the cities, the quality of the water supply, the state of natural flora and fauna, pollution of the sea, contamination of foodstuffs etc. Findings had revealed that the Lebanese environment had reached the danger point in only a few areas, such as the pollution of beach and marine areas. The trend, however, was towards growing deterioration of the environment due to the haphazard development of industry, urban sprawl and the gratuitous destruction of flora and fauna. The Council, despite the on-going war situation, was in the process of executing a number of environmental research and survey projects. The delegation stated Lebanon's conception of the interaction between development and the environment, stressing the principle that man was the central element in the environment, whose protection was not an end in itself but rather in the interests of man. Development of man both as an individual and as a community required an environment that was conducive to

those objectives. Proper action must be informed by a knowledge of the laws that govern the environment, a respect for those laws and their implementation so as to preserve the right balance and avoid the deterioration of the environment. Action should aim ultimately at meeting the spiritual and material needs of individual and society. Human development should encompass both qualitative and quantitative elements. Happiness was not founded on the growth of material consumption; spiritual and emotional alternatives existed and warranted consideration. Economic and social development was based on the spirit of human initiative and discovery. The education of the up-coming generations had to be oriented towards those values. Comprehensive development which respected both the qualitative and the quantitative in society as well as the laws of ecology was the only means for moving mankind towards a better future. Comprehensive development should work towards a balance among the different elements of economy and society and towards a "natural" distribution of the population between urban and the rural areas — i.e., among the agricultural, industrial and services sectors. The utilization of the fruits of modern scientific and technological progress was a contemporary necessity in the effort to further a development that would liberate mankind from the machine and from a number of material obstacles and impediments so that men can devote more and more of their energies to intellectual and spiritual activities.

## CONCLUSIONS AND RECOMMENDATIONS

### I. Economic development strategy

The seminar made the following recommendations concerning the economic development strategy of the ECWA countries for the Third Development Decade:

#### 1. Self-reliance

Self-reliance does not mean self-sufficiency. It means, rather, reliance on one's own available resources, first and foremost of which are human resources. It presupposes democracy and popular participation in decision-making and demands a joint developmental effort among the countries of the region, especially in the productive sectors.

#### 2. Meeting basic needs

Development should be oriented to securing the following material needs: wholesome food, decent clothing, suitable shelter, facility of movement, culture, education, health and the right to employment. These basic needs also include non-material requirements such as the enjoyment of the fundamental freedoms that promote self-development, active participation in decision-making and the exercise of the principle of local management at the village and production unit level. Basic needs are dynamic in nature; they grow as they are satisfied and represent a critical objective of development.

#### 3. Selection of appropriate technology for economic development

The technology selection process calls for an ideal combination of the element of production. The technology selected must be capable of achieving the greatest possible utilization of available resources without prejudice to environmental considerations. Finally, the appropriate technology must be in harmony with the authentic cultural values of the society it is intended to serve. Accordingly, the seminar stresses the need for prompt action for the establishment and development of an independent scientific and technological base through the joint efforts of the countries of the region.

#### 4. Sound environmental management as a basic element of development planning

Development strategies should be given an environmental imprint from their very inception; for sound environmental management is an essential component of development planning requiring for the rational development of natural resources, life styles and human relationships.

#### 5. Production and consumption patterns

Production and consumption patterns need to be thoroughly reviewed and brought into line with genuine needs and demands ordered to accord with the economic and cultural realities of the countries of the region in order to promote the sensible utilization of resources and the rationalization of both production and consumption.

#### 6. Economic, financial and customs policies

Economic, financial and customs policies should be co-ordinated within comprehensive development plans in order to bolster the trend towards the economic integration of the countries of the region.

#### 7. Financial co-operation

The seminar recommends that countries of the region strengthen financial co-operation between countries rich in human, agricultural and industrial resources and countries rich in financial resources in order to serve the interests of integrated economic development and to open up genuine, guaranteed investment opportunities.

#### 8. Replacement of prevailing economic order

Efforts should be made to change the international economic order so as to obtain for the ECWA region, as well as for the other regions of the Third World, its fair share in the international division of labour and the distribution of the benefits of economic transactions; so as to more efficiently utilize resources and avoid waste and pollution; and so as to eliminate the state of economic and technological dependence of the region.

#### 9. Academic and vocational instruction

Theoretical and applied academic and vocational training should be rationalized so as to:

- (a) Raise the standards of human achievement.
- (b) Improve awareness of environmental issues.
- (c) Raise the level of economic performance.
- (d) Liberate the human potential of the Arab individual who is both the end and the means of development.

## **II. Land and water management**

Since agriculture is still the major source of livelihood for most people in most ECWA countries, its proper development should be the cornerstone of any overall development strategy. During the 1980s, it will be necessary to raise the annual rate of growth in agriculture from the present 2.6 per cent to a minimum of 5 per cent per annum in order to keep pace with growing food demand. This can be achieved by the following means:

- 1) Better planning of land and water use in order to intensify crop production, reduce fallow areas and narrow the gap between food production and demand;
- 2) Control of soil depletion, erosion and desertification through proper land use, rational land and water management and sound conservation practices;
- 3) Control of soil salinity and waterlogging in irrigated areas through proper irrigation practices, drainage systems and rational water use;
- 4) Control of desertification through better management of the eco-systems. This would mean controlling grazing, planting shelter belts, and leaving unploughed those areas receiving marginal rainfall (less than 25mm/annum) which should be left as permanent pasture land;
- 5) Development of rural institutions, including credit unions, co-operatives and extension services, and the training of farmers in soil and water management;
- 6) Extension of irrigated areas through rational water use and long-term storage. This will result in more stable food production which is less subject to annual variations in climate and rainfall.
- 7) Since groundwater is the main water source in many ECWA countries, a joint effort should be made by countries of the region with common aquifers to assess the potential of this resource and to set up a sound utilization policy.
- 8) Since the major portion of cultivated land is still under rain-fed agriculture, more attention should be given to a better management of agriculture in rain-fed areas.
- 9) It is essential to stop the encroachment of buildings on agricultural land and to reduce the flow of rural-urban migration. This can be achieved through an integrated rural development strategy of which agricultural development is only one element.
- 10) Since the future challenge facing the region will be in meeting a growing food demand and narrowing the food gap, an integrated regional development strategy should be established based on production specialization which takes into account ecological considerations. Balanced development (agricultural and non-agricultural) will maximize the benefits deriving from an overall development strategy. The proportion of total investment going into agriculture should be greatly increased in both national and regional plans.
- 11) The intensive development of agriculture will have negative effects on the environment resulting from the increased use of fertilizers and pesticides, the intensive cropping of land, the extension of irrigated areas, prolonged storage, etc. These negative effects should be reduced through a better land and water use policy.
- 12) The extension of forested areas and the conservation of existing forests should be promoted because of their salutary impact on the environment.

## **III. Industrial development strategy**

In this area the seminar made five general recommendations.

1. The industrial development strategies of the ECWA countries should give top priority to the following objectives:
  - (a) Securing the basic needs of the population, particularly low-income groups.
  - (b) Rational allocation of resources in the selection of production techniques.
  - (c) Accelerated shift from the prevailing imitative industrialization pattern to a more creative pattern, thereby rationalizing the distribution of scarce resources among the different industrial sectors.
  - (d) Limiting the negative ecological effects of industrialization and promoting optimum environmental conditions in the vicinity of industrial establishments.
2. Scientific research and science and technology centres in the ECWA region should be supported and provided with the quality of skilled manpower they require in order to free themselves from the technological dependency that thwarts all efforts at genuine, independent development.
3. The ECWA countries should give greater attention to man as the artisan of development; hence the importance of administrative development and the review of educational and vocational training curricula in arming the Arab individual for independent development.
4. The principle of comprehensive and balanced should be adopted as a basic component of socio-economic planning mechanisms. The purpose is to make sure that the comparative advantages of the developmental resources of different regions of a single country are recognized and exploited; that all regions are included in the development effort and receive an equitable share of its fruits; that rural-urban migration is stemmed and that the geographic

concentration of industrial and service facilities with its negative implications is avoided.

5. Economic and social development policies should be oriented so as to protect the rural population, combat poverty and rural-urban income disparities and promote the equitable distribution of the fruits of development among all categories of society.

#### **IV. In the area of oil**

It is recommended that:

1. Those ECWA countries which have not yet done so, adhere to the relevant international conventions for combatting pollution, especially the 1973 International Convention for the Prevention of Pollution from Ships;
2. Full support be given to the Mediterranean Action Plan and the Gulf Action Plan to combat pollution;
3. Local anti-pollution legislation be introduced;
4. Wasteful patterns of consumption be avoided;
5. Excessive depletion of oil resources be avoided and their development be geared to the legitimate needs of the region and to the interests of future generations;
6. The oil-producing countries of the region participate more equitably downstream operations of shipping, refining and marketing;
7. Future plans be made for the increased use of renewable and recyclable resources, especially solar energy and that an Arab Solar Research Centre be created.

#### **V. Condemnation of Israel industrial and agricultural policy**

The seminar directs attention to the dangerous consequences attending the diversion of Arab waters to Israel, *condemns Israeli industrial and agricultural policies for their harmful effects on the Palestinian environment: These effects include the pollution of the seashore and the atmosphere as well as the depletion of natural and animal resources.* The seminar also condemns those practices that aim at arresting the economic, social and cultural development of the Palestinians by forcing them to emigrate, by depriving them of educational and health services, by cutting down their forests and by diverting their irrigation waters to Israeli settlements.

#### **VI. Recommendations for future studies**

The seminar recommends that the ECWA secretariat in collaboration with UNEP carry out the following studies:

1. An exhaustive study of the economic relations between the ECWA countries and the external world, with special reference to the industrialized countries. The study should aim at the promotion of greater collective self-reliance among the countries of the region.
2. Additional studies on the basic needs of the region (understood in their dynamic sense), such as food security, clothing, shelter and social services. These studies should identify the needs of each of the countries of the region and should propose strategies for meeting these needs in the foreseeable future.
3. A comparative study of the different social and economic patterns of the countries of the region so that the advantages of each can be put at the disposal of all.
4. Additional research on integrated rural development. A better balance between industrial and agricultural development will further the objective of an improved rural environment.
5. Additional studies aimed at the formulation of a unified Arab strategy for furthering the independence of the region through food security.
6. Studies on the development of solar energy as a means of reducing both environmental pollution and dependence on such a non-renewable resource as oil.
7. A study of the impact of vastly increased Arab financial resources on the Arab environment, especially the way the expenditure of these funds, accumulated rapidly in recent years, has precipitated population movements, the exploitation of natural resources and transformations in consumption and production patterns.
8. Additional studies of the implications of self-reliance taken to mean enhanced local production capabilities, increased relations among the developing countries and the promotion of a new world economic order more compatible with the social and economic development requirements of the developing countries. This sense of the word should be opposed to the notion of self-sufficiency or isolationism.
9. A long-term study of the prospects for social and economic development in the region over the next two decades and the anticipated problems for which solutions may be formulated in advance.

10. Up-dating those country and regional studies in the hands of international and regional organizations (such as ECWA and the Arab League's IDCAS) which relate to the industrial problems of the public and private sectors and proposing resolutions for those problems at the country level.

## **VII. Adoption of the final report**

The seminar adopted its final report at the closing session held on 25 January 1980.

**PART TWO**  
**WORKING DOCUMENTS**

**A KEYNOTE AND AN OVERVIEW PAPER**  
**by**  
**ISMAIL SABRI ABDALLA<sup>★</sup>**

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★ Consultant, former minister of planning, A.R.E.

## PREFACE

### A TUMULTUOUS ECOLOGICAL HISTORY

People of the ECWA region ought to be sensitive to environmental issues. All through their long and well known history, they have been used to deal carefully and cautiously with Nature. It has never been so generous as to allow for a relatively easy life on its spontaneous fruits, nor so harsh as to inhibit man's effort and inventiveness. It has always called for and responded to his endeavours provided they did not provoke disruption of its course. Mistakes in estimating the carrying capacities of its biological systems and the inconsiderate intervention of man were at the origin of major catastrophies that destroyed flourishing civilizations and dispersed erstwhile prosperous populations.

At the dawn of their history during the last glacial period, deforestation of the light woods remaining around the Mediterranean, which exceeded their reproduction capacity, decreased rainfalls considerably, and made survival possible almost exclusively only in areas close to rivers, where irrigation became the main way to sustain life. Later misuse of irrigation without adequate drainage increased the soil salinity and reduced its permeability. This fact together with gradual shifts of the rivers' courses accounts for the collapse of the early civilizations in Mesopotamia. Fabulous cities, like Babylon, were abandoned; people migrated to more promising areas with all the conflicts and wars that marked the ancient history of to-day's Iraq, Syria, Lebanon, Palestine and Jordan. More recently the Mongol invasion led by Holagu Khan (13th century) completed the destruction of the irrigation systems. The present day desert still traces of irrigation canals and remnants of historic cities, retains side by side with poor quality soil defying land reclamation efforts. In the extreme south of the ECWA region, a not too remote event, the fall of the Maareb Dam in Yemen, explains the impoverishment of Arabia Felix and the population movements that upset the Arab Peninsula and its immediate neighbours. The role of devastating floods and the cult dedicated to some rivers (the Nile for instance) in the ancient faiths of the region underline the place of environmental events in the spirits of our ancestors.

The Arab Renaissance (Al-Nahda) has been to a great extent a national reaction to Western conquest and domination. It had from the outset the typical ambivalence that usually characterises the sentiments of the conquered toward the conqueror: rejection coupled with imitation. While Arab identity was asserted in moral values, language and literature, it was implicitly assumed that modernization is equated with westernization. Consequently, economic growth and even global development were conceived as a kind of "remake" of the historical pattern of the West, as if the process of development were not value loaded. Amazingly, when ecology became fashionable in the industrialized nations, the elite in the region took interest only in some aspects related to pollution. More thoughtful people started to worry about the exhaustion of depletable natural resources (oil in the first place), while the majority of the population trapped in poverty did not dream about such a luxury as the quality of life.

Meanwhile, the consequences of the insertion of the region into the world economy and the impact of population growth have produced some noticeable environmental effects calling for assessment and careful management. The increasing food needs, in conditions of a more or less world wide severe food shortage, drive towards more intensive agriculture, and greater efforts for land reclamation with the usual corollaries: irrigation projects, chemical inputs, mechanization... etc. The oil resources gave birth to mushroom cities in some desert areas, while the inflow of oil revenues brought a real cultural shock with direct effects on styles of life. Urban centres all over the region tend to swell in a cancer-like manner, inordinately and non-functionally. Here and there, extreme wealth and extreme poverty pose serious threats to the environment. It is high time to subject the complex relationship between environment and development in a multi-purpose exercise aimed at:

- raising public awareness of environmental issues;
- assessing the actual development practices and trends against sound environment management principles;
- identifying, whenever necessary, alternative development strategies and life styles more compatible with the aforementioned principles.

Following the same sequence, this paper deals first with environment as a newly perceived dimension in human life and progress, pulling together the variety of complex issues related to the topic. Thus, the summing up and assessment of development performance can be viewed in the particular light of this development-environment relationship. The last part of the paper is devoted to alternative patterns of development and life styles.

## CHAPTER ONE

### THE ENVIRONMENT IMPERATIVE

#### I. From the Notion of Pollution to that of Quality of Life

The first environmental phenomenon to draw public attention in the industrialized nations was "pollution", especially in the big cities and industrial areas. Location of industrial activities obeyed the rule formulated as a law by A. Marshall "Industry attracts Industry". The outcome has been, in most countries, zones of high industrial density and others recognized as relatively "under-developed". Industry required the parallel growth of other activities (transportation, communication, storage, as well as marketing activities, finance and other tertiary activities); and cities in the industrial areas or neighbouring them grew into big metropolises. High concrete buildings, unprecedented population densities, private cars and other energy using devices, and the virtual disappearance of green spaces produced various forms of pollution and nuisance. Forms of pollution included the famous London smog, the dead fish of the Rhine in the heart of Europe's Golden triangle, the increase of carbon dioxide (CO<sub>2</sub>) content in the air resulting from emission by industrial plants and motor vehicles<sup>(1)</sup>, the disturbance of climate regimes on a local scale resulting from both excess of CO<sub>2</sub> and waste heat, and which caused an increase in temperature, rainfall and thunderstorms<sup>(2)</sup>... etc. These were among the most obvious and worst forms of pollution in the major urban centres of industrialized nations. Escaping from the urban landscape for a brief change is no solution: the most beautiful beaches are often unusable because of oil spills (normal or accidental), the country-side has lost much of its charm and its products are sometimes contaminated by pesticides of all sorts, especially those containing persistent toxic chemicals<sup>(3)</sup>. At home, urban people hear about mercury polluted fish and shell fish inflicting the "Minimata disease" a virtually fatal illness<sup>(4)</sup>. Once awareness about pollution had been aroused, research proved that numerous chemicals used for instance by the food industry were cancerous. Dramatic side-effects of many current pharmaceuticals (e.g. Interferon bismuth...) were revealed. Furthermore, it has been discovered that some persistent toxic chemicals used as pesticides undergo a process of selective concentration as they pass through successive levels of food chains and food webs; their toxic effects become more noticeable in top carnivores. Thus in the UK tests in the same locality showed that human milk had 22.5 times more DDT than cow's milk<sup>(5)</sup>. Last but not least, accidents at nuclear power stations remind people of some of the serious environmental risks usually minimized by officials of that industry.

Besides the relatively well-defined notion of pollution, the term "nuisance" is used more and more to designate actions that disturb or perturb life in society without necessarily entailing casualties; for example noise, ugly buildings... etc. More positively, people started to think of ideas, measures and arrangements that may render living conditions less of a strain and/or less tedious. Hence, the worry about the "quality of life" as a notion from the quality of material goods and related services supposed to secure comfort and pleasure. For example large green spaces within urban centres contribute to the improvement in the quality of life, but one can not quantify the share each inhabitant gets from this improvement.

The second warning about the environment in the industrialized nations came with the publication in 1972 of the first report of the Club of Rome called "Limits to Growth". Based on a model built by Demis Meadows, the book questions the sustainability of growth given the pollution effects, and more important the exhaustivity of some of the basic natural resources. The "energy crisis" intervening a year later assured "Limits to growth" an almost unprecedented popularity for this otherwise difficult exercise. The issue of exhaustion became fashionable and many authors started to advocate "zero growth" as the only sound policy. In the meantime, the UN World Environment Conference (Stockholm, June, 1972) has tried to adopt a more balanced approach and to address itself to possible environmental policies of development for Third World countries. Without venturing to take part in the debate about how fast depletable resources will be exhausted, we retain only the basic fact that the sustainability of present patterns of material consumption as well as their generalization through the world raises serious doubts.

However, the consequent slow growth in the industrialized nations was not due basically to environmental

- (1) Without CO<sub>2</sub> in its atmosphere, the Earth would radiate all of the energy it receives from the sun, it would have remained as cold as the Moon. With too much CO<sub>2</sub>, on the contrary, it would become warmer and at the limit register temperatures too high for man's life. Vegetation tends to regulate the process by absorbing CO<sub>2</sub> and releasing Oxygen. Threats arise endangering this delicate balance by the reduction of vegetation or the excessive emission of CO<sub>2</sub> by the combustion of wood and fossil energy (coal and hydrocarbons) cf. J.C. COURVOISIER: "L'Aube Solarie, Ed. Favre, Lausanne, 1977, pp. 31 etc.
- (2) The 4,000 sq. miles of the Los Angeles basin currently generate thermal power equivalent to more than 5% of the solar energy absorbed by the ground. cf. OCEC INTERFUTURES Project, Midway Report, Chapter XIII. Paris, 1978. (rest. circulation).
- (3) Like DDT. R. CARSON: "Silent Spring" Boston 1962 and U.S. Secretary of Agriculture: "Control of Agriculture-related Pollution", Report to the President, Washington D.C., 1969, also OECD-Interfutures, op.cit.
- (4) The disease is named after Minimata bay in Japan where at least 41 people died from mercury poisoning due to eating of fish or shell-fish originating from the bay which was contaminated by waste containing mercuric oxide from an acetaldehyde production plant.
- (5) OECD-Interfutures, op. cit. p. 39.

considerations. The causes of recession could be identified more realistically. In fact, the "developed market economies" — an euphemism for capitalist industrialized countries that form the Centre of World economy — have great capacities for co-option of "revolutions" and internalization of issues. Except for the marginal groups of "ecologists"<sup>(1)</sup>, the system's response has been the production of pollution abatement devices, a fairly lucrative business in these times of recession. So far exhaustibility has been taken into account only when its spectre generates immediate or short term price increases. And even then, changes in life styles and production patterns so far are insignificant. The best evidence is the incapacity to limit the growth of hydrocarbon consumption in spite of the recent increase in the price of oil. Meanwhile, the most optimistic forecasts, those of W. Leontiff and his team in the UN study "Future of the World Economy", predict if not the extinction of important natural resources, at least substantial price increases due to growth of demand and rise of costs. On the pollution front, the study excludes dramatic environmental risks, provided that adequate policies are adopted. But it also foresees a steady increase in the cost of pollution abatement up to 5% of the GNP in some cases.

Puzzled by this state of affairs, the layman, and the decision maker absorbed by day-to-day problems, as well as the scientist entirely devoted to his narrow speciality start asking some odd questions. Are environmental threats the price man has to pay in order to enjoy the comforts of modern life? Are they built into the process of scientific and technological progress? (*The other side of the coin, the first being the spectacular achievement of the industrial and post-industrial age*). Under the growing stress of life in the "asphalt and concrete jungle" of modern cities, a good number of people dream about some return to "natural" life, imagined as simple and with less material goods but with better psychic balance. More estranged and superstitious people go so far as to see something diabolical in the uncontrolled technological developments which carry such risks as the extinction of life during a thermonuclear war or its evil manipulation through what came to be known as "biologic engineering".

But doomsday visions<sup>(2)</sup> are useful only in so far as they draw attention to threats of lesser magnitude. On the other hand, the kind of historical pessimism spelled out by Henry Kissinger<sup>(3)</sup> when he says that all civilizations are mortal and Western civilization is no exception, divert attention from the real causes of the crisis and lead to a kind of determinism. A closer look into the historical patterns or growth of Western<sup>(4)</sup> nations would be more constructive and less inhibiting especially for Third World nations. Without any claim to in-depth analysis or thorough multidisciplinary study, one can pinpoint some factors that have been at the origin of degradation or threats of degradation of the physical and socio-cultural environment in recent times.

## II. Environmental Dramas: Old and New

The environmental threats and crisis are by no means something entirely novel. In the ECWA region — as we have hinted in the first lines of this paper — we can see the scars of some ancient ecological catastrophies. We have lived with some other threats — like those linked to irrigated agriculture — ever since the first civilizations grew in Mesopotamia and the lower Nile Valley. The gold mines of Egypt have been exhausted by the Pharaohs and Noblemen so preoccupied with their burial ornamentation. Elsewhere on our planet ethnologists and historians can trace some characteristic misfortunes met by human societies through the very long struggle of man for better conditions of life. What is new then? Two things: The first is the increase in the numbers of mankind. The second is manifested in errors linked to prevalent patterns of development and life-styles.

### A. POPULATION GROWTH

As everybody knows, the rate of increase in world population in the last few decades has shown an impressive acceleration. An abundant literature — of varying quality — popularized this fact. The "population explosion" has even been presented as a threat to life on Earth, in the same way as thermonuclear war is. If the latter is more spectacular in terms of its sudden effect, the former is more likely to happen. Once more we will not take part in a debate that seems already "dépassé". Let us only state the main facts. As we shall mention later, the regular increase of any living community introduces significant disturbances in the ecosystem. If it passes the limits of tolerance, disruptions are unavoidable. Nobody can argue with the fact that demographic growth in the last decades achieved some unprecedented rates in many parts of our planet<sup>(5)</sup>. But population increases take place in developing countries and cannot account for environmental deterioration in the industrialized nations; something has gone wrong in the prodigious growth performance of the West.

As for the prodigious population growth rates registered by almost all Third World countries, we would like to remind you that the hominidae population, like that of any species, cannot entirely escape the laws of nature. In fact it has two stable equilibrium positions. One is at low income characterized by high rates of birth and death; and the other at high income with low birth and death rates. In both positions, the rate of "natural increase" is around 1%. The

(1) It is quite remarkable, nevertheless, that various ecologist groups have gathered more than 4% of the votes for the European parliament. In fact today's ecologists resemble socialists' in the first half of the last century; some utopian approaches and too many quarrels strain their credibility.

(2) See for a good example: Roberto VACCA. "The Coming Dark Age" English translation, Doubleday & C.N.Y. 1973.

(3) An interview in New York Times, Oct. 1974.

(4) By Western we mean European civilization and its offshoots in North American and Oceania, including therefore European Socialist countries.

(5) The Demographic and Fertility — Related Indicators of the World Bank's "World Development Report 1978" show a decline in the crude birth rate (1960-1977) in most countries.

"explosion" occurs where development efforts reduce death rates (mainly by eradication of epidemics and some endemic diseases), while the rise of living standards is not yet enough for spontaneous birth control. Obviously this is a situation of disequilibrium and consequently must not last for long. Either development performance is successful and the country approaches high income position, or the setbacks in development raise the death rate and the country returns to low income equilibrium. The UN has recently revised population forecasts and lowered them. Europe during its development experienced a similar phenomenon of ten masked by statistics that do not take into account massive emigration to the colonies.

## **B. WHAT WENT WRONG?**

### **1. A false assumption: the concept of natural resources**

Seven years after Stockholm, textbooks of Economics still mention "natural resources" as a production factor. The underlying assumption here is that those resources are limitless and sometimes here is that those resources are limitless and sometimes costless. In the first case, there is only a question of supply, demand and price. In the second, economists used to speak of "free goods", and to cite as examples: air and water. This was also illustrative of the concept of "scarcity" as the subject matter of both economic activities and economic theory. Nothing is more false than such an assumption. To-day economists should be aware that regular water supply for any use has a cost, especially if the water needed has to be more or less clean. Irrigation water can be chemically polluted when it does not help in agriculture; it may even damage the soil. Pollution abatement costs make air look like a commodity even though it remains a "public good". In fact, natural resources are either stocks or flows. Stocks, like fossil energy minerals and soil, took millions of years and major tectonic and geological events to be formed. Overdrawing on stocks leads to their exhaustion. Some of them cannot be replenished in any human time scale (e.g. fossil energy), and when their reconstitution is possible (in case of soil) it would be a very time-consuming and extremely expensive process<sup>(1)</sup>. The flows, or the so-called renewable resources, are renewable, all other things being equal so to say. Man's interventions can change their course, perturb their rhythm and in extreme cases disrupt the flow. The best example for this is provided by forests. Deforestation for agriculture animal husbandry and urbanization considerably reduced the forest areas in the World. Excessive use of wood and paper now threatens the life of the remaining wood lands. Let us recall here some facts about depletion and the risks of disruption:

— In the area of plant germ plasm, one out of every ten plants is either extinct or in imminent danger of extinction and over 20,000 species are now in need of protection<sup>(2)</sup>.

— Arable land suffers regular losses every year from non-agricultural land uses (urbanization, highways, airports... etc.). Thus, between 1945 and 1970 the USA lost 45 million acres of land, equivalent to the size of the state of Nebraska. According to other estimates, that country has lost at least 30% of the top soil during the past 200 years. In irrigated areas of the World, loss of productive soil due to water logging and salination is estimated at 200 to 300 thousand hectares a year<sup>(3)</sup>.

— While there does not seem likely to be a global water shortage in the coming few decades, the supply of fresh water is already becoming a serious problem in several regions. Moreover, the supply of potable water to the majority of the Third World population entails tremendous investments.

— Estimates of the life span of oil and natural gas vary between 50 and 150 years.

— Certain species of fish have already been overfished, and are showing a decline in population. The whale is in the same position... etc.

Behind the false economic assumption there was a specific cultural attitude towards Nature. Western culture in general viewed development as a process of increasing domination of Nature by Man, unlike the view of many oriental cultures. Attempts at rationalizing this attitude, by stressing the need to better understand the laws of ecosystems did not alter the main thrust.

### **2. Wrong modes of economic calculus: What costs and what benefits?**

Another aspect of the philosophy that presided over economic growth in the West was the axiom according to which the general good of the society would be achieved through each individual's striving to maximize his profit (the producers), or his utility function (the consumers), thanks to the "invisible hand" of the market. It would be completely out of place to announce here any value judgement concerning this philosophy. We refer to it only because it gave birth to modern systems of accounting and economic calculus. Even now, more than 40 years after the "Keynesian revolution", macro-economic aggregates are nothing more than the addition of micro-data resulting mainly from the

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(1) Present estimates indicate that under natural conditions, soil may form at the rate of one cm. every 125 to 400 years. Under good conditions of soil management, it would take from 12 to 40 years to form one cm. of topsoil; OECD-Interfutures, op.cit. p. 15.

(2) Ibid.

(3) LESTER R. BROWN; "The Twenty-Ninth Day: Accomodating Human Needs and Numbers to the Earth resources" World watch Institute, Norton, 1978.

(4) The term was coined by the German philosopher and biologist Haekel who advocated the idea of the individual being the product of co-operation between the environment and organismal heredity. Almost at the same time, another German philosopher, Fr. Engels wrote in his "Dialectics of Nature" that Nature never forgives those who ignore its laws. It manages always to have its revenge.

decisions of enterprises, households and government agencies. It is remarkable that all practical systems of national accounts make no room for environmental data.

For almost two centuries, the decisions that shaped to-days "post industrial societies" were taken at the micro-level by individual producers or consumers. To be more accurate, one should say that they were taken by entrepreneurs. Utility is subjective, impossible to measure; and consumption habits have a pronounced social character. On the contrary, profit is an objective phenomenon, measured in monetary terms. The entrepreneur's ultimate economic motivation-and even the ethical basis of his role- is to maximize his profit. This objective can be attained by a combination of actions aimed at reducing costs and increasing sales, price increases being occasional and marginal in conditions of perfect competition. One of the ways to reduce costs is to externalize cost elements as much as possible. The so-called externalities are elements of cost paid by the community (e.g. solid waste disposal through municipal services), or the environment (e.g. effluents drained into rivers, emission of gas or particles into the air). Pollutants tending to spread over space and to accumulate over time, their medium term effects on the neighbourhood of an industrial plant may not be sizeable and their harm may take time to be noticed and identified. Thus, it is not far-fetched to assert that the benefits of externalities are in fact costs for the society and its environment. Moreover, the entrepreneur cannot calculate otherwise. What happens outside his production process does not enter his books. Even if he is aware of his wrong-doing and endowed with high morality, an individual entrepreneur cannot pay for things his competitors take as free goods. To calm his conscience, he can only give part of his accumulated profit to some humanitarian foundations. In addition, the long term (20 or 30 years) has no place in business accounting for obvious reasons. In a completely free economy, there is no means of accounting or measuring the impact of the multitude of various activities on the environment. Cost-benefit analysis was originally conceived as a means for assessing profitability. Adding the adjective social only means introducing some cosmetics, because only immediate and readily measurable social effects can be taken in consideration.

On the other hand, increasing sales mean producing more. Indeed modern industry has from the outset been characterized by its voracious appetite for energy and raw materials, and its endless need for ever expanding markets. Consumption habits have been shaped and reshaped by "marketing techniques", and in the first place by advertising. The outcome has been the "consumer society", with its numberless objects and gadgets thus promoted as factors of the good life, as well as status symbols. This excessive production guided only by profit maximization implies tremendous waste of energy and other natural resources. It did not make man happier, while it puts unprecedented stress on the environment. A major conclusion here: it is not scientific and technological progress which is a threat to the environment, nor is the process of industrialization perse, but only a given pattern of industrial growth, in a specific socio-cultural set-up and during a certain period of history. Science and technology remain precious tools, especially in the search for alternative patterns of growth. Industry can be imagined in a different structure and content. To imagine such environmentally sound development patterns, we must dwell a while on environment as a set of interrelations between Man and Nature, and between Man and Man<sup>(1)</sup>.

### III. The Natural and the Man-Made

#### A. PHYSICAL ENVIRONMENT: MAN AND NATURE

Any opposition between Man and Nature is nothing more than a philosophical view; man always lives "within" nature and never "outside" it. Privileged among other living beings, man remains one of them. For sure, he can live under very different climates, he is "diversivorous" and above all he is intelligent and capable of memorizing, analysing, abstracting and inventing. Nevertheless, he is not an "external" factor vis-à-vis natural life. Because notwithstanding the tremendous modifications he has introduced in his environment man is part and parcel of it in a web of interrelations.

Phrases like "the conquest of the desert" or "mastering the jungle" should be understood as figures of rhetoric; often they express man's effort to overcome the ancestral fear of striking natural phenomena. Dominating nature is an "ideology" interpreting forms of life as a merciless struggle where only the fittest can survive. Struggle alone can lead to the limit to complete destruction of life. Man, like other living beings, survives because of the subtle successive combinations of struggle and co-operation. Nature and all the forms of life it contains follows a closely-knit web of systems the behaviour of which can be studied and its knowledge formulated in scientific laws. Disruptions are exceptions; they might be destructive. Those systems of Nature are called "ecosystems". The ecosystem is defined as: "an integrated, functional and dynamic system of interrelations between living organisms (biotic components) and non-living things (abiotic components) within which energy and matter are produced, accumulated and transformed"<sup>(2)</sup>. Let us add immediately two further remarks. An ecosystem is never in a state of complete isolation. All ecosystems are interconnected, but the link between various ecosystems can be strong or loose, close or more or less

(1) cf. A.V. KNEESE, R.V. AYRES and R.C. D'ARGE "Economics and Environment; A Material Balance Approach" Resources for the Future, Washington, 1970.

(2) Jacques BARRAU: "L'homme dans le Milieu Naturel" in "Environnement et Qualité de la vie" Paris 1975 p. 34. also, D.R. HARIS: Agricultural systems; Ecosystems and the origin of agriculture" in P.J. UCKO and G.W. DIMBLEDY "The Domestication and Exploitation of Plants and Animals" London 1969.

remote. In the second place, an ecosystem is called generalized when it contains a great number of biotic components with complex and diversified interrelations. It is called specialized when it contains a small number of species, each one represented by a relatively great number of individuals, like in the case of the polar Tundra and the Boreal Taiga.<sup>(1)</sup> Homogeneity goes with fragility and vulnerability, while complexity and diversity offer more resistance. Modern agriculture systems are man-made specialized ecosystems.<sup>(2)</sup>

### 1. The Biosphere

The biosphere is the most generalized ecosystem conditioning all forms of life and within which all ecosystems are born, develop, undergo change and transformation (the disruption of one ecosystem may be followed by reconstitution or lead to destruction).

It is defined as "a region where liquid water is available in substantial quantities, where there is an ample supply of energy from an external source (the sun in the last analysis) and where coexist the different states of matter: solid, liquid and gaseous"<sup>(3)</sup>. Within the biosphere there are innumerable ecosystems. Among the major ones we can cite: the atmosphere, the hydrosphere and the lithosphere. The biotic components. "At the limit, the life of every metabolizing organism is a system within a web of superposed and interconnected ecosystems. Thus, man is defined from this viewpoint as: a system of organic macromolecules dispersed in an aqueous milieu"<sup>(4)</sup>

From another important viewpoint, soil is a place of interaction between the atmosphere, the water from the hydrosphere, the lithosphere and the living organisms that these all support, and by which they are in turn affected and changed. Biotic and abiotic components are especially intimate in soil, which by definition consists of the weathered layer of the earth's crust, with living organisms intermingled with the products of their decay. Thus, soil is not only a "factor" of the environment of organisms, but is produced by them as well. Quite naturally UNESCO's approach to environment has been the global multidisciplinary monitoring and study project called Man and the Biosphere (M.A.B.). Among the countless ecosystems of the biosphere, four biological systems are of vital interest to man because they are directly related to his most basic needs. These are:

- Oceanic fisheries;
- Grass land;
- Croplands;
- and Forests.<sup>(5)</sup>

But within each one, there are hosts of ecosystems and ecosubsystems. In fact hierarchy and superposition are as characteristic of ecosystems as are complexity and diversity. A regional sea (e.g., the Mediterranean) and its basin form an ecosystem, but the mouth of the Nile or the Northern Adriatic industrial zone are sub-systems with distinctive features and behaviour. A remote isolated lake as well as valleys surrounded by high mountains are distinct ecosystems. The same applies to regions enjoying a special micro-climate.

### 2. No reason for conservatism

What precedes does not imply that ecosystems follow immutable and eternal courses, repeating their cycles ad-infinitum. Neither does it imply that any intervention of man endangers the environment. As a matter of fact, change is in the nature of Nature, so to speak. Everything in Nature is subject to change and transformation. When man transforms his environment, by the same token he transforms his way of life, his mentality and even his values. Furthermore, not all changes are minor or quantitatively measurable. Some changes are real shifts from an old ecosystem to a new one, and have to be described qualitatively and not exclusively in figures<sup>(6)</sup>.

Another fact often overlooked is that when man took his first steps on Earth, the natural system had already been subjected to traumas and shocks imposed by droughts, floods and geological changes. The systems that had emerged from this turbulent paleo-history were the ones that were able to absorb and adapt to those traumas and their continual occurrence. Hence such systems are the creation of change and their resilience is generally considerable. In addition the parts of an ecological system are connected in a selective way, and consequently some connections — not all — are critical. Even within a relatively modest ecosystem everything is not strongly connected to every thing else; the identification of which is directly linked to which is decisive for the good management of man's intervention<sup>(7)</sup>. The effects of unfavourable changes are not always irremediable. Many ecosystems are remarkably tolerant; once the cause of the deterioration is removed, the system may recover its former capacity.

(1) BARRAU, op.cit.

(2) As a reminder, a system is made up of diverse elements or compartments or units, each capable of existence under various states, whose the selection for every unit is influenced by the state of the other units. Elements connected by reciprocal influences constitute an aggregate with internal feedbacks. cf. R. Margalef: *Perspectives in Ecological Theory* Chicago 1968.

(3) G.E. HUTCHINSON "The Biosphere" *Scientific American*, 223(3).

(4) Hutchinson, op.cit.

(5) LESTER R. BROWN op.cit.

(6) V. LABEYRIE: Bases Ecologiques pour une prospective de l'Environnement in "Analyse Socio-Economique de l'Environnement; problèmes de Méthodes", Mouton, Paris-Lahaye, 1973.

(7) See for more details: C.S. HOLING, ed. "Adaptive Environmental Assessment and Management" International Institute for Applied Systems Analysis (IIASA), 1978.

The variability of ecological systems is the feature that contributes to their persistence and self correcting capacity. Even sharp shifts in behaviour are not unusual and can produce more viability and yield more benefits to man. Nothing in these conditions can justify a superstitious attitude towards Nature consisting of a fear of unpredictable catastrophes that might occur whenever man touches upon the "mysterious" laws of Nature. Moreover, conservation of the environment, as it is now, is simply a kind of chimera since variability and not constancy is the essential feature of all ecosystems. There is nothing to prove that spontaneous changes would be more congenial to good human life than man-induced ones. Thus, a conservation approach is justified only when some species, ecosystems or landscapes of particular interest are endangered. The reduction of species impoverishes the ecosystems and increases their vulnerability.<sup>(1)</sup> Beyond this sphere conservationism has no justification. What is essential is to abandon what some authors have baptized as the "cow boy" mentality referring to the experience of Americans conquering limitless plains with greed and violence.<sup>(2)</sup>

Man's intervention in ecosystems is part of his own existence. As a living being, he interacts with his environment, even in the most primitive forms of life, by performing his basic biological function. The call for non-intervention is accordingly a call for the renunciation of the search for a better life. Better knowledge and careful observation of the behaviour of ecosystems are instrumental in avoiding blunders that might compromise the sustainability of development. Ignorance, inadvertence or shortsighted calculations are usually at the root of damaging interference.<sup>(3)</sup>

### 3. Environment assessment and management

The resilience of ecosystems is great but not infinite. Each has its "carrying capacity", or its maximum sustainable yield. If this capacity is not taken into consideration, the ecosystem will be partially or even wholly endangered. A natural resource which is a flow is in general a biological system. If we exceed the carrying capacity of such a system by placing too great a demand on it, we destroy the base itself. The offtake should never exceed the regenerative capacity of any biological system. Such an excess has already happened with many forest lands, grass lands and crop lands<sup>(4)</sup>. Stocks of natural resources, such as fossil energy for instance, are on the human scale "gifts of Nature" — once entirely used up they are not reconstituted.

Two facts further complicate the issue. Firstly, impacts on the environment, unlike what we tend to believe, are not always diluted over space. The intensity of the impact of human intervention (e.g. a development action) can be high at the locus of intervention and decrease with distance; but it can rise again at a longer distance. Thus, some pollutants can be concentrated to dangerous levels far from the source of pollution by biological and physical mechanisms. This is especially true when impacts are mediated by social and economic processes. For example the impacts of a pipelines project in a developing region can be identified and ameliorated. But the induced effect of the invasion of capital and of construction workers on settlements remote from the pipeline can have dramatic social consequences that cause more significant environmental impacts than the pipeline itself<sup>(5)</sup>.

Secondly, a similar phenomenon occurs over time. In many cases there is a cumulative effect as years pass. That is what happens with non-biodegradable pollutants; for example the accumulation of some chemicals used in the fabrication of pesticides or even pharmaceutical products in the human body, over several years, provokes serious diseases, e.g. cancer. The "impact dilution" paradigm has to be abandoned. Accordingly ecosystems have to be monitored, and variation in their behaviour has to be assessed. Constant monitoring and periodical assessment is the necessary prelude for any sound human interaction with the environment<sup>(6)</sup>.

Research on the principles and methods of environment assessment has been very active in recent years, especially since the Stockholm conference. Several global approaches have been devised. Reference must be made here to at least three of them. The first is used in the preparation of the yearly report to the U.S. president on the "Environmental Quality". The second was prepared for the International Council of Scientific Unions (ICSU) in 1975 by a "Workshop on Impact Studies in the Environment" (WISE) under the aegis of the ICSU's "Scientific committee on problems of the Environment" (SCOPE)<sup>(7)</sup>. The most recent approach is the product of the work of a special group at the Vienna based International Institute for Applied Systems Analysis (IIASA)<sup>(8)</sup>.

Once knowledge about ecosystems and human activities improves through the processes of monitoring, assessment and relevant research, the environment can be "managed". The term management implies the idea of rational use tending to reconcile maximization of yield with long term sustainability. Rationality of course means measurements and calculations that are beyond the interest and reach of individual entrepreneurs, private or public.

(1) Thus one understands the action of the International Union for the conservation of Nature and Natural Resources (IUCN). See its: "A world conservation strategy" 1978.

(2) K.E. BOULDING: "The Economics of the coming Spaceship Earth" in: L.J. Forrester and J.H. TODD: **The Everlasting Universe** 1966.

(3) Ignacy SACHS: "Environmental Quality Management and Development Planning" in "Development and Environment" Founex, 1971.

(4) Lester R. BROWN: "Vanishing croplands" in ENVIRONMENT, vol. 20, No. 10, December 1978.

(5) Example quoted from C.S. HOLLING; op.cit. p. 29.

(6) Since its establishment, UNEP has built up several monitoring systems and helped in sharpening the principles and methods of environment assessment. Two major actions of this kind are undertaken in the ECWA region: "The Mediterranean Action Plan (M.A.P) and the Gulf programme"

(7) See: SCOPE 5: "Evaluation des Impacts sur l'Environnement. Principes et Methodes", published in Canada, 1977.

(8) "Adaptive Environmental Assessment and Management 1978, op.cit.

Therefore, the role of the state and other public authorities is critical in this area. New tools and indicators are needed and are under development. But as the authors of the IIASA work put it: "qualitative measurements of structure are more important than the measurements of numbers of every organism possible. The structure depends on who is connected to whom and how"<sup>(1)</sup>. Description and non-quantitative analysis are at least as important as data gathering. From another viewpoint, environment management has a preservative, or passive aspect: prohibition of the use of toxic substances, pollution abatement measures, pollution combat, restrictions on the use of rare or exhaustible resources, conservation of endangered fauna and flora... etc. But the most stimulating aspect of environment management is its socio-economic component: the positive search for alternative development patterns and life styles more congenial to a better environmental quality. Thus, starting with Nature and its ecosystem, the preoccupation with the environment leads to socio-economic structures and cultural values.

## B. THE SOCIO-CULTURAL ENVIRONMENT

Man does not live only in symbiosis with Nature, but also in community with other men. Community life, from the nuclear family to entire World Order, forms the socio-economic and cultural environment of any individual. It is not irrelevant to the physical environment; on the contrary man's behaviour is normally dictated by perceived economic interests. It always implies establishing relations with other men, hence its social character. Finally it obeys cultural values held by the community. Consequently this "institutional framework" — as economic planners call it — is relevant to the nature of the activities (economic or other) and their impact on the physical environment. Recent and serious studies have proved that the "carrying capacity" of "spaceship Earth" could cope with the growing human population provided environmentally sound patterns of development and life styles are universally adopted<sup>(2)</sup>. This implies, **a contrario**, that socio-economic institutions and cultural values (the socio-cultural environment) may, at their extremes, preserve life or destroy it. A thermo-nuclear World War can practically put an end to man's existence on Earth. Getting rid of inadequate institutions and the environmental malpractices they engender is far more difficult to achieve. In the first place, it calls for diversified approaches according to the concrete situations of different countries or groups of countries and even within countries along the lines of social and cultural stratification. On the other hand, the socio-cultural environment can stimulate or inhibit individual potentialities. To quote a classical example, the state can help the citizen when it provides security of life, human rights and basic social services; it could also be too repressive and ever present in a such a way that the citizen feels helpless<sup>(3)</sup>.

### 1. Wealthy Nations, Poor Nations

Although many environmental problems are located and isolated on the national or sub-national levels, the most dramatic ones transcend national borders (e.g. air and water pollution), and some have a pronounced global character (e.g. energy, food, climatic changes...). This fact accounts for the current fashion for writings and speeches stressing the global interdependence of nations. In fact, interdependence is almost as old as Western capitalism. During thousands of years men lived in separate communities more or less large and settled, each one knowing only of the existence of its immediate neighbours. The empires of ancient times each covered a limited portion of the globe, and none of them integrated the communities it controlled into a single socio-economic system.

Things have developed otherwise during the last two centuries. The nascent socio-economic system of capitalism threw the Europeans into an unprecedented enterprise: the conquest of the whole planet. The captured riches of conquered nations provided a good part of the primitive capital accumulation that allowed the wealthy Europeans to invest in transforming inventions, considered until then as curiosities supplying princely courts with gadgets, into techniques of production. Modern industry was born with two characteristics: a voracious appetite for energy and raw materials, and an endless need for ever-expanding markets. Colonialism was the means to ensure both. Thus, capitalism<sup>(4)</sup> unified the world for the first time in man's history not only politically but also economically.

What is new about interdependence is its present magnitude and complexity but not the phenomenon itself. The latter started in fact the day the Lancashire textile mills expanded by the use of American, Indian and Egyptian cotton. In turn the economies of the colonies were shaped by the colonial powers to satisfy primarily the needs of their own industrial growth. Thus the World economy evolved into an integrated system, parts of which were interdependent. The outcome of this process was the formidable industrial growth and concentration of wealth and power in a few nations (the Centre of the system), to the detriment of the rest of mankind (the periphery). Underdevelopment of the South is not sheer historical backwardness. It is a distorted, extroverted and dependent development, the by-product

(1) Ibid, p. 28.

(2) See for example: J. MCHALE and M.C. MCHALE: "Human Requirements, supply levels and outer bounds" Aspen Institute publications, 1975. - Fundacion Bariloche: "Catastrophe or New Society? A Latin American World Model" IDRC publication, 1976.

(3) This debate which was central to 18th century is surfacing again in these last decades of the 20th century, not only because of the existence of so many dictatorships and police regimes, but also in some Western democracies where taxation/social security systems are considered by some people as excessive bureaucratization of society. Also the spectacular advance in computing hardware and software with the almost unlimited possibilities of data storage and retrieval is seen by many as a threat to the privacy of the individual.

(4) We do not attach any value judgement to this term here. It describes a mode of production characterized by the search for profit by the owners of the means of production through the play of market mechanisms. See I.S. ABDALLA: "Heterogeneity and Differentiation — the end for the Third World?" in: **Development Dialogue**, 1978.

of the development in the North. At present, this polarization — without any hope of catching-up<sup>(1)</sup> — poses limits to growth which are intolerable for the Third World, as well as for the global environment.

The present situation is not without its nuisance for the people in the wealthy nations either. As we mentioned before, public opinion and public authorities in the North are aware of pollution and the other undesirable aspects of environment, as well as of the need to preserve some endangered species, exceptional natural landscapes and historical sites. Most OECD countries have a ministerial department or a major government agency to look after the "environment" and the "quality of life". Yet, nothing so far has been undertaken to reduce inequality among nations<sup>(2)</sup>, where only 18% of the total world population (the developed market economies) account for about 68% of total world GNP<sup>(3)</sup>. But the monetary figures are abstract — they do not illustrate the impact of wealth on the world environment. One striking illustration is that the average energy consumption in the U.S.A. is eleven million tons oil-equivalent a year (against 1.9 TEP in Saudi Arabia). If the American style of life and growth pattern were to be generalized, world consumption of energy would reach fifteen times the actual world oil production<sup>(4)</sup>. This example is not unique as is shown in the following table .

Two conclusions from the table are almost self-evident. Firstly, if this consumption pattern were to be universal, the impact on the physical environment would be disastrous. Secondly, this consumption is obviously excessive, contains a good proportion of waste and might be harmful to man's health and well-being. More critical is the fact that it cannot be pursued without keeping Third World populations in conditions of abject misery, a position rather difficult to maintain in today's world. Hence the call of farsighted people in the North for action in two complementary directions: massive transfer of resources to the Third World, and the search for alternative life styles in the North. They realize that in order to avoid rationing, all of us have to rationalize the use of "natural resources." Or as Lester R. Brown puts it, people have the choice between "voluntary simplicity" and "forced austerity"<sup>(5)</sup>.

Average Annual Per Capita Consumption  
of Selected Commodities (Kilograms)<sup>(6)</sup>

	Developed	Developing
Grains <sup>a</sup>	98.8	229.3
Starchy roots	71.0	63.9
Pulses and nuts	5.5	15.4
Meat <sup>b</sup>	66.5	11.4
Fish	21.5	6.9
Dairy Products <sup>c</sup>	168.2	38.8
Fruits and Vegetables	178.3	71.9
Vegetable oil	11.1	4.1
Animal fats	4.5	0.4
Sugar	37.7	19.4
Fibres <sup>d</sup>	13.7	2.6
Fossil Fuels (oil equivalent)	4,420.0	246.0
Steel	480.3	44.0
Selected other metals <sup>e</sup>	25.1	2.1

**Notes:**

- a. Wheat, rice, maize, sorghum and other cereals
- b. Beef, veal, pig meat, poultry, mutton and other meats.
- c. Milk, eggs, cheese and butter.
- d. Cotton, wool, cellulose and non-cellulose.
- e. Aluminium, lead, zinc, tin and nickel.

The central idea in the research and debates concerning alternative life styles can be summed up as follows. The "consumer society" has pushed people to scramble to accumulate material goods many of which are of doubtful usefulness. This scramble has placed on "modern" man considerable psychic stress and left him no time to enjoy the

(1) For the empirical evidence of the illusion of catch-up ideology See I.S. ABDALLA, *op.cit.* p. 9.

(2) cf. Mahbub UL HAK: "The poverty Curtain: Choices for the Third World" Columbia University Press, New York, 1979.

(3) World Bank Development Report, Washington 1978.

(4) Courvoisier, *op.cit.*

(5) L.R. BROWN, *op.cit.*

Also Carter HANDERSON: "The Economics of Less Developed Countries" in **Business Horizons**, April, 1979.

(6) Overseas Development Council: "The U.S. and World Development: Agenda for Action". Washington, 1975.

non-material aspects of life (e.g. togetherness, nature, art... etc.). Less emphasis on material goods would secure a more balanced development of man, and thus he could dispense with tranquilizers, alcohol, narcotics, and the other plagues of "modern" civilization<sup>(1)</sup>.

## 2. Rich People, Deprived People

However, the glamour of Western civilization and the consumer society has easily convinced the former colonies that there was no other path to development than that of trying to do what the powerful and advanced nations had done before them. A series of simplifications formulated by "development theoreticians" and propagated by Western academic as well as by international organizations prevented any deeper analysis of the real dimensions and mechanisms of the development of those countries given as a universal model<sup>(2)</sup>.

Development was understood as the equivalent of economic growth; social aspects of development (education, health...) were limited in scope to raising labour productivity. In turn, economic growth was supposed to take place in the modern sector: industry and sometimes big farming. The ideology underlying this approach was that underdevelopment is a historical delay that can be compensated for by hard work, capital accumulation, foreign aid and investment. Thus the "gap" between developed and underdeveloped countries would be gradually filled. The underdeveloped would "catch up" at various time horizons according to the actual stage of their growth<sup>(3)</sup>. Furthermore, this approach saw in income inequalities a *sine qua non* condition for rapid growth. Only people with higher incomes can save and invest; any increase in lower incomes leads to increased consumption. It was usually admitted that national savings would not meet the investment rate necessary to guarantee a rate of growth noticeably higher than that of demographic growth; hence the need for foreign capital to fill the "investment gap" on one hand and the formidable — and often ineffective — campaign for family planning on the other.

A development theory can be judged against the outcome of the policies it has inspired. Three decades of efforts undertaken in this ideological framework led the Third World to the sad conditions of today, conditions considered intolerable by the people concerned, and regarded as a threat to World peace and security by the President of the World Bank. Indicators of poverty are now well known, notwithstanding their shortcomings and their inadequacy to describe the physical and moral misery of two billion people the majority of mankind<sup>(4)</sup>. What is relevant to this paper is the relationship between poverty and environment. It is two-fold. Poverty as a socio-cultural (mostly man made) environment inhibits man's potentialities and becomes in many cases a threat to his survival. On the other hand, extremely poor people cannot afford to pay attention to physical environment. Extreme poverty is as polluting and as destructive as extravagant wealth.

While threats to ecosystems arise in the industrialized nations from excesses of production and consumption, the main threat in Third World countries is "underdevelopment" itself. A small number of indicators suffice to illustrate our statement. Let us start with the famous GNP per capita. One third of mankind live with an average income of \$166, equivalent to 3.3% of that prevailing in rich countries (\$4976). Almost another third has an average income of \$429, less than one tenth of that of the rich countries. Two thirds of Third World countries (known in the UN system as the group of 77) have infant mortality rates higher than 100 per thousand births. Some have rates above 200. Death rates are about 20 per thousand in the same countries. Life expectancy is 45 years only in low income (less than \$300) African countries, and 49 years in Asian countries of the same category. In a not small number of countries, public expenditure on education is as low as one dollar per capita a year; in many others it is around ten dollars. Literacy rates are around 20% in low income Africa. In a good number of countries, they are less than 10%<sup>(5)</sup>. There is nothing astonishing in these figures. Shelterless, undernourished, dwelling in slums or living in overcrowded houses without potable water nor waste disposal, the majority of the Third World population is exposed to all kinds of diseases and other hazards.

The real magnitude of poverty can be better assessed when we take into consideration the levelling effect of the GNP per capita as a measure. As a matter of fact, one of the main results of development efforts has been the aggravation of income inequalities. Whenever income distribution statistics are available (they are extremely rare for Third World countries), the richest 20% of the population account for more than 50% of the national income. This fact

(1) The most famous advocate of new life styles is the author Ivan ILLICH. See for example his "Medical Nemesis". Other authors to be quoted: Johan GALTUNG Ignacy Sachs, Richard Jolly... etc. See also: Sweden's Secretariat for the Future: "Challenge to Sweden; views about Sweden in the World Society" Stockholm, 1977.

(2) See on this topic: I.S. ABDALLA; "Al-Arab bain Al-Tanmiah Al-Qotriah wal Al-Tanmia Al-Kawmiah" in Al-Mostaqbal-Al-Arabi, No. 3 September 1978.

(3) The most candid exposition of this pseudo-theory of development is found in W.W. ROSTOW's *Stages of Economic Growth*, which found great popularity in the late 50's and early 60's. This author tried even to forecast the year when India can catch-up with U.K. Moreover, he considered the number of automobiles compared to the number of inhabitants as the ultimate indicator of progress.

(4) cf. Mahbub ULHAQ op.cit.; O.D.C. *Agenda for Action*, 1979; and R.S. MCNAMARA, *One Hundred Countries, Two Billion People* Praeger, 1973.

(5) cf. O.D.C. *Agenda for Action*, 1979. The total percentage of illiteracy has declined from 59% in 1960 to 50% in 1970. But the absolute number of illiterates increased during the same decade from 701 million to 756 millions.

added to the low per capita income points to the extreme poverty of the majority. Ironically enough, the rich of the Third World, unlike western capitalists during the first 150 years of capitalist development, indulge in conspicuous consumption, and their savings are far from being proportional to their growing income<sup>(1)</sup>. Instead of correcting the distorted, extroverted and dependent development of colonial times, post-independence development aggravated those features. While historically capitalism achieved the internal integration of national economies, this pattern of development followed so far in most Third World countries has disintegrated the national economies: modern enclaves versus traditional sector, sophisticated elites with western life styles versus marginalized masses... etc. The impact of the values of western consumer societies is so strong that national cultural identities are often withering away. Thus our countries know the impact of both wealth and poverty on the physical environment. Moreover our people endure socio-cultural conditions which often go with political repression.

### **C. THE PROBLEM: DEVELOPMENT-ENVIRONMENT**

The aforementioned state of affairs has already given birth to a valuable literature about alternative development strategies for Third World countries. The last ten years or so have produced a set of new ideas and concepts. The essence of the endeavour is to identify ways and means to secure self-sustained overall development, with accelerated economic growth as a major component, while avoiding threats to and stresses on Man and Nature. The key words for the solution of the development-environment problematique are: self reliance, basic needs, participation and ecodevelopment. Before going into a detailed exposition of these concepts, we think it would be preferable to have a bird's view of development performance and development trends in the ECWA region. Thus we can address ourselves to concrete alternatives and policy choices instead of an ex cathedra general demonstration.

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(1) cf. Raúl PREBICH: "A critique of peripheral capitalism" in **CEPAL REVIEW** December 1976.

## CHAPTER TWO

### AN OVERVIEW OF DEVELOPMENT TRENDS

#### I. The Regional Approach: A Justification

According to the terms of reference, this action is supposed to give an "overview" of development trends in the ECWA region. A complete survey with full details being thus excluded, it would not be of much help in revealing the nature of the trends determining the whole course of development in individual countries as well as in the region as whole to compile sets of summarized country tables and official documents. The ECWA region is not a pure (and loose) geographical notion. The region is a physical and cultural continuum beyond State borders and above the countries' political and economic typology. It is the "Mashreq", the eastern part of the Arab land. Before the establishment of ECWA, all its members were and still are members of the League of Arab States and its specialized agencies, as well as a host of inter-Arab governmental and non-governmental organizations and professional unions. Often they are also members of multilateral enterprises. Common physical and cultural features have to a scatter or lesser extent put their imprint on the policies of every member country.

Moreover borders (mostly recent and often without ethnic or geographical justification) show great permeability to population and wealth movements. Notwithstanding more or less opposed ideological and political options, actual development policies and performances appear much more like variations on a very limited number of themes than radically different development patterns. Therefore, a regional approach to the identification of various development trends with due allowance to country specifics seems more appropriate than a country approach which ends by pointing to some similarities.<sup>(1)</sup> Therefore it has been decided to adopt the regional approach throughout the exercise. Not only will this paper focus on common features, but the case studies will also be identified problemwise and not country wise. Thus the ECWA exercise in its methods is logically different from similar ones undertaken by other UN Regional Economic Commissions.

This being stated, the next step in the elaboration of a meaningful overview is to sort out, from the plethora of facts and figures, the salient features that form the axes around which evolve both ideas and actions. For this purpose let us recall the fact that the concrete development of any Third World country is determined in the last resort by the interaction between three fundamental factors;

- the resource base (including area and population);
- the international relations of the country, or its place in the World order;
- the policies and strategies adopted and implemented.

This applies to the ECWA region as a whole, as well as to its individual members. Accordingly, this overview will deal in the first section with the resource base and international relations. A second section will be devoted to internal structures and policies.

#### II. Resource Base and International Relations

##### A. DESERT, RIVERS AND OIL

For thousands of years the rich and often bright history of this region was nothing else but the drama of survival and growth in very arid, arid and semi-arid areas. The miracles of successive or perennial civilizations were linked to rivers. Then came the oil revolution, the attraction of industry and the search for various mineral resources. In parallel with this evolution, foreign interest in the region has changed. Traditionally only Egypt and the Fertile Crescent were coveted by conquerors for their agricultural wealth and strategic position on the routes of international trade. Oil has now shifted the interest towards the oil rich sands of the desert, formerly disdained as Arabia Petra or Arabia Desertica.

##### 1. Area and population

The total area of the ECWA region is about 4.8 million km<sup>2</sup>. The total population is around 83 million. These two figures give a population density of 17.3 inhabitants per square kilometer<sup>(2)</sup>. Like most averages, this one is terribly misleading. Let us have a closer look at both area and population figures. According to ECWA experts, the cultivated

(1) This characteristic of the ECWA region becomes obvious when compared for example with ESCAF region where the 30 members and 8 associate members constitute in fact a small scale picture of the World Order: industrialized OECD countries (Japan, Australia, New Zealand), centrally planned economies (China, Viet Nam...), side by side with Third World countries. From another point of view, that region includes Western nations (Australia and New Zealand) and countries of distinctive old cultures (China, and India); also the two most populated countries in the World and some tiny mini-states (Fiji, Maldives... etc.).

(2) See detailed statistical appendix.

area in the region amounts to only 3.8% of the total area (17.8 million ha.). Further details we should add that only 2% are under permanent agriculture, while 1.8% is cultivated during the rainy season. Forests and woods cover an area equivalent to about one third of that under cultivation (6.7 million<sup>(1)</sup> ha.). Complete desert (2.3 million km<sup>2</sup>) and poor, mostly seasonal pastures (1.1 million km<sup>2</sup>) represent the bulk of the total area 70.8%.

A look at a physical map suffices to show that the ECWA region is not without resemblance to the Sahel. In the centre there is the great desert of the Arab Peninsula between the Red Sea and the Arabian Gulf. To the North it extends to cover important parts of Jordan, Iraq and Syria. To the South agriculture is possible in parts of the two Yemens, thanks to rainfall. To the West Egypt is part and parcel of the Sahara except for the thin valley of the Nile and its modest delta<sup>(2)</sup> (3.6% of the Egyptian territory). The striking contrast between the "Empty Quarter" in Saudi Arabia and the overcrowded green belt surrounding the central desert tells the long story of tumultuous population movements through the region, with the consequent rise and fall of civilizations, as well as of the vital importance of water resources management and irrigation projects. Despite the oil wealth, the optimum use of water resources for agriculture and other uses remains central to any development in all the countries of the region. Quite understandably, how pressing is the need for water, and at what cost it can be met, vary from one country to another. Yet all of them face the problem of absence or paucity of rainfall.

In area ECWA countries are very different. Bahrain (622 km<sup>2</sup>) is the smallest in size, while Saudi Arabia is the largest of all (2.1 million km<sup>2</sup>). But what is specific to the region is that with the exception of Lebanon, all the small countries (Bahrain, U.A.R., Kuwait and Qatar) are in the same area and in a desert environment. This calls for joint water supply projects, if only with view to economies of scale.

As to population the countries range from some 229 thousand (UAE) to 37.8 million (Egypt)<sup>(3)</sup>. Combining inhabited areas with population high densities appear. Egypt painfully locates 45.5% of the total population of ECWA region on some 36,000 km<sup>2</sup>, which means a population density of 105 inhabitants per square kilometer (against the general average for the region which is 17.3). In Lebanon the density is much higher: 290 inh/km<sup>2</sup>. In other countries where available information does not allow for a clear distinction between inhabited zones and sparsely inhabited or uninhabited arid ones, the relative importance of the urban population provides an indirect indication of high density. As a rule, urban population all over the region represents a high percentage. At its extreme, we have real city-states like Kuwait, Qatar and UAE, where the percentages of urban population are 88.3, 88.6 and 84% respectively. More significant is urban concentration in countries with vast rural areas like Iraq, Lebanon, Syria and Egypt (the percentage urban populations are 66.70, 47.3 and 44% respectively). In a desert country like Saudi Arabia, the urban centres — where the administration, oil activities and other business ventures are based — have lived within their walls 59% of the total population. The important exception to this trend is the Arab Republic of Yemen where the urban population is still modest (8.8%), but growing very fast (7.5% per annum) since the end of its isolationism in the early 60's. In addition, labour shortage in neighbouring Saudi Arabia attracts a major share of emigration from rural areas. As we shall explain later, development practices and "modern" styles of life have considerably aggravated the demographic-spatial misdistribution born originally from the push effect of arid areas and the overcrowded country side.

Another demographic feature of the region is that it has the youngest population in the World. For seven countries with available data (Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Syria), children under the age of 15 represent between 42.8% (Lebanon) and 48.3% (Iraq) the average being 44.3%<sup>(4)</sup>. For the other six countries, the very high rate of population growth (not less than 3%) would justify a supposition that the percentage of this age bracket is even higher. Considering the low life expectancy (with the exception of Kuwait and Lebanon), the labour force segment of the population is particularly narrow. According to World Bank statistics for 9 of the region's countries, the percentage of those of working age (15-65 years) varies between 50% (Syria, Jordan) and 56% (Egypt). Only Kuwait crosses the bar of 60%. The average is 52% against 65% in the industrialized nations<sup>(5)</sup>.

Last but not least, according to the same source the total population of the above-mentioned countries will reach 135 million by the year 2000 against 83 million at mid-1977, an increase of 68.8%.

## 2. Rivers and the fertile belt

Some 83 million people depend on 17.8 million hectares, almost 5 persons per hectare. What will be the magnitude of discrepancy between agricultural resources and the population by the end of the century when the latter will reach 135 million?

(1) A.S. HEIBA, Joint ECWA/FAO Division: "ECWA and Desertification" December 1978, mimeographed. Also: ECWA Statistical Abstract, Part I, Beirut, 1978.

(2) Modest in comparison with those of other major rivers: Mississippi, Gange, Amazone, etc...

(3) Population estimates in Oil-rich sparsely populated countries are hard to establish because of the great fluidity of labour movements and the magnitude of non-local labour, especially from other Arab countries. Figures here are computed from the ECWA Statistical Abstract and the World Bank "World Development Report 1979".

(4) For purposes of comparison the percentages in other regions are: 25.5% in North America, 23.9% in Europe, 42% in Latin America, 43.2% in South Asia and 44.2% in Africa.

(5) A qualification on those figures seems necessary. Due to bad health conditions, people in the region usually retire at the age of 60 and not 65. This reduces further the percentage of the labour force.

#### A. THE DISRUPTION OF A MULTISECULAR BALANCE

Today's alarming situation is a relatively new one; it arose from rapid population growth and continuous encroachment on crop land. For tens of centuries the population increased very slowly. High birth rates were almost entirely counter-balanced by normal high death rates. Moreover, disasters (devastating wars, droughts leading to famines, fatal epidemic diseases) critically reduced the population every now and then. The establishment of the Arab-Islamic realm some fourteen centuries ago put an end to the violent eruptions of some people-threatened in their existence by drought, floods, increasing salinity and the like — into other people's land. Gradually the majority of the population of the region settled down in the fertile belt combining the water resources of major rivers coming from outside (Nile, Euphrates and Tigris), the smaller local ones (in Syria, Lebanon and Palestine) and some rainfall. Many people were engaged in agriculture. Their productivity was high enough to allow an annual surplus that used to be drained away by foreign conquerors and rulers<sup>(1)</sup>. Under the self-centered new system, this surplus helped primarily the development of urban centres. Seats of the Caliphate for some time, the big cities with fabulous names (Damascus, Baghdad, Cairo...) gathered numbers of bureaucrats and soldiers. Moreover, remarkably well-situated at the convergence of three continents, they enjoyed flourishing trade activities: urban — rural, inter-city, and with the outside World of Southern Europe, Eastern Africa, Central and Southern Asia. Tributes enriching the imperial coffers, as well as the trade profits, developed an important demand for luxury goods and refined products. Handicrafts multiplied, and acquired great diversity and skill. Last but not least, those cities became centres for learning and culture. At the desert's periphery, some rain added to underground water allowed pastures and limited agriculture. Then there was the great desert where nomadism was the style of life appropriate to the carrying capacities of water points and the extremely rare rainfall, provided the total number of each tribe did not exceed a certain ceiling. The crop lands of the fertile belt used to contribute to the food supply of the Holy cities in Hedjaz, while important areas supported modest settled communities.

This pattern of land use and population distribution is now disrupted. The growing population of the fertile valleys and other crop and grass lands has built houses, roads, factories, airports... etc. on an important portion of the arable land. For instance, in Egypt where good crop land is extremely scarce, non-agricultural uses took out of it in the last 20 years as much as all the "newly" reclaimed land during the same period (almost a million acres). The disproportion between population and cultivated land made all these countries of the fertile belt net food importers. At the same time, oil and its related activities dramatically increased the food needs of the desert countries.

#### B. A VALUABLE BUT LIMITED POTENTIAL

Astonishingly, the relative shortage of agricultural products has not so far led to the full identification and optimum use of all available land and water resources. Planners ought to realize that agriculture should develop in order to meet food needs as much as possible, to supply industry with some raw materials, and to allow for exports whenever a comparative advantage is clear. Meanwhile, they should never lose sight of the fact that major agricultural development schemes directly produce some changes in the environment that have to be carefully studied and assessed.

In assessing the potential of agricultural expansion in the region, the two constraints (water and land) should be taken in consideration simultaneously<sup>(2)</sup>. Land may be arable, but water resources in the present and foreseeable future may not be enough for regular cultivation. More rarely water may be available but the topography of the land or the quality of the soil may make agriculture too difficult for it to become economically viable. This type of study is very recent in the ECWA region as a whole. Previous estimates vary greatly and are sometimes fanciful. To our knowledge, the most reliable work in this respect is the not yet published study carried by Prof. M. Elgabaly in the framework of a large research project sponsored by the Industrial Development Center for Arab States (IDCAS) on "Industrialization Strategy Based on Self Reliance and the Satisfaction of Basic Needs". Elgabaly and his team were dealing with food. We extract here from the voluminous study the figures relevant to this paper. For the countries with important agricultural potential the picture is as follows:

— **Syria:** The total arable area is estimated at 8.15 million ha. or 44.4% of the national territory. Currently only 620,000 hectares are under irrigated cultivation. About 5.3 million ha. are cultivated by rainfall. Yet only 2.8 million are actually cultivated every year; the variation is due to the quantity and duration of rains. The above-mentioned study shows that irrigated land can be increased to 1.1 million ha. i.e. almost doubled. Moreover economically viable agriculture can cover 5.6 million ha. that is to say 32% of the arable land.

— **Iraq:** The total arable area is estimated between 8.6 and 10 million hectares. The cultivated area is around 5.3 million ha. Some 3.7 million ha. are irrigated and the remainder benefits from rainfall. Prospects for expansion on rainfall land are limited. On the other hand, a combined effort to reduce salinity, improve irrigation and raise agricultural intensity can, by the end of the century, give 3.8 million ha. (with agricultural intensity equal to one full year crop) against 1.1 million currently.

(1) In ancient times, Egypt was called the granary of the Roman Empire. The "annona" was shipped to Byzantium until the arrival of the Arab army in the Seventh Century.

(2) See land & water resources in statistical appendix.

— **Egypt:** The total arable area is estimated at 4.5 million hectares only. Intensive irrigation and cultivation now covers 2.8 million. There are ideas and projects to attain its full utilization by the end of the century.

### 3. Then oil came

No other single economic event in the recent past (a few centuries by the region's historical scale) has ever upset life in the ECWA region more than the massive exploitation of its tremendous oil resources. We have to wait for the domestication of solar energy, or at least the desalination of sea water at cheap cost, to witness an event of comparable far reaching consequences. We do not need to expand on figures of reserves, production, revenues and capital surplus. These are abundantly publicized and often purposely inflated. For the objectives of this paper, three figures are necessary and sufficient:

- Estimated oil reserves in ECWA region amount to 47% of the total World reserves<sup>(1)</sup>
- Estimated oil production of the region in 1978 represented 25% of the World production.<sup>(2)</sup>
- Estimated oil revenues of the five major exporters (Saudi Arabia, Kuwait, Iraq, UAE and Qatar) in 1977 were about US\$62,600 millions.<sup>(3)</sup>

This said, let us drop the fanciful stories of the Western media and concentrate on the dynamics of the oil revolution. Discovered first in Iraq, oil became "explosive" in all possible meanings of the word under the combined effect of several factors. In the aftermath of World War II, exceptionally rich deposits were developed in Kuwait, Saudi Arabia, and the Gulf Emirates. Their growing output helped in keeping the oil price<sup>(4)</sup> very low. This in turn shaped the growth of production and consumption in the industrialized nations with a markedly high energy profile. During the last 25 years the total energy consumption of OECD countries — already high-increased by 157%<sup>(5)</sup>. Between 1960 and 1975 the increase was 76.3%. More pertinent is the fact that during these fifteen years coal consumption remained stagnant or even declined, while that of oil jumped by 129.7%<sup>(6)</sup>. Consumer durables and gadgets (and in particular the extensive use of private cars the profusion of which provides most of the glamour of the "consumer society") are energy consumers and depend primarily on oil. This swollen demand for oil was bound to provoke price augmentation, since this fossil energy is not renewable. The final outcome is the "energy crisis" and the tense market situation between OPEC countries and the major consumers gathered in the International Energy Agency with its financial, economic and political corollaries. Oil abundance in the ECWA region is certainly a blessing, but it is far from being a panacea. We shall come back to this aspect when we deal with the international relations of the region. Turning back to the effects of oil within the region, the most important are:

#### A. AVAILABILITY OF ENERGY

In fact eight countries are net exporters and belong to OAPEC. The others produce some oil or have good prospects of becoming producers. Anyhow, they can at least cover their needs with a modest transportation cost. This availability is obviously a very important asset for development, and especially for industrialization, mechanization of agriculture and modern transportation. It goes without saying that this should never be allowed to lead to wasteful use and pollution. Fossil energy conservation is a must, in particular when it constitutes the main — if not the sole — natural wealth of the country. Pollution is avoidable provided appropriate technologies are actively sought. Moreover, oil is also the raw material for the petrochemical industry.

#### B. POPULATION MOVEMENTS

Development projects, undertaken in oil rich countries remarkable for their number and dimensions, have given birth to population movements of unprecedented magnitude in the region. Several studies have been carried with a view to assessing the number of people involved in these movements as well as the various effects they produce both in the host countries and in the countries of origin<sup>(7)</sup>. Unfortunately all the figures advanced so far are estimates. We have the feeling backed by some facts that they are grossly below the real figures<sup>(8)</sup>. Many of the countries considered as suppliers or receivers of manpower have not had a recent census, or have never organized one. Furthermore, the movement involves not only the workers but often several of their dependents; hence the inadequacy of labour statistics. One important feature of the phenomenon is the fact that emigrations are never permanent (precluding naturalization as in the case for the brain drain), and are rarely for long periods (exceeding 4-5 years). At most there are seasonal and occasional migrations. This high rate of rotation implies that the total number of people participating in

(1) Source: ECWA, Natural Resources, Science & Technology Division: "Medium and Long Term Projections of Energy in the ECWA Region" Beirut, 1977.

(2) OAPEC Information Bulletin.

(3) Mahmoud Abdel Fadil: *Oil and Arab Unity* (in Arabic), Centre for Arab Unity Studies, Beirut, 1979.

(4) Fadil Shalaby: "The Administered Price of Oil" a paper presented to the "Seminar on Natural Resources" Sponsored by OAPEC et al. Kuwait, February 1978.

(5) OECD-Interfutures projects, final report, p. 28, Paris, 1979.

(6) Overseas Development Council: "The United States and World Development, Agenda for Action" 1979, Washington D.C.

(7) M. Abdel Fadil, op.cit. part one. Also, Nazli Choncri: *Migration Processes Among Developing Countries: The Middle East* Washington 1977. J.S. Birks and C.A. Sinclair: "A Preliminary Assessment of Labour Movements in the Arab Region", ILO, WEP, Geneva 1977.

(8) The Central Statistical Agency in Egypt gave the figure of 2.7 million for all Egyptians being abroad on the night of the census in November 1976. Last June the Saudi authorities announced that 1,050,000 Egyptians were living in that country alone!

the movement is several times that of migrant workers and their families at any given point of time. A second feature is that "labour" in this case covers all socio-professional categories from manual semi skilled up to the managerial and academic levels. Finally tourism became very active. People from the desert rich countries go to the more moderate climates in Egypt, Syria and Lebanon. In the other direction, parents and relatives of the "guest workers" often pay them visits. All this travelling allows for stop overs and the extension of trips to visit other countries. What the consequences of such movement are will be considered later. It is enough to state here that oil has opened up a great number of job opportunities of available human resources<sup>(1)</sup>.

### C. FINANCIAL TRANSFERS

Financial transfers from oil rich countries to the rest of the region are now a major factor in the economies of the recipient countries and assist the movement towards closer co-operation if not complete integration. We have in mind here the facts of life and not official statements and programmes. The transfers can be classified into several categories. The first is workers' remittances. It is the most durable and reliable. It is in fact quite remarkable that political divergences (and even conflicts) between individual countries of the region have not so far led to mass withdrawal (or expulsion) of "guest workers". The hard economic facts are that those workers are very much needed in the host countries and their large scale return home raises tremendous problems. Unfortunately, statistical data concerning the magnitude and directions of transfers are very inadequate both with regard to coverage and time series. Formal bank transfers or remittances are not the only or even the most important channel. In fact, there is a considerable amount of transfer in kind, i.e., all merchandise (especially durable goods) carried back home by the workers or visiting members of their families, which are not accounted for at all because they are within the limits allowed for tax free "personal belongings", or are included under one heading with similar goods originating from other parts of the Globe. In a full account of transfers, the expenditures of visiting members of workers families (who are in fact tourists) should be taken into consideration. On the other hand, transfers by private exchange between worker savings and tourist expenditure when tourists come to the host country are difficult to assess. Finally, in some cases there is a rather odd system called "importation without transfers" whereby importers collect savings from workers abroad and use them to finance importation of goods (usually durables and luxuries). Thus, in the case of Egypt, according to World Bank figures "remittances" rose from US\$ 189 million in 1974 to 700 million in 1977. During the same period "finance for own exchange imports"<sup>(2)</sup> increased from 16 to 725 million. The IMF estimates for "emigrant remittances" for major labour suppliers are as follows<sup>(3)</sup>:

	1973	1974	1975	1976	1977
Jordan	45	75	167	411	425
Arab Republic of Yemen	129	156	307	796	1000
P.D.R.Y.	33	41	56	115	179

(in million US dollars)

These are not all the countries getting remittances. The list should include Lebanon and Syria. There is even a further complication. Some countries get remittances from workers in other countries of the region, while they employ considerable numbers of nationals from other countries. This is clearly the case of Iraq and to a large extent Jordan. However, some authors ventured some estimates of the total figure of workers transfers at something between 2.5 and 3 billion dollars in 1978<sup>(4)</sup>. Our own belief is that the movement involves a much bigger amount. The subject is worth further investigation. Anyhow, it should be pointed out that remittances now constitute a major item in the balance of payments of several countries of the region. This is true not only in the case of relatively small or poor countries (like the two Yemens) but even in that of the biggest country of the region: Egypt with all its agricultural and industrial growth. In 1977 the value of remittances was equal to 70.8% of total merchandise exports of raw cotton, manufactured cotton products and petroleum.

The second item in financial transfers is aid. In particular since the 1973 war the volume of aid increased dramatically. Grants to the "front-line" states reach billions of dollars, but not-negligible amounts go to the "least developed" countries. Loans on concessional terms to solve balance of payments problems or food supply crises as well as inter-central bank deposits with relatively low rates of interest have been normal practice in recent years. Then there are project loans with rates of interest actually lower than those prevailing in the international capital market. The main feature of this type of lending is the fact that it is completely untied. As a matter of fact, the money is spent in a "Third country" — mostly in the Western industrialized world. Finally, there is direct investment, both public and private,

(1) Actually the "spontaneous" and inordinate labour movements have created some severe shortages in the supplier countries and fall short of meeting entirely the needs of ambitious development plans and programmes in the oil rich countries. Thus labour is imported in great numbers from Pakistan, Bangladesh, India, Sri Lanka and South Korea.

(2) The name coined by the Bank's experts for what is incorrectly called in Egypt "importation without transfers". IBRD: "Arab Republic of Egypt, Recent Economic Development and External Capital Requirements" May 1978.

(3) IMF. Survey, September 4, 1979.

(4) Abdel Fadil. op.cit. p. 51.

bilateral and multilateral.

Noteworthy from the angle of integration is the emergence of Arab joint ventures and multilateral enterprises. The last type is of great interest as an instrument of collective self-reliance, since a multilateral enterprise is established to develop a common resource, to unevenly distributed production factors, or to raise the share of participating countries in an activity so far handled by non-Arab companies. According to a 1977 survey carried out by the Council for Arab Economic Unity (CAEU), about forty Arab joint ventures and 24 Arab multilateral enterprises were already in business or about to go into business by that time.

Once more we face the irritating problem of the absence of statistical data covering all forms of intraregional aid and investment. We are consequently reduced to quoting some examples of financial flows within the region for illustration purposes. As a first example, here are the aggregate loans given by the four official "development funds" to countries in the ECWA region.

Recipient	Arab Fund	Kuwait Fund	Saudi Fund	Abu Dhabi Fund	Total
Jordan	61	139.5	98.6	6.6	305.7
Egypt	169.8	216.4	228.1	51.6	665.9
Syria	90.3	81	157.1	13	341.4
ARY	88.8	54	99.4	11	253.2
PDRY	74	43.3	34.3	7.3	158.9
Oman	22.2	27.7	97.1	15	162
Bahrain	18.5	34.4	21.4	50	124.3
	524.6	596.3	736	154.5	2011.4

(in million US dollars)

Now some observations on this consolidated table of project loans. The Arab Fund for Economic and Social Development is a multilateral institution whose membership coincides with that of the League of Arab States, but the oil-rich countries contribution to it is substantial. These Funds are more or less new institutions. The oldest (the Kuwait Fund) was established in 1962, while the latest (the Saudi) started operations in 1975. Moreover, the Funds are not the only channels for development aid. This is particularly true in the case of Saudi Arabia. As has been mentioned before, this aid is untied. Finally, the rates of interest are very moderate; they range from zero for some Saudi loans to 4% (some Kuwait loans) and to a maximum of 6% for some loans from the Arab Fund.

Now let us take an example of bilateral concessional aid. In 1975 Kuwait, Saudi Arabia and the UAE supplied non-oil Arab countries with total aid of 2,377 million dollars out of which 74% went to Egypt, Syria and Jordan.<sup>(1)</sup> Another example from the area of investment, the Council for Arab Economic Unity established four multilateral enterprises (mining, livestock, pharmaceuticals and industrial investment) with a total equity capital of 1383 million dollars. These examples of financial transfers from oil rich countries to others in the region whether in terms of workers remittances, financial aid, or investment may give an idea of the magnitude of financial flows within the ECWA region, a major consequence of the increase in oil prices and a central factor in the development of the whole region.

#### D. A NEW CENTRE OF GRAVITY

For many countries material prosperity and cultural progress used to take place in the hospitable confines of the Arab Peninsula, where precipitations and/or rivers have always permitted more or less permanent agriculture and animal breeding. The agricultural surplus fed the growth of important cities which became centres of trade within the region as well as with the outside world. These favourable material conditions added to old cultures passed through the melting pot of Arab-Islamic civilization, and contacts with the East (India, China...), and West (Southern Europe and parts of Africa) made of the same cities prestigious cultural centres. The "home of the faith" in the Arabian desert enjoyed the veneration of the faithful for the Holy cities, the expenditure of pilgrims and often some aid. Now this former state of things is changing with dazzling speed. The oil wealth is feeding ambitious economic schemes. Labour is pouring into the areas which were up to recent years very lightly populated. Industries are emerging in unusual conditions. In Saudi Arabia in 1960 only 30% of the population lived in urban areas and no single city had more than half a million inhabitants. Fifteen years later the percentage almost doubled (59%) and the country has two cities of

(1) Abdel Fadil, op.cit. p. 98.

more than half a million inhabitants. Prospection for oil led to the discovery of other metals, and countries like Saudi-Arabia have embarked on vast geological prospection programmes. The first results announce serious mining prospects for precious and non-ferrous minerals.<sup>(1)</sup>

The political leverage provided by wealth need not be stressed. On the other hand it is important to single out the cultural activities in the oil countries. New universities are built, an academic-professional community is growing, newspapers, magazines and even specialized reviews are numerous and tend to increase in numbers and improve in quality. These developments can be beneficial to the whole region, since they introduce a trend towards more balanced growth in the different parts of the region. But the short and medium negative effects of unplanned movements of population and labour together with the spreading patterns of western consumption can be of disadvantage to other countries of the region and increase disparities. There is a real threat of a simple reversal of roles. Those who used to be well-off are becoming the new poor, while the deprived of yesterday take the lead and jump far ahead. Nevertheless, several political and economic factors continue to work towards co-operation and forms of integration. The oil revolution has upset secular relations. Great wisdom and historical vision are much needed for the making of the right political decisions.

## B. THE ECWA REGION AND THE WORLD ORDER

### 1. Integration into the world order

Examination of the national accounts of the thirteen countries of the ECWA region shows two characteristics. The first is the importance of foreign trade when related to the Gross Domestic Product. The second is that the greater part of this trade takes place with the industrialized Western countries. Here are the most relevant figures, followed by some brief comments.

#### Exports and imports as % of GDP

	GDP in \$ million	exports	imports
Iraq	15425	51.9	44.5
Jordan	1186	49.7	115.2
Kuwait	11146	80.8	22.5
Lebanon	2829	13.9	46.5
Oman	2141	66.2	50.7
Saudi Arabia	43924	77.6	31.1
Syria	5812	23.4	39.3
U.A.E.	7288	95.7	45.4
YAR	1654	6.7	46.6
Egypt	5828	20	32.2

#### Notes;

Data for last available year. Source for Egypt is the World Bank, for other countries ECWA: Statistical Abstract, 1968-1976, Part II, Beirut 1978. Figures relate to 1976 except for those marked x (1975) and xx (1973).

As usual the data are not complete. Some countries with sizeable foreign trade are missing (Bahrain, Qatar...). For some others the figures are rather old (Lebanon). In several cases the central figure of the value of oil exports is lacking for recent years (Iraq). Yet nothing in the missing data can lead by its nature or its size to the alteration of the picture reflected in the table above. All countries of the ECWA region are "open economies" closely linked to the World economy. Exports of oil countries are as a rule higher than 50% of the GDP; in some cases, they go up to 95%. In non-oil exporting countries the percentage of exports to GDP is much lower: from 6.7% in the Arab Republic of Yemen to 23.4% in Syria. But this modest share in exports is more than compensated for by the high imports: from 32.2% for Egypt to 46.5% for Lebanon and YAR. Jordan is in a rather odd position: exports amount to 49.7% of GDP while imports reach 115.2%. Let us now have a look into the trade balances. The most complete and recent data provided by the IMF<sup>(2)</sup> give the following picture.

(1) Mohamed Said Afia & Ahmed Omar Mansour "The Development of Mineral Resources in the Arab Region", ALECSO — IDCAS joint publication, Cairo, 1977.

(2) IMF International Financial Statistics Year Book, 1979.

**ECWA Region Trade Balances, 1978**

	Exports	Imports	Balance
Bahrain	1898.7	2052	- 153.3
Iraq	(9254)	(3463.5)	+ 5790.5
Jordan	309.3	1559.8	- 1250.5
Kuwait	10347.1	4568	+ 5779.1
Lebanon	—	—	—
Oman	1773.8	1112.5	+ 661.3
Qatar	23353.7	11933.2	+ 11420.5
Saudi Arabia	37846.6	23217.2	+ 14629.4
Syria	1064.8	2565.7	- 1501.7
U.A.E.	9137.5	4441.5	+ 4596
YAR	11.3	1053.2	- 1041.9
PDRY	—	—	—
Egypt	970.7	3758.8	- 2788.1

(in million US dollars)

The IMF does not provide recent data (post 1975) for Lebanon and the PDRY. Figures concerning Iraq relate to 1976. The total exports of the remaining ten countries amount to 86.6 billion dollars, or 7.3% of the world exports for the same year. The addition of Iraqi exports might raise the percentage to around 8% while those of Lebanon and PDRY can be ignored. More than two thirds of the exports originate from two countries exporting almost exclusively oil: Saudi-Arabia (43.6% of the total) and Qatar (26.9%). When other major oil exporters (Kuwait, Iraq, and Oman) and minor ones (like Egypt) add their shares, the proportion of oil in the region's exports is close to 90%. The total imports of the same ten countries amount to 56.3 billion dollars, 4.6% of world total. The largely favourable balance between exports and imports is due to oil exports — the famous oil surpluses.

In fact all non-OPEC members are deficit countries. What is quite alarming is that the deficit of Egypt, Jordan, Syria and the two Yemens is in each case higher than the total value of exports<sup>(1)</sup>. In the case of Egypt the deficit amounts to almost three times (2.87) the total value of exports. In that of Jordan it is about five times. The YAR is a unique case: the deficit is close to 100 times the value of exports!

Persisting deficits lead unavoidably to growing foreign indebtedness. On the other hand a good share of the surplus is invested in foreign financial assets. A table abstracted from the World Bank "World Development Report, 1979" illustrates this two-tier financial relation with international financial centres.

(amounts are in million dollars)

	External Public Debt and International Resources (1977)			
	External Public Debt		International Resources	
	Amount	% of GNP	Amount	In months of import coverage
Egypt	8099	69.2	534	1.1
PDRY	291	50.3	101	2.3
YAR	147	14.6	1240	16.8
Jordan	645	29.4	678	4.9
Syria	1528	20.7	546	2.3
Lebanon	39	4.1	1961	16.5
Iraq	161	4.0	6995	—9
Saudi Arabia			30034	12.9
Kuwait			2990	6.4

(1) For Lebanon the deficit and value of total exports are almost identical. But the country, characterized by heavy reliance on the tertiary sector, has always relied on invisibles for correcting the imbalance. Moreover, the effects of the civil war cannot be overlooked.

Source: World Development Report, 1979.

It is obvious that countries with persistent big foreign trade deficits are heavily indebted. Egypt is the most dramatic case, followed by PDRY. The YAR is in better shape thanks mainly to remittances from workers abroad. Jordan is more or less in a similar position. When remuneration of foreign services is included, only Saudi Arabia, Kuwait and UAR are considered by the World Bank as net capital surplus countries. There is no need to emphasize the fact that both debts and reserves are in the currencies of major OECD members, and mainly in US dollars.

To complete the picture of the foreign trade of ECWA region, let us have a look at the directions of its countries merchandise exchanges. What strikes one most is the very modest proportion of intra-regional trade. Only 5% of the total exports of the thirteen member-countries went to countries within the region. On the import side the figure is higher: 9.1%<sup>(1)</sup> This region that enjoyed for a very long time complementarity, if not integration in the modern sense, has fallen apart under the action of colonial powers, and then under the effects of the soaring oil exports. Its countries have indeed witnessed a typically outward oriented development. The biggest exporters to other countries in the region are: Saudi Arabia S 1344 million, Kuwait S 891 million, Bahrain S 479 million and Lebanon S 379 million. Oil exports explain the high figures for the first two, while transit trade accounts for the Bahrain and Lebanon figures. The major importers from the region are Saudi Arabia S 1422 million, Syria S 387 million, United Arab Emirates S 225 million, and Jordan S 221 million. Here also oil and transit trade account for a good deal.

Driven away from each other, they are subject to external poles of attraction. It is of the utmost importance to identify these poles. From the outset the socialist countries are not one of these poles. According to the combined data of IMF<sup>(2)</sup> and the World Bank<sup>(3)</sup>, the share of this latter group of countries in the total exports of the region amounts to 1.5% only. On a country basis, their share is biggest in the exports of Egypt (25%), YAR (24%) and Syria (21%). The imports from socialist countries reach 5.3% of the total imports of the region. This can be easily explained by two factors: the imports of the region are much lower than the exports (S 45.2 against S 77 billions), and the imports financed by development credits from the socialist group of countries.

Now let us turn to the total share of Third World countries. It is relatively important: 23% of exports and 19.2% of imports. Two remarks seem necessary regarding this item. Firstly it is not different from the general pattern prevailing in international trade. Exchanges among Third World countries usually hover around 20% of their total international trade<sup>(4)</sup>. Secondly, oil exports coupled with the increase in oil prices contributed greatly in raising the share of the Third World in the foreign trade of the ECWA region. Comparing the data in 1960 and 1977 one can see that this share went up from 9% to 30% for Kuwait, and from 14% to 44% for Iraq. Almost stable in the case of Syria and Lebanon, it took a sharp downward turn in Egypt from 27% to 11%<sup>(5)</sup>. Thus, the real pole of attraction in the foreign trade of the ECWA region remains the industrialized countries of the OECD. They absorb (73%) of the total exports and supply about 70% of the imports.

## 2. Shortage and abundance: two causes of dependence

The analysis of the nature of relationships between the ECWA region and the "industrially advanced countries" should address itself to the crucial issue of asymmetric interdependence, or dependence. It is fashionable today in some circles in industrialized nations to emphasize the "interdependence" of all nations, including the most powerful, as if it were an entirely new phenomenon while what is in fact new is its present magnitude and complexity. Interdependence started the day some two centuries ago that the Lancashire textile mills expanded by using American, Indian and Egyptian cotton. In turn the economies of the colonies were shaped by the colonial power primarily to satisfy the needs of their own industrial growth. By the end of the nineteenth century the entire globe was under the domination of the industrialized nations and most of its population became part of colonial empires. Thus the World economy evolved into an integrated system, parts of which are interdependent. But the central issue remains — as in the case of the integration of a national economy — who manages the system and thereby draws the major portion of its benefits. Obviously the integration of the world economy and more broadly the building up of the World Order with its economic, military, political and cultural relations was carried out under the aegis and for the benefit of a limited number of Western industrialized nations (the centre of the system) and to the detriment of the people of the colonies and semicolonies (the periphery). The old colonial system has now almost completely disappeared. Nevertheless it has left behind potent power structures: military might, factors of economic power (industry, technology, finance...) and cultural dominance. These power relations between the centre and the periphery render interdependence terribly asymmetric. The centre has the means to impose its interests (much more subtly and often more effectively); while Third World countries, entangled in the web of the interlinked power structures, have much less freedom of action and thus their interests are subjugated to those of the centre. The dependence of Third World countries is in the last analysis illustrated by the limits on their sovereign decision making. Political independence is

(1) For all the Arab countries, the figures are slightly higher: 6% for the exports and 9.2% for the imports.

(2) IMF: Directions of Trade, 1977.

(3) World Bank, World Development Report, 1979.

(4) Overseas Development Council: "Agenda for Action" 1975-1979.

(5) All those figures include trade with Yugoslavia which is an important trade partner of many ECWA countries but which is not really a Third World nation.

valuable, but to translate it into facts a nation has to master its own economic and cultural life and destiny. These remarks apply to almost all Third World countries. The ECWA region is no exception. It is interesting in the analysis of the dependence phenomenon to refer to specific features: food shortage and oil surpluses.

Indeed it would be ineffective to deal with balance of payments deficits in purely financial terms. Persistent phenomena of financial imbalances always reflect more serious economic disequilibria. Focusing on deficit absorption through financial measures is inoperative and may lead to political and social disorders as is shown by the effects of the universal medicine administered by the International Monetary Fund. Some imports cannot be drastically reduced even in the medium term. In the ECWA region this is the case with food. The following tables do not call for much analysis. They amply show how dependent in this vital area the ECWA region is.

	Cereals: Production and Imports, 1977 (in thousands of metric tons)			
	Imports	Production	Total consumption	%deficit
Bahrain	61.5	—	61.5	100
Iraq	1,115.0	1,456	2,571	43.4
Jordan	453.5	65	518.5	87.5
Kuwait	312.4	—	312.4	100
Lebanon	582.4	38	620.4	94
Oman	114.5	6	120.5	95
Qatar	31.4	—	31.4	100
Saudi Arabia	979.4	250	1,229.4	79.7
Syria	729.4	1,612	2,341.4	31.2
UAE	190.7	—	190.7	100
YAR	270.0	1,000	1,270.0	21.3
PDRY	237.0	110	341.0	68.3
Egypt	3,864.4	7,997	11,861.4	32.6
	8,936.6	13,534	22,470.6	39.7

Source: FAO, Production Yearbook 1977.

Thus the ECWA region as a whole had a grain deficit of almost 40%. On a country bases the deficit varies between 21.3% (YAR) and 100% (Bahrain, Qatar, and Kuwait). In absolute quantities the biggest importers in decreasing order are Egypt, Iraq, Saudi Arabia and Syria. A few additional remarks: the figures in the table cover all cereals including those used to feed livestock and poultry and those consumed rather as vegetables and not as bread substitutes (rice). The deficit in wheat is clearly more dramatic. Thus the wheat deficit in Egypt is as high as 76.7% against only 32.6% for all cereals. In the second place, we will see later that the calorie supply is not generous. On the contrary, it hardly meets the daily requirements as defined by FAO. The deficit in the case of meat is of a similar or even greater magnitude. Finally, the gloomy picture of the food insecurity in the region is completed by the stagnation and even the decline in the food production per capita in the major producing countries. This will be dealt with later. Considering the strong position of a limited number of industrialized Western countries in the world food market (USA, Canada and Australia account for two thirds of wheat exports), this important food deficit becomes a political issue with tremendous bearing on the degree of dependence in the region. This is more true in the case of oil exporting countries for whom food dependence is the Achilles heel in any confrontation with the major oil consumers in the IEA.

But the position of oil exporting countries is more sensitive, precisely because they export a highly sensitive commodity. It is often said that OPEC has been able to improve marketing conditions because the demand elasticity of industrialized nations is very close to zero. But people forget that this is a double-edged weapon. Oil is the only commodity for the supply of which Western countries do not exclude military intervention. As a matter of fact, oil producers, unlike all other producers, cannot employ change in quantity of production in their strategy. Western demand determines production figures. Any significant decrease of output by producers would be considered as an act of hostility against the "World community"<sup>(1)</sup>, if not a *causus belli*. Consequently, the only means of action the oil producers dispose of is a concerted increase in prices. Each time they dare to do this, the World sees an orchestrated clamour of politicians and mass media denouncing the "oil cartel". If the oil exporting countries were free to decide upon

(1) While as a matter of fact OECD countries consume 86% of all OPEC exports.

output, prices would have increased smoothly and steadily according to the sacrosanct market laws<sup>(1)</sup>.

But the irony of the matter is that even the high prices are not the best way of promoting the overall development and the security of national interests of the producing countries. Those interests should in fact make every oil producing country export only within the limits of its need for foreign currency, for the obvious reason that oil is exhaustible. When it exports more it complies with the needs of the industrialized nations. By so doing it converts a real asset whose value is bound to increase into a financial asset, whose purchasing power will decline regularly given the chronic state of world inflation. This is not a mere hypothesis. The capital surplus oil producing countries with huge holdings in dollars today face a painful dilemma. If they agree to a more significant price increase or admit other currencies in the determination of oil prices, the dollar value will immediately go down, thus depreciating the value of their financial assets. If they avoid this path, they will have to accept the steady loss of purchasing power of their oil revenue; in other words the decline of the real price of their major if not their only export product. Moreover although they remain legally free to dispose of their financial assets, any massive withdrawal might provoke a financial crash. It would surely be considered as an inimical if not outright subversive action. Thus the abundance of a much demanded resource and the wealth it entails, far from securing economic independence, make those countries more vulnerable. For the poor countries the customary threat of the West is to let them down, to cut aid... etc. For oil rich countries the threat is more interference and in the last resort intervention.

### III. Policies and Performances

#### A. PRELIMINARY REMARKS

##### 1. What trends?

The factors dealt with in the previous section constitute the hard and relatively unaltering facts actually ruling the situation of the ECWA countries. Therefore, any development strategy or set of policies should address itself to them and the results obtained must be assessed against them. Rates of investment and growth will be of little significance with regard to overall development, if they do not reflect a sizeable decrease in food deficit, a drive towards economic integration within and among the countries, and a reduction thereby in the degree of dependence. Moreover, they have to be put side by side with the social indicators in order to evaluate better the improvements in the standards of living of the population. Accordingly it would be futile to align sets of national accounts figures in a conventional manner, and to limit the analysis to percentages of increase (or decrease) here and there. Such an exercise would mean nothing more than the desk work of compilation of tables published by the UN, its specialized agencies, the World Bank and the IMF plus the inter-Arab organizations. A more critical detailed assessment is beyond the terms of reference of this paper. Moreover, there are good studies of this kind published by Arab and foreign scholars<sup>(2)</sup>. In our opinion what is more relevant to the purpose of this paper is the identification of those trends which affect (positively or negatively) the following phenomena, bearing in mind throughout the analysis the impact on the physical and socio-cultural environment:

- The food deficit;
- The degree and form of utilization of natural and human resources;
- Dependence;
- The standard of living of the broad majority of the population.

This approach is more compatible with modern development thinking. It is now recognized that there is no "passé partout" model of development. Development strategies — unlike development theory — must deal with the concrete situations of the countries concerned at the moment they are elaborated, and provide adequate solutions for the most fundamental problems facing those countries. The quantitative analysis and formulation should never obscure the qualitative issues of change. Economic growth is of dubious interest unless it is accompanied by social progress and cultural self-assertion.

##### 2. Strategies or Policies

It would be both presumptuous and misleading to talk about development strategies followed by Third World countries during the last decade, unless one means by strategy simply the patterns of economic growth and their deliberate and implied characteristics. We prefer to preserve the original meaning of strategy (borrowed from Military Science) as a deliberate and knowledgeable set of consistent actions, tending to achieve, over a relatively long span of time (15 to 25 years or so), some fundamental societal goals, through the successive attainment over time of a series of targets, with due provision of ways and means. Obviously "developing" countries have seldom followed this path when they devise their development plans and programmes. It could hardly be otherwise, given the prevailing development thinking up to the seventies. It is well known in fact that development theories elaborated since the late forties used to reduce development to economic growth, social welfare being left to the "trickle down effect" of economic growth, and

(1) This is exactly what South Africa (and the Transnational corporations co-operating with it) is doing with gold. Despite the ten fold rise of gold prices in terms of US dollars, nobody is pressing the racist regime of Pretoria to increase the output of its gold mines.

(2) A special mention should be made here of the most comprehensive work in this field: Yusif A. SAYIGH: "The Economics of the Arab World" and its analytical companion: "The determinants of Arab Economic Development", Groom Helm, London, 1978. See also: Abdelhamid BRAHIMI: "Dimensions et Perspectives du Monde Arabe". Economica Paris, 1977.

cultural progress was supposed to be the adoption of Western values, behaviour and styles of life.

In such an intellectual atmosphere, the best a developing country could do in order to "catch up" was to increase national savings, to complement them with foreign aid and investment, to implement projects that satisfy cost-benefit criteria and to try to co-ordinate them by the use of national accounts, a mathematical model (usually the Harrod-Domar) and input-output tables. The remote goal was to fill the famous "two gaps": the trade gap by increasing exports and the investment gap by increasing national savings. Nothing tells better the story of these fallacious concepts than the fact that the two gaps have never been filled except for oil rich lightly populated countries. The so-called newly industrialized countries (NICs) like Brazil and South Korea still suffer from trade deficits and are among the major borrowers<sup>(1)</sup>. Anyhow the general picture of development in Third World countries (with very few exceptions) has been characterized so far by socio-political statements of goals unrelated to real development, as well as the divorce between plans (more or less sophisticated) and the results of implemented projects. The ECWA region is by no means an exception to this rule. Therefore, it is more realistic to talk about "policies" rather than "strategies" of development. Moreover, the focus should be on the concrete facts of development rather than on the political statements or the official plan documents.

### 3. Development performance

In other words what counts is the development performance and not the intentions be they wrong or right. One thing in this regard is obvious. By established standards, the development performances of the ECWA region countries are neither radically worse nor significantly better than the average for similar Third World countries. The absolute rate of growth of GNP at market prices is almost meaningless, if only because of the fact that both population increases and rates of inflation are not reflected in it. Therefore, it is better for purposes of comparison among Third World countries in growth performance — and not in overall development — to take the rate of growth of GNP per capita in real terms. Here is the table for the ECWA region.

**Average Rate of Growth of Real GNP per capita**

	1960-75	1970-75	1960-77
Bahrain	20	20.3	—
Iraq	3.3	6.7	3.8
Jordan	1.3	1.9	1.8
Kuwait	—2.9	—3.3	—3.1
Lebanon	n.a	—15.9	n.a
Oman	10.1	—1.0	—
Qatar	4.1	—0.4	—
Saudi Arabia	6.8	4.1	3.8
Syria	2.2	1.8	2.3
UAE	13.7	1.6	—
YAR	n.a	5.8	—
PDRY	—	—	—
Egypt	1.5	1.3	2.1

Sources: The first and second columns, World Bank Atlas 1977. The third column: "World Banks" World Development Report, 1979).

The World Bank puts ECWA countries mentioned in its "World Development Report" (other than those which are oil exporting capital surplus) in the category of middle income countries defined as having a GNP per capita over \$300. The same document gives 3.6% as the average growth rate of real GNP per capita for the 55 countries included in this category. At first glance, ECWA region figures are rather disorienting. Take for instance Bahrain with its exceptionally high rate of growth of 20% over 17 years. Of course the World Bank takes the precaution of underlining the fact that these figures are "estimates". Yet one notices that this country produces only 3.3 million tons of oil a year. The entry into production of an important aluminium plant and aluminium related industries, the importance of its ship-repair facilities, industries established in the free zone, financial activities and a relatively limited inflow of labour from abroad may contribute to the explanation of this growth. On the other hand the "oil bonanza" did not produce similar high rates in other OPEC countries. The figures of Saudi Arabia and Iraq are not outstanding.

More interesting is the case of Kuwait where the rate is negative. This can be easily understood given labour migration on a large scale into this city state. The World Bank estimates the population growth rate between 1965 and 1975 at 7.7%. Obviously the Bank has no information allowing for the break-down of population figures into nationals, other Arabs and foreigners. The same applies to the United Arab Emirates and Oman after the initial jump in GNP per

(1) On NICs, See I.S. ABDALLA's article in development Dialogue op.cit.; See also data in World Development Report 1979, op.cit.

capita following oil discoveries, since the rate of population growth in the same period was 13.7% and 10.5% respectively.<sup>(1)</sup> The rates of growth available for the whole period for non-OPEC countries are not far from the average of the group of middle income countries as mentioned above.

At the level of statement of goals, all governments of the region, notwithstanding their conflicting ideological options and diverging political orientations, declare themselves dedicated to two fundamental goals: raising the standard of living home and promoting inter-Arab integration, economic unity or at least close co-operation.

On the institutional front, all of them have established national planning bodies, ministries or agencies. Yet the real course of evolution has so far been dominated by the project approach and the piecemeal handling of development policies. Quite understandably the results fall short of the declared objectives; some concrete development results even went contrary to those objectives. It goes without saying that socio-political biases can never be overlooked, when one tries to explain the divorce between what is repeatedly emphasized officially and what takes place in fact. But it would be only fair to admit that the "gap" between declared development goals and concrete development realities is common to most Third World countries. It is the only gap that development economists—overconfident in their knowledge—have completely missed. Now it has come to the fore in the serious debate about the nature and content of development processes in the last few years.

This state of affairs does not facilitate the task of identifying the trends that seem to govern development in the ECWA region. If one concentrates on the results of the definition of trends that force countries away from desirable development, there would be a risk of not doing justice to well-deserving efforts, not to mention good intentions. On other hand, dwelling too much on sectoral growth and quantitative change here and there runs the risk of banishing to the shadows the real threats that justify the search for alternative development patterns and life styles. In the following section we will try to follow a middle course, keeping in mind the purposes of this paper.

## B. TRENDS IN ECONOMIC GROWTH

### 1. Agriculture

Since the food insecurity of the region became an item of public debate, it is often said that governments have neglected agricultural development, either because they overemphasized the importance of industrialization or because they have relied on the huge oil revenues for the procurement of food products. This kind of assessment does not tell the real story. It is not entirely true for the past and can be misleading for the future. In fact, the share of agriculture in national investments is by no means negligible, provided that irrigation and drainage projects are taken into consideration.

#### A. AGRICULTURAL EXPANSION

Unfortunately we do not know of the existence of the statistical series of capital formation in the different sectors for a large number of countries and for a relatively long time span. Therefore, we are forced to highlight some facts we consider to be telling in the development efforts made in agriculture. Even the desert, oil rich countries are trying to get the best out of their poor agricultural resources. Most of them already use sea water desalination techniques. But the green belt remains the base for the real growth of production and productivity. These efforts took several directions:

- The expansion of areas under cultivation through land reclamation and the improvement of water supply management;
- The intensification of agriculture by prolonging the cropping period, multiplying the crops in a single year and increasing industrial inputs into agriculture;
- Changing the socio-economic institutional framework to make it more responsive to greater productivity.

Let us now look at some illustrations of actions taken and measures adopted. **Egypt** has always paid great attention to agriculture, and the industrialization drive of the fifties and sixties had not been to the detriment of agriculture. Through the period 1952-1972 for which planning figures are available, the share of agriculture in gross capital formation has been on average around 18% with a peak of 24.4% in 1964-65, coinciding with the peak expenditure on the Asswan High Dam<sup>(2)</sup>. This dam, let it be recalled, was originally conceived for irrigation purposes. It has permitted the reclamation of about 900,000 acres, the expansion of rice culture in the Nile delta and perennial irrigation in upper Egypt. Since the early fifties fertilizer plants figured at the top of industrialization projects. Later on tractors were assembled locally, but with limited success. A vast network for tile drainage is under construction since the mid-sixties to avoid the increase of the subsoil water table and salinity. Physical productivity per acre registered satisfactory improvement for most crops. It is now the opinion of our eminent experts that agricultural stagnation in the seventies cannot be overcome by technical measures. A change in the socio-economic structure of the country-side seems to be the **sine qua non** for better yields and higher productivity.

**Syria** started to develop its agriculture with the introduction of cotton culture on a large scale in the late forties. The

(1) See: World Bank. World Economic and Social Indicators (November-December 1977).

(2) Ministry of Planning (Cairo): "Indicators of Economic Growth 1959/60-1971/72" in Arabic. The Ministry computed 2/3 of the cost of the construction of the High Dam as an irrigation project, the other third was attributed to the electricity sector.

Euphrates High Dam (250,000 acres of irrigation) is a milestone in this direction. Other smaller dams and regulators have since been built or are under construction: Gharb, Yarmouk, Barada, Khabour.. etc.

**Iraq** expanded its irrigation area from 5.6 million ha. in 1953 to some 8 million ha. in the early seventies. Major irrigation projects are: the Thartar Regulator, the Karkouk Irrigation Scheme, the Dakan Dam and the Haditha Dam on the Euphrates. The lag in the construction of a drainage system accounts for the increase in salinity. Currently a master plan for drainage is under implementation. The Baghdad government took the unique initiative of inviting several thousands of Egyptian peasants to settle on newly reclaimed land. This experiment is exciting and deserves thorough assessment as well as more publicity.

**Jordan** devotes 18% of investment in its current five year plan (1976-80) to the agricultural sector. The main irrigation projects are: extension of the East Ghor canal, construction of the Maqaren Dam, Wadi Mujeb, Southern Ghor as well as the introduction of a sprinkler irrigation system in the Jordan valley. Attention is given also to the improvement of rain-fed agriculture.

**The People's Democratic Republic of Yemen (PDRY)** took the deliberate decision to use its modest land and water resources for food production and reduce accordingly the area allocated to cash crops: cotton, coffee and tobacco. The first five year plan (1976/77-1980/81) allocates 14% of the total investment to the agricultural sector.

#### B. AGRARIAN REFORM

Egypt, Iraq, Syria and the PDRY have experienced agrarian reforms. From the economic point of view, the objective was to establish an institutional framework of land tenure which is more effective in promoting agricultural production and productivity than the old system characterized by large estates often coupled with very small tenant farms. In the four countries agrarian reform laws have been submitted amendments. The most far reaching reform in the sense of socialization has been that of the PDRY. In fact apart from a limited number of private farms in the country's remote areas most agricultural production is undertaken by co-operatives or state farms. Crop marketing and processing are also in the hands of public authorities. In the other countries land reforms reduced — by varying degrees — the number of landless peasants and imposed a ceiling on land ownership which leaves room for small and medium scale capitalist farming.

It goes beyond the purposes of this paper to assess in detail the socio-economic consequences of agrarian reforms in the region.<sup>(1)</sup> What is relevant here is the trend within the fertile belt of the ECWA region towards less unequal land distribution. On the other hand experience shows that this distribution, while quite important in itself, does not solve all the issues related to social justice and economic growth. It needs either to eliminate landless labour or to be accompanied by such measures as regulation of rents, provision of credit and marketing facilities, and supply of inputs and technological advancements.<sup>(2)</sup> Last but not least, the system needs to be evaluated periodically and revised whenever necessary.<sup>(3)</sup> As in some other Third World countries, the rich farmers were in a position to draw major benefits from measures of agrarian reform and state aid to agriculture.<sup>(4)</sup> Often the maximization of the farmer's profit and the optimization of the use of arable land in the country do not coincide. The disaffection of Egypt's farmers in recent years for cotton growing (the only crop in which the country has an obvious comparative advantage) is a good example.

#### C. INSUFFICIENCIES

Judging the outcome of agricultural development by the present food situation of ECWA region, it has so far fallen short of bringing drastic solutions to the burning issue of dependence. We have already illustrated quantitatively the magnitude of the cereal deficit. More alarming is the declining or stagnating per capita food production in most of the ECWA countries during the seventies. According to the World Bank the index of per capita food production (base: 1969-71 = 100) shows the following averages for the years 1975-77:

Egypt:	97	YAR:	101	PDRY:	100
Jordan:	71	Syria:	146	Lebanon:	87
Iraq:	78	Saudi Arabia:	92 <sup>(5)</sup> .		

Syria is the only country where per capita food production has increased. As we have already mentioned, food production was insufficient in the sixties. If the trend shown by this table were to continue, it would mean growing food scarcity and dependence on supply from abroad.

Some other indicators become disquieting when their real significance is perceived. Thus the decline of the share of agricultural products in total exports cannot be explained entirely by the growth of exports of manufactured products. The analysis of quantities exported shows that the value of agricultural products tends to stagnate and even to

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- (1) Many authors have attempted complete studies in this field. For Egypt the best study in our opinion is: Mahmoud ABDEL-FADIL: "Land Reform and Income Distribution in Egypt: Cambridge University Press.
- (2) Wolf LADJEJINSKY: "Agrarian Reform as Unfinished Business" World Bank-Oxford University Press, 1977.
- (3) See the proceeding of the "World Conference on Agrarian Reform and Rural Development" FAO Rome, (July 1979).
- (4) For comparison purposes, see: C. HEWITT de AICANTARA "Modernizing Mexican Agriculture" UNRISD, Geneva 1976. K. GRIFFIN "The Green Revolution, An Economic Analysis" UNRISD. Also: Sartaj AZIZ: "Rural Development, Learning from China" MACMILLAN, 1978.
- (5) World Development Report, op.cit.

diminish. Thus in the case of Egypt for example the receipts of payment for exports of agricultural products declined in the percentage of total exports regularly during the last three years (33.7%; 29% and 23.2% respectively). In absolute value the figures were L.E. millions 215.5; 229.2 and 179.7<sup>(1)</sup>. In Iraq the value of main agricultural exports (dates, raw wool hides and skins, fodder and straw) was I.D. million 39 in 1968 and went down to 15.6 in 1976. The quantities exported stagnated (e.g. dates) or declined (hide and skins)<sup>(2)</sup>. In Jordan foreign trade statistics give a more or less similar picture. Only in Syria is there some increase in the value of agricultural exports during the period 1968-76 from Syrian pounds 429.1 millions to 771 millions<sup>(3)</sup>. Yet this growth in value does not always reflect an increase in quantity. The value of cotton exports tripled while the quantity increased only slightly. Meanwhile livestock exports went down drastically.

The same applies to the urban/rural population ratio. The diminution of the percentage of the population living in rural areas does not reflect absorption of the labour force by industry, nor a rise in agricultural labour productivity. The push effect of rural poverty figures much more in the displacement to urban centres. Rates of growth of agricultural output need to be in constant prices to be meaningful, otherwise they may be the expression of some price phenomena rather than real growth.

The contribution of agriculture to industrial output by the supply of raw materials is important mainly for the textile industries. It is noticeable that processing cut down the exports of raw fibres and did not entail a significant increase in their output.

To conclude it is clear that agriculture in the ECWA region is currently unable to cope with food demand or to provide enough raw materials for industry.

## 2. Industry

Industrialization has been looked at as the most dynamic factor of economic growth and even overall development. Here again the ECWA region countries followed the patterns that have prevailed in the Third World in general. Import substitution and/or the export drive, and the processing of available raw materials governed the selection of industrial ventures. Before going into detail, let us try first to paint a general picture of industry in the region in two tables.

	Industry: Share in GDP and Rates of Growth							
	% of GDP				Average Annual Growth Rate			
	Industry		Manufacturing		Industry		Manufacturing	
	1960	1977	1960	1977	1960-70	1970-77	1960-70	1970-77
Egypt	24	30	20	24	5.4	5.2	4.7	5.7
PDRY	—	7	—	—	—	—	—	—
YAR	—	14	—	5	—	9.9	—	—
Jordan	14	23	8	—	9.9	—	—	—
Syria	21	14	16	—	5.9	11.1	4.4	7.5
Lebanon	20	—	13	—	4.5	—	5.0	—
Iraq	52	69	10	7	4.7	12.2	5.9	11.5
Saudi Arabia	—	83	—	5	—	13.9	—	4.1

(1) Central Bank of Egypt: Annual Report 1978 Cairo, June 1975.

(2) Central Bank of Iraq Bulletin, No. 2, 1977 quoted by ECWA Statistical Abstract op.cit.

(3) ECWA Statistical Abstract, op.cit.

	Industry: Share in Exports and Labour Force			
	% of Exports		% of Labour Force	
	(Manufacturing only)		(All industry)	
	1960	1976	1960	1977
Egypt	12	27	12	26
PDRY	—	—	15	20
YAR-	—	13	7	11
Jordan	4	21	26	39
Syria	4	10	19	23
Lebanon	—	—	23	27
Iraq	0	0	18	25
Saudi Arabia	0	0	10	14

These two tables are extracted from the world Development Report 1979. Obviously they are incomplete, particularly with regard to the industrialization drive in oil surplus countries after the price hike of 1974.<sup>(1)</sup> Nevertheless, they call for some comments. In the first place, when extractive industry is included, oil dramatically contributes to raising the share of industry in GDP. This is the case of Saudi Arabia and Iraq in the above tables. One can safely suppose a similar situation for the United Arab Emirates, Kuwait, Qatar and Oman. Secondly several oil exporting countries have started processing parts of their crude output. Refineries and natural gas liquification plants are included in manufacturing.<sup>(2)</sup> Yet the lack of appropriate statistical coverage makes it difficult to obtain figures on the non-oil related manufacturing industry. Thus when comparing the relative shares of industry — including extractive and oil related manufacturing — in GDP in various countries, the performance of manufacturing industries in Egypt and Syria is overshadowed by the total figures for industry in Saudi Arabia and Iraq. In the third place, rates of growth in the manufacturing sector are not among the highest achieved by Third World countries. In fact countries as different as Nigeria and South Korea, Thailand and Tunisia reached growth rates in the manufacturing sector higher than 10% yearly during the period 1970-77 despite the energy crisis. Fourthly manufactures represent an essential component of the exports of Egypt, Jordan and Syria. Finally, all industries (including extractive) employ sizeable portions of the labour force: from 11% in the Arab Republic of Yemen to 39% in Jordan. However, labour force distribution by branch of industry needs special research work which goes beyond the terms of reference of this paper which is devoted only to trends. Therefore, we limit our presentation to the most salient features.

— **Textiles** was the first modern industry in the region. In fact it satisfied two industrialization policies: import substitution and the processing of local raw materials. According to World Bank data, the value added realized from "textiles and clothing" as a percentage of total value added in the manufacturing sector in 1975 was as follows: 34% in Egypt, 36% in Syria and 25% in Iraq. The practical non-existence of customs duties on imports in oil rich countries limits the expansion possibilities of this industry. The erection of important petrochemical plants in these countries could supply the industry with synthetic and artificial fibres that could make it more competitive, a missed opportunity for regional integration.

— **Food and tobacco:** The same comments apply to a lesser extent to sugar production, food processing and canning, vegetable oils, tobacco and cigarettes... etc. Labour-intensive, viable at small and medium size, this branch faces the major constraint of the stagnation of agricultural output.

— **Engineering industries:** Typical for import substitution policies but composed mainly of assembly plants: refrigerators, air-conditioners and other household devices, tractors, lorries, buses and private cars.

— **Chemical industries:** Here the major component is fertilizer plants. In agricultural countries like Egypt, the erection of these plants corresponded to import substitution, while in oil exporting countries it corresponds to the raw materials processing drive. Major nitrogen fertilizer producers are Kuwait, Egypt, Qatar and Saudi Arabia, followed by Iraq and Syria<sup>(3)</sup>. The region as a whole is a net exporter. Yet there is no evidence that import needs of deficit countries

(1) The ECWA Statistical Abstract does not add much to the World Bank data. The voluminous UNIDO: World Industry since 1969: "Progress and Prospects" Vienna, July 1979 includes 3 ECWA countries only in its samples. Therefore, the World Bank Report remains the least incomplete.

(2) UNIDO: "World Industry Since 1960" op.cit.

(3) Farouk MAAYUF: "Chemical Fertilizer Industry in the Arab World" in OAPEEC Oil and Arab Co-operation, Vol. 4, No. 1, 1978.

are supplied from the same region. On the other hand current standards of fertilizer inputs in agriculture are not everywhere comparable to those of modern agriculture in industrialized nations.

— **Metallurgy:** Iron, steel and aluminium are the main metallurgical industries of the region. The Bahrain aluminium plant is to-date the biggest metallurgical plant in the Gulf area.

To conclude, the ECWA region as a whole is in the first phases of industrialization. The countries' problems and obstacles are numerous, while the solutions adopted — often based on the advice of foreign experts — are not always optimal. On the other hand, the potential needs of the region in manufactured goods are tremendous, and the human and natural resources of the thirteen countries taken together (or better still in the framework of the Arab World) should permit a harmonious collective industrial growth at very high rates.

### 3. Energy

The facts and fancies about the fabulous oil reserves in the region are not a reason to dispense with the energy issues other than oil prices. These reserves are depletable. The home and regional energy consumption is quite low, given the state of underdevelopment. Relying exclusively on oil for rapid industrialization, agricultural mechanization and household consumption inspired by western patterns is not without environmental consequences. The oil producing countries have to assess the impact on the region's environment of compounding the polluting effects of crude oil production, transportation and refining, plus those of petrochemical industries and other industrial activities with a high energy profile, plus those of intensive household energy consumption.

#### Energy Consumption 1976

(In Kgm of coal equivalents)

	Per capita <sup>(1)</sup>	Per dollar GDP <sup>(2)</sup>
Bahrain	12,000	—
Iraq	727	0.5
Jordan	527	1.0
Kuwait	9,198	0.6
Lebanon	535	—
Oman	696	—
Qatar	25,236	—
Saudi Arabia	1,589	0.4
Syria	744	1.0
UAE	13,322	—
Yemen Arab Republic YAR	41	—
PDRY	324	—
Egypt	473	1.8

Two remarks. The extremely low energy consumption in the YAR is among the lowest in the world shared by only a few countries (Cambodia, Mali, Nepal... etc.). The exceptionally high consumption of Bahrain and Qatar (more than double the USA figure) is due to the establishment of export oriented industrial plants whose size is out of proportion to the population figures.

Studies presented at the first Arab Energy Conference (Abu Dhabi) expect rapid growth in the total energy requirements of the region during the coming couple of decades. Experts advise extensive use of natural gas — associated or unassociated — both at home and for exportation as NGL to decelerate the growth of oil extraction and exportation. As for other energy sources, hydro-electricity is supposed to supply 1.5 million TOE out of 75.7 millions total oil requirements (TER) in 1980<sup>(3)</sup>. This figure does not include Egypt where hydro-electricity represents an estimated 60% of the total electricity production. Some Arab States are attracted by the nuclear alternative, not only for economic reasons. Most ECWA region countries take some interest in solar energy (about 27 million dollars total yearly expenditure). Saudi Arabia alone spent 15 million dollars, and it has a stake in an American solar project of 50 million dollars<sup>(4)</sup>. Yet, a scepticism concerning its utilization prevails. The Arabs do not yet give enough attention and effort to one of their major resources for the future: solar energy.

(1) Osama Al-Kholi: "Energy and Environment in the Arab World". The First Arab Energy Conference, Abu Dhabi, March 1979, proceedings.

(2) World Development Report, 1979

(3) ECWA: Natural Resources, Science and Technology Division: "Medium and Long Term Projections of the Demand for and Supply of Energy in the ECWA Region". 1979.

(4) Ali KATANI and M.A. MALEX: "The Solar Energy in the Arab World" Proceeding of the First Arab Energy Conference, op.cit.

#### 4. Population Growth and Urban-Rural Distribution

In the mid-seventies, the population of the ECWA region was estimated at about 80 million inhabitants. For the demographic evolution of the region in the past two decades and the coming two, here are some indications:

	Population: Mid-1977 and 2000				
	Average Annual		Mid-1977	2000	
	Growth		Population	Population	
	1960-70		1970-77	(IN MILLION )	
Bahrain		(3.3)		0.3	
Iraq	3.2		3.4	12.0	23
Jordan	3.1		3.3	3.0	6
Kuwait	10.3		6.1	1.0	2
Lebanon	2.9		2.5	3.0	5
Oman		(3.1)		0.8	
Qatar		(10.5)		0.2	
Saudi Arabia	2.6		3.0	8.0	14
Syria	3.2		3.3	8.0	15
UAE		(13.1)		0.8	
YAR	1.8		1.9	5.0	9
PDRY	1.9		1.9	2.0	3
Egypt	2.3		2.2	38	58

Sources: World Bank: World Development Report 1979 except figures between brackets which are quoted from World Bank: World Economic and Social Indicators, November, December 1977 and are averages of the period 1965-75.

Neither the current population of 80 million nor the projected one of 135-140 million is too large with regard to the regions area and resources. But the region is not actually a single integrated economic unit. Therefore, the uneven distribution of the population among countries makes demography a critical issue for some countries. This is typically the case of Egypt with 47.5% of the current population and about 41% by the turn of the century. This country's case is the more critical, because its population occupies less than 4% of its land area. The case for family planning policies is obvious in such countries. Moreover, there are some sound arguments in favour of those policies in the other countries also.

Let us mention only the burden to the family (and in particular the mother) and the society of adequately bringing-up great numbers of children in countries where the percentage of those in the age bracket 0-14 ranges between 43 and 49% of the total population. Child care, and education and health services for the young are not only a problem of cost — which is by no means negligible — but also of time, parental awareness and societal attitudes. Those decision-makers who believe their countries need more people to work given their natural resources should bear in mind that additional labour has to be physically fit, professionally qualified and appropriately educated. They have also to assess the future status of women in the light of their own modernization efforts and their wealth. Will they join the labour force in increasing numbers or will they remain confined to household tasks and child breeding? —

From another point of view, the population is badly distributed within most countries. Since we deal mainly with trends, we want to single out here the rapid and excessive urbanization process. Let us first have a look at facts and figures in order to grasp better the magnitude of the process before considering its consequences. (See next table on page 74).

With the exception of city-States for obvious reasons, and the Arab Republic of Yemen where the urban population remains modest, the growth of urban population is clearly higher than the overall population growth rate. Sometimes, it is double the latter or even more (Iraq, Saudi Arabia, YAR). The phenomenon is common — in varying degrees — to all Third World countries. Today's industrialized nations experienced a similar population movement during their industrial and "post-industrial" growth. But the features of contemporary urbanization in our countries differ markedly from those of the historical Western experience. Whereas urbanization in the industrialized countries took many decades, permitting a gradual emergence of economic, social and political institutions to deal with the problems of transformation, the process in Third World countries is occurring far more rapidly, against a background of higher population growth, lower incomes and fewer opportunities for international migration. Indeed the urban growth of Western countries kept pace broadly speaking with industrialization, while the excess labour force used to settle in new countries (USA, Canada, Australia and New Zealand), or used to seek employment in the colonies. Now, in Third

World countries rural poverty pushes great numbers of people towards urban centres far in excess of the needs of labour mobility. The urban unemployed or underemployed have no place to go. There is no "new world to conquer" and industrialized countries, so earnest in the defence of free movement for capital and commodities, tightly close their borders and reject labour immigration except for the brain drain.

	Urban Growth in the ECWA Region <sup>(1)</sup>							
	Growth				Distribution			
	Urban Population				City		% in cities of over 500000 inhabitants	
	% of total		Annual Rates					
	1960	1975	1960-70	1970-75	1960	1975	1960	1975
Bahrain		39.9						
Iraq	43	66	6.2	5.6	35	53	35	62
Jordan	43	53	4.5	4.5	31	36	0	36
Kuwait	72	84	10.4	7.8	75	33	0	0
Lebanon	44	77	6.2	4.9	64	77	1	1
Oman	—	5	—	—	—	—	—	—
Qatar	—	85	—	—	—	—	—	—
Saudi Arabia	30	59	7.5	6.7	15	16	0	2
Syria	37	47	4.8	4.7	35	33	35	56
UAE	—	80	—	—	—	—	—	—
YAR	3	8	7.5	7.3	—	28	0	0
PDRY	28	34	3.2	3.2	61	53	0	0
Egypt	38	44	3.4	2.7	38	39	53	54

We will discuss the validity of the Western model in urban-rural population distribution when we consider the issue of alternative development patterns. Here we want only to point out the negative effects of this phenomenon both for urban centres and rural areas. It is common knowledge that big cities are hard to manage. The case of New York is classic in this respect. The capital of world finance was on the edge of bankruptcy. It was saved by massive federal aid (2 billion dollars, or 30% of the total US development aid to all Third World countries) and by cutting down some of the basic services: police and firefighting, and the closing down of New York City University. In less prosperous countries it is almost impossible to afford the high capital cost of urban infrastructure and the cost of its maintenance and expansion to cope with the excessively rapid increase in city dwellers. Too often the inherited infrastructure cannot cope with the new size of population, thus losing its efficiency or even collapsing. Congestion, pollution and degradation of housing and public health conditions are the usual outcome of this situation. Moreover, the rural poor often fail to find remunerative jobs in cities and they become urban poor, and destitute as the rural poor, and usually more desolate because of the loss of extended family ties and the rural social values of help and solidarity. The coexistence of shanty towns and over-crowded slums side by side with luxury residential areas in the same city is politically dangerous. The urban poor play a major role in "riots" so characteristic of political life in Third World cities. Even when the country's wealth allows for some remedies to the most alarming aspects of mushrooming urban growth, urbanization often remains a fiction in so far as the new-comers do not acquire urban culture and habits rapidly enough.

Rural emigration is also detrimental to agriculture. Economists usually think that the reduction of the rural labour force in a heavily populated country leads to the increase of labour productivity. This does not occur spontaneously. Unless machines effectively replace workers, there is no reason to expect better labour productivity. In fact, the latter tends to go down for another reason always overlooked by economists accustomed to thinking in terms of numbers. A sociological approach immediately reveals an issue of quality, because many of those who abandon the country side are young, often educated and always ambitious. The majority of those who stay in the fields are not happy about their life and work, and suffer the frustration caused by the inability to realize the dream of a better life. Things are worsened by the fact that the political weight of urban centres is such that their population is favoured in state care and services to the detriment of the peasants. Can there be a greater disincentive to agricultural growth than the systematic neglect of rural development<sup>(1)</sup>?

(1) See for more detailed analysis, I.S. ABDALLA "Depaysanisation ou Développement Rural? Un choix, jour de conséquences" in IFDA Dossiers No. 9.

### C. SOCIO-CULTURAL EVOLUTION

Man is supposed to be the agent and the beneficiary of development. A review of development policies and performances cannot be complete if it dispenses with the living conditions of the people. In the following pages we will try, despite the terrible dearth of quantitative information, to identify the trends in socio-cultural evolution that have accompanied the economic growth briefly described above.

#### 1. Nutrition and health

Country sources are remarkably discreet when it comes to social indicators. Inter-Arab organizations, interested recently in what is called food security, have not published detailed data on nutrition, while health is one of the rare areas there is no inter-Arab organization. United Nations Publications usually reproduce figures provided by member countries, be they incomplete or inaccurate. To our knowledge, the World Bank takes greater liberties in assessing official country data and produces its own estimates when such data do not exist. We are forced to rely heavily in this section on World Bank publications. Computing some of them, we have been able to build the following two tables. The first deals with "inputs" FOR NUTRITION AND HEALTH, AND THE SECOND WITH "outputs" measured in human life. Needless to say not all inputs are available. We lack data on housing, waste disposal, preventive medicine... etc. But human life comprises all the inputs man receives in all areas related to nutrition and health.

	Food, Water and Medical Care				
	Daily Per Capita		% of population with access (c) to clean water	Population Per (d)	
	calories supply <sup>(a)</sup>	protein intake <sup>(b)</sup>		Physician	Nursing Personnel
Bahrain	—	—	—	—	—
Iraq	101	60	62	2530	3010
Jordan	90	65	56	2250	930
Kuwait	—	—	89	850	280
Lebanon	101	63	—	—	—
Oman	—	—	—	—	—
Qatar	—	—	—	—	—
Saudi Arabia	102	56	64	2220	—
Syria	104	75	75	2510	3810
U.A.E.	—	—	—	—	—
Yemen AR.	83	61	4	18770	7200
Yemen PDR.	84	57	24	9210	1650
Egypt	113	69	66	1190	1150

- Notes:**
- (a) as a percentage of daily requirements.
  - (b) in grammes. Minimum allowance according to F.A.O. is 75 grammes daily of which 23 must be animal protein. Both food figures are for 1974.
  - (c) Water supplies by public authorities or under their supervision.
  - (d) 1976 figures.

With regard to nutrition, the above mentioned estimates are average percentages of a standard average established by F.A.O. for the whole World. To be reduced to using them demonstrates to what extent this vital issue is not subject to systematic data gathering and analysis in any country in the region. Secondly, like all averages, this one is terribly misleading. Enormous income inequalities, especially in heavily populated low income countries, as well as marked discrepancies in income between urban centres, rural areas, and nomadic populations in vast semi-desert spaces, allow the analyst to conclude that the majority of the region's population suffer from different types of malnutrition in varying degrees. Further research on nutrition patterns in different communities and social strata may reveal cases of malnutrition among well-to-do families (e.g. massive reliance on canned food in the gulf area). Except for the Arab Republic of Yemen, the relatively modest percentage of potable water supply reflects the neglect of non-urban areas. The percentages of this table are almost identical with those of urban population. Figures concerning medical personnel show the dramatic lack of health care in some countries. Two further qualifications here. How many doctors and nurses registered in a given country are really practising, and what are the percentages of the retired, the un-declared emigrants and those who practises abroad for a certain number of years? Secondly, what is the urban rural distribution of medical personnel both in numbers and professional competence?

	Death rates and Life Expectancy			
	Infant Mortality	Child Death Rate	Death rate	Life Expectancy
Bahrain	78	—	18.7	45
Iraq	99	38	14.6	55
Jordan	117	16	14.7	56
Kuwait	44	—	5.3	69
Lebanon	59	—	9.9	65
Oman	—	—	18.7	41
Qatar	138	—	—	47
Saudi Arabia	152	—	—	48
Syria	39	14	4.8	57
U.A.E.	138	—	—	—
Yemen A.R.	152	31	20.6	47
Yemen PDR	152	31	20.6	47
Egypt	100	18	12.4	54

Sources: World Bank op.cit. UN Demographic Year Book 1976 and Overseas Development Council: Agenda for Action, 1978. Infant = less than one year; Child = 1 to 14 years.

This table hardly needs comment. The image of human life it illustrates is so sombre that comment seems superfluous. Particularly distressing is infant mortality. The lack of statistics here is in itself revealing of the little value attached to the life or death of a baby. Moreover, the infant mortality rate is, generally speaking, higher — and sometimes much higher — than in a poor country like Sri Lanka (per capita GNP \$200). The best rates in the region (Syria and Kuwait) are more than double the average rate of industrialized nations. Some countries of the region, enjoying among the highest per capita GNP in the World, still have infantile mortality rates of the same magnitude as those prevailing in countries with one tenth or so of their income. Let us refer here to the responsibility of the high infant mortality rate in keeping the crude birth rate high<sup>(1)</sup>. The life expectancy estimates in ECWA countries are below the average of the "middle income countries group" of the World development Report (60 years). The only exceptions are Kuwait and Lebanon. In some cases it is even below the average of the "low income group" (50 years). Further investigation is necessary to identify the major causes of death in countries and areas which are epidemic-free, enjoy good health services and do not have severe malnutrition. Our impression is that "modern life styles" introduced recently bear a certain responsibility in this respect (e.g. fatal car accidents).

Obviously available data reflect at best a "snap shot" of the nutrition and health situation in the mid 1970s. Identifying and assessing trends supposes the availability of a statistical time series. Yet the impression backed by some observation is that neither economic growth nor "sudden wealth" has contributed greatly to the improvement of the situation. Planners and decision makers should design and implement comprehensive policies in this area. Their first step must be to organize and encourage data gathering and analysis by research centres to explore this almost unknown ground.

## 2. Education

In the area of formal education we have a host of data concerning school enrolment; much less of course when it comes to school drop-outs and illiteracy. As usual we start with the available data. (See next table on page 83).

What is striking in the first place is the high rate of illiteracy. The lowest rate is that of Lebanon. It is around 32 per cent, much higher than Sri Lanka (22%), Philippines (13%), Colombia (19%) and Cuba (4%). About 59% of the total population of the region are illiterate, 42% of them in Egypt. As for school enrolment, let us first explain the puzzling figures of more than 100%. Such figures exist in small countries with important numbers of Arab workers from other countries. The common language and the similar organization of the public education systems in all Arab countries allow the children of those workers to join schools in the host country. They are counted in school enrolment but not in the number of children of school age. This said it is clear that some countries have very high enrolment rates (Kuwait, Lebanon). Others have achieved a good performance during the last fifteen years (Iraq, Syria, PDR of Yemen and to a lesser degree Bahrain and Saudi Arabia). After the initial jump realized by Egypt in the fifties, the enrolment rate is tending to stagnate. The important percentage of children without schooling added to the number of drop-outs mean that illiteracy will continue to increase in absolute numbers during the coming decades, though it might decrease slightly in percentages. This is a very serious under-development feature that deserves great attention and high priority. Last but not least, enrolment of females is often much lower than that of males. The negative effects of

(1) For details see I.S. ABDALLA: "Basic Services for the Child in the Arab Region" Third World Forum, Occasional Papers, No. 5.

neglecting women's education are too well known to be repeated here. In historical perspective, however, the analysis reveals a trend toward more equality reflected in some countries in the recent admission of the principle of women's access to education, while in others it is reflected in increased enrolment figures (Syria, Iraq, Lebanon).

	Primary Education and Adult Literacy							
	Numbers Enrolled as % of age group						Adult Literacy rates as % of Total Population	
			Male		Female			
	1960	1976	1960	1976	1960	1976	1960	1976
Bahrain	—	(77)	—	(82)	—	(71)	—	—
Iraq	65	99	94	125	36	72	18	—
Jordan	77	84	94	88	59	79	32	59
Kuwait	117	93	131	98	102	81	47	60
Lebanon	102	—	105	—	99	—	—	68
Oman	—	(40)	—	(53)	—	(26)	—	30
Qatar	—	112	—	—	—	—	—	21
Saudi Arabia	12	47	22	58	2	34	3	15
Syria	65	103	89	121	39	85	30	53
U.A.E.	—	75	—	—	—	77	—	21
Yemen AR	8	26	14	45	—	7	3	27
Yemen FDR	13	78	20	107	5	48	—	27
Egypt	66	72	80	88	52	56	26	44

Sources: World Bank except for figures between brackets relating to 1975 and extracted from ECWA statistical Abstract).

So much for formal basic education. But children of the region suffer from shortcomings and inadequacies in informal education. Nobody is producing appropriate toys for Arab children. Literature and specialized magazines are, generally speaking, translations and adaptations from Western sources, and not always the best. On the contrary, they are daily exposed for hours to television programmes whose quality is sometimes doubtful. Finally, there is the complex issue of the relevance of both formal and informal education in the region to endogenous self-sustained development. Given its importance, it deserves a whole set of investigations, studies and analyses.

### 3. Income distribution

(a) **Within countries:** Wealthy or poorly endowed, industrializing or making the first steps along growth paths, large or small, all ECWA region countries have so far abstained from publishing income distribution data. As far as we know no governmental agency or local research centre has ever embarked on serious work in this area. Several countries have gathered information on family budgets but these are of little interest for the student of income distribution patterns. One cannot rely on samples of family budget to calculate the Lorenz curve or the Gini coefficient. A scientific analysis must not be based on impressions. Therefore, all that we can assert here is the obvious poverty of the majority of the population in all non-oil surplus countries. There is also evidence of great wealth concentration and the persistence of pockets of poverty in rich countries. Nationalization and land reforms modify the pattern of income distribution. But to what extent? The question remains open. This is not only a problem of social justice. All modern development literature emphasizes the fact that inequality reduction is instrumental to sustained growth. The economists of the World Bank after holding for years that income inequalities might help in bridging the "investment gap" now advocate that reducing inequalities is conducive to more growth<sup>(1)</sup>.

(b) **Between countries:** Discrepancies in per capita GNP in the ECWA region are the most striking in the World. The highest (Kuwait) is almost forty times the lowest (Egypt). According to World Bank figures no country from the region belongs to the low income group (\$300 and less). Four countries have per capita GNP comparable and in some cases superior to the average of industrialized countries (\$6,980). This state of affairs would not raise problems, if the countries of the region did not have the special relations we have referred to previously. The common culture plus the

(1) H. Chenery et. al: "Redistribution with Growth" Oxford University Press, 1979. See also the now classical work of I. Adelman & C.T. Morris: "Economic Growth and Social Equity in Developing countries" Stanford, 1972, on poverty and growth see Robert S. McNamara: "One Hundred countries, Two Billion People".

geographical relationship leave no single country isolated from the others, nor can any one of them afford to be indifferent to events surrounding it.

Several articles and some studies have dealt with the negative effects of "sudden wealth" within the oil countries and in the region as a whole<sup>(1)</sup>. Here we limit ourselves for the moment to those effects directly related to tremendous income disparities among countries otherwise linked by so many ties:

— **Brain and skill drain from the relatively poor countries.** As we mentioned before the oil money attracts great numbers of workers to countries where ambitious growth schemes are undertaken, and the lavish life styles call for countless types of services. Wage rates incommensurate with those prevailing in the other countries attract into the migration flow the best qualified and most dynamic elements. The problem is not one of sheer numbers. Some of the labour supplier countries have sizeable unemployment. Still, the unplanned and rapid migration has left no chance of adequate replacement through appropriate training. The quality due to inborn talent or acquired experience is hard to replace even in the medium term. This state of affairs is reflected in the higher costs and longer periods of implementation of new projects, and in some cases the poor maintenance of infrastructures, as well as the low productivity of labour.

— **The remittances do not compensate for this drain.** There is much ill-feeling about wages and salaries paid to Arab "guest" workers in comparison to those received by foreigners. In any case, money is not a proper substitute for qualified people. It has been said that some supplier countries are forced to import labour, often at higher wages, in particular when it comes to professionals with recognized expertise. Moreover, not all the money remitted is invested. There is, on the contrary, strong evidence that the largest portion goes on consumption. We will deal shortly with the life-styles' aspect of this phenomenon. Now we only refer to its immediate economic effect i.e. the inflationary pressures it creates. As a matter of fact, uncontrolled labour migration gives birth to cost-pushed inflation by the labour shortages it leaves behind as well as demand-push inflation by the greater propensity to consume fed by the remittances.

— In the wealthy countries, exceptionally high incomes generated by the oil revenues may become a **disincentive to local labour and labour productivity**. The people tend to believe that money can buy anything including development. The tendency to hire non-nationals to each and every job leads in the final analysis to minimizing the interest in human, social and cultural development. The spread of the "turn-key" type of contracts beyond areas where sophisticated technology and equipment are necessary simply means more reliance on the outside world, in other words more dependence.

— The availability of substantial financial resources lead towards **conspicuous, if not outright extravagant, consumption**. Realizing that oil is exhaustible and that world inflation systematically reduces the real value of financial assets, governments rush to implement "development projects", sometimes astounding in their number and size. Such a rush based on feasibility studies performed (and often proposed) by Western consultancy firms, and "turn-key" contracts with transnational corporations, give the industrialized world and its TNC's a major role in shaping the future of the economy and the society. This is not without serious risks of economic losses, in addition to the threat to the independence and the cultural identity of countries.

— The feeling of polarization between rich and poor countries, with the precedence given to financial wealth over all other factors of development, produces frustration and bitterness on one side, and excessive self-confidence coupled with suspicion on the other. Thus, it becomes a major obstacle on the path of regional integration, unless present patterns of economic growth and life-styles are seriously reexamined with a view to the achievement of overall, self-centered and self-sustained development<sup>(2)</sup>.

#### 4. Life Styles

The sudden<sup>(3)</sup> intrusion of the "consumer society" with its paraphernalia of goods and gadgets into the desert environment reputed as traditionalist of the oil countries has been and still is the favourite topic of comment in the region, as well as in international mass media. We naturally dismiss the ill disposed comments of certain Western media. There is no reason to blame the extravaganza of rich Arabs more than that of their western peers, unless there is a certain racism behind the argument. But this is not the case of all critics, even from outside the region. Indeed, economists have a point when they denounce excessive and wasteful consumption of oil revenues as an unhealthy phenomenon. Oil being depletable, cohesion between the generations necessitates prolonging the life span of its deposits, and at the same time the conversion of its revenues into new productive assets. Moreover, the interrelations among the countries of the region being what they are, the new life styles and social values attached to consumption are propagated beyond the borders of the rich countries not only by the general effect of demonstration, but also because of the very important population movements across the region, in particular workers from countries who return home with new consumption habits.

(1) See a good exposition: Yousif B. Sayigh: "The social costs of oil revenues" proceedings of the Arab Energy conference, and also Abdel Fadil op.cit.

(2) c.f. Adel Hussein, "Negative effects of income differentials among Arab countries" in Al-Mustakbal Al-Araby, Jan 1979 (In Arabic).

(3) Two factors contributed to the sudden increase in oil money in the region: new discoveries that took place in the late sixties and early seventies, and then the jump in prices.

Educationalists are worried by the fact that those who have the financial means to import the products of Western civilization do not care enough about ensuring the existence in their countries of the factors that contributed to the advancement of the West, namely scientific progress, hard work, perseverance and discipline. Sociologists raise the issue of cultural shock resulting from the conflict of two sets of coexisting values: the traditional values still cherished officially (and sometimes legally binding) and the irresistible penetration of alien values of all types. For psychologists this state of things can be detrimental to the psychological balance of the individual, and not only to social interrelations. Finally, many Arab thinkers start questioning the chances of survival of the cultural identity of the region, not to speak of those of integration and unity. Some of them express their dismay and anger at this rush to adopt styles of life that are increasingly subject to criticism in their land of origin.

All this is true. One can expand and add further misgivings. But it is unfair to concentrate one's fire on the oil rich countries, because those countries did not opt for a path radically different from that prevailing elsewhere in the region. As a matter of fact, they are simply doing more of the same, because they have the means to do so. Moreover, the notion of waste of resources in each country must be related to the amount of available resources. From this standpoint, some non-oil countries might be more wasteful than those who are ten times richer.

It is central for the analysis of life styles which are being transformed, to understand the origins of the process accelerated by but by no means introduced by the oil money.

It should be recalled that since the early years of "AL-NAHDA" (Arab renaissance), there has always been a certain ambiguity in the prevailing concept of "modernism". Two extreme attitudes regarding modernization have to be mentioned, because they are symptomatic of trends resurging periodically although more attenuated and with different ways of expression. The first is symbolized by what Ismail, Khedive of Egypt, said some hundred years ago. "I want Egypt to become part of Europe"<sup>(1)</sup>. At the other end there was the complete isolation of North Yemen from the outside world (including neighbouring countries) under the Imams' regime. The mainstream of Arab thought at the official and intellectual levels has been, without classification, to learn science and technology from the West, in order to achieve material progress and intellectual values. During the last decades marked by "development efforts", this meant roughly aiming at mimetic patterns of economic growth, and simultaneously asserting attachment to cultural differences.

This way of thinking implicitly admits certain assumptions which are hard to hold when made explicit. Firstly, there is the assumption of the feasibility of a "remake" of the historical pattern of growth in Western countries, despite the far reaching changes in the international environment and the existence of constraints imposed by such factors as dependence and exploitation. As we have already emphasized, the growth of Western capitalism took place when the rest of the world was considered by Western powers as "no mans land" to be divided among their respective spheres of influence. Their nascent might had not been challenged from outside. On the contrary, it was western nations who conquered the others. On the other hand, this growth itself submitted Third World countries to a world order where they do not share wealth and power, but are entangled in a web of power structures that limits their freedom of action.

The second assumption — more relevant to the topic of life styles — is that economic growth will lead to social progress and cultural advancement, without any special attention given to social justice and cultural development. Reference to the modern critiques of the theory of "trickling down effects" of growth and the like suffices to show how far such an assumption fails to correspond to the actual evolution of the "successful cases" of growth in different parts of the "Third World"<sup>(2)</sup>. As we have seen, the social indicators of the region — including the available ones for fabulously rich countries — are not among the best in the Third World. The city states aside, poverty or absolute poverty is in many cases the condition of many people. This means that the ECWA region knows the negative environmental effects of both excessive wealth and extreme poverty in the same time.

The third implicit assumption is that economic processes are socially and culturally neutral. Nothing is less true than such an assumption. Economic processes involve people and change their conditions of living and even their behaviour and social values. When a tribal structure, with no or little class differentiation, undergoes economic growth, it becomes a class society with a new social stratification, even though the authorities may secure substantial income increases for the poorest. A country may proclaim itself socialist and proceed to radical income and assets redistribution measures. Then, as a result of the pattern of economic growth it adopts, social differentiation grows again, the talk about the "new class" in such cases is familiar. Likewise, the automobile is not simply a means of private transportation; its generalized use leads to what some authors call the "car culture"...

The oil money has been instrumented in revealing the built-in contradiction of the Arab approach to modernity. By accelerating the invasion of the region by Western life-styles, it cruelly focussed attention on the schizophrenic nature of the prevailing attitudes and the social, cultural and political tensions and environmental threats they entail. The picture of life styles in the region offers the following striking features:

— Feverish accumulation of material goods and gadgets that make up the "glamour" of the consumer society in

(1) A policy that has been literally implemented in Turkey in the aftermath of world war I by K. Ataturk. Half a century later, the current events are not unrelated to that policy.

(2) See I. Adelman and C.T. Morris: "Economic Growth and Social Equity in Developing countries", 1973, now looked at as the standard book on this topic. Also: M.S. Ahluwalia, N. Carter and H.B. Chenery: "Income Distribution and Poverty in Developing countries" World Bank staff Working Paper No. 309, May 1979, J. Bergsman: "Growth and Equity in Semi-Industrialized Countries" World Bank staff working Paper No. 351, August 1979.

the eyes of Third World elites, while the recent worry in Western societies about the quality of life is totally absent. Enough attention is not given to such phenomena as overmedication, health hazards in imported food and beverages, identification and measurement of pollution use and protection of natural landscapes and historical sites, use of leisure time... etc.

— The inappropriateness of some imported goods and techniques is so obvious that it becomes difficult to understand the demand for them. Examples are numerous. Just to quote a few, let us refer first to architecture. Appropriate and aesthetically valuable Arab architecture is abandoned for concrete and glass buildings in countries where the temperature oscillates between 40° and 50° most of the year. To remedy the inconveniences of such an environment, air conditioners are a must everywhere. Beside the energy consumption this entails, air conditioners make the street air more unwholesome. Other examples include the rush to purchase high-fidelity stereophonic sets to be used mainly to listen to arabic music which is basically monodic, the extensive use of polyester and other synthetic fabrics in a climate where cotton is more convenient for perspiration... etc.

— The demonstration effect pushes everybody to the limits of his financial means to follow the example set by the wealthy. Needless to say, this consumption fever is detrimental to savings, so necessary in most countries to raise the rate of growth. Focus on goods and gadgets leads the individual, and in some cases the society as a whole, to neglect the non-material human needs, such as access to knowledge, human rights, good health (as opposed to curative medicine)... etc. Moreover, when financial resources fall short of allowing the satisfaction of endless material desires, the attempt to achieve this satisfaction develops individualism, weakens family and other social ties, and endangers some of the basic moral values much cherished in the region so far.

— The coexistence of Western life styles side by side with some traditional values, maintained by law (like the prohibition of alcoholic drinks in some countries) or by the power of tradition, and the sudden exposure of some social groups (women, children) to images of life in Western countries, is accompanied by feelings of uneasiness, frustration, psychological tension and social conflicts, even though they do not surface often and are not publicized.

— The indiscriminate admiration for the West is thus shaping tastes and values at large, and thereby reinforcing the preexisting tendency of planners and decision-makers to look toward western nations, in their search for solutions to every problem they face, notwithstanding the dissimilarities of the situations. The "ready made" formula becomes the rule, not only in consumption but also in project identification, feasibility studies, plant erection, urban development, health services, education, national defence... etc. There cannot be any better description of dependence.

## CHAPTER THREE

### A KEY NOTE ON

## ALTERNATIVE DEVELOPMENT STRATEGIES AND LIFE STYLES

No single person or group of persons can claim the ability nor the right to elaborate a comprehensive development strategy for a country and even less so for a whole region. A strategy for development is above all the choice of a definite type of society, a societal project as it is fashionable to say nowadays; hence its eminently political character that calls for decisions democratically taken by the people concerned. In the second place, such a strategy should contain several sets of consistent actions, measures and projects in all areas of social life, corresponding to the objectives of each period within the relatively long time span necessary for the attainment of the goals aimed at by the society and governing the strategy. In the third place, development being in the last analysis the shaping of the living conditions of the people, any strategy implies an impact on life styles. The more explicit and precise this impact the better it is with regard to the assessment of the chances of implementation and the people's mobilization. Accordingly, the following considerations can be nothing more than a "Key-note", an attempt at the identification and presentation of the basic themes around which variations may be infinite. These themes need not be invented. At the close of this decade, they constitute the pillars of the "new conventional wisdom prevailing in what has been described as the new development thinking"<sup>(1)</sup>.

### I. Self Reliance: From Grassroots to the Whole Region and Beyond

#### A. REDEFINING DEVELOPMENT

##### 1. Development is not always good

A positive value judgement has been attached to the term "development" ever since Third World countries have started to change the inherited conditions of their economies<sup>(2)</sup>. One can hardly find two authors in full agreement on what development really means. Yet, almost all of them assume, often implicitly or as something that goes without saying, that development is always good. Critical assessment of some patterns of development led some authors to qualify this. Maybe the best known attempt in this respect was "**another development**" coined by the authors of the rightly famous **Dag Hammarskjöld Report**. In the early 1960's Charles Bettelheim, speaking about underdevelopment, explained that in fact it was a distorted "deformed" development<sup>(3)</sup>. Other authors describe what they call "maldevelopment"<sup>(4)</sup> with the obvious intention of distinguishing "bad" from "good" development.

At the root of this persistent high regard that the term enjoys, notwithstanding all the recent criticism, may well lie the fact that it has been borrowed from biology. For more than a century economists have been fond of mechanistic approaches and tools. Neoclassical Economics, in its claim for timeless universality, is built with tools borrowed from physics since the laws of theoretical physics were reputed to be universal and eternal (at least before Einstein's General Relativity Theory).

The so-called "development economists" departed from this much-honoured attitude and reverted to biological analogies reminiscent of those of the Physiocrats. This deserves some thought. How did it happen that an old style has been exhumed? The explanation is almost purely ideological. The basic assumption being the "developed market economies" are the natural state of things, the situation in the former colonies - so different from the norm - needed an explanation. It could be easily found, in their opinion, when one observes the resemblance between those economies and the early years of Western capitalism. Paradoxically, the role of world capitalism in shaping them was completely overlooked in favour of the more superficial view of simply impeded evolution that can be remedied within a reasonable time span, provided adequate medicine is ably administered. The treatment of such a pathological situation amounted in practice - and this was quite logical - to the development of a set of more or less sophisticated recipes and techniques, baptized "Development Economics", outside the main body of "economic theory" which to be concerned with normal situations.

The concept of "equilibrium", the centre piece of Economics, implies only incremental changes, while the "developing economies" have to undergo mutations similar to those that occur during the passage from childhood to the adult state. An adult may be better or less well built, yet he will definitely be more able to cope with the difficulties of life

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(1) See about the "State of the art": O. SUNKEL: "The Development of Development Thinking" I.D.S., Sussex 1979.

(2) Even before the widespread use of the term, when J. Schumpeter some fifty years ago introduced into economic jargon for the first time the German equivalent of development ("Entwicklung"), he bestowed on it a positive value judgement. It meant for his analysis "innovation" that from time to time imprints a "leap forward" on the curve of economic growth. To him, only those capable of introducing innovations entailing changes in the structure of the economy deserved to be called entrepreneurs. The others are just managers.

(3) Ch. Bettelheim: "Planification et Croissance Accéleée", Maspero, Paris, 1964.

(4) See, for instance, the recent writings of Ignacy Sachs.

than a child. Only adults are citizens of the realm of Economics. The handicapped "young nations" have to "develop" into adult nations at the price of great sufferings and with the help and the tuition of the already "developed" ones. Nothing is more remote from this "imagery" than the hard socio-political realities of our concrete world. Societies, unlike living beings, do not follow a unique and preprogrammed life cycle. If it were otherwise, why not continue the analogy and consider the maturity and then the decay of "developed" societies? Every social formation exists in specific concrete conditions of time and space. Similarities in the evolution of human communities have been less striking than the differences; and this is still true in spite of the uniforming and standardization processes engendered by the expansion of modern capitalism.

History never repeats itself, nor is there any possibility of a "remake" of historical events and processes. On the other hand, change is the essence of existence. All societies have been and remain subject to evolution; the "stationary state" is a pure abstraction. This evolution may be for the better or the worse, the distinction often being based on value judgement. Let us then demystify the term "development" and make it a professional code name for change or evolution without any predetermined positive (or negative) content. Keeping in mind that modern capitalist expansion and power structures have omitted nobody - not even the Australian aborigines or the Indians of the Amazon - we can safely state that all nations develop. Then the concrete development of a nation may be good or bad according to the yard-stick used; the interests of the people concerned and/or the ideological stand of the analyst.

## 2. Underdevelopment is Bad Development

Proceeding along these lines, we can better understand the essence of underdevelopment and, by the same token, resolve an apparent contradiction in its analysis. It would suffice to dismiss the "historical gap" theory to point out that those who hold this view are unable to provide a satisfactory and generally acceptable explanation for such a delay. If we had to stick to biological images, we would have said that former colonies are not children, but adults suffering from very severe malformations. But we need not follow the wrong path. The facts (and not the images) can explain the phenomenon in a more realistic and coherent manner. Colonial powers did develop some sectors of the economies of the colonies and some aspects of their life. They did so, needless to say, with a view to their own interests. Therefore, those sectors and aspects that attracted their attention overdeveloped in comparison with the other sectors and aspects, and became very much linked to industries in the colonizing nations. The outcome has been distorted, extroverted and dependent societies.

My own country Egypt is a good illustration in this respect. During the first decades of the 19th century, under the leadership of Mohammad Ali, the country embarked on a "modernization and industrialization" effort, not without similarity to what Japan did in the 1870s. The experiment was smashed by a coalition of European powers which intervened militarily against Egypt. Then came the British occupation in 1882. The colonial power decided that a cotton mono-culture was the best use it could make of the new colony, given its historical agricultural tradition and the "comparative advantage" of the long staple cotton it could produce. Hence nothing was spared to promote cotton. Irrigation and drainage projects figured at the top of public investment. Ginning and pressing industries were introduced. Egypt built its first railway as early as the 1850s, because cotton had to be gathered from all over the country and carried to the port of Alexandria where it used to be shipped to the Lancashire textile mills. A modern banking system was established to finance the cotton trade. The Alexandria Cotton Exchange was as well organized as that of Liverpool. Scientific and technological research was financed in order to develop new varieties of cotton as the current ones started to deteriorate. Judging that plantation systems would be inadequate, the colonial authorities decided to rely on nationally-owned latifundia. The new civil code promulgated in 1883 recognized, for the first time in our history, exclusive private ownership of agricultural land. Later, the 1923 Constitution made a landed property one of the conditions of qualification for membership in the Senate. The other side of the coin was the shameful neglect of education (the first modern university was financed by donations and public subscription), health and, of course, industry, since Egypt had to import cotton textiles from England. Even in this agricultural country cereals and other food staples were not given due attention.

Thus, there is no contradiction between our overall negative evaluation of development under colonial rule and the "achievements" that in fact took place. Almost everywhere the colonial authorities built roads, railways, harbours and also some schools and hospitals. They even initiated a few young people into the "Mysteries of modern civilization". Yet this led to the hypertrophy of some sectors and activities side by side with the decline and dislocation of others, and to greater class differentiation. Even in the rare cases where the net result was not greater impoverishment of the majority. It is allowable to suppose that a more balanced and self-centered development would have yielded radically better results. The main characteristics of underdevelopment being distortion, extroversion and dependence, economic growth (measured in terms of GNP) and even some industrialization can be recorded while the country remains underdeveloped. Moreover, if such growth is oriented outwards and aggravates the distortions of the economy and the society, it leads to greater dependence. Thus, the underdevelopment characteristics become more pronounced. That is precisely what was meant by the authors who diagnosed the evolution in certain countries considered conventionally as good development performers as the "development of underdevelopment"<sup>(1)</sup>.

(1) A. G. Frank: "Lumpen Bourgeoisie et Lumpen Development" Maspero, Paris 1971; Samir Amin: "Le Developpement Inégal" Paris 1973. See also: Galal Amin: "The Modernization of poverty" Brill, 1974.

### 3. Good Development is Economic and Cultural Decolonization

It follows from this concept of underdevelopment, without any further demonstration, that good development consists essentially in undoing the ties of dependence, correcting distortions and achieving the internal integration of national economies.<sup>(1)</sup> In other words, a country will be considered to be developing well only in so far as the changes introduced into the economy and the society as a whole lead to a balanced, self-centered and independent development. Indeed, the biggest mystification of the post-colonial era has been the dissociation of development from liberation. While the latter cannot be imagined but as a struggle against the foreign oppressor and his local agents, the former was presented as the result of close co-operation with the adversaries of yesterday. This view is obviously highly ideological, since it masks the real nature of imperialism, i.e. economic exploitation through foreign appropriation of the economic surplus, and reduces it only to its most visible and humiliating features: occupation armies and colonial officialdom. The more or less forced and total withdrawal of troops and colonial civil servants was thus considered enough to wash away all the sins of imperialism. After accomplishing this act of repentance (or redemption), the former colonial powers become the indispensable angels providing aid and assistance to the "newly born" nations in their endeavour to attain full, adult nationhood.

Once more, the idyllic image reflects nothing of the sordid realities of subtle, but ever-increasing, domination and exploitation. Imperialism is, in the first place, an enterprise of exploitation. It is true that exploitation cannot continue without domination. But military occupation and direct foreign rule are not the only ways to ensure control over the decisions of governments and people who are supposed to enjoy full sovereignty. With the upsurge of the national liberation movements, in particular in the mid-fifties after Bandung and the successful nationalization of the Suez Canal, traditional colonialism became more and more expensive and even - in some cases at least - counterproductive<sup>(2)</sup>. Settler colonialism alone offers obstinate resistance to this trend. Foreign settlers who occupied a country could not tolerate the universal rejection of cold colonialism. Israel and South Africa still defy world public opinion and pursue aggression and domination in the name of "racial rights". However, neocolonialism spread as occupation troops retreated. It is exploitation backed by all the "power structures" that still encroach heavily on the newly acquired independence. These power structures are: military might, factors of economic strength, (industry, technology, money and finance...) and cultural dominance (education, information, communication...)<sup>(3)</sup>. The forms of exploitation are manifold: adverse terms of trade, transfer of profits and interests, costs of shipping, insurance and marketing, depletion of natural resources, brain drain, cheap labour - on the spot or by migration,...etc.

The remarkable fact in this respect is that, in almost all cases, development efforts - especially those undertaken with the assistance and under the aegis of Western powers - have deepened the dominance/dependence relationships, with their natural corollary - growing exploitation. The characteristic features of underdevelopment - distortion, extroversion and increasing income inequalities - become more marked, even though the rates of growth of GNP and industrial output and export of manufactures sometimes seem spectacular, at least at first glance.

#### B. SELF-RELIANCE IS THE PATH TO GOOD DEVELOPMENT

##### 1. Self-Reliance is Not Autarchy

Since objectively industrialized nations cannot take care of our development, we have to rely on our own means; hence the call for self-reliance. One need not repeat again that self-reliance is not autarchy. This has been said enough.

Let us only recall here that the trend toward closer relations and more intensive exchanges of all kinds among all countries is bound to remain and even to gain momentum. What we are questioning is the unequal nature of exchanges between Western countries and those of the Third World; the imbalance in the foreign trade of the latter which secures a dominant position to Western countries, and the distortion this state of affairs imposes on Third World economies with all its negative effects. Consequently, what is at stake is to correct the situations impeding good development. The objective has been clearly set by the phrase: delinking with the present unjust World Order precisely in order to relink later on better conditions: more South South exchanges, less unequal terms of trade with the North...etc.

But a concept should be defined positively and not negatively: by what it does mean and not what it does not mean. Definitions are always hard to formulate accurately, especially in social sciences. We have no intention of providing here an elaborate definition of self-reliance. We have in mind only what the term conveys etymologically: for a nation to rely on its own means in its multiform efforts aimed at getting rid of the stigma of bad development.

##### 2. Self-Reliance is the Central Element in Alternative Development Strategies

What does a nation have in the first place? The answer is so obvious, but too often overlooked: **the energy of its**

(1) See for a similar approach, Denis GOULET: "Development as Liberation" in IFDA Dossier No. 3, January 1979.

(2) When P. Mendes-France signed the peace treaty in Vietnam, in 1954, he declared that the Indo-China war had cost France much more than it had received as aid out of the Marshall Plan. Aware of the costs of the Algerian war of liberation, de Gaulle decided to recognize en bloc the independence of almost all France's African colonies. The same happened, in a less spectacular way and over a longer time span, with the British colonies in Asia and Africa.

(3) For more detailed analysis of power structures, see I.S. ABDALLA, "Heterogeneity and Differentiation: End for the Third World" Development Dialogue, 1978:2.

**people.** Hence self-reliance is, before everything else, reliance on the people. Thus man, relegated for a long time to the shadows emerges to fill the centre of the stage. Man reconquers his legitimate place in development, both as agent and as beneficiary. Thereby, the din: ding of development into economic, social, cultural,.... etc., (which has so far helped only to emphasize economic growth as the engine for change) loses its place absolutely since man cannot be divided. Furthermore, reliance on man enhances the **development software**: health as well-being, education as free access to knowledge and information, useful employment as a means of self-fulfillment... **Development hardware**, i.e. machinery, factories, vehicles... is important because it helps in promoting the software, and should be developed accordingly.

On the other hand, since reliance on the energy of the people is so central, the question of motivation comes naturally to the fore. Why should people work hard or leave their country? Or, in other words, how can they feel concerned and get involved? The answer once more is self-evident: if and when they believe that the fruits of their endeavours belong to them, and when this is actually so. It is now the new conventional wisdom to stress the desirability of reducing income inequalities. But such a target cannot be achieved through the combination of free profit maximization and corrective state measures (taxation, social security...). This has been possible in to-days industrialized nations, because of many unrepeatable historical factors among which not the least important was the drainage of the economic surplus from the colonies.

In Third World countries, the crucial issue is the availability and accessibility of goods and services that satisfy the needs of the majority. Furthermore, in the rare cases of exceptionally high returns generated by a natural resource, securing supplies of most goods and services from abroad goes against the concept of self-reliance. Idle people benefiting from state "largesse" do not rely on themselves and tend to become clients. Producers contributing their endeavour for the satisfaction of their needs are the basis of self-reliance. Thus, self-reliance leads necessarily to reshaping the economy and the society in order to meet the **basic needs**. This concept, hijacked by the international aid establishment, sounds almost like a dirty word in the ears of many Third World people. The fact of the matter is that all needs are basic provided we make the necessary distinction between the need *per se* and the desire of fixation on some of the objects considered as satisfying that need. Inflated purchasing mania is a pathological phenomenon created by big business. In most Third World countries, levels of satisfying human needs will be close to subsistence level. Of course, things have to improve, but consumption growth will have to be rational.

This reshaping of the economy and the society will gear most activities towards the "home market", at the expense of the present patterns of foreign trade. In other words, it will produce the famous "selective delinking" from the Centre of the world order. This in turn will assist the internal integration of the national economy by abolishing "enclaves", "dual economies" and the like. Development becomes **self-centered** instead of being extroverted.

But man does not live on bread alone; he does not only have needs but also rights. The human rights issue in most of our countries is crucial. Almost everywhere in the Third World basic freedoms are denied in varying degrees, and often in the name of development requirements. Yet it is insufficient - and often unrealistic - to imagine that democracy through representation can be the solution. Without expanding on the fate of experiments with this in the Third World, we want to emphasize that development as described above needs more than freedom of opinion and universal suffrage. It needs **participation** in the process of decision-making at all levels and in every area: the family, the village, the community, the urban neighbourhood, the co-operative, the school, and the hospital, ... etc. Self-reliance cannot be effectively implemented without a radical change both in mentalities (a kind of cultural revolution) and in socio-political structures. Self-reliance is both a means and an end at the same time. Participation achieves its full meaning when it is coupled with the duty of the group at every level as much as possible to solve its problems by its own means. Thus, while enjoying their legitimate rights, people reduce the share of development effort which rests with the central authorities.

We have deliberately insisted on the "people'd energy" as the driving force for good development. Now one should add that man lives within a physical environment that conditions his activities to a great extent. Self-reliance implies that the nation should draw on this environment in a rational way. It should avoid as far as possible depletion of non-renewable resources, and use the renewable ones in such a manner that sustainability is guaranteed. Relying on its own resources makes a nation more aware of such considerations and prepares the ground for practicing **ecodevelopment**.

Last but not least, national self-reliance can be enhanced by **collective self-reliance** at sub-regional, regional and all-Third World levels. Nationalism as an anti-imperialist drive is objectively progressive. Rejecting collective self-reliance in the name of national sovereignty is a misuse of the concept, since its outcome is certainly the weakening of the anti-imperialist position. On the contrary, collective self-reliance is the only way for Third World countries to reinforce national development efforts and to deal with the tentacle-like grip of the TNCs. This last point must be elaborated upon in this section before addressing ourselves to the other elements of alternative development strategy in the following sections.

### C. COLLECTIVE SELF-RELIANCE

Starting at the grassroots, self-reliance at the country level can only be strengthened by regional - and for that matter all Arab - collective self-reliance. This is not a new "trade-mark" for an old product, i.e. economic integration.

**Collective self-reliance is a collaborative joint development endeavour undertaken by a group of countries in order to accelerate the overall development of each one and of all of them by making their efforts mutually reinforcing.** Therefore, the disenchantment with the poor results from the impressive treaties, accords and agreements signed by all Arab states, or by some smaller groupings among them, with the declared purpose of promoting integration and unity, is no argument against the feasibility of collective self-reliance. In fact, the concept of economic integration is imprecise, static and irrelevant to development, while collective self-reliance is a dynamic concept that should be fundamental to development strategies. Integration as a concept has a history a knowledge of which shows how useless the concept is in the case of Third World countries.

### **1. A Critique of the Concept of Economic Integration:**

The "pure theory of economic integration" stemmed from the neoclassical international trade theory. Its main object was to measure the positive and negative effects on world trade of such legal institutions as free trade areas, customs unions and common markets. This static or comparatively static approach can hardly be defended even in the case of industrialized countries; it is completely incompatible with the dynamics of "developing" economies. As historical approach would have been more appropriate in this respect. Anyhow, we dismiss the definitions of "integration" offered by the different authors who have dealt with this subject because they are too closely attached to the institutional (legal) framework and overlook the socio-economic nature of the integration process and both its time and political dimensions. However, we would not propose a new definition to be added to the existing list, because we are convinced that a good part of the confusion is due to the fact that the same term is used to cover processes which are different in nature, scope and mode of operation. Let us try some classification.

#### **A. INTERNAL INTEGRATION**

The first process that can be rightly called integration is the formation of Western "national economies". It is not true that the existence of a central power controlling all the territory of country can by itself realize the integration of its economy.<sup>(1)</sup> In ancient times, for instance, the Roman Empire never tried to integrate Italy not to mention all its other territories into an integrated "Roman National Economy". The same can be said of the Arab Islamic & the Ottoman Empires, to keep closer to the region's own history. Nowadays many Third world Countries have not yet achieved the integration of their national economies. This objective, on the other hand, has been attained by industrialized countries. A view on how it happened may give a fair idea the complexity of the process. The transformation of the agglomerations of feudal fiefs in Europe and the confederations of white settlers in North America into nation-States merits some of our attention in order to understand better the similarities with and differences from to-day's problem. Firstly, one can observe that this process took place over a very long period of time: several decades at least, around two or three centuries in some cases. Secondly, integration of the national market was intimately linked with the rise of capitalism, and in particular the growth of modern industry. The integration of the national market was the product of one of the basic characteristics of the capitalist mode of production, i.e. the growing "socialization of production". By socialization is meant that as a result of the specialization and the division of labour every productive activity needs "inputs" from a growing number of other activities, while its products will satisfy a growing number of indirect or direct users. In other words, modern industry employed integration in the production sphere. Intra and inter-industry exchanges within the national economy were imposed by the new mode of production and not the other way round. This last remark is central to the debate, since integration theories and most practices in the Third World have been concerned primarily, if not exclusively, with the sphere of exchange. Thirdly, from this point of view, the people who fought for integration, and thereby were the first to benefit from it, were the capitalist entrepreneurs or more broadly the bourgeoisie. Fourthly, this process was by no means peaceful; the modern industrialized nation-States have been established through feudal struggles, revolutions, civil wars, repressions and wars. Finally, the integration of these national economies, having been effected through market interplay, produced inequalities among social groups as well as among regions in the same country.

#### **B. INTEGRATION BY COLONIZATION**

In parallel with the formation of national economies, Western powers were proceeding with another type of integration in which inequalities were outright exploitation: the building-up of the colonial empires. The most spectacular aspect of this conquest of the globe, the one that usually retains the interest of historians, was the use of military force to conquer countries and subjugate their populations. But colonial wars were the means for economic exploitation. The perpetrators were again "business people", from the "company of Merchant Adventurers" down to the oil "Seven Sisters", colonial companies, banks, manufacturers, trade enterprises, shipping firms... etc. They established the close web of ties that integrated the economies of the colonies into those of their metropolis. The essence of this integration was ill-reputed division of function: raw materials for the periphery, manufacturing for the countries of the Centre<sup>(2)</sup>. What should be added here is that colonial integration, like the integration of the national economies, created relationships of interdependence in the sphere of production: factories in the Centre cannot operate without

(1) This misconception is among the causes that have led to the collapse of the unification of Egypt and Syria (1958-61).

(2) More bluntly called in the 18th and 19th centuries "the colonial pact" as if it were negotiated.

the raw materials coming from the periphery, while the economies of the periphery were shaped in order to produce mainly for those factories. Exchanges were only the normal result of specialization in production. Again the people who established this integration were in a position to draw the maximum benefit from it.

### C. TRANSNATIONAL INTEGRATION OF CONTEMPORARY CAPITALISM

After the Second World War, it became obvious that major wars which used to be instrumental in the growth of capitalism must be avoided. In the meantime, the emergence of a powerful group of socialist countries in ideological confrontation with world capitalism and the high momentum of the national liberation movements in the colonies made clear to "big business" that the fight for the control of markets and sources of raw materials would take new forms. Whenever the "national market" was dwarfed by the size of the giant national enterprises, they found it in their interest to create a joint and larger economic forum. The European Economic Community - the show piece for all integration experiments in the Third World - was set-up formally by the Rome Treaty. But this legal consecration was meant to promote further a process started years before: the transnationalization of big European corporations co-operating with the American corporations. Thus, the TNC's are the real element which made the EEC a success. But the phenomenon of transnationalization goes much further. With European and Japanese investment in the USA, one can see how the transnational strata of contemporary capitalism is horizontally integrating in global and powerful networks. In each capitalist country, contradictions are visible between the interest of TNC's based in the country and the other segments of local capitalism. The mechanisms that in the first phase of capitalist expansion produced the integration of national economies are becoming to-day factors of "disintegration" as in those same economies. On the other hand, the TNC's are the main catalysts in the process of deepening the integration of the periphery with the centre after the collapse of colonialism.

### 2. Contents, Conditions and Tools of Collective Self-Reliance.

Modern integration processes, formalized by intergovernmental treaties or implemented by agreements between TNC's, have as an objective to co-ordinate as much as possible the existing production capacities and to harmonize incremental growth. Arab countries, like other Third World countries, are concerned with development, i.e. structural changes and the multiplying of production capacities. This goal cannot be approached without gaining freedom from the control of Western capitalism and its TNC's. This is why we have defined collective self-reliance as a joint and collaborative development endeavour, development being conceived as economic and cultural decolonization. It can materialize when a certain group of countries have obvious economic interest and enough political motivation to combine their efforts systematically and durably in order to reduce the burden of the dependence/exploitation relations that link them to the centre of the World Order. The success of such an endeavour will depend on several factors among which we would like to single out: the political will, the proper development strategies and the appropriate tools and institutions. The political will can arise from a common national culture, feelings of the similarities of conditions and of the need for joint effort, the adoption of the same ideology... etc. It is obvious that in the case of Arab countries, the sense of belonging to the same nation and the fact of common language and culture are important instruments for collective self-reliance. Important as it is, the political will is a necessary but not sufficient condition. The right approach to development and the adequate institutional framework will have determining roles in the success or failure of any collective self-reliance experiment. Once more, the Arab region is an interesting case. There has always been a political drive, sometimes strong at other times weak, but ever present and never denied. There is a complete set of inter-Arab institutions. What is missing is a consensus on the broad lines of a strategy for economic and cultural liberation. Because there lies the essence of good development and the true nature of collective self-reliance. Freedom from formal ties with industrialized countries, as well as from the more insidious control by Transnational Corporations, is precisely what distinguishes in the last analysis collective self-reliance from "common markets" and other free trade areas sponsored, patronized or controlled by TNC's. The successful pursuit of collective self-reliance implies also the following:

— The internal integration of the economies of participating countries is the starting point for self-reliance both country-wise and collectively. This integration means the gradual disappearance of all forms of dual economy and the building-up of self-centered economies. "Dependencia" is the expression of integration into the Centre, independent development requires "disintegration" or delinking from the centre.

— Self-reliance in each country is necessary both for the integration of the internal economies and for the successful implementation of regional collective self-reliance. The latter is meant, before anything else, to enhance every participating country's own self-reliance. It is also true in reverse that self-reliant economies will have better chances of development when inserted in a collective self-reliant system.

— Collective self-reliance should focus on the sphere of production because only common interests in production activities provide guarantees of stability and durability and are less subject to external influences and interferences. The patent failure of free trade areas, customs unions and common markets in all Third World regions illustrates the fragility of ties based upon trade currents that do not reflect intra-industry organic relations.<sup>(1)</sup>

— Collective self-reliance cannot emerge spontaneously within the free interplay of market forces. Our markets,

(1) See E. FLOTTO, and A. SHALABY, Economic Integration and Third World Collective Self-Reliance. Third World Forum occasional paper No. 4, 1979.

like those of most Third World countries, have been captured by the Centre. The forces that want to perpetuate this state of subordination, mainly the TNC's, are in a far better position in the market game than the national forces. Mobility of production factors and free access of products to our markets will inevitably aggravate discrepancies in development and styles of life between member countries and at the same time benefit the TNC's. Collective self-reliance should be based on deliberate and planned action. Moreover, it should aim at identifying and strengthening the forces whose interests are opposed to those of TNC's, such as multilateral enterprises, trade unions and peasant organizations.

— Conformity of development strategies is *asine qua non* for the success of collective self-reliance. These strategies need not be identical; otherwise political unification in a single State would become absolutely necessary and thereby the case for collective self-reliance would become pointless. But they should reflect similar attitudes on some basics: self-centered independent development, priority given to the satisfaction of the needs of the people. Furthermore, successful experiments in the area of collective self-reliance will help in the right formulation of strategies. Collective self-reliance being a joint development effort, it has to be seen as a process spreading over a long period of time with all the interactions at the country and the regional levels.

A final word on some tools of collective self-reliance. Producers associations are a good example. Another can be purchasers associations. The Arab countries have OAPEC. They can equally well constitute a "grain board", co-ordinating their massive imports and establishing emergency stocks. There are the multilateral enterprises created by all or several Arab states. They can become instrumental in promoting collective self-reliance provided they embark on production, cease to be mere financial holdings, spread their activities in various countries, and keep their freedom of action vis-a-vis TNC's.

## II. Basic Needs and Self-Centered Development

### A. ON THE CONCEPT OF BASIC NEEDS

#### 1. Needs and Desires

In Classical and neo-classical economics, needs are described as infinite, the satisfaction of one giving birth to another. This is simply a confusion between needs and the products/services that meet them. Products and services satisfying a given need (like food for instance) are multiple and can be multiplied almost *ad infinitum*, at least in shape and presentation; they are object of desire. But desires are never completely subjective, they are felt within a given cultural and socio-economic setup. One of the main features of capitalism, especially contemporary, is the fact that the profit maximization principle pushes private enterprise to stimulate to the maximum the desire for newer and more fashionable products and services. Advertising through the powerful modern mass media submits the tastes and desires of most people to what the TNC's find conducive to more extensive and lucrative sales, regardless of the side-effects of over-consumption on the individual, the society or the environment. **A need, as the word means linguistically, is an objective necessity for sustaining man's life and securing his well-being.** The best evidence is that all consumer goods and services can be classified into sets, each set corresponding to a single need. If this distinction is made between needs on one hand and desires for various objects and services on the other, it is easy to admit a first and crucial fact: **needs are rather few and they are all basic.** They can be broadly classified into two categories: material needs and non-material needs.

Material needs are those which cannot be met without the use of human and natural resources (factors of production), and whose satisfaction produces directly or indirectly measurable effects on the consumer. Non-material needs can be met mainly through political and social restructuring without drawing significantly on the available material resources.<sup>(1)</sup>

#### 2. Material Needs

Accordingly, material needs are:

##### A. ADEQUATE NUTRITION

The adjective is added to avoid gross reduction of this need to simple food, any food that can keep a man alive or even provide him with sufficient food. "Adequacy" allows for considerations of health and tastes. We recognize without hesitation the fact that fine "cuisine" is a part of most cultures, but we have our reservations about "fashions" and desires induced by advertising and demonstration effects, with all the incredible impact modern mass media give them. Adequacy from the health point of view applies to both insufficiencies and excesses. Besides, where man gets his meals is not without importance; both house and collective facilities related to food have to be taken into account. In almost all societies, meals (or some of them at least) have a clear social content, where company is enjoyed almost as much as the food itself. Rare and exotic foodstuffs have always been appreciated, sometimes in a way not without damage to ecosystems. Food has long been seen as a status symbol. Abundant quantities and expensive dishes are even now signs of wealth and rituals at celebrations. Finally, monotony in nutrition has always been felt to be a source of annoyance and a sign of poor living.

(1) This approach is radically different from that adopted by most authors. Usually they discard most of what we include as non-material needs, while they mention health and education as non-material needs. See for instance: ILO Studies on Basic Needs and also P. STREETEN: "Basic Needs; Premises and Promises" *Journal of World Modelling*, vol. 1 No. 1, Jan. 1979, and P. STREETEN and J. BURKI "Basic Needs, some issues" *World Development* Vol. 6, No. 3, March 78.

#### B. CONVENIENT CLOTHING

Covering the human body in order to protect it against the adverse or unpleasant effects of nature varies considerably in time and space. Moreover, since the earliest days an element of ornamentation has been introduced into clothing. Materials and design acquired the value of symbols for ethnic, religious or professional groups, and for social status based on age, political power, wealth or social functions. Finally, clothing is a chosen field for fashion. Hence, convenience cannot be defined in purely physical terms and in complete isolation from social norms. Yet, social trends and values in this field are neither immutable nor free from manipulation. Far from preaching any kind of "uniformity", we advocate mass participation and enlightening discussions in solving clothing problems both in the use of materials and the selection of designs.

#### C. SUITABLE HABIT

Having a shelter to live in, more or less protected from nature and its whims, is an obvious necessity even for many animal species inferior to man. Suitability of the shelter is the real problem. It means first of all securing the physical convenience of the individual without neglecting his aesthetic aspirations. Moreover, a nuclear "family" group is the natural setting for man's life. Thus, house becomes home with all that this notion implies in terms of space and facilities. Last but not least, families tend always to gather in agglomerations: hamlets, villages, towns, or cities. Thus, housing evolves always into human settlements. This in turn raises issues of space use, collective facilities, sound environment, balance between the advantages and disadvantages of size... etc. Sticking to the fashionable terminology, we willingly use the concept of habitat as encompassing these interrelated aspects of this need.

#### D. MOBILITY

In order to earn his living, man has to move to go from one place to another. This is true even in the most primitive forms of society living by gathering wild fruits and hunting. The more the organization of production evolves and its social character grows, the more pressing becomes the need for displacement of persons and goods. Transportation is part and parcel of all modes of production. Integrated national economies are simply inconceivable without an adequate infrastructure of transport. Two additional remarks; man often wishes to travel for purposes other than production: spending leisure time, curiosity about other people and lands... etc. On the other hand, transmission of news, ideas and instructions or enquiries can be a substitute or a supplement to physical mobility. Hence, communication facilities are as essential as those of transportation in meeting the need for mobility.

#### E. EDUCATION

This term should be understood in its broadest sense: **acquisition of knowledge and access to information.** Education is basic in all human societies. If we look beyond formal schooling we can trace it back to the oldest groupings. It starts at home when the family and then the social group teaches the child to walk, to talk, to defend himself and to perform what is considered as adequate work. All cultures had their more or less institutionalized education systems. The best possible knowledge of facts, events and the links between them confers power. So it was quite natural that in all class societies education was at the same time the privilege of a minority and — occasionally at least — a means of social promotion. In a true democratic society the egalitarian access to knowledge and information should promote collective and individual inventiveness and make of citizenship a complete reality by securing for all citizens the awareness of all the aspects and consequences of any decision they are asked to make. Formal schooling tending to provide only professional skills can without doubt "raise the labour productivity", but it falls short of ensuring the overall development of man. Given the volume of accumulated knowledge, the pace of scientific progress with all its technological potentialities and the increasingly intricate interdependence of subnational social groups and of nations, only the multilateral flow of relevant information and recurrent education can help meet this need. Fortunately, the human and material means are within reach; their political and social reorientation is the main issue at stake.

#### F. HEALTH

To be in good health should not be reduced to being disease-free. Health should convey a positive state of being. Recently several tentative definitions have been proposed. We will dare to suggest here that while the feeling of good or bad health is subjective its roots can always be traced to "nature", i.e. the physical environment, or to the sociocultural setting, i.e. the man-made environment, and to the individual's physical and psychological reaction to both. Accordingly, health can be understood as the **development and maintenance of a state of physical, mental and psychological well-being conducive to good performance and self-fulfilment.** The need for health thus defined is not merely a need for disease curing. It is in the first place a need for the judicious satisfaction of other needs: adequate food, convenient clothing, suitable habitat, education and also the non-material needs. Dealing with the physical environment and coping with life within superimposed social groups, while absolutely necessary for the survival of man, are full of threats to his life. Too much food is as dangerous as insufficient nutrition. Private automobiles increase physical mobility considerably, but the "car culture" has numerous negative "side effects". Chemical products can prove very effective in the prevention or eradication of microbic diseases, yet they may be the origin of another set of diseases such as cancer... etc. This approach is obviously very different from the health services system that evolved in industrialized countries and which Third World governments try desperately to copy.

### 3. Non-material Needs

As for the **non-material needs** we put them in two categories. The first focuses on the assertion of the individual and the second around the role of the community.

#### A. SELF-FULFILMENT

Unlike other animals living in groups, human society never reproduces itself identically. While the life cycle of animal societies is a monotonous repetition of actions integrated into an immutable pattern, that only exogenous factors can disturb or disrupt, the history of human societies has always been made of ups and downs, development or decline, expansion or regression, and here and there cases of complete collapse. Sometimes entirely imputable to natural cataclysms, these variations are more generally the consequences of man's actions. People are so made that both individuals and social groups are tempted to do better than their predecessors, or at least to do it differently. The social group (or society) each time sets the goals and defines the value system inspired by them or supposedly conducive to them. *The individual tries to find himself a function or room in this system, "a place in the sun" as it is often said.* Consequently, he has a sense of design for his life (more or less articulated, it is true). This design or mission gives meaning to man's life, notwithstanding whether this design is rational or irrational, natural or supernatural, realistic or illusory, clearly articulated or vague, innovative or imitative. Its attainment is gratifying. To miss it is frustrating. We call "**self-fulfilment**" **the feeling the individual can have that he is able to attain his goals without frustration.** Accordingly, this need as everybody must realize is multifaceted. In the first place, there is the right to perform a function considered by a social group as useful. In many cases this means the **right to productive work.** But in other cases the work may not be productive *stricto sensu*, nor even secure a good stable income; but it should be an object of social consideration (the cases of warriors or monks for instance). What is essential is work on one hand, and the opinion the social group holds of it on the other hand. *Second — and this is not an order of priority — we have freedom, or what is conventionally called human rights.* Due respect for the human person and his opinion is a **sine qua non** for self-fulfilment. Without freedom, man is reduced to the animal state. It is true that men have never fully enjoyed human rights, even though societies have accomplished tremendous material progress. But this is no reason to discard human rights. Moreover, it is sheer nonsense to speak about men being happy with enslavement; on the contrary, people's ingenuity in getting round rules and regulations infringing their freedom often account for much of the progress achieved; let alone all forms of outright revolution against oppressive orders. Looking towards the future, it is not enough to understand human rights in a passive way (the protection of freedoms); they should acquire a more positive significance, that of the practical and concrete possibility for people — at all levels — to share in the making of decisions and the bearing of the responsibility for what they have freely decided. That is the real content of the concept of **participation** (often distorted by politicians and reduced to acquiescence to the orders of a charismatic leader, or used as a device to dissimulate capitalist domination and exploitation). Last but not least, there is the **right to leisure**, or in more careful wording, **one's right to have a decisive say in the use of one's time daily, yearly or for the life span.** This is one of the basic necessities for relief from the alienating character of most of our work in the present societies.

#### B. TOGETHERNESS

Man has always lived in a community. He is a social animal. The need for community life does not arise exclusively from the desire for better organization for the satisfaction of material needs. Being together is a need in itself; it can be explained by the necessity for the individual to share with others the sufferings and the joys of life, to give and get affection, to enjoy the company of parents, friends, colleagues or even interesting strangers. But life in a community is not that easy. It can satisfy the need for togetherness; but it can also become inhibiting or even oppressive. The family is — generally speaking — a congenial way of meeting the need we are talking about. Nevertheless, in the patriarchal family the **pater potesta** can become unbearable. In today's industrialized nations, the socialization of almost all forms of production has relieved the family of many arduous material tasks and provided alternatives for many obligations. But given the prevailing individualistic ideology and the drive in favour of ever growing labour mobility, the family itself has been reduced to its minimal expression and even tended to complete dislocation. The individual, harassed by work and by the struggle for the acquisition of status symbols and "modern" gadgets, deals mostly with big depersonalized monsters: huge corporations, banks and insurance companies, a rather abstract state machinery against which he disposes (at best) only of his vote in general elections, where the choice is of necessity limited and has little to do with his own problems; municipal authorities of megalopolises and metropolises... and powerful repressive organizations making the worst use of electronics. Loneliness among the millions is the poisoned gift of "advanced countries" to most city dwellers. Yet, the impact of the life-style of the industrialized countries on the younger generations in many Third World countries has tended so far to destroy the extended family, while the economic growth and the pattern of income distribution are far from securing for the individual even the material help the traditional family was able to provide at least to a certain extent. A system based upon the maximization of the income and the consumption of the individual fails to meet the minimal satisfaction of material needs of the masses, unless the country is wealthy enough and the political activity of the poor is able to impose more equitable income distribution. The breaking down of family and village solidarity and the growth of individualism can only increase the distress of the poor, the unemployed and the disabled. It is doubtful, moreover, if it assures for those few happy individuals who do become wealthy the satisfaction of all their non-material needs.

#### 4. The Wholeness of Needs

As we have just seen, the list of needs is not endless, quite the contrary. Furthermore, all the above-mentioned needs are basic; superfluous can only be the right qualification for this or that means of meeting one or the other of these needs. An expression like superfluous needs is a mere contradiction in terms. What we would like to emphasize at this juncture is what we call the "wholeness" of material and immaterial needs. Not only are all needs basic and have to be met, but also any substitution between needs is detrimental to the well-being of man, in a much more serious way than in the case of substitution between goods satisfying the same need. This is obvious for material needs. A spacious luxury mansion can never prevent its owner from feeling hungry.

The marginalist assumption according to which utility is a purely subjective matter and consequently there can be as many "indifference curves" as there are consumers is incompatible with observable and observed facts. The individual decision to buy a given product may appear *prima facie* completely free. We should try to see behind it to discover how it has been made. Then we must take into account two constraints on the consumer's choice, even more pertinent than the famous "budget constraint"; the physical base of needs and the prevailing social values. This explains the great similarity in the behaviour of the bulk of citizens in a given society at a given time. More worthy of consideration is the link: material-non-material. The satisfaction of material needs is not independent of the ways and means of satisfying them. For instance, not many people will be happy with a dictatorship even if it guarantees their food, shelter, transport... etc. On the other hand, the satisfaction of non-material needs alone is quite unimaginable. And even if we admit the contrary for the sake of discussion, we can surely assert that people would not be happy with freedom while they are starving. Moreover, one may say that given enough resources in a society, the satisfaction of non-material needs will lead necessarily to that of the material ones. The contrary is far from being evident. Yet, it is reasonable to suppose that meeting better the material needs provides by itself grounds for and receptiveness to aspirations for non-material needs. Finally, if we accept that the goal of the society in this respect is the well-being of man, man as a whole and all men, the case for the "wholeness of needs" becomes almost self-evident.

#### 5. Levels of Satisfaction: The "Floor" and The "Ceiling"

##### A. NORMS AND PATTERNS OF CONSUMPTION

It is a remarkable fact, often overlooked or disdained, that the history of precapitalist societies demonstrates a rate of change in consumption habits even slower than that of change in production techniques. Before the expansion of capitalist industry, mankind lived in a situation of subsistence. The privileged classes in those societies did not usually enjoy a qualitatively different Life; they generally consumed more of the same products of current consumption. Even the happy few very wealthy monarchs could only have easier access to rare products, the invention of new ones being the exception. Therefore, nobody bothered to explore consumption habits or to assess their degree of rationality. Of course, health reasons and availability may explain many "taboos" and predilections observed in "primitive" or even more recent societies. But that was almost all. The cancerous growth of consumption in capitalist "affluent" societies, on the contrary, raises a whole set of questions concerning rationality and the impact on individual consumers, the social groups and the environment. Economics is of no help in this respect, since economists concentrated on the price theory with some assumptions that we will discuss later. First and foremost, the **study of use value** should be rehabilitated and reintroduced into socio-economic analysis. Use value is a relation between the commodity and man, while exchange value is the relation between commodities. Dealing exclusively with the latter while being completely indifferent to the former has been the starting point in the dehumanization of economics. It is pointless to object that the thorough analysis of the use value of a product calls for contributions from many scientific disciplines, because once such technical studies are carried out — and they have to be undertaken — the results should be taken into consideration by the economists. Otherwise, obscurantism will prevail in the vital area of deciding what is good for the consumption of man in what quantity. In the second place, a distinction has to be drawn between the commodity as a whole and the necessary elements it contains. The nature of a necessary element and the adequate quantity needed (to avoid both hypo and hyper-consumption), we call **norm**. But the same element can be contained in various goods in different quantities. On the other hand, each human need requires the simultaneous use of several elements. The combination of goods that contribute to the satisfaction of a given need, we call **pattern**. Food provides a good illustration. From the point of view of nutritionists the average man needs 3000 calories a day with a minimum protein intake of 45 grammes. These are norms. In fact there can be infinite combinations of nutriments that supply those norms. The relevance of this distinction appears fully when we understand that **improvement of living conditions can be achieved mainly through the pattern, since increasing the quantities of the same elements or products containing them rapidly becomes detrimental to the individual, the society or the environment**. Tastes and desires for change and refinement should accordingly be directed mainly toward the pattern. If we recall what has been said about the "wholeness" of needs, we can state without risking major error that when all the needs are met there will not be excessive global pressure on the satisfaction of any one of them. To conclude with this difficult and roughly treated point, we have to answer who decides what is good and what is simply waste or even nuisance. We must clearly state that we are against any manipulation of the consumers. If we denounce the present manipulation by TNC's, we do not accept any other carried out by a state bureaucracy of technocracy. Decisions in this field, one of the most relevant to freedom, should belong to all free and responsible citizens, once artificial stimulation is eliminated and the flow of true information is instituted. Some objective factors should of course be taken in consideration: availability

of natural resources, scientific research and appropriate technology, geographical location, cost of transport, national product... as well as sociological facts since values and tastes are basically social phenomena.

## B. SUPPLY CREATES DEMAND

As a matter of fact, modern capitalism has reversed the old axiom of the neo-classical "consumption theory": Demand creates supply. Since the middle of the 19th century it has become more and more evident that supply creates demand. Mass consumption of an ever increasing variety of products and services, that is the pride of "affluent" societies, is by no means the spontaneous outcome of the famous infinite character of human needs discussed above. Utility of a product cannot be evaluated by the consumer previous to the existence of that product. Indeed the producer's decision precedes that of the consumer. A music-lover can never think of the pleasure to be derived from "high fidelity" reproduction before the new electronic devices are already on the market. In contrast, owning one of these devices can lead a neophyte to dispense with attending concerts, while there is no full substitute for real live concert — at least as far as classical music is concerned. Profit, on the contrary, is measurable in terms of financial magnitude. Its concrete amount depends for any enterprise on the profit per unit multiplied by the number of units absorbed by the market. Maximizing it calls for action in three directions: reduction of costs, increase of prices and expansion of markets. The first item will be the result of two contradicting forces: technical progress and the action of the workers to obtain higher wages. For the second, the enterprise's action is limited by the effects of higher prices on the amount of sales. In these conditions, increasing the sales becomes the main way to greater profit. Consequently, from the very beginning capitalist industry has lived with the ever present obsession of **ever-expanding markets**, and its corollary the voracious appetite for energy and raw materials.

In the framework of economies dominated by Transnational Corporations, the famous "consumer sovereignty" becomes a joke. What all sociological studies on consumer behaviour show is that big industry does indeed shape the tastes of the consumers and thereby commands their choices. It has for this purpose an impressive arsenal of weapons. The **demonstration effect** can be found in all types of societies. What is new is that modern capitalism uses it consciously and can produce relatively cheap imitations of luxury goods and services, while the prevailing ideology extols this as a sign of democracy and social mobility. Then we have the whole paraphernalia of marketing techniques and paramount among them: **advertising**. These are pure capitalist practices born from the above-mentioned endless need for expanding markets. Images, sounds and mottoes vaunting the product literally hammer the consumer and engrave their impact on his subconscious. Modern **mass media** provide advertizing with exceptionally powerful vehicles assailing the consumer everywhere including in the intimacy of his bed room, where a TV set equipped with a remote control device imprints the product's image on his eyes until they are shut by sleep. The individual consumer has no means of testing the necessity of the product nor of making a rational objective choice between the different brands of the same product. Time and information are lacking. His only reference is what others do: neighbours, colleagues, friends... or those fabulous stars whose photographs cover so many pages of his newspaper or who address him on the TV screen. Never before has the consumer been manipulated to such an extent. Strangely, the affluent society is undoing human bonds and substituting for them attachment to things. The "modern" man has more relations with things, than with people.

## C. TOWARDS A CONSUMPTION THEORY

Thus the present levels of consumption in capitalist countries are questionable. They should never be looked on as goals by Third World people. Satisfaction of "**basic needs**" means in most countries and for the majority of the people securing subsistence levels of satisfaction for all material needs. That is the **floor level**. There is no reason to be ashamed when we admit it. True development is supposed to improve this state of things. Consumption will increase. But to what extent? Certainly not to the prevailing Western levels. The debate about "**alternative styles of life**" tends to rationalize and reduce consumption. We believe that there should also be a **ceiling level** which could be defined as that which realizes at any time the right balance between the requirements of the individual, the society and the environment. Thus we have a **single approach to consumption in both industrialized and Third World nations**. Another development then has to be geared in all cases towards the satisfaction of human needs. In all cases also, everybody should at least get the subsistence level of satisfaction, and nobody should increase his consumption to the limit that endangers the right balance between man, society and the environment.<sup>(1)</sup>

## B. CAN IT WORK?

### 1. From An Analytical Tool to An Instrument for Planning

The preceding analysis was necessary with a view to two considerations. The concept of basic needs has been quickly appropriated by the international aid establishment and associated with the slogan of the direct attack on

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(1) This section is in very compressed form, the result of a personal work in which the author has been engaged for a long time. See on the topic of basic needs inter-alia: ILO: "Employment, Growth and Basic Needs; a one World Problem" Geneva 1976; Dag Hammarskjöld Foundation: "What Now? Another Development" uppsala, 1975; J. and M.C. MacHale: "Human Requirements: A Framework of Thinking About the Planetary Bargain" Aspen Institute, 1975.

poverty<sup>(1)</sup>. The means advocated in this framework range from pressing calls for international charity to a proposal in favour of a "Marshall plan" for the Third World<sup>(2)</sup>. In a natural reaction to this approach, many Third World thinkers and policy makers totally dismissed the concept itself as a diversive manoeuvre, a humanitarian pretext for interference in national development policies, and an apology for a kind of second rate growth. In the second place, therefore, was the intellectual uneasiness about what is basic among innumerable needs? And who has the right so to decide? We believe that, at the theoretical level, we can restate the concept as follows: development has to be geared to meeting the needs of the population, in a sustainable and continuously improving manner, within the limits of the right balance between the individual, the society and the environment. This being said, the main issue becomes: to what extent can this direct assessment of needs — as a guiding principle for development — be operational? Since the birth of economics as a scientific discipline (which coincided with the rise of capitalism), it has been assumed that the needs would be met indirectly through the free interplay of market forces; the too famous "invisible hand of Adam Smith". Planners in socialist countries have tried it the other way round, starting with the assessment of the needs of the population. This approach worked quite well during the early plans, when what was at stake was the satisfaction of subsistence levels of material needs for everybody. One might qualify this with regard to the bureaucratic aspect of the process, the relative neglect of some non-material needs... etc. Still, what is disconcerting from the analytical point of view is the fact that when these countries start consuming beyond the subsistence level, the planning techniques look less efficient. We believe that this is due, among other things, to the poor state of research on consumption patterns and needs. Moreover, things become more difficult when the society is not exactly egalitarian, which implies the co-existence of different levels of satisfaction.

The author has had the opportunity of being involved in an exercise tending to test the operability of the concept of basic needs in the area of industrialization in the Arab World. It might be relevant here to give a summary of the relevant findings, since the scope of this paper does not allow for a comprehensive study on this aspect.

## **2. The IDCAS Project**

### **A. SCOPE AND OBJECTIVES**

In compliance with a resolution of the Fourth Arab Industrialization conference (Baghdad, December 1976) the Industrial Development Centre of Arab States launched in 1977 a major study entitled "An industrialization strategy for the Arab Region based on self reliance and aimed at meeting basic needs." The author acted as principal consultant. The objective of the study was to test the concept of basic needs against the concrete realities of a region well endowed with resources and suitable for collective self reliance. Accordingly, it aimed at assessing the value of the concept as an analytical tool, and more important its instrumentality in designing a concrete industrialization strategy. Nevertheless, time and financial constraints, as well as the institutional framework, excluded any attempts to draw up a detailed global strategy for the 22 member countries of the Arab League. Therefore, we deliberately limited ourselves to the clarification of the concept on one hand, and its illustration through the study of three material needs on the other. Besides the work on the analytical aspects, three teams embarked on empirical inquiries to assess the present needs of the Arab region in food, clothing and habitat. Each team was asked to elaborate, in quantitative terms, the level of satisfaction it considered basic in view of the present patterns of consumption prevailing in the region, while not neglecting international standards whenever they exist. The study of production + imports - exports figures yields immediately the present gap between demand and supply for the need under study at country and regional levels. Average present consumption per capita is then corrected according to what the team considers as a decent minimum. Evidently, the replacement of needs in the place of demand widens this gap. Then projections were made for the years 1985 and 2000. This has shown, in general, that the gap in meeting the needs tends to widen. Then, calculations were carried out on the requirements of increasing domestic production to fill that gap. This did not stop at the level of the amount of investment needed. It went in to the estimation of raw materials needed, the possibilities of growth of their production in the region, the capital goods required and the implications of all this for the main sectors of the economy: agriculture, industry and energy.

### **B. FINDINGS**

The results of methodological, conceptual and empirical research undertaken in the framework of this project led to some unconventional policy conclusions concerning the operability of the concept, the potentialities for economic growth and the implications for the socio-political aspects of development. We will try to summarize these conclusions as follows:

— An industrialization strategy for the Arab World, aimed at the early satisfaction of the needs of the broad majority, is intellectually conceivable and operationally feasible. This is so because, firstly, needs can be understood, identified and enumerated. In the second place, the degree of satisfaction of material needs is measurable.

— In fact, the conceptual and analytical work shows that far from being infinite, as is usually assumed by economists, needs are relatively few, provided a distinction is clearly drawn between a need and the innumerable

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(1) See the annual speeches of R. McNamara at the meetings of the Governors of IBRD and the report of the Development Assistance Committee (DAC) of the OECD, 1979.

(2) Openly recognized as a means for boosting Western economies from the persistent recession.

objects capable of — or supposedly capable of — satisfying it both qualitatively and quantitatively. The assumption that needs are identifiable only through the market interplay is both incorrect and misleading; incorrect because the market reflects the purchasing power more than the real need; and misleading because under capitalism — and particularly contemporary trans-national capitalism — supply tends to create its own demand. The proclaimed sovereign consumer is nowadays so standardized in his tastes and behaviour that he is almost one of the products of the ironically misnamed consumer society.

— The study of three material needs, food, clothing and housing, enabled us to find in each case a common denominator. For food, it is the daily consumption of a number of calories, together with some protein intake. For clothing, it is the weight of textiles used in the production of different forms of dress. For housing, it is a sheltered space adequately designed and provided with some facilities and surrounded by a congenial neighbourhood. In each case, the common denominator can be drawn from different sources, combined from various elements, increased in quantity and improved in quality according to concrete conditions of income, climate, kind of work availability of resources, technologies in use... etc. and even the understandable desire for change (misused by commercial fashion designers and fashion setters). In the concrete conditions of the 21 countries of the Arab League, the teams came up with the following figures, for a start:

**Food;** FAO minimum requirements defined for various countries and ranging from 2304 to 2497 calories/day.

**Clothing:** Based on an empirical analysis of clothing patterns in various Arab countries, minimum norms of specific clothing needs for urban and rural populations were established. Those norms were converted into standard weight measures. Thus the final norms ranged from 4.0KG TO 8.0 kg./capita (for adult clothing needs/year).<sup>(1)</sup>

**Housing:** The norms for housing area/individual ranged from 14 to 21 square meters for urban areas, and from 11 to 23 square meters for rural areas. These norms are higher than those adopted by the UN housing office. This was because the research team took into consideration the specific climatic and cultural conditions in the Arab World (e.g. peasant houses allow for a barn and stable). Once the gap in satisfaction is thus measured, it becomes relatively easy to identify the type of industries necessary to fill it in the first instance, and then to improve the degree and quality of satisfaction, which the authors of the empirical studies have done. Thus the first elements have been laid down for a needs oriented industrialization strategy in complete disregard of the conventional market studies.

### C. SELF-CENTERED DEVELOPMENT

#### 1. The Potential domestic and regional market

Moreover, such a strategy aimed at meeting the needs of the people is economically sound. The three empirical studies of the IDCAS project revealed, in all cases, and even in wealthy countries, an enormous gap between the actual consumption and the requirement of meeting the minimum satisfaction of human needs. In the food area, while the daily calories intake varies between 83 per cent (North Yemen) and 117 per cent (Libya) of the minimum requirements, the real situation is by far worse due to income distribution patterns and general lack of protein. The under-nourished are currently estimated at some 30 million Arabs (23 per cent of the Arab Nation). The consolidated food deficit of the Arab countries is so high that they import currently about 30 per cent of all World exportable wheat. In clothing, the gap is estimated at about 400,000 tons of textiles i.e. more than 100 per cent of the actual production. In housing, the situation is simply tragic, particularly in rural areas.

Growth of production of goods filling these gaps means the growth of a host of other productive activities both up-stream and down-stream. An attempt at estimating the main activities has been made in each study. Of special interest in this respect is the fact that the needs approach shows the absolute necessity of coordinating industrial and agricultural growth from the outset. In addition, contrary to what some authors think, emphasis on meeting the needs of the population boosts the production of capital goods and not the contrary<sup>(2)</sup>. Thus, the proposed industrialization strategy contributes to self-centered development.

Meeting the needs of the broad masses in this way can be best attained through collective self-reliance. Geographically neighbours and culturally united, the Arab countries vary greatly in size, population and resource endowment. Together, they have all the ingredients for independent and self-sustained development. The regional market is essential both for the supply and for the sale of various products meeting the needs of the total population.

#### 2. Endogenous development

The conclusions arrived at by the IDCAS project can safely be generalized. Nobody can question the statement that the majority of the region's population live in conditions of greater or lesser poverty. Their legitimate needs are not fully and adequately satisfied. Yet, these real needs unbacked by corresponding incomes do not exert enough pressure on the market to orient the production. Hence the talk about limited home markets and competitive

(1) One of the curiosities uncovered by the empirical clothing study was the abnormally high levels of per capita clothing consumption in small oil-rich states. However, this is explained mainly by the fact that foreign residents (labourers and their families) largely exceed the native population of these countries, while the average consumption figures were based on total clothing imports divided by the official population figures which exclude foreign residents.

(2) Ajit SINGH: "The Basic Needs Approach to Development; The significance of Third World Industrialization" World Development, Vol. 7, No. 6, June 1979.

Arab economies. When development strategy sets the target of meeting these needs, it leads necessarily to the reshaping of the production and in particular to the right choice of investment and technologies. The turn-key contracts, the complete reliance on foreign expertise, the growing volume of imports of all kinds, the desperate efforts to find export outlets... will gradually be replaced by the search for appropriate technologies, innovations, and full employment that provides everybody with the purchasing power permitting him to buy his share of the products destined to meet his needs. The duality in the economies (modern and traditional sectors) tends to disappear. A careful look into the use of natural resources will permit to a great extent the optimization of that use. These are some of the features of what has been called endogenous development, development from within the countries and the region, emerging from real needs and an innovative striving to satisfy them by drawing on domestic resources to the best advantage. In the same time, this strategy will alleviate the exploitation by industrialized nations and reduce dependence on the Centre of the World Order. This is obvious when most of the production is absorbed by the domestic market instead of relying on exports, which are subject to price fluctuations engineered by TNCs. This becomes all the more possible when we give up the imitation of Western life styles, cease to be obsessed by the wish to produce the same goods and gadgets, and thereby do away with the need to import the equipment and know-how used to produce them. Last but not least, if most of the Arab countries follow this kind of strategy, the volume of inter-Arab exchanges of goods and services will increase drastically. These countries are in fact complementary resource-wise which implies possibilities for important movements of production factors. Moreover, products meeting the needs of the poor cannot be threatened by western competition because they must be much cheaper, and excess production in one Arab country can find outlets in some others.

### III. Autonomous Scientific and Technological Capabilities

**A) The decolonization of our intellect:** Nothing is worse than intellectual dependence. Too often Arab intellectuals and professionals put the blame on politicians (the decision makers) for all that has gone wrong in our development and our efforts at cooperation, integration or unity. This is unfair in so far that the thinkers (the opinion makers) have not always developed better alternatives that had been knowingly rejected by politicians. As a matter of fact, both groups shared some basic yet wrong assumptions in the area of development. Therefore, the critical assessment of development performance by intellectuals and professionals is more often related to implementation than to the underlying thought: efficiency, rigour in choices, pace of growth both global and sectoral, social justice... and so on. Here are those basic assumptions in summarized form:

- Development is in the first place modernization of traditional, stagnant societies;
- Western societies are the most advanced, and all that Third World people have to do is to copy the West. Thus, modernization equates with Westernization except for the retention of some cultural values;
- Science and technology have been the tools of the spectacular progress in the West; therefore Third World people must have access to them as they stand today in complete isolation from their history and socio-cultural interrelations.
- All means of access to science and technology — or at least most of them — are admissible: foreign investment, foreign expertise, training abroad, reproduction of schooling patterns and curricula, foreign aid, technical assistance and transfer of technology.

Amazingly, the Arab intellectuals when faced with the mischievous consequences for large sections of the population in countries which carried out such strategies (Brazil, South Korea...) either tend to overlook these consequences or remain puzzled by their occurrence. In fact, the aforementioned assumptions are wrong and can only lead to a misrepresentation of the role that science and technology play in development.

#### 1. The universal and the particular in science

The physical and mathematical sciences are universal. Their laws are the same in all parts of our planet. Yet, scientific discoveries are social products. They usually take place in concrete economic and sociocultural set-ups. Their occurrence is rarely the result of mere chance, nor entirely due to the talented individuals whose names are attached to them. This is true even in the case of mathematics, the most abstract among scientific disciplines. Ancient Greeks had been able to "invent" geometry, while their arithmetic remained very primitive. Some authors explain this discrepancy by the fact that progress in geometry was due to aristocratic philosophers contemplating the mysterious properties of figures, in complete isolation from despised trade and manual work. Later, the crossfertilization of Greek geometry with Egyptian advanced building techniques gave birth to trigonometry. The Arabs, given to trade and having to handle the finances of an empire, borrowed from India the sign of zero, revolutionized arithmetic by the adoption of the decimal system and went on further to invent algebra. In more recent times, the "invention" of analytical geometry was an amazing parallel with the development of a new weapon, artillery, that was in great need of the new discipline for target calculations.<sup>(1)</sup> Unfortunately, most historians of science concentrate on the evolution of concepts and tools, without any attention to the conditions that surround this rapid evolution of each of its turning points. As a result, we have this prevailing impression that the sequence of progress has been, and still is, the following: fundamental research - applied research - technology - industry. In economic jargon, this sequence means that supply shapes demand. Nothing is less true, at least since the rise of capitalism.

(1) See HOGVEN: Mathematics for the Million "Oxford", 1947.

All through the last two centuries or so, demand has influenced, directly or indirectly, the orientation of scientific research<sup>(1)</sup>. In fact, profit maximization is what distinguishes capitalism from all other modes of production. It means in practice the striving for lower costs, higher outputs, bigger sales, and prices as high as possible. Technical progress, as it was called by economists since Adam Smith until to some years ago, was a determining factor in all these respects. The industry's demand for better (i.e. more profitable) techniques determined in turn the areas where scientific breakthrough was most needed. The advancement of education and the high value put on reason and the scientific approach to Nature raised universities and research centres to a position of high responsiveness to this demand. Public and private funds were available, thanks to capital accumulation, to strengthen research capabilities. The state also plays a more and more decisive role in this field, not only as purveyor of funds for education and research networks, but also through the specific demands it puts on science and technology, especially for defence fully and adequately satisfied. Yet, these real needs unbacked by corresponding incomes do not exert enough pressure on the market to orient the production. Hence the talk about limited home markets and competitive Arab economies. When development strategy sets the target of meeting these needs, it leads necessarily to the reshaping of the production and in particular to the right choice of investment and technologies. The turn-key contracts, the complete reliance on foreign expertise, the growing volume of imports of all kinds, the desperate efforts to find export outlets... will gradually be replaced by the search for appropriate technologies, innovations, and full employment that provides everybody with the purchasing power permitting him to buy his share of the products destined to meet his needs. The duality in the economies (modern and traditional sectors) tends to disappear. A careful look into the use of natural resources will permit to a great extent the optimization of that use. These are some of the features of what has been called endogenous development, development from within the countries and the region, emerging from real needs and an innovative striving to satisfy them by drawing on domestic resources to the best advantage. In the same time, this strategy will alleviate the exploitation by industrialized nations and reduce dependence on the Centre of the purposes. It is common knowledge that the money of the tax payer has financed most of the decisive steps in areas like aeronautics and nuclear energy<sup>(2)</sup>. Modern states have "national science policies". One should remember in this regard that "science policy does not comprise only policy for sciences... it also comprises science for policies affecting the ways in which scientific and technical consideration bear on important political decisions and policy choices, in areas that are not in themselves mainly scientific, such as foreign affairs"<sup>(3)</sup>. The relevance of the point to our case that scientific progress in physical and mathematical sciences depends always on the interrelations between several socio-economic and cultural values in the societies where this progress takes place at the time of its occurrence.

In the social sciences, things are quite different. Here, the subject matter of research and analysis is changing both in time and in space in a perfectly discernible manner. Nothing permits an assumption of the immutability of social phenomena, since their history and possible evolution cover time spans infinitely than those of radical changes in the physical environment. Nevertheless, social sciences as they stand today are mainly the outcome of the study of a definite type of society: the modern Western capitalist society<sup>(4)</sup>. This is not due only to the fact that they have been elaborated in this specific socio-cultural environment and thereby submitted to its influence. There was, beyond this, the ethnocentric ideological stand, whereby this type of society has been for a long time considered as the natural society. All that preceded it was a kind of prehistory. All that differed from it was backward, if not simply primitive. Any attempt to change it bears the threat of a return to the barbarian ages. Anyhow, it is obvious that the "laws of the social sciences" cannot claim the universal validity of those formulated by the physical and mathematical sciences. The unbiased study of most Third World societies remains, so to say, virgin land. This is particularly the case in the Arab World.

The conclusion on this point is that the Arab World needs its own autonomous scientific capabilities in order to "produce" in physical and mathematical sciences, instead of being a marginal consumer, and to carry out genuine scientific work in the study of Arab societies.

## 2. Techniques and Technology, some clarification

For many of our "elites" technology is the key not only to overall development but also to the solution of political and social problems. Popularized in the region by the mass media, especially since the 1967 Israeli-Arab war, the term came to mean everything and nothing. Its misuse created more confusion than understanding. Hence the need for some clarification:

### A. WHAT DO WE MEAN BY TECHNOLOGY?

A decade ago, dictionaries used to define "technology" as the comparative study of techniques, these being the arts of producing commodities and delivering services.<sup>(5)</sup> But as it usually does, the public was already extending the meaning in one direction: it came to convey the idea of a set of interrelated techniques in use in

(1) See on the process of learning in general: J. BOTKIN, M. ELMANOJARA and M. MALITZA; "No Limits to Learning". A report to the Club of Rome, Pergamon Press, 1979.

(2) See C. NORMAN: "Knowledge and Power: The Global Research and Development Budget" Worldwatch paper, July 1979.

(3) H. BROOKS, in OECD: "Science, Growth and Society" Paris, 1970, p. 37.

(4) Conventionally economics was born with the "Wealth of Nations" 1776; Sociology emerged a century later; modern psychology, political science, behaviour science and management during the 20th Century.

(5) See for example "Oxford Shorter English Dictionary" P. 2140 and "le Petit Robert" P. 1754, both 1967 edition.

a given branch of activity as in the expression "nuclear technology" and "space technology". Then, in the era of the "scientific and technological revolution" the word acquired a new sense: the systematic and organized effort tending to apply the discoveries of basic sciences to invent new and supposedly better techniques.<sup>(1)</sup> Thus it became very close to what is otherwise known as Research and Development (R & D). Finally, it is now used to designate at the same time or alternatively the activity (R & D) and its products (the techniques). Hence, all the writings, debates and negotiations about the **transfer of technology**, while what is transferred is in fact techniques more or less "ready-made".<sup>(2)</sup> In evidence, one can quote the UNCTAD document "Guidelines for the study of the transfer of technology to developing countries"<sup>(3)</sup> where it is said: "Technology is often referred to in a vague and diffuse way and surrounded by mystery. Yet the concept is neither vague nor mysterious. Technology is an essential input to production, and as such is bought and sold in the world market as a commodity in one of the following forms"...We would like to be able to share the assurance of the author of this document. Unfortunately what he describes are "products" and not the process. Thus formulated, the quest of developing countries for the transfer of technology can only lead to a "dialogue of the deaf", or at best to a slightly better bargain in the so-called world market. Governments of the industrialized nations can always reply that they have a certain power of decision in the field of financial aid, while technologies are generally speaking the property of private firms. More fundamental is the question of the assessment of the impact of these ready-made technologies on societies of the Third World. That is why it is essential from the point of view of this paper to make a sharp distinction between the **process** and the **products**, between **technology** and **techniques**. The first comprises the combined efforts of the society as whole to increase its capabilities (in areas varying from production and distribution to the use of leisure time) by means of promoting scientific research, with a view to devising better techniques. The institutional set-up in charge of this task includes the administration, universities and research centres, research divisions in important enterprises, private organizations... etc. But the public at large is also involved because people welcome innovations, adopt easily the new products and even expect an ever accelerating rhythm of innovation. This quest is what precisely distinguishes a "modern" society from a "traditional" or stagnant one. It is obvious that such a process is inherent to the socio-economic and cultural set-up and cannot be transferred like commodity stocks or financial assets. On the other hand, the products of this process, the techniques, can be attached to commodities and services and can be the object of transactions and have markets and prices.

#### B. THE ASSESSMENT OF TECHNIQUES

The historical link between the advances of the physical sciences and the industrial revolution and the influence of XVIIIth century philosophers implanted in Western civilization the faith in "Science" as the absolute weapon of man in his struggle to master Nature and to improve his life. In the XIX century "scientism" went with the ideal of a "society of abundance". The impressive number of innovations in areas like nuclear power, space conquest, electronics, cybernetics and automation, computers...etc. reinforced the two centuries old faith, somewhat tarnished by the difficulties of the thirties. The "scientific and technological revolution" was considered in the sixties as a panacea enabling Mankind to overcome all obstacles, conflicts, fears, and uncertainties and relegating ideologies to a kind of museum of ideas. In the seventies the mood changed. Pollution, exhaustion of non-renewable resources, manifestations of alienation in the most "affluent societies", stagflation, the emergence of those till recently forgotten two billion people who make a lot of "sound and fury" about the conditions of hunger, disease and illiteracy in which they hardly survive, all these and similar phenomena plunged the world into a new phase of uncertainty. A full set of new terms surfaced: "limits to growth", "pollution abatement", "outer bounds", "quality of life"... and "technology assessment". For sure, the "Establishment" in the industrialized countries still believes that "identifying the potential of applied research and Technology, promoting of ways and means to accomplish their transfer into practical use, and identifying the undesirable by-products and side-effects of such applied research and technology in advance of their crystallization; and informing the public of their potential in order that appropriate steps may be taken to eliminate or minimize them"<sup>(4)</sup> remains the only and ineluctable way to progress. In other words, more elaborate and sophisticated techniques were coupled with other techniques tending to minimize their negative impact. Exactly as in the environmental issue: let us continue to pollute, but discover ways and means for "pollution abatement". Prisoners of their type of technological "advance", the developed societies are becoming in a way "traditional", i.e. unable to change this type. Hopefully the ecological movements, the anti-nuclear drive, the professional stand on the control of biological engineering, consumer action, the greater and more general awareness of the multiple forms of pollution, the literature underlying the dependence of affluent societies on the resources of the Third World, the search for alternative and less alienating ways of life... etc., will contribute to a "more progressive" approach. However, what we want to retain from this debate is that, **novelty aside, there is no universal yard-stick to measure the usefulness of a new technique**. The assessment depends on the motivation of private profit. In armaments, it has been the devastating power of a new weapon.

#### C. WHAT IS TRANSFERRED AND HOW RELEVANT IS IT?

In fact, the ruling circles in most developing countries have a kind of metaphysical belief in the "powers of

(1) Y.C. DERIAN et A. STARAPOLI: "La Technologie Incontrôlée" P.U.F. 1975.

(2) See for a more sound approach: Third World Forum Statement on the UN conference on Science and Technology for Development, Vienna, 1979. and Pugwash Guidelines for International Scientific cooperation for Development 1978.

(3) ID/B/AC/11/9/N.Y. 1972.

(4) National Academy of Science, "Technology: processes of Assessment and USA choices". 91st. Session, 1969. p. 7.

technology". They think that "modern techniques" can promote by themselves fast self-sustained and overall development. They ignore completely the dialectical relationship between social, cultural and economic change on the one hand and technical innovations on the other. History tells us that "inventions" may remain simply curiosities, or produce some gadgets to divert bored magnates, when the socio-economic set-up is not prepared to make use of them in production<sup>(1)</sup>. They do not fully realise that when they buy a nuclear power station they do not enter "the nuclear age", because every single nail of the equipment will be imported, not to mention the fuel and its very peculiar trade. Moreover the station will be manned by foreigners, and whenever some nationals are highly trained they usually make their career in the transnational corporation running the plant and join the plant and the brain drain. The society as a whole remains "technologically backward"<sup>(2)</sup>. Encouraged by TNC's (who know how lucrative trade in technology is) many developing countries bought (often with foreign indebtedness) the "most up-to-date" industrial plants because of their high productivity. The consequences are well known. In most cases these plants work at around half of their capacity reducing to nothing their extremely costly high productivity, not to mention many other social, economic and even political adverse effects. To be fair, one should not put all the blame on decision makers, because until recently the intellectuals of the Third World tended to equate modernization with westernization and accepted implicitly the idea of a unique path to progress. Dazzled by the glamour of Euro-American civilization, they used to look at their national cultures with shame or even disdain. The impact of the way of life the so-called of "consumer society" on the middle classes of the developing nations makes them take the colourful, mervellous gadgets so popularized by the mass media as symbols of modernism and social prestige. Anyhow, the importation of techniques continues and raises a whole set of problems explained at length in the UNCTAD papers. In spite of their importance, this paper will not deal with them in order to stick more closely to its subject-matter. We single out only the question of the relevance of imported techniques. Certainly physical science is universal, its laws are the same at least in all parts of our planet. But these laws are valid all other things being equal. That is why when applied research tries to develop out of them techniques of production, it has to take into account most of all those other things which never are equal. Thus **technology is in fact the use of scientific knowledge by a given society, at a given moment, to resolve concrete problems facing its development, drawing mainly on the means at its disposal, in accordance with its culture and scale of values.** Consequently, every technique bears its "genetic code" relating it to the society that engendered it. Very often the transfer of a technique from one society to another, notwithstanding differences in culture and socio-economic set-up, can produce the same effect as the transplantation of organs in human bodies, namely the limited chances of success and the great chances of rejection. This is not a simple metaphor. Rejection of imported techniques is a fact of life in the Third World. It takes the form of "lack of adaptability" of labour, "inefficiency"...etc. which can be explained by a kind of passive resistance. This of course does not imply that all transfers are harmful or useless. But it does imply that importation in the areas of techniques offers no short cut, and can never be a substitute for local production. Techniques, moreover, are not neutral. They are conceived to satisfy specific needs for producing specific goods. Choosing a given technique means opting for a certain type of activity and adapting the society to it. To take one example: production of durable consumption goods needs expansion of the local market which in turn favours in developing countries greater income inequality. Finally complete reliance on imported techniques means in the last analysis that the developing nations admit the most hateful form of the international division of labour: a few groups of nations endowed with the capacity of producing techniques, while the rest of Mankind can at best adapt themselves to techniques conceived by and for others. The racist connotation is obvious.

## B. APPROPRIATE VERSUS MOST-UP-TO-DATE TECHNOLOGY

### 1. The Appropriateness of techniques

Let us try, in the light of the preceding remarks, to understand more closely the concept of the appropriateness of techniques. Given the fact that the same scientific knowledge can give birth to various applications, some of these applications are bound to be more appropriate to certain societies at certain moments of their history than others. We know how the outburst of technology and the increasing flow of new techniques took place more or less spontaneously in the now industrialized nations. It is beyond our intention to examine their appropriateness then or in recent years. Our point is that Third World countries are the last comers to the era of the intensive use of scientific progress for the betterment of Man's life. Faced with a host of rapidly changing techniques, and an ever increasing stock of scientific discoveries, allowing for diversification and not only linear succession in technical progress, they should make careful and deliberate choices. Their resources being limited and the legitimate aspirations of their people immense, they should not tolerate either infatuation with other people's techniques or easy solutions. The price of errors is tremendous. The social cost of more suffering for those who are already miserable can be easily translated into political cost: upheavals, rebellions, coups-d'Etat, guerilla warfare and military dictatorships. Planning in the area of technology might be, in many cases, more relevant than planning for investment. In fact the first should command

(1) The Chinese invented the printing press before Gutenberg and printed only playing cards: compare this with what James Watt, the inventor of the steam engine, wrote about the industrialist who financed his work: "without Boulton, my invention would never have reached the results it had effectively reached." Quoted by F.M. SCHEHER: "Invention and Innovation in the Watt-Boulton steam engine venture" in "Technology and culture", the International Quarterly of the society for the History of Technology" 6/2, Chicago, 1965.

(2) A striking illustration of this sad reality is given by a photograph in "Time" magazine (May 16, 1977) showing in Indonesia a "Radio satellite station and stone age man" in front of it.

the latter. A quite voluminous literature has been published on project analysis and evaluation, as well as a good number of mathematical models to deal with economic aggregates accompanied by the rules of national accounting for computing them. Little of significance has been devoted to what is usually mentioned under the heading "choice of techniques" and generally limited to some considerations about the classical debate: "labour intensive" versus "capital intensive". The same type of false dilemmas abound in textbooks on development, of which another famous example is: "import substitution" versus "export promotion" as "strategies" for industrialization<sup>(1)</sup>. The term appropriate is becoming rather fashionable now. Fashion can be a good thing insofar as it does attract attention to this central issue, but it can discredit it if it does not lead to the birth of an operational concept. In our opinion a technique, or better a set of techniques, can be qualified appropriate if it fulfils adequately the following conditions.

## 2. Conditions of Appropriateness

### A. THE OPTIMUM COMBINATION OF PRODUCTION FACTORS

In micro-economics, the theory demonstrates that the entrepreneur maximizes his profits by combining production factors according to their relative scarcity. We are here on the familiar ground of economic rationality. One can be tempted to extend the theorem, *mutatis mutandi*, to the National Economy as a whole. Yet we have to qualify it, precisely because the micro-calculations do not always coincide with the macro-computations. For an individual enterprise - whether public or private - maximization of profit can mean the use of capital intensive techniques, especially when these are provided by foreign "aid" or some transnational partner, when the society is affected by underemployment. Of course an enterprise has to make profit - we are not advocating profitless ventures! But the attainment of precalculated profits and their persuance will depend in the medium and long range on the performance of the economy as a whole, and in the first place on the creation of job opportunities which enlarge the home market. Thus the optimum combination of production factors should be considered simultaneously on the micro-and-macro levels. In most Third World countries, labour is available in greater quantities than capital. This entails quite naturally that there is a bias in favour of "labour intensive techniques". But again we have to qualify this. Intensity of the labour component must not be understood as systematic preference for obsolete ways of production. First, because techniques abandoned by western firms for new ones are often also capital intensive; progress in reducing labour inputs goes by steps and rarely by leaps. The concept of "intermediate technique" is of no help simply because it is vague and proceeds from the idea of linear technical progress (traditional - intermediate - modern), an idea we have already rejected. In our opinion labour intensive techniques can be modern ones, conceived - as all techniques are - with a view to increasing labour productivity in concrete situations and not universally. In other words, the high labour component bias should lead to the invention of new types of equipment. This is not impossible to imagine unless one remains a slave of the indefensible idea of the uniqueness of every technical solution already discovered. We shall deal later with the crucial issue of how can the developing nations recover their creativity and inventiveness and make such possibilities enter the realm of facts. The call for appropriate techniques should never mean that the poor nations have to resign themselves to being content with what the others see as archaic. On the contrary, it is a challenge to their intellect and imagination. In the second place, appropriate techniques in heavily populated Third World nations are not only nor always labour intensive. In many cases, capital intensive techniques can be more appropriate. As a rule, industries producing capital goods are more capital intensive than those producing consumption goods. In other instances the time factor is decisive and imposes the choice of expensive equipment. A combination of different degrees of capital intensity in the same industry during the various phases of processing or even in the same phase is not to be excluded. That is why the "turn-key" plants, and the "technological packages" are the worst means of the transfer of techniques. Finally the "mix" of techniques to be used, and the multiple forms of the combination of labour and capital are not merely an abstract exercise because other elements have to be taken into consideration, mainly: for whom the productive machinery will produce (the market), what materials will it use (the national resources) and what kind of product it will deliver.

### B. THE RELEVANCE TO THE STRATEGY OF DEVELOPMENT

The issue of the choice of techniques has been obscured for more than a quarter of century by the dominant "theory" of development that has been more or less explicitly accepted all over the period, according to which development was basically seen as a "remake" of the historical pattern of growth of the Western nations. In such a conceptual framework there was naturally no reason to waste time in philosophizing about the choice of techniques. Unfortunately things were not that simple. The famous gap between rich and poor nations is widening, in spite of an average rate of growth of GNP of the Third World countries that is almost double that of industrialized countries at the same "stage". It is now of the utmost importance that Third World nations realize that in history there is no "remake". The exceptionally favourable conditions in which the West developed cannot be reproduced. It is high time now for every Third World nation to think out and formulate a consistent development strategy, development being understood as a global process of renovation in which economics is a major, but not exclusive, component. Personally, I believe that there is no universal "model" of development and that a general (and highly abstract) theory of development may take shape gradually through the analytical efforts of Third World intellectuals, grappling with the realities of their societies, struggling for a theoretical break-through and for new tools of analysis, and confronting their own findings

(1) As a matter of fact, the same commodities can be consumed by the home market or exported, depending on the commercial policies and not industrialization strategies.

with those of their colleagues in the industrialized nations. For the time being, what seems obvious is that conscious, deliberate choices at the level of the society as a whole are inevitable; no spontaneous mechanisms can lead to a self-sustained comprehensive development. The experiences of three decades provide irrefutable evidence of theoretical fallacies or vacuum, disastrous illusions and political short-sightedness. In the context of a need oriented strategy, techniques will be appropriate in as much as they contribute to need satisfaction. "Basic needs" in most cases actually are the same as subsistence needs. Goods and services to satisfy them are not sophisticated and should be as cheap as possible. Labour intensive techniques are generally speaking less expensive than capital intensive ones. At the same time, they provide more productive jobs. By so doing they satisfy a basic need (a productive job assuring a stable income is a need in itself) and distribute the necessary income for acquiring the products satisfying other needs. In heavily populated countries there is a huge potential home market for such products; it will become an effective market if the right types of goods and services are produced. with the help of appropriate techniques. It goes without saying that fundamental political and social choices are necessary to counter the inertia of the trends engendered by the still prevailing policies. The privileged elites have to consent to sacrifices. But this will only be political wisdom. Because as Robert Mac Namarra put it in one of his speeches: "when the highly privileged are few and the desperately poor are many - and when the gap between them is worsening rather than improving - it is only a question of time before a decisive choice must be made between the political costs of reform and the political risks of rebellion"<sup>(1)</sup>. However, starting by satisfying subsistence needs does not mean sticking to a sort of "stationary state" of poverty. A needs oriented development aims at raising the level of satisfaction steadily, both quantitatively and qualitatively, and by diversification of needs, both material and immaterial. This in turn implies a dynamic concept of appropriate techniques, because technical progress is to be pursued mainly by means of intensive national technological endeavour. Nevertheless, the people of Third World countries ought to be told that to assure for all Mankind the material *per capita* consumption of the U.S.A is out of reach. The resources of our planet would not allow it. Moreover this type of consumption is wasteful and can be alienating. Two additional remarks before concluding on the issue of needs oriented development strategies. First, they do not weigh heavily in favour of consumption and thus neglect the necessary formation of capital for further growth. Abolishing conspicuous consumption of the rich minorities and "prestige" expenditure of the State and its agencies can almost compensate for the satisfaction of subsistence needs. And even if the savings are to be lower in the first phase they will tend to increase. Besides, the low capital intensity in many projects can raise sharply the total physical output resulting from the same amount of investment. On the other hand, the cheap commodities produced under this strategy can be exported to other Third World countries without suffering from competition from developed nations.

### C. FULL UTILIZATION OF NATIONAL RESOURCES AND THE ENVIRONMENT ISSUE

It is a well known fact that an invention becomes a technique only when its cost is not prohibitive. A major element of cost is the materials to be used. If these are available at a reasonable cost the new technique can be a success. Until recently the availability of energy and raw materials has not been a major constraint in the industrialized world. On the contrary, for most developing nations with chronic balance of payments deficits an extra import is a painful burden. Hence an appropriate technique is the one that allows for greater use of locally available raw materials and sources of energy. Substitution of materials is not infrequent. A relatively recent good example is the substitution of natural gas for coal in ferrous metallurgy. Third World nations have to draw up an inventory of their resources and to base their development on them, and to seek by all means techniques that make use of them. Here again these nations have to depart from their intellectual dependence and try hard to develop appropriate techniques. On the other hand, they should aim at avoiding the mistakes made in the industrialized world. They have to avoid as much as possible polluting techniques. The costs of pollution abatement are so high that it becomes common sense to spend in preference on the research and development of alternative techniques. In the same category of ideas, awareness of the finiteness of natural resources should persuade Third World nations away from wasteful techniques. For example, it has been a mistake in Egypt to expand rice cultivation with a view to increasing exports, given the very limited water resources of the country. It is obvious that relying on exports of a non-renewable resource to satisfy local conspicuous consumption (as is the case in some oil exporting countries) is the worst possible use of natural resource. The national geographical area itself should be looked at as a natural resource use of which has to be rationalized. This approach upsets the traditional views on location of economic activities and the image of a post-industrial country as one where there are no villages. In trying to copy the Western pattern of industrialization, developing countries succeed only in establishing "modern enclaves", a dual economy and monstrous urbanization, when the systematic neglect of the country-side is transformed through the migration of the rural poor who become more miserable urban poor. The balanced growth of industry and agriculture, the increasing linkages between both sectors, the harmonized development of both urban rural-areas can open new horizons for industrialization and for techniques suitable to it if it is a deliberate and constant policy. The identification of industrialization in general with the concrete historical form it took in the North leads Third World nations into a blind alley. But if we stick to the essence of the concept and adopt as a working definition for it "the use of machines (i.e. equipment run by sources of energy other than human or animal) to multiply the productivity of labour" it will not be beyond our imagination to conceive other patterns of industrialization, making more room for small

(1) R.S. MACNAMARA: "One Hundred Countries, Two billion People". Praeger, N.Y. 1973. p. 112. See also in the same chapter figures about poverty in Brazil "the successful middle class country". I would like to add one figure only: Brazil is the most indebted developing country: about 50 billion dollars in 1978.

and medium size plants and more even spatial distribution of industrial activities, closer linkages with the other sectors of the economy mainly with agriculture, and less sharp polarization between rural and urban areas. Again, what is needed here is social and political decisions curbing the rich urban minorities obsessed by the styles of life prevailing in the consumer societies. From a purely economic point of view, it will suffice to make calculations on a macro-level and for a long time span to find that the results of the proposed approach are positive. One does not need to be a fanatic partisan of fully centralized planning to recognize that the entrepreneurs cannot take in to account such considerations. They are bound to the medium term seen from the angle of profit maximization. Last and not least the geographic and climatic conditions of the country should be taken into consideration. This is obvious in agriculture technology where the differences between the temperate areas of the industrialized countries and the tropical, sub-tropical and equatorial areas cannot be overlooked, especially when they are aggravated by discrepancies in industrial growth and diversity in the social and cultural backgrounds. But this applies also to areas such as architecture and urban planning. Imitating "modern" cities of the North governments and rich people in southern countries erected high buildings entirely in glass, steel and aluminium, while good living there needs shade and coolness. And to remedy the intolerable sunshine and heat, they pay additional costs for air conditioning.

#### D. RELEVANCE TO THE CULTURAL ENVIRONMENT.

The last example (concerning architecture) brings into the light a hidden dimension of the appropriateness of techniques. The disdain of national cultures coupled with blind faith in Western techniques led until now to the general acceptance of the idea that under-developed people have to adapt themselves to imported techniques. There is a copious literature on attitudinal obstacles to development and the way and means of changing "traditional" scales of values and on the spreading of developmental behaviour. The "efficiency" of such a process of submitting men to techniques is doubtful even from a purely economic viewpoint. Men are not so easily manipulated as that. They can use many forms of passive resistance when they are dealt with as simple tools. On the other hand, if enough consideration is given to their culture and their scales of values, and if the analysis is free from all Eurocentrism, it is possible to identify values that can be good levers for development. Undoubtedly, development means evolution of attitudes and a certain change in values. But this should never take the form of disruption, cultural aggression or rape. A comparison might help here. Japan imported many Western techniques, but it never adopted Western rules of organization and management, and it became the third industrial power in the World. The relative importance of cottage industry there can only be understood in the light of the strong family ties characterizing the Japanese culture. With its growing links with the West, Japan is worried now about the effects of cross-cultural relations. On the other hand, modern Turkey started with a sweeping attack against the traditional culture. One wonders to what extent this favoured economic growth, but we can notice that religious trends, inhibited for half a century, are flaring up with a certain fanaticism. That is why we believe that the only realistic path for technology is mutual adaptation between men and machines. A technique will be appropriate when it is accepted and assimilated by the producers, and when it stimulates their enthusiasm and creativity, thus preparing the ground for further progress. In this approach, the study and improvement of "traditional" techniques acquire a special importance as we will explain later. The relevance to culture is crucial when it comes to "soft technology". We have already mentioned the case of organization and management. We shall only add that these techniques are closely related to profit maximization, market mechanisms, promotion of consumption...etc., and hence can differ according to the structure of the economy, the organization of the society, its culture and values. If we move now to the field of education, we can say that whatever the excellence of Western education systems nobody has demonstrated their universal validity. The system in itself loses much of its efficiency when transferred to a different socio-economic and cultural set-up. Instead of promoting development, it often inflates the numbers of white-collar workers trying to escape from the hardships of the peasant and workers file and feeds the brain drain. Its content in social terms is often alienating because of its heavy load of Western values and biases. The situation is really tragic when the language of teaching is a foreign one, and the graduates of the system often suffer from a cultural schizophrenia. If we turn now to health services we can easily see how Western techniques have not coped adequately with the needs of developing nations. Benefits in terms of infant mortality and life expectancy are far from justifying their costs. On the contrary, some recent studies carried by scholars or international bodies prove that different techniques practiced in countries like China, Cuba and Tanzania are most effective<sup>(1)</sup>. To sum up **modernization should not equate with westernization because otherwise it will mean also depersonalization. Modernization is the capacity of a nation to renew itself.** Its motivation can be found in the basic need for self assertion both individually and nationally. Its outcome should be the assertion of cultural identity by genuine endogenous development. Cultural diversity of Mankind enriches all our cultures by cross-fertilization, while cultural dominance is impoverishing. Development is a global process whose economic component is decisive but unattainable if it is not adequately fitted into the processes as a whole. Appropriate techniques are central to this integrated view.

#### C. POLICIES AND INSTITUTIONS

At this point of our exposition it becomes clear that Arab countries have to adopt an active policy aimed at the building of scientific and technological capabilities fully autonomous with regard to T.N.C.'s. This means in the first place the necessity of elaborating science policies. At the same time it is equally imperative to embark on Research and Development.

(1) V. DJUKANOVICH and E.P. MACH: Alternative approaches to meeting basic health needs in developing countries. A joint UNICEF-WHO Study Geneva 1975.

## 1. Science policies

Most Arab countries have scientific research centres. Some even have an academy or ministerial department in charge of scientific co-ordination and supervision. Otherwise, this task is performed by the Ministry of Education or of Higher Education. Yet, both the research workers as a group and the government are not satisfied with the results. If this demonstrates anything, it does show that institutions do not necessarily produce policies. It is high time now for each of our countries to elaborate a "science policy" that should be a major component of its development plan. Such a policy must be binding on the administration, that is to say that public financial support has to go in the first place to areas of research given priority in the science policy, without infringing on the academic freedom of the research workers, or excessive rigidity prohibiting necessary adjustments. Priorities in scientific research should be set in accordance with the concrete needs of development, and the availability of resources, particularly human resources. Obviously, this exercise should be undertaken jointly by scientists, the administration, the business community, trade-unions and other social organizations. Otherwise, the science policy document will run the risk of remaining an academic one. Then, and only then, the institutional set-up of scientific research can be designed, not as replicas of what exists elsewhere, but in the form most adequate for the implementation of the policy decided upon, and with a view to optimization of returns on investment allocated. Anyhow, the institutional set-up should comprise some central co-ordinating body, academy or ministry. But in order to avoid excessive bureaucracy, the science policy must be translated into definite programmes and projects. Finance will be better channelled through research contracts with institutes and research units.

The case for collective self reliance is very clear in the area of scientific research. The Arab World, and even the ECWA region taken alone, is rich in research workers. They show a very high degree of mobility across the region. The use of a common language, the community of economic interests, the cultural background and the optimum use of funds allocated to scientific research are all factors favouring close co-operation. Co-ordination of science policies, a kind of division of labour among various research centres, and joint work between teams from different countries could contribute to the emergence of an autonomous Arab scientific community.

Special emphasis should be put on research in the social sciences for the reasons mentioned above. Nothing is more alienating than reliance on foreign books written on our history, culture, development and social structures. Arab social scientists will never understand the realities of our societies, if they do not come in to direct contact with them through objective and unbiased analysis. Without such understanding the elaboration and implementation of meaningful development strategies will be hazardous.

In the physical sciences, basic research in promising areas should receive due interest and care. On the other hand, applied research should be geared toward problems facing development and must aim at technological outputs. Commitment to the welfare of the deprived majority should be demonstrated by special attention given to "production technology", in order to increase the amount of goods and services corresponding to the needs of the majority, rather than embarking on "consumption technology" under pressure of the demand emanating from rich minorities indulging in wasteful styles of life.

To conclude on this point, one should recognize that scientific research, with all that it implies in terms of innovation and creativity, gathers momentum only when the socio-political and cultural climate is propitious. It is needless to emphasize here to struggle for the eradication of illiteracy, an adequate education system related to national renaissance and developing imagination and curiosity, and a set of ways and means of informal and recurrent education at all levels. Full respect for human rights, not only for the sake of "academic freedom", but in the sense of democratization of the society at large, is of paramount importance for the processes of scientific and technical progress. Dictatorships can at best produce technocrats whose only source of power lies in channelling foreign know-how, like priests of a pagan religion drawing their prestige and benefits from their access to the "mysteries" of the world of gods and demiurges. On the other hand, in democratic societies creativity is stimulated, new ideas blossom and intense free debates help in making the best social choices.

The preceding remarks apply of course to technological research as well. From another viewpoint, the latter does not have to wait until scientific research achieves important advances. We have already pointed out the positive interrelation between the two kinds of research and showed how they are mutually stimulating. This again brings us to the thesis defended above, according to which scientific and technological progress is a function of demand. Basic research is often looked on our countries as a kind of academic luxury. Unless decision makers start to rely on local and Arab expertise, and unless Arab research workers are able to develop valuable know how, policies and institutions cannot remedy the present serious dependence in this central area. Therefore we will go deliberately into some details in the following section.

## 2. Research and development

### A. TECHNOLOGICAL CAPABILITIES

As defined in the preceding section, appropriate techniques are rarely available in markets. Therefore, it would be a waste of time to dwell upon the conditions of their transfer. The real issue is elsewhere. It is **how a Third World country can identify and develop appropriate techniques**. And the answer is almost self-evident: by building and strengthening its own technological capabilities. In other words, Third World nations have to practice technology in the

sense given to the term in this paper. That is to say the systematic study and analysis of the possible alternative technical solutions, that might be derived from available scientific knowledge, in order to identify those which are appropriate to the concrete conditions in which each nation (or group of nations) is living, and by trying to accomplish steady advances along the path of its own over-all development. At this point some pertinent questions arise. How can such capabilities be built? Should a country defer all decisions concerning techniques until it acquires them? At what costs can national technological capabilities evolve? Are they within the reach of poor nations? Are they justifiable by substantial benefits?... etc. We think of building and strengthening national technological capabilities as a complex of processes, of concomitant and successive activities, including, *inter alia*, choices and decisions concerning techniques. In the following few pages we shall try to outline our way of thinking.

## B. THE ORIGINAL SOURCES

In today's world, one can hardly imagine a country setting out to develop in a complete technological vacuum. Both by deliberate decisions and through inertia and/or spontaneous socio-economics trends, there is in every country at a given time a set of techniques in use. Hence the most natural starting point for the process of building and strengthening the national technological capabilities is to rationalize the decisions and orientate the trends towards more appropriate techniques. Four fundamental activities should be stressed in this respect.

### (i) Screening of imported techniques

Classically choice of techniques is mentioned in the list of activities that planning bodies are supposed to perform. The fact of the matter is that they seldom do. Choices are usually induced rather than decided upon. Let us recall here that external financing carries in itself a tacit decision on technology. This does not need any demonstration in the case of direct investment; techniques are part and parcel of the package of choices, the outcome of which is the investor's decision to set up a venture in a given country. Bilateral official development assistance (ODA), even when it is not explicitly "tied", drastically limits the choice. A Third World country often gives priority in implementation—regardless of the scale elaborated within the planning exercise — to the project for which the foreign financing is available. Quite naturally, it uses the funds it obtains in the donor country. The latter can only sell what it has, that is to say its own techniques. Multilateral aid offers of course more possibilities — even if they are limited to member countries of the agency (the case of the World Bank). But a sound decision on a loan requires a "feasibility study". Consultants — even when free from all other biases — are bound to favour those techniques which are familiar to them, which are practised in industrialized countries. And this will be the case no matter who selects the consultants and hires them. The nationals of the Third World nations who might have some influence on the choice of techniques belong to two groups: politicians and technocrats. Both groups have a leaning towards "up-to-date techniques", the latter because they are "modern" and the former because they are prestigious. In the framework of a development strategy based on self-reliance and geared towards real needs, there is enough room for rational decisions on the choice of techniques, even when we keep in mind how stringent external financing is. We use in this respect the term screening rather than selection. The latter relates more to financial conditions or at best to micro-level traditional project analysis. While what we have in mind is a more thoroughgoing analysis tending to test comparative available techniques by the criteria of appropriateness explained in the preceding paragraph. Special focus should be made on the upstream and downstream effects and inter-sectoral consequences. The target of such an endeavour is to identify the least inappropriate technique, if not the most appropriate one (which will not be easy to find given the conditions of inception of techniques). It would be rather naive to believe that this kind of exercise will lead immediately and always to rational decisions. Errors are bound to happen, and rationality may remain relative. But on the other hand, the screening has a valuable by-product: its **educative character**. Those who will devote themselves to this task will acquire great knowledge about the comparative merits and defects of similar techniques and learn about how they have been invented and why. They will take their first steps in technology.

### (ii) Adaption of imported techniques

It is quite exceptional that the whole set of techniques used in say industrial plant can be transplanted to a Third World country without any adjustments. Not infrequently some adjustments are unavoidable (to cope with local climate for instance). TNCs try, naturally enough, to reduce adjustments to the strict minimum because they entail additional costs. On the other hand, the search for appropriateness should lead the Third World nations not only to adjust marginally the imported techniques, but also to adapt them as much as possible, according to the above-mentioned criteria. The *sine qua non* for this is to give up practices such as "turn-key" plants and "technological packages". Nationals of the Third World countries have to be involved in all phases of any project, from the prefeasibility to full implementation and then the running of the new enterprise. In the first place, this is the right way to train them in technology and not just in handling installed equipment as TNCs do when they send local engineers and workers to be trained in one of their subsidiaries operating abroad. In the second place, this association creates a climate favourable to the germination of new ideas and the crystallization of national technological inputs. Nationals may not be very familiar with sophisticated techniques but they have a wide knowledge of their country, simply because they are born and live there. A main direction of adaptation is the substitution of local inputs for foreign ones. There major come under this heading. First, construction of buildings and some other infrastructure such as roads, canals, land levelling... etc.) Here, the quality of the product is not very relevant to the techniques used, while its relevance to the local environment is obvious. The use of local materials goes as a general rule with more labour inputs and less mechanization. The

outcome can be a drastic reduction of costs. To have an idea of its magnitude, it will suffice to recall that construction absorbs on average 40 per cent of the total cost of a project, one third of which is currently paid for in foreign currencies. The second area is of course labour. The costs of educating and training nationals are less high than the salaries to be paid to expatriates. I go so far as to state that local labour should be drawn upon, even if it is at the beginning less "efficient", provided that in-service training is generalized and workers are rightly motivated to learn from their own work and steadily raise labour productivity. In the first stages of development, new enterprises should be looked on both as productive units and training centres. The third area is that of intermediate goods. Technologically, raw materials and semi-finished goods are often interchangeable, sometimes at the pice of lowering the quality of the product and sometimes at that of further research. Needs oriented production values low price more than sophistication of quality. Further technological research is almost a target per se. Its returns are rarely confined to the calculation of the profitability of an individual enterprise; it raises the national technological capacity with some multiplier effects. A second main direction of adaptation is what I may call the "combination of techniques". Any production process of some complexity uses a full set of techniques, and some of them can be replaced by others borrowed from other foreign technologies or even by some revival local techniques. This combination is to be sought mainly in order to facilitate the substitution of local of local inputs for imported ones, but also for other considerations such as environment conservation or cultural values.<sup>(1)</sup>

### **(iii) Reviving traditional techniques**

Nobody has ever proved the total obsolescence of all traditional techniques. Their rejection *en bloc* is a good example of irrationality in development thinking and attitudes. Quite naturally, they are looked at in an ethnological way by experts from the industrialized World. As a typical form of alienation, local educated experts from the industrialized World. As a typical form of alienation, local educated experts share this disdain. Still, it is a fact that they cannot be totally and immediately replaced by "modern techniques". Ignoring them is tantamount to neglecting people and communities who live by them. The dual economy is not only the result of unconsidered and indiscriminate importation of foreign techniques, but also that of the systematic denigration of traditional techniques. Historically, these were appropriate because they were invented by the community to resolve some of its problems under the constraint of available resources. Their evolution has been more or less stopped by the impact of the alternative solutions invented in other societies. Modern education and the global social change, taking place for the better or the worse in Third World countries, deprive traditional techniques of the transmission and evolution that would have occurred, if young dynamic people had continued to be interested in them, and if the authorities had paid enough attention and given due encouragement to this evolution. Selective inputs from new technology would have been most beneficial to this most desirable evolution. In the absence of such a policy, instead of evolution traditional technologies are in full decline and tend to fade away, leaving growing numbers of rural and urban poor, unskilled and more or less jobless, in societies unable to provide them with modern skills and stable jobs in the "modern sector". A more realistic and developmental attitude towards these techniques is essential. They have to be subject to survey and analysis. A systematic research and some financial effort should be allocated to their improvement. We have to live with most of them for many years. Hence, we have to revive them by adding all that can make them more productive without altering their small scale, labour intensive, and spatially scattered nature. Some of them in handicrafts can produce luxury "hand made" goods with considerable export potential (for example: footwear). Others can assure part time, seasonal or complementary industrial activities in the over populated rural areas. Many can provide low cost solutions to problems the society is still unable to handle. This ranges from the use of human and animal wastes, with some minimal sanitation measures, as organic fertilizers, to the use of medicinal herbs after due scientific examination of their effects and side effects. The Chinese try to "walk on two legs". That is not a matter of ideological choice, it is in the first place an economic necessity.

### **(iv) Innovation**

Intense activity in the screening and adaptation of imported techniques and in reviving traditional ones form a whole process of education and research in technology. While increasing and broadening the knowledge-technical or otherwise — of those engaged in it, it will stimulate their imagination and creativity. Innovation is bound to appear during this continuous process, at first in a fragmentary way most probably. Still, a deliberate policy is needed in order that relatively marginal innovations can become conducive to cumulative expansion in this field. Technical innovations of some significance realised in Third World countries may today sound like a sort of science fiction. But did not most of technical achievement of the industrialized nations appear first as "fiction" written by particularly imaginative authors? The time span between fiction and its concrete materialization is generally a function of the social priority given to this task. We should remember in this respect that we in the Third World are not aiming — at least for the time being — at the moon (both literally and figuratively), but only at devising appropriate techniques to vanquish illiteracy, disease and poverty, at the lowest possible costs, in the frame-work of societies rejecting greed and wastage in material consumption, and hopefully freed from the search for military power. Our ambition nonetheless great and uplifting: to find our own paths to genuine endogenous technical progress instead of trailing in a state of despair and submissiveness behind the rich fifth of Mankind. The choice is dramatic and rich in social, political and cultural implications.

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(1) These remarks were inspired originally by the development experience of Egypt in the late 1950's and the 1960's.

Compromise is hardly possible: we either continue with development policies that lead our countries to where they stand now, or we adopt development strategies that allow, *inter alia*, for technological autonomy.

### C. COST AND BENEFITS

It is clear that what we are recommending here amounts to nothing less than adding investment in R and D to the "burdens" of development. Before looking at the "costs and benefits" of this activity, we have to examine its feasibility — to use the familiar jargon of development. At the outset, no sensible person can deny that the human factor plays the decisive role in R and D more than in any other field. It is frequently quoted — and sometimes deplored — that over 90 per cent of all scientists and technologists living today work in the industrialized countries.<sup>(1)</sup> The phrase to be underlined in this quotation is "work in the industrialized countries". First because it implies that not all of them are born in the countries where they are working now; in other words, it hints at the dramatic "brain drain" from Third World countries to the industrialized World of the Western nations. The problem has been dealt with in some serious studies, but none is comprehensive enough to calculate the real magnitude of this "technical assistance" supplied by the "less developed" nations to the "post-industrial" rich ones, nor to compute the cumulative losses incurred by the former. However, what is relevant to our subject is that among the motivations for emigration is undoubtedly the lack of effective demand for research workers at home.<sup>(2)</sup> In the second place, those who resist the temptations and remain to serve their nations are incredibly underutilized for many reasons on which we cannot expand here (preference given to foreign expertise, lack of research infrastructures, reliance on imported techniques in the business sector, defects of the education systems... etc.). Our conclusion regarding personnel needed for R and D in Third World countries then is that with few and insignificant exceptions Third World nations own enough intellectual resources to embark on ventures in technology<sup>(3)</sup>. Moreover, intensive activity in R and D will promote the supply of brain power: some will return from abroad (think about what happened in the Chinese case), research will raise the competence and knowledge of those involved in it, this new demand on university graduates will modify the pattern of higher education... etc. Some will object that the financial costs are prohibitive and will quote very impressive figures from OECD studies, especially the case of U.S.A. But things in the Third World are or should be different. First of all most developing nations do not need R and D in areas like space, aeronautics, sophisticated electronics or highly lethal weaponry. They are looking for appropriate techniques in the framework of needs oriented development strategies. Secondly, close relations between production units and research centres can save duplication of expenditure, maximize the use of equipment and personnel, and help in setting research priorities in ways that lead to tangible and early returns. Thirdly, the definition of the broad lines of a national policy for science and technology, and the integration of the relevant detailed research programmes is to the national development plans, will lead to a certain degree of optimization of the returns on R and D allocations. Finally, if the cumulative effects of research are taken in account, one can conclude safely that the costs will soon become much lower than those of importing techniques which are often inappropriate. Once the development strategy is purged of the obsession with the most "advanced technology" and unconditional faith in Western superiority, there will be no problem in deducting the initial R and D funds from the total amount of those allocated to obtain know-how, licenses, patents and hiring foreign experts and consultant firms. At the institutional level, it might be convenient to establish a kind of "**national technology authority**" to handle the R and D funds. Such an organization should be in charge of the studies concerning the screening of foreign techniques, the adoption of imported techniques, the improvement of traditional techniques and the promotion of innovations. This does not imply any government monopoly in the field of technology leading to the subjection of research workers to State bureaucrats. The central idea is pooling the research resources, securing common services (like data banks and information dissemination, documentation centres etc.), insuring minimal co-ordination between the various research activities and between research and production, providing special incentives to research in priority areas, as identified in the national policy for science and technology and national development plans. Full participation of representatives of the scientists and technologists, the industrial and financial community, agricultural co-operatives, trade-unions... etc. in boards of management and consultation of this authority can be an effective anti-bureaucratic device. On the other hand, the authority should deal with research institutions, whether teams or individuals, on a contractual basis and not through administrative instructions.<sup>(4)</sup> Such an agency with its nation-wide multi sectoral and inter-disciplinary network and its documentation centres and information banks will be the most knowledgeable representative of the national interests, not only in the choice of techniques to be imported, but also in negotiating the terms on which they will be imported: valuation of patents, agreements on royalties and fees, time and space limits in licensing contracts... etc., in a word all the commercial issues that stir up discontent in the Third World

(1) TINBERGEN et al: Reshaping the International Order (RIO) p. 39.

(2) Some available "figures" concerning **brain drain** are so eloquent that they need no comment.

- in the U.K. 44 per cent of junior medical staff are foreign

- in the U.S.A. 90 per cent of Asian students who arrive for training never return home.

- Togo sent to France more physicians and professors than the other way round...

see Alexander King and Akilu Lemma in RIO pp. 270.

(3) The ECWA region has been dramatically affected by brain drain. See: ECWA: "The Brain Drain Problem in the ECWA Countries", Beirut, July 1978.

(4) Agencies of more or less similar nature already exist in some countries. For instance, the "Instituto de Investigacion Tecnological Industrial Y Normal Technicas" in Peru, (see: F.R. Sagasti, "The ITINTEC system for Industrial Technology Policy in Peru" in World Development, vol. 3, No. 1) and the "Consejo Nacional de Ciencia Y Tecnologia" CONACYT in Mexico (see, National Council for Science and Technology "National Indicative Plan for Science and Technology", Mexico City 1976 pp. 45) et ss.

nations. Without further discussion of those issues, we are convinced that they can be related to the weakness of the bargaining power of those nations. In turn, this weakness can be explained by two major causes: the fascination of advanced techniques no matter how appropriate they might be and the lack of adequate information about both what is going on at home and what is practised in the world market. The centralization of the decision-making in the hands of the best informed national body, which at the same time possesses the right terms of reference for national development plans, gives the country the best chances in bargaining. Besides, most licences should be obtained for the country and not for an enterprise, otherwise only big enterprises will have access to foreign technical know-how, while in numerous countries there is a case for encouraging small industries and agricultural co-operatives.

The preoccupations that have dominated this rather lengthy section are now spreading fast in our area of the World. As evidence we would like to mention in conclusion two major feasibility studies, because their very existence shows how far the ideas have gone:

1. "A Proposal for Establishing an Arab Fund for Scientific and Technological Development" (by Z.A. Nasr, Kuwait Fund for Arab Economic Development, July 1978).
2. "Second Revised Feasibility Study For the Arab Regional Centre for the Transfer And Development of Technology" (ECWA, E/ECWA/NR/CTT.2/Rev.3).

#### **IV. Ecodevelopment**

In the previous sections of Part III, we have constantly hinted at the environmental consequences of the alternative approaches we are advocating. It might still be useful to sum up in this concluding section the various elements scattered through our exposition. This allows also for a more systematic explanation of the concept of eco-development as a main component of alternative development strategies and life styles. Thus, the paper concludes as it began with the environment-development problem.

##### **1. Environment Management and Planning**

Coined by Maurice Strong, the Secretary General of the United Nations Conference on Environment (Stockholm June, 1972) and then first Executive Director of UNEP, the concept of eco-development conveys the idea of man developing with his environment and not against it, nor superstitious conservation of what it contains. This means that the concept of "natural resources" given as infinite and costless must be dropped and should give place to the more realistic one of "environment management". As has been said in Part I of this paper, present modes of economic calculation leave no room for environmental accounts. To take ecological factors into consideration, accounts should be made on the level of the society as a whole and for longer spans of time. In other words, environment management calls for long range global planning. This applies also to socio-cultural environment. It is obvious that the indirect social and cultural effects of a single project are usually hard to assess. Moreover, those effects become tangible as a result of the multiplicity of enterprises or activities of a given type. Therefore, learning from foreign experience and long range projections with model building and/or systems analysis are necessary for any serious assessment. This must be the task of national planning bodies which are in a position to collect comprehensive data and process them. It is now recognized that environmental considerations should be dealt with at all levels in a framework designed by a central agency, often a ministerial department. This central action achieves its best efficiency, when it is closely linked with or better still integrated into national planning processes. Of course we understand planning as covering overall development and not only economic growth. All the elements of alternative development strategy, as we have previously stated, can never emerge spontaneously nor be implemented separately. They call for planning. Hence, these alternative strategies are more conducive to sound environment management. Let us add here that planning should not lead to a huge techno-bureaucratic structure, isolated from the people and their day to day life. Damage to the environment can occur at any time and at anywhere by individual actions. Environmental awareness, including education in and information about the environment and what affects it, is a preliminary condition for sound management. On the other hand, the behaviour of individuals and groups must always be purposefully regulated. Therefore, participatory planning at all levels is much needed.

##### **2. The rational use of resources**

As has been said above, self reliance means relying on one's resources. This in turn confers great importance on the rational use of these resources. Depletable resources call for a conservation policy tending to prolong as much as possible their life span. Renewable resources need to be pollution-free and, more pertinently, to remain renewable by keeping the use of each ecosystem within the limits of its carrying capacity. Self reliance develops in the direction of the identification and revaluation of additional resources. In fact, it was the demand emanating from the industrialized countries that has, generally speaking, decided what is and what is not valuable among our resources. The search for appropriate techniques and the drive towards substituting local for imported materials can shape domestic and regional demand on other materials previously considered valueless. The area of energy is a striking example. It is often forgotten that the sun is the primary source of energy in the last analysis. Human societies have used it, directly or indirectly, in a renewable manner (biomass). Fossil energy (a stock of biomass accumulated by geological convulsions and accidents hundreds of millions of years ago), closely linked to modern industry and life styles, will disappear one day. In our region, we dispose of this valuable resources, the sun, which is present almost all through the year. There is

a clear case for our countries to embark, without further delay, on **solar energy** research and development to make every possible use of this available resource, generally considered as an annoyance in our hot climate.

National geographical area is a resource in itself; leaving part of it without positive development is not only unfair to its inhabitants (if there are any), but also a waste of a resource. This approach leads to a new geography for economic and social activities aiming at a balanced regional (sub-national) distribution of facilities. This in turn means the possibility of the avoidance of the concentration of pollutants in some areas. It also helps in promoting rural development in such a way that a limit can be put on the excessive growth of urban centres, with all the damage it causes to physical and socio-cultural environment.

### **3. Reasonable consumption patterns**

Self-reliance is closely associated with "basic needs". As we have explained earlier, a needs oriented strategy means securing at least the minimum level of satisfaction of human needs. In other words, it means the abolition of poverty. We have demonstrated in Part I that poverty constitutes a major threat to the environment. On the other hand, we have tried to show that there should be, in any society and at any given time, a ceiling on consumption. This ceiling has been characterized as the level of consumption that strikes the right balance between the individual, the society and the environment. Thus, environmental damage caused by wasteful consumption by the wealthy can also be avoided. In most of our countries, it is impossible to achieve the floor level for everybody without imposing the ceiling level and public consumption as well. This does not always lead to restrictions on freedom. Excessive consumption can be harmful to the individual. More significant still is the concept of the "wholeness of needs" that puts as much emphasis on non-material needs as on material needs. A better development of man can surely be achieved with less goods and gadgets, if he has full opportunities to enjoy self-fulfilment and togetherness.

### **4. Cultural Identity**

We have defined development as economic and cultural liberation. The cultural issue is very relevant to environment. Frustrated individualism, the restless effort to dominate nature, and even conspicuous consumption are not among the fundamental components of Arab culture. Life styles are greatly influenced by cultural values. If, for the sake of environment, we have to preach life styles different from those prevailing in the West, we have to seek their foundations in our own culture. Besides, asserting national culture on an equal footing with Western culture satisfies the need for self-fulfilment, provides good motivation for development efforts and helps the concrete implementation of the crucial concept of being modern but different.

### **5. Participation**

We have mentioned in the sections devoted to self-reliance and basic needs how central is the issue of participation to the design and implementation of the alternative development strategies and life styles we are advocating. We conclude here by stating that ecodevelopment can best be achieved by free and responsible citizens, participating actively in the process of decision making at all levels of socio-political life.

May it be the privilege of Arab people to blaze the path for other Third World nations? As for those who think that we indulge in a kind of utopia when we talk about new paths and alternative social projects, we take the liberty of reminding them of an established fact. Major progressive changes have always been the fruit of the creative combination of rich imagination and rigorous analysis. And since western civilization continues to exert a real fascination, let us recall that one of its great intellectual fathers, Francis Bacon, who expounded in his "Novum Organum" (1620) the then revolutionary experimental method, wrote also "New Atlantis" (1624), a beautiful utopia.

**STATISTICAL APPENDIX\***

**Table (1)**  
Area (1976)

(1000 HA.)

Total Area	473 285	
Land Area	471 917	100.0 %
1. Arab. and Perm.		
Crops:	18 407	3.9
Arable	17 205	3.6
Perm. Cr.	1 202	0.3
2. Perm. Pastures	115 104	24.4
3. Forest and Woodland	6 657	1.4
Other Land	331 749	70.3

**Table (2)**  
Land Use (1976)

(1000 HA.)

Country	Total Area	Land Area	Arab.& Perm. Cr	Arable	Perm. Crops	Perm. Pastures	Forest & Woodland
Bahrain	62	62	2	1	1	4	—
Iraq	43492	43397	5290	5100	190	4000	1500
Jordan	9774	9718	1365	1175	190	100	125
Kuwait	1782	1782	1	1	—	134	2
Lebanon	1040	1023	348	240	108	10	778
Oman	21246	21246	36	16	20	1000	—
Qatar	1100	1100	2	2	—	50	—
Saudi Arabia	214969	214969	1110	1040	70	85000	1601
Syria	18518	18418	5672	5260	412	8541	457
U.A.E.	8360	8360	13	8	5	200	—
Yemen A.R.	19500	19000	1570	1520	50	7000	400
Yemen P.D.R.	33297	33297	172	152	20	9065	2090
Sub Total	373140	372372	15581	14515	1066	115104	6655
Egypt	100145	99545	2826	2690	136	—	2
Grand Total	473285	471917	18407	17205	1202	115104	6657

**Source:** FAO — Production Yearbook. 1977, Rome, 1978.

\* The reader can find herein detailed — and as complete as possible — data computed from various available sources. Other data-incomplete for the whole region up to a reasonably recent year — have been dealt with in the text.

**Table (3)**  
**Population and Population Density**

Country	Area (000 km <sup>2</sup> )		Population	Population Density
		Census	(thousands) Estimates mid-year 76	(inh./km <sup>2</sup> )
Bahrain	0.62	216(1971)	265	427
Iraq	434	—	11505	27
Jordan	97	—	2840	29
Kuwait	18	995(1975)	1065	60
Lebanon	10	—	2550(*)	249
Oman	213	—	791	4
Qatar	11	111(1970)	185	17
Saudi Arabia	2150	7013(1974)	7432	3
Syria	184	6305(1970)	7595	41
U.A.E.	184	254(1971)	737	4
Yemen A.R.	195	4526(1975)	4861	25
Yemen P.D.R.	288	1590(1973)	1688	6
Egypt (**)	1001	38228(1976)	—	28

**Source:**

ECWA, Statistical Abstract of the Region of ECWA, 1968-1976, Part I, and II, Beirut, 1978.

**Table (4)**  
**The proportional population of primate cities in  
relation to national and urban population in 1970**

Country	percentage of total population %	percentage of urban population %
Bahrain — Manama	42	100
Iraq — Baghdad	22.6	49
Jordan — Amman	21	46.7
Kuwait — Kuwait	77.2	95.0
Lebanon — Beirut	28.	50.7
Oman —	—	—
Qatar — Doha	72.	100
Saudi Arabia — Riyadh	5.2	26
Syria — Damascus	13.6	31.6
U.A.E.	—	—
Yemen — Sanaa	1.7	50.3
Yemen — Aden	18.4	83.6
Egypt — Cairo	17.	78

**Source:**

"Primate cities in the Arab World", Seminar on Population and Development in the ECWA Region, ECWA, 18—30 Nov. 1978. Amman, Jordan.

(\*) 1975

(\*\*). CAPMAS, 1977.

**Table (5)**  
**Population Vital Statistics**  
**(1975)**

Country	Crude birth rate %	Crude death rate %	Rate of natural increase %
Bahrain	45.0	7.0	38.0
Iraq	41.6	10.1	31.5
Jordan <sup>(1)</sup>	50.0	15.0	35.0
Kuwait	51.1	6.1	45.0
Lebanon	33.0	8.0	25.0
Oman	50.0	19.0	31.0
Qatar	50.0	20.0	30.0
Saudi Arabia <sup>(2)</sup>	49.0	20.2	29.3
Syria	47.8	15.1	32.7
Yemen A.R.	48.7	25.0	23.9
Yemen P.D.R. <sup>(3)</sup>	45.5	23.1	22.3

**Table (6)**  
**Cereals Production**

(1000 m.t.)

Country	1969-71	1976	1977
Iraq	2058	2121	1456
Jordan	153	81	65
Lebanon	50	38	38
Oman	4	5	6
Saudi Arabia	441	182	250
Syria	1121	2918	1612
Yemen A.R.	1075	1063	1000
Yemen P.D.R.	90	102	110
Sub-total	4992	6510	5537
Egypt	7385	8188	7997
Grand Total	12377	14698	13534

**Source:**

FAO — Production Yearbook, 1977

(1) 1976.

(2) 1974.

(3) 1973.

**Table (7)**  
**Cereals Imports**

(1000 m.t.)

Country	1970	1976	1977
Bahrain	43	61.2	61.5
Iraq	104	846.6	1115.0
Jordan	200	370.0	453.5
Kuwait	159	253.1	312.4
Lebanon	632	584.4	582.4
Oman	37	74.0	114.5
Qatar	18	49.2	31.4
Saudi Arabia	585	923.2	16.4
Syria	640	272.2	729.4
U.A.E.	—	205.0	190.7
Yemen A.R.	110	344.3	270.0
Yemen P.D.R.	203	116.4	237.0
Sub-Total	2731	4099.6	5072.2
Egypt	1306	3378.0	3864.4
Grand Total	4037	7477.6	8936.6

Source:

FAO — Trade Yearbook 1977, Rome 1978.  
1973.

**Table (8)**  
**Meat Production and Imports**

(1000 m.t.)

Country	Production		Imports (fresh+ch+frozen)	
	1975	1976	1976	1977
Bahrain	1	2	8	10
Iraq	88	103	30	33
Jordan	13	13	4.4	5.6
Kuwait	8	10	43	49
Lebanon	12	15	8	16.5
Oman	4	4	6	6.3
Qatar	3	3	5	5.
Saudi Arabia	43	44	78.4	82.5
Syria	68	72	1.2	1.2
Yemen A.R.	73	38	1.2	9.0
Yemen P.D.R.	11	11	0.1	0.3
U.A.E.	—	—	30.0	41.2
Sub-Total			215.3	259.6
Egypt	288	315	36.0	46.4
Grand Total			251.3	306.0

**Table (9)**  
**Food Supply**

Country	I. Calories per caput per day		II. Protein per caput per day (grammes)		— of which: Animal protein	
	1961-63	1972-74	1961-63	1972-74	1961-63	1972-74
Iraq	2005	2883	55.3	65.1	14.5	16.2
Jordan	2188	2197	56.7	57.3	8.8	11.9
Lebanon	2407	2505	67.8	67.5	19.1	18.0
Saudi Arabia	2153	2403	54.3	63.6	8.5	14.1
Syria	2430	2513	68.1	68.7	14.6	13.6
Yemen A.R.	2062	1994	64.9	60.1	11.3	8.5
Yemen P.D.R.	1968	2034	49.1	51.8	15.7	13.8
Egypt	2577	2631	73.2	71.2	10.0	10.3

Source: F.A.O. Production Yearbook, 1977, Rome, 1978.

**Table (10)**  
**Share of the industrial sector  
in GDP (percentage)**

Country	Year	All Industries	of which Manufacturing
Bahrain <sup>(1)</sup>	1976	48.5	32
Iraq	1975	63.0	6
Jordan	1976	15.0	10
Kuwait	1975	77.0	5
Lebanon	1972	16.0	n.a.
Oman <sup>(2)</sup>	1976	65.0	—
Saudi Arabia	1976	76.0	5
Syria	1977	19.0	7
Yemen A.R.	1976	6.	5
Yemen P.D.R. <sup>(3)</sup>	1974	16	16
Egypt	1975	22	17

Source: UNCTAD. Handbook of International Trade and Development Statistics, 1979, U.N., New York, 1979.

(1) I.M.F. Recent Economic Development, Bahrain, 28 March 1979.

(2) Yearbook of National Account's Statistics, Vol. I, 1978, U.N., New York, 1979.

(3) I.M.F. Recent Economic Development, People's Democratic Republic of Yemen, 15 June, 1979.

**Table (11)**  
**Industrial employment as percentage**  
**of total employment — 1975**

Country	Mining	Manufacturing
	%	%
Iraq	0.7	7.3
Jordan	0.8	6.5
Kuwait	1.6	8.0
Oman	2.0	1.0
Qatar	6.0	15.0
Saudi Arabia	3.0	3.4
Syria	0.7	12.7
Yemen A.R.	0.5	4.0
Egypt	0.5	12.5

**Source:** Preliminary results of the study on the future of Arab industry (1985). Industrial Development Center for Arab States, June 1978.

**AGRICULTURAL DEVELOPMENT AND LAND MANAGEMENT  
IN RELATION TO ENVIRONMENT AND FOOD SUPPLY  
NEEDS IN THE ECWA REGION**

by  
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## **Agricultural development and Land Management in Relation to Environment and Food Supply Needs in the ECWA Region**

### **Introduction**

The struggle to provide sufficient food for the fast growing population of countries in the region is of prime concern to all national governments whether rich or poor. It is postulated that the need for cereals alone in 1985 will increase by at least 35 per cent relative to the demand in 1970. The same is true for other major food commodities including sugar, vegetable oils, pulses, ... It is only through integrating resource use, technical, socio-economic and political measures, that the Arab countries can win the challenging battle for food. Countries of the region vary in natural resources endowment, human resources and financial resources.

Due to the existing differences in resource base and the stage achieved in agricultural development, approaches and alternatives to the food problem and the use of resources should vary from country to country.

Countries with limited potential and unused agricultural resources (Egypt, Jordan) would have to rely mainly on yield improvement of arable land, others with unused potential resources (land and water) and low crop yield would have to have to rely on expanding the irrigated base, in addition to yield improvement on both irrigated and rainfed areas (Syria and Iraq). The remaining countries with exceedingly low agricultural resource potential but a favourable financial situation would have to invest in joint venture projects in Arab countries outside their own countries (Gulf states) in addition to strengthening their home agricultural production base.

The green revolution and the new technological advances in agricultural production offer good prospects for the size of the yield increase that can be achieved from the existing resources. New high yielding varieties, new techniques in animal, poultry and fish production, and new methods of water conveyance and use on the farm, require suitable institutions at the grass roots level in order that their impact can reach the small producers (land tenure, credit, extension and co-operatives).

To improve traditional rainfed farming requires concerted efforts of soil and water conservation, increased cropping intensity, special crop management practices and better land use planning. Insufficient and erratic rainfall adds to the hazards of food production in many countries of the region.

Uncontrolled livestock grazing on natural range land leads to overgrazing, destruction of the natural vegetative cover, and subsequent soil erosion and degradation. Usually animal population builds up during years of good rainfall and decreases when drought occurs. To minimize such hazards proper management of range land, grazing rotation, grazing reserves, drinking points and suitable livestock carrying capacity, is imperative.

To avoid the secondary effects of the irrational use of land and water and to avoid possible undesirable side effects of irrigation schemes, it is essential to engage scientists, engineers, planners, sociologists, administrators and farmers at the different stages from project identification to development. Since the farmer is the main beneficiary of the irrigation scheme, his involvement in decision making will improve the efficiency of the scheme.

Agro-industries and improved traditional farming are suited to generating social response which leads to a reduction of rural-urban migration. Irrigation farmers have to adapt themselves to the scheme rather than the scheme being adapted to them. When an irrigation scheme is established, it generally attracts people from areas with different ecosystems. Social and psychological stresses are apt to arise. In this new environment the strains may be great and create need for a sound approach to environment and development. In this paper, the most important environmental problems associated with agricultural development are identified both in rainfed and in irrigated agriculture. The quantitative dimensions of salinity and waterlogging problems in ECWA countries are dealt with here in some detail. Approaches and policies which would help promote environmentally sound development are discussed together with alternative patterns of development.

## 1. The Agricultural Resource Base:

### 1.1 Land resources

The total land area of ECWA countries is about 468 million ha. of which about 19 million ha. are cultivated with a cropping intensity of 56 per cent (excluding Egypt with an intensity of 190 per cent). The irrigated area is about 7.0 million ha. or 41 per cent of the cultivated area. However, the irrigated cropped area in the region has remained virtually the same in spite of the expansion that has taken place in Egypt, Syria and Iraq. This may be due to the fact that large areas of irrigated land have gone out of production because of the spread of salinity and waterlogging. Data on cultivated and cropped areas, irrigated, rainfed areas, crop yield and cropping intensity in different ECWA countries are given in Tables 1-5 (Annex).

### 1.2 Water resources

The volume of water used for irrigation purposes in ECWA countries is estimated at 80-90 billion m<sup>3</sup>/year. The potential water resources available for agriculture are estimated at about 140 billion m<sup>3</sup>. About 95 per cent of the water now used is surface river water of good quality. However, ground-water and sewage water are the main sources of water in the Gulf states. The water supply from the Tigris and Euphrates rivers varies greatly from year to year. This necessitates the construction of long range storage reservoirs. Without assured long range storage, the irregular supply will remain as a major constraint on irrigation development. In the two Yemens and Saudi Arabia spate irrigation (flood) plays an important role in agricultural development.

In the Gulf countries over-use of ground-water has led to the depletion of the limited resources and a deterioration in its quality. The common aquifers between two or more countries require co-operation among them to ensure efficient use and safe management (Saudi Arabia, Bahrain, Qatar, U.A.E.).

## 2. Salient Features of Agriculture in the ECWA Region

2.1 Although the irrigated area constitutes only about 41 per cent of the total cultivated area, yet the contribution of irrigated agriculture is more than 80 per cent of the gross value of agricultural production.

2.2 The cropping intensity is very low being about 56 per cent (not including Egypt with an intensity of 190 per cent). With a better control and rational use of water resources, cropping intensity can be raised in both rainfed and irrigated areas to at least about 100-110 per cent.

2.3 The efficiency of water use application is very low. Losses generally exceed 50 per cent. There is an urgent need for rational water use throughout countries of the Region for future agricultural development.

2.4 Yield level of most crops in both irrigated and rainfed areas is low (except Egypt) compared with that of many developing countries and the world average. The yield of irrigated land is far below the potential yield. The yield of main crops on both irrigated and rainfed areas in some ECWA countries is given in Table 5 (annex) in tons per ha. (1975).

2.5 The projected rate of growth of the irrigated area in the region between 1975-1990 estimated by FAO (1977) to be about 1.5 per cent per annum and is progressively slowing down because of the high costs involved (about \$ 6,000/ha).

2.6 More emphasis was given in the last two decades to new land development at the expense of increasing production from the already cropped areas. However, a balance between both horizontal and vertical expansion is a pre-requisite to maximizing returns from available resources in the Region. Increasing agricultural production within the next decade is cheaper and quicker, when pursued on already existing irrigation schemes. Doubling of yields can be achieved from more effective use of existing irrigation schemes with about 33 per cent of the capital expenditure required for similar yield increase on new projects. This may be due to the fact that the best available resources (land and water) have already been developed and to the high cost of providing infrastructure and supporting services to the new areas.

2.7 The ECWA region is characterised by the limited potential for expanding the rainfed cultivated area and by the low productivity of the irrigated land. Thus the land and water resources will remain scarce and agricultural labour may become scarce, whereas capital will not be a limiting factor. As a result agriculture in the Region is expected to become more intensive, more energy consuming and more capital intensive.

2.8 The rapid increase in the income of oil-exporting countries and the enhanced rate of urbanization will increase the demand for higher value crops. To meet the expanding demand the development of irrigation schemes even on relatively lower productivity soils and the use of somewhat inferior quality water might be justifiable under certain conditions. The main other ways for increasing productivity of irrigated areas include the selection of better cropping patterns, increased cropping intensity, raising yields, and the integration of livestock with cropping. This integrated system of land use helps maintain soil fertility and generates additional employment.

2.9 In many countries of the region the limited water resources are spread too thinly over too big an area with resulting salinization of the soil. In almost all ECWA countries water value is not included in the economic evaluation

resulting in its wasteful use. Failure to provide farmers with knowledge, inputs and services essential to the development of a dynamic production system, and the imposition of quotas have greatly hampered production.

### **3. Agricultural Development**

3.1 The search for a suitable agricultural development strategy, with the aim of narrowing the food gap, should therefore assume special dimensions within an integrated economic development strategy.

3.2 The ECWA countries can be grouped according to their agricultural development potential into three sub-groups:

3.2.1 - Countries with great agricultural potential. These include Egypt, Syria and Iraq, Lebanon and Jordan where irrigated agriculture and/or rainfall assume special importance and permit the production of summer and winter crops;

3.2.2 - Countries with limited agricultural potential where surface and ground-water resources are very limited and rainfall is too low to permit extensive rainfed agriculture. These include Oman, Saudi Arabia, Yemen Arab Republic and People's Democratic Republic of Yemen.

3.2.3 - Countries with little or no agricultural potential. These include Bahrain, Kuwait, Qatar, United Arab Emirates, where suitable water resources (both surface and underground) are too limited to permit any extensive agricultural development.

3.3 Cereals constitute about 65 per cent of the cropping pattern with an average yield of about 1.11 ton/hectare as compared with the world average of 1.8 ton/hectare. Cropping intensity is very low being 56 per cent (excluding Egypt with about 190 per cent cropping intensity). Pulses, vegetables and fruit trees occupy about 4.5 per cent, 3 per cent, 9 per cent respectively. Industrial crops such as fibre crops, oil crops and sugar crops occupy 4.5 per cent, 5.5 per cent and 0.6 per cent respectively.

### **4. Contemporary Agricultural Development Thought**

4.1 In the forties food production in the main agricultural countries of ECWA kept pace with the population growth and left an excess for export. Gradually agricultural and food production lagged behind that of population growth. Finally the Region became a net importer of agricultural and food commodities.

4.2 Starting with the early 1950's some of the countries in the ECWA Region have formulated new programmes to accelerate agricultural and rural development. At that time development thought was dominated by the thinking that the major role of agriculture was to provide a surplus that could be channelled into the non-agricultural sectors (mainly industry).

4.3 During the fifties and sixties most development efforts focussed on agrarian reform and the rural institutions required for its implementation (Egypt, Syria, Iraq). During the sixties there was a gradual shift in development thought towards the idea that growth in agricultural productivity could constitute a major contribution in the growth of the national economy. This was reflected in the introduction of new high yielding varieties and the application of higher inputs (fertilizers, pesticides). During the seventies emphasis was placed on ways and means to modernize rural institutions to meet the challenge imposed by the development of the green revolution, new technology and income distribution.

4.4 In the sixties water storage projects of main rivers (Nile, Euphrates and Tigris) have assumed top priority among agricultural development projects in Egypt, Syria and Iraq. New lands were reclaimed at relatively higher cost to sustain economic development in some countries of the Region (Egypt, Syria).

4.5 During the seventies national programmes were launched to raise the productivity of the cultivated area. These included drainage of saline and water-logged soils, intensifying the use of agricultural chemicals (fertilizers, pesticides) and the diffusion of high yielding varieties (Egypt, Iraq, Syria). In spite of the efforts exerted by many governments to increase agricultural production, they failed to maintain a balance between supply and demand, to narrow the food gap, or to achieve self-sufficiency in food.

4.6 Rural institutions required to implement a sound agricultural development policy are weak in most ECWA countries. As a result administration of land reform programmes and land and water development policies are still erratic or non-existent. In addition the uncertainty and irregularity of the rainfall increase the risk in rainfed agriculture.

4.7 The agricultural sector in some countries of the Region can contribute more to overall development, provided that a consistent policy which ensures maximization of resource use, incentives to producers, and a sound price system, is implemented. Besides the political and economic policies should not be biased in favour of the large producers at the expense of the small ones. Failure to develop institutional infrastructure capable of extending the development initiative to small farmers is still common in many Arab countries.

4.8 The political environment plays an important role in the agricultural development process. Political systems should encourage the majority of small producers to participate actively in the system through strong representation at all levels.

4.9 As a result of the recent world food crisis and the great rise in oil prices, many countries of the Region have given agriculture higher priority in their national development plans. However, little progress is being achieved towards the long-term objectives of ensuring food security. Since countries of the Region have an uneven distribution of agricultural, human and financial resources, a regional development strategy aiming at the fuller utilization of available resources may offer the best solution to the increasing food shortage. Focus on country development will only lead to misuse of resources and conflict in production and trade policies.

4.10 To overcome the effects of insufficient and erratic rainfall on crop yields and to ensure more stable production, expansion in irrigation should receive top priority in future development plans. Since irrigation development involves higher costs per unit area, profitability to capital should not be taken as the only criterion governing the investment strategy.

4.11 The livestock sector is dominated by sheep and goats and to a lesser extent by cattle (Egypt). In rainfed areas development of livestock relies heavily on pastureland. As a result, the improvement of pastureland, regulation of grazing, establishment of feed storage and drinking points should constitute the key elements in the development of this sector. On the other hand, in the case of irrigated areas competition between man and animal for resource use is increasing (Egypt). In both cases a balanced system where livestock is integrated with crop production will ensure better land use.

## 5. Need for a Balanced Development Strategy

5.1 Arab Governments placed more emphasis on achieving higher rates of agricultural growth than on integrated rural development. In the sixties and early seventies the development strategies of some governments had given more attention to industry. As a result, the share of agriculture did not exceed 15 per cent, of the total investment with an annual growth rate ranging between 1.5-4 per cent. Recently the share of agriculture in some countries has reached 30 per cent of the total investment with a projected annual growth rate of 4-10 per cent. The modern irrigated sector receives most of the capital investment, technology, skilled management, infrastructure and public services; whereas the traditional subsistence sector comprising about 80 per cent of the cultivated area receives far less.

5.2 If such an unbalanced pattern of development continues, a large number of the rural population will remain poor and underdeveloped, with their production potential not achieved. This shows the need for a balanced development between agriculture and industry, the traditional sector and the modern sector, the irrigated and rainfed agriculture, and the agricultural sector and integrated rural development.

5.3 In non-oil exporting countries, 13-77 per cent of the population are engaged in agriculture (1976) and the share of agriculture in G.D.P. varies between 8.4 and 61.3 per cent, whereas in oil-producing countries the percentage of population engaged in agriculture varies between 43 per cent (Iraq) and 64 per cent (Oman) and the share of agriculture in G.D.P. varies between 2.5 per cent (Oman) and 15.8 per cent (Iraq) as shown in Table 6 (Annex) for some ECWA countries.

5.4 Most governments of the ECWA countries adopt pricing and subsidy policies which vary from country to country. However, most of these policies are geared to provide relatively cheap food for the urban population at the expense of rural producers. As a counterbalance measure, governments usually subsidize basic consumption goods (sugar, oil, bread,...) and agricultural production inputs. The disparity in income level and living conditions between rural and urban population has led to the accelerated migration of rural people to urban areas experienced in some countries of the region during the period 1965-1976.

Rate of population growth  
(per cent)

Country	Rural	Urban
Egypt	1.8	4.5
Iraq	2.6	7.0
Syria	2.1	4.6
Yemen A.R.	2.5	8.5

Source: Seminar on Population and Development in the ECWA Region, 1978.

5.5 If this trend continues, it is expected that urban population will double by 1990. This will exert more pressure on public services and infrastructure, cause creep on agricultural land, increase environmental pollution, and create a national food shortage problem.

## 6. Impact of Agricultural Development on Environment

6.1 Within the field of agriculture, environmental deterioration does not result only from the polluting effects of misused chemicals, but more from accelerated soil erosion (wind and water), creeping of deserts, decline of soil fertility, salinity, and waterlogging, all of which join together in undermining the productive capacity of the ecosystem

which constitutes the basis for the livelihood of the human race. In this respect the world's poor are the first victims of the misuse of the natural environment. Therefore ecological degradation is considered a cause of poverty, and a factor that undermines the efforts made in rural development.

6.2 In most countries, particularly developing ones, policy-makers have failed to place agriculture in its proper ecological context. As a result environmental disasters have confronted many of them as reflected in major crop failures, floods and droughts. The role of man in making a region vulnerable to damage should not be ignored. Environmental deterioration is accelerated by rapid population growth and poor social conditions. The balance of nature will not be preserved as long as poverty exists.

6.3 Forest destruction had been accelerated by the advent of agriculture, high energy costs and occasional fires. Deforestation in the lowland around the Mediterranean was acute by the end of the glacial age. The clearance of farmland, overgrazing, and wood collecting for fuel, all contributed to deforestation. Rapid population growth in the last fifty years has increased the need for firewood, grazing areas and crop land, all at the expense of the forested areas. In spite of major reforestation programmes, forest losses still outpace the gains from reforestation.

6.4 In the rainfed areas of Syria, Iraq, Jordan and Lebanon, cultivation has been extended to marginal and sub-marginal land with rainfall less than 250 mm. As a result land productivity is declining and soils are exposed to degradation by erosion. With the continuous rise in prices the shift from pastureland to crop land will increase. In addition the frequent tillage operations of such soils will expose them to wind erosion.

6.5 To avoid the above condition, marginal and sub-marginal land should return to permanent pasture. Minimum tillage, strip cropping, contour cultivation, and terracing will help reduce the hazards of erosion. Controlled grazing will prevent the destruction of plant cover.

6.6 Desertification is becoming a major world problem affecting the food producing capacities of many countries, regions and continents. The scale of destructive human pressures on fragile environment in the arid and semi-arid climate through deforestation, overgrazing, and fires is increasing. Desert encroachment is becoming a great threat to the livelihood of many nations through the loss of productive land. Desert-like environments have been created as a result of long periods of overgrazing. Some of these lands would recover if controlled grazing were practised together with other conservation measures.

6.7 Since droughts are an unavoidable aspect of an arid environment, the life-style must therefore, be reshaped to survive the driest years, otherwise dislocation of people and livestock will have to take place whenever there is rainfall. The impacts of such an effect will be more felt with each successive drought. In years of low rainfall pressure on fragile environment from man and his animals will lead to a continuous retreat towards the cultivated land, leaving behind a denuded ecosystem and a reduced population of humans and livestock.

6.8 In arid zones there is a repeated cycle of increased carrying capacity and herd size followed by drought, reduced capacity, and shrinkage in herd size associated with economic and ecological collapse. The key to better management of arid land is a reduction in the herd size and not extending cultivation to fragile land. However, there is always a conflict with what is in the interest of the individual. Therefore the future of the arid land environment depends upon adopting an institutional structure which takes into account both the individual's interest as well as the welfare of the society.

6.9 Improved farming in the settled localities is as important as controlled grazing. A cropping system that minimizes erosion and preserves fertility is a suitable alternative to the fallow system. The planting of forest barriers as shelter belts will help stem the encroachment of dunes, and stabilize them. An example is the sixteen kilometer wide tree barrier planted by Algeria along a fifteen hundred kilometer front.

6.10 Rarely has the path of civilization been linked to changing ecological conditions as it is in Iraq. One of the early civilizations emerged on the plains of the Tigris and Euphrates known as Mesopotamia. With the introduction of early irrigation the region's productivity was legendary throughout the old world. The faulty practice of irrigation by the Sumerians ruined the soil as a result of increased salinity and waterlogging. Over-irrigation in the absence of adequate drainage led to a continuous rise in the water table until it reached a critical level. Under the warm arid climate evaporation took place and the salt tended to accumulate on or near the soil surface. In addition active seepage from canals enhanced the rise of the water table and created water logging conditions. The new ecosystem became unsuitable for agriculture. Today about 50 per cent of the middle and lower Mesopotamia plain is either salt-affected to varying degrees and/or suffers from waterlogging.

6.11 The progressive built-up of salts is accompanied by a change in the cropping pattern and a decline in productivity. With the increase in salinity wheat cultivation, for example, gave place to barley (a more salt tolerant crop) and the yield of wheat has declined from about 2 tons/ha. around 2400 B.C. to less than 0.75 ton/ha. today. This ecological degradation may explain the role played by increasing soil salinity in the break-up of the Sumerian civilization. On the other hand civilization continued in the North of Mesopotamia where salinity was not a serious problem.

6.12 A lesson which has been well learned from the history of Iraq's civilization is that irrigation and drainage are inseparable components of a single water management system. The time gap between the execution of irrigation and drainage projects greatly determines the extent of the spread of salinity and water logging. The longer this gap is, the

more costly it is to restore the soil to its initial condition.

6.13 Another example of the effect of man's activity on disturbing the salt regime in the soil is the case of Egypt. When the land was flooded annually with Nile water, the water washed the salts down and the soil (within the root zone) remained free from salts and highly productive throughout its history. However, with the increased population pressure on the land and the urgent need for more production from the limited available cultivated area, a new system of controlled irrigation was introduced which permits higher cropping intensity. As a result of the continuous use or misuse of irrigation water on the heavy flat Nile soils, in the absence of both natural and artificial drainage, there was a quick rise in the level of the groundwater table. This, coupled with the warm dry climate, has led to the spread of salinity and waterlogging over at least 33 per cent of the cultivated area. The once famous and highly productive soils of the Nile Valley have turned into saline soils of much lower fertility as a result of the elimination of the natural desalination process.

6.14 With the completion of the High Dam (over year storage), the Nile water has become devoid of most of its silt load which used to renew naturally the fertility of Egyptian soils. A new situation is developing from this side-effect of the Dam which the Egyptians have to cope with if they want to maintain their land resources within an acceptable state of productivity.

## 7. Increased Production and Environment

7.1 Planning for increased production (food and non-food commodities) is likely to increase pressure on natural resources and thus create new environmental problems. Processes that lead to environmental problems in the arid regions include salinity, waterlogging, wind and water erosion and desert encroachment on agricultural land. However, some of the present day environmental problems are the result of the past history of land use and of human interference.

7.2 Environmental problems arise as a result of change from extensive to intensive agriculture. This is best exemplified by the change from seasonal or annual flood inundation to perennial irrigation as was the case in the Nile, Euphrates and Tigris Valleys. The perennial system of irrigation with its storage, control and distribution network was introduced in the early 19th Century into Egypt. Perennial irrigation has brought about increased production per unit area per year. However, irrational application of water led to adverse effects as a result of salinity and waterlogging. This is in contrast with the so called "basin" or "flood" system of irrigation which naturally leaches the salts and maintains the fertility at higher levels through the annual deposition of silt.

7.3 Huge projects which aim at the improvement of waterlogged and salt affected soils in Egypt and Iraq are being implemented. The programmes involve the levelling, draining and leaching of salt affected soils. In order to reduce the resalination of Iraqi soils during the summer, cropping intensity should be raised from the present low level of about 10 per cent to about 70 per cent. This requires the storage of the excess water which flows during the spring. The five year plan of Iraq envisages the conversion of about 1.5 million acres from rainfed to irrigated agriculture. In Egypt, Iraq and Syria the improvement of soil fertility through increased consumption of chemical fertilizers assumes special importance in their national programmes.

7.4 A good example of contemporary salinity is the greater Mussayeb project in Iraq. A modern irrigation network was installed in the early fifties. After ten years a rise in soil salinity and silting of water courses has forced some of the new settlers to leave the project. No attention was given to the establishment of suitable institutions required for its successful implementation. With the creation of such institutions and proper management, conditions have greatly improved and reclamations is now progressing in the right direction.

7.5 There is a great potential for pastoral development in ECWA countries if the problems of environmental degradation are solved. Traditional forms of pastoralism deplete the natural vegetation and reduce their carrying capacity. In order to make the best use of natural grazing, pastoralists should use a system of the seasonal movement of animals. Traditional forms of pastoralism are generally associated with nomadism, characterized by small social units with a high degree of mobility. The increase in animal population creates pressure on the pastureland and as a result the rate of degradation increases.

## 8. The Impact of Climate on Soil Degradation

8.1 In an arid climate rainfall is low and erratic, solar energy is abundant, and natural vegetation is sparser than in semi-humid or humid climates. Run-off may occur in spates during heavy storms. Under natural conditions, the dry land ecosystems maintain a balance between water and energy. This favourable balance is disturbed with the interference of man in land use which may lead to the destruction of organic matter, the deterioration of the soil structure, reduction in stored moisture, and an increase in the rate of run-off. All this constitutes a less favourable environment for plants with less production of biomass.

8.2 Removal of the natural vegetative cover exposes the soil to wind and water erosion, puddling of the surface due to the beating action of rain, reduced infiltration rate, removal of top fertile soil finally ending with gully formation, silting of water courses and increased flooding of low lying areas.

8.3 The principal manifestations of degradation of irrigated lands are the increase of salinity and alkalization of

soils which are generally associated with waterlogging. Use of saline water for irrigation, especially on soils of low permeability, can lead to salinity and/or alkalinity. In irrigated systems lack of drainage allows the water table to rise above the critical level which induces secondary salinization. If the accumulation of salts reaches a certain point, the land may be abandoned.

8.4 Immediate action is needed to stop the physical processes of desertification through educating people in reducing the hazards to which the fragile ecosystems are exposed, and adopting an improved system of land use, taking into consideration that the dry lands have a low level of natural biological productivity. Therefore efforts to combat desertification should be an integral part of a wider development programme aiming at the well being of the people affected by it.

8.5 The deterioration of ecosystems and the destruction of the biological potential for more intensive use, at a time where there is an increasing pressure on land and water resources for increased food production, requires the integration of physical development with socio-economic development. The misuse of the natural environment by man has given rise to degradation of the system especially in the more fragile and less productive systems. It is thus essential to sustain and promote the productivity of areas vulnerable to deterioration.

8.6 Deterioration of land, water and other natural resources implies improper use of such resources either due to lack of know-how or in attempt to meet the short-term requirements at the expense of the long-term conservation of the productivity of the system. The adoption of improved management of resources is basic for maintaining the productivity of the ecosystem and a key to the success in combating desertification. Improved land use policy based on the understanding of the climatic limitations, periodic drought, nature of the vegetative cover, fragile condition of the system, and the application of proper management practices based on sound ecological principles are prerequisite to balanced environmental development.

## **9. Proper Land and Water Use Planning**

9.1 The use of too much water is as harmful as the use of too little water. In the first case both salinity and waterlogging develops; whereas in the second, salinity is apt to develop under arid and semi-arid conditions.

9.2 Civil engineers entrusted with irrigation projects used to ignore the need for a sound drainage programme. This feeling may have stemmed from viewing irrigation as an end in itself and not as one of the means to agricultural development. It is rather unfortunate that the damage caused by salinity and waterlogging does not show itself quickly following the introduction of irrigation. Usually it takes a few years before reduction in yield is observed.

9.3 It is estimated that between 30 and 60 per cent of the world's irrigated area is affected by salinity to varying degrees and that 200,000-300,000 ha. of total of 200 million ha. pass out of production each year because of salinity and waterlogging.

9.4 Silting of rivers, streams and reservoirs is one of the end results of erosion. Silting reduces the efficiency of irrigation systems, and requires higher maintenance costs. The silting of reservoirs greatly hampers their function and reduces their useful life.

9.5 Each irrigation system may constitute an ecological danger which represents a serious threat to a nation or region unless careful measures are taken to diminish or bring under control the projected side-effects to the environment.

9.6 The conflict between present and future needs of the society can influence the priority and trend in a sound land use policy. It is also seldom occurs to planners to translate ecological trends into costs accruing to society. Government authorities always try to boast about the new land areas brought under cultivation, but none of them tries to estimate the land lost due to salinity, erosion and urbanization which in many cases may exceed the land gained through reclamation. Social costs may even greatly exceed physical losses. There will always be a conflict between present and future interests, as well as between private and social interests. Ecologically sound planning requires public awareness of the ecological dangers anticipated, and a strong political force to override the economic and political interests of those who might oppose the necessary reforms.

9.7 Conservation measures cannot be implemented through official decrees of forced upon people who do not understand the reasons behind them. In the meantime poor people cannot be asked to change their present practices, which might be harmful to the system, unless a better alternative is offered to them. Poor farmers, who live on a subsistence level, are not ready to sacrifice more for the next generation in order to stop ecological decay. People suffering from exploitative economic and social systems will not be ready to treat land or nature any better. The enforcement of sound ecological measures requires the creation of social, legal and economic structures and institutions that permits the participation of the poor in decision-making and gives them a sense of responsibility for actions that might shape their destiny. No conservation measures will ever succeed if they are not accompanied by a programme aimed at satisfying basic human needs.

9.8 In the light of the recent food crisis, loss of arable land anywhere in the world concerns everyone else, and soil degradation affects poor countries most. Loss of productive land to urban creep and other competing uses is taking place at a rapid pace in most ECWA countries. In a very densely populated country such as Egypt, over 60,000 acres of

the best farmland are taken over every year by urban and infrastructural expansion, an area exceeding the new area reclaimed by the high dam. These losses added to other environmental deterioration greatly reduce the food and agricultural productive capacity of the land resources.

9.9 Productive soils can often be damaged if the number of humans and animals it is capable of supporting exceeded. Technology adapted to local environmental conditions and appropriate farming systems are essential for the proper management and conservation of land resources. It is therefore urgent to incorporate the ecological perspective into the development plan from the beginning.

9.10 The soils of the arid regions, like those of the ECWA countries, possess common features. They are potentially saline when irrigated, have loose surface structure which is generally susceptible to wind and water erosion if left without cover or intensively ploughed, have profiles characterized by heterogeneity and stratification which poses problems when put under irrigation. The changes include deterioration of soil structure, decrease in permeability, secondary salinity and/or alkalization all associated with lowered productivity.

## 10 Salinity Problems in ECWA Countries

10.1 Extensive areas of the presently irrigated land in the region suffer from salinity and waterlogging and associated lowering in crop yields. To cite examples from the ECWA region, we find that in Iraq more than 50 per cent of the land of the Lower Rafidain Plain suffers from salinity and waterlogging. Most of this needs reclamation and management measures to restore it to its original condition and raise its productivity. In Syria about 50 per cent of the irrigated land in the Euphrates Valley is seriously affected by salinity and waterlogging. Losses to main crop yields resulting from this are estimated at about \$ 300 million annually (1975 estimate). In Egypt, about 33 per cent or 2 million acres suffer from salinity and poor drainage to varying degrees with a loss in production of at least 30 per cent of the potential yield.

10.2 A second land use problem develops in the gypsiferous and calcareous soils when irrigated. Such a case exists in the newly developed soils of the Euphrates Valley in Syria, where the high content of gypsum has been the cause of irrigation structural failures. In calcareous soils a hard surface crust is usually formed following the wetting and drying of the soil. This crust impedes the germination of seedlings and restricts root penetration. An example of this is the calcareous soils in the newly reclaimed areas on the desert fringers of the North-West areas of the Nile Delta.

10.3 In Egypt in addition to the spread of salinity and waterlogging in the old land, the newly reclaimed areas (about one million acres) suffer to varying degrees from salinity and waterlogging. This has developed as a result of the overuse of irrigation water in the absence of adequate drainage, seepage from unlined canals and water courses, and the movement of water and salts from the high lying land to low lying areas. The migrating salts find their way back into irrigation canals, thus raising the level of salinity in these water courses and hence into the soils irrigated with it. An example of this quickly developing secondary salinity is the newly reclaimed West Nubaria area in Egypt. Here the water table rose at a rate of more than one meter a year. The salt lenses originally present in these soils dissolve and finally find their way into the irrigation canals. Therefore, a faulty engineering structure of the water conveyance coupled with excess use of irrigation water have contributed to the increase in salinity of these soils. To remedy the present situation, a water conveyance system not subject to salt contamination from groundwater sources together with a rational regime of water use are needed.

10.4 In Iraq the irrigated area in the Mesopotamia Plain is about 3.6 million hectares of which more than 50 per cent suffers from waterlogging and salinity. Most of the affected area is situated in the middle and lower Rafidain Plain, due to misuse of irrigation water (both excess and insufficient), lack of drainage, high evaporation from the shallow saline groundwater table, seepage from canals, tidal action in coastal areas and low summer cropping intensity. The Government of Iraq is allocating about 3 billion dollars for the execution of a national programme of land improvement over the next ten years which it is hoped will restore productivity to these already deteriorated land and raise the cropping intensity to about 150 per cent.

10.5 In Jordan the irrigated area is about 50,000 hectares of which 90 per cent is located in the Jordan Valley. The main problem is the insufficiency of water relative to the available soil resources. In addition irrigation water (both surface and underground) is of medium to poor quality (800-2000 pp.m). The use of such water for the irrigation of desert soils under the arid warm climate has led to secondary salinity. As a result at least 10,000 hectares suffer from salinity to varying degrees. In the light of the limited water resources and their inferior quality, it is advisable not to spread such limited water too thinly over a large area. Proper water management is required to maintain a favourable salt balance.

10.6 In Saudi Arabia, Kuwait, Bahrain, Qatar and the United Arab Emirates, agriculture depends on very limited groundwater resources of varying quality. Irrigation with saline water under such a very arid warm climate leads to a quick increase in soil salinity. There is a tendency to overuse the limited groundwater resources. This in turn increases their salinity and aggravates the soil salinity problem where the soil texture is heavy and natural drainage is lacking. The use of sewage water in agriculture is common in most of these countries. Such water is usually contaminated with sea water which develops soil salinity after a few years following its use. The inclusion of alfalfa in the cropping system in most of the Gulf countries leads to a quick depletion of the limited suitable groundwater. Therefore, a balance between water recharge and withdrawal is basic for continuing successful agriculture under these conditions.

10.7 In Syria the present irrigated area is about one million acres which will reach about 2.5 million acres after the full development of the Euphrates project. About 50 per cent of the present irrigated land suffers from waterlogging and salinity as a result of the use of saline water in irrigation on relatively fine textured soils without due consideration of the leaching of accumulating salts. Due to the aridity of the climate, it is postulated that the potential salinity might reach 70 per cent of the soils to be put under irrigation. In the Ghab project waterlogging still constitutes the main problem in addition to the quick decomposition of organic matter. In the Sinn project waterlogging is caused by the heavy winter rainfall aggravated by the presence of an impermeable layer that impedes natural drainage. The expansion in cotton cultivation, the exhaustion of the underground water resources and the delay in the construction of a drainage system have aggravated the salinity problem.

## **11. Soil Degradation and Desertification**

11.1 Human mismanagement of soil, water, energy and flora may lead to land degradation. Excessive pressure on land such as overgrazing leads to destruction of natural cover followed by erosion. Farming of marginal rainfed land leads to wind erosion of the rich top soil. The degradation of ecosystem proceeds at a faster rate once it starts. Desertification hazards cause a reduction in the food producing capacities of the system, socio-economic repercussions, and changes in both the macro and the micro climate.

11.2 Actions against soil degradation cannot yield results unless it constitutes an integral part of a national social and economic development plan. Productive land and water resources are the key elements in any agricultural development strategy. Proper land use would prevent man-made desertification, promote and sustain land productivity, and maintain a proper vegetational cover.

11.3 Measures essential for the fight against desertification include: soil and water conservation, revegetation, controlled grazing, the maintenance of feed reserves, nomad settlement, dune fixation, establishment of greenbelts, and rational utilization of pastureland.

11.4 The heritage of desert communities and their success or failure in preserving or disturbing the ecological balance should be carefully evaluated. Saudi Arabia is a country where deserts are a way of life and where climate, human activities, oil extraction and industrialization are new factors which affect the ecological balance. In Syria over-exploitation of forests, misuse of land and water resources, overgrazing, extension of cereal cultivation into the marginal lands have played an important role in upsetting the ecological balance. In Iraq the increase in soil salinity and the expansion of cultivation to land with less than 250 mm rainfall have contributed to the degradation of the ecosystem. The use of petroleum mulch for the stabilization of sand dunes may offer good prospects in the oil-producing countries of the region. The problem of land use is aggravated by the fragmentation of holdings common to many countries of the region.

11.5 In order to check soil deterioration, programmes must be developed with the direct participation of the affected people. A philosophy of resource management must be followed and supported by strong institutions of planning, assessment, research, training and extension. New principles of resource planning and management, use of new technologies such as satellites, and remote sensing offer great hopes for future resource utilization. In addition greater use of saline water, sewage water and desalinized brackish water in irrigation will be possible in many countries of the ECWA region (i.e. Kuwait, Qatar, Bahrain, United Arab Emirates, Oman, and Saudi Arabia).

## **12. Loss of Productive Soils and Food Demand**

12.1 To-day food production in ECWA countries falls far short of satisfying the basic food needs of a population of about 152 million people. The task of satisfying these needs by the year 2000 will be a challenge to these countries, when we know that they are net importers of more than 65 per cent of their food needs. However, the ECWA region as a whole possesses enough resources to meet such demands. This largely depends upon the political determination and institutional structure required to implement the desired policies.

12.2 However, loss of productive soils increase with the increased pressure on agricultural land to produce more food for the growing population. Measures to stop such losses are most pressing and thus should receive top priority in national plans.

12.3 Soil is lost through erosion due to water or wind. Decline in fertility due to poor management can be considered as loss or degradation. Urbanization accounts also for a measurable proportion of the loss of productive soil. Deposition of silt carried by run-off, or sand carried by wind can cause loss of productive soil. Salinity and waterlogging can greatly contribute to soil degradation and loss. Unbalanced use of fertilizers, pesticides and herbicides can cause soil degradation, chemical pollution and the accumulation of toxic elements. Once the soil is destroyed, it may take thousands of years to form a new depth of soil capable of supporting plant growth. Under the best management condition soil may form at a rate of one cm. per 15 years.

12.4 Loss of agricultural land to urbanization is common in all ECWA countries. A striking example is the case of Egypt which loses some of its better land at an increasing rate. In spite of the fact that about one million acres has been reclaimed during the last 25 years, even so the net land area remained the same, an indication that Egypt is losing its cultivated land as fast as new land is reclaimed. The problem of losing land to urbanization in Egypt is becoming very

serious because of the high productivity of the lost soil as compared with that of the newly reclaimed land. Moreover, the agricultural land lost is closer to centres of population where the need for more food is urgent.

12.5 Soil losses to the farmer are valued at about \$3.0 required for their conservation. It is estimated that between 50,000 and 70,000 sq. km. of useful land are going out of production every year. Once soil degradation takes place, it becomes very expensive and time-consuming to reverse the process. It is thus more logical to undertake appropriate soil conservation measures at the proper time rather than to wait until the soil deteriorates and then try to undertake expensive and time-consuming conservation measures.

### **13. Food Security Position in the Region**

13.1 About half of the region's consumption of major food commodities is produced domestically (Table 8, Annex). The self-sufficiency ratio for major food commodities is declining at a rapid rate for cereals, oils, meat, milk and sugar (Table 9, Annex). Major food imports and their value are given in Table 10 (Annex) for the years 1970 and 1976.

13.2 The average calorie requirements are adequate in all ECWA countries except in Yemen A.R., and Yemen P.D.R. The daily protein intake is below requirement, and the share of animal protein is very low and is declining with time in most countries. The nutritional situation is shown for selected ECWA countries for 1972-1974 (Table 11, Annex).

13.3 The achievement of self-sufficiency in food is only possible within an Arab integration development strategy aiming at better utilization of land, water and manpower resources. Most irrigation projects in the region have failed to contribute to increased production to the extent expected.

13.4 Improvements in crop yields can be achieved under both irrigated and rainfed agriculture. Irrigated cereal yield in Arab countries can be increased by 1 ton/ha. or more than 10 million tons a year. This increase is equivalent to developing a new area of 5 million ha. This will require a minimum capital outlay of about \$25 billion. The index of food production and per capita food production in ECWA region for the period 1970-77 is shown in Table 12 (Annex).

### **14. Constraints on Higher Food Production in the ECWA Region**

14.1 Imbalance between agricultural growth and food demand as a result of the recent upsurge in population has led to increased pressure on land and water resources in all Arab countries. In addition to such pressure the misuse of these resources is responsible for the lower yields obtained.

14.2 Although expansion of irrigated agriculture is taking place at a relatively rapid rate in many countries of the region (Egypt, Syria, Iraq, etc.) there is no corresponding increase in agricultural production. This may be due to poor land and water management which leads to waterlogging and salinity. Actual yields obtained are very low compared to both world average and potential yields (except Egypt). The rainfed areas generally receive less attention than the irrigated sector. No conservation measures are undertaken, and inputs required for crops grown in rainfed areas are accorded a subordinate position. The soil is subject to wind and water erosion, invasion by weeds and quick decline in fertility. As a result, yields obtained in rainfed areas do not exceed 60 per cent of the world average.

14.3 Since water is the rarest resource in all countries of the region, and in view of the growing competition for the limited amount available, there is an urgent need for "sound water" resource planning between agricultural, industrial and domestic uses, as well as a rational use policy to achieve maximum returns per unit of water. Since groundwater resources are the main source of water for many countries of the region (Saudi Arabia, Kuwait, Qatar, United Arab Emirates, and the People's Democratic Republic of Yemen), it is essential to evaluate carefully the present and potential quantity and the recharging of this resource. Many countries of the region are overusing their limited resources of groundwater at the expense of its quality. This has led to secondary salinity and reduced productivity of their soils (Bahrain, United Arab Emirates, Qatar). Taking the surface water resources of the region, we find that not more than 50 per cent is actually used and the remaining 50 per cent is lost.

### **15. Man and Environment**

15.1 Man has learned since early times to manipulate properly his environment to meet his needs. However, the increase of population pressure on the limited available resources has led to a deterioration of the environment. To-day increased attention is being directed to the potential effects of irrigation on the environment with special attention to changes in water quality during storage, conveyance, application and drainage.

15.2 In deeper reservoirs (High Aswan Dam, Euphrates Dam), there exists water stratification with accompanying undesirable effects on quality. Evaporation leads to a higher concentration of soluble salts in the water. Cold temperature of lower strata water may reduce yields of certain crops (rice). Entrapped sediment deprives the soil of a source of renewal of its fertility. The changes in water quality in most large new reservoirs are generally more complex and should be considered carefully during the planning and operation stages.

15.3 Water quality changes during conveyance and distribution. This takes place as a result of evaporation from the water surface, inflow of groundwater and pollution from drainage water and pesticides. These changes in quality can be avoided or minimized by the use of closed conduits.

15.4 The increase in use of pesticides in agriculture and public health in some countries of the region (Egypt, Lebanon, Jordan) has led to soil, plant and water pollution. Degradation may take place during their passage through

the soil. Surface run-off is probably an important route of pesticide transport to water courses.

15.5 Due to the rising costs of pest control, increasing environmental pollution, and developing pest resistance to pesticides, the search for alternative methods of control which ensure a healthy environment such as biological control, male sterility, etc... should assume special priority.

15.6 Soil deterioration under irrigation can be prevented by a package of ameliorative measures. These include canal lining to prevent seepage losses, deep drainage (horizontal or vertical) to lower or prevent the rise of the groundwater table; use of chemical additives to alkaline soils (gypsum, sulphur, or any acid producing material), leaching of soluble salts, and well balanced irrigation and drainage systems working as a co-ordinated water regulating mechanism.

## 16. Rural Development Strategy

16.1 In ECWA countries the rural sector assumes a subordinate role in development strategies. The functions attributed to the rural sector include the production of exportable raw material (cotton, oil crops, etc...), supplying cheap labour for industry, being a source of finance to industry and finally supplying space for expanding urban and industrial sectors.

16.2 The socio-economic consequences of the neglect of rural development include skewed land distribution patterns with the majority of the rural population either without land or with small plots insufficient for subsistence, and increasing rural under-employment and unemployment, with subsequent labour migration to cities or oil countries.

16.3 The failure to adopt a suitable model of rural development that responds to the needs of the rural population gives rise to the rapid increase in urban population estimated at more than 4.5 per cent per year. This rate of urbanization aggravates the difficult living and working conditions of the urban poor who are forced to live without shelter or under unsanitary conditions. Public transportation systems are overcrowded, and slums are coming to dominate the scene. Urban industrial development is incapable of absorbing the great influx of rural migrants or offering them gainful employment. According to ILO the total of unemployment and under-employment in urban areas reached 30 per cent of the Asian labour force and 36 per cent in Africa (1975). This is reflected in the growing dependence of the Third World for their food needs on developed countries as shown from the changes in world grain commerce for the period 1938-1976.

### Changes in world grain commerce — million tons —

(+ = export; - = import)

Region	1934-38	1948-52	1960	1970	1976
North America	+ 5	+23	+39	+56	+94
Latin America	+ 9	+ 1	+ 4	+ 4	- 3
Western Europe	-24	-22	-30	-30	+17
Eastern Europe	+ 5	—	0	0	-27
Africa	+ 1	0	- 5	- 5	-10
Asia	+ 2	- 6	-17	-37	-47
Austria and New Zealand	+ 3	+ 3	+ 6	+12	+ 8

Source: FAO Trade Yearbook 1977.

The developing countries were net exporters of 12 million tons of grain up to 1938, whereas in 1976 they have changed into importers of about 60 million tons which is expected to reach at least 85-100 million tons in 1985.

16.4 If there is no substantial changes in the current view of rural development, most likely the tendency towards urban concentration will continue. This will be associated with increasing problems of pollution, poor living conditions, violence, unemployment and shortage in food supplies. However, many factors have contributed to the recent realization of the importance of rural development. Among these are the social consequence of the green revolution, the new strategy of satisfying the basic needs, the preoccupation of the World Bank with the problem of rural poverty, the impact of the recent food crisis, the influence of the Chinese model which gives priority in development to peasants, and the new concept of self-reliance in development.

16.5 Integrated rural development should be the basic element in development planning. This will ensure the creation of various economic activities capable of ensuring productive employment for the people. It should not be thought of only in terms of agricultural activity but also in terms of industrial energy, services and cultural activities.

16.6 Priority must be given to the production of the food required for meeting the basic nutritional of the production capacities of the country through better resource use. In the meantime production should make use of new technology, market demand, available skills and the infrastructure.

16.7 Industrialization of rural areas should be developed along a line that serves the intensification, specialization and modernization of agriculture. This would create additional employment in rural areas, aid in the modernization of agriculture, and check the migration influx of the rural population into the big cities.

## **17. Development Policies and the Environment**

17.1 The ECWA region is predominantly arid deserts with most of its population living in the small cultivated area. Distribution of population follows the river courses and rainfall pattern. The arable land is only about 3.5 per cent of the total area of which only 41 per cent irrigated. Pastureland plays an important role in the economy of the region being a source of animal production. Fishery resources are available in sufficient quantities once they are properly developed.

17.2 Arab oil countries are now devoting a sizeable portion of their income to agricultural development, both at home and in other Arab countries (i.e. Saudi Arabia and Kuwait's investments in agriculture in the Sudan), with the objective of satisfying basic food needs in the years ahead when their oil revenues are likely to decline. This is rather an important divergence from the already conceived philosophy of giving top priority to industry at the expense of agriculture.

17.3 In view of the fact that the region as a whole is a food importer by more than 50 per cent, and in spite of the great potential for agricultural development, it appears that a shift towards more concentration on agricultural development offers a logical solution to the acute food shortage facing all countries of the region. Realizing the uneven distribution of resources and population, therefore, an integrated regional development plan may ensure the better utilization of available resources to the betterment of all the people of the region. This is in contrast to the individual country approach to achieving self-sufficiency under conditions and constraints which make it difficult to achieve such an objective.

17.4 Agriculture and food production in the countries of the region is faced with major constraints including poor land tenure systems, lack of appropriate rural institutions, inconsistent price policy, lack of incentive, pre-and post harvest losses, inequalities in food distribution, and primitive production methods. As a result both production and labour productivity did not change relative to the increase in investment. Rational use of the available resources has not been generally practised in most countries of the region. There is a great need to design and adopt new policies for the better utilization and management of agricultural resources with more emphasis on institutional and administrative aspects. In spite of the fact that most inhabitants live in rural areas, most human settlements are unfit for healthy and sanitary living. Basic problems of hygiene and malnutrition are common. This situation must be improved since a healthy human environment is basic to the successful implementation of any development plan to the creation of a sense of social responsibility.

17.5 Sound agricultural development planning requires: a comprehensive survey of the country's needs in agricultural products with the projected increase in population and rise in the standard of living over a time span. This should be followed by a survey of agricultural natural resources including soil, water, climate, vegetation, animals, manpower, etc... An appropriate land use policy which ensures resource conservation should be adopted. In order to avoid undesirable side-effects to the ecosystem, a monitoring system devised to discover the changes taking place in good time is required.

17.6 To ensure an ecologically sound policy for the management of pastureland, it is essential to adopt an appropriate system of grazing, to control the ploughing of marginal rainfall areas, and to make available a cheap source of fuel which prevents the destruction of natural vegetation.

17.7 Planning for healthy human settlements should be based on integrated rural development, promotion of the industrialization of rural areas using technology, checking the creep of urban expansion on agricultural land, and control of waste disposal. In attempting the improvement of the environment, the cultural heritage and traditions of the community should be fully considered.

17.8 To avoid the side-effects of river control projects on the environment and life-style of the people, it is necessary to assess the expected effects before designing and implementing such projects. A sound management of water sheds is necessary for the protection of vegetation, soils, and water from degradation, erosion and run-off effects. It is very common in most countries of the region that development plans lead to exhaustive exploitation of resources without due regard to environmental effects.

17.9 A striking example of such adverse effects on the environment is the problem of salinization and waterlogging following the advent of irrigation schemes in most Arab countries. However, such a situation could have been checked in the early stages if measures to control the depth of groundwater were taken from the beginning. Such measures include drainage (both vertical and horizontal), as well as a rational water use policy. Unfortunately, many countries in the region gave priority to irrigation over drainage with resulted in a rapid rise in the groundwater followed by increased salinity of the soil.

17.10 The environmental dimension has now been recognized as an integral part of development planning and

implementation. In the past man has been able to live with his environment in a remarkable state of equilibrium. However, under wise management of the ecosystem, improved quality of the environment can be maintained. Land having assured agricultural potential can be converted into crops. Pastureland and marginal rainfed areas should be kept under natural cover. In developing natural resources to satisfy basic human needs, we should maintain the appropriate balance between our legitimate needs and the ability of the environment to meet them. Expanding agriculture into marginal lands in response to the urgent need of hungry people may solve temporarily the satisfaction of basic food needs but ends up with the degradation of the ecosystem. About 12 per cent of the earth's surface (or 60 million sq. km.) is available for agricultural production which could be trebled to meet growing food needs. However, if we focus on the Arab region, most of which is desert, we find that it is unlikely to be able to double food production by the year 2000 at which time the population will be more than doubled. Expansion of agriculture into the grass land without sound environmental planning will be hazardous to the ecosystem.

## **18. Effect of New Technology**

18.1 The introduction of improved adapted technology in the production of subsistence crops will benefit both the producers and the consumers. The relative gains to the different groups of producers depend on the rate of flow of the new technology to each group through existing institutions. If the technical progress is slower for small farmers than for large farmers, the relative gains for the small farmers are greatly diminished. Likewise a monopoly of the new technology by a small number of large commercial farms will lead to the appropriation of the total gains by them. The extent to which new technology can increase crop productivity is determined by the quality and quantity of available resources and the distribution system for the inputs.

18.2 Farm size affects the use of both machinery and labour. A greater percentage of medium and large farms use modern machinery and technology than small ones. Labour input per unit area tends to decrease with the increase in farm size. Socio-economic constraints may also limit or even prevent the spread of the new technology.

18.3 The shift to the new high yielding varieties will create an additional demand for water, fertilizers and pesticides. Mechanization of agriculture may call for changes in field size and layout. Changes brought about by introducing the new technology will bring about impacts on the ecosystem. This is reflected in the chemical pollution of soil, air, groundwater and food; susceptibility to erosion; increase in salinity and/or alkalization of soils. To safeguard against these side-effects, a sound land and water use policy which prevents salinity, waterlogging, soil degradation, erosion and depletion of soil fertility, and deterioration of the environment should be adopted in soil conservation. Priority should be given to the least developed traditional sector, both in the rainfed and irrigated areas on which large number of small farmers live. Adjustment of agrarian structure to give equal attention to environmental aspects as well as to production aspects would lead to a balanced development.

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**ANNEX**

**Table 1 — Cultivated and cropped land (total and irrigated), cropping intensity in the ECWA countries (1000 ha). — 1975.**

Country	Cultivated			Cropped			Cropping intensity
	Total	Irrigated	%	Total	Irrigated	%	
Iraq	7,000	2,895	41	3,000	1,567	52	43
Jordan	347	31	9	284	29	10	82
Lebanon	348	68	20	240	60	25	69
Syria	5,476	625	11	3,700	516	14	68
Yemen P.D.R.	170	110	65	63	63	100	37
Saudi Arabia	897	190	21	525	168	32	59
Yemen A.R.	1,570	230	15	1,114	170	15	71
Bahrain	3.7	3.7	100	1.5	1.5	100	41
Kuwait	.7	.7	100	1.0	1.0	100	130
Oman		36.0	36.0	100	22.0	100	61
Qatar	3.6	3.6	100	1.5	1.5	100	42
U.A.E.	12.5	12.5	100	10.8	10.8	100	86
Egypt	2,850	2,850	100	4,700	4,100	100	190
<b>Total</b>	<b>18,714</b>	<b>7,055</b>		<b>13,362</b>	<b>7,010</b>		<b>56<sup>(1)</sup></b>

**Source:** Computed from national and international sources.

(1) Not including Egypt

**Table 2 — 1975, 1985 and 2000: Irrigated areas in the ECWA region (1000 ha.)**

Country	Irrigated cropped area	Projected irrigated area	
	1975	1985	2000
Egypt	4,100	3,100	4,000
Iraq	1,567	2,825	3,850 - 4,400
Jordan	29	80	125-140
Lebanon	60	103	135-150
Syria	516	769	1,050-1,250
Yemen P.D.R.	63	115	150-175
Saudi Arabia	168	228	350-400
Yemen A.R.	170	160	200-250
Other countries	37	41	75-100
	<b>7,010</b>	<b>7,421</b>	

**Source:** 1975 Table 1, 1985 and 2000 computed from A. Abu Khaled. Potentials of land and water resources in Arab countries, FAO — Arab Econ. Unity Council 1977.

**Table 3 — Irrigated and rainfed cultivated areas in some ECWA countries (1975 and 2000)**

(million ha.)

Country	Rainfed	1975 Irrigated	Rainfed	2000 Irrigated
Bahrain	—	.003	—	.007
Iraq	3.33	3.67	2.67	4.33
Jordan	1.24	.06	.32	.100
Kuwait	—	.001	—	.001
Lebanon	.28	.068	.28	.112
Oman	—	.042	—	.056
Qatar	—	.002	—	.006
Saudi Arabia	.404	.178	.404	.436
Syria	5.25	.619	5.00	1.05
UAE	—	.008	—	.125
Yemen A.R.	1.1	.120	3.05	.45
Yemen P.D.R.	.162	.09	.094	.158
Egypt	—	2.85	—	4.00

Computed by the author from different sources.

**Table 4 — Total, cultivated and climatically possible areas in the ECWA countries**

(million ha.)

Country	Total area	Cultivated area	Climatically cultivated area
Egypt	10.15	2.85	—
Iraq	43.49	7.00	6.05
Syria	13.52	5.90	5.92
Jordan	9.77	1.30	.92
Lebanon	2.07	.34	.13
Saudi Arabia	214.97	.89	6.75
Yemen A.R.	19.50	3.50	3.06
Yemen P.D.R.	28.72	0.25	.037
Oman	21.25	.04	0.45
UAE	8.36	.009	—
Qatar	2.20	.002	—
Kuwait	1.60	.001	—
Bahrain	.06	.003	—

Source: Recalculated from: Land Resources in Arab Countries, Arab Organization for Agricultural Development. 1979.

**Table 5 — Yield of main crops in some ECWA countries — 1975**

(ton/ha)

Crop	Egypt		Iraq		Jordan		Syria		Yemen Average
	Irrigated	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed		
Wheat	3.47	1.06	.43	1.80	.64	2.10	.71	1.20	
Maize	3.62	2.90	—	1.10	—	1.90	—	1.78	
Sorghum	3.77	—	—	3.53	.65	1.70	.72	.80	
Rice	5.48	1.91	—	—	—	5.20	—	—	
Lentils	1.31	—	.94	—	.78	1.20	.67	1.64	
Potatoes	17.49	15.60	—	13.30	—	16.40	12.50	7.60	
Tomatoes	15.43	—	8.66	18.20	6.33	19.60	4.20	1.02	
Groundnuts	2.08	—	—	—	—	1.65	—	—	
Sugarbeet	—	24.40	—	—	—	22.43	9.44	—	

Source: Agricultural and development ECWA, 1979.

**Table 6 — Share of agriculture in total population, G.D.P. and total investment**

Country	% of agricultural population 1976	% share of agricult. in G.D.P.	% share of agricult. in total investment
Egypt	52	30.2	—
Iraq	43	15.8	—
Jordan	29	8.4 (76-80)	18.0 (76-80)
Lebanon	13	—	—
Oman	64	2.5	4.4 (76-80)
Saudi Arabia	63	5.0	8.0 (75-80)
Syria	49	22.2 (76-80)	31.1 (76-80)
Yemen A.R.	77	61.3	—
Yemen P.D.R.	61	—	36.8 (76-79)

Sources: Extracted from different sources.

**Table 7 — Per Capita G.D.P. for agricultural and non agricultural population and annual rate of growth of population and G.D.P.**

Country	Per capita G.D.P. (\$) 1976 prices agric. pop.	Non agric. pop.	Annual rate of growth (1960-75) Population	G.D.P.
Egypt	199	485	2.5	7.2
Iraq	205	2,151	3.3	15.8
Jordan	98	374	3.2	10.0
Kuwait	850	6,102	0.4	17.8
Lebanon	525	744	2.8	10.8
Oman	100	6,000	3.1	28.0
Saudi Arabia	85	13,650	1.9	25.0
Syria	275	1,116	3.3	14.2
Yemen A.R.	99	419	2.3	n.a.
Yemen P.D.R.	50	414	3.2	10.5

Source: FAO/ICS data 1978.

**Table 8 — Production of important food commodities in ECWA region excluding Egypt (for the period 1976-1978)**

Commodity	Production/1000 tons
Cereals	5,847
Wheat	2,959
Barley	1,422
Maize	205
Coarse grains	2,647
Pulses	420
Oil crops	154
Vegetables	4,340
Fruits	2,888
Meat (mutton and goats)	207
Kilk (cow)	822
Eggs	1,951

Source: FAO/ICS data 1978

**Table 9 — Self sufficiency ratios and growth rates in production and consumption in ECWA countries 1970-1977.**

Commodity	Self 1970	sufficiency 1976	ratio 1977	growth rate production	(1970-77) consumption
Wheat	69	54	39	-4.2	4.0
Rice	24	13	15	-13.6	2.6
Pulses	92	90	98	- .7	6.0
Sugar	8	6	5	-6.2	4.6
Vegetable oils	50	64	37	-1.7	- 0.3
Red meat	58	55	50	-1.8	1.3
Poultry meat	81	36	38	-4.7	16.1
Eggs	78	67	74	-1.5	3.8
Milk	65	60	56	-2.3	2.4
Fish	101	99	99	-0.6	-0.4

**Source:** Calculated from FAO/ICS printouts 1978.

**Table 10 — Major food imports and value in countries of the ECWA Region 1970 and 1976 (not including Egypt)**

Commodity	1970		1976	
	Quantity (000 tons)	Value \$ million	Quantity (000 tons)	Value \$ million
Wheat and flour	1,902.0	131.0	2,859.9	570.3
Rice	417.0	69.7	780.8	345.7
Sugar	705.9	63.2	1,074.9	508.8
Meat	35.2	24.7	215.2	278.9
Chicken	16.7	10.8	165.3	194.7
Live animals		58.9		119.2

**Source:** Compiled from FAO/ICS printouts 1978.

**Table 11 — Nutritional situation in selected ECWA countries, 1972-74**

Country	Calories per caput	Total protein gm/day	Animal
Yemen A.R.	2043	50.1	13.8
Iraq	2397	60.0	16.1
Jordan	2208	52.5	11.9
Lebanon	2508	67.6	18.0
Saudi Arabia	2411	61.4	14.1
Syria	2525	63.5	13.7
Yemen P.D.R.	1996	59.2	8.5
Average	2337	60.4	13.8

Source: FAO, Fourth World Food Survey, 1978.

**Table 12 — Index numbers of food production and per capita food production in ECWA region for the period 1970-1977 (1969-71 = 100)**

Item	1970	1975	1976	1977
Food production	94	116	125	118
Per Caput food production	93	98	103	94

Source: Computed from FAO/ICS printouts 1978.

**STUDY ON THE DEVELOPMENT AND MANAGEMENT  
OF WATER RESOURCES IN THE ECWA REGION.**

by  
**A. A. ABUL-ATA\***

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# Study on the Development and Management of Water Resources in the ECWA Region

## 1. Water as a Natural Resource

Water is a source of life. It is hard to imagine a development project or a scheme for the improvement of living standards which does not basically include prospecting for sources of water.

Water is fortunately different from other natural resources, in that its supplies can never be depleted. Unlike oil which could run dry, or coal which might be exhausted by excessive mining, water is generated by a perpetual geological cycle, which ensures continuity of supply. On the other hand, unlike timber resources which can be increased by forestry, the volume of water resources cannot be increased.

Moreover, water supply possesses another distinctive characteristic. It has neither uniform cycles nor stable courses. Rather, it is governed by a number of natural and meteorological factors, which alter the pattern of flow and supply from year to year, from season, and from place to place.

A basic aspect of the earth's topography is that land covers one third of the globe, while the hydrosphere covers the rest.

Water resources on earth are estimated at 1,366 million km<sup>3</sup>, of which 97 per cent consists of sea and ocean water and 4.17 km<sup>3</sup> of underground salt water. The remainder, estimated at 33.34 million km<sup>3</sup>, or 2.5 per cent, supplies the world with its potable water. Of this last quantity, 29 million km<sup>3</sup> or 87.3 per cent of the total amount of natural potable water lies in frozen state in the Arctic and Antarctic polar regions.

Of the small remaining fraction of potable water, estimated at 139,220 km<sup>3</sup>, run-off and lacustrine account for 125,050 km<sup>3</sup> (89.8 per cent). The rest, or 14,170 km<sup>3</sup>, drains into rivers or permeates the atmosphere.

The relatively small quantity of potable water which lies above the surface of the earth derives its importance not from its quantity (14,170 km<sup>3</sup>) but from a dynamic quality which keeps it moving in a perpetual cycle of rainfall and evaporation.

Water in short is a constant element which neither diminishes nor increases. It has been available in the same quantities and form for ages, and today it is present in the same volume and form as it was thousands of years ago.

However, the quantities of water available on earth, in the atmosphere, and in underground reservoirs do not necessarily meet the immediate demands made on them by man. The distribution of water resources is not in total conformity with demand and human needs. It can be abundant in areas that have no arable land, and scarce in vast tracts of land which might be potentially arable.

It is to redress this imbalance that man has recourse to modern science. By a judicious application of technology man can harness natural resources and determine their distribution. He can direct the flow of water to wherever he needs it, in the quantities he desires, and at the moment that he chooses.

Fortunately water is available in sufficient quantities to allow the expansion of agricultural lands and the increase of food production to any extent that the human imagination might conceive.

Cultivated land in the world, presently estimated at 1,520 million hectares, could be increased by another 1,700 million. Irrigated land could be increased at an annual rate of 3 per cent.

Hence, the world production of food could feasibly be doubled. Scientists and planners hope in fact to achieve this increase within the next 25 years.

The success of agricultural development programmes is directly related to man's ability to utilize, conserve, and treat resources as a rare commodity and a basic factor of survival.

Water is first and foremost among these resources and, as already mentioned, the basic factor among them.

## 2. Water Resources in Western Asia

The total surface of the Arab world in both its African and Asian parts amounts to 13.6 million km<sup>2</sup>. It supports a population of 160 million Arabs with a density of 11.7 per sq. kilometre.

In the 13 countries of the ECWA region (Bahrain, Democratic Yemen, Egypt, Iraq, Kuwait, Lebanon, Saudi Arabia, Syrian Arab Republic, Oman, PLO, Qatar, Yemen Arab Republic, United Arab Emirates) a population of 90 million live in an area of 4.7 million kms<sup>2</sup> with a density of 19 p/sq. km.

In order to carry out a survey of water resources in the region, it would be convenient to divide it into three hydrological sectors: The Arabian Peninsula, the Central Sector, and the Western Sector (or Egypt).

### 2.1 Rainfall

#### 2.1.1 The Arabian Peninsula

The Arabian Peninsula may be defined as the tract of arid land whose boundaries are: in the north a line drawn

from the confluence of the Euphrates and Tigris rivers at Shatt-El-Arab, on the northern tip of the Arabian Gulf, to the town of Aqaba on the Gulf of Aqaba, in the northern part of the Red Sea; in the east the Arabian Gulf, and in the west the Red Sea.

The total surface of the Arabian Peninsula is about 2.96 million km<sup>2</sup>. It has a population of about 21 million, and a demographic density of 7.1 p/km<sup>2</sup>.

The Peninsula comprises eight countries: Bahrain, Democratic Yemen, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates and Yemen Arab Republic.

The areas of the Arabian Peninsula which enjoy regular rainfall are the coastal mountain ranges on the Red Sea, the Gulf of Aden, part of the Arabian Sea, and the Gulf of Oman.

The average rainfall in these mountainous regions is 150-800 mm/year. In the rest of the Peninsula it hardly rains except in the mountain ranges of the eastern coastal region around the Gulf of Oman, where the annual rainfall fluctuates between 100 and 300 mm/year.

An analysis of the map showing the distribution of rainfall in the Arabian Peninsula reveals that the total level of annual rainfall is 213.973 billion m<sup>3</sup>. Of this, 104 billion m<sup>3</sup> (86 per cent) fall in the Red Sea mountain ranges, while 20 billion m<sup>3</sup> (9.3 per cent) fall in the Arabian Gulf. The frequency and quantity of rain are subject to fluctuation from year to year, and forecasts are difficult to make. It does not meet the needs of the population.

### 2.1.2 The Central Sector

This area consists of Iraq, Jordan, Lebanon, the Syrian Arab Republic and Palestine, and has a surface of 0.743 million km<sup>2</sup>. The population is 29.671 million, with a density of 40/km<sup>2</sup>. The population is expected to grow to 46.495 million by the year 2000.

The average annual rainfall in the coastal strip ranges from 500 to 1000 mm; but inland it diminishes to 500 mm/year, and thereafter declines gradually, as the distance from the sea increases, until it falls below an average of 100 mm/year in the southern region of the Syrian desert. The overall annual rainfall in this area is about 174 billion m<sup>3</sup>, most of which falls in Iraq and Syria, where the average overall figure is 152.605 billion m<sup>3</sup>, or 87.7 per cent of the corresponding figure for the whole area; the rest, totalling an average of 21.584 m<sup>3</sup>, falls in Jordan, Lebanon and Palestine.

### 2.1.3 The Western Sector (Egypt)

Here the rain falls in the coastal region on the Mediterranean. The average annual rainfall varies between 200 mm. on the coast to less than 10 mm. in the southern part of the country. The total annual rainfall averages 15.2 billion m<sup>3</sup> over a surface of 978.000 km<sup>2</sup>.

### 2.1.4 Summary of Rainfall Averages

The total annual rainfall in the ECWA region is about 403.2 billion m<sup>3</sup> distributed among the three hydrological sectors as follows:

Sector:	Quantity (in billion m <sup>3</sup> )	%
Arabian Peninsula	213.9	53
Central Sector	174.1	43
Western Sector	15.2	4

Table I gives details of the average annual rainfall in the Arab countries, in each of the three sectors shown above.

## 2.2 Surface Run-off

Total surface run-off is about 18.8 billion m<sup>3</sup>, representing 4.7 per cent of the total annual rainfall. Surface run-off in the three hydrological sectors is illustrated in the following table:

Sector	Quantity/in (billion m <sup>3</sup> )	%
Arabian Peninsula	5.207	27.7
Central Sector	13.274	70.6
Western Sector	0.365	1.7

### 2.3 Surface Water

River waters, excluding those of Palestine, total 107,762 billion m<sup>3</sup> divided as follows:

Country	Quantity: (in billion m <sup>3</sup> /Year)
Jordan	0.417
Syria	5.445
Iraq	
The Tigris:	23.1
The Euphrates:	17.0
Inland rivers:	2.5
Lebanon:	3.8
Egypt:	55.5

### 2.4 Underground Water

If we wish to obtain a clear picture of the underground water in the countries of the region, it is essential to sketch a brief outline of the area's geological features. This will enable us to understand the movement of underground water.

Rocks of the Palaeozoic era are to be found along the Arabian Peninsula and in the mountain ranges of the Red Sea in Egypt. These Palaeozoic rocks consist of sedimentary strata which have been formed over a period of 310 million years, mostly of sand and sandstone. Because of their porosity and permeability they are capable of retaining water.

The Palaeozoic strata are overlaid with Mesozoic rocks that outcrop in some of the region's countries. The middle and upper Mesozoic layers are formed of sand and sandstone and are also capable of retaining water. However, the lower Mesozoic stratum which is some 120 million years old is formed of low-permeability limestone that does not permit water retention.

Tertiary and Quaternary Era strata, formed some 0.91 million years ago, overlay the Mesozoic rocks and outcrop in Egypt, Syria, Iraq, and the southern parts of the Arabian Peninsula. They are mostly limestone strata that can store water only under special conditions.

Movements in the earth's crust have had a direct effect on the movement and the direction of flow of underground waters, and have similarly affected the formation of geological basins. The outcome of all these changes in the countries of the region has been as follows:

Country:	Palaeozoic: (310 million yrs) Thickness of sandstone strata	Mesozoic: (120 million yrs) Thickness of sandstone strata	Tertiary and Mesozoic: (Thickness of water retaining sandstone strata)
Jordan	720	500	1.220
Arabian Peninsula	2.921	2.184	5.105
Egypt	3.370	885	4.255

Tertiary and Quaternary limestone strata outcrop in many parts and reach the following thicknesses:

- Syrian Arab Republic: 5.700 m
- Jordan: 890 m
- Arabian Peninsula: 1.934 m

These strata have an immense water-retaining and storage potential.

Volcanic strata are quite common in Syria, especially in the south-western part of the country and in the plains. There high-permeability basalt layers have been formed as a result of ramified veins of fractures in the volcanic strata.

As for the mountainous regions, pyroclastic formations predominate providing an adequate medium for underground water flow and storage. But since these formations are restricted in area, they form local pockets of water in which springs and waterspouts are abundant.

In the mountains of Yemen, volcanic strata reaching a depth of 2.000 m are common and widespread. These layers are believed to have a great potential for retaining underground water, both on account of inherent structural flaws, as well as of an increased average rainfall. (600-800 mm/year),

The total amount of underground water that can be economically exploited on a long-term basis without causing a deterioration in quality is estimated at 18.9 billion m<sup>3</sup>, distributed as follows:

- Arabian Peninsula: 8.070 billion m<sup>3</sup>/year.
- Central Sector: 7.046 billion m<sup>3</sup>/year.
- Western Sector: 3.785 billion m<sup>3</sup>/year.

## 2.5 Summary of Water Resources

Listed below is a summary of water resources in the countries of the ECWA region:

Area	Annual rainfall billion m <sup>3</sup>	Surface run-off billion m <sup>3</sup>	Surface water billion m <sup>3</sup> /yr	Underground water billion m <sup>3</sup> /yr
Arabian Peninsula	231.9	5.207	—	8.070
Central Sector	174.1	13.274	52.252	7.046
Western Sector	15.2	0.365	55.5	3.785
Total	403.2	18.846	107.762	18.901
%	100%	4.7%	26.7%	4.7%

## 3. Current Exploitation of Water Resources

### 3.1 The Arabian Peninsula

— Summary of water resources (in billion m<sup>3</sup>):

Rainfall	Surface run-off	Dams	Underground storage
214	5.2	0.388	8.070

— Exploited water resources:

— Surface water	4225 million m <sup>3</sup>
— Underground water	3827 million m <sup>3</sup>
— Desalinated sea water	142.9 million m <sup>3</sup>
Total	8194.9 million m <sup>3</sup>

— Current exploitation of water resources:

— Agriculture	17.225 billion m <sup>3</sup>
— Housing	
— Industry	1.179 billion m <sup>3</sup>
Total	18.404 billion m <sup>3</sup>

It is to be noted that the quantities of water currently exploited, which amount to 18.404 billion m<sup>3</sup>, exceed the measurable exploited water by 10.209 billion m<sup>3</sup>. This difference results from the direct exploitation of rain water for agriculture in the areas where rainfall is regular and abundant.

### 3.2 The central Sector

— Summary of water resources (in billion m<sup>3</sup>):

Rainfall	Surface run-off	Surface Water	Underground Water
174.1	13.274	52.252	7.047

Exploited water resources:	
— Rainwater	**
— Surface water	48.924 billion m <sup>3</sup>
— Underground water	3.999 billion m <sup>3</sup>
Total	52.923 billion m <sup>3</sup>

\*\* Data not available.

— Current exploitation of water resources:	
— Agriculture	47.482 billion m <sup>3</sup>
— Housing	
— Industry	3.324 billion m <sup>3</sup>
Total	50.806 billion m <sup>3</sup>

### 3.3. The Western Sector (Egypt):

— Summary of water resources (in billion m<sup>3</sup>):

<u>Rainfall</u>	<u>Surface run-off</u>	<u>Surface water</u>	<u>Underground</u>	<u>Discharge water</u>
15.255	0.365	55.5	3.2	11

— Exploited water resources:	
— Rainwater	**
— Surface water	55.5 billion m <sup>3</sup>
— Underground water	1.5 billion m <sup>3</sup>
Total	57.00 billion m <sup>3</sup>

\*\* Data not available.

— Current exploitation of water resources:	
— Agriculture	49.20 billion m <sup>3</sup>
— Navigation	3.93 billion m <sup>3</sup>
— Housing and industry	3.74 billion m <sup>3</sup>
— Winter storage	1.80 billion m <sup>3</sup>
Total	58.67 billion m <sup>3</sup>

It appears from the above that the total amount of exploited water in the ECWA region (excepting direct rainwater exploitation) is 118 billion m<sup>3</sup> annually, divided as follows:

— The Arabian Peninsula	8.195 billion m <sup>3</sup>
— The Central Sector	52.923 billion m <sup>3</sup>
— The Western Sector	57.000 billion m <sup>3</sup>
Total	118.118 billion m <sup>3</sup>

The exploited water, it is noted, may be divided as follows:

— River water	104.424 billion m <sup>3</sup> (88.4%)
— Surface run-off	4.225 billion m <sup>3</sup> (3.6%)
— Underground water	9.326 billion m <sup>3</sup> (7.9%)
— Desalinated sea water	0.143 billion m <sup>3</sup> (0.1%)
Total	118.118 billion m <sup>3</sup>

It is to be noted that the quantity of exploited water drawn from surface run-offs amounts to 4.225 billion m<sup>3</sup> only whereas the total amount of run-off in the region exceeds 18.8 billion m<sup>3</sup>. Exploited run-off water in other words amounts to about 22.7 per cent of the water available from this source. Consequently there is considerable scope for new projects in this area of exploitation, to benefit from this source of water rather than allowing it to be wasted.

So far hardly any prospecting for underground water has been undertaken, and little has been done in the way of surveys, analysis, and data collection. It was only recently that this source of water has attracted some attention, but the accelerating rate at which surveys are being carried out leads us to hope that the quantity of underground water to be exploited in the coming few years will be doubled.

As for desalinated sea-water, the amount thereof has risen to 143 million m<sup>3</sup>/year in 1976, and it is expected to rise

still further to the level of 238.5 million m<sup>3</sup> by 1981. The degree of desalination measured in units of brine attains 100 p/1.000.000. In some countries, desalinated water is diluted with underground water drawn from artesian wells.

Currently the total amount of water used in irrigation is roughly 113.907 billion m<sup>3</sup> annually. It therefore accounts for 96.4 per cent of the total amount of water that is currently being exploited. The rest is used for human consumption, household use, industry and navigation.

However, recycled water, which is one of the main sources for irrigation, has recently received increased attention, and is the object of thorough research in some countries.

The use of discharge water in irrigation has therefore gained approval and this method has been adopted in the general strategy of water exploitation, as has happened for example in Egypt, where discharge water amounts to five billion m<sup>3</sup>/year (a volume equal to the total capacity of the old Asswan Dam), and it is feasible that this quantity may be increased to 11 billion m<sup>3</sup>/year.

#### **4. Development of Water Resources**

This brief review of the region's water resources emphasizes the importance of these resources, and stresses the necessity to develop them. For they constitute the basic factor in the evolution of civilization and economic development. In other words an optimum exploitation of the available water resources can only be achieved by the use of modern technological methods. Moreover the consolidation of the economy and the acquisition of real independence by the countries of the region can be achieved only when the region's natural resources have been fully developed; and water is the primary natural resource, for it is the basic element of agricultural production, and therefore an essential factor in providing Arab citizens with their nutritional requirements.

From our historical background and from our experience of great engineering projects we know that the ancient Egyptian civilization flourished on the banks of the Nile, and the Babylonian blossomed on the banks of the Tigris and the Euphrates. In more recent times Egypt's Asswan Dam has revolutionized the Egyptian economy and agriculture in an unprecedented way, while in Iraq projects to harness the waters of the Euphrates River will have a radical effect on the economy and the methods of agriculture in that country.

Recorded history does not reveal the date when man began to harness water for irrigation purposes. But it is generally believed that this occurred when early man began to change his life-style, and to seek a more stable form of existence. Perceiving that water was essential for his new way of life early man tended to settle in river basins and close to sources of water in order to exploit this vital resource for agriculture and animal husbandry.

As man began to make use of the resources provided by the rivers he gradually became aware of the necessity to control and organise the use of water, and to harness the resources of nature for his own use, in order to meet his increasing demands. From these early endeavours and from the achievements of a few talented men, the science of Hydraulics and Irrigation was born, and became the object of ever increasing development and improvement.

Although modern irrigation technology is only 300 years old, several great water projects were undertaken in earlier eras. They have long since been destroyed by the passage of time and the fluctuation of fortunes, leaving only archaeological traces in such centres of ancient civilization as Egypt, Iran, Iraq, and Italy. In the Euphrates and Tigris River basins there are traces of huge water canals built in the year 2200 B.C., such as those at Al-Nahrawan and the Shatt-El-Hayy.

Five thousand years ago the first reigning Pharaohs of the First Dynasty in Egypt built bridges across the Nile to protect their capital Thebes and the adjoining lands in the valley against floods. This multi-purpose engineering project is probably man's earliest attempt to develop resources and protect the environment. About 4000 years ago (2.000 B.C.) a Pharaoh from the Twelfth Dynasty built the first Rockhill dam in history. His object was to turn Lake Morris in the Fayoum district into a huge water reservoir which would satisfy the needs of agriculture during the dry months of summer, when the volume of the Nile waters decreases.

These are only a few of the impressive cases of man's attempts — sometimes with great success — to harness and control the earth's natural resources for the purpose of increasing production, serving society, and protecting the environment.

Notwithstanding all this, the greatest strides in the development of water resources have occurred during the last century. For it is man's achievements in this field during that period that may be contemplated with wonder and awe. In 1800 the total surface of irrigated land in the world amounted to 8 million hectares only. But the implementation of gigantic programmes in different parts of the world during the nineteenth century increased this surface to a total of 48 million hectares by the year 1900. In other words man was able in the span of one century (from 1800 to 1900 A.D.) to increase the surface of irrigated land sixfold.

However, the outstanding achievements in the last century were characterized by scientific progress in the fields of hydrology and hydrokinetics and the implementation of great hydraulic and irrigation projects.

This advanced technology produced many large-scale projects during the second half of the last century.

Progress therefore is currently being made at an unprecedented pace. The surface of irrigated land in the world presently exceeds 250 million hectares.

Our concern in this great race to increase the production of food is the potential amount of water that will be available to us during the coming years. At the same time we are also concerned about the problems which arise from the exploitation of water resources, within one country, or between several countries which share the same source of water.

## 5. Seepage and Wasteful Practices in the Current Methods of Exploitation

It should be noted that the respective amounts of water that are earmarked for irrigation by the countries of this region vary considerably from one country to the other.

This suggests that there is a great disparity in the ability to exploit water and organize its distribution. It also indicates that the exploitation water could be greatly increased if steps were taken to prevent seepage and waste, improve know-how, and increase awareness in rural areas about the importance of water as a basic factor in the overall process of development.

It is an accepted fact that efficiency in the use of irrigation water is very low in the countries of this region. An excessive amount of waste occurs in the field of the distribution of water. Seepage and losses during transport and distribution are unacceptably high. To redress these shortcomings the countries of the region are badly in need of a technological revolution in the field of irrigation.

In order to expand the surface of irrigated land without increasing the demand on water, this wasteful use of water must be stopped. Otherwise it would be pointless to appropriate funds for the development of new sources of water, for these would suffer from the same inefficiency. The additional water would seep into the ground, causing soil fatigue, and diminishing the productivity of the land.

In Egypt efficiency in irrigation could be increased by 50 per cent to 80 per cent. In the U.A.E. the surface of irrigated land could be doubled, if the ratio of water/hectare earmarked for irrigation is reduced by half. (e.e. from 40.000 m<sup>3</sup>/ha to 9.000 m<sup>3</sup>/ha).

In Iraq, for example, an intensification of agriculture from 0.54 to 1.7 could be achieved by implementing irrigation projects and improving efficiency in the exploitation, distribution, and management of water. All this illustrates one obvious fact: that water is a limited factor in the expansion of agricultural projects of the region. Large sums of money and considerable efforts are required in order to develop this important resource.

## 6. Projections for the Exploitation of Water Resources

In the ECWA region plans for water exploitation in the immediate future aim at increasing the surface of agricultural land from the present 5 million hectares to around 12 million hectares by the year 2000. This will be as follows:

Country	Surface of Irrigated Agricultural Land, by thousand hectares		
	Presently	1985	2000
Egypt	2.500	3.000	5.600
Iraq	1.576	2.825	3.800—4.400
Jordan	29	80	125-140
Lebanon	60	103	135-150
Syrian Arab Republic	516	769	1.050-1250
Democratic Yemen	63	115	150-175
Saudi Arabia	168	228	350-400
Yemen Arab Republic	170	160	200-250
U.A.E.	37	41	75-100
Total	5.119	7.321	11535-12465

\*\* The projects which will bring about this ambitious expansion will result in widespread ecological and economic changes.

At present, most of these lands are irrigated by the region's main rivers, such as the Nile, the Euphrates, the Tigris, the Khabur, the Litani, and the Jordan. These rivers, however, require special attention. The volume of water they carry is not consistent, for the flow varies from year to year, and even from season to season. Moreover, they flow from one country to another. It sometimes happens that the sources of a river are located in a country which does not need water desperately, while its watercourse traverses a country which does. This is the case with the Nile River. The waters of the Nile are badly needed in Egypt and the Sudan, whereas its sources are located in Ethiopia and East Africa.

In other countries of the region, such as Yemen and Saudi Arabia, traditional irrigation is achieved by flooding. In recent years considerable progress has been made in developing and improving irrigation projects there; but it

behoves the authorities in these countries to carry out additional studies on alternative methods of irrigation which draw on underground water supplies — as yet an untapped source, but one which is worthy of study.

The Gulf countries, on the other hand, depend almost exclusively on underground water. In this respect there are, however, certain risks. Underground water, if excessively exploited, increases in salinity and may even run dry. Underground reservoirs therefore require constant vigilance on the part of experts, especially in Qatar and Bahrain.

## **7. Obstacles to the Development of Water Resources**

It is necessary at this point to study the problems which hinder the development of water resources in the countries of this region, for most of these problems stem from the prevailing circumstances in the region, and they affect the environment and are, in turn, affected by it.

### **7.1. Regional Problems**

— Exploitation of the water resources which are shared by more than one country must be organized on a joint basis.

This cannot be achieved unless the countries in question collaborate in preparing combined hydrological maps for their common water basins. Such maps should indicate clearly all the sources of water, as well as all the locations at which water could best be tapped, both quantitatively and qualitatively.

— Moreover, these countries must collaborate in assessing the contents of major water basins. They must agree on joint long-term policies for exploiting underground water in a manner which would not expose it to deterioration, depletion, or quality modifications.

— These countries must also adopt an overall joint plan for the equitable distribution of the waters of international rivers which they share together. The purpose of such a plan is to guarantee that schemes for the harnessing and conservation of river waters may be coordinated with the general development plan, especially in connection with providing water for agriculture, human and animal consumption, industry, household use, fluvial navigation, etc.

— Large-scale water development and irrigation projects involve high costs, which far exceed the financial resources of individual countries; and although they constitute important elements of the economic infrastructure, they are nonetheless slow in showing visible returns. The wealthier nations should therefore participate in financing these projects and should support them, notwithstanding the meagreness of the benefits that accrue from them in the immediate future.

Participation in the implementation of these projects is the duty of all the countries of the region, for good food supplies are a firm basis for the strategy of the whole region and a sound guarantee of national security under all circumstances, especially in cases of emergency arising from international events over which these countries have no control.

— Furthermore large-scale agricultural development projects require advanced technology and lengthy experience. Fortunately some countries of the region already have an adequate number of qualified scientists and engineers who are capable of implementing such projects. What remains is to distribute these talents and to achieve a greater degree of cooperation and coordination for the benefit of all concerned. This is particularly pressing in view of the sharp rise during the past few years of the costs of importing expertise from abroad, a factor which has affected project costs in a manner hitherto unknown.

### **7.2. Obstacles Arising in Individual Countries**

The following measures are recommended:

— Integrated surveys should be carried out on virgin land, for the purpose of developing agriculture and water resources. Modern trends in irrigation should be adopted for the purpose of minimizing losses by seepage or waste. Drainage systems should be constructed to prevent the uncontrolled surge of underground water, and increased salinity in the soil.

— The management of water resources should be carried out in a uniform, coordinated, and integrated manner.

— Government departments or other agencies in charge of water resources should be staffed by competent technicians, who are capable of verifying the feasibility of projects and ensuring their proper implementation on the basis of thorough, appropriate, and integrated studies and surveys prepared in advance.

— Appropriate legislation should be established to regulate the conservation of water resources, organize their exploitation, and prevent waste, dilapidation and seepage.

— A thorough survey of the water needs of all the countries concerned should be carried out, as the quantities of water presently earmarked for irrigation are excessive by a ratio which ranges from double to fourfold the quantities economically required. Avoiding this waste would provide these countries with a huge additional potential without incurring additional expenditure.

— Integration should be achieved in the exploitation of the various hydraulic resources: surface water, underground water, run-offs, recycled drainage water — while at the same time adopting up-to-date methods of irrigation to

achieve optimum results and a homogeneous type of water.

— Quantitative and qualitative segregation of water which is used for industrial purposes should be effected with strict control of the method of using it and of treating it for waste disposal. Precautions should be taken to ensure that industrial water discharge does not cause pollution. The feasibility of recycling industrial waste should be investigated.

— Potable water must be made available to the population at large in urban as well as in the rural areas. Priority should be given to areas of scant water resources, inhabited by low-income and destitute groups. In fulfilling this task the necessity for investigating the potential use of underground reserves assumes greater importance.

— Water storage reservoirs should be built in pastoral areas for the purpose of providing water for humans as well as for cattle.

— Integrated economic studies for water development schemes should be undertaken, and these should be incorporated into the current national development schemes.

— Technical staff should be trained to manage the water projects and ensure proper distribution of the water. This step should be backed up by legislation to enforce the requisite discipline and prevent irresponsible squandering of this national resource.

It is fortunate that some countries in the region already possess considerable experience in dealing with these problems. Furthermore awareness of these problems is already widespread, notwithstanding the necessity for some guidance in matters of seepage and neglectful waste. For, if negligence may be tolerated in some sectors, it cannot be permitted where the natural resources of a country are at stake.

## **8. The Effect of Development Projects on the Environment: A Basic Factor in Planning**

These are some of the general problems connected with and stemming from the exploitation of water resources and the need for conservation. Projects for the development of water resources mainly involve the construction of dams and large storage reservoirs. The basic object behind these is to store river water for varying lengths of time: annual storage is when the water is retained during part of the year, so that it may be used during the dry season of the same year. Over-yearly storage is when the river's total water flow is retained over a period of several years, so that it can form a huge reserve which, in turn, would be used over several years. This latter type of storage enables a country to have full control over its fluvial water resources in the long term, irrespective of the yearly fluctuations of flow.

This kind of storage generates a radical transformation in a country's water resources.

Storage reservoirs of either type mentioned above may be built on the river basin in the territory of the beneficiary country; or they may be built on the territory of one country, for the benefit of another. The Owen reservoir in Uganda, for example, was built for the benefit of Egypt and the Sudan; the Jabal Awliya reservoir in the Sudan was built for the benefit of Egypt; and the Asswan Dam in Upper Egypt was built for the benefit of both Egypt and the Sudan.

Therefore, the impact of these reservoirs on the ecology must be given due attention during the planning and design stages of any project. It must in fact be considered a basic factor in the assessment of the technical and economic feasibility of any project.

That is because water reservoirs built in river courses, or near their sources, entail fundamental changes as well as marginal effects of varying magnitude, depending on the nature of the project:

— Changes in the river basin, or in the storage lake, as a result of the growth of vegetation which was formerly not native to that area, and ecological changes, which in turn result from changes in soil properties and from climatic changes. (increased hydroscopy).

— Changes in the properties of the stored water as a result of the circumstances of its storage and accumulation over a long period of time, and also as a result of major changes in the river bed, or in the storage lake itself.

— Changes in public health, as a result of inhabiting a new environment or of transformations in the irrigation system, in the nutritional habits and in life-styles.

— Social changes due to the migration of new inhabitants, or the construction of new housing centres; the creation of new patterns of human relations, arising from changes in the methods of agriculture, irrigation, and production.

— Changes in the river basin, due to scouring of the river bed, erosion of its banks, changes in its course, accumulation of silt in the river bed and the storage lake, and the resultant shallowing of the lake. These changes entail an expansion of the lake's perimeter, and the erosion of its shores.

— Changes in the regional distribution of animal wealth, its migration from one place to another, including a change in the numbers of some species, and the complete extinction of others.

Changes in the level of soil hydration, as a result of modifications in the methods of irrigation; and the effect thereof on soil fertility, on the properties of water, etc.

— As a result of all these factors, water storage projects that are undertaken on a large scale are among the

fundamental causes of ecological transformations and changes in the concepts of environment.

— All this stresses the importance of taking into consideration all the possible repercussions of these projects on the environment. Planners should bear these repercussions in mind and provide the appropriate remedies to counteract their negative effects.

— Political considerations, though at times a serious obstacle to the implementation of such projects, do not alter the fact that the benefits which accrue to man from such projects are undeniable.

— Egypt's Asswan Dam is perhaps one of the most marvellous experiments undertaken in the modern age. It was the fruit of creative cooperation between governments for the common welfare of their peoples, and has influenced revolutionary thinking and political methodology.

— The Asswan Dam was built on Egyptian soil, for the purpose of storing huge quantities of water that would be divided in a proportion of 34 per cent for Egypt and 66 per cent for the Sudan. The land flooded by the retention of water behind the Dam constitutes a large artificial lake which extends in length 350 kilometres into Egypt and 150 kilometres into the Sudan. Villages and towns in both countries have thus been submerged for the common welfare of their people.

The Asswan Dam stores the whole flow of the Nile, including its flood waters, in consequence whereof Egypt is able to satisfy its water needs at all times, regardless of any adverse circumstances affecting the Nile.

— This great project has brought about a complete hydrological revolution in the river's main water course, on the north of the Sudan as well as in Egypt. It has also brought about a total agricultural revolution in both countries.

— Another positive factor is that control over the Nile waters has been transferred from the river's sources into the hands of the beneficiary countries. The Asswan Dam may therefore be taken as a perfect example of the influence which such great projects for the development of water resources can have on the environment and on life itself.

In this connexion a special study has been devoted to this subject. It deals with the effects of the Asswan Dam and its influence on the natural environment of the Nile's basin.

Table I: Annual rainfall in Western Asia (In million m<sup>3</sup>/yr)

Country	Les than 100 mm	100- 300 mm	300- 600 mm	600- 1,000 mm	Over 1,000 mm	Total
I.						
U.A.E.	1.1	1.3				2.4
Bahrain	0.009					0.009
Saudi Arabia	89.4	24.7	11.9	0.8		126.8
Oman	5.4	7.6	1.9			14.9
Qatar	0.2					0.2
Kuwait	0.01	2.4				2.4
Yemen A.R.	4.7	12.1	28.4	0.9		46.1
Dem. Yemen	2.3	18.6	0.2			21.1
						214.00
II.						
Jordan	4.0	2.7	0.05			6.7
Syria	0.5	25.4	16.00	4.00	6.8	52.7
Iraq	4.7	54.5	20.8	7.1	12.8	99.9
Palestine	0.09	1.2	3.7	3.00		8.00
Lebanon	—	0.08	0.8	6.00		6.8
						174.1
III.						
Egypt	11.1	4.1				15.2
						15.2
						403.3

— Total rainfall in the region, 403 billion m<sup>3</sup>

— Total surface of the countries of the region, 4.7 million km<sup>2</sup>

Table II. Current exploitation of water resources in the Arabian Peninsula

Region	Surface water	Underground water	Desalinated sea water		Exploited water resources		
			Current	Future	Agriculture	Housing	Industry
U.A.E.	160-270 (215)	270	2.0	*	331	31300	
Bahrain	—	199	8.3	24.7 (1981)	166	20	13
Saudi Arabia	2200	1723	17.3	128.8 (1977)	13500	830	150
Sultanate of Oman	10	665	2.0		420	10	
Qatar	—	50	10.4	18.6 (1980)	44	6	
Kuwait	—	130	102.9	66.4 (1980)	134	75	8
Yemen A.R.	300	440	—		730	10	
Dem. Yemen	1500	350	*	*	1900	26	
Total	4225	3827	142.9	238.5	17225	172251179.3000	

(million m<sup>3</sup>)

\* No date available

Source : Report submitted by the Economic Commission for Western Asia to the Conference on Water Resources, Argentina. (Baghdad, December 1976).

Table III. Current exploitation of water resources in the central Arab countries

	Surface water	Underground water	Desalinated sea water		Exploited water resources		
			Current	Future	Agriculture	Housing	Industry
Jordan	230	221	*	*	405	4	6
Syria	6903	2528	—	—	6900	400	*
Iraq	41100	1200	*	*	39580	580	2240
Palestine	**	*	*	*			
Lebanon	691	50	*	*			
Total	48924	3999			47482	3324	

(million m<sup>3</sup>)

No data available

Source: Regional report submitted to the Mar Del Plata Conference on Water, Argentina 1977  
Regional reports on Food Sufficiency submitted to the Arab Organization for Agricultural Development, 1979

**Table IV. Summary of water resources in the countries of the Region  
(in billion m<sup>3</sup>)**

	<b>Arabian Peninsula</b>	<b>Central Sector</b>	<b>Western Sector</b>	<b>Total</b>
Rainfall	214	174	15.2	
Surface run-off	5.2	13.2	—	
Available surface water	—	52.2	55.5	
Surface water available through future development Dams	—	60.4	64.5	
	0.4			
Exploited underground water	8.07	4.5	1.5	
Available underground water	8.07	6.5	3.8-11	
		from discharge water		
Currently exploited for agriculture	17.5	46.5	49.2	113.2
Currently exploited for housing and industry	1.8	3.3	3.7	8.8
			3.9*	
			1.8**	
Currently exploited from desalinated sea water	0.4			
Total needs in 2000 for all purposes		91.5	79.2	

\* Navigation

\*\* Winter storage

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**CASE STUDY ON THE ASWAN HIGH DAM: ITS IMPACT ON  
THE  
ENVIRONMENT AND ITS SIDE-EFFECTS**

by  
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## **Case study on the Aswan High Dam: its impact on the Environment and its Side-Effects**

### **INTRODUCTION**

The High Dam is considered one of the largest multipurpose projects in the world. It is in fact **the** largest from the point of view of its impact on the environment and on the people for whose benefit it was built.

A controversy commensurate with the size and impact of the project, but often exceeding the bounds of science and objectivity, involved the proliferation of views and ideas which questioned the project's soundness and worth and which went far in exaggerating and distorting its attendant side effects.

From the early 1950's until the Dam was completed in 1970, scientists and engineers in Egypt, the Arab world, and the world at large, applied themselves to this discussion. In as much as the various stages of the planning, design and financing of the High Dam were international in character, they became entangled in the events that dominated the Arab world during the 1960's. The ensuing international controversies, critiques and analyses gave the Dam a markedly political character.

Now that the Dam has been in operation for fifteen years, sufficient study, observation and data have been compiled to reveal its side effects and explain the natural phenomena which have attended its operation. With facts and figures finally at our disposal, it is now possible to draw a clear picture free from rhetoric, bias, speculation or unwarranted conjecture.

In this study it will be useful to take up the more salient views that have been expressed in this connection. It is also proposed to describe and deal with all the project's side effects.

There is no doubt that this study of the High Dam is of the greatest interest. The High Dam project is a unique example of the impact of giant water development projects on the environment and on life in general with a wealth of accompanying side effects, socio-economic consequences and technological transformations. Continuous monitoring and integrated study are, therefore, absolute necessities if the proper functioning of the project in the service of society and the environment are to be assured.

# 1. The Nile

## 1.1. Sources of the Nile

The Nile River dominates the western regions of Western Asia (Egypt). With a length of 6,700 km it is the second longest river in the world. From its headwaters near Lake Tanganyika in the south until it empties into the Mediterranean Sea, it crosses 35 lines of latitude between 4°S. and 31°N.

The area of the Nile basin is estimated at 2,900,000 km<sup>2</sup>. It includes parts of Uganda, Kenya, Tanzania, Rwanda, Burundi and Zaire, one third of Ethiopia, and large areas of Egypt and the Sudan.

This vast expanse of land comprises a variety of climates, fauna and flora, and a mosaic of races, civilizations, languages, customs and religions.

The Nile draws its waters basically, but not exclusively, from two major sources, namely:

- (1) The equatorial lake plateau of East Africa; and
- (2) The Ethiopian Plateau.

Compared with these, its other sources are at present insignificant.

## 1.2. Characteristics of the Nile

A close observation of the Nile flow reveals that the volume of water it carries fluctuates from day to day, month to month, season to season, year to year.

Thus, during the flood season, the Nile becomes a giant carrying more water than is needed; while in the summer it turns into a dwarf, unable to provide even drinking water, much less the quantities needed for other daily requirements.

Its fickle habits have made the Nile a cause of deep concern and perplexity for Egyptians, ancient and modern.

## 1.3. Nile studies

When, in the second half of the nineteenth century, the Egyptians discovered the headstreams of the Nile, a whole new realm of knowledge was opened up to them. They were at last in possession of the means by which they could acquire detailed information about the river and solve the secrets which shrouded its capricious behaviour.

From that point on Egyptians began to monitor and collect data on the levels and discharges of the Nile, the depths of the river bed, the nature of the basin, the prevailing winds and temperatures, and the quantity of rainfall. As this continued a corpus of scientific facts was compiled which made the Nile one of the most thoroughly researched rivers in the world.

By discovering the facts which had eluded them for ages, the Egyptians were finally able to devise the means to tame the river, release its useful potential and thwart its destructive propensities.

## 1.4. Yearly storage

Very soon schemes for the yearly storage of the Nile's waters were launched. They were initiated during the last century by Egyptians who in order to regulate irrigation built the Aswan and Jebel Awlia reservoirs as well as a number of artificial barrages along the river course between Aswan and Cairo.

The system of yearly storage is based on the idea of holding part of the flood waters behind a limited-capacity dam after the torrents have passed. The water thus impounded is then released in controlled quantities to meet irrigation requirements during the dry months of the summer. This cycle is repeated year after year.

This seasonal storage system, however, was only a partial solution to the problem of regulating and controlling the flow of the Nile; for the volume of water which is carried by the Nile varies widely from year to year. It could reach a total of 151 billion m<sup>3</sup> as happened in 1878/1879, and it could fall to as little 42 billion m<sup>3</sup> as in 1913/1914. Such a wide fluctuation limits dependence upon yearly storage for the purposes of agricultural expansion and renders it inadequate even for the purpose of regulating the existing agricultural cycle.

Even during the summer season annual variations can be considerable: the flow can be plentiful, as in 1878 when it reached 36 billion m<sup>3</sup>, or it can be meager, as in 1914 when it did not exceed 7 billion m<sup>3</sup>.

Yearly storage subjects the replenishment of the reservoirs to the mercy of the elements. In some years it may be impossible to fill the reservoirs. Summer crops would consequently be lost to drought. This would be particularly true during the drier summers, when the level of the river would be too low and stored water too meager to meet the estimated 22 billion m<sup>3</sup> needed for the summer months alone.

The problem was compounded when the question of agricultural expansion was raised. At a time when the population of Egypt was constantly on the rise and the need for foodstuffs was growing more critical, cultivated land did not exceed 4 per cent of the total land area, while 40 per cent of the Nile waters — of which every drop was needed for agricultural expansion — flowed unexploited into the Mediterranean.

To deal with this situation, planners and engineers in Egypt first turned their attention to the equatorial lakes upstream of the main Nile Valley; for they saw that these lakes constituted natural reservoirs which could be economically exploited by the construction of dams at outflow. These lakes could be turned into perennial storage

basins where surplus water might be stored for hundreds of years, to be released by means of artificial gates as the need dictated in Egypt and the Sudan.

These projects, however, provided for harnessing only the equatorial sources, which accounted for no more than 16 per cent of the Nile waters. They did not take into account the flood waters which were lost yearly as they drained unexploited into the Mediterranean.

### 1.5. The concept of a high dam and perennial storage

Thus emerged the idea of constructing a giant dam on the main course of the Nile that would control the combined flow of the main tributaries after they had poured from their different sources into a single stream. Surplus water would be retained in a high-capacity reservoir. This artificial lake would be large enough to accommodate the accumulating quantities of water even if the river were to carry a high volume over a successive number of years. In this way, the quantity of accumulated water would always be large enough to compensate for years of poor flood.

This in simple terms is the concept of perennial or long-term storage, known also as overyearly storage, by which total control of the river is sought. In accordance with this method of storage, it would be possible to guarantee a stable yearly flow of water that would be discharged to meet the year-round requirements of Egypt and the Sudan.

It was for this reason that the Egyptian Revolution of 23 July adopted the idea of the High Dam as the basic foundation of the agricultural and industrial development of the country.

## 2. High Dam feasibility study

Due to its importance and its impact, this project acquired from the beginning the aspect of an international venture. It attracted the attention of all who were involved in the construction of major dams and water storage facilities. Inevitably it gave rise to a substantial amount of research concerning the validity of the project and the selection of the most suitable design for its implementation.

In fact never before had an engineering project been the object of so much detailed technical and economic study as the High Dam project. From the start a series of independent surveys were undertaken by a variety of international experts. These were later complemented by detailed reconnaissance of the project and particularly its anticipated side effects.

### 2.1. Research on sedimentation in the reservoir basin

From the moment that the High Dam was conceived as a long-term reservoir designed for the purpose of harnessing flood waters, its designers knew that a project of that magnitude entailed the creation of a huge artificial lake which, in addition to accommodating usable storage for irrigation and flood protection, would have to include additional storage space to hold sedimentary deposits over a long period of time. Sediment at Wadi Halfa for example accumulated at an estimated yearly rate of 110 million tons. These muddy substances are carried downstream during flood time between July and November of each year.

The breakdown of these substances is roughly as follows:

- Coarse sand (0.200-2.00 mm)
- Fine sand (0.020-0.200 mm) 30 per cent
- Silt ( 0.002-0.02 mm) 40 per cent
- Clay (0.0002-0.002 mm) 30 per cent

The annual volume of sediment to be deposited in the reservoir was forecast by analysis as follows:

— 100 per cent fine sand (i.e., $110 \times 30\% \times 100\%$ )	33 million tons
— 75 per cent clay (i.e., $110 \times 40\% \times 75\%$ )	33 million tons
— 10 per cent silt (i.e., $110 \times 30\% \times 10\%$ )	3 million tons
— Total	<hr/> 69 million tons

Coarse sand moving close to the bottom of the basin was forecast at about 21 million tons. The total amount of trapped sediment, which was expected to diminish with time, would therefore be 60 million tons per year.

Since the dead storage space assigned to the retention of sediment has been estimated at about 30 billion m<sup>3</sup>, the actual storage capacity of the reservoir will not be affected noticeably before the elapse of 500 years. This forecast, however, is much more conservative than the one made by the German firm of Hochtief, which calculated that sedimentary deposits will not reduce the reservoir's storage capacity before 750 years.

In fact the American Bureau of Reclamation adopted a similar method of calculation to forecast the life span of the Hoover Reservoir; but subsequent follow-up studies of the actual accumulation of sediment determined that the expected life span of the reservoir would be more than double the time predicted.

### 2.2. Research on scouring and sedimentation

The scouring and sedimentation which were expected to follow upon the construction of the High Dam were the

subject of detailed study right from the beginning. In 1955 L. Straub, an American member of the international committee of experts, prepared a research programme devoted to that problem. His recommendations were implemented and a thorough study of on-side data was carried out. Modern scientific theories on the subject suggested the following considerations:

(1) Any scheme for the storage of silt-carrying flood water would result in a scouring of the river bed, because the water would have its silt content filtered from it as it was released from the reservoir.

(2) Since every river had its own particular properties, it was impossible to predict the extent of scouring which would occur in the Nile. Nevertheless some prediction could still be made on the basis of the experience of similar rivers upon which reservoirs had been constructed.

(3) Even after the completion of the horizontal water expansion projects, maximum outflow from the High Dam would have to be maintained at a safe level so as to avoid serious scouring that would threaten the artificial barrages downstream.

(4) Successive high floods would occasionally make it imperative to maintain outflow at a level that exceeded actual demand; but such an occurrence should not be considered as a constant factor.

(5) Scouring in the first reach between Aswan and the Esna Barrage was no source of worry for it would not affect water levels upstream of the barrage. Scouring downstream of the Esna Barrage would occur only after the lapse of many years.

(6) By monitoring the scouring which occurred in the first reach between Aswan and Esna, it would be possible to forestall similar deterioration downstream of Esna. Scouring beyond the lower barrages would not reach a critical point before the lapse of many years and its impact could in any case be forestalled in the same manner.

Research showed that scouring would be minimal and that it would occur at a slow pace. It would, therefore, be easy to counteract with timely remedies at a reasonable cost that would be more than offset by the many great benefits to be derived from the project.

### 2.3. Research on losses in Lake Nasser

#### 2.3.1 EVAPORATION LOSSES

Forecasts of the rate of evaporation at Lake Nasser were made on the basis of an earlier study at Aswan and Halfa using the Beach evaporation measuring device. The findings of the earlier study had been as follows:

Month	Evaporation at Aswan, in mm	Evaporation at Halfa, in mm
January	3.8	4.4
February	4.5	5.4
March	6.5	7.2
April	8.4	9.1
May	9.3	9.7
June	10.8	10.8
July	9.8	9.7
August	9.6	8.8
September	9.1	9.1
October	7.8	8.0
November	5.4	5.8
December	3.6	4.3

On the basis of this data, the average annual level of evaporation from Lake Nasser was estimated at about 10 billion m<sup>3</sup>.

#### 2.3.2 SEEPAGE LOSSES

Studies and estimates to determine the average seepage from the High Dam basin established the following:

(1) Sections of the river bank in the lake areas were formed of nearly impermeable massive granite rocks. The remaining stretches were formed of Nubian sandstone interpenetrated by layers of clay and fine grain silt, which too is impermeable.

(2) Silt carried by the river would, with the passage of time, seal any pores or faults. This had been demonstrated by the low level of losses in the old Aswan Dam; for, were this assumption incorrect, losses from that dam would have been far greater than they actually were.

(3) A geological survey of the area to be inundated was recommended in 1953 by the international team of

experts. The purpose was to determine the permeability of the sandstone at the different depths of the reservoir and the seepage losses that would occur therefrom.

The survey was duly carried out. Bores of varying depths were drilled into the sandstone. Some of these were fitted with automatically equipped peisometers capable of determining the levels of underground water. The results were as follows:

— The crust of the area to be inundated consisted of Nubian sandstone interpenetrated for the most part with layers of clay. Total porosity of the Nubian sandstone was around 25 per cent.

— Fractures and faults were non-existent in the area.

— The inundated Nubian sandstone with an estimated porosity of 25 per cent would inevitably be saturated during the early stages of storage but would gradually lose its porosity as the level of the stored water rose. The amount of water which would be absorbed by the sandstone during the early years of storage should amount to about 3 billion m<sup>3</sup> per year. Thereafter, the amount of loss through seepage would diminish as the sandstone reached total saturation.

— The peisometers would be closely monitored during the successive periods of submersion so as to arrive at final figures on seepage losses.

In the light of these observations, seepage losses from the Lake were tentatively estimated at no more than one billion m<sup>3</sup> per year.

#### **2.4 Effects of the High Dam on Nubia and its archeological sites**

Plans for the construction of the High Dam at Aswan gave rise to the necessity of finding a quick solution to the problem of the Nubian villages which would be submerged under the waters of the High Dam Lake. It soon became apparent that the inhabitants of these villages would have to be relocated elsewhere, compensated for their properties, and provided with new housing and new land to till. After thorough investigation it was decided to relocate the inhabitants in the Kom Ombu Valley, a wide and potentially fertile plain which could be reclaimed by irrigation water pumped from the river.

Relocating the inhabitants of Nubia involved the reclamation of 28,000 feddans of agricultural land which were parcelled out among them. Housing units meeting modern standards of comfort and hygiene were constructed and the new villages were provided with all the essential public utilities, social services centres and vocational training institutes.

The High Dam feasibility studies also included a plan for salvaging the archeological sites of Nubia, also threatened with permanent inundation. The preservation of these great monuments to man was a worthy task which deserved the utmost effort.

As soon as the Egyptian Government made its appeal for assistance to UNESCO in 1959, offers for help began to pour in from government and cultural institutions the world over. This encouraged the Egyptian Government to announce that it would reciprocate by permitting foreign archeological missions to retain 50 per cent of the archeological materials which they unearthed, excepting from this offer only such antiquities that turned out to be either unique or necessary to fill the gaps in the collections which were preserved in Egypt. The Egyptian Government also pledged to make gifts of four ancient temples to the countries which made the largest financial contributions to the effort to save the antiquities of Nubia.

**In the effort to save the Nubian archeological sites, the following additional measures were taken:**

(1) To protect the Temple of Fiala, an immortal monument from Ancient Egypt, earth dams were built around Fiala Island.

(2) The two temples of Abu Simbel, considered by far the most important of Nubia's temples, were raised to a point above the projected maximum level of stored water.

(3) The Egyptian Department of Archeology, in collaboration with a number of foreign countries, removed the remaining temples to a safe place.

#### **2.5 Certifying the soundness of the project**

When the soundness and the technical and economic feasibility of the project were certified, a decision was taken to start implementation. That decision was influenced particularly by the report submitted by the World Bank in February 1955 in which the experts stated the following:

(1) The project was technically sound. Its size insured the exploitation of the greater part of the Nile waters. The Dam would become the cornerstone of a series of projects which aimed at the complete exploitation of the river's resources. Moreover the High Dam and the yearly storage schemes for the equatorial lakes were not mutually exclusive projects. The High Dam by storing the annual flood waters would dampen the short-term annual variations of the river's flow and guarantee irrigation requirements. In this way the High Dam would meet the need more successfully than alternative large-scale irrigation projects.

(2) The project would occupy a prominent place in the economy of the country over the next ten years and would no doubt stimulate the economy considerably.

(3) The most outstanding benefit of the project was that it would increase agricultural output in the country by permitting the horizontal expansion of cultivated land into areas that had hitherto remained fallow. Such an expansion could not be achieved unless new supplies of water were provided, particularly since the available supplies were already being fully exploited.

(4) Hydroelectric power generated by the project would quadruple current supply to 1,900 million kw. It was estimated that increased output would be fully absorbed by rising demand by the year 1973. Moreover power from this source could be easily transmitted to Cairo and the Delta at a cost far below that which would be required for the construction of thermal power plants.

(5) Round the year navigation on the Nile and its tributaries would be ameliorated and transport costs would accordingly be reduced. Considerable savings would also result from the flood protection provided by the dam. In effect the Dam would save the State the prohibitive annual cost of repairing flood damage. It would also eliminate the losses incurred by the seepage of water into adjoining land at flood time.

(6) Although the estimated cost of the project was high, it was nevertheless reasonable in view of the economic and financial benefits which would accrue. The resulting annual increase in national income for example would amount to more than one-third the cost of the project and the estimated net income from the power generating plant over the next 17 years would more than cover the construction costs of the plant.

Thus the High Dam studies achieved their objective and the project was put into effect. Its principal features were as follows:

### **3. High Dam technical specifications**

#### **Hydrological data related to the Nile River at Aswan**

- Maximum discharge: 13,500 m<sup>3</sup>/s
- Minimum discharge: 275 m<sup>3</sup>/s
- Mean annual flow: 84,000 million m<sup>3</sup>

#### **Reservoir**

- Maximum storage level 182 m
- Storage capacity: 162,000 million m<sup>3</sup>
- Dead storage capacity: 31,000 million m<sup>3</sup>
- Usable storage capacity: 90,000 million m<sup>3</sup>
- Flood control storage capacity: 41,000 million m<sup>3</sup>
- Length of storage lake: 500 km
- Average width of storage lake: 12 km
- Surface area of storage lake: 6,500 km<sup>2</sup>
- Maximum annual discharge: 84,000 million m<sup>3</sup>
- Average evaporation and seepage losses from reservoir: 10,000 million m<sup>3</sup>
- Irrigation requirements of Egypt and the Sudan: 52,000 million m<sup>3</sup>
- Net annual surplus for Egypt and the Sudan: 22,000 million m<sup>3</sup>

#### **High Dam**

- Type of dam: rockfill
- Length of crest: 3,600 m
- Length at river level: 520 m
- Length of right wing: 2,325 m
- Length of left wing: 755 m
- Maximum height above river bed: 111 m
- Track width above river bed: 40 m
- Width of base: 980
- Volume of construction material: 43,311,000 million m<sup>3</sup>
- Level of river bed: 85 m
- Level of dam crest: 196 m
- Its Length: 2 × 787 Km
- Number of 500 kv transformer stations: 3 stations
- Branch line voltage: 132-220 kv
- Length of branch lines: 937 km.
- Number of 220 and 132 kv transformer stations: 10 stations

## 4. Benefits of the High Dam

From the moment that the High Dam was conceived, it became the cornerstone of all productive projects in the country. It became the basis on which Egypt's modern industrial, agricultural and economic progress rested. For, from the point of view of its economic benefits, the High Dam was unique and unsurpassed among irrigation projects all over the world.

The High Dam was a multi-purpose project. It was not only expected to provide a stable irrigation system and increase hydroelectric power capacity; it was also meant to provide better navigation, flood protection, stability of production from year to year, etc. All of these are multi-purpose benefits which have rarely come out of one single project.

Moreover the High Dam is also unique in that its impact and its benefits encompass the whole country, and in fact extend beyond its borders to neighbouring Sudan as well. The electric power it generates is transmitted from Aswan to Alexandria, its waters will irrigate the newly reclaimed land in the Sa'id and in the eastern and western Delta. Its artificial lake, extending into the Sudan, will become the largest of its kind in the world.

The major benefits of the High Dam may be described as follows:

### 4.1 ECONOMIC BENEFITS

- It will provide the irrigation water necessary for the expansion of cultivation into virgin land totalling some 2.5 million feddans. Land in Upper Egypt, which was formerly on the basin system of flood irrigation, will be converted to the perennial system of irrigation, thus making it possible to grow two or three crops a year instead of just one.
- The project will put a definite end to complaints about the irrigation system, as it will furnish the required amounts of water for all crops at the optimum of the year, even in the driest years.
- It will introduce flexibility into agricultural planning and permit the authorities to increase the cultivation of any crop without fear that the available water supply is insufficient. This in turn will bolster the agricultural economy of the country.
- It will augment water discharge to all agricultural land, thus increasing productivity by 20-50 per cent, depending on the crop; in addition it will simplify drainage projects and reduce their costs.
- It will improve the prospects of cultivating at least 700,000 feddans of rice every year; it will save millions of pounds which were formerly spent on the maintenance and elevation of bridges and the protection of villages, agricultural land, islands and town banks against annual flooding.
- It will improve navigation between Aswan and the Mediterranean and open a new means of transportation and communication throughout the country, thereby helping to maximize utilization of the river and its tributaries.
- It will make the power generation plant at the Aswan reservoir more economical by raising its capacity throughout the year.
- It will permit the generation of hydroelectric power at an estimated rate of 10 billion kwh per year, which amounts to more than twice the supply available in Egypt. This makes the High Dam the cornerstone of industrial progress in the country. It creates opportunities for expanding a number of important industries and provides the inhabitants of the country with a variety of services.
- It permits a saving of 3 million tons of fuel oil every year.

### 4.2 SOCIAL BENEFITS

- It offers total agricultural stability for millions of destitute people who will subsequently become owners of reclaimed land both upstream and downstream of the Dam. This will raise the general standard of living and bring into existence a new class of small landowners who will become the nucleus of a new democratic socialist society.
- It will modernize the Egyptian village by introducing electric light to streets and alleys which have hitherto been covered in total darkness. This will contribute to the introduction of fundamental changes in rural life and will help bridge the urban-rural gap in Egypt.

### 4.3 ADVANTAGES TO THE SUDAN

- 1) It will double the area at present under cultivation.
- 2) It will assure sufficient water to meet the irrigation requirements of all land currently under cultivation as well as the needs of newly developed land, even during the driest years.
- 3) It will increase the cultivation of long-fibre cotton.
- 4) It will augment government and national income from agricultural sources by 200 per cent per year.
- 5) The Sudan will get benefit of the hydroelectric power generated from the barrages which it is currently constructing.

#### 4.4 EVALUATION OF THE HIGH DAM'S BENEFITS TO EGYPT

In order to give a more concrete picture of the magnitude of the benefits to the country, it would be as well to give a corresponding estimate in monetary terms based on the prices which prevailed at the time of construction.

	Million LE.
<b>I. Increase in national income</b>	
1) Horizontal expansion of agricultural land and conversion of Upper Egypt basins to perennial irrigation.	84
2) Guaranteed water supply in all years to all lands currently under cultivation as well as to newly reclaimed land; improvements in drainage methods; guaranteed cultivation of rice crop in at least 700,000 feddans of land.	56
3) Protection of the country against high floods; prevention of water seepage into agricultural land; protection of villages, river valleys and islands from flooding and bridges from disruption.	10
4) Improvement of waterborne transportation by controlling discharge behind the High Dam.	5
5) Improving the economic operation of the Aswan hydroelectric power project through the generation of an estimated 10 billion kwh per year.	100
Total	255
<b>II. Increases in Government revenue</b>	
Million LE.	
1) Increased revenue from taxes on newly reclaimed agricultural land and increased productivity of land currently under cultivation.	10
2) Increased revenue arising from improved navigation; saving of expenses formerly spent on flood protection measures.	2.5
3) Increased revenue arising from the sale of electricity generated at the High Dam hydroelectric power plant.	10.5
Total	23

In addition, there is the sum exceeding LE 300 million which the Government will obtain from selling newly reclaimed land to small farmers on the basis of long-term loans.

This account suggests that the cost of constructing the High Dam can be met within two years. The cost of the project as well as the cost of all ancillary works, including the extension of electricity lines, was estimated at LE 450 million, while the attendant annual increase in national income was estimated at LE 255 million. This revenue is very high when compared with similar projects in other parts of the world.

### 5. The High Dam compared with other giant dams in the world

The High Dam is one of the largest dams in the world and is the largest in terms of the storage capacity of its lake. The lake holds:

- 162 billion m<sup>3</sup> at level 182
- 169 billion m<sup>3</sup> at level 183
- 182.7 billion m<sup>3</sup> at level 185

Comparing this tremendous capacity with other dam basins in the world, it appears that:

- It has more than four times the capacity of Lake Mead, the largest in the United States, created by Hoover Dam which is one of the highest dams in the world.
- The capacity of Lake Nasser is one and a half times the total storage capacity of the basins of the next seven largest rockfill dams in the world.
- It may be enough to point out that the combined storage capacity of the Soviet Anjuri Dam (the highest dam in the world), the American Fort Peck (the largest earthen dam), the American Grand Coulee Dam (the largest concrete type dam) and the Soviet Krasnoyarsk Dam (which has the world's biggest hydraulic power station) represents only 67 per cent of the capacity of the High Dam.
- If the waters held by the High Dam at full capacity were released all at once, they would submerge all the cultivated land areas of the earth under 13 cm of water!

The High Dam ranks second in size in the world. No less than 43 million m<sup>3</sup> of materials were used in its construction. It is 980 m wide at the base. At the crest it is 40 m wide and 3600 m long.

The total size of the next six major rockfill dams in the world amounts to only eight-tenths the size of the High Dam.

- The diversion canal on the right bank of the river is 1960 m. long and 60 m. wide at its bed. It can discharge 1000 billion m<sup>3</sup> of water per day— a capacity greater than that of any known canal.

The High Dam is also second in the world in power generating capability. Its plant at the diversion canal produces 2.1 million kw.

- This equals one half the combined capacity of the next six hydroelectric power plants in the world. The High Dam,

however, ranks only sixth among the highest rockfill dams in the world.

Its injection curtain goes down to a depth of 210 m. below the river bed, while the curtains of the French Serboncon Dam and the Canadian Michan Dam do not penetrate further than 140 m. The High Dam, therefore, has the deepest foundation in the world.

It is among the most effective dams in the world in its ability to provide for flood control. Its capacity of 41 billion m<sup>3</sup> assigned to this purpose can cope with the severest floods and spare the country the danger and devastation experienced before the High Dam was built.

From the economic viewpoint, no dam in the world combines its numerous benefits, which cover the fields of agriculture, industry, power generation, fisheries, tourism, flood protection...

In short, though the High Dam is neither the highest nor the largest in the world, its value like that of any other dam is measured by the extent of its achievements in irrigation and power generation.

The less the height and materials used to achieve these two results, the lower the construction cost. Successful technical feats are those which realize the greatest advantage at the lowest cost.

If this is true, then the High Dam figures rightfully as one of the greatest dams in the world.

The following table provides data on a number of major rockfill dams, so as to facilitate comparison with the High Dam:

Dam	Country	Type	Height (m)	Size (million m <sup>3</sup> )	Capacity (billion m <sup>3</sup> )	Power (million KW)
High Dam	Egypt	Rockfill	111	43	164	2.100
Bestnurik	Russia	Rockfill	300	45	10.3	2.700
Firnas	Brazil	Rock/Earth	123	9.45	20.20	0.900
Miburn	Japan	Rockfill	126	7.90	0.32	0.215
Randlas/Malibaso	Mexico	Rockfill	130	6	12.50	0.900
Kitty	Canada	Rockfill	104	3.07	22	0.775
Infiernilo	Mexico	Rockfill	150	5.50	12	0.600

## 6. Achievements following the completion of the High Dam

### 6.1 Drought and flood protection in Egypt after 1964

In mid-May 1964 the flow of the Nile was diverted to the diversion canal. That year the flood was exceptionally high and dangerous. The hydrological year 1964/65 was the first year in which partial storage took place in the High Dam. The reservoir reached a level of 127.60 m. above sea level, with a storage of 9.62 billion m<sup>3</sup>. This storage was discharged gradually the following season until by 1 August 1965 it was completely drained so that the reservoir could receive the waters of the new flood. It was thanks to the High Dam that Egypt was protected from this flood which could have inundated 100,000 acres of land and which would have cost tens of millions of pounds to counter.

After 1964 there was a succession of low floods. In the 1965 flood the total charge reaching Aswan was 12.5 billion m<sup>3</sup> below average.

The 1966 flood was still lower with a charge of 20.3 billion m<sup>3</sup> below average and 15.8 billion m<sup>3</sup> below the notoriously low flood of 1941.

The input of the 1968 flood was also below that of 1941. In September of that year it fell below the record low flood of 1913, the lowest ever since monitoring of the Nile's levels was started.

Were it not for the storage of the High Dam lake, crops in those years would have been destroyed and large areas of productive land would have been ruined.

The 1972/73 flood was the lowest since 1913.

The following table shows the summer supply between 1 February and the end of July 1973 as against the effective requirements of each month:

Month	Total normal supply	Requirements
February	1.7 billion m <sup>3</sup>	3.7 billion m <sup>3</sup>
March	1.7 billion m <sup>3</sup>	4.0 billion m <sup>3</sup>
April	2.3 billion m <sup>3</sup>	3.8 billion m <sup>3</sup>
May	2.9 billion m <sup>3</sup>	4.9 billion m <sup>3</sup>
June	7.7 billion m <sup>3</sup>	6.4 billion m <sup>3</sup>
July	3.3 billion m <sup>3</sup>	6.8 billion m <sup>3</sup>
Total	14.6 billion m <sup>3</sup>	29.60 billion m <sup>3</sup>

If the 7.5 billion m<sup>3</sup> that would have been supplied by the country's yearly storage system were added to the above total, the total summer supply available for the hydrological year 1972/73 would have amounted to only 22 billion m<sup>3</sup>, which is 7.50 billion m<sup>3</sup> less than the effective requirements for that period. This would have resulted in severe losses in basin agriculture which extend over 900,000 feddans of land, the destruction of maize crops over 700,000 feddans and a reduction of the area under rice cultivation from 1.1 million to 200,000 feddans.

In 1972/, therefore, the High Dam protected the Egyptian national economy against a real loss of not less than LE 250 million. It also saved the country the foreign exchange which would have had to be spent on essential agricultural imports at a time when the country badly needed its hard currency for economic development.

Moreover there would have been considerable difficulty in filling the yearly storage reservoirs to full capacity considering the sudden fall in the flood waters of 1972. The reservoirs would have had to be replenished after the first ten days of September, when the flood waters were still thick with silt. This silt would have settled in the reservoir bed of the old Aswan Dam, with obvious effects on its limited capacity.

The year 1975 finally brought with it a particularly severe flood. Were it not for the strong bulwark of the High Dam, many houses would have been destroyed and towns and villages, people and animals, would have been swept away.

The level and discharge of this flood in September exceeded those of the 1946 and 1964 floods. Were it not for the High Dam the river level at Rawda in the second ten days of September would have risen to more than one metre above the tolerance point of river bridges.

Considering the fact that wages and prices had increased in comparison with earlier years of high flood, one can imagine the enormous sums which the Government would have had to spend in order to counter such a severe flood and to meet the ensuing losses and damages.

## **6.2 Conversion of basin irrigation to permanent irrigation**

The most significant achievement of the High Dam since coming into operation is in the economic advantages derived from the conversion of agriculture from basin to permanent irrigation. The total area under irrigation was 973,000 acres, of which 602,000 were entirely basin irrigated (371,000 under cereals and mixed crops). Shifting to the permanent irrigation system has resulted in the following improvements:

- 1) Growing two or three crops a year instead of one. This expanded cultivated areas by about 6 per cent.
- 2) By providing water to irrigate the fine maize crop at the different stages of its growth in adequate quantities and at the appropriate times, the High Dam caused the average productivity of the feddan to rise by 1.5 ardebs.
- 3) Early cultivation of winter crops became possible as there was no longer any need to wait for the flood water to subside.
- 4) Orchards could now be grown on converted lands. This had been impossible under basin irrigation.
- 5) Sugar cane cultivation could be expanded, thus making available the raw materials for expanding the sugar refineries of Upper Egypt.
- 6) The High Dam made a number of social and public works facilities possible. Villages and public utilities were connected by the new canal bridges which came to serve as roads, facilitating the transport and marketing of crops.

The revenues accruing to the national economy as a result of the transformation to permanent irrigation has been estimated at not less than LE 100 million a year.

## **6.3 Horizontal expansion of agriculture**

About 900,000 acres have been reclaimed by controlled discharges from the High Dam, thereby increasing the area under cultivation by about 14 per cent.

In addition to the substantial increase in national product brought about by this agricultural expansion, new work opportunities have been made available and foreign currency reserves have been saved either as the result of reductions in the import of some crops or through the export of surplus production.

## **6.4 Other achievements in agricultural development**

The following tables document the achievements of the High Dam in providing a stable and sufficient water supply to irrigate all the old and new lands, independent of monthly and yearly variations in the charge of the Nile.

This stability has led to a steady annual expansion in the area under cultivation and to improvements in crop structure. This in turn has led to considerable increases in vegetable and orchard cultivation, as well as in other crops, such as sugar cane, needed for national industrial and economic development.

The table below shows the total area under cultivation and its annual growth before and after the High Dam up to 1975:

Crops	1952	1961	1968	1970	1972	1974	1975
Winter crops	4364	4693	4929	4836	4911	4977	5072
Summer crops	3026	3527	4945	5051	5078	5109	5083
Nile crops	1824	1616	646	616	593	668	723
Orchard areas	94	138	225	243	249	272	285
Total area under cultivation in (1000 acres)	9308	9974	10745	10746	10831	11026	11163

The table below shows the development of national agricultural income from 1962 to 1975 (in million LE):

Year	Agricultural income (million LE)	Year	Agricultural income (million LE)
1962	461	1969	729
1963	484	1970	783
1964	557	1971	817
1965	612	1972	905
1966	670	1973	1020
1968	670	1975	1422

The table shows that in 1975 national agricultural income registered an increase of LE 938 million as compared with 1963. Full credit goes to the High Dam for achieving a total increase of LE 4307 million in national agricultural income since it started operation in 1964.

### 6.5 Achievements of the High Dam in power generation

The following table shows the power generated at the High Dam for the period beginning with the operation of the first turbines in late 1967 up to the end of 1976, as compared with the total output of all thermal and hydroelectric power plants in Egypt:

Power (billion KW/h)	1968	1969	1970	1971	1972	1973	1974	1975		Total
Total power generated	6	6.5	6.9	7.3	7.4	7.4	8.5	9.8	12.0	71.8
Power generated at the High Dam	1.5	2.4	3	3.4	3.7	3.8	4.5	5.0	6.0	33.3
Percentage generated at the High Dam	25	37	43	47	50	51	53	51	50	46

It is estimated that the annual increase in total power generated will be 14 per cent in view of the rapid increase in electricity consumption arising from the completion of rural electrification programmes and the expansion of aluminium, iron and steel mills, newly established fertilizer plants and oil refineries.

This means that the High Dam power plant will to be operated at full capacity to produce about 10 billion Kw/h of energy.

The total power produced by the High Dam since its first turbines began to function late in 1967 until the end of 1976 was 33.3 billion Kw/h. This is equal to a savings of about 10 million tons of fuel oil valued at that time at world petroleum prices at about \$ 800 million.

Thus the High Dam has achieved in practice what was previously a major national aspiration. It has achieved in addition many other goals that include the following:

- Improvement of navigation following the stabilization of the level of the Nile and major navigable canals.
- Creation of work opportunities for thousands of labourers. Employment in the High Dam and other associated projects from the beginning of the project to its completion reached 245 million worker/days.

- The inhabitants of Nubia were relocated to new settlements at Kom Ombo, which had been carefully planned and provided with the facilities and services essential for creating a new integrated community.
- Egypt was spared from the annual flood scourge; tourism was promoted to the ancient temples which had been moved to a new site away from the Nile waters.
- The creation of a new generation of engineers, technicians and skilled labourers with experience and qualifications in operating, implementing and managing major engineering projects. This by itself is a great asset of considerable value in the launching of such major works, not only in Egypt, but in Africa and throughout the Arab world.
- National income was increased as a result of the implementation of industrial projects associated with the High Dam, which would not have been established otherwise.

Finally it is significant to note that the revenue of the High Dam over a ten year period has been estimated at no less than LE 10,000 million, which is equal to 20 times its cost.

## 7. Side effects of the High Dam

Many things were said about the project to discredit it and belittle its value. Among these were what the critics called the "side effects of the High Dam".

To answer these criticisms and clarify matters, it is necessary to describe each of the so-called "side effects" and assess its magnitude. This is possible because of the empirical data collected by the Egyptian engineering specialists of the research institutes at the Ministry of Irrigation. These institutes were established as by-products of the High Dam and are manned by many scientists and research workers of unquestionable ethics capable of collecting and analyzing data with scientific objectivity and skill.

### 7.1. Total scour of the Nile and its threat to the land and to major irrigation works

In the early studies of the High Dam project, research workers anticipated scouring of the Nile River between Aswan and Cairo once the water began to flow out of the Dam almost free from silt, which would be trapped in the Dam basin.

Studies of total scour in Egypt began with the High Dam project report of the international committee of experts in 1954. The committee included the well-known American expert Lorenz Astrap, who is considered to be a top authority on this subject.

That report included passages on the problem of scouring and related studies. Here are some excerpts:

- 1) Each river has its special characteristics; it is, therefore, difficult to predict how scouring will affect the course of the river and the safety of the barrages built upon it.
  - The occurrence of scouring depends fundamentally on the speed of the water and consequently on the volume of the expected discharge from the High Dam.
- 2) The highest discharge anticipated for meeting maximum water requirements after the completion of the High Dam will still be within the margin of safety and should not disturb sedimentation on the river bottom and embankments.
- 3) In emergencies and in the case of successive high floods, the need to discharge extra quantities of water to the sea exists only as a remote possibility.
- 4) The experience gained from operating the old Aswan Dam, where relatively clear water flowed from its sluices six months of the year, enhances optimistic predictions of the anticipated scour on the completion and operation of the High Dam.
- 5) The possibility of scouring the Nile behind Aswan after the High Dam needs more research and study. In fact data on the Nile have been collected for decades, including information on sediment in the waters of the river. These studies should be continued and they should be complemented with other more detailed, more comprehensive and more extensive studies of the total river. In addition preventive measures should be taken to protect the barrages erected on the Nile between Aswan and the Delta.

In 1956 an engineering professor at Alexandria University conducted the first investigation into the anticipated total scour of the Nile between Aswan and Cairo with the aim of finding answers to the following questions:

- What is the maximum scour anticipated?
- At what rate is total scour expected to take place?

In his investigation the professor limited himself to theories and hypotheses, disregarding the fact that each river had its own characteristics. Hypotheses and theories that apply to one particular river may not apply to another. Consequently his answers to the above questions were extremely pessimistic.

He predicted that the constant slope of the Nile would be 1.36 cm/km and that the average depth would be 22 m., on the basis of an assumed discharge of 600 million m<sup>3</sup>/day.

He also estimated that total scour along the course of the river would reach 53 m, distributed among four locks at the rate of 14 m. each; that most of the scour would take place in the first two years after the beginning of storage in the

High Dam; and that the scour would reach its highest point in the four locks after the following periods:

Location	Distance between Locations (km)	Time to Reach Total Scour (years)
Behind the Aswan Dam	167	9
Esna Barrages	192	12
Naga Hamadi Barrages	180	11
Asyut Barrages	407	54

The professor's pessimism reached its nadir when he concluded in his report that the High Dam would turn into a lake at which the ancient Nile would end. A new delta would be formed starting from the lake's front and extending through it. At the same time total scour would cause the river to cut a new course for itself behind Aswan.

He added that the effects of scouring might not be confined to the main course of the river but might extend also to the river's tributaries. Later the professor revised his views after four years of operation of the High Dam. In 1970 he submitted a report entitled: "Considerations on the Problem of Scouring". The report presented estimates of scouring and the slope of the water along the entire river behind Aswan that were entirely different from his estimates of 1956.

He stated that the constant slope of the river attendant upon a discharge of 365 million m<sup>3</sup> a day at Aswan was 4 cm/km.

This meant that the average drop in the river bed behind each barrage would be 4-5 m. In the most favourable circumstances scouring would cause a drop of at least two metres in the river bed after five years of operation of the High Dam on a permanent basis and three metres after ten years.

The same scientist revised once again his estimates of scour. In 1976 he wrote another paper on the outcome of his further investigations at Alexandria University. The paper was entitled "Estimation of Expected Scour in the Light of Developments to Date".

His latest study revealed the following findings:

- 1) The actual drop in the river bed was one metre behind the Esna barrages, and 0.60 m and 0.70 m behind the barrages of Naza Hamadi and Asyut, respectively.
- 2) 83 per cent of total scour would take place within 17 years of the commissioning of the High Dam on a permanent basis, i.e. in 1985 when scour would reach 4 m. The period before final stability was reached, however, would be indefinite.
- 3) The extent of the drop in the river bed in the future would be as follows:
  - Between the Esna and Naga Hamadi barrages: 6.65 m
  - Behind the Naga Hamadi barrages: 8.40 m.
  - Behind the Asyut barrages: 0.60 m.

This was his extremely discouraging prediction of scour from the High Dam. It can best be countered by the findings of scour monitoring between the first operation of the High Dam and the present.

Ever since the river course was blocked in 1964, the river between Aswan and Cairo has been under careful observation. Its levels have been constantly monitored and samples of the river bed have been analyzed periodically.

With these and other data collected over time, it has been possible to assess empirically the actual scour in the bed between 1964 and the present, the drops in level corresponding to different discharges and the diminishing water slopes.

The following table shows the average annual scour at the various locks from Aswan to Cairo:

Sector	Length of sector affected by scour (km)	Annual average scour of bed (cm/year)
Aswan-Esna	72	2.20
Esna-Naga Hamadi	94	3.00
Naga Hamadi-Asyut	107	2.50
Asyut-Cairo	340	0.40

### **Protection of river installations against total scour**

Empirical evidence has shown that scour is actually taking place; but its progress is so slow that it does not constitute any danger to river installations as long as the discharges at the High Dam remain within the limits of practical requirements.

It is now fifteen years since the river was diverted in 1964 and about ten years since the High Dam began full operations in 1968. In the years that followed, the body of the Dam was completed and the basin irrigated lands, which needed high discharges to fill, were completely converted. The storage of all flood water in excess of irrigation requirements was started and discharges behind the Dam were limited to meeting these requirements, which never exceeded the volume of 230 million m<sup>3</sup>/day.

During those years the river's discharges differed widely as it registered a maximum 900 million m<sup>3</sup>/day in 1964, 500 million m<sup>3</sup>/day in 1965, 370 million m<sup>3</sup>/day in 1966 and again 500 million m<sup>3</sup>/day in 1967. In 1968 a new stage began as discharge remained within the limits of actual requirements, namely a maximum of 230 million m<sup>3</sup>/day.

On the basis of this experience and the studies, observations and data analysis set forth above in some detail, it can be safely said that scouring does not pose any danger now and will not pose any in the future as long as the Dam discharges are controlled so as not to exceed the limits of actual requirements.

However, the possibility of such danger remains with the possibility of high floods at times when the Dam's reservoir is full. In such cases it may be necessary to release higher discharges in order to lower the reservoir level and make room for the waters of one or several successive high floods.

In order to prevent such a dangerous eventuality, it was decided to proceed with the Toshky Depression project. The idea was to cut a diversion channel across the Western Desert between the High Dam lake and the Toshky Depression, passing through Toshky Gor 250 km south of the High Dam. The Depression would receive the surplus discharges of a high flood that came at a time when the High Dam reservoir was full. This scheme would make it no longer necessary to discharge heavy volumes of water over long periods of time behind the High Dam with its attendant risks of scour damage.

Toshky Ghor which opens onto and flows into the Nile is an ancient waterway. It is about 72 km long from its opening on the Nile to the beginning of the Toshky Depression. In the first 42 km its height above sea level ranges between 150 m by the Nile and 184 m towards the east. From the 42nd km to the edge of the Depression it tends to slope from east to west until it flows into the Depression at a level of 174 m.

The total capacity of the Toshky Depression is estimated at 120 billion m<sup>3</sup> at a level of 180 m. Its height above sea level ranges between 121 and 180 m. It is divided into two parts: the first has a capacity of 83 billion m<sup>3</sup> and is connected to the second part, which has a capacity of 37 billion m<sup>3</sup> through several gates at levels varying between 155 and 178 m.

The 22 km channel was designed so that the water flows freely into it when the level of storage in the High Dam lake exceeds 178 m. Its maximum discharge capacity is 250 million m<sup>3</sup> a day.

After the hydrological, geological and engineering studies were completed two years ago, work on the canal project was begun.

### **7.2. Sedimentation in Lake Nasser and effects of silt loss in the Nile**

Ever since 1929 the Physics Unit in the Ministry of Irrigation (then Ministry of Public Works) has been carefully studying the phenomenon of silt caught in the Nile waters and swept along with the floods from the volcanic lands of the Ethiopian plateau.

Since the old Aswan Dam had such a small capacity, every cubic meter of which was needed to store water for irrigating summer crops, the operation of replenishment had to wait until the floods receded and the silt content of the water dropped, lest the silt-laden flood waters deposit their silt in the Dam basin and consequently reduce its capacity.

Data were collected at Wadi Halfa 360 km south, and at Ja'afra 30 km north, of the old Aswan Dam. When the High Dam was completed, the silt monitoring station was moved southward to Dankala in the Sudan.

Through regular year-round monitoring and silt sample analysis, considerable data has been accumulated on both the quantity and quality of silt in the Nile waters, both in the flood months and when the river waters reach their lowest level.

The following table shows the monthly average of silt concentration in the river waters based on data monitored, collected and analyzed over a thirty year period.

Month	Silt concentration (1/1,000,000)	Weight of silt carried per month (million tons)
January	84	0.29
February	60	0.15
March	53	0.11
April	50	0.13
May	41	0.08
June	44	0.09
July	278	1.81
August	2820	56.22
September	2497	56.64
October	1032	15.54
November	294	2.15
December	121	0.53
Yearly Total		134

It appears from this table that silt concentration is at its lowest in May-June (less than 50/1,000,000) and at its highest during the flood season of August and September (over 2500/1,000,000). These ratios, however, are much lower than for some other rivers of the world, such as the Colorado River in America and the Yellow River and the North China River in China. While the yearly average silt load carried by the Nile is only 134 million tons, the Yellow River carries 19,000 million tons every year.

The question of sedimentation in the High Dam lake was dealt with in the project design study. The study took up two aspects of the problem. It concentrated on the effects of sedimentation on the Dam basin and on the effects of yearly silt deprivation on the nature of the soil and the harvests of riverine agricultural lands.

With respect to the problem of sedimentation in the lake, a dead capacity of 30 billion m<sup>3</sup> was allowed for receiving silt deposits and calculations were made to determine how many years would pass before further silt deposits began to eat into the usable capacity of the reservoir.

Simple arithmetic showed that the dead capacity would be quite enough to absorb the entire silt input — which as we have seen averaged about 134 million tons a year — for at least 500 years.

The German firm Hochtief estimated that the dead capacity of the High Dam would be filled in about 750 years, while the committee of experts called in by the Egyptian Government estimated that period at 500-900 years.

Sedimentation studies of the American Hoover Dam were similar to the High Dam studies in methodology. Actual sedimentation rates showed that the life span of the reservoir would be twice what the pre-operation predictions estimated.

### 7.3. Effects of silt deprivation on soil fertility

Research has revealed the following facts:

- Before the High Dam, the river carried 134 million tons of silt a year, of which 125 million tons were carried during the flood season. Most of this silt went into the sea leaving behind only 12 per cent, or 16 million tons, to settle on Egyptian soil.
- With the construction of the High Dam, the water discharged from Aswan became relatively pure, carrying only 3 per cent of the river's silt; i.e. only four million tons settled on the land annually.
- Therefore, as a result of the High Dam Egyptian soil has been deprived of only 9 per cent, or 12 million tons, of the silt carried by the Nile.

Other studies indicated that two thirds of this quantity, or 8 million tons, settled on basin irrigated lands during flood seasons.

This means that the remaining land areas were deprived of only four million tons of silt annually.

Investigations also dealt with the nutrient value of Nile silt, i.e. the proportion of nitrogen in its total organic content. It was found that the proportion of nitrogen was about 13 per cent of the silt mass, and that only one third of this was suitable as plant nutrient.

The conclusion was that cultivated Egyptian land lost only 1800 tons of nitrogen. This could be compensated for by about 13,000 tons of lime nitrate. Moreover there can be no comparison between the value of this small loss and the enormous returns of the High Dam project.

Silt was a problem even before the High Dam, not only in that it settled in canals, but also in that it restricted

expansion of the annual limited storage capacity. The High Dam eliminated that problem at a slight and tolerable sacrifice which is not even worth considering.

If some critics are still concerned over the silt deprivation to Egyptian soil caused by the High Dam, they should be reminded that many countries of the world without significant amounts of river-carried silt still manage to have abundant harvests.

Despite the loss of this small amount of silt nutrient the productivity of Egyptian land increased — thanks to the benefits that accrued from the High Dam, such as improved irrigation (the provision of water in adequate quantities and at the right time all year round) and improved drainage (the steady extension of covered and open drainage systems).

The comparison made in the following table clearly shows that production per acre of the main crops increased after the High Dam:

Crop	Unit	Production per acre	
		Before High Dam (averages for 1965-1966)	After High Dam (averages for 1970-1976)
Wheat	ardeb	6.75	9.01
Maize	"	9.10	11.95
Cotton	kantar	4.61	6.25
Rice	ton	2.11	2.22
Sugar cane	ton	38.49	36.77
Beans	ardeb	4.44	6.33
Barley	"	8.55	9.42
Indian corn	"	9.92	12.21
Peanuts	"	11.35	11.71
Flaxseed	"	3.32	3.98
Onions	ton	5.73	8.15
Lentils	ardeb	3.70	4.60
Chickpeas	"	4.27	4.86
Sesame	"	3.06	4.31

Among the other losses and damages that pessimistic investigators have imputed to silt deprivation were the reduction in the permeability of the soil and the suppression of soil bacteria, which would result in the reduction of the productivity of some lands.

The best rebuttal of this thesis was that of Dr. Mustapha Gabali, who explained that the silt settling on the soil was composed of very fine particles and that the continued accumulation of such colloids would result in negative consequences as these particles obstructed the processes of washing and drainage.

#### 7.4. Effects of silt deprivation on building materials

It is true that barring the flow of silt beyond the High Dam has deprived brickmakers of an important raw material: the silt that was dredged from river and canal beds in the wake of every yearly flood.

On the other hand in recent years there have been dangerous signs of erosion of agricultural land and undercutting of the banks of the Nile due to the extravagant utilization by brickmakers of the silt.

Through further studies and new measures this problem should be solved in the near future. In fact the National Production Council and the National Assembly have already adopted the following recommendations thereon:

- Continued exploration for argil deposits.
- Extraction and processing of clay for feeding brick kilns as an alternative to Nile silt.
- Implementation of projected clay brick and sand brick works in Cairo, Suez, Kina, etc., while introducing technologically modern production methods on a scale to meet the needs of national construction plans and eliminate dependence on Nile silt.
- Search for suitable substitutes for adobe bricks used in rural areas.

Studies have shown that large areas reclaimed by the High Dam project have gone to urban expansion, the construction of new industries and other facilities. This called for special legislation to ensure that urbanization and industrialization did not encroach on agricultural areas, and opted for the wide waste lands suitable for such development. This legislation provided for severe penalties for eroding fertile soil, which is Egypt's most precious national resource.

## 7.5. Losses from evaporation and seepage

It is natural that reservoir water anywhere in the world will lose some of its volume through evaporation and seepage. Storage efficacy is inversely related to such losses.

The details of these losses in the High Dam figured high among the aspects examined by hydrologists before determining the feasibility of the project.

Dr. Abdul Aziz Ahmad, an electrical engineer at the Ministry of Public Works, raised a storm in the late 1950's concerning the anticipated evaporation and seepage losses in the High Dam basin. He wrote a paper on this subject to the British Association of Engineers in which he expressed the following pessimistic conclusions:

- 1) The High Dam basin is connected to the water carrying Nubian sandstone strata in the Western Desert. This connexion will lead to losses between Halfa and Aswan through seepage at high levels.
- 2) In the first two decades of the High Dam's operation, it will only be possible to fill it up to the projected level by storing the entire input, as seepage losses will be as high as 27 billion m<sup>3</sup> per year when storage reaches 100 billion m<sup>3</sup>.
- 3) In the third decade of operation assuming that the High Dam was completely filled in some way or another, the average loss should drop to 18 billion m<sup>3</sup> a year; as by then the water-carrying strata would have become saturated and faults would have been partially sealed by silt deposited in the Dam basin.
- 4) After the third decade the average loss should fall to 17 billion m<sup>3</sup> a year.

In the light of these estimates, Dr. Ahmad urged that the idea of a high dam be dropped and replaced by a series of smaller barrages.

During the construction of the High Dam a team of international and Egyptian experts examined the question of seepage. They concluded that it would not be more than two billion m<sup>3</sup> at a height of 180 m. storage above sea level. They excluded the possibility of other than normal losses from the lake. However new absorption losses should be expected every time a new level is reached in the lake. Bedrock too should absorb water to saturation when submerged for the first time.

In fact these theoretical estimates exceeded by far the findings of on-site experiments undertaken between 1960-1964, when the porousness of the Nubian sandstone forming the lake bed and its banks was measured with the use of deep experimental bores. Experimental wells were drilled on both banks of the High Dam lake at three places: Hussein Shelf 100 km. from the Dam, Toshky about 240 km. from the Dam, and Wadi Alaqi 311 km. from the Dam. The total length of these wells 4616 m. Some were deeper than 10 m. below the river bed. Piezometers to gauge the pressure and the slope of the seeping water and to measure the permeability factor of the rocks at the banks of the lake were set up at each well mouth.

- A maximum of 970 million m<sup>3</sup> of seepage a year was estimated.
- When the water level rose to about 55 m. above the storage level of the old Aswan reservoir, no weak points could be detected through which water could seep at rates higher than the ones estimated.
- Surveys revealed the presence of pressurised substances that sealed the basin faults, rendering it less porous than the integral rock itself.
- After the river flow was diverted in 1964 a water balance was drawn up every year, estimating the actual losses of the High Dam by evaporation, seepage and absorption. It was found that over the past 12 years measured losses were less than anticipated. The details will be presented below.

### 7.5.1 Absorption losses

As a reservoir is filled, the rising level of the water is accompanied by a gradual saturation of the rock thus submerged. This is called absorption loss. When the water reaches its maximum level, however, all bank rock is submerged and saturation takes place. At that point, absorption loss comes to an end.

- Expected absorption at various storage levels was estimated.
- It appeared that about 53 billion m<sup>3</sup> of the High Dam waters might be lost by absorption during its first filling.
- Accordingly the estimated loss from the time that filling was started (1964) until the water reached its maximum level of 176.51 m. above sea level (November 1976) was about 38.50 billion m<sup>3</sup>.
- The actual recorded loss through absorption and seepage in accordance with the annual water balance was a little above half these estimates.

### 7.5.2 Evaporation losses

Studies which preceded the construction of the High Dam estimated this loss at a yearly average of about seven billion m<sup>3</sup>. This estimate was based on average annual evaporation figures at Aswan and Wadi Halfa taken at evaporation monitoring stations over several years before the High Dam. The estimates assume that lake storage is apt to fluctuate over many years between 148 m. and 175 m.

Year	Highest lake level (m)	Theoretical losses			Actual losses (Water balance method)			
		Seepage, absorption (billion m <sup>3</sup> )	Evaporation (billion m <sup>3</sup> )	Total theoretical losses (billion m <sup>3</sup> )	Lake yield (billion m <sup>3</sup> )	Lake discharge and storage difference	Total actual losses (billion m <sup>3</sup> )	Actual losses to seepage and absorption (billion m <sup>3</sup> )
1964	126							
1965	133,61	0,279	1,872	2,151	88,411	87,611	0,800	—
1966	140,74	1,022	2,308	3,330	71,422	69,662	1,760	—
1967	142,40	0,448	4,003	4,451	90,185	86,535	3,650	—
1968	156,50	6,836	5,466	12,302	73,768	66,598	7,170	1,704
1969	161,23	4,363	6,782	11,145	74,047	65,977	8,070	1,188
1970	164,87	4,251	7,822	12,074	77,258	68,324	8,934	1,111
1971	167,62	3,994	9,158	13,152	77,152	66,517	10,635	1,477
1972	165,26	—	9,587	9,587	58,050	45,145	12,905	3,318
1973	199,24	—	8,763	8,763	79,527	60,502	9,025	0,291
1974	170,61	4,878	9,694	14,572	84,934	70,465	14,469	4,775
1975	175,70	10,468	11,167	21,635	97,988	81,629	16,359	5,192
1976	176,51	1,929	12,443	14,372	68,964	54,820	14,144	1,701
Total		38,468		127,534			107,921	20,828

This table shows that theoretical losses exceeded actual losses by 18 per cent and that actual losses due to seepage and absorption were only 54 per cent of the estimated volume.

Since the beginning of storage in the High Dam losses have been calculated on a water balance at the end of each year. The three types of losses — evaporation, seepage and absorption — were compared with former estimates. The following table shows yearly figures over the past 12 years between 1965-1976:

## 7.6. Can the reservoir be filled to capacity?

In the discussion on seepage and absorption losses, mention was made of the furore created by a certain expert who predicted that these losses would be enormous and would make it impossible to fill the reservoir to its projected level and capacity. That pessimistic forecast was shared by others who thought that the filling process down the years would be too slow.

Such criticism shows ignorance of the purposes and mechanisms of the High Dam. The High Dam was built for the purpose of perennial storage, a system which stores the waters of high flood years for use in low flood years. Storage will therefore fluctuate and the water level will vary. Water in excess of the needs of Egypt and the Sudan will accumulate in the basin year after year to serve as a reserve to be used in times of shortage or draught. The rate at which the reservoir will fill up is, then, a function of the size of the floods that will follow the completion of the Dam — a quantity that cannot be forecast, as it depends on the amount of rainfall over the Nile's headwaters on the Ethiopian Plateau.

Fifteen years have passed since storage in front of the High Dam began in 1964. During those years the reservoir was progressively filled until eleven years later in October 1975 it reached the level of 175 m.

The reservoir has finally reached its full live capacity of 90 billion m<sup>3</sup> for the first time. This figure is over and above the Dam's dead capacity of 31.5 billion m<sup>3</sup>. This means that Egypt and the Sudan can receive their full share of Nile water for many years to come, even if a series of low flood years were to follow.

In December of the same year (1975) the contents of the reservoir climbed to around 12.5 billion m<sup>3</sup> for a level of 175.7 meters. In November 1976 this level rose to 176.51 meters as storage increased to 129 billion m<sup>3</sup> of water.

The following table shows the different levels registered by the reservoir from 1964 to the present:

Date	Highest Level (m)	Storage (billion m <sup>3</sup> )	Observations
1964	126.00	8.5	Partial storage took place in view of work in progress on High Dam.
January 1965	127.60	9.38	
January 1966	132.70	13.96	First total storage of flood waters.
February 1967	142.48	25.57	
December 1968	156.50	51.80	
October 1969	161.29	65.43	
December 1970	164.88	77.47	
December 1971	167.64	87.86	Year of exceptionally low flood led to drop in volume of storage.
November 1972	165.26	78.36	
December 1973	166.24	82.40	
November 1974	170.61	100.20	
October 1975	175.00	121.20	
December 1975	175.70	124.94	
November 1976	176.51	129.25	

In this manner, the views that predicted that Nasser lake could not be filled to capacity were proved mistaken.

## 7.7. Water quality and soil fertility

The flexibility introduced by the High Dam opened the way to radical changes in the traditions that bound Egyptian agriculture. For the first time in history Egypt became the master of the Nile instead of its servant. Now that irrigation water was available all year round Egyptians could gear the cultivation of different crops to the most productive schedule. Likewise crop distribution could now be improved.

Changes in the system of irrigation, crop rotation and agricultural seasons amounted to a genuine agricultural revolution for the betterment of the country's economy.

Accompanying all this were changes affecting the mechanics of the river and its waters. Among these were the following:

- Storage of the Nile's entire flow in the High Dam reservoir.
- Total control over water flow behind the Dam, assuring Egypt's effective agricultural, industrial, hydroelectric and other requirements.
- Entrapment in the reservoir bed of around 97 per cent of all sediment carried by the annual floods.

Accompanying the revolution in agriculture a radical transformation in the country's drainage system took place. The system was expanded to cover both Upper and Lower Egypt more intensively. Plans were adopted to cover all of

the country's agricultural land with a network of drainage canals before the end of 1985.

The electric power generated at the High Dam made possible an industrial resurgence which was accompanied by a construction boom all over the country and along the Nile in particular.

As a consequence of all this, scientists turned their attention to the study of possible changes brought about by the Dam in the quality of the Nile water and the fertility of the soil. Some of the opinions expressed thereon, however, were not theoretically and empirically well-grounded.

The question of water quality is an old one that has long concerned students of Egypt and the Nile. Scientists such as Todd, Nolte, Lenny, Mustafa Magdala, Figari, Salem, Richmonds, Lucas Hearst..., made numerous analyses of the Nile waters all along its course. Their findings have been published since 1877. After the High Dam was completed interest in this question passed to the Dam's builders, who continued and extended pre-Dam research and studies with their own indispensable scientific efforts.

#### 7.7.1 Water quality of the Nile's principal tributaries

It was noted above that the Nile obtains its yield from two principal sources: the equatorial lake plateau, via Baħr El-Gebel and Zeraf; and the Ethiopian Plateau, via the Sobat, Asbara and the Blue Nile rivers. The proportion of their average annual contribution to the total yield of the Nile is as follows:

Equatorial sources: 14 per cent

Ethiopian sources: 86 per cent

The following table shows the saline content of the Nile's headwaters according to analyses made in 1884:

Location	George	Lake Edward	Lake Victoria	Lake Albert	White Nile	Lake Tana	Blue Nile	Atbara River
Salinity (part per million)	270	360	120	540	170	170	170	170

The degree of salinity in the principal course of the Nile inside Egypt varied between 138 parts during the flood months and 200 parts/million just before the floods.

According to the laboratory reports of the Ministry of Health chemical analysis were made between 1902 and 1906 of samples taken from the Nile and its tributaries and from its waters near Cairo. The results were as follows:

Location	Lake Victoria	Baħr El-Gebel	Baħr El-Zeraf	Soubat River	White Nile	Blue Nile	Nile at Cairo
Salinity (parts per million)	134	164	220	70	140-199	103-106	124-260

The salinity of the different tributaries of the Nile varied between 234.7 parts/million at flood time and 260.0 parts/million immediately preceding each flood.

These figures are corroborated by analysis of water samples taken throughout the year 1927 near Cairo as follows:

Month	Sodium part/million	Hardness	Calcium oxide	Magnesium oxide	Sodium chloride	Sulphates	Ammonia protein
January	196.6	Zero	—	12.08	18.9	6.3	0.14
February	188.8	—	47.0	10.4	25.0	7.8	0.16
March	216.7	—	51.5	16.04	36.3	10.8	0.20
April	231.7	—	49.8	16.1	43.3	11.4	0.19
May	229.1	—	44.2	16.3	35.0	10.0	0.20
June	207.1	—	42.7	14.8	34.4	9.2	0.19
July	198.6	—	34.9		22.1	8.8	0.27
August	137.7	—	34.4	0.8	6.1	7.8	0.13
September	128.1	—	31.9	0.3	4.1	5.6	0.11
October	133.2	—	30.7	9.7	5.4	5.1	0.11
November	135.8	—	32.1	10.1	7.1	4.7	0.14
December	154.0	—	36.7	11.4	13.6	6.2	0.13

From this table it can be seen that the saline content of the Nile waters reaches its minimum in September (128 parts/million) and its maximum in April (232 parts/million). Similarly analysis of the Nile waters near Cairo in 1963, before the High Dam could have had any effect on water quality, revealed a saline concentration varying between 162 parts/million in August and September and 216 parts in July. The major elements were as listed in the following table:

Month	Sodium (parts/million)		Calcium		Chlorides		Sulphates		Silicates	
	Maximum	Minimum	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
January	182	198	28.8	26.0	15	12	16.0	9.2	20	20
February	19	209	28.8	26.4	18	15	14.4	10.3	24	16
March	19	208	37.6	28.0	0	17	12.8	9.2	24	24
April	17	204	28.8	22.4	13	20	14.2	10.4	24	24
May	182	202	34.4	27.2	20	18	20.2	9.6	24	24
June	176	188	34.4	27.1	21	18	13.2	6.8	18	18
July	204	216	25.6	21.6	28	15	12.4	6.2	6	6
August	193	172	29.6	29.6	16	11	12.4	7.9	10	10
September	192	182	24.8	20.0	12	7	16.4	13.8	20	20
October	162	172	25.6	21.6	9	7	13.1	9.1	18	18
November	172	178	27.2	21.6	13	9	12.2	9.5	21	20
December	160	180	24.8	20.0	13	7	10.0	9.0	18	18
Averages	177	192	29.2	24.3	17.3	13	12.7	9.6	18.8	8.1

In a lecture entitled "The Future of Agriculture after the High Dam" delivered in 1965 Dr. Mustafa Gabali called for a comparative analysis of the Nile water before and after the High Dam. He stated that its saline content at that time, before the High Dam could have had any effect on water quality, was 138 parts/million during the flood season and 191 parts during the dry season. The relative composition of the different elements was as follows:

	Flood season (parts/million)	Dry season (parts/million)
Calcium	23.6	28.8
Magnesium	8.8	6.9
Potassium	25.22	11.6
Sodium	5.5	3.7
Nitrates	16.4	5.1
Phosphoric Acid	0.4	0.4

### 7.7.2 Water quality after the High Dam

In an attempt to answer the questions raised on the effects of the High Dam on water quality, Dr. Mustafa Gabali in the same lecture stated that, if reservoir evaporations were assumed to be 10 per cent per annum, the saline content of the water would gradually increase to a point of stability (where the decrease resulting from annual discharge balanced the increase resulting from evaporation). He predicted that the saline content of the reservoir would rise to 235 parts/million as soon as the reservoir was filled. It would then continue to increase though at slower rates depending on the annual discharge and the size of each flood. He claimed that a concentration of 235 parts/million was not harmful. The maximum degree of concentration to be reached by the water in succeeding years and the time it would take for stability to be established would have to be calculated.

The saline content of the reservoir water in May of the last three years just before flood time, was respectively 175, 151 and 146 parts/million. Before the High Dam the figure was around 138 parts at flood time and 200 parts just before flood time as stated above).

The following table shows the saline concentration in the reservoir before the floods for the years 1975-1977 at different depths below the surface to 60 meters as recorded by the High Dam Authority chemical lab at Aswan:

Depth	Saline content (parts/million)		
	25.5.1975	25.5.1976	25.5.1977
Surface	175	151	145
10 metres	169	151	149
20 metres	175	142	145
30 metres	166	152	146
40 metres	176	157	147
50 metres	179	150	146
60 metres	175	154	141

#### N.B.

- (i) The average pre-flood saline concentration of the water is at present much lower than it was before the High Dam.
- (ii) If the change in the salinity of the water during the floods is used as the basis for determining the effects of evaporation on saline concentration in the waters of the reservoir, the result is a 3 parts/million increase to 1975 followed by a drop to 1 part/million to 1977.

As for the quality of the water at Cairo, the analysis of samples taken in 1972 and 1975 (eight years and eleven years after the beginning of storage in the High Dam reservoir) shows that the annual average saline concentration was 198 parts/million in 1972 and 170 parts/million in 1975. The proportion of calcium, sulphurs and magnesium in the different months of 1972 were as follows:

Month	Salts (parts/million)	Calcium oxide (parts/million)	Magnesium oxide (parts/million)	Sulphurs	Chloride
January	211	12	58	—18	—26
February	198	16	53	22.5	21.5
March	190	18	55	22	20
April	207	10	53	26	18
May	207	10	—63	—15	20
June	181	18	52.5	11.2	18
July	168	12	46	14.5	—16
August	177	12	42	—18	15.5
September	181	14	47	17.5	19
October	237	16	61	—17	—15
November	207	16	62	17.5	27.5
December	221	16	61	20	28

In the past water quality studies of the Nile were restricted basically to the comparison of data taken at Cairo. At present, however, the Egyptian Ministry of Irrigation monitors water quality in the High Dam reservoir and all along the course of the Nile down to Cairo, in an effort to examine the effects of the development of irrigation and drainage and the spread of construction and industry on water quality. Monitoring the Nile between Aswan and Cairo produced the

following findings:

- 1) The saline concentration of the water 30 km. downstream of the Dam was 178 parts/million.
- 2) Salinity increases to reach its highest value (208 parts/million) behind the Naga Hamadi barrage; it decreases to reach its minimum value (168 parts) behind the Asyut barrage and increases again to reach 206 parts/million at Cairo.
- 3) The degree of salinity in the drainage canals varies between 192 and 174 parts/million. The canal water with high degrees of salinity, however, never surpasses 0.5 per cent of the salinity of the Nile waters at their point of junction. The effect of increases in salinity at the junction points, therefore, is negligible.

#### Conclusions

- 1) All chemical analysis of the waters of the Nile before and after the High Dam, as shown in the examples above, have shown that the alkalinity, salinity and hardness of the water have not changed appreciably and that up to now the storage of the Nile's waters in the High Dam has had no effect on the quality of the water and its suitability for all uses.
- 2) The degree of salinity of the High Dam storage waters may increase gradually at the rate of 1 to 3 parts/million per year. This slight increase, however, will not be continuous. It is expected that the normal operation of the High Dam will empty the reservoir three times a century. In consequence, the salinity of the water in the reservoir will fluctuate back and forth rather than increase continuously. It will, therefore, remain suitable for all uses.
- 3) The effects of storage on the water quality of the Nile are negligible when compared with the effects of industrial waste and the spread of construction. A stop must be put to the dumping of untreated wastes into the Nile so as to protect the quality of its water from pollution.

The seminar held by Asyut University in April 1977 reached similar conclusions, which can be summarized as follows:

The salinity of irrigation water at Cairo has increased as a result of the disposal of industrial wastes and other pollutants into the Nile. The degree of salinity, however, has remained below 300 parts/million, leaving the water suitable for all uses, as the degree of salinity remains acceptable up to 500 parts. It would take 100 years for the Nile to reach that threshold, and it is expected that the Nile's salinity will have stabilized at a lower figure long before that period.

#### 7.8. Silt and soil fertility

Egypt is a desert country whose arable land was formed over thousands of years by the accumulation of silt loosened by the torrential rains on the Ethiopian Plateau and carried down with the flood waters of the Nile to be deposited over Egypt's flat terrain when the river subsided.

This phenomenon continued for thousands of years until a natural balance was reached and the river began to carry most of this sedimentary material across Egypt and into the Mediterranean, leaving only a small quantity to find its way through irrigation canals, or settle down on the canal beds or over agricultural land.

Over many years before and after the erection of the High Dam the silt concentration of the Nile waters was a subject of serious study. The following table presents a comparison of the average silt content at Gaafara (behind Aswan) before the Dam was built (1958-1963) with the average for the years following the Dam (1968-1976).

Period	Degree of silt concentration in Nile waters at Gaafara (parts/million)											
	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Pre-dam average: 1958-1963	64	50	45	42	43	85	674	2702	2422	925	124	77
Post-dam average: 1968-1976	44	47	45	50	51	49	48	45	41	43	48	47

This table shows that it was the high silt concentration of the flood months (July, August, September and October) that decreased after the operation of the High Dam; the concentration for the remaining months remained fairly much the same. The quantity of silt of which agricultural lands were deprived as a result of the High Dam is estimated at around 4 million tons per annum (basin areas excluded). If this quantity were spread evenly over this area of land, it would be no more than one millimeter thick.

The chemical composition of the silt has also been a subject of study for over a hundred years.

In a report in the archives of the Scientific Institute, Dr. Mustapha Magdali states that in 1977 he attempted to determine the organic content of Nile silt and discovered that the organic content was insufficient for plant growth in

Egypt — one of the most fertile lands in the world. The fertility of Egypt's soil, therefore, has to be explained otherwise — such as by the decomposition of roots in the soil, which produces ammonia, and the presence of carbonic acid in the Egyptian atmosphere.

These findings support the analysis made of the Nile silt that makes up Egyptian soil. The following is a comparison of such analysis made in 1925 and 1963:

Element	Percentages			Remarks
	1925 Analyses	1963 Analyses	Average	
Calcium	2.97	4.61	3.79	A third of which is suitable for human nutrition.
Magnesium	2.07	3.68	2.87	
Sodium	1.35	2.07	1.71	
Potassium	44.0	0.82	0.68	
Iron	4.0	9.01	6.50	
Nitrogen	0.13	0.12	0.13	
Phosphorus	0.05	0.08	0.06	
Manganese	0.17	0.15	0.16	
Zinc	—	0.03	0.03	
Copper	—	0.03	0.03	

Accordingly, the quantities of nutrient silt elements lost to each feddan are as follows:

Nitrogen 1.3 kg. (0.04 kg. of which are plant nutrient)  
 Phosphorus 0.6  
 Potassium 6.8  
 Manganese 1.6  
 Iron 0.3

In reality, these proportions though minute did not decrease; they increased with irrigation water. Asyut University confirmed this finding when a seminar on the effects of the High Dam on the fertility of the soil concluded as follows:

The post-Dam drop in the silt concentration of irrigation water has as yet had no negative effect on the fertility of agricultural soil as had been predicted. On the contrary, the variations in irrigation water increased after the High Dam, as did the proportions of nitrogen, phosphorus, potassium, iron, manganese, calcium, etc.

This scientific finding needs no comment. The empirical evidence speaks for itself.

#### 7.9. Salinity and groundwater level

A body of opinion holds the High Dam responsible for the increase in salinity and the elevation of the groundwater level in some areas, attributing these problems to the absence of the washing action of the flood waters.

In fact this problem has nothing to do with the High Dam. It appeared before the Dam was erected. Some scientists attributed it to an elevation of the groundwater level resulting from the elevation of the water level of the Nile and its tributaries at flood time, which disturbs the normal levels of salinity, alkalinity and oxygenation needed for plant growth.

If the High Dam has overdone its job, it has been in providing water for irrigation all year round from its huge reservoir. It is the misuse of its storage and the uneconomical use of its waters that has made this problem more prominent. When the groundwater level rises gradually in more and more areas, the water, particularly through capillary action, lifts saline substances to the surface. There evaporation leaves these substances behind in ever greater concentrations, thereby increasing the salinity of the soil.

The reclamation of new lands in elevated areas coupled with the extravagant use of irrigation water and the absence of drainage has led to the elevation of the groundwater level and the degree of salinity of lower-lying areas year after year.

This opinion, which is the result of much study and observation of this phenomenon, is shared by leading international experts on the subject.

The solution to the problem consists in the expansion of existing extension programmes in the proper use of irrigation water and the limitation of wasteful practices. In fact efforts to date have already produced fruitful results. Experience has also shown and World Bank reports have certified that the expansion of open and covered drainage

systems to service the agricultural areas of Egypt will raise productivity for all crops by at least 30 per cent and that returns therefrom can be expected to come in the year of execution.

As a result of extension programmes in irrigation water use and the reduction of wasteful practices by about 90 per cent, there was a drop of over one meter in the level of many drainage canals and consequent drops in groundwater levels.

These findings are based on empirical evidence. The continuation of extension programmes in irrigation and the continued expansion of open and closed drainage will be sufficient to stem the deterioration of the quality of Egypt's agricultural soil.

What is left when all the major doubts concerning this great project have been rebutted? There only remain a number of minor criticisms that are easily answered and that are included herein only for the sake of comprehensive coverage of all the possible side-effects of the High Dam.

#### **7.10. Erosion of the Egyptian coastline**

The erosion of the Egyptian coastline is an old phenomenon that antedates the High Dam. It is due to the wear and tear caused by the waves on Egypt's seashore. Precautionary measures have been taken to stop the erosion of the shoreline. The Netherlands have confronted a similar problem with a drastic remedy. Egypt should in any case continue to monitor the situation and undertake studies for the construction of the necessary preventive installations on the coast.

#### **7.11. Spread of Malaria and endemic diseases**

Some critics have expressed concern over the possibility of the spread of malaria, bilharzia and other endemic diseases. The response is that studies to date have indicated that the reservoir of the High Dam is clear of any trace of malaria carrying insects. Bilharzia on the other hand is a disease that became endemic in the Delta region with the introduction of the perennial irrigation system. Preventive measures have long since been in effect to combat it. At present the latest scientific methods are employed in combating bilharzia. The agreement with the World Bank provides that a portion of the funds assigned to covered drainage projects should be used for combating bilharzia in the areas concerned and especially in the basin areas transformed into perennial irrigation.

#### **7.12. Loss of Egypt's sardine schools**

Some have complained that the High Dam has deprived the sardine schools of Egypt of the silt nutrients that were carried by the flooding Nile waters and deposited on the shores of the Delta. The result was the migration of the sardines to other shores. What the critics forget is that the High Dam has created a huge lake of 6,000 m<sup>2</sup> which has been filled with a sizeable fish population and which is expected to produce around 25,000 tons of fish per year. Furthermore, there have been some indications that the sardines are returning to a number of shore areas and modern fishing fleets will follow them to their new beds.

The above has dealt with what has been said concerning the High Dam and its side-effects — their magnitude, their nature and their impact on the Egyptian environment. In addition, however, there are a number of social aspects that must be considered to complete the picture; for they represent an impact of the High Dam on the Egyptian environment that has not had its due share of attention.

#### **7.13. Wasteful irrigation practices**

These practices have become widespread since the operation of the High Dam. The Dam, however, did not bring them about. Responsibility falls on the Egyptian **fellah** who became careless when he discovered that he had an abundant and continuous supply of water for his irrigation needs in contrast to the past, when the six months of dryness each year had made necessary a considerable amount of discipline, restraint and precision in the distribution of water.

After the Dam the factors calling for restraint and precision on the part of the engineers responsible for water distribution and the **fellah** anxious to secure his needs disappeared, to be replaced by public pressure for a continuous supply of water without any supervision of its use.

The result was the onset of wasteful practices which at times exceeded crop needs by over 5.7 billion m<sup>3</sup> and even exceeded the economic requirements of certain crops threefold.

The effect of this waste was the elevation of the groundwater level with its attendant impact on soil fertility and on the limited capacities of drainage and irrigation networks.

Efforts to meet this serious problem began in 1975 with greater control over discharge at the High Dam, intensified extension services and improvement of drainage and irrigation facilities. In one year wastage was reduced by over 70 per cent. The rate of expansion of open and closed drainage canals, which were to cover the entire country by 1985, was doubled.

#### **7.14. Conflicts over water use**

Before the High Dam killings and assaults in Egypt always increased appreciably in the summer months when the need for scarce irrigation water became more intense and precipitated conflicts among **fellahin** competing for its use. In fact 50 per cent of all crimes were related to irrigation water disputes.

This phenomenon disappeared after the High Dam went into operation and water became plentiful and assured at all times.

In the basin areas of Upper Egypt (one million feddans), where the land could only be watered once and only one crop a year could be sown, the **fellah** remained idle and virtually unemployed for the rest of the year. Consequently tribal disputes and other problems related to idleness proliferated in the Egyptian countryside.

The transformation of these lands to perennial irrigation and the planting of three crops a year changed the life-style of the Egyptian countryside to a more normal, more solid and less violent pattern and gave the **fellah** the opportunity of a more secure and stable existence.

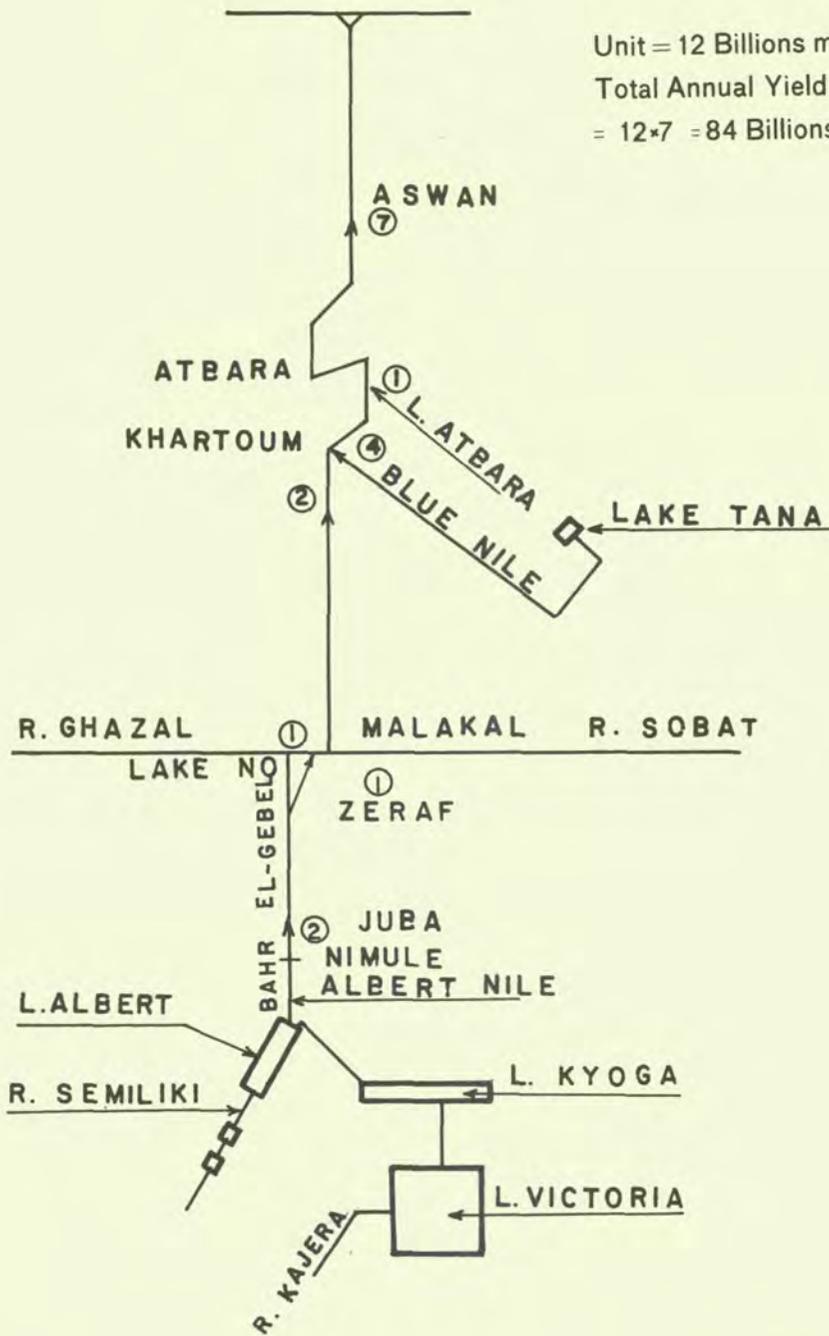
#### **7.15. Emergence of aquatic weeds**

The reduction of silt in the waters of the Nile increased the amount of sunlight reaching the beds of water courses, thereby providing the conditions for the growth of plants and weeds on a scale unknown in pre-Dam times. New forms of weed, including the floating and the fully and partially submerged strains, emerged in great densities and spread out over around 70,000 km. of water-course beds and banks.

In fact before the Dam there was the problem of clearing 80 million m<sup>3</sup> of water courses of silt every year so as to maintain their full capacities. The clearing was done by hand and with dredgers.

With the disappearance of silt, the silt problem was replaced by the problem of weeds. An institute for the study of aquatic weeds was quickly established for the purpose of studying their different characteristics and types and the different ways of exterminating them. Complete control over this problem was achieved. A permanent plan was set forth in which manual, mechanical, chemical and biological methods would be used as needed. In any case, the cost of weed fighting is balanced by improvement in irrigation and drainage capacities, reduction in water losses and improvement in irrigation schedules.





A SKETCH SHOWING THE NILE  
 YIELD FROM DIFFERENT TRIBUTARIES

**PRESENT TRENDS OF INDUSTRIALIZATION AND URBA-  
NIZATION  
AND THEIR ECONOMIC, SOCIAL, AND ENVIRONMENTAL  
IMPLICATIONS**

by  
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## Present trends of industrialization and urbanization and their economic, social, and environmental implications

### 1. Pattern of industrialization in ECWA countries<sup>(1)</sup>

The pattern of industrialization in ECWA countries cannot be defined and determined on the basis of the goals set by the development plans of these countries. This is because these plans usually involve such a number and variety of strategies that it appears as if the plan is seeking to implement a number of alternative strategies at once, rather than a single alternative. This can be explained by the fact that the industrial sector has so many weak points that there are many goals that must be realized to bring it up to the standard of advanced countries. Consequently, plans contain provisions designed to help achieve all these goals: import substitution, processing of local resources, promotion of linkage of the industrial and agricultural sectors, development of intermediate and heavy industries.

Since we are concerned with defining the actual pattern of industrialization, rather than analyzing and evaluating development plans, we must examine the accomplishments of the industrial sector. A careful examination of the structure of manufacturing industries shows that the common industries are consumer industries which in 1972 constituted the following proportions of the production sector: 74 per cent in Egypt, 79 per cent in Syria, 64 per cent in Iraq, 51 per cent in Jordan and 50 per cent in Saudi Arabia. Industries producing food-stuffs, tobacco, textiles, leather and shoes contributed the following proportions of the production sector in 1974: 69.3 per cent in Egypt, 46 per cent in Jordan and in 1975: 65.5 per cent and 56.5 per cent in Syria and Iraq, respectively.<sup>(2)</sup>

The comparative importance of intermediate and capital industries in Iraq, Jordan and Saudi Arabia is attributed to the fact that, due to the limited growth of the manufacturing industries in these countries, it is sufficient that there be a few simple industries that are classified as intermediate (such as cement) or capital (such as the manufacture of truck chassis and vehicle bodies of different kinds, and the repair of machines and cars), in order that the proportion of their contribution to the production sector rise, even though these industries are far from the complexity and importance of corresponding intermediate and capital industries in advanced countries.

It can be deduced from the above that despite the differences in the importance of the industrial sector and in the availability of the components of industrial development among ECWA countries, a scrutiny of the industrial structure of these countries reveals that consumer industries occupy a dominant position in them all. It might seem that this structure is not the result of deliberate economic design, but rather the natural outcome of the conditions of these countries as newcomers to industrialization and of the two variables which determine the scope and the nature of industrial development opportunities, namely the population and the per capita income. However, this is not true. Some of the ECWA countries, such as Egypt and Syria, are not newcomers to industrialization. Moreover, the economic policies of ECWA countries were aimed at achieving import substitution of industrial products, especially consumer goods. However, the strategy of import substitution has stamped certain features on the industrial sector which were not originally envisaged by these countries and which have a negative impact when considered from an overall viewpoint.

**Structure of Manufacturing Industries  
in some ECWA Countries  
1972**

Country	Consumer Industries %	Intermediate Industries %	Capital Industries %	Total
Egypt	74	16	10	100
Syria	79	18	3	100
Iraq	64	16	20	100
Jordan	51	25	24	100
Saudi Arabia	50	15	35	100

**Source :** Arab Industrial Development Magazine, the Evaluation of Industrialization Policies in the Arab World, pp. 33, 37.

(1) The Council for Arab Economic Unity, Industrial Production Administration, Preliminary report on industrial production development in the countries of the Arab Common Market, a study submitted to the Arab Industrial Co-ordination Committee at its session in Amman, 25-29/11/1979—Tables 5, 7, 9, 13.

(2) Idem.

## 2. The Main Features of the Pattern of Industrialization in ECWA countries

Most ECWA countries have adopted a generally protectionist system to promote import substitution efforts. The basic features of this system are high tariffs on imported consumer goods, in addition to occasional administrative restrictions, while intermediate and capital goods are completely exempted from tariffs or else subject to only slight duties. The original objectives of such policies were to encourage industrialization, secure revenues for the state and ease the pressure on the balance of payments in countries with hard currency problems. Such a protectionist system means the adoption of an industrialization pattern of import substitution, especially in terms of consumer industries. This pattern has stamped a number of features on the industrial sector, the most important of which are:

**A. Emphasis on Consumer Industries:** The imposition of high tariffs on consumer goods, and low tariffs or none at all on intermediate and capital goods attracts investment to the first category since the investor realizes that his products are protected from the competition of foreign goods in proportion to the level of the tariff. On the other hand, the investor is scared away from the field of intermediate and capital goods by the small or nearly non-existent protection, except for transport costs which have become meagre with the development of means of transportation, especially shipping. Even this mild form of protection, which is due to transport costs, vanishes partially or completely when raw materials are **imported**. It is also noteworthy that volume restrictions are sometimes imposed on the import of consumer goods, which gives consumer industries total or near-total protection.

All these considerations generally encourage the investor of the private sector, or the official managing an industrial establishment of the public sector, to invest in consumer industries and to avoid investment in intermediate and capital industries, a trend which creates a gap in the industrial structure, as we have seen previously.

Consequently, the industrial imports of ECWA countries are basically intermediate and capital goods. However, within the scope of this general statement, distinction should be made between different countries to the extent that they have been successful in import substitution. Egypt, Syria and Iraq have covered considerable ground in this direction. As a result, consumer goods imported by Egypt in the 1968-1973 period only constituted 13.9 per cent of total imports (11.1 per cent non-durable consumer goods and 2.78 per cent durable consumer goods), whereas intermediate goods, capital goods, raw materials and fuel made up 36.9 per cent, 21.5 per cent, 19.5 per cent and 6 per cent of imports, respectively.<sup>(1)</sup> In Syria imports of consumer goods, intermediate goods and capital goods in 1955 were 1.6 per cent, 51.2 per cent and 23.5 per cent of imports, respectively.<sup>(2)</sup> As for Iraq the corresponding ratios for 1971 were 12 per cent, 13 per cent, and 38 per cent respectively.<sup>(3)</sup>

It is only natural that imports of consumer goods in countries which are new in industrialization (such as the two Yemens, Saudi Arabia or Kuwait) should constitute an important proportion of imports.

Two very important facts should be kept in mind. The first is that despite the relative unimportance of imports of consumer goods, these imports impose a burden on the trade balance which cannot be ignored. The second fact is that despite the concentration of industrialization in ECWA countries on the production of consumer goods, local industrial production is still unable to meet the basic needs of the lowest-income groups due to the gap between the characteristics of this production and the purchasing power of those classes. Evidently, most Arab countries conform to this generalization, even in the simplest of industries: textiles and shoe-making.<sup>(4)</sup>

### B. Pressure on the balance of Payments

The existing protectionist system encourages the establishment of consumer industries which depend to a large extent on imported intermediate goods, or in other words industries in which the ratio of the imported input to the production unit is high. These are "final touch" industries, to borrow a term from Hirschman, which are capable of realizing a good profit margin in return for very little added value. The equipment and machinery needed for these industries is also imported. In addition, local industries are sometimes established with a production capacity that exceeds import levels in order to cope with the increased demand that could be generated due to the establishment of local industries and under the impact of the "demonstration effect". This means the importing of large quantities of intermediate goods. Finally, the increase in income arising from growth, particularly from industrialization, generates demand for new consumer commodities which require the importation of a large proportion of the inputs needed. The present protectionist system and its consequent pattern of industrialization lead to a rapid growth of imports of intermediate and capital goods, in contrast with a decline in imports of consumer goods. Evidently, in many cases this contrast imposes a burden on the balance of payments since the rise in imports of intermediate and capital goods exceeds the savings accrued as the result of the establishing of consumer industries which produce import substitutes.

In any case, the import structure arising from the substitution of consumer goods definitely confronts the ECWA countries with difficult choices in seeking to cope with the large deficits over the years in the balance of payments.

(1) M. Girgis, *Industrialization and trade patterns in Egypt, 1961*, p. 155.

(2) *Evaluation of Industrial Development Experiment in Syria*, p. 102, in the *Arab Industrial Development*, a bulletin issued by the Industrial Development Centre of the Arab countries, January 1977, pp. 97-110.

(3) *Evaluation of Industrial Development in Iraq*, p. 80, in the *Arab Industrial Development*, a bulletin issued by the Industrial Development Centre of the Arab countries, January, 1977, pp. 74-94.

(4) See Dr. Majid Masoud, "Requirements Towards Meeting Basic Needs of Limited-income People" a study presented at the Seminar on New Development Concepts and Strategies and their Reliance to the Arab World, Damascus, May 19-22, 1979; pp. 16-17.

Relieving the pressure on the trade balance requires either a decrease in imports of intermediate goods, which means a decrease in the proportion of benefit derived from the existing production capacity, or a decrease in capital goods imports, with the consequent limitation of capital formation. A third alternative would be the limiting of imports of foodstuffs, which are increasing yearly due to the inability of the agricultural sector to meet the growing needs of the population.

### **C. Resource Allocation Bias**

Investment funds are attracted to consumer industries which put the final touch on imported intermediate goods because these industries give high profits. This, in reality, is taking place at the expense of investment in the country's real natural resources, even though the latter could, from the national economy viewpoint, give greater benefits than investment in consumer industries.

Likewise, the imposing of low tariffs on capital goods or their total exemption from tariffs makes capital (machinery and equipment) available at a low cost, compared to labour, especially since the official rates for local currency are higher than the actual rates (social). This state also influences investors, be they of the private sector or decision-makers of public institutions, to choose capital intensive techniques whereas rational resource allocation would have called for the use of less capital intensive techniques, in order to create greater employment opportunities.

### **D. Adverse effect on work performance**

High tariffs allow producers to function in isolation from foreign competition; this eliminates the positive effect of competition represented by efforts to raise productivity. In this situation, the national economy is plagued by production at low capacities and consumers are plagued by the high prices of locally-produced goods which enjoy protection.<sup>(1)</sup>

There are three distinct groups of industrial goods in ECWA countries which have guided economies:

- Goods produced by the public sector which are considered essential (such as textiles in popular demand in Egypt, or sugar and vegetable oils in Syria). The state sets the prices of these goods below production cost.
- Luxury industrial goods, the prices of some of which are set at high levels to ensure profits, while price levels of most others are left to be determined by market factors. These goods are usually produced by the private sector.
- Other industrial goods with prices set to achieve reasonable profit margins (10-15 per cent). These goods could be produced by both the public and private sectors. This method of setting prices cannot be called the 'cost-plus-profit-margin' method unless it is viewed from an historical angle because, with the exception of projects which produce vital goods, the only projects which are included in development plans, in principle, are those estimated capable of producing goods at competitive prices.

If the private sector produces goods which are the same as those produced by the public sector, these goods are subject to the same pricing, even though the private production costs might be less due to the keen mercantile ability of the private sector or to its flexibility and speed in decision-making. This price-fixing policy supports the import substitution pattern by not providing incentives for industrial plants to raise their productivity levels.

Actually, there are justifications for the protection of newly-established industries during the first stages of their operation, but this protective tariff must be gradually reduced to motivate producers to increase productivity and to provide consumers with goods at reasonable prices, competitive with similar foreign goods available on world markets. Consequently a part of the local production can be exported, thus infusing the trade balance with hard currency. In practice, the customs protection is maintained.

### **E. Non-Innovative Industrial Sector:**

This import substitution pattern leads, by definition, to the creation of an industrial sector that is non-innovative in terms of both the quality of goods produced and the technology used.

This pattern involves the local production of goods which were mostly imported from industrial countries, and were designed originally to meet the consumption demands of these countries. Such goods are in strong demand among high-income groups in the ECWA countries. Their production locally increases and intensifies the demonstration effect, thus increasing demand for them. In addition, the imported means of production for these goods represent a technology that is based on the relative availability of production factors in the industrial countries, irrespective of the extent of compatibility with the available factors of production in the ECWA countries. Under such circumstances, it is difficult for the industrial sectors of these countries to produce these goods at competitive prices compared to advanced countries, except in cases when they have the advantage of distinctive features of very great significance.

### **F. Difficulties of Penetrating World Markets**

In view of all that has preceded, it is difficult for industrial products of ECWA countries to penetrate world markets. Consequently, industrial exports of Syria in 1975 represented only 11 per cent of exports, and 2 per cent in Iraq in 1971 (while petroleum exports were 96 per cent of the total exports). Industrial exports in Egypt were 12 per cent of exports

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(1) A number of Latin American countries experienced this along with most of the characteristics associated with industrialization in ECWA countries. UNITED NATIONS, *The Process of Industrial Development in Latin America*, New York, 1966.

(not counting textiles).

It is noteworthy that some countries of the ECWA region, such as Egypt, Syria and Iraq have in recent years started to give increasing attention to the industries of the second stage of the import substitution pattern. This is being done by the establishment of a number of intermediate industries which will basically market their products locally, but this effort has been on such a limited scale that it has not made any appreciable impact on the structure of the industrial sector.

### 3. The Under-utilization of Existing Production Capacities

The under-utilization of existing production capacities, or the failure to benefit fully from the potential available is considered a waste of resources and an index of the inability to utilize them. Available data indicate that the industrial sectors in Iraq, Egypt and Syria under-utilize existing production capacities in proportions which vary according to the sections of the industry, and which could vary from one factory to another within the same section of the industry. The Iraq production capacity utilization was 20 per cent in the shoe-making industry, 30 per cent in the transportation equipment industry, 52 per cent in the textile industry, 63 per cent in the tobacco industry and 66 per cent in the beverages industry.<sup>(1)</sup> Even though the problem of industrial capacity under-utilization is long-standing and has plagued the Egyptian industry since the fifties, it has taken on wider dimensions in the second half of the sixties and in the early seventies. Under-utilization of capacity in 1974 has been estimated to total 32.5 per cent of existing production capacities<sup>(2)</sup>. This under-utilization of capacities is attributed, to a large extent, to a shortage in the foreign currency needed to import primary and intermediate goods needed in industrial operations. There are other factors that could also be added to the shortage of foreign currency, including:

- The irregular supplying of factories with primary and local goods.
- Shortage of technicians and skilled labour needed for operation and maintenance of factories, and failure to carry out maintenance work at regular intervals.
- The failure to manage stocks of primary and intermediate materials. A study of the industrial sector in Egypt<sup>(3)</sup> showed that factories frequently had a surplus stock of some imported primary or intermediate materials, while lacking in other intermediate materials. This situation created bottle-necks sufficient to halt factory operations until the needed materials were made available.
- The establishing of some factories with a productive capacity that exceeds the absorptive capacity of the local market, without ensuring export of the surplus.

Reasons for failure to benefit from the full existing production capacity can be summed up under two headings: internal reasons and external reasons. We mean by the internal reasons a decline in the administrative, organization and productive performance of the factory. These factors can be dealt with gradually, even though they should not be under-rated, especially when they are widespread enough to include all or most of the industrial sector and are not merely confined to a few industrial units.

External reasons can be basically summed up as backward bottle-necks, involving the inability to make inputs available, and forward bottle-necks, involving the inability of the market to absorb the output. It is only natural that the methods used in dealing with these bottle-necks differ according to the different bottle-necks.

It should be noted, in this connexion, that supplying recently-established sugar refineries in one of the ECWA countries with their requirements for sugar beet to ensure full-capacity production is by no means an easy operation. Even if it is possible to provide the needed supply, it might be at the expense of the cultivation of other crops, thus creating production difficulties in sections other than the sugar industry. Egypt also faced problems in supplying sufficient quantities of sugar cane to the sugar refineries to ensure full-capacity production.

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(1) Ministry of Planning, National Development Plan for 1976-1980, Baghdad 1977, p. 51.

(2) In view of the use, occasionally, of unsound methods in the measuring of capacity utilization proportions, and the consequent need for consideration of published figures with reservation, these figures are only accepted as approximate guidelines.

(3) The World Bank, Arab Republic of Egypt, Economic Management in a period of transition, Vol. III, Productive Sectors, 1978, p. 84.

### Under-utilized Industrial Capacities in the Egyptian Industry

Section of Industry	Production Capacity (Millions of Guineas)		Under utilization ratios
	Full	Unutilized	
Food Industries	453	133	39.4
Textiles Industries	440	102	23.2
Chemical Industries	135	57	42.2
Engineering Industries	134	65	48.5
Metallurgical Industries	117	60	51.3
Construction Industries	59	14	23.7
Public Sector Total	1,338	431	32.2
Private Sector	475	159	33.5
Grand Total	1,813	590	32.5

Source : M. Girgis. *op.cit.*, p. 225

In order to cut down on the waste resulting from under utilization of productive capacities, the following steps should be taken:

- Factories should be supplied regularly with local primary products and with the foreign currency needed to ensure that these factories will be supplied at the right time with their production needs of imported goods. Import permit routine formalities should be streamlined.
- The technical and skilled labour force should be strengthened, and there should be a definite commitment to carry out maintenance work at regular intervals.
- In cases where the incremental capital output ratio is low, old machinery should be replaced and partial modernization introduced to make a substantial increase in production possible with a limited investment. It seems that comparatively older industries, such as the textile industries of Egypt and Syria, need such improvements.
- The administrative and economic apparatus should be strengthened to draw up a quantitative and chronological plan for stocks to avoid bottle-necks.
- The choice of productive capacities of projects should be considered objectively to avoid unwarranted optimism over the possibility of providing the inputs or of handling exports. This actually should be considered within the economic feasibility studies.

Available data indicate that the productivity of the industrial sectors of Egypt and Syria has not increased appreciably. In Syria there was a slight decline in productivity in the 1971-1975 period (which includes 1973, an exceptional year)<sup>(1)</sup>. The Egyptian industry has sustained a drop in productivity since 1962, after having realized a 2.7 per cent annual increase in productivity in the 1954-1962 period.

This drop in productivity, especially in Egypt, (the 1971-1975 period in Syria was obviously influenced by the special situation of 1973) is not attributed to a decline in production nor due to a lack of technical progress. It is attributed basically to the state employment policy. Ever since the early sixties Egypt has adopted a course designed to cut down on unemployment by obliging public sector institutions to employ large numbers of workers, irrespective of the actual need for them. The motive and aim of this plan are derived from the social betterment policies, or, to put it more accurately, the policy of limiting the misery of people caught up in the poverty cycle. The negative aspects of this policy, however, neutralize and even outweigh the positive aspects. From an economic viewpoint, this labour surplus has a negative impact on the increase in the productivity of the workers actually needed by the factory because the presence of the surplus labour which does not actually engage in any work dampens the drive of the others to work.

The thrusting of this labour surplus into the labour ranks constitutes adoption of a new division of labour imposed by factors beyond the aim of creating the ideal conditions for productivity. This, in turn, confuses the performance level of the workers. The practice of using high capital intensive techniques on one hand, while requiring factories using these techniques to employ numbers of employees whose work is not needed in order to cut down on unemployment on the other, is a glaring inconsistency.

It is also worthwhile in connexion with productivity referring to the waste in the Egyptian textile industry, which is regarded as the main section of industry since it contributes 20 per cent of the gross industrial product. This industry

(1) Central Statistics Office, General Survey of the Industrial Sector and Major Indicators, 1971-1975, Damascus, 1977, p. 22.

uses the good, local, long-staple cotton, that is suitable for the production of high-grade, expensive products, for the production of products of limited quality and of fixed prices. Such patterns of action constitute a state of obvious waste, and also deprive Egypt of the benefit of a comparative advantage in the textile industry due to the availability of the primary material locally. A number of alternatives could be envisaged to rectify this situation. One of them could be the use of long staple Egyptian cotton in the production of high-quality, expensive products oriented basically towards exports. At the same time medium-grade cotton could be imported for use in the production of medium-quality products. Obviously a technical-economic study should be conducted to evaluate this and other alternatives and to choose the most suitable.

#### **4. Industrialization and the size of the market**

The small size of the market is considered one of the main drawbacks for industrialization in the ECWA countries. The size of the market is usually measured by two variables — the average per capita income and the population. The importance of per capita income arises from the fact that internal elasticity of demand for industrial goods is above one. It was estimated in the sixties that an increase of individual annual per capita income from 100 dollars to 1,000 dollars is accompanied by rise in per capita consumption of iron from 10 kg to 300 kg. This represents a 30-fold increase in consumption corresponding to only a 10-fold increase in per capita income.

Likewise, the importance of the size of the population arises from the fact that the industrial product elasticity, compared to the population, is above one. It is easy to realize that the market of a country of one million cannot absorb the production of heavy industries, no matter how high the per capita income of its people. While it is true that there are some such small countries, such as Belgium, Holland, Sweden and Switzerland among the industrial countries, that is because the modern industrial growth in these countries took place under circumstances which differ from those existing today, nearly two centuries after the start of the industrial revolution. At that time the savings of scale production had not yet assumed important dimensions, and protectionist tariffs were still low. This, along with their proximity to large countries, helped them to establish and develop specialized industries which supply nearby countries with some of their products.

We only need to examine the variables that determine the size of the market of ECWA countries to realize how small this market is. The per capita income in Kuwait and Qatar is high, equal to approximately twice the per capita income of industrial countries. However, the problem is the small population of these two countries. The other extreme is represented by Egypt, where the population of 38 million has a per capita income of 280 dollars a year, which constitutes the main obstacle to industrialization. Other countries range between these two extremes with varying market sizes which do not provide the dimensions needed to realize profitability for the many industries which could play a dynamic role in industrial development.

The problem of a small-sized local market cannot be solved by turning to external markets, except for a few specific industries for which a country might have a distinct advantage. Over-reliance on external markets generates a dependence which deprives the country of its freedom to take decisions. In addition, industries which can be described as playing a dynamic role in the industrial development can only exercise this role if the bulk of their production is used within the producing country. In that way they can contribute towards stronger links between industrial activities on one hand, and can be used in ways which will help to increase productivity on the other hand.

The course that can be followed under these circumstances is the industrial co-ordination or integration of the ECWA countries. Ever since 1964, when the Arab Economic Unity Agreement should have become effective, the Arab countries have tried and are still trying to realize some form of industrial integration (Arab Economic Unity, Arab Common Market, joint Arab projects, and, lately, attempts at prior co-ordination of Arab industrial production and at the co-ordination of social and economic projects).

### Basic Variables in ECWA Countries

Country	Year	Gross Domestic Product (millions of dollars)	Population (Million)	Per Capita Income (Dollars)
Egypt	1976	10,668	38.1	280
Iraq	1976	15,778	11.5	1,372
Jordan	1976	1,106	2.8	395
Kuwait	1975	11,146	1	11,146
Lebanon	1973	2,829	2.4	1,179
Oman	1976	2,315	0.8	2,894
Saudi Arabia	1976	43,924	7.4	5,935
Syria	1976	5,812	7.6	765
United Arab Emirates	1976	7,288	0.7	10,411
Yemen Arab Republic	1976	1,654	4.9	337
Democratic Yemen	1974	202	1.6	126
Bahrain	1976	642	0.3	2,140
Qatar	1976	2,280	0.2	11,400

They have not made any enviable progress, in my estimation, due to what could be termed the "golden rule" of integration, which can be summed up in this way: integration must be beneficial to all member states. If this principle is well-known to specialists and non-specialists alike, it still needs clarification. The first consideration must be that the market mechanism will not allow the realization of the golden rule because this mechanism, due to external economies, attracts industrial investments to the main centre of growth which is located in the most advanced member state. This means that this state will be the main beneficiary from the co-operation agreement, at the expense of the other states. Consequently, integration agreements are constantly faltering.

This situation should be remedied by the fair distribution of investments among member states. This could be realized through the setting up of a supranational authority in which every state which is a signatory to the agreement would be represented. This authority would decide on the locating of industrial projects to be executed in members states, if the factory products are to be marketed in countries other than that in which the factory is located. In the adoption of its decisions on the locating of projects in member states, this supranational authority must observe two sets of criteria, one purely economic and the other social. The first takes into consideration the profitability of investments. However, since confinement to the consideration of these criteria would lead to the most advanced country getting the lion's share of industrial projects, which is something which must be avoided, the second set of criteria with a social basis rectifies the situation by providing that the supra-national authority consider the following in the adoption of its decisions:

- The sacrifices made by each country due to previous decisions on the locating of industrial investments taken since the integration agreement came into effect.
- The condition of the lesser developed member states. If this involves slight 'partiality' in favour of these states, this is justified by the fact that the dependence on solely one economic criterion would lead to depriving these countries of the opportunity of industrial development.

The consideration of social criteria could leave a negative economic impact, but the adoption of the principle of relative advantages will reduce this negative impact to the minimum level.

In terms of geographical comprehensiveness, the ideal framework which ECWA countries should strive to reach is not the framework which Arab economists call the pan-Arab development framework, which most of them advocate, neither is it the framework that includes all the ECWA countries, because of the sharp differences in the economic structures of these countries. Efforts should be made, rather, to realize industrial integration on the level of relatively smaller regions, in which the economic and social structures of the member states would be somewhat similar. This, naturally, should not lead to the neglect of efforts to realize gradual integration between these regions.

In addition, we must emphasize the importance of joint projects of a purely regional nature<sup>(1)</sup>, namely projects in

(1) There are three distinct groups of joint projects: the first group includes simple joint projects between incompatible parties, the second group includes partially regional joint projects and the third group includes joint projects of a purely regional nature. M. Bourguinat: *Le Marché Commun des Pays en Voie de Développement*, Genève, 1970, p. 163-174.

which a group of developing nations participate in financing and marketing products and in decision-making without any foreign partners. These projects are an effective means for realization of integration between ECWA countries, because these projects forge strong links between these countries based on tangible common interests, supported and regulated by institutional systems.

Finally, the positive impact of integration is not restricted to the expansion of the market size, but it also includes rationalization of the use of natural, human and financial resources by the removal of the obstacles which, under the present system, prevent production sectors from using these resources in the proportions that will allow for the increase of production.

## 5. Industrialization and Employment

ECWA countries can be divided, on the basis of the problem of industrial employment, into two groups which differ in their characteristics, at least on short and medium terms.

The first group includes countries with oil-based economies, while the second group includes the other countries. In the first group there is abundance of capital, while there is a shortage of skilled manpower seeking productive work. As such, the choice of technology poses no problem. The relative abundance of the means of production imposes on these countries the choice of high capital-intensive technology. In the second group of countries, with scarcity of capital and abundance of labour, the problem of the choice of technology surfaces.

ECWA countries which have covered some ground in industrialization are moving towards the adoption of high capital intensive technology.

Investments in industry in Iraq have increased on an average of 13.2 per cent per year during the 1958-1971 period, whereas employment only increased at the rate of 2.8 per cent<sup>(1)</sup>. The same trend existed in Syria, where capital intensity rose from L.S. 4,160 in 1953 to L.S. 10,820 in 1964<sup>(2)</sup>. It also rose at high rates during the 1971-1975 period<sup>(3)</sup>. It is estimated that employment in the industrial sector between 1960 and 1972 did not constitute appreciably more than 11 per cent of the total working force.

In Egypt it is estimated that the index number fixed capital at the disposal of the individual worker employed in manufacturing industries in 1947 was 63, taking 1937 as the base (this was an extraordinary case arising from the delay by World War II of imports, including some production equipment), and that this figure rose to 119 in 1953, 123 in 1960, and 136 in 1965<sup>(4)</sup>. A study carried out on this subject, which adopted the added value as the index for the overall capital-intensity (material and human) estimates that the average index number for the capital intensity of all manufacturing industries (taking 1954 as the base year) rose to 141 in 1961, 176 in 1965 and 195 in 1969/1970<sup>(5)</sup>, and the modernization of equipment is continuing in the seventies.

This development is frequently justified on the basis of the absence of any alternative. On one hand technology is imported from the advanced countries which produce the capital goods suitable for the production factors available to them locally, where there is a comparative surplus of capital and scarcity of manpower. Consequently, these countries produce machinery of high capital-intensity, and low capital-intensive technology gradually disappears from the market. As such, ECWA countries and other developing countries have no choice (if we overlook the possibility of importing used machinery, a practice not easily accepted). On the other hand the structure of the Egyptian industry started to shift in the early fifties towards the development of industries which by their very nature are of high capital-intensity, such as paper, cement, oil refining, steel and fertilizers. The same was true of Syria and Iraq in later stages. There were, however, fields in which there could have been a choice, such as cotton ginning and textiles in Egypt and Syria. These are both industries which are well known for the possible substitution of production factors in the choice of production techniques. In fact a study conducted by the Dutch Institute of Economic Sciences in the early fifties shows that there is an appreciable degree of elasticity in substitution between the production factors of a number of industries. This is established through the comparison between the proportions of the aggregate of production factors in the industries of flour, sugar, textiles, steel and paper pulp in each of the United States, Mexico, Colombia and India<sup>(6)</sup>. The possibility of production factor substitution exists even in the industries that are considered of high capital intensity through supportive or auxiliary work in industry, such as transportation within the factory or maintenance work. It seems that the manufacturing industry of the Soviet Union has managed to substitute labour for capital in this respect to the greatest possible extent<sup>(7)</sup>. Nevertheless, Egyptian industry did not give this substitution much attention.

(1) Evaluation of Iraqi Industrial Development, Arab Industrial Development, Technical Bulletin issued by Arab Industrial Development Centre, January 1977, p. 73-93.

(2) Evaluation of Industrial Development Experiment in Syria, Arab Industrial Development, Technical Bulletin issued by Arab Industrial Development Centre, January, 1977, p. 97-120.

(3) General Statistics Office, General Study of the Industrial Sector and principal indicators, 71-75, Damascus, 1977, p. 29.

(4) R. Mabre, Industrial Growth, Agricultural Under-Employment and the Lewis Model, the Egypt Case, 1937-1965, in Journal of Development Studies, July 1967, p. 322-351.

(5) Girgis, *op. cit.*, p. 43.

(6) J. Tinbergen, "Le Choix des techniques de production au stade de la planification industrielle," p. 30, in "industrialisation et productivité," Avril, 1958, p. 26-36.

(7) D. Granick, Economic Development and Productivity Analysis, in the Quarterly Journal of Economics, May, 1958.

Could it be that Egypt wanted to adopt high capital-intensive technology in order to enjoy the features that are frequently attributed to such technology, such as speeding up development, raising the productivity of capital and of labour, and limiting the burdens of urbanization on investment? Are these real features?

- **Technology and the Speeding-up of Development:** The goal of development is that the economy achieve in a future year, a year is merely an example, the level that will realize for it the greatest value possible. This requires the maximization of the fixed capital placed at the disposal of the worker. The greater this capital, the greater the productivity of the individual (per capita product) also. In order to increase the fixed capital at the disposal of the individual worker (or capital intensity), the marginal per capita investment during each of the years between the present and the designated year must be high. If we use the marginal per capita investment quotients as the criteria to compare between high labour intensive and high capital intensive industries, the comparison leads to the choice of the latter, because the amount that is made available for investment through the employment of a new worker is merely the result of the subtraction of the salary of this worker from his productivity or from the production he achieves. Since the salary of the worker does not vary appreciably with the change in technology, while the per capita production is higher in high capital-intensive industries than in high labour-intensive industries, then, assuming that profits are diverted basically to savings and investment, the marginal per capita reinvestment will be higher if the former technology is used. On this basis, high capital-intensive technology will lead to a faster growth of employment than is possible for high labour-intensive technology. In support of this view Liebenstein and Galenson have formulated an attractive formula which they applied, with assumed promises, to four technologies in the textiles industry which varied according to their capital intensity. It can be used in an initial investment which allows the use of one worker in the first technology, four workers in the second technology, thirteen workers in the third technology and thirty-four workers in the fourth technology, in keeping with the order of the technologies, arranged according to their capital intensity. This formula demonstrates that in 25 years these technologies will allow for the employment of 12,200 workers, 12,860 workers, 13 workers and 34 workers, from the highest capital-intensive technology and down through the technologies that follow, respectively. However, this analysis on one hand assumes that profits will go fully or mainly to savings or investment, while all the wages are spent on consumption. On the other hand it completely neglects the condition of manpower seeking employment from the launching year to the final year of the period covered by the analysis and the impact of this condition on development. It also neglects the nature of future technological development.

In order to avoid the spending of all profits and wages on consumption, the state can intervene to ensure the accumulation of savings for use in investment. The claim that all profits are going into investment is not true because it is well known that the rich people of the ECWA countries and other developing countries compete in spending on imported luxury goods. This means that a portion of the profits goes abroad to contribute to keeping foreign factories running after local manpower has been deprived of employment opportunities by the use of high capital-intensive technology.

- The use of labour-intensive technology would allow workers who had been deprived of work opportunities to participate in production. This would increase the gross national product, even though it would lead to a drop in the profit rate of the added value. The rise in the gross national product would allow for increased funds to be set aside for investment. In other words, the adoption of high labour-intensive technology will lead to an increase in the funds which can be made available for investment because it makes it possible to reach a higher gross national product, even though on the other hand it could lead to a drop in the proportion of the gross national product earmarked for investment.
- Any analysis of the nature of the future development of technology requires that the capital-intensity of modern technology be steady, so that consequently the manpower needed for the investment of a specific sum of money in this form of technology will be steady also. The fact is that modern technology is constantly moving towards higher capital intensity, and consequently the ability of a specific investment of capital to absorb manpower is constantly decreasing, if the same technology is used.

Therefore, the relationship between capital-intensity and the speeding up of development through investment is an unacceptable justification for the use of high capital-intensive technology in the ECWA countries where capital is scarce compared to manpower.

#### 5.1 TECHNOLOGY AND THE PRODUCTIVITY OF PRODUCTION FACTORS

The use of high capital intensive technology cannot be justified on the basis of the claim that the use of such technology will increase the productivity of the capital, which is the comparatively scarce production factor in non-oil-producing countries. Theoretically it is true that the use of high capital-intensive technology could lead to a rise in capital productivity as well as to a rise in work productivity, since the capital productivity is the quotient of work productivity divided by capital-intensity. If increased capital intensity leads to a higher increase in the dividend (or the work productivity) than the increase in the divisor (or capital-intensity) the result will be a rise in the capital productivity. However, even though this is possible theoretically, on the practical level its validity is limited.

## 5.2 TECHNOLOGY AND RELIEVING URBANIZATION

Finally, it cannot be claimed that the adoption of high capital-intensive technology in ECWA countries is justified by the need to offset the growth of cities that follows the adoption of high labour-intensive technology which provides employment for many workers who move in from rural areas, thus requiring that the state invest its resources heavily in the infrastructure of major cities, at the expense of other productive investments. Urbanization is continuing at a high pace in ECWA countries, despite the adoption of high capital-intensive technology. Moreover, it would have been better to avoid urbanization problems by providing for a pattern of fair geographic distribution of industries in rural and urban areas, coupled with the choice of high labour-intensive technology in order to raise the living conditions of the rural populations and establish them in their rural areas.

In summation, we say that it is not in the best interests of ECWA countries, with the exception of the oil-producers, to use high capital-intensive technology. However, it is well known that under the present system of international labour division the advanced countries control the means of production. It is only natural that these countries would develop the means of production towards higher capital intensity in keeping with the comparative availability to them of production factors. The continued acceptance by the comparatively capital-poor ECWA countries of this state which confines technological know-how and the production of the means of production to the advanced states means an admission that they are barren when it comes to developing technology, and that they will keep on using means of production which were not designed to meet their needs, but rather to meet the needs of a different culture, with its distinctive features and characteristics. This means that the development of these countries is subject to rules and principles which were followed by the Western world, even though prevailing conditions might not be suitable for such rules and principles. What, therefore, can these countries do? Our analysis of the alleged features of high capital-intensive technology which we have presented above leads to the conclusion that these countries should mobilize a portion of their available competence and set up research centres to develop new technology which is compatible with the relative availability of their production factors and with their specific social conditions. In so doing, they do not have to start from scratch, but can draw upon two sources: national or traditional technological know-how, and Western technological know-how.

National or traditional technology must be developed, even if that means an increase in capital-intensity, on condition that it remains far less than the capital-intensity of modern Western technology. Actually, the use of traditional technology might be justified, as is indicated by an experiment that is still limited to a number of rural units in Syria. It involves providing a number of rural families with the means of producing specific types of textiles which are in public demand. This approach introduces the rural woman into the circle of materially productive work while she remains in her home and exercises her functions as a housewife. Such an operation contrasts sharply with the migration of the rural population to the city to impose on the tertiary sector; they are two extremes: one is positive and creative, while the other is negative and wasteful.

Western technology, when adapted to the conditions and requirements of the environment in which the equipment is used, can be another source of benefit. However, this adaptation does not occur overnight, neither is it carried out by one person, but is rather the result of joint efforts and long and repeated research. In the meantime, awaiting accomplishments in this field, the ECWA countries should choose the technology which least conflicts with the various environmental conditions, especially human conditions. In fact, this trend is not being adopted, as can be seen from the following illustration. A factory established in one of the ECWA countries was fully equipped with modern, advanced technological equipment, including electronic scanners to control work in various sections of the factory. The electronic equipment was supposed to be supervised by a qualified worker. Obviously, the cost of the equipment and the expense of the supervising worker were supposed to be off-set by savings realized through dispensing with a number of workers. Shortly after the factory started operating it was discovered that the electronic equipment was not functioning, either because it was misused or because of lack of maintenance. Therefore, the expensive electronic equipment did not dispense with the need to hire workers, nor did this expenditure spare the factory any other expense. This is a clear contradiction of what we are advocating. Instead of importing Western technology of limited capital intensity, with the intention of adapting it, very high capital-intensive technology was imported and implanted in an environment it was not originally designed for with a resulting waste of resources. Naturally both the choice and the adaptation of technology require the establishment of scientific and technological research centres, which would bring together expertise and scientific knowledge. They would function according to guidelines and within a serious framework with the suitable scientific and experimental climate and the flexibility required by the very nature of scientific and technological research.

The approach of these centres could rectify the bias of the advanced countries which are constantly searching for high capital-intensive technology which will lead to a decline in production costs. They are not seeking pure technological progress as such, but rather progress which is favourable to capital. Countries which are comparatively capital poor should strive to achieve technical progress favourable to labour or to invent high labour-intensive technology which would lead to a decline in production costs. This involves basically the rationalization of the use of production factors, and particularly making efforts to raise productivity instead of depending mainly on the accumulation of capital in the form of machinery and equipment.

## 6. Industrial Location

The pattern of industrial location is similar in ECWA countries, with most industries located in a limited number of centres, with the size of the centre differing from one country to another. It is only natural that a limited number of centres, possibly one or two, emerge during the first stage of industrialization and attract most industrial developments. Even though the positive social and economic aspects might outweigh the negative impact of such attraction, at that stage, nevertheless, the growth of these centres should be constantly watched, along with the development of their positive and negative impacts on the centres themselves and on other areas also. Centres of development have emerged and developed in some of the ECWA countries due to the availability of all or some of the main factors which determine the location of industrial projects. These can be classified into three groups: primary materials, including sources of energy, which can be called natural factors; means of transportation, including ports (man shares in shaping this factor); and human factors, since factories need manpower and consumers to market their goods. If the means of transportation develop to the degree that the importance of primary materials in determining the location of the industry is limited, except for conditions involving a particular primary material, then transportation means and human factors and their mutual impact on one another will emerge as the major factors in growth and the development of poles of development.

In Egypt most industrial investments have been concentrated in Cairo and Alexandria since the turn of the century. In 1907 the proportions of each city's workers to the total of industrial workers were 41 per cent and 31 per cent respectively. In 1960 the total share of Cairo (including Giza and Kleiyoubiya) and Alexandria was 55.2 per cent of the industrial work force, and with the addition of the Western Governorate this figure rises to 63.8 per cent.<sup>(1)</sup> It is noteworthy that decision-makers responsible for industrial location in both the public and private sectors neglected the negative impact of geographic concentration of industry on both the national economy and on society. They obviously gave prime consideration to the technical, profitability and commercial aspects of projects and the impact of the external economies provided by Cairo and Alexandria. If this approach is only natural in the case of private sector investments, it is very surprising in the case of the public sector, which is supposed to conduct both an economic analysis and a social analysis and should not be swayed by financial and commercial considerations only. In view of the dramatic dimensions assumed by industrial concentration in greater Cairo, regional planning designed to curb continued centralization has become an urgent necessity.

In Syria the industrial concentration has not reached the pressing proportions of Egypt, since it has three main poles, located in North Syria (Aleppo), Central Syria (Homs) and South Syria (Damascus). A total of 59 per cent of industrial workers are working in these three areas. Another 24 per cent are employed in other urban areas, and 17 per cent in rural areas.

There is a high concentration in urban areas (83 per cent of all industrial workers) as compared with rural areas, but there is a form of comparative distribution among the urban centres.

The launching of industrial projects, even if concentrated in one or two centres of development, is generally welcomed in ECWA countries which are new-comers to industrialization, such as Saudi Arabia, Kuwait, Bahrain, Qatar, Oman, the United Arab Emirates, Democratic Yemen and the Yemen Arab Republic. Actually choices are limited in these countries due to their limited size and the limited number of suitable sites for concentrated development centres. However, these emerging development centres can be recognized in the Yemen Arab Republic (Sana'a, Taiz and Hodeidah) and two main centres in Saudi Arabia (Jeddah and Riyadh), with efforts underway to establish a new centre in the North-East of the country that will be a focus for heavy industries.

## 7. Urbanization and the Urban Environment

Industrialization and urbanization are two inseparable operations linked by mutual interaction. Many industries are located in urban areas in view of the prospects of success. On the other hand, the locating of industries in a particular location leads to the urbanization of that area or its development and the consequent speeding up of its urbanization through its attraction of other industrial and services projects and the attraction of manpower. Since the industrial revolution of the late 18th century preceded the emergence of large cities in the advanced world, and later industrialization and urbanization continued side-by-side, urbanization is generally considered one of the results of industrialization.

### 7.1 DIMENSIONS OF URBANIZATION IN ECWA COUNTRIES

Urban growth rates in ECWA countries are high due to the high rates of migration from the rural areas to the cities, without any accompanying decline in the natural growth rates in the urban areas. While Egypt has the highest level of urbanization in the ECWA countries, other countries also have high urbanization rates, which in most cases are even higher than the urban growth rate in Egypt. However, the limited size of the population in these countries makes urbanization trends of lesser gravity than is the case in Egypt.

Egypt, in the first place, has an overall population problem, which is represented on one hand by the fact that the bulk of the population (around 99 per cent) are basically settled on only around 4 per cent of the country's area, mainly

(1) Dr. Mohammed Fateh Akeel and Dr. Fouad Sakkar, *The Economics of the United Arab Republic: Industrial and Mineral Production*, Alexandria, 1968, pp. 491-496.

in the Nile Valley and Delta, with an average population density of 1,000 km<sup>2</sup>, due to the known considerations of climate, soil quality and natural resources, and on the other hand by the high population growth rate (2.2 per cent). In the second place Egypt faces a population problem of regional dimensions that is no less serious than the overall problem. This problem is the result of the rise in urbanization rates, when compared with Egypt's economic structure and per capita income. Out of a total population of 36.5 million in 1976 (not counting the 1.5 million Egyptians who work abroad, most of whom are from urban areas) 16.1 million live in urban aggregates of 20,000 or more. Greater Cairo alone includes around 8 million people, one half of the urban population. While the population of Egypt is increasing at a rate of 2.2 per cent, the urban population is rising by 3.6 per cent annually, and the population of greater Cairo is increasing by 4 per cent annually, which has brought urban population from 21 per cent in 1917 to 33 per cent in 1947 to 44 per cent in 1976<sup>(1)</sup>.

In Lebanon, despite the fact that industrialization is recent, 70 per cent of the population is urban, which is mostly due to the capital being an advanced commercial centre.

The urban population of Syria is 47 per cent of the total population, most of whom are located in two strips, one internal extending from Aleppo in the north to Dara'a in the south, and the other coastal and less intensive extending between Latakkiyeh and Tartous.

In the oil-rich countries the urban population is a high proportion of the total population due to the climate, the limitations of the population and the extent to which non-oil natural resources are exploited. Oil revenues have also provided for the growth of major cities through increased government spending and higher individual incomes.

## 7.2 MAIN FEATURES OF URBANIZATION IN ECWA COUNTRIES

Migration from the rural to urban areas in the ECWA countries is basically due to factors of expulsion, as well as the possible work opportunities in the city. In Egypt, for example, the limited availability of arable land, coupled with the rapid population growth, forces residents of rural areas into urban areas. In a country in which the cultivated land per capita declined from 0.5 acres at the turn of the century to 0.2 acres at present, the rural population must seek a living outside the agricultural sector, and consequently expulsion elements emerge as the prime factors behind rural migration. It is possible to detect two groups within the rural migration current. The first group includes the young men who migrate seeking better education facilities and better living conditions in the city. This kind of migration is basically the result of attraction factors. The second group, which is the most widespread, includes the rural poor who leave the village under the pressure of increasingly hard and difficult living conditions. Therefore, this migration is actually more the result of expulsion than attraction factors. A survey that covered 156 Egyptian families which migrated from rural to urban areas showed that among the most important factors which prompted migration were: lack of land ownership, the desire to secure independent income, lack of land available for rent, lack of available agricultural work, and lack of other work or vocations.<sup>(2)</sup>

The slow increase in the area of cultivated land, and the rise in development costs needed to increase yields from the cultivated areas, are considered the two main incentives for internal migration in Egypt, Jordan and Saudi Arabia, whereas the lack of growth of agricultural production behind migration in other countries is attributed in the first place to the low investment in the agricultural sector.<sup>(3)</sup>

Urbanization motives differ in ECWA countries from those in the industrial countries during the industrial revolution. In the ECWA countries expulsion factors are primary, whereas in advanced countries migration was in response to industrial growth and the consequent demand for manpower which could not be satisfied by the city. In addition, the mechanization of agriculture freed a number of agricultural workers. The differences in migration motivation leave a real impact on economic growth. In cases where migration is the response to the increased demand for manpower in the city, then migration means the movement of manpower from the agricultural to the industrial sector, which has higher productivity and effective dynamism in development. Migration arising from expulsion factors, however, gives rise to two negative results: one is the continued migration to the city despite unemployment, which is a contradiction of the Lewis-Fei-Ranis model on internal migration, that both migration from rural areas, where the traditional sector is predominant, and employment in the cities increase in response to the increased demand of the modern sector in the city. This model is based on the presumption that the rural resident only migrates to the city where he has urban work opportunities which provide better income than his rural income. What actually happens in developing countries, according to the Todaro model, is that the rural resident in deciding on migration to the city takes into consideration the extent to which work opportunities might exist for the migrant to the city, and the difference in real income of jobs in the rural and urban areas. If the income of an unskilled worker in rural areas is 200 monetary units, whereas unskilled workers are paid 400 monetary units in the city, but only can work 60 per cent of the time, the expected city income is 240 units. The rural resident decides to remain or migrate on the basis of the comparison of his rural income with the expected urban income.

As such, the migrant accepts in advance periodic unemployment, with the extent of this period varying from one

(1) The World Bank, Egypt Urban Development Project, 1978, p. 1.

(2) Dr. Mohamed Fādeel, Economic and Social Changes in Rural Egypt, 1952-1970, The General Egyptian Book Authority, 1978, p. 230-240.

(3) G. Amin, Urbanization and Economic Development in the Arab World, Beirut, 1972, p. 15.

case to the other. This full-year view also applies to the total period of migration. While this analysis helps to explain continued migration, it does not accurately describe migration occurring primarily under the impact of expulsion factors and which does not have these economic grounds. It also inaccurately concludes that the decision of the rural resident to migrate or stay hinges on the comparison between the present value of the expected rural income and the present value of all the income expected in the city for the full migration period.

The other negative result in ECWA countries of migration prompted basically by expulsion factors is the intrusion of the migrants into the services sector, swelling the employment in this sector in contradiction with the theory of the three sectors. This theory stipulates that the primary sector (agriculture) is the first to develop. Since internal demand elasticity for the goods of this sector is limited, the turn of the secondary sector follows shortly after. Since technology in this sector changes rapidly with a consequent rapid rise in productivity, internal elasticity of demand for its goods, though higher than the elasticity of demand for primary sector goods, is still limited. At this state the turn of the tertiary sector (services) to develop rapidly comes, especially since there is high internal elasticity in the demand for services. This is from the angle of the products of sectors. However, from the employment angle the theory of the three sectors considers employment a function of two variables, technical advance and demand for products (consumption). This is the natural outcome of the definition of productivity as the ratio of production to the amount of work needed for this production, which means

$$\text{Productivity} = \frac{\text{Production}}{\text{Employment}} \quad \text{or}$$

$$\text{Employment} = \frac{\text{Production}}{\text{Productivity}}$$

Employment = demand/productivity, when production is considered as a different aspect of demand. Consequently, a sector can be described as employment — attractive if the growth in the consumption of demand for its goods is higher than its productivity, and vice versa it can be described as shrinking or employment-repellent. This, according to the theory of the three sectors, explains the movement of manpower first from agriculture to industry, and then from these two sectors manpower moves to the services sector at some advanced stage in economic growth, a stage started by Western Europe after the United States of America. This analysis is true when the choice of work in various economic fields and the movement of manpower between them are determined by national economic motivation. The economic and social realities determine a distribution of manpower which differs from that actually dictated by economic growth. Consequently in every sector it is possible to distinguish between "required employment" (or necessary) and "actual employment" and the difference between the two is considered an index of the irrationality of the economy. In the ECWA countries most of the motivation which prompts migrants to seek employment in the tertiary sector is economically irrational. In fact they enlist in the tertiary sector, or actually impose themselves on it, because no special skill is required for what they are working in. There is a definite and distinct difference in these countries between the required and the actual employment in the tertiary sector. Consequently the number of people employed in the tertiary sector is much higher than the number of workers in manufacturing industries, with the former outnumbering the latter by 4 to 1 in six ECWA countries; the ratio is 2.2 in Egypt, 2.6 in Syria, 3.7 in Iraq, 4.1 in Jordan and 8.3 in the Yemen Arab Republic. This inflating of the tertiary sector, despite the low income level of those going into it, is undoubtedly reflected in rising consumer prices, leading to demand pressure for commodities of high price elasticity, or else is reflected in lower profits on industrial investments. The ultimate result, which is mostly a mixture of both these outcomes, always holds up economic development.

### 7.3 GHETTOIZATION IN THE URBAN ENVIRONMENT

One of the positive impacts attributed to urbanization is that the urban centre (or city) transfers the individual from a society dominated by a backward, primitive mentality, to an advanced society in which the various components interact to achieve rapid development through the increase in the productivity of the individual which is made possible through the accumulation of capital and the use of advanced machinery in production. Urban centres are supposed to emit development waves to other areas, at intensities and to extents that vary from one case to another, through the transfer of cultural and modern values and through economic exchange, since the city is a consumption market for agricultural products and a centre for the production of industrial goods, especially intermediate and capital goods. However, the urban environment of ECWA countries has not produced this positive impact due on one hand to its limited ability to retain the incoming rural residents and absorb them culturally and economically, and due on the other hand to the failure of the urban environment to transmit modern economic and cultural values to rural areas. The absorption of migrants into the urban environment and their adoption of its cultural values requires the presence of conditions which will foster their integration into urban life with all its components. One of the most important of these conditions is that the migrant be assured of achieving an income which will ensure an acceptable standard of living. This is a condition that, in general, is not available to most migrants in ECWA countries, where migration was not in response to attraction factors but to repulsion factors. Consequently the new migrant makes his first contacts with previous migrants of his village or tribe and he depends on them in searching for a job to earn a living. It is not rare for him to work in a shop or at a site owned by a previous migrant. Irrespective of the work he engages in, he resides in the same quarter as the others and maintains his relations with them since he is not assured of the continuation of his

income from his employment by others. This concentration of the migrants, which is not restricted to housing, but also extends to the field of employment, or in other words the ghettoization of the migrants in the city, while helping to relieve some of the burdens of migration with all its conflicts and psychological pressures, also hinders the acceptance of migrants by the urban culture and hinders the absorption of urban culture by the migrants. The autonomy and isolation of the migrants are augmented by the rise in the rate of migration because it seems that the ability of the urban culture to absorb rural residents is inversely proportional to the magnitude of the migration, reaching a point where the impact of urban culture on the migrants is nearly or completely non-existent. While the dimensions of migration in ECWA countries have not yet led to the ruralization of the city, it can be said that this dimension hinders to a great extent the "urbanization" of the migrants.

The diffusion of cultural values to rural areas is also limited due to the lack of contact between the urban and rural areas, and due to the concentration of cultural life in a limited number of large cities. In most of the ECWA countries the largest city includes more than 32 per cent of the urban population, and in an appreciable number of countries this figure is more than 50 per cent. It can be said that the "ghettoization" of migrants in urban areas is matched by a "ghettoization" of the urban environment with respect to the rural areas.

However, this ghettoization does not prevent a change in consumption patterns along the lines of consumption in advanced countries. We noted that import substitution industrialization policies involve giving priority to the production of goods imported from advanced countries, which basically are used by high-income individuals.

The production of these goods locally prompts increased individual demand from people who, regardless of whether they are of rural or urban origin, seek to copy the consumption patterns of the high-income people for both foodstuffs and other goods. While some of these consumer goods can be produced locally, an appreciable proportion of them have to be secured through importing, either due to the appeal of the foreign-made label in the case of industrial goods or to the limitations of the agricultural sector in the case of foodstuffs.

## 8. Industrialization and Income Distribution

Growth rates in some of the ECWA countries in the sixties and seventies were higher than those of developing countries in general. The gross domestic product rose during the 1970-1977 period at an average annual rate of 7.9 per cent in Egypt, 7 per cent in Syria, 10.8 per cent in Iraq, 12.9 per cent in Saudi Arabia, 7.8 per cent in Yemen Arab Republic, 5.1 per cent in Democratic Yemen<sup>(1)</sup>. However, the growth of the national or domestic gross product is not an end in itself, but is rather a means for achieving social welfare. Consequently consideration of development from the angle of social welfare requires the evaluation of the accomplishments of development plans or policies on the basis of the benefits extended to various social groups, because the growth of the domestic gross product might not help to narrow the gap, but in fact might widen the gap between the incomes of individuals or social groups<sup>(2)</sup>. In order to accomplish this, the index of economic performance can be used<sup>(3)</sup>. In order to calculate it, society is divided into different groups on the basis of income levels or other distinctive features and a specific greater weight is given to the growth rate of the group income which reflects the social premium given by the planner to this group. The sum of the growth rates of all groups given greater weight is the index of economic performance of development plans or policies. Since nobody disputes the fact that a one-currency unit increase in the income of a poor individual leads to greater social welfare than that created by a similar increase in the income of a rich individual, the growth rates of the low-income groups should be given greater weight.

Distribution of Labour by Economic Activity in ECWA Countries (%)

State	Agriculture	Industry	Manufacturing Industries	Services	Non-technical activities	Services industry	Services manufacturing
Bahrain	5.9	33.8	10.3	60	1.3	1.8	5.8
Egypt	50.6	17.17	14	31	1.2	1.8	2.2
Iraq	56.5	10	6.3	23.3	10	2.3	3.7
Jordan	28.9	26.9	10.6	44.4	—	1.6	4.1
Kuwait	2.8	21.1	7.2	76	—	3.6	10.5
Lebanon	17	25.9	18.	56.8	—	2.2	3.1
Qatar	3.4	28	?	68.5	—	2.4	?
Saudi Arabia	66	11.7	?	22.2	—	1.9	?
Syria	48	19.6	11.3	29.8	—	1.5	2.6
United Arab Emirates	2.8	47.6	6.6	50	—	1.1	7.6
Yemen Arab Republic	77.2	5.3	2.2	18.3	—	3.4	8.3
Democratic Yemen	49	10.2	4.3	35	5.4	3.4	8.1

(1) The World Bank, World Development Report, 1979.

(2) M.S. Ahluwalia and others, Growth and Poverty in Developing Countries 1979, pp. 12-14.

(3) M.S. Ahluwalia and H. Chenery, The Economic Framework in, Redistribution with Growth, 1974, pp. 34-51.

Five social groups can be observed in general in ECWA countries<sup>(1)</sup>:

- (a) Owners of large or medium estates, who own the production, distribution and real estate assets and who enjoy high incomes;
- (b) Members of professional groups — doctors, engineers, lawyers — some of whom have incomes which are comparable to those of medium and even large-estate owners;
- (c) Senior employees, many of whom have high incomes in some ECWA countries;
- (d) Farmers with small holdings and artisans who engage in productive work and own its means;
- (e) Peasants and poor farmers, rural and urban workers and low and middle-level employees.

Poverty is concentrated in general in groups "d" and "e" (even though the skilled artisans in group "d" are outside the poverty limits), and these two groups constitute the bulk of the population, since effective demand for these cannot ensure for them their basic needs, development policies should first aim at increasing their incomes to narrow the gap between their incomes and those of the rich groups, or in other words to realize growth characterized by fair distribution.

The use of the index of economic performance, which takes into consideration the differences in the weight ascribed to the growth rates of different income groups with the aim of evaluating the impact of industrial growth in ECWA countries on the fair distribution of incomes, requires that exact data be available on groups and income levels during the evaluation period. Figures and estimates available for these countries are not adequate for the calculation of the index.

#### Urbanization in several ECWA countries

	Urban Population				Proportion of Population (%)			
	Proportion of Total population		Average annual growth rate		In Largest City		In Cities of Over 5,000	
	1960	1975	1960-1970	1970-1975	1960	1976	1960	1975
Egypt	38	44	3.4	3.6	38	50	53	54
Kuwait	72	84	10.4	7.8	75	33	0	0
Lebanon	44	70	6.2	4.9	64	77	64	77
Iraq	43	66	6.2	5.6	35	53	35	62
Saudi Arabia	30	59	7.5	6.7	15	15	0	22
Jordan	43	53	4.5	4.5	31	36	0	36
Syria	37	47	4.8	4.7	35	33	35	56
Democratic Yemen	28	34	3.2	3.2	61	53	0	0
Yemen Arab Republic	3	8	7.5	7.5	—	28	0	0

However, it is possible to deduce from more than one indicator that industrialization policies have not had an impact on narrowing the gap between group incomes.

#### 8.1 IMPACT OF TECHNOLOGY USED ON INCOME

We have noted previously that ECWA countries are inclined towards the adoption of high capital-intensive technology in industrial development. This course could exclude many artisans from the field of productive activity and in fact has, due to the success of modern products with their sometimes superior competitive prices and their wider distribution to retail outlets in changing the tastes of consumers. This technology also tends to limit employment opportunities, blocking employment openings for labourers, thus increasing the number of those suffering from the worst forms of poverty. Conversely, the share of capital, or of those who own the modern productive assets (the national income), tends to increase, which hinders the narrowing of the gap between income levels.

#### 8.2 IMPACT OF INFLATION ON PRICES OF INDUSTRIAL GOODS

The inflated prices of industrial goods, for which the import-substitution pattern of industrialization is partially responsible due to the continued high protective tariffs and the consequent slowness in increasing productivity, have led to a drop in the real income of limited-income employees, especially those working in the public sector. This arises from the fact that salary increases come after rises in prices and are at rates which are less than the rates of price increases.

(1) Dr. Majid Massoud, Necessary Requirements to Meet Basic Needs of Limited-Income People, Study presented at Seminar on New Development Concepts and Strategy and their applicability to the Arab World, Damascus, 19-22 May, 1979, pp. 2-5.

### 8.3 CONDITIONS FOR TERMS OF TRADE BETWEEN AGRICULTURAL AND INDUSTRIAL PRODUCTS

Every decline in the terms of the internal trade of agricultural goods, regardless of whether this decline is due to a guided-price system or to natural factors, means a wider gap between income levels in the city and in the rural area, where most of the deprived people live. It is estimated that the change of prices in Syria in the seventies led to a decline in the terms of trade of agricultural products and services in favour of agricultural products. While there were some improvements in the terms of trade of agricultural goods in the early seventies, the terms of trade of services declined during the first six years of the seventies. When we keep in mind that the majority of the poor or deprived are concentrated in the agricultural and services sector, this change in the terms of trade could only increase the gap between income levels, even though this gap is narrow in Syria compared to other developing countries. It is noteworthy here that the price changes of the past two years could result in a relative improvement of terms of trade of agricultural products only.

In Egypt development policies have sought to support industrialization by creating agricultural surpluses for use in the industrial sector<sup>(1)</sup>. Among the methods used to achieve this objective were the following:

- Gradual expansion of the co-operative marketing system to cover most field products (cotton, rice, onions, potatoes, etc.) to ensure the supply of these products to industry and the export sector.
- Compulsory delivery system which requires the farmers to deliver a certain proportion of their crops to the State at fixed prices, usually fixed by the state below the price levels on the free market (the difference between the prices is estimated to range from 27 per cent for wheat to 100 per cent for rice).

How do a marketing system and a compulsory crop delivery system have an impact on the terms of trade between agricultural and industrial products? In a recent study on agricultural reform in Egypt, three series of figures for terms of trade indices were calculated. The first series represents the general terms of trade index between agricultural products and all industrial products. The second series represents the terms of trade index between agricultural products and industrial consumer goods. The third series represents the terms of trade index of agricultural products and the industrial goods essential for their production. These indices were calculated for all farmers and for poor and rich farmers, and show that the general terms of trade index between agricultural products and all industrial products for all farmers declined in the 1961-1974 period, and improved slightly in 1975. The limited decline in this index was the result of a larger decline in the price of agricultural products as compared to industrial consumer goods on one hand, and due to the rise in the price of agricultural products when compared to the industrial products used as inputs for agricultural production on the other hand. It must be noted here that the government adopted the policy of fixing the prices of industrial inputs in agricultural production, which relieved the farmer of the losses sustained from the setting of their crop prices at levels below those of the free market.

Contentment with the results of the general index of agricultural products and all industrial products implies the assumption that all farmers are equally affected by the fixed or floating prices. This assumption is not true. In this context it is essential to distinguish between medium and small farmers on one hand, and rich farmers on the other. The former group usually cultivates traditional crops, whereas the second group have the means to diversify their products. Consequently they produce meat through raising cattle, dairy products, fruit and vegetables because they have the financial and technical capability. These products are not subject to the restrictions of marketing through co-operative channels and are marketed through private trade channels. The prices of these products have risen at rates which are higher than the rates of the increase of other crops, both cash crops and foodstuffs. It is estimated in this connexion that one acre of land cultivated with traditional crops would give a net income of 54.5, 29.3 and 25.4 Egyptian guineas if planted with cotton, wheat or rice respectively, whereas the comparative income from the cultivation of tomatoes is estimated between 150 and 250 guineas. Under these circumstances it was only natural that wealthy farmers should partially replace the cultivation of traditional crops with the cultivation of fruit and vegetables. This meant that the medium and small-size farmers only were required to bear the burden of the fixed prices imposed by the state. Therefore any survey of the impact of development policies on the distribution of income in rural areas requires the scrutiny of the last two indices of terms of trade, mentioned above, in addition to the study of terms of trade between agricultural products and all industrial products. This will show a decline in the terms of trade of the agricultural products of small farmers and an improvement in the terms of trade for the agricultural products of rich farmers. We must note finally that the fact that the terms of trade of agricultural products with all industrial products remained nearly stable during the sixties and seventies at a level just below 100 does not mean that industrial goods were not favoured at the expense of agricultural products, despite the fact that the prices of industrial inputs (especially fertilizers) in agriculture were fixed, because the prices imposed on traditional agricultural products are much lower than the free market prices.

We conclude that the desire to foster industrial development prompted the state to work on creating and mobilizing a surplus in the agricultural sector for use in industry, by maintaining direct control on the prices of agricultural products. This led to a comparative bias against the small farmers in particular, and widened the gap between their income level and the income level of the rural and urban rich. It is estimated that the proportion of destitute families (farmer families

(1) See Dr. Mahmoud Abdul Fadeel, *Economic Changes in the Egyptian Rural Area 1952-1970*, the Egyptian Public Book Authority, 1978, pp. 155-175. Also see the World Bank, *Egyptian Agriculture Development, Problems, Constraints and Alternatives*, 1976, pp. 29-30.

which neither own nor rent land) in rural areas in Egypt increased from 30 per cent in 1960 to 33 per cent in 1970<sup>(1)</sup>.

Poverty is not restricted to rural areas but also extends to the cities. An extensive study on income distribution in Egypt in 1974 estimates that the proportion of urban families that live below the poverty line (which means that their income cannot provide them with the basic necessities), which is set at 380 Egyptian guineas per family, was thirty eight per cent of the total population and represented 31 per cent of the total urban population. The lower 40 per cent of the urban population from the point of income have an income of only 21.4 per cent of the total income, whereas in rural areas the lower 40 per cent group income-wise has an income of 24 per cent of the total rural income. Despite the growth witnessed by ECWA countries, which is expressed in the growth of the per capita income, there has been no appreciable progress in narrowing the gap between income levels, which means that the income of deprived groups is not enough to pay for basic needs for foodstuffs, clothes, shelter, educational and health services, and transportation<sup>(2)</sup>. Even though many ways of improving the living standards of these groups can be envisaged, such as state involvement in guiding investments (the allocation of resources), the distribution of income or consumption, the distribution of means of production (such as land reform) in the best interests of the deprived groups, the actual circumstances of each country play an important role in the choice of the right course or combination of courses which should be adopted.

The strategy of seeking to meet basic needs, which is within the framework of the necessity to narrow the gap between income levels, distinctively concentrates on the nature and kind of goods and services which must be available to the individual, and as such its content is more concrete than that of other concepts of the equitable distribution of the fruits of development, such as "wiping out poverty" or "reducing unemployment"<sup>(3)</sup>. Since this strategy aims at creating opportunities to develop fully the individual on the material, moral and social levels, it requires the change of the production structure to make it compatible with the basic needs of society. This requires, in turn, a change in the pattern of the allocation of resources and the investment structure.

## 9. Impact of Industrialization and Urbanization on Environment

In the early seventies the developing countries used to consider the question of protecting the environment from the hazards of development an undesirable luxury "item", even though it might be a necessary "item" for the advanced countries "it is obvious that the position of developing countries depends, ultimately, on the relationship between the environment and development. If concern for the environment is to obstruct, in one way or the other, the tempo of development, we cannot expect the subject of environment problems to absorb the attention of these countries"<sup>(4)</sup>.

Mrs. Ghandi, speaking at the 1972 conference on development in Stockholm, expressed her position on the problems of environment pollution within the framework of the development operation as follows:

"Do not poverty and deprivation constitute the worst forms of environmental pollution? How can we speak to those who live in villages and in houses which are more like huts of the necessity to protect the atmosphere, ocean and rivers at the time when their very lives are polluted? The environment cannot be improved under conditions of poverty".

The views of technicians and decision-makers in developing countries on environmental problems started to evolve gradually to the point where a number of them have started to establish agencies specialized in environmental protection, even though they only have limited authority and capability and ultimately are limited in their activity.

There can be no doubt that industrial projects in general have a polluting impact on the environment — air, water or land — and consequently on the human being, which differs in importance according to its extent and the nature of the residuals resulting from it. It is very difficult to estimate the cost of environmental pollution due to the fact that intangible elements are involved. These costs can be divided into four groups.

- Costs of damages arising from pollution, which include direct costs, such as spoilage of crops, decline in health standards and rise in mortality rates.
- Costs of avoiding pollution damages, such as air-cleaning equipment in homes, and the migration of people to areas far away from polluted areas.
- Costs to cut down on the extent of pollution, which include devices and equipment used by factories to reduce pollution by limiting pollutants emitted.
- Costs of materials used in anti-pollution research, planning, and control.

Likewise it is difficult to evaluate the benefits from different forms of spending on the protection of the environment even if it is possible to estimate some of the expenses, because of the difficulty involved of estimating the savings realized from the decrease in illness caused by pollution, as one of the proceeds of those expenses. However, in many cases the protection of the environment gives appreciable direct material benefits, such as the securing of new sources of raw materials or of energy sources, or the improvement of production levels.

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(1) Dr. Mahmoud Abdul Fadeel, *ibid*, p. 8.

(2) Dr. Majeed Masoud, *op. cit*, p. 8.

(3) P. Streeten, *Basic Needs*, 1979, p. 1.

(4) S. Naggar, *Seminaire régional sur le développement et l'environnement*, Beirut, September 1971, cite Y. Laulan, *Le Tiers monde et la crise de l'environnement*, Paris, 1974, p. 30.

A review of industry in the ECWA countries reveals that only recently has there been any concern for the impact of industrial activities on the environment, which is the general case in the developing world. An organic fertilizer factory and a tannery were built in Cairo when they should have been located far from the city. In Syria a number of factories were built west of Damascus, whereas a consideration of environmental factors would have avoided such a location due to the prevailing wind patterns. A phosphate-base fertilizer plant, which will produce over a million tons of polluting phosphatic slag a year, is being built near one of the major cities. The dumping of this slag in a near-by river is not possible, since this would cause pollution that should be avoided in view of the experience of Austria with phosphatic slag. An Austrian factory dumped the same phosphatic slag in the Danube River, but the amount involved was only around 10 per cent of the expected annual slag production of the Syrian plant and the Danube River has a flow of nearly 600 times the minimum flow of the Syrian river involved. Nevertheless, after a number of tests were conducted to determine the impact of this slag on aquatic life, it was decided to halt the dumping of slag in the river, even though the findings were not conclusively negative. Another Austrian company hauled its phosphatic slag by trucks to a dumping site 27 km. away from the factory. In France, the same slag was until recently dumped in the sea. Evidently, the French, or at least the French companies which produce this slag, feel that it is not a source of dangerous pollution, even though the official authorities require that the companies which store phosphatic slag take steps to prevent it from seeping into the soil (it seems that only a simple treatment procedure is required to prevent this seepage into the soil). The companies are also required to constantly check on the dust emitted by the factories to ascertain the effectiveness of their anti-pollution devices. In Rumania, where state-owned chemical industries produce large quantities of phosphatic slag, detailed experiments have been conducted on its impact on the environment. The Rumanians, like the French, affirm that quantities of this slag can be dumped in locations near the cities, as the Rumanians actually do, without fear of the hazard of pollution. Naturally, however, such dumping does have its own impact on the environment in that it takes up large areas which could have been used for agriculture. Hauling over long distances simply to avoid dumping on agricultural lands would not be a practical solution in view of the high costs involved.

At this point we should recall what was mentioned earlier about the fact that the protection of the environment could give substantial direct gains. Studies carried out on phosphatic slag with the intention of protecting the environment from it revealed that there were several ways to benefit from phosphatic slag, the most important of which are:

- It can be used as a substitute for natural gypsum in the making of building blocks; an Austrian company has a factory for this purpose with an annual capacity of 300,000 tons, and a French company has a similar plant of smaller capacity.
- It can be used in the production of cement and sulphuric acid; an Austrian company adopted this solution some years ago to dispose of its phosphatic slag and a similar plant has been built in South Africa.
- It can be used in the production of ammonium sulphides.
- It can be used, at only a small additional cost, for the reclamation of certain types of soil, as is the case in Rumania. This use could be the most effective and profitable, if sound scientific rules are observed, since it could lead to a significant increase in the productivity of the agricultural sector. It is noteworthy that the type of soil which can be reclaimed by the use of phosphatic slag is found in wide areas of ECWA countries, such as Egypt and Syria.

Another example in this connexion is one of the oldest cement factories in Syria. Some of the filters of this plant are old, which causes large quantities of dust, amounting to up to 5 per cent of the plant production. Therefore, the cost arising from the use of new filters to protect the environment by cutting down on the dust generated will be partly offset by recovering the product now lost in the dust. This is estimated to represent savings of 1.8 million Syrian pounds annually, whereas the cost of purchasing and installing the new filters is around 19 million Syrian pounds. Even from the purely financial angle, and without taking into consideration the positive results of the protection of the environment from cement dust, the efforts to protect the environment give positive returns at times.

The rise in the rate of internal migration from rural to urban areas and the concentration of urbanization and industrialization in a limited locality have negative effects on the environment, most noteworthy of which are:

- High urban growth rates led to the growth of the major cities at the expense of agricultural lands in ECWA countries, despite the limited availability of such land; this happened even in the cases where the city was surrounded by very fertile land. Even though the largest two urban centres in Egypt, Cairo and Alexandria, are growing to a large extent on non-agricultural land, in many locations there is serious competition between the expansion of urban centres and the need to conserve agricultural lands.
- A high proportion of migrants are rural youth. As such, urbanization is emptying the rural areas of a large portion of their youth who constitute the potential which could develop the rural environment. Instead of the rural areas benefitting from these elements through their reclamation of arable land, and the evolving of improved living conditions, these areas are left to the aged who are incapable of renewal and development and possibly of even retaining existing levels of productivity. Therefore, urbanization has a negative impact on the agricultural environment in two ways: from the point of the migrants leaving rural areas, and from the point of the agricultural land surrounding the cities to which they migrate.

- The past and present growth of urbanization far outstrips the growth of the housing and services sectors, which reflects negatively on the urban environment to an extent which has reached the level of aesthetic disfigurement in addition to inhuman sanitation conditions.
- Public and private investments in the housing sector in Egypt have failed to keep up with needs. Construction during the fifties was 7 housing units for every one thousand people of the urban population, which is lower than the estimated minimum of 10 units per thousand urban residents needed to maintain the existing housing standard. In the sixties the rate of construction dropped to 2.5 housing units for every one thousand urban residents, with the exception of the construction carried out by the informal sector. This led to an increasing shortage in the housing sector that was estimated to be 1.5 million housing units. The population concentration occasionally assumes dramatic proportions, especially in some central sections of Cairo. The occupancy rate in greater Cairo has been estimated to be 3.1 persons per room and two persons per room in some other cities. Even though this points to a housing shortage overall, the poorer groups bear the heaviest burden. It is also noteworthy that the criteria for subsidized public housing have not been set in a manner that serves the interest of the limited-income groups. Since the housing built by the formal private sector can only be afforded by the higher-income groups, the poorer groups resorted to informal housing construction which they executed themselves on public property without securing building permits. Consequently illegal housing constitutes a sizeable and increasing proportion of housing.

While the lack of secured tenure constitutes the biggest problem facing the urban poor, the environment in turn is also suffering from constant abuse inflicted on it by the absence of regulatory conditions in the districts which were built in this way in Egypt and in other ECWA countries<sup>(1)</sup>.

In the field of services, the consequences of the lack of water networks and other basic services in slum areas which would help to protect the environment from pollution also harm the environment. The cities that are adequately supplied with water in relation to their population are limited. In other cities the water supply in many cases is erratic, while there are severe shortages in water supplies to the suburbs and city fringes, and sometimes no water at all. Drainage services are restricted to only the main sections of the major cities, and only serve around one-half of the urban population. The collection and disposal of domestic garbage from the poor areas of the major cities of the ECWA region poses an important problem since such gathering and disposal is limited to the richer quarters occupied by people of higher incomes. In the poor quarters garbage is thrown in the streets, awaiting its collection by local government agencies.

The scarcity of water, the absence of drains and the dumping of garbage in the streets of slum areas has a highly negative impact on the environment that expresses itself very eloquently. Moreover, there is a shortage of internal transportation facilities within the cities which creates difficulties in movement, over-crowding in public transport and waste of time on the way to and from work.

- The concentration of industrialization and urbanization in a limited number of cities in ECWA countries leads to the accumulation of the polluting effects of the industrial units. While it is obvious that industrial centres in the ECWA are still far from the standards of industrial countries, it should be noted that even though advanced countries have the material and technological means to cut down on pollution, individuals in these countries are still confronted with the pollution problems that the state has not been able to control. This has led them to leave their urban residences and to spend a considerable part of their time commuting to and from the city.
- Finally, once the population of a city exceeds a certain limit, which has not yet been determined by specialists, the concentration of industrialization and urbanization leads to the increase in the costs of services at rates which exceed the growth rate of the concentration. This additional expense is met by the State and industry does not bear the real burden, and consequently the concentration of industry continues, oblivious to the real burden imposed on the national economy.

Despite the difficulty of the economic evaluation of environment protection, due to the number of intangible elements which constitute its non-material returns, this protection can be considered a socio-economic operation the neglect of which will lead to the accumulation of the negative effects on the environment until it becomes imperative that society remove these effects, fully or partially. At that time the cost will be much higher than that which would have been needed for protection at first, regardless of whether that protection be in the form of the choice of project sites, the choice of production technology or the limiting of migration from rural to urban areas.

## **10. Regional Planning for Economic and Environmental Considerations**

### **Industrial Location**

Economic and environmental considerations combine to emphasize the need to adopt regional planning, in addition to national planning, as a means of avoiding the negative economic and environmental consequences of the concentration of industrialization and urbanization in a limited number of cities. The positive influences of centres of development in developing countries are frequently limited in outreach, whereas their negative impact extends far and wide. We have already noted that Cairo, the largest city of the ECWA countries, has been incapable of exercising the

(1) Dr. Majeed Masoud, *op. cit.*, pp. 17-22.

positive influence of a growth centre, which is basically to change the traditional mentality of the individual to a modern mentality, even in the case of those migrating to it from rural areas. The establishment of new growth centres in numerous locations which are characterized by commodity interdependence with the rural areas and with the old centres will make a developmental impact on the nearby rural areas<sup>(1)</sup>.

Naturally it is not logical to expect industrial projects to be located outside the existing growth centres, where there are barely any external economies or economic and social infrastructure. The more advanced growth centres in the advanced countries get the bulk of industrial investments and new projects prefer to be located in these centres, even though an acceptable economic and social infrastructure, including a banking network and manpower with an industrial training aptitude, is available in all parts of advanced countries. It is only natural, therefore, that industrial investments in developing countries be concentrated in growth centres, in view of the lack of adequate infrastructure outside these centres. Therefore, the state must intervene. This has been the case in a number of West European countries (especially Britain, France, Italy, and currently, Greece) where the state intervened on behalf of the less developed areas by taking direct measures (financial or fiscal) or indirect measures (developing the infrastructure, creating industrial zones...) in order to encourage the location of investments outside the more advanced growth centres. In addition, they have taken restrictive measures in connexion with the location of new projects in old growth centres. It is only natural that the differences in production costs between growth centres and undeveloped areas be greater in ECWA countries than in the advanced European countries, a fact which requires that ECWA countries employ more intensely direct and indirect measures to limit the expansion of existing growth centres and encourage the establishment of new centres. It is noteworthy that differences in production costs between factories located in old centres and those located in new centres are gradually decreasing. A comparison study of the production costs of the main factories of various establishments in London and branch factories located outside London indicated that the production cost rates between the latter and the former dropped over a three-year operational period from 178 per cent to 113 per cent in the shoe industry, from 172 per cent to 101 per cent in the production of machinery, and 182 per cent to 109 per cent in the metallurgical industry. This gradual drop in the cost production difference is most probably a world-wide phenomenon, which encourages the adoption of a policy of geographic dispersion of industrial activities.

### Population Re-distribution

Population growth rates and urbanization rates in all ECWA countries are high, but the huge population of Egypt confronts it with an urgent population problem that requires the formulation of a policy designed to alter the traditional migration patterns, especially movement from rural areas to Cairo and Alexandria. Such a policy should also relieve some of the population pressure by establishing urban areas away from agricultural lands in order to protect both the urban and agricultural environments. The population density in the Nile Delta area at present is 1000 inhabitants per square kilometre, and is expected to rise to 2000/km<sup>2</sup> by the year 2000 if the people remain concentrated in the same area. Consequently it is imperative that attention be given to the desert and coastal areas as part of a comprehensive policy designed to establish new, integrated cities which would offer urban employment opportunities that would make them self-sufficient to the extent that they would not be a burden on other large cities. Egypt is currently working on establishing and developing a number of new cities in the following desert areas<sup>(2)</sup>

- The Sinai Peninsula and Suez Canal: Sinai has an agricultural potential that could be developed, given regular scientific efforts. A geological survey should also be conducted to determine the possibility of tapping its mineral wealth. The Suez Canal area also presents a limited agricultural expansion potential. A construction plan has been drawn up for the area, especially for its three main cities, Port Said, Ismailiéh and Suez, under which the population of these cities should reach three million by the year 2000 AD.
- Maryout region: A comprehensive regional plan has been drawn up for the coastal strip north-west of Alexandria which aims at raising the population of that area from the present 200,000 to 2.5-3 million people by the year 2000 AD.
- The Egyptian government has decided to establish three new industrial cities as part of efforts to restrict industrial concentration in Cairo and Alexandria. One city is located 55 km. north-east of Cairo, with plans calling for its population to reach half a million by the year 2000 AD. The second, located 55 miles from Cairo on the desert road to Fayyom, is scheduled under the plan to reach a population of 100,000 by 2000 AD. The third city is located 90 km. from Cairo on the desert road to Alexandria; plans call for its population to reach half a million by the year 2000 AD. In the first two cases it is essential that the new cities be supplied with all the production, services, and administrative elements needed to avoid dependency on Cairo, with all the continued population pressure that such dependency would involve.

The population re-settlement programme in Egypt should have been launched years ago, since it cannot achieve its objectives on a short-term basis. Accelerated implementation imposes heavy burdens on the State and cuts down on the funds available for investment in productive activities. The ECWA countries should learn positive lessons from the experience of Egypt, in the sense that they should take steps to limit migration to the big cities before they reach the point where the execution of resettlement policies has to be accelerated, with the consequent depletion of funds

(1) G.D. Debern *Les industries industrializantes et l'intégration Economique Régionale* pp. 59-60 in *Economie Appliquée* No. 1, pp. 44-77.

(2) The World Bank, *Egypt URBAN DEVELOPMENT PROJECT*, It, p. 4. Also: Dr. Mohamed Subhi Abdul Hakim, *op. cit.*, pp. 78-91.

available for investment in production sectors.

## 11. Strategies of Industrial Development

1. The strategy that gives priority to light industries import substitution: This policy is usually justified on two counts — the first the law of the relative availability of production factors, and the second the size of the market in developing countries.

### 1.1 The law of the relative availability of production factors and the priority of light industries:

The law of the relative availability of production factors stipulates that each country should specialize in the production of goods which absorb comparatively large quantities of production factors available locally in abundance, and only use comparatively small quantities of factors scantily available. It is generally accepted with some exceptions that developing countries are manpower-rich and capital-poor. This applies to the ECWA countries, with the exception of the oil-rich countries of the Gulf. It is also generally accepted that light industries absorb less capital and more manpower than heavy industries (which produce intermediate and capital goods). Developing countries consequently are required, on the basis of the law of the relative availability of production factors, to give priority to light industries.

The law of the relative availability of production factors is based on the classical thinking that prevailed early in the last century, which assumes that the relative availability of production factors in a specific country remains unchanged over the years and that the difference in the relative availability of production factors between one country and another results generally in each state specializing in the production of the products which suit the relative availability of its production factors, with the consequent exchange of products between these countries. The production factors are assumed to be fixed geographically in the countries where they are located, and thus cannot be moved to another country.

The basic weakness of the classical thinking on which the law of the relative availability of production factors is based is that it perceives matters in a static framework, and not subject to change or evolution, which is not true. The United States is a clear example. At the end of the 18th century it was an agricultural country of low per-capita productivity, but today it has become an industrial country with higher per-capita productivity than the countries with a long history of industrial activity, and its relative availability of production factors differs today from what it was in the past. The same holds true for the ECWA countries. The status quo should not be accepted, and intermediate and capital industries should not be considered the exclusive domain of advanced countries, with a consequent shrinking from establishing such industries when it is in the interest of the countries involved to do so. The basic task of development policies is to strive to develop the existing economic situation by formulating economic policies which reject this situation and seek to create a new national economic structure in which the relative availability of production factors differs from that of the rejected structure. Moving from a rejected structure to a new structure requires the adoption of a number of measures, one of the most important of which is to give priority to some heavy industries instead of remaining stuck for a long time within the framework of light industries. In fact a distinction should be made between industrial activities on one hand and capital-intensive technology used in production on the other hand. If it is in the best interests of a capital-poor and manpower-rich country to establish heavy industries, it can establish these industries while exerting an effort to limit the use of capital by choosing technologies of less capital intensity, if there is room for choice, or by depending on the labour element in the operations which supplement production such as internal transport within the factory or maintenance operations. This is the approach adopted by the Soviet Union in contrast to the United States of America.

1.2 Size of Market and Priorities of Light Industry. This argument can be summed up as follows: since the size of the local market in the first stages of development is smaller than the minimum economic volume of heavy industries, whereas it is equal to or larger than the minimum economic volume of a number of light industries, differing from one country to the other, only light industries should be established. Those who put forward this argument do not always deny the various characteristics of heavy industry, but they feel that the size of the market leaves no other choice. In adopting this view they distinguish between two main stages of industrialization, basing this distinction on the impact of the flow of commodities between light and heavy industries on the size of the market of the products of the latter.

In the first stage two types of industries are started. The first type processes primary goods, especially agricultural, into consumer goods (foodstuffs and industrial goods) which meet the final consumption demand. Examples of this type are foodstuff industries, textiles, and cement production. The second type of industries at this stage consists of industries which import semi-manufactured goods and semi-finished goods and transform them into goods which meet final consumption demand through a series of simple industrial operations which often are actually no more than what could be termed "the final touch".

During the second stage, after the increase and diversification of final-product industries, the amount of semi-manufactured goods being processed by these industries becomes large enough to ensure profits for the local factories producing them. This leads to the establishment of such factories. In other words, the backward linkage of finished-product industries will encourage the establishment of heavy industries which will produce intermediate goods. These are the mechanics of the move from the first to the second stage, according to the argument of the size of the market and the impact of the flow of commodities between the light and heavy industries.

These mechanics are not so much a strategy of industrial development as an analysis of the possible course of the

natural or spontaneous development of the industrial sector. It should be kept in mind, however, that there are a number of reasons why owners of light industries prefer to depend on the use of semi-manufactured imported goods and obstruct the establishment of heavy industries. The most important of these are:

- The rise of local industries which produce intermediate and capital goods could impose on owners of light industries the purchase of locally produced goods instead of imported goods even though the former might be of inferior quality or of limited technical specifications, whereas in the absence of these industries the factory owners can choose any quality or specification, regardless of the identity of the producing country.
- The establishment of local industries for intermediate goods could encourage some investors to establish light industries to transform these goods into finished products that could compete with the products of the old light industries which depended on imported intermediate goods.
- The geographic locations of light industries established during the first stage are chosen after consideration of the fact that the source of primary materials is the outside world. If local industries which produce these primary or intermediate goods are established, then the ideal location for light industries which process these goods into finished products could differ from the first location. This would deprive the old light industries of the advantage of the ideal geographic location.

Actually, the industrialization strategy that gives priority to light industries on the basis of the argument on the size of the market and the import substitution strategy are parallel. This is evident from the fact that according to the latter industrialization must begin with the establishment of industries which will have such a volume of product revenues as to ensure proceeds for local factories. Naturally in the developing countries only the revenues from light industrial products can reach the volume that will ensure proceeds for local factories, whereas the volume of revenues from heavy industrial goods does not ensure income for the factories until after the increase and diversification of light industries (consumer). Only at that point, according to the import substitute strategy, can heavy industries be established. Here again, the movement from the first to the second stage is confronted by the same difficulties that we have referred to in relation to the strategy that gives priority to light industries and protective tariffs, thus imposing upon the industrial sector features which, to say the least, hinder development. Since we have reviewed these features in our analysis of the pattern of industrialization in the ECWA countries, we will only mention them here: Bias towards consumer industries, pressure on the balance of payments, bias in the allocation of resources, negative impact on the performance level and difficulty of penetrating world markets.

## **2. The Strategy that gives priority to heavy industries.**

Great value is set by modern economists on the attraction (linkage) or interdependence of various economic activities. This linkage can be backward, forward or a combination of both. This strategy adopts attraction or linkage as the criteria for determining priority between light and heavy industries in view of the dynamism and speeding of development that results from this linkage. A study on the linkage of economic activities showed that heavy industries, especially the steel industry, exert high backward and forward linkage. Consequently the special concern shown by developing countries for steel production should not be attributed to concern for prestige. However, the absorptive capacity of the markets in developing countries constitutes a very serious obstacle to the implementation of this strategy.

## **3. Comprehensive Concept of Industrial Development Strategy.**

The launching point and the golden rule of this strategy is the exigency of raising the standard of living of the largest possible number of people. It is well-known that agricultural workers constitute the bulk of the population in developing countries. It is also a well-known fact that giving priority to the establishment of light industries which produce finished products designed to meet individual demand for personal consumption does not necessarily lead to improved living conditions. This is achieved rather through the establishment of industries, the products of which can be used to raise productivity standards. The question then posed is this: What are the means that will be instrumental in raising the productivity levels of agricultural workers, who constitute the bulk of the labour force?

Raising the productivity of agricultural workers requires, first of all, the introduction of fundamental changes in the social structure, in the ownership system, and in the system for marketing agricultural products so as to create conditions that will encourage work. However, whatever changes are introduced into the social structure, the ownership system and the system for marketing agricultural products, productivity cannot continue to rise unless workers will use modern implements and equipment. Another factor which is equally important to the raising of the productivity of agricultural workers is fertilizers. Consequently, priority should be given to the industries which produce these two products; these industries, which are heavy industries, have a number of vital features in addition to the fact that their products are essential for raising the productivity of agricultural production. The steel and metallurgical industries produce, in addition to agricultural machinery and implements, the machinery used in the industrial sector. As such they represent the basis of the formation and development of the fixed industrial capital. These industries also represent a major source for the development of technology and as such represent a basic condition for the realization of independent technical progress which is compatible with the needs of the national economy. In fact, the absence of these industries in any particular country means the dependence of that country on the countries that supply it with that machinery and those installations, be it in terms of the technical-economic characteristics of these machines and

installations, or in terms of the rate and pattern of this country's technical progress. The fertilizer industry exerts a strong linkage effect on other chemical industries.

Two main conditions must be fulfilled, however, before the steel, machinery and fertilizer industries can effectively play a role in the development of the national economy. The first condition is the need for the effective organization of the spreading of technological progress, because these industries can only create a satisfactory impact in an environment that has been prepared for that purpose. An example of this condition could be that it would be wasteful to supply fertilizers to the farmer before teaching him how to use them. Therefore, the agricultural sector must be prepared and trained to handle industrial products (machinery, implements and fertilizers) and to benefit from them. The second condition is that these products, or most of them, should be used within the geographic boundaries of the producing nation. The establishment of steel, machinery and fertilizer industries is vital, not because of the foreign currency income they would generate in the event of the export of their products, but because of the positive impact on the industrial and agricultural productivity arising from the placing of modern production means at the disposal of local production projects.

The success of this strategy, which basically deals with the problem of the priority of light or heavy industries within a wide framework, depends on the fulfilment of a number of conditions, most important of which are:

- This strategy can only be applied in countries in which the State intervenes directly and actively in the national economy, especially in industry, because the private sector usually refrains from investment in intermediate and capital industries during the first stages of development in favour of investment in light industries. This strategy also requires that a new priority list for the evaluation of industrial projects be drawn up that will on one hand reject the traditional criterion of profitability, which is sacred to the private sector, and will on the other hand take into consideration the direct and indirect impact of heavy industries, so as to avoid neglect of the dynamic impact that these industries give to the national economy.
- The application of this strategy requires that special efforts be exerted to carry out land reform. The development of the structure of socio-economic relations in the agricultural sector is a prerequisite for realization of the desired impact of heavy industries.
- This strategy requires that the problem of financing in the first stages of industrialization be dealt with, and this consequently requires an austerity import policy.
- Due attention must be given to periods or time spans. Changing the structure of the agricultural society requires a time span of several years, and only after such a period will the farmer be capable of using new agricultural implements. Likewise the establishment of heavy industries requires a number of years (a fertilizer plant in one of the ECWA countries started production over ten years after the signing of the original contract for the establishment of the plant, even though the plant is of comparatively modest size).
- The minimum economic volume of most heavy industries is higher than the absorptive capacity of the national markets of developing countries. Therefore, the application of this strategy requires industrial co-ordination between neighbouring countries.

## 12. Proposed pattern of Industrialization

The strategy that gives priority to light industries is nearly identical with the import substitution strategy, and we have seen the impact of the latter on industrialization in the second section of this paper. The strategy that gives priority to heavy industry concentrates on the importance of the forward and backward linkage effect in the choice of the priority listing of industries, regardless of the nature of the goods produced, which should be given primary attention. Industries producing products which when used raise the productivity of the largest group of labourers, namely that of agricultural workers, are given priority in the comprehensive concept of industrialization strategy. This concept ignores or does not address itself clearly to the importance of moving towards meeting the basic needs which have been developing during recent years. The pattern of industrialization which ECWA countries, in our opinion, should seek to adopt is that which realizes the following two objectives:

- first, meeting the basic needs of the public, especially of low-income people;
  - second, allocation of resources in a manner that will ensure an increase in the national product.
- **Meeting basic needs**

We have noted that the import substitution strategy means the creation of a local industrial production structure that reflects the consumption patterns of high-income groups, whereas the structure should primarily reflect the basic needs of the majority of the population, who actually are low-income groups. In order to rectify the course of industrialization, each country should define these needs, so that they can serve as an indicator of the industries that should have priority. The basic needs differ from country to country, as they do within the same country from time to time, according to the country's development. It is vital at this point that all social groups, especially those of low-income, participate in determining these basic needs in such detail as not only to state the nature of the goods, but also to spell out the specifications. A refrigerator can be considered a luxury item when designed according to the specifications of demand in industrial countries, and can be considered a basic need in the city when it is a mere ice-box, in one portion of which an ice-block is placed while the other section is reserved for preserving foods. Likewise,

housing can be a palace built with a wasteful use of materials, or a house designed to meet the need at the lowest cost. The most important basic needs are food, clothing, shelter-equipped with running water, electricity and drains, health, education, transportation and communications services, and opportunity for self-realizing employment.

#### — Allocation of resources

This means here the rationalizing of the allocation of resources or production factors or their distribution between the production of consumer intermediate and capital goods and their rationalization from the point of the aggregation of production factors. Concentration on production to meet basic needs and the consequent needs for the allocation of resources should not lead to the neglect of the production of intermediate goods, so that bottlenecks that could arise from dependence solely on imports can be avoided. A balance should likewise be established for the production of consumer goods and of capital goods, which are considered the source of consumer goods. Therefore, a balance must be observed in the allocation of resources for the production of consumer, intermediate and capital goods. In the context of intermediate and capital goods, priority should be given to those goods (agricultural machinery and implements and fertilizers) that increase the productivity of the largest group of workers, namely the agricultural workers. We have already noted previously that progress in land reform and due attention to time spans are two basic conditions for the use of machinery, implements and fertilizers to realize the desired goal of increased productivity. This strategy should also give priority on one-hand to the development of "independent technological research and creative thought and the development of the linkage between the products and the resources available nationally and regionally (contrary to the import substitution strategy which develops linkage between the final products and the resources available for them in the advanced world), and on the other hand to independent administrative development designed to create and develop incentives to raise the performance level and "sanctity" of productive work. Japan successfully realized the latter two.

With reference to the ratios of the aggregate of production factors (or technology), work opportunities should be made available for all the work force, not only in order to mobilize all potentialities and to utilize them in production, but also because employment is one of the basic needs of the individual, being the means for him both to express himself and to feel that he is a useful factor in society. This requires that ECWA countries which are relatively capital-poor and labour-rich utilize high labour-intensive technology. It could be claimed that development is being slowed down by the giving of priority to meeting basic needs, since this will limit the growth rate of savings and investments. This actually is not true because the giving of priority to meeting basic needs is part of a strategy of rationalization of resource allocation designed to increase the national product and at the same time boost consumption and investment, in a manner that will allow simultaneously for an actual decline in the rate of savings and investments and an increase in the level of savings and investments.

Recommendations contained in this paper, especially those on avoiding under-utilization of production capacities, the market size, technology, and on regional planning for economic and environmental considerations, should be taken into consideration within the framework of the proposed pattern. Finally, we reaffirm the necessity of the adoption of social and economic criteria as the scientific means of evaluating projects and assessing their efficiency in a manner that can show numerically the direct and indirect socio-economic impact of all the variables involved in the project. Consideration of these criteria will lead to the avoiding of centralization of projects, to the rational choice of production technology, to the limiting of migration, to the distribution of income in a more equitable manner, and to the minimizing of the negative impact of industrialization and urbanization on the environment.

**ENVIRONMENTAL IMPLICATIONS OF OIL  
AND ALTERNATIVE SOURCES OF ENERGY IN THE ECWA  
REGION**

by  
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## ENVIRONMENTAL IMPLICATIONS OF OIL AND ALTERNATIVE SOURCES OF ENERGY IN THE ECWA REGION

### I. Introduction

Oil produced great growth resulting in a considerable increase in **per capita** income and therefore a rise in the standard of living as defined by consumption of goods and services.

This oil-produced growth led to the significant spread of certain goods such as cars, electricity, household appliances and television sets. Furthermore, in every oil-producing country in the region there was a considerable growth in educational, health and social security services. In most countries, some sort of welfare State was established where the state assumed responsibility for a series of social services including pensions, medical care, family allowances and unemployment benefits.

The rise in income, development of new technology and services and increased urbanization were accompanied by a marked trend towards standardization of life styles. Another major contributing factor to this standardization was the development of television and other mass media which spread certain stereotyped images considered symbols of prosperity that people sought to imitate. Obviously standardization of life styles led to cultural loss and to a reduction in variety.

From another angle, the oil industry has encroached upon the environment with problems of pollution and depletion. Environmental conservation, to be effective, has to be integrated into planning at government and private industry levels. Obviously environmental conservation is not a new issue for the petroleum industry. Improved oil-water separation techniques, development of smokeless flares, noise reduction in refineries and a variety of steps taken to protect employee health in the plants are examples of progress made by the industry. The latter can further contribute in the technical areas to define levels and methods. Governments, on the other hand, have the task of weighing environmental conservation goals against other social needs, aspirations and demands. Each country has different social priorities in housing, water supplies, food and sanitation, to mention only a few.

Environmental protection is an integral part of what is called the quality of life which involves economic and social factors as well as pleasant physical surroundings. How do you quantify the quality of life which obviously contains subjective elements? Basic health, safety, food and shelter are obvious priorities. Beyond this, however, the selection of environmental priorities becomes increasingly difficult. For example, what is the right balance between clean air and the availability of convenient transport?

Furthermore, wise resource management and responsible stewardship of the world's natural resources are essential for the benefit of this and future generations. Petroleum is a resource which is limited and which is being presently depleted at a high rate, although it is accepted that it must be used as wisely as possible for the good not only of the present generation but also of future generations. Patterns of wasteful and irrational use of fossil fuels will accelerate the rate of depletion. Policies regarding utilization of energy resources and their conservation have to be developed. The rich countries currently consume a large proportion of the world's natural resources. The present patterns of production and activities in the export field are leading to rapid exhaustion of the more easily accessible and cheap resources. Those with purchasing power have determined the composition of output.

Through OPEC there is a greater awareness of producing-country interest and hence the conflict between producers and consumers. The rich industrialized nations with a high propensity to consume would prefer an unrestricted flow of oil to the world market. On the other hand the interests of the leading oil-producing countries demand a conservationist approach in order both to maintain its prices and to limit the rate of depletion.

Moreover transnational corporations control much of the world's trade in natural resources through a large network of subsidiaries, affiliates and associates. In a very real sense they have been the institutions of resource management, responsible for fixing prices of both intermediate and final products. Furthermore their size and vast financial resources enable them to maintain technological superiority over their rivals, the Governments. Therefore, it becomes necessary to control them.

As guidelines new patterns of development should induce changes in the life styles to stop the wasteful and irrational use of oil and gas, in order not to endanger the environment or the development prospects of future generations. It is in this connexion that the present paper attempts to study and present environmentally oriented new patterns of development and to examine the alternative sources of energy with the aim of ensuring a greater use of renewable and recyclable resources. Furthermore solutions in terms of alternatives have to be carefully developed keeping in view the social, economic, cultural and ecological aspects of the problem. Only in this way would it be possible to effect sustainable improvements in the quality of life.

## II. Environmental Implications of Oil in ECWA Countries

### A. IMPACT ON INCOME DISTRIBUTION

The great wealth generated by oil in the producing countries has resulted in **per capita** incomes which are among the highest in the world. Thus, **per capita** income in Kuwait for 1975 was 11,640 US Dollars<sup>(1)</sup>, that of the United Arab Emirates was 13,500 US Dollars, and that of Qatar was 7,240 US Dollars<sup>(2)</sup>.

This wealth is not evenly distributed among the population of the oil producing countries, there being substantial differences in the incomes of the various classes of the population. The states concerned, however, have attempted a redistribution to some degree through the generous schemes of social services, education, pensions, medical care and unemployment benefits available to all nationals.

In some of the ECWA countries, with fabulous wealth accumulated in the hands of the few, social stresses may appear demanding a fairer distribution.

On the other hand this immense wealth has also produced another sort of distinction, this time between the haves and the have-nots within the ECWA group of states with the resulting stresses, since at the lower end of the scale you find countries such as the Yemen Arab Republic with **per capita** income of 180 US Dollars<sup>(3)</sup> and Egypt with **per capita** of 310 US Dollars for the year 1975<sup>(4)</sup>.

### B. IMPACT ON PATTERNS OF CONSUMPTION

Consumption habits have a pronounced social character. Modern industry has been characterized by its endless need for ever expanding markets. Consumer habits have been shaped by advertizing and other marketing techniques. The result has been the creation of voracious appetites for all sorts of material goods, objects and gadgets which are looked upon as factors of the good life. Industry, led by the single motive of profit maximization, has relentlessly increased its production, with a parallel encouragement of increased consumption. This rush to accumulate material goods has led to the significant spread of certain goods such as cars, household appliances, radio and television sets, etc.

### C. OIL REVENUES AND ECONOMICS DEVELOPMENT

The oil-producing countries in the ECWA region are still developing countries. The way the oil wealth is acquired and the way it is spent influence behaviour and attitudes which are not always conducive to economic development. The government, as the first recipient of oil wealth, has a greater economic role than in an ordinary developing country. Moreover the government has the financial means to exercise this role, but does not always have the administrative structure, the manpower and the institutions required to accomplish its task. Governments with the financial means at their disposal are not always able to implement projects without excessive waste, inefficiency and delays.

From another angle, as one of the tasks of the government is to redistribute oil revenues through public expenditure, much income will inevitably be received in the form of open or disguised handouts. Excessive numbers in the Civil Service, lavish welfare programmes, purchase of land from individuals by the government at high prices, generous housing loans, are some examples of such handouts. This is far from being ideal from the point of view of economic incentive, attitudes to work and economic development.

Oil revenues are not the reward of factors of production. The oil industry employs an extremely small proportion of the labour force but generates a huge share of the national income. The general attitude is that the oil revenues belong to everybody in the nation as a natural inheritance or right, without any productive contribution or effort as a counterpart.

Again there is pressure to spend immediately on a variety of projects. The spending spree has been directed to human needs, development, investment and arms. The mental attitude is that since oil is depletable (within 30, 40 or 60 years) it is essential to develop other sectors and other resources and to develop them fast.

The spending spree caused problems: inflation, congestion, disruptions, social tensions and illicit practices.

Through the immigration of workers and high level manpower, the opening-up of business opportunities for firms of the poorer Arab countries in the oil-exporting economies, the large financial transfers from oil rich countries to the rest of the region in the form of emigrant remittances and loans from the various Arab Funds, and tourist expenditure, some of these economic curses have been imported into the non-oil-producing countries. The result has been inflation, high prices for real estate, and wage level increases in the non-oil-producing countries as well.

Another factor impeding proper economic development is waste resulting from insufficiently thought-out priorities and plans. There has been excessive investment because investment projections have been well beyond realization. Furthermore the cost of imported capital goods and skills has been **extremely high** and there has been **lavishness** in the design and construction of projects. Again the technology chosen for these projects has been very **capital**

(1) UN/ECWA. Demographic and Related Socio-Economic Data Sheets for countries of the ECWA No. 2 Beirut, January 1978.

(2) Ibid.

(3) Ibid.

(4) Ibid.

intensive, induced mainly by foreign representatives and salesmen<sup>(1)</sup>

Another social cost of the oil revenues has been that the new wealth has weakened the awareness of the importance of non-oil sectors in the oil-producing countries, such as agriculture.

#### D. INCREASED URBANIZATION

The oil industry has resulted in increased urbanization. This urbanization has taken place in two ways. First, the industry has created its own cities around its operations, such as Ahmadi in Kuwait and Dhahran in Saudi Arabia. Second, people who have made money in the industry itself or in the parapetroleum industries move to cities and towns together with the large number of job-seekers who are also moving to find jobs in the new industries developing around the cities and towns.

Consequently urban population all over the region represents a high percentage. There are real city-states like Kuwait (urban population 88.3%, Qatar (88.6%) and U.A.E. (84%). Even in countries with large rural areas there is a significant urban concentration. Thus Iraq has an urban population of 66 per cent, Lebanon 70 per cent, Syria 47.3 per cent and Egypt 44 per cent. In Saudi Arabia the urban centres, where the oil activities and other businesses are centered, account for 59 per cent of the total population. The exception is the Yemen Arab Republic where the urban population is only 8.8 per cent but growing very rapidly at the rate of 7.5% per annum.

As regards the coastal areas of the Arabian Gulf, the urban population is increasing at the rate of approximately 10 per cent per annum (500,000 per annum). Further, coastal dredging and mining for land-filling material, with 90,000 new homes and 95 square kilometres of newly urbanized land needed each year, degrade the environment.

This urban growth has created problems.

Thus in Iraq whole families uproot themselves from their villages and gravitate to the cities and towns. Almost 60 per cent of the urban population is in the age-group of 5 to 20<sup>(2)</sup>. The increased population will automatically cause an increase in sewage. Because of the flat terrain sewage must be pumped and this has always been a problem. Often the flow in pipes is static, causing the sewage to turn septic and to produce gases which corrode the pipes<sup>(3)</sup>. Overpopulated areas have poor environmental sanitation where citizens are vulnerable during any outbreak of a cholera epidemic<sup>(4)</sup>.

In the **United Arab Emirates** the coastal areas are already experiencing certain problems which will intensify in the future. These include poor health and sanitary conditions, inadequate housing, over-fishing of some stock, and pollution from oil related activities, such as tanker and cargo transport<sup>(5)</sup>. "Gulf Mirror" on February 14, 1977, reported that "houses along the coastline in Ajman are crumbling into the sea. The houses were already condemned to make way for future development but winter storms have taken their toll. It is estimated that the coastline is being eroded by several feet a year"<sup>(6)</sup>.

In **Qatar** the natural growth of population and immigration rate would require annually some 6 km<sup>2</sup> of additional habitation land and facilities<sup>(7)</sup>. The housing problem aggravated by the massive influx of expatriate workers continues to be one of the government's major headaches. Despite large scale housing projects demand continues to outstrip supply<sup>(8)</sup>. The city of Doha is embarking upon an expansion of its waste-water treatment system. The present treatment capacity of the plant is between 6800-9000 m<sup>3</sup> per day. The treated effluent is re-used for irrigation in the city<sup>(9)</sup>.

In **Bahrain** in addition to a 3.4 per cent population growth rate there is some 10 per cent annual immigration. This requires an additional km<sup>2</sup> of habitation land and facilities per year<sup>(10)</sup>. In order to diminish the demographical pressure in the urban zones of Manama and Muhanaq, the enlargement of the city of Isa has been undertaken, where land has been donated by the State. Housing is one of the government's chief worries, as it is throughout the Gulf, where this pattern of rapid growth is too familiar. The government has ambitious low-cost housing programmes. Bahrain needs 2,500 houses a year to tackle the housing problem over the coming years. The current target of the Ministry of Housing is to construct 2,000 housing units a year by 1982<sup>(11)</sup>

In the **People's Democratic Republic of Yemen** a large section of the population of the Aden Governorate live in

- (1) For further discussion, see Yousef Sayegh, **The Social Cost of Oil Revenues** and R. Mabro, **Oil Revenues and the Cost of Social and Economic Development**, in **First Arab Energy Conference**, Abu Dhabi, 4-8 March 1979.
- (2) UNDP **Iraq Country Programming Exercise Background Paper**, Baghdad, April 1973.
- (3) UNEP/ECWA **Report of the Joint UNEP/ECWA Mission on Human Settlements Technology in the ECWA Region**, November 1977.
- (4) Anonymous, **"Problems of Environmental Pollution in Iraq" Seminar on Industrial Development and Environmental Pollution**, Baghdad, 14-16 November 1976.
- (5) UNDP **Survey of Coastal Areas** Project UAE/75/001, 1975.
- (6) Ames, J. **"Problems of Environment: A Proposal for Pilot Projects of the Environment in the U.A.E."**, February 1977.
- (7) Anonymous: **A Study of Gulf Region**, 1977.
- (8) Cooper, Roger ed. **Gulf Guide and Diary 1979**, The Middle East Review Co. Ltd., Essex, 1978.
- (9) ECWA **"The projection of water demands for ECWA countries by the year 2000"**, a paper presented to the **Second Regional Water Meeting**, 30 December 1978-3 January 1979, Riyadh, Saudi Arabia, E/ECWA/NR/CONF.3/8 December 1978.
- (10) Anonymous: **A Study of Gulf Region 1977**.
- (11) World Bank, **Bahrain: Current Economic Position and Prospects**, June 28, 1978.(1) Saad, Nadia **"Mission Report on People's Democratic Republic of Yemen"**, 30 January-9 February 1976, Beirut.

slums, at times with 6 persons to a hut, and with health and sanitation conditions falling below minimum standards.<sup>(1)</sup>

### **E. STANDARDIZATION OF LIFE STYLES AND CULTURAL LOSS**

A number of factors were conducive to a standardization of life styles. The most important among these factors was certainly the rise in income. Other factors were: imported technology, imported personnel, the organization of uniform services in the country and increased urbanization. Another major contributing factor to this standardization was the development of television, the cinema and other mass media. These means of communication spread certain stereotyped images considered symbols of prosperity that people sought to imitate.

The importation of large numbers of cars, gas ovens, refrigerators, record players, records, tapes, transistors and other gadgets, as well as western clothing, developed a uniform taste and style of life which were materialistic in content.

This society came to be described as a "consumer society" the main characteristic of which was to make people scramble to accumulate material goods many of which are of doubtful use or value. Non-material aspects of life and traditional values (family ties, friendship, spiritual endeavours) were weakened if not utterly destroyed. Furthermore, old skills and crafts are dying out.

A conspicuous example of a blind importation of foreign life styles, when the local life style is more suited to the climatic conditions, is architecture. The tall steel and glass buildings in some of the areas are most unsuited to a sunny and warm climate. People through their wisdom and collective experience had developed a thick-walled style with narrow streets for permanent shade and cool interiors. This is being replaced. Again western clothing does not particularly seem to be suitable to the local climatic conditions which certainly favour a light gown-like garment.

The result of all this has been that, with the coming of wealth and the increase in financial means, western life styles are being adopted and there is the great danger that, under the impact of the values of western consumer societies, national cultural identities will wither away.

## **III. Encroachment of the Oil Industry Upon Environment**

### **A. POLLUTION**

Environmental conservation is not a new issue. Such conservation, in order to be effective, must be integrated into planning at government and private industry levels. In modern life it is impossible to avoid pollution completely and there exists no industry that can be made entirely pollution-free. Governments have the task of weighing environmental conservation goals against other social needs, aspirations and demands. For example, to make available to the public a convenient public transport system, which is obviously a desirable social benefit, some pollution must be accepted. Of course, each country has different social priorities on housing, water supplies, food, sanitation, and transportation, to mention only a few. Environmental protection is an integral part of what is called the quality of life which involves economic and social factors as well as pleasant physical surroundings. Besides the obvious priorities which are basic health, safety, food and shelter, the other constituent elements of the quality of life are very subjective and difficult to quantify. The selection of environmental priorities, therefore, is a matter of discretion for each community. Accepting this as a premise, we all agree, however, that to reduce pollution resulting from oil operations is an urgent necessity that gains everybody's consent.

The oil industry is an old hand at environmental conservation. Improved oil-water separation techniques, development of smokeless flares, noise reduction in the refineries, cleaner smokes and other discharges, safety measures to protect employee health in the plants are examples of progress made by the industry. While the Governments are taking the socio-economic decisions in connexion with pollution, the oil industry should help them in the technical areas by defining the desirable levels and methods.

For a better understanding of the problems related to pollution, the various stages of operations in the oil industry must be examined, with the purpose of defining the areas and problems and making suggestions to reduce the pollution to acceptable levels.

#### **1. Drilling**

Under certain conditions an accumulation of mishaps can lead to a blow-out, which means an uncontrolled flow of fluids from a well to the atmosphere. Such a blow-out can have a great impact on the environment and cause considerable losses in human life, resources and equipment. Control of a blow-out may be a time consuming and expensive exercise. Blow-outs must therefore always be prevented. Effective blow-out prevention depends on proper well planning and continuous monitoring and control of the drilling operations. Furthermore reliable equipment and sound procedures and techniques are essential tools to ensure that drillers perform properly their tasks and to eliminate erroneous decisions or actions. The personnel have to be instructed and trained to understand the problems encountered to make sure that the proper control equipment is used and the right procedures are applied. Today's greater well depths have made it increasingly more difficult to operate and hence the increased necessity of planning

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(1) Saad, Nadia, "Mission Report on People's Democratic Republic of Yemen", 30 January-9 February 1976, Beirut.

and control in view of the greater risks involved. To meet these greater challenges and to minimize the chances of blow-outs occurring, the industry continues to improve available equipment and techniques<sup>(1)</sup>.

## 2. Offshore development

Exploration for oil and gas began towards the end of the last century: wells were drilled from piers off the coast of Southern California to extend an onshore field. In the late 1920's development started in Lake Maracaibo in Venezuela, and later drilling took place in the Caspian Sea near Baku.

After World War II the search for oil was intensified and this led to drilling in the shallow waters of the Gulf of Mexico. The next step was the exploration of deeper waters off the Louisiana coast and eventually exploration in other parts of the world, including the Middle East, Nigeria and Australia. The capability of the oil industry to explore and exploit oil wells in deeper and deeper waters in offshore areas has developed considerably and today it has become possible to work in depths of several hundred metres in the extremely severe weather conditions of the North Sea.

Today offshore oil production represents about 17 per cent of the total world production. With the increasing world demand for oil and gas and decreasing onshore discoveries, it can be expected that this proportion will at least double by the early 1980's.

In the oil-producing countries of the ECWA region, a large number of offshore wells are in operation, producing a substantial part of the oil exported from the area. The recently developed principles of International Law and the Geneva Convention on the Law of the Sea of 1958 have made it possible for the Gulf States to make unilateral declarations extending their rights to explore and exploit the sea-bed and the sub-soil to areas beyond their territorial waters, and to enter into bilateral agreements with their neighbours dividing the continental shelf (the entire Gulf falls within the definition of Continental Shelf).

Offshore work cannot proceed without a lifeline extending to the shore where a wide range of essential supporting services have to be developed. These will include administrative, supply and construction services. These services will depend on adequate road, rail and air links to supply centres. They will depend too on a work force. The resulting influx of people to the area will have an environmental effect through the construction of houses, schools, shops and leisure facilities.

The areas where offshore operations are taking place within the ECWA countries were not already industrialized regions and therefore basic communications, transport facilities, etc., had to be developed, with a great impact on the environment.

*In offshore operations pollution results mainly from the following:*

Emissions of sulphur dioxide and hydrocarbons into the air result mainly from the flaring of gas produced with the oil. Also there are the operational and accidental discharges of oil into the sea. These discharges should be kept to a minimum.

Another cause of pollution could be the drilling muds. Fluids are circulated around a drilling string to lubricate it, transport the drill cuttings to the surface and line the walls of the borehole. The result is an oil-based mud which should be transported ashore for treatment, together with any oil-contaminated drill cuttings.

Problems may also be caused by what is known as "Produced Water". This is water drawn from the reservoir associated with oil or to a much lesser extent gas. The water may occur naturally or arise from water injected into the well to maintain pressure and oil flow. The ratio of water to oil in the produced fluids can vary depending on factors such as the geological characteristics of the field and the degree of depletion of the reservoir. The produced water must be treated and then re-injected into the well if necessary, or discharged over the side.

Treatment is also required for displacement water. This oil-containing water results from a system under which the oil is displaced by sea water when oil storage tanks are emptied, and vice versa when they are filled.

Again rain falling on oil contaminated surfaces should be collected and passed through a treatment system which will allow any oil to be separated before the rain water is discharged overboard.

The environmental impact of oil terminals is of two kinds: one kind arises during the constructional phase and the problems arising are those associated with most civil engineering projects, namely excavation, movement of heavy vehicles, dumping of waste soil, etc. The other results from oil spills during oil loading and the discharge of contaminated ballast water.

Apart from oil loading, terminals are normally also designed to receive ballast water which tankers have taken on board during their inward journey. Water which has been in contact with oil must be treated prior to discharge into terminal waters. Several treatment processes are available. The 1973 **International Convention for the Prevention of Pollution from ships** calls for segregated ballast in new tankers greater than 70,000 tons (dead weight).

Finally, we should look into the question of accidental spillages from offshore drilling and production operations. Such accidents leading to significant oil spillages are rare events, but they could happen as the recent Mexican oil

(1) For further discussion see A.W.J. van den Hoek, "Drilling Well Control", UNEP/ISS./J/3, UNEP Industry Sector Seminar, Petroleum Industry Sector Seminar, Petroleum Industry and the Environment.

spillage in the Gulf of Mexico proves. National governments must have contingency plans consisting of procedures and stocks of cleaning-up equipment. In many countries special legislation makes it a requirement that the operator accepts responsibility and demonstrates adequate insurance coverage and contingency plans in case oil spills occur. ECWA countries seem to be lacking in this respect and should enact legislation to protect themselves against prospective claimants who may suffer injury (to themselves or their property) from such spills.

Despite stringent precautionary measures and controls, offshore and terminal operations will unavoidably result in some discharge into the surrounding waters. Monitoring therefore becomes an essential tool in determining the effects of these discharges of the environment, especially in connexion with flora and fauna.

If these measures, including monitoring, are going to be effective, there is need for planning and co-operation with governments and the oil industry. What is now planned to protect the environment should be assessed not only in the current context but also for future guidance. Effects should be anticipated and dealt with in comprehensive long-term planning programmes and not piecemeal. Finally, in deciding the level of environmental protection the different view points must be considered and therefore it becomes necessary to have an exchange of information between government and industry <sup>(1)</sup>

Attached as an appendix, Table A-1 lists the Offshore and Onshore Activities with Environmental Impact, Table A-2 gives the figures on oil production offshore and onshore and Table-3 shows the oil introduced into the oceans and the quantities under each of the operations.

### 3. Transportation of oil and its environmental impact

The amount of oil transported by sea has increased by nearly 7 times (10 times for crude oil) during the past 20 years. In terms of pollution marine transportation is responsible for one-third of the total input of oil into the sea.

The group of experts on the Scientific Aspects of Marine Pollution has defined marine pollution as follows:

"Marine pollution means the introduction by man, directly or indirectly, of substances or energy in the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazard to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of the quality for use of sea water and reduction of amenities".

Oil is popularly regarded as an important pollutant of the marine environment because it is visible, as it is frequently found on beaches as lumps or smears (so-called "tar" or "tar balls"), and is therefore a great despoiler of coastal amenities. Oil is a killer of sea birds and in enclosed waters may produce a marked mortality in many species.

Oil pollution arising from maritime transportation is broadly divided into the following two categories:

- (a) deliberate (or operational) pollution; and
- (b) accidental pollution.

Under the first heading the main source of pollution is the ballast water carried by tankers, equivalent to about 40 per cent of the deadweight in the case of VLCC's in order to maintain adequate stability.

In the early 1960's the oil industry introduced a procedure known as the Load on Top (LOT) (sometimes referred to more recently as the Retention on Board (ROB)) whereby washings and oily water from ballast are retained on board the ship for settling and separation of oil from water and the separated oil is then incorporated into the next shipment as a cargo oil.

It is estimated that at present about 80 per cent of tankers use LOT. This system, together with other control measures introduced since 1954, such as discharge at special places at terminals for the purposes of treatment, has played an important role in reducing oil pollution, although the quantities of oil carried by sea have greatly increased.

The average amount of oil discharged during a ballast voyage is estimated to be about 0.35 per cent of the deadweight of the ship. On the basis of 1,400 million tons of crude oil transported by sea in 1973 (the peak year), almost 5 million tons would have been discharged to the sea. However, Table A-3 (Appendix) referred to previously shows that the actual quantity from this source (LOT and non-LOT tankers) is estimated to be only 1.08 million tons. This shows that a substantial reduction in operational oil pollution (around 80%) has been achieved by the adoption of improved procedures and other measures.

As regards accidental pollution, the major sources are tanker accidents resulting in massive oil spills which can cause very severe local damage to the marine environment. The most significant cause of this type of pollution is that involving stranding or collision, usually due to human error. This demonstrates the close interrelation between measures for the improvement of safety at sea and those directed specifically at pollution prevention. This is why efforts are being made to improve navigational procedures, and the qualifications of ship-masters are important factors in the prevention of accidents and the reduction of consequent marine pollution.

Substantial oil spillages, mainly in harbours and berths, also arise from mishandling of oil loading or unloading equipment, leakages from hoses and couplings, and similar incidents.

(1) For further discussion, see M.T. Westaway "Environmental Impact of Offshore Development" UNEP/ISS.5/3, UNEP Industry Sector Seminar, Petroleum Industry and the Environment.

The first multilateral effort to conclude an international agreement for the control of pollution from ships was the **International Conference on Pollution of the Sea by Oil** convened in Washington early in 1926.

Later the conclusion of the **International Convention for the Prevention of Pollution of the Sea by Oil, 1954**, was a significant achievement in that the problem of pollution and control measures was tackled at the international level. It dealt with operational discharge of oil from ships, especially tankers, with the principal aim of protecting amenities, such as beaches, from pollution by oil discharged during tank washing and ballasting operations.

An international conference on marine pollution was convened by IMCO in 1973. This conference proved to be a milestone in the history of international efforts for the prevention of marine pollution. The **International Convention for the Prevention of Pollution from Ships** was adopted by the conference. The implementation of the said Convention would substantially achieve the elimination of operational pollution by oil and other noxious substances and the minimization of accidental spills.

The Convention, with the aim of controlling the discharge of pollutants from ships, provided for the:

1. Establishing of discharge criteria for oily waste and other pollutions.
2. Designation of special areas within which discharge is totally prohibited or strictly controlled.
3. Operational procedures to comply with discharge criteria.
4. Provision of equipment for controlling and monitoring the discharge of waste.
5. Construction of ships with segregated ballast tanks.
6. Development of new techniques and methods for cleaning, recycling and disposing of harmful substances carried by ships.
7. Provision of shore-based facilities to receive and treat water from ships.

With the aim of preventing maritime accidents resulting in pollution, the Convention made provision for:

1. Safe navigational procedures and ships' routing schemes for the prevention of collisions, strandings and groundings.
2. Development of performance standards for navigational aids.
3. Watchkeeping practices in port and at sea and the training and certification of seamen.
4. Compulsory provision of modern navigational and communications equipment.
5. The operational procedures during the transfer, loading and unloading of oil and other noxious substances.

Finally the Convention recommended appropriate remedial measures for pollution (contingency planning, salvage and methods of dealing with spillages).

IMCO has attached great importance to the promotion of technical assistance to developing countries in the field of marine pollution. The technical assistance activities of IMCO are implemented through national and regional technical assistance programmes with financial support by the United Nations Development Programme or by the United Nations Environment Programme. The types of technical assistance programmes include:

1. Supply of equipment and personnel, for example, to the Arab Maritime Academy in Alexandria.
2. Expert missions to provide technical advice.
3. Fellowships whereby persons from developing countries are trained in institutions and other establishments in developed countries<sup>(1)</sup>.

A number of ECWA countries have not yet signed or ratified this Convention. It is suggested that they do so because of the great benefit they will derive from it, under the regulatory and control powers it confers upon the signatories.

#### **4. Crude oil pipelines**

The effect of a pipeline on the environment is such that constructors must include about 10 per cent of the total construction cost as cost of environmental protection. The major items are: protection of rivers and streams, wildlife conservation, aesthetics, revegetation, and the cost of environmental monitoring by government agencies.

Considerable research has been done on the problems of dealing with spilled oil in soil and groundwater. Such spills may occur of course from pipeline leakages or from any other cause resulting from the use or transport of oil.

When oil is spilled on land the action to be taken will depend upon a variety of factors. No one contingency plan can be written that would cover all situations. The man on the spot must have sufficient background knowledge to be able to assess the situation that he faces and to select the most effective course of action. The principles involved and the measures that can be taken have been summarized by the American Petroleum Institute in publication No.4149, December 1972, **"The Migration of Petroleum Products in Soil and Ground Water"**.

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(1) For further discussion, see Y. Sasamura, "Environmental Impact of the Transportation of Oil, UNEP/ISS.5/3, UNEP Industry Sector Seminar, Petroleum Industry and the Environment.

Oil and oil products that escape on land create several potential hazards: fire and explosion; contamination of ground water supply; damage to the environment; damage to underground utilities, such as telephone cables.

The mechanisms of migration of oil products are complex, but where sufficient data are available it is possible to predict whether a given amount of oil is likely to reach a water table or to estimate the depth to which it is likely to migrate in the soil.

Once petroleum products have escaped into the soil and ground water, it is necessary that they be contained and recovered.

Microbes, mainly bacteria, will degrade hydrocarbons in the environment. Biodegradation in soil is one method used currently to dispose of refinery wastes. There is a possibility that biodegradation might be used to clean up hydrocarbons in subsurface soils and even in ground water<sup>(1)</sup>

##### **5. Environmental conservation and refining**

The problems of environmental pollution by refineries may be divided into the following groups:

- (a) unpleasant sensory pollution;
- (b) air pollution with refinery emissions;
- (c) water pollution.

Annex Table A-4 lists various compounds, most of which might be found around a petroleum refinery, with their threshold limits. Anything exceeding these threshold limits constitutes an odour nuisance.

Another kind of unpleasant sensory pollution is noise pollution which is defined as an unwanted sound. Noise disturbs the environment and exposure of humans to excessive noise can produce physical and psychological disorders, and will have some adverse effect on the quality of work and productivity. Such noise can affect the workers and the surrounding community. Regular noise survey analysis must be carried out by industrial hygiene and acoustic engineering experts and suitable control measures implemented. Noise suppression can be accomplished by containment and absorption of the sound waves by silencers, barriers and special enclosures or by redesign of equipment to reduce gas velocity or mechanical noise.

A reasonable separation between heavy industry with its noise sources and quiet residential areas provides normally a satisfactory solution to community noise pollution.

A third aspect of sensory pollution is visual pollution which means visual annoyance by refineries resulting from the state of cleanliness, landscaping, architectural style, colour selection and even the industry's advertising. It also includes smoke, emission of particles, flares, oil spills, exhaust steam and dust particles settling on people's personal property.

It is therefore obvious from the above that considerable weight should be attached to sensory pollution in selecting plant sites.

As regards air pollution with refinery emissions, it differs according to the capacity of the refinery, the types of units and installations, operation control and monitoring systems, efficiency of repair, maintenance, management and staff training and orientation activities, and the types of crudes used.

Many countries are enforcing stringent laws and regulations on environmental pollution, tightening standards of emissions and allowable pollutants.

ECWA countries are lacking with respect to the enactment of such laws, regulations and standards.

Petroleum storage tanks are one of the most important sources of hydrocarbon emissions which take place through evaporation. To remedy this it is important to enforce through legislation the use of floating roofs for tanks with a capacity greater than 40,000 gallons and to devise vapour recovery facilities for more volatile products.

Pollution also emanates from catalyst regeneration systems, crude distillation units, cooling towers and oil separator ponds receiving hydrocarbon-containing wastes. In the case of the catalytic crackers the pollution results from the emission of particulate matters, CO, Hydrocarbons and SO<sub>2</sub> into the atmosphere, while in the case of the crude distillation units, cooling towers and the oil separator ponds, it is through hydrocarbon evaporation. Correcting devices would consist of precipitators, burners incinerators and flaring systems for the crackers, and vapour recovery systems for the others.

The problem of air pollution is especially important when a plant is periodically closed down for maintenance and inspection. During this operation the purging of towers, containers and pipe systems causes an enormous quantity of

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(1) For further discussion, see R.E. Watkins "Crude Oil Pipelines" IPIECA paper, UNEP Industry Sector Seminar, Petroleum Industry and the Environment.

products to be conducted into the separators and settling ponds, thereby releasing certain amounts of gases into the atmosphere. To avoid environmental pollution all gases collected from the system should be ducted to the flare.

There is also another source of pollution which emanates from boilers and furnaces. Refining requires considerable quantities of fuel to produce the heat and energy necessary for processing. Refineries burn in their boilers and furnaces any type of fuel available, such as heavy residues, natural gas or refinery gases.

Annex Table A-5 lists emission sources in refineries.

Finally, refineries may become a source of pollution by allowing liquid effluents to pour into a river, lake or the sea without proper treatment. Also, oily water emanating from tank cleaning, line flushing and ballast water must be treated, through gravity separation and biological treatment<sup>(1)</sup>

## **6. Pollution from automotive emission**

Economic development, industrialization and urbanization in different countries have been accompanied by increased mobility and the growth of overdependence on transportation in both the private and the public sectors. Possession of a motor vehicle has become a necessity of daily life and a status symbol. However, despite the undoubted benefits of the motor vehicle, society is becoming increasingly aware of the disadvantages associated with its intensive use for it is one of the major contributors to air pollution and noise, as well as a source of congestion and accidents.

The main impact on the environment of the motor vehicle arises from its use. Although the industry has already made considerable improvements in its products, especially in relation to noise and safety, a great deal remains to be done to produce a convenient, durable, low-polluting, low-energy consuming, motor vehicle.

The motor vehicle is the major contributor to carbon monoxide levels and hydrocarbons and, to a lesser extent, to nitrogen oxide (40-60%), suspended particulate matter, polycyclic aromatic hydrocarbons, aldehydes, airborne lead and aerosol sulphates as well as odours. Under certain meteorological and other conditions the hydrocarbons and nitrogen oxides may react on the atmosphere to give photochemical oxidant air pollution.

It is incomplete combustion that results in the formation of carbon monoxide, soot and aldehydes. Again, the quantity of nitrogen oxides formed depends upon the combustion conditions.

The combustion of gasoline in engines is clearly less complete than the combustion of gasoil in diesel engines.

## **7. Pollution from the Petrochemical Industries**

In the human working and living environment, petrochemical industries emitting carbon dioxide, carbon monoxide, ammonia gas, fluoride gas, etc., present serious respiratory hazards. Such gases can accumulate for long periods in the stagnant air temperature inversions which characterise some parts of the Arabian Gulf. Furthermore, the carbon dust and gases emanating from such industries may produce thick blankets of smog for long periods over the urban areas.

## **8. Regional efforts to combat pollution**

A number of ECWA countries belong to the Mediterranean region. Three agreements on Mediterranean pollution that were signed in Barcelona in 1976 came into effect on February 12, 1978. These three accords required the formal ratification of at least 6 of the 18 Mediterranean coastal states to enter into force. Lebanon ratified the Barcelona agreements on November 8, 1977 and was among the first six states to ratify the agreements. Syria ratified on December 26, 1978.

One of the agreements commits Mediterranean countries to protecting the sea, their common heritage, from pollution "for the benefit and enjoyment of present and future generations". The other outlaws the dumping of certain dangerous substances from the land or by ships at sea and strictly controls dumping of less toxic wastes. The third treaty calls for co-operation in combating massive oil spills.

The dumping treaty contains a "black list" of substances that in no case can be dumped by ships or aircraft into the Mediterranean. These forbidden substances include mercury, cadmium, persistent plastics, DDT, crude oil and other hydrocarbons. The treaty's "grey list" consists of substances considered somewhat less dangerous, that can be dumped into the sea but only with authorisation from the appropriate government. These substances include lead, zinc, copper, cobalt, silver, cyanides, fluorides and disease-causing micro-organisms.

UNEP agreed to act as the Secretariat of the Barcelona Convention and in this capacity to co-ordinate the Mediterranean Action Plan, which is a co-operative programme conceived and controlled by the Mediterranean countries.

In February 1979 representatives of 17 Mediterranean governments and the European Economic Community

(1) For further discussion, see M.H. Mofidi "Environmental Conservation in the Petroleum Industry with Particular Reference to Refining" UNEP/ISS.5/4, UNEP Industry Sector Seminar, Petroleum Industry and the Environment.

agreed to a programme of co-operation for the years 1979 and 1980 and by establishing a 3.28 million dollar Trust Fund took over the major responsibility for the Mediterranean Action Plan.

In late June 1979 technical and legal experts from the Mediterranean governments and the European Economic Community reached broad agreement on the draft text of a future protocol controlling pollution from man's activities on land, such as factory wastes, municipal sewage and agricultural pesticides and fertilizers.

As regards the Arabian Gulf, the problems of pollution are very critical, because of exceptional conditions. This is the world's fastest-growing industrial region, gaining half a million people annually. With 1,200 kilometres of coastline around a shallow, warm and exceptionally salty sea, the Gulf is the main outlet for the world's richest oil-producing region. About 100 ships enter the strait of Hormuz into the sea every day. Some 60 per cent of all the oil carried by ships throughout the world is exported from the Gulf. Industrialization, petroleum complexes, oil tankers, the very salty sea, high temperatures and humidity, all pose a major threat of pollution.

The Gulf varies in width from about 75 to 350 kilometres. The average depth is only 34 metres, but shore waters less than 10 metres deep stretch for many kilometres into the sea. Further, the region has the greatest concentration of desalination plants in the world, channeling fresh water to the land but returning extremely salty water to the sea.

Moreover 142 major coastal plants are in existence or planned. These include 60 refineries and other oil plants, 11 cement plants, 8 fertiliser plants and 26 desalination and power plants. On the Arab coastline of the Gulf industrial investment averages 40 million dollars a kilometre of coast.

Moreover pollution of coastal areas from the sea is further increased by the fact that winds and surface currents drive the wastes towards the shore, and the hot and humid air, characterised by long-term air inversions, is capable of causing serious accumulated air pollution from the refineries, petrochemical, cement and metal industries.

Without action the Gulf would probably reach saturation point by the end of the century. But the Gulf states decided to act.

Eight countries of the Gulf, at a meeting convened by UNEP, have signed agreements in 1978 designed as the first step in promoting an environmentally sound development through joint action.

The framework convention, entitled **Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution**, the first of the two treaties adopted, states in its preamble that the eight countries "realize that pollution of the marine environment in the region by oil and other harmful and noxious materials arising from human activities on land or at sea, especially through the indiscriminate and uncontrolled discharge of these substances, presents a growing threat to marine life, fisheries, human health, the recreational uses of beaches, and other amenities". The signatory states agree to "prevent, abate, and combat pollution caused by intentional or accidental discharge from ships, by dumping from ships and aircrafts, by discharges from land reclamation and associated coastal dredging".

The second treaty, the **Protocol Concerning Regional Co-operation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency**, calls on the signatories to "co-operate in taking the necessary and effective measures to protect the coastline from the threat and effects of pollution due to oil or other harmful substances resulting from marine emergencies".

With the approval of the two anti-pollution treaties and of an Action Plan, Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates also agreed unanimously at their conference in Kuwait in April 1978 to set up a Bahrain-based emergency aid centre to co-ordinate action against oil spills by setting up a permanent pollution monitoring system to identify origin and size of oil spills and to scrutinize uncontrolled dumping and waste disposal into the Gulf's waters. The centre will be equipped with pollution-fighting vessels and aircraft.

The signatories have also decided to create a 6.3 million dollar Regional Trust Fund and establish an organization in Kuwait to protect the marine environment.

The Action Plan aims to achieve an assessment of the state of the environment, the development of guidelines for the management of those activities which have an impact on environment, the development of legal instruments providing the legal basis for co-operation, and the devising of supporting measures including national and regional institutional mechanisms. UNEP will provide the know-how for the organization to manage the Action Plan in the first stages.

As of April 1, 1979, Bahrain, Iraq, Kuwait, Oman and Qatar had deposited their instruments of ratification with the Kuwait Government, depositary of the Convention. On June 30, 1979, that is ninety days after the fifth ratification, the Convention came into force.

## B. DEPLETION

Wise resource management and responsible stewardship of the region's natural resources are essential for the benefit of this and future generations. Petroleum is a resource which is limited and which is being presently depleted at a high rate, although it is accepted that it must be used as wisely as possible not only for the good of the present generation but of future generations.

An ECWA study supplies the following information:

"The five countries in the ECWA region which are members of OPEC (Iraq, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates) accounted in 1976-1977 for 54 per cent of OPEC crude exports, compared to 42 per cent in 1970, and this upward trend is likely to continue.

At the beginning of 1978, the region accounted for 47 per cent of world proved crude oil reserves. Annual production in the past 25 years sustained an average growth rate of 9.2 per cent, as against 6.3 per cent for the rest of the world. Moreover, the region's annual production has been as of 1976 larger than the cumulative output of the first 28 years of production, approaching 6 billion barrels or 28 per cent of the world total. The cumulative output of the past 7 years (1971-1977) exceeded all that the region had ever produced before (37 billion barrels).

The rate of depletion is in direct relation to the desirable date of depletion to be fixed for the proven reserves. Depletion dates of reserves that are acceptable to the region are estimated on the grounds that oil should be able to provide the fuel, raw material and foreign exchange required for a rapid and balanced development and diversification of the region's economies for as long as it cannot be replaced by alternative sources of energy that would be available at competitive prices and in sufficient quantities.

Oil is a scarce, depletable and non-renewable resource. However, its rate of depletion has been accelerated far beyond the development needs of the exporting countries, for the benefit and rapid growth of the world economy, particularly the industrialized countries. Oil mostly serves today for energy production, which is not its optimal use, but this will anyway continue until appropriate and competitive alternatives are developed in sufficient quantities"<sup>(1)</sup>

One Arab economist has stated:

"The process involves unduly fast depletion of the precious and irrecoverable hydrocarbon resources of the Arab world. The volume of production and therefore of financial resources earned is distinctly in excess of the totality of the legitimate and justifiable needs of the producers (national, regional and international needs). To produce beyond such a volume would result in the accumulation of surplus financial reserves the real value of which would be eroded heavily"<sup>(2)</sup>

## C. WASTEFUL AND IRRATIONAL USE

The rich countries currently consume a large proportion of the world's natural resources. The present patterns of production and activities in the export field are leading to rapid exhaustion of the more easily accessible and cheap resources.

The average energy consumption per capita (tons of oil equivalent), GDP per capita and the Energy/GDP for the year 1976 for four industrialized countries are given hereunder:

Table 1  
Comparative Energy/Output Relationships, 1976

	Gross GDP per capita Dollars	Energy consumption per capita (tons of oil equiv.)	Energy/GDP Ratio Index US = 100
U.S.	5,960	8.3	100
France	4,740	3.5	54
West Germany	4,350	4.5	73
Sweden	5,460	6.1	82

Source : Energy Future: Report of the Energy Project at the Harvard Business School Edited by Robert Stobaugh and Daniel Yergin.

The United States alone is consuming around 30 per cent of the total world production of energy. This certainly contains an element of waste, as the following table on energy consumption of U.S. v. West Germany in 1976 indicates:

(1) See ECWA Paper (Medium and Long Term Projections of the Demand for and Supply of Energy in the ECWA Region "First Arab Energy Conference," 4-8 March 1979, Abu Dhabi, U.A.E., pp. 6-7, vii, xx and xxi.

(2) Yousef Sayegh, op. cit.

**Table 2**  
**Energy Consumption — 1976**  
**United States v. West Germany**

Per Capita	U.S.	West Germany
Total Energy Consumption	1.5	1.0
<b>Per Capita</b>		
Transportation	4.0	1.0
Residential	2.0	1.0
Commercial	2.0	1.0
Industrial Food, Paper, Chemicals, Steel	1.2—1.6	1.0

U.S. total energy consumption is 150 per cent (1.5) as compared to that of West Germany rated at 100 per cent (1.0).

**Source :** A.R. Rescorla, **Environmental Conservation in the Petroleum Industry — Current Impacts and Trends**, UNEP/ISS.5/7 UNEP Industry Sector Seminar, Petroleum Industry and the Environment, Vol. 2 p. 720.

If the American style of life and growth pattern of energy consumption is to be generalized, world consumption of energy would reach fifteen times the actual oil production. If this consumption pattern becomes universal, the impact on the physical environment would be disastrous. This pattern of consumption is obviously excessive, contains a good proportion of waste and is based on an irrational use of energy. This pattern has developed as a result of cheap oil in the past.

Obviously the oil issue is a global one. ECWA countries, as we have seen, produce a large share of the world production, while this is consumed largely in another region of the world. In the past the pattern of consumption in the industrialized world has governed the rate of production and hence the rate of depletion in the producing countries. Now a point has been reached where two conflicting interests are militating against each other. The rich industrialized nations with a high propensity to consume would prefer an unrestricted flow of oil to the world market, while the interests of the leading oil-producing countries demand a conservationist approach in order both to maintain its prices and to limit the rate of depletion. Surely the answer is on the side of conservation.

An analysis of the fossil fuel consumption in the U.S.A., Japan and Western Europe in 1970 has shown that about half of the total supply is wasted in the process of conversion of fuels into more convenient forms of energy and in the transportation of energy. The reasons for these losses are the low inherent efficiency of power generation (steam turbines) and of transportation (internal combustion engines) and to a lesser extent efficiency losses in industrial processes and in domestic and commercial heating equipment. In addition substantial avoidable losses are incurred in the use of energy, for example by insufficient insulation of buildings and inefficient uses of cars and other means of transportation (low load factors, traffic congestion, etc.).

Speaking of conservation and rationality in the use of oil and gas, mention must be made of the necessity to preclude the use of fuels for "inferior end uses". The utilization of gas in electrical power generation is a perfect example of this term. It has been pointed out that over 61 per cent of the uses of gas today are so called inferior end uses<sup>(1)</sup>

Petroleum is a raw material too valuable to be burnt for inferior uses and should be conserved for its use as feedstock for many chemical, petrochemical and pharmaceutical industries. As long as no alternative is available petroleum must also be used for road and air transportation, despite the very low overall efficiency of these uses.

#### **IV. New Development Patterns within the Oil Industry**

There are certainly new areas of development for the oil-producing countries of the ECWA region in the following fields:

##### **1. Shipping**

Currently, the total Arab fleet of tankers makes up about 2 per cent of the world tonnage of tankers at a time when Arab States generate about 30 per cent of world seaborne trade of oil, measured by volume. The difficulties encountered seem to be caused basically by two facts: the first is that it has been impossible to obtain up till now a preference in the carriage of oil for tankers of Arab oil producing countries. The second is the fact that all oil is traded on an f.o.b. basis, leaving the power of cargo reservation to the consignees rather than the national tanker fleets. It has been suggested that OPEC countries should link the sale of crude oil and products to the use of producing states'

(1) Alkema, H.J. and Newland, E.V. (1974), *Increased Efficiency of the Use of Energy Resources*.

tankers in the carriage of a determined proportion of such crude and products.

## 2. Refining

Less than 12 per cent of OAPEC's production of crude oil is refined within the member countries. This percentage can be increased substantially. It is logical for the processing of energy to be carried out in the producing countries and it is fair for such countries to be partners in the processing operations. The leaders of the area have made various public statements to the effect that it is no longer acceptable to them to export energy and have it come back to them in manufactured form at an exorbitant price. In order to ensure markets for refined products, the tying of the sale of such products to the sale of crude oil by the producing countries is certainly a possibility.

## 3. Marketing

There has been a good deal of resistance on the part of the oil companies to allowing the producing countries of the region to have a fair share of their downstream operations in general, and their markets in particular. The efforts made in negotiating the prospects of market entry within the context of the Arab-European dialogue in the late 1970's have not produced great results. Little progress has been made by producing countries in securing direct access to major industrial markets for crude oil and petroleum products. Here again, the tying of a certain percentage share in the marketing for the producing country to the sale of crude oil would be a practical solution of the problem.

## 4. A fuller Utilization of Gas Resources

There must be a fuller utilization of ECWA region's gas resources. As late as 1974 about two-thirds of the gas produced by the five leading Middle East oil producers was flared. This was associated gas, a small percentage of which was used to operate companies' installations or was reinjected to maintain reservoir pressure. Over the recent years utilization of natural gas in the region has increased tremendously. At present, it is being utilized in the production of LNG (Liquified Natural Gas), LPG (Liquified Petroleum Gas), in the generation of electricity, in the desalination of water, in the energy intensive industries such as metal-processing and as feedstock in the petrochemical industry. Such utilization can further be increased and new options are always available for the producing countries, such as the use of natural gas as a fuel for local refineries. Further, natural gas can substitute for petrol or diesel in transportation. At present, natural gas compressed to about 200 kg/cm<sup>2</sup> is used for fleets of trucks and taxis in many parts of the world. The refuelling is accomplished either by replacement of the high pressure cylinders, which takes a few minutes, or by refilling the cylinders without removing them from the vehicle which takes considerably longer. The cost of compressed gas is comparable to the current cost of diesel

In this connexion it must be stated that most of the natural gas being produced in the region is from associated gas. However, the region has huge reserves of unassociated gas which are still awaiting exploitation.

Such new developments within the oil industry will produce real benefits when the managerial and technological dependence on Western transnational corporations ends. Indigenous managerial skills will have to be developed and fair guidelines for transfer of technology at reasonable cost should be adopted.

## V. Alternative Sources of Energy — Renewable and Recyclable Resources

With the intention of studying and presenting environmentally oriented new patterns of development, it is now proposed to examine alternative sources of energy with the aim of ensuring a greater use of renewable and recyclable resources and with the purpose of identifying and promoting alternative patterns of development and life styles.

### A. SOLAR ENERGY

"Solar energy is free, clean, safe and generously and widely distributed in the Region. Moreover, solar power technology is simple and could be easily transferred to and assimilated by developing countries"<sup>(1)</sup>. Further, solar costs are likely to follow a downward trend due to rapid technological advancements such as cheaper silicon cells.

Almost all member countries are at present engaged in solar energy development projects.

**Bahrain** is investigating possible solar power uses for water desalination, heating and cooling, in cooperation with British and German firms. It is also cooperating with Kuwait in some of the research work.

In **Egypt** some research into prospects for solar energy and in solar panels for heating is being carried on.

**Iraq** has a small desalination unit. The Foundation for Scientific Research has established an energy unit which will initiate the development of solar energy projects. It is particularly interested in the establishment of "Solar Villages" where the energy required would be produced by solar energy devices.

**Jordan** recently installed a power and desalination station at Aqaba and cooperates with German firms and Kuwait. There are two factories making solar water heaters in Jordan.

**Kuwait** has recently signed a contract with a German company for the construction of an experimental solar power station. Research on the use of solar energy is mainly done through the Kuwait Institute for Scientific Research.

"In **Oman** 2 solar-powered pilot plants having 20 square metres each of photovoltaic silicon cells may soon be

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(1) ECWA Paper "Medium and Long-Term Projections of the Demand for and Supply of Energy in the ECWA Region". First Arab Energy Conference 4-8 March 1979, Abu Dhabi. p. 63.

installed in two Dhofar villages.

In **Qatar** a British solar generator has recently begun operation.<sup>(1)</sup>

**Saudi Arabia** has perhaps the most significant energy research programme in the area of development of solar energy, with a variety of projects most of which are being carried out in cooperation with United States institutions. In 1974 a joint Commission on economic cooperation was set up by the United States and Saudi Arabian Governments. It deals with solar energy research, among other projects. In October 1977, under a five-year US\$ 100 million agreement, the project "Solaris" was launched to fund solar energy research and applied development. The finance is divided equally between Saudi Arabia and the United States. In addition to research into the use of solar energy for heating and cooling, other less conventional areas will also be examined including biomass conversion, wind and ocean energy, and photovoltaics. Projects so far announced include a solar powered air conditioner to be developed for Riyadh University in cooperation with an American institution, and work on a project to provide solar power for electricity generation, water desalination, heating and cooling for a village near Riyadh. In April 1978 a US\$ 1.4 million contract was also signed with the French Société Française des Recherches Thermiques et d'Energie Solaire (Sofretes) for the construction of the first solar-powered electricity plant in Saudi Arabia to be used for lighting and for pumping water. A Saudi-Swiss joint venture (Sotec) is building an experimental solar-powered desalination plant at King Abdul Aziz University.<sup>(2)</sup>

After the above cursory survey of the work being done in the area of solar energy, it becomes apparent that some action is badly needed. Existing and potential Arab talent should be helped and encouraged to work in the areas of research, development and industrial application. An Arab programme of solar energy must be prepared for the purposes of research and development. The institution created to organize the programme should also help in advising any governmental or private organizations in the Arab world on all matters related to solar energy.

One of the ideas often advanced is the creation of an "Arab Solar Research Centre". Another is an "Arab Solar Energy Commission" with an Executive Board to propose a programme of action, define policies, plans and strategies<sup>(3)</sup>.

## B. HYDROELECTRICITY

In **Egypt**, electricity generated from hydroelectric power stations has grown steadily since 1960 when the Aswan Dam began production, and after 1967 when the High Dam power station began operations. A 500 KW transmission line runs from the High Dam to Cairo and a 220 KV system from the Aswan Dam to just short of Cairo. Hydroelectricity reached its peak as a percentage of total electricity generation in 1974 when it accounted for 72 per cent of the total. Since then thermal electricity has been increasing in importance<sup>(4)</sup>.

Under the Qattara depression project, a canal is planned from the Mediterranean sea to the Qattara Depression in the eastern desert, which is from 50 to 60 meters below sea level and covers an area of some 30,000 sq. km. The hydro energy created when channelled to a power station could in principle produce ten times the electric energy produced by the High Dam. At present the best method of digging the canal is still under study.

Another ECWA study gives the following information regarding the countries listed hereunder:

**Iraq's** first hydropower plant was completed at Samarra in 1972, with a capacity of 84 MW. Another project is to be commissioned towards the end of this decade at Dokan, with a 400 MW capacity. Both plants are expected to generate 1.87 billion KWH by 1980.

Hemrin and Derbandkhan hydropower stations are expected to be completed by 1985, with capacities of 50 MW and 240 MW respectively. It is also planned that a capacity of 500 MW would have been installed at Haditha station and 600 MW at Mosul dam by 1990.

In **Lebanon**, there are 5 hydroelectric installations owned by Electricité du Liban, the national electricity company, with a generating capacity of 219 MW, 70 per cent of which is at the Litani plant. In addition, there are a few privately-owned stations selling their production to the national network and adding up to a capacity of 26 MW.

The **Syrian Arab Republic's** most important resource for hydropower and irrigation is the Euphrates river, accounting for 88 per cent of the country's water resources. The first of the Euphrates basin development scheme, comprising a reservoir, a dam and a power station, with a capacity of 800 MW will become operational in 1979.

Further, there are plans for a new Hydroelectric plant on the Khabour river, a tributary to the Euphrates, to be operational in 1987 with a capacity of 150 MW.

(1) Ibid.

(2) ECWA Paper: Aspects of the Role and Operation of Energy Institutions in Selected Arab Countries — First Arab Energy Conference, 4-8 March 1979, Abu Dhabi, U.A.E. p. 16.

(3) Ali Kettani and A. S. Malik "Solar Energy in the Arab World", First Arab Energy Conference, 4-8 March 1979, Abu Dhabi, U.A.E.

(4) ECWA Paper "Role and Operation of Energy Institutions in Selected Countries of the ECWA Region", First Arab Energy Conference, 4-8 March, 1979, Abu Dhabi, U.A.E.

There are also existing hydroelectric stations at Wadi Baradah (7MW) and at Rastan (8MW)"<sup>(1)</sup>.

### C. NUCLEAR POWER

Whether the introduction of nuclear energy in the Region for large-scale electricity generation is a sound option on economic, social, political and environmental grounds, is an important subject which deserves careful investigation and scrutiny, particularly in a region endowed with tremendous hydrocarbon resources and sunlight.

Plans have so far been reported in 5 of the 12 countries in the Region, 4 on a commercial level (Egypt, Iraq, Kuwait and the Syrian Arab Republic) and 1 on a research and experimental level (Saudi Arabia).

**Egypt** has a training reactor of 20 MW and it has planned with foreign assistance to have a 600 MW unit. There are three nuclear authorities: for nuclear power, nuclear materials and nuclear energy research.

"**Iraq's** Atomic Energy Commission was established back in 1956. Research is going on at the Nuclear Research Institute (Tuwaitha) and at the Nuclear Research Centre (Baghdad) with experimental reactors. Cooperation agreements have been concluded with France, Italy and the USSR. France is reported to provide a 70 MW training reactor and to install a 600 MW nuclear plant which would be fully operational in 1985.

**Kuwait** has plans up to the year 2000 which envisage the installation early in the second half of the 1980's of a station of about 600 MW, which would be followed around 1990 by a plant of the same size. The construction of 2 more stations of 1,200 MW each would subsequently be considered, thus allowing for a total capacity of 3,600 MW by the turn of the century. A cooperation agreement has been signed with the United Kingdom. The acquisition of a 50 MW research reactor has been under consideration. A nuclear energy commission is to be set up.

**Saudi Arabia** has no intention at present to introduce nuclear energy on a commercial scale, but considerable emphasis is being put on research and development. A nuclear medicine centre was established in Riyadh. The Ministry of Petroleum and Minerals is at present in control of nuclear energy affairs pending the establishment of an atomic energy commission.

The **Syrian Arab Republic** established an Atomic Energy Commission in 1976. It is planned to have 3 units of 150 MW capacity each in operation by 1990"<sup>(2)</sup>

It has been suggested that an Arab Energy Institute with particular emphasis on nuclear energy be created. One author has recommended "a massive and concerted effort, financed by oil money and on an Arab-wide cooperative basis, to prospect for uranium and thorium ores".<sup>(3)</sup>

### D. GEOTHERMAL ENERGY

A study refers to prospects in the Region in the following terms:

"Prospects do exist in certain areas. In **Democratic Yemen** there is a hot spring at Sidara which gives birth to the river Wadi Hajar. **Jordan** is at present investigating the possible use of geothermal energy in the zerqa-Ma'an Rift Valley. Saudi Arabia has also plans in this respect. In **Yemen**, geothermal potentials do exist, particularly in the area of recent volcanic activity near Dhamar, with temperatures reaching 180 degrees Centigrade of dry heat on the surface. There are also hot springs in various parts of the country. Some assistance in studying the possibilities of exploiting these energy sources came from Italy in 1975 and in 1976."<sup>(4)</sup>

### E. OTHER ENERGY SOURCES

Wind energy, tides and biomass (organic matter from plants and animals) conversion are considered today as other alternatives suitable for the Region in the long run. These, together with the plentiful resources of unassociated natural gas, solar energy and, to a lesser extent, nuclear power, may constitute the future oil alternative energy resource base for the Region, with natural gas also replacing oil for non-energy uses.

Biogas is a kin to natural gas and it can have a vast variety of applications in industry. In addition it can also be used to produce carbon dioxide<sup>(5)</sup> On the Maya farms in the Philippines biogas has been used on an experimental basis for a large variety of operations such as canning, industrial cooking, running petrol engines and refrigerators, and generating electricity<sup>(6)</sup>. A large variety of small scale industries can be run and many new uses can be introduced<sup>(7)</sup> But running medium or large scale industry on biogas must await the possibility of the production of biogas on a large enough scale (such as biogas from tropical bogs). Using biogas to substitute for or complement natural gas, oil and coal in industry is, in general, an ecologically sounder course.

(1) ECWA Paper "Medium and Long-Term Projections of the Demand for and Supply of Energy in the ECWA Region", **First Arab Energy Conference**, 4-8 March, 1979, Abu Dhabi, U.A.E. pp. 58-59.

(2) Ibid.

(3) M. El-Wakil "The Nuclear Energy Option for the Arab Countries", **First Arab Energy Conference**, 4-8 March, 1979, Abu Dhabi, U.A.E.

(4) ECWA Paper "Medium and Long-Term Projections of the Demand for and Supply of Energy in the ECWA Region", **First Arab Energy Conference**, 4-8 March 1979, Abu Dhabi U.A.E. P. 64.

(5) A.K.N. Reddy "Technological Alternatives and the Energy Crisis", **Economic and Political weekly**, vol. XII pp. 1486-89.

(6) S.K. Subramanian, **Biogas System in Asia** (New Delhi, Management Development Institute, 1977), p. 34.

(7) Arjun Makhijani, "Economics and Sociology of Alternative Energy Sources," **ESCAP Regional Seminar on Alternative Patterns of Development and Life-styles in Asia and the Pacific**, pp. 31 and 32.

Like natural gas biogas can also be used as a fuel in total energy systems. Thus, methane obtained by purifying biogas can be compressed in high pressure cylinders (about 200 kg/cm<sup>2</sup>) and used for supplying power to irrigation pumps and tractors. In China the use of biogas for cooking has increased dramatically in the last few years to the point where about 7 million household biogas plants are now reportedly in operation. There are at present 100,000 household units in India and the Republic of Korea <sup>(1)</sup>

It may also be possible to use treated garbage to generate gas in neighbourhood plants in towns. Such biogas can provide fuel for cooking and perhaps for small scale industry.

Sewage gas was used for transportation in a number of countries, principally during the Second World War. Two trucks were operated for about 2 years during 1942-1944 in Bombay with gas from the municipal sewage treatment at Dadar. Similar uses were common in Europe during the same period<sup>(2)</sup>

There is another source of biogas which could supply more than adequate quantities of fuel, were it to prove technically feasible. The vegetation which grows in tropical and subtropical bogs is the most efficient photo-synthetic converter of solar energy. The amounts of biogas produced annually in tropical and subtropical bogs is enormous — about 15 billion tons — which is approximately equal to the world's energy use today, excluding wood and crop residues<sup>(3)</sup>.

It is assumed that appropriate new energy technologies, however, would not be available on a large scale in the Region before the year 2020. The Region's oil reserves, consequently, will have to last at least until then. This assumption will have to be reviewed regularly in the light of developments on the energy scene. It could be pushed further into the future in case no or too slow progress is being made in the industrialized world during the coming few years in the development of alternatives. Conversely, it could be brought if a major technological breakthrough in some field, say solar energy, were to happen.

## VI. Conclusions

There is a great need for a logical outlook in the solution of environmental problems which will protect the environment as a whole without imposing unnecessary constraint on any group of people, industrial sector or area. All efforts to prevent pollution depend ultimately on the acquisition of data and correct evaluation of criteria on which to base enforced regulations.

Admittedly there exists an inherent conflict between the result of anti-pollution measures and the aim to increase the efficiency of energy use. The introduction of high-octane low-leaded gasoline will result in low efficiency as additional refining losses are involved in its manufacture. Also exhaust gas purification is quite energy consuming.

It would be too costly to abate pollution completely. The alternative is to reduce the levels of environmental pollutants and hazards below the levels which are considered to be harmful to health, through careful monitoring and through regulations and measures.

Speaking of regulations, it becomes necessary for the ECWA countries to adhere to the relevant international conventions and to become part of the international system.

It also becomes necessary to introduce local anti-pollution legislation.

It is being increasingly recognized that conservation is the first step society ought to take to alleviate the critical energy shortage facing the world. This is a global problem and not one related to the Region. Conservation, however, is only part of the answer to the solutions of the energy problem. It is evident that new sources must also be made available to satisfy the immediate future requirements.

Moreover, the socio-economic pressures to continually upgrade the quality of life with the corresponding increase in GNP should be balanced against the energy demand and environmental deterioration, since a better environment is part of the quality of life concept. Further, wasteful patterns of consumption should be avoided as these are part of the cause of the pollution and the high rate of depletion enforced upon the Region.

Society is faced with seeking a solution for balancing the economic-energy-environmental equation. Although the factors to be considered have been identified, the constraints to be applied to each factor will have to be carefully evaluated in seeking a balance for the present and future applications. Further, the schedule of constraints acceptable to one nation may not necessarily be applicable in another situation.

It is certainly desirable to moderate the use of resources. Whether this means the use of greater or of smaller quantities of oil or any other resource will depend on the specifics of the situation. We should radically rethink our ways of using energy. The ecological philosophy implied by such an approach to energy use is one of harmony with nature — a harmony which is created through an understanding of nature and of ourselves.

In practical terms any action plan should achieve primarily an assessment of the state of the environment

(1) Arjun Makhijani, "Economics and Sociology of Alternative Energy Sources, *ESCAP Regional Seminar on Alternative Patterns of Development and Life-styles in Asia and the Pacific*, pp. 31 and 32.

(2) *Ibid.* p. 44.

(3) Alan Poole and Robert Williams, "Prospects for Photosynthetic Energy", *The Bulletin of the Atomic Scientists*, May 1976, table 1.

including socio-economic factors and of the needs of the region, and a development of guidelines for the management of the activities which have an impact on environmental quality. To support such measures the proper institutions should be created.

From another angle a fairer distribution of wealth within each of the countries of the Region and within the region as a whole would certainly be conducive to a better quality of life. This quality of life would further be enhanced by avoiding the pitfalls of western industrialized society, that is the adoption of purely material values based on consumption, increased urbanization, standardization and the resulting loss of local culture and traditional values.

As regards new policies for development and bearing in mind that oil is not renewable or recyclable, it is important to see that development of the oil resources are geared to the legitimate needs of the Region and to the interests of future generations.

Furthermore, it is clear that in the future the oil producing countries of the Region will have to play an increasingly direct role in the marketing of their crude and move downstream in the industry into refining and shipping of their products. The oil producers should diversify and not remain mere exporters of crude. They have already taken steps in this direction. Much of the groundwork is being laid by OAPEC by creating some of the institutions for Arab downstream industrial development and establishing various joint ventures, and also by taking a leading role in discussing and negotiating with the industrial countries the creation of a new economic order. Also, in view of the fact that oil will be exhausted within a period which is shorter than a lifetime, it is necessary to make future plans for a greater use of renewable and recyclable resources, especially solar energy which is so abundantly available in the area.

Such new resources seem to be less polluting, cheaper if the right technology can be developed, inexhaustible and more conducive to a better quality of life. What is more, they make available to the Region alternative life styles.

## **APPENDIX**

**Table A-1  
OFFSHORE AND ONSHORE ACTIVITIES  
WITH ENVIRONMENTAL IMPACT**

<u>Supporting Services</u>		<u>Oil Development</u>
<u>Secondary Development</u>	<u>Primary Development</u>	
Infrastructure Housing Schools Shops Road and Rail links Leisure facilities Hotels	Administrative Bases Supply Bases Ports Airfields Construction Yards for Platforms Boats Pipelines Supply Industry Drilling Muds Tool Manufacturers Diving Geophysical Investigations	Exploration: Drilling Rigs Production: Platforms Pipelines (Land and Sea) Tankers SBMs Storage Tanks Refining Terminals

**Source :** Westaway "Environmental Impact of Offshore Development" UNEP Petroleum Industry and the Environment Seminar Vol. I p. 158.

**Table A-2  
OIL PRODUCTION OFFSHORE AND ONSHORE  
OFFSHORE OIL PRODUCTION  
10<sup>6</sup> barrels/y**

<b>Area/Year</b>	<b>1972</b>	<b>1973</b>
United States	600.120	572.040
Middle East	1 083.240	1 337.400
Venezuela	858.960	916.200
Others	712.440	809.640
Total:	3 254.760	3 635.280
Total Onshore and Offshore	19 080.000	20 843.000
Per cent Offshore:	17.04	17.47

**Source :** Westaway "Environmental Impact of Offshore Development" UNEP Petroleum Industry and the Environment Seminar Vol. I p. 160.

**Table A-3**  
**OIL INTRODUCED INTO THE OCEANS**

<u>Source</u>	<u>Input</u> (Million tonnes per annum)
Natural Seeps	0.6
Offshore production	0.08
Transportation:	
LOT tankers	0.31
Non LOT tankers	0.77
Dry docking	0.25
Terminal operations	0.003
Bilges Bunkering	0.5
Tanker accidents	0.2
Non tanker accidents	0.1
Coastal refineries	0.2
Atmosphere	0.6
Coastal municipal wastes	0.3
Coastal non refining, industrial wastes	0.3
Urban run off	0.3
River run off	1.6
Total:	6.113

\*LOT = Load on top. Descriptive of tank washing and oil separation procedure

**Source :** Westaway "Environmental Impact of Offshore Development", UNEP Petroleum Industry and the Environment Seminar Vol. I p. 161.

Table A-4

Chemical	Odour threshold ppb	Odour Description
Acetic Acid	1,000	Sour
Acetone	100,000	Chemical, sweet
Amine, monomethyl	21	Fishy, pungent
Amine, dimethyl	47	Fishy
Amine, trimethyl	0.2	Fishy, pungent
Amonia	46,800	Pungent
Benzena	4,700	Solvent
Benzyl sulfide	2	Sulfidy
Carbon disulfide	210	Vegetable, sulfidy
Chlorine	314	Bleach, pungent
Chlorophenol	0.03	Medicinal
Dimethyl sulfide	1 - 2	Vegetable, sulfidy
Diethyl sulfide	6	Garlic-like, foul
Diphenyl sulfide	5	Burnt rubbery
Hydrogen sulfide	5	Rotten egg
Methyl Ethyl Ketone	10,000	Sweet
Mercaptan, methyl	1 - 2	Sulfidy, decayed cabbage
Mercaptan, ethyl	0.4 - 1	Sulfidy, decayed cabbage
Mercaptan, n-propyl	0.7	Sulfidy
Mercaptan, n-propyl	0.7	Sulfidy
Mercaptan, n-butyl	0.7	Strong, sulfidy
Paracresol	1	Tarry, pungent
Paraxylene	470	Sweet
Phenol	47	Medicinal
Phosphine	21	Oniony, Mustard
Sulphur Dioxide -	470	Sharp, pungent
Toluene	2,000 - 4,700	Solvent, moth balls
Butane	6,000	
Heptane	18,000	
Amylenes and Pentenes	170 - 2,100	

Source : Mofidi, "Environmental Conservation in the Petroleum Industry with Particular Reference to Refining", UNEP Petroleum Industry and the Environment Seminar, Vol. I p. 315.

**Table A-5  
REFINERY EMISSION SOURCES**

<b>Emissions</b>	<b>Sources</b>
Hydrocarbons	Transfer and product loading operations, sampling valves, storage tanks, shut-downs and start-up operations, spills and leaks, oil separators, settling ponds. Relief valves, catalyst regeneration, pumps, compressors, cooling towers, vacuum towers, barometric condensers, asphalt oxidizers, chemical processing Units.
SO <sub>2</sub>	Hydro cracking units, boilers, furnaces, flares, scrubbers, chemical processing units (burning of any sulphur containing fuel, subsequent burning of gases containing H <sub>2</sub> S).
H <sub>2</sub> S	May be emitted as above.
No <sub>x</sub>	All combustion operations: Boilers, furnaces, flares and also catalyst regeneration.
Co	Catalyst regeneration, scrubbers, furnaces, off gas incinerators, etc.
NH <sub>3</sub> and aldehydes	Catalyst regeneration
Aromatics	Chemical processing units, asphalt oxidizers, Barometric condensers, sewers, vacuum towers, oil separators, etc.
Particulate matters	Cracking units using fluidized catalyst, steam boilers, furnaces, scrubbers, off gas incinerators.
Smoke	Inefficient combustion of heavy oils and tars, starting up and shutting down of heaters, flaring operations.

**Source :** Mofidi, "Environmental Conservation in the Petroleum Industry with Particular Reference to Refining", UNEP Petroleum Industry and the Environment Seminar, Vol. I pp.328-9.

**THE ECONOMIC, SOCIAL, AND ENVIRONMENTAL IMPLICA-  
TIONS  
FOR THE ECWA REGION OF PRESENT AND FUTURE  
TRENDS IN  
INTERNATIONAL RELATIONS**

**by  
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# The Economic, Social, and Environmental Implications, for the ECWA Region of Present and Future Trends in International Relations

## I. Introduction

The current world-wide search for alternative avenues to and patterns of development and life-styles derives essentially from growing dissatisfaction with the patterns in dominance and, until recently, widely accepted as most satisfactory to man's needs and wants. Two central areas of dissatisfaction in the Third World are the predominant international economic order and the sub-optimal utilization of resources, with all that follows in distorted development, economic and social hardship, and socio-political imbalance.

Stated differently, the dissatisfaction relates first to the Third World's relations with the advanced industrial countries, which constitute the core or centre of power in the international economic order. These relations, it is now widely realized and conceded, are characterized by marginality for the Third World, inequality between the industrial and the developing countries in favour of the former, unjust distribution of benefits from international economic intercourse, inefficiency in the use of the world's resources (whether in the form of over-use, under-use, or misuse), and the near-helplessness of the Third World in its desire to correct this distorted world order<sup>(1)</sup>.

The second area of dissatisfaction is shared, in some of its aspects, by the advanced and the developing countries alike. It is closely related to the international context of the first area, but it has an internal context as well. This is the inability of the developing countries to put their natural resources (and for that matter, their human and man-made resources) to optimal use. This cause for dissatisfaction is, to a great extent, a function of the pattern of international relations and the power-system in the prevailing international economic order. Hence the contention above that we face here a matter that falls both in the internal and the international context. Furthermore, there is a great deal of anxiety over natural resources — or the environment — in the advanced industrial world too. But the causes for anxiety are distinctly different between the developed and the developing countries, although there is a slowly growing area of overlap with respect both to pollution and to resource depletion.

These inter-related sources of anxiety or dissatisfaction which beset the ECWA region, as part of the Third World, constitute the concern of the present paper. This concern embraces a number of issues. These include: production, consumption, and distribution (marketing) patterns; the acquisition by the ECWA region of technological capability<sup>(2)</sup> the proper management of the Region's environment and proper use of its resources; the redeployment of industry between the developed countries and the Region; governmental ability to design and control development processes, including the control of the role of Transnational Corporations; intraregional and international co-operation; and the Region's to help in reshaping the international economic order and to take the necessary measures in self-interest if its efforts at co-operation meet with lukewarm response from the industrial countries.

This is indeed a very wide range of subjects, and the discussion will necessarily be brief. However, in attempting to treat these numerous and varied topics even if briefly, the paper will have first to look into the main developments of relevance both in the developed countries and in the Region, and, in the process, to sketch very broadly the nature of the Region's international relations.

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(1) The literature on the ills of the economic order in existence, and The New International Economic Order which The Third World hopes to see emerge, is quite extensive and well-known. There is no need, therefore, to list references of relevance here.

(2) Many of the references to the ECWA Region (or the Region, in short) apply to the whole Arab Region. Where it is desired to indicate the wider coverage, this is made explicit. Furthermore, the ECWA Region consists of the community of countries known as the Mashreq, a term which will be used occasionally.

## II. Main Developments of Relevance in Developed and ECWA Countries

Perhaps it is useful to emphasize, right at the outset, that throughout the discussion, the question of international relations will occupy the focus of attention, with that of the environment also assuming an important place. This is in line both with the frame of reference drawn for the paper in the Project Document, and with the desire to integrate the nature and implications of international relations into the concern and search for alternative avenues to more fulfilling and meaningful development and life-styles. Hence the selection of the main developments of relevance and their examination in this section.

1. It is appropriate to point first to the deep concern with growth in the developed countries — whether theirs are market or centrally-planned economies — as a major indicator, if not the sole indicator, of development. The market economies, for which more statistical information and general economic literature is available, and which are much more involved in the Region's international relations, show this concern on every possible occasion, whether in referring to global economic performance, or to sectoral or regional performance. In fact, calculations of growth rates have reached a high — one could say an exaggerated — degree of precision. Where forecasts are concerned, the precision reaching one or two decimal points for one or more years ahead acquires the quality of absurdity or of "misplaced concreteness", considering the many unpredictable or unquantifiable factors that could suddenly enter the picture and confuse the calculations and forecasts, and later the performance<sup>(1)</sup>

Concentration of concern with growth, rather than development in its much fuller dimensions, is understandable in the context of the advanced industrial countries. These, by definition, have acquired the attitudes, built the institutions, and acquired the technological and productive capabilities necessary for notable economic performance. Hence their focus on growth in the narrow sense of the term.

But there are three aspects of the emphasis on growth in the advanced countries which are of relevance to this paper. The first is the intensive use of natural resources (and we use the term in its broad sense, realizing that resources are not put to final use straight from their natural or raw state); predominant among these as far as the ECWA Region is concerned is oil and gas, but other products are involved as well. The question of depletion comes in here with growing urgency.

The second is the content of production, and in the same connexion consumption. The consumption patterns encouraged very strongly and intensively by the business sector and the media in the industrial countries with market economies are ones that do not necessarily in many instances respond to needs keenly felt by the consumers. More often they are created and nurtured by advertising and other promotional mechanisms. Production is adjusted to satisfy the newly-created needs, but more often production of new goods and services is first undertaken and consumption is subsequently encouraged. This syndrome is of great and in the present context of grave consequence for Arab oil and gas, and for the many primary products provided by the developing countries, including the ECWA Region. But it is of graver consequence to the development patterns and life-styles of this Region, as we shall see later.

As far as hydrocarbon products are concerned, the chain reaction involved (namely, excessive concern with growth and profit rates, production of goods and services not of high urgency and priority, the creation of consumption desires to absorb production) creates pressures on oil producers that are difficult to resist and/or insufficiently rewarded in terms of prices charged. The adverse implications for natural resources, whether depleting (as in the case of oil and gas), or renewable, and for the rest of the environment, are quite obvious.

2. In the second place, continued, intensive technological advances in the industrial market economies are made. These are in general beneficial, in the sense that they enrich mankind's heritage and enhance its capability to come into relation with nature and the environment. But in some instances they are dangerous and threatening both to mankind and nature. Consider, for example, the fast-changing technology of conventional weaponry and that of nuclear, biological, and chemical warfare. This emphasis on the destructive aspect of technology sounds dissonant with the "conventional wisdom" which has nothing but praise for technological progress. Yet it can be easily shown, even apart from the case of weaponry, that many of the civilian technological innovations are not sufficiently justified by genuine human need, nor do they add to real welfare. And, to the extent that they lead subsequently to the use of more resources, they end up by not contributing to the social good in the advanced countries.

The other side of the coin is that technological innovations put great pressure on the resources of the Third World — fuel, minerals, metals, and agricultural produce — and in certain instances endanger human, animal, and plant life, as well as the environmental balance at large. Likewise, they distort the pattern of production in the Third World by diverting many of the primary and intermediate products concerned from internal use to exports, that is away from the production of the goods and services better employed to satisfy basic needs to exports. The price mechanism and the profit motive together operate in the same direction and intensify the distortion.

Equally essentially, the technological advances, with the resultant acceleration in technological obsolescence,

(1) Examples of such "precision" abound in reports and studies prepared by OECD, the Stanford Research Institute, the Wharton Econometric Forecasting Associates, and such bodies that undertake forecasting. See also The World Bank, *World Development Report, 1979*, (Oxford University Press, 1979), Part 1, "Development Prospects and International Policy Issues".

the production of a greater variety of attractive gadgetry, and the greater command the industrial market economies have over modern technology, together lead to greater dependence by the developing on the developed countries. This dependence exacts a heavy price in the literal as well as the figurative sense, in addition to rendering the fundamental task of the developing countries of acquiring real and appropriate technological capability all the more difficult, time and resource-consuming, and frustrating. The natural reaction is the resort to the line of least resistance in the Third World: the importation of yet larger quantities of capital goods and gadgetry, instead of learning how to produce those capital goods that are basically needed and to develop the appropriate mixes of capital, labour, and resources that are more in harmony with national and regional resources, and instead of learning how to do without much of the superfluous gadgetry<sup>(1)</sup>.

3. Directly connected with the previous point is the fast development of weaponry in the developed countries. Weapons are becoming increasingly sophisticated and more subject to quick obsolescence, and at the same time increasingly expensive. All that the industrial countries have to do is produce the weapons and advertise their superiority, and the race for arms purchases is launched. As far as the Mashreq is concerned, there is a real enemy planted in the heart of the Arab World and there is continued external threat likewise. Yet the industrial countries manage to expand their arms sales by selling arms to both parties in the regional conflict. In some instances, the new arms are hardly absorbed, before they are declared already superseded by better versions, and the spiral continues moving upwards<sup>(2)</sup>. The arms purchases in excess of immediate needs, or those not really meant for use against the acknowledged enemy, divert valuable financial resources from economic development. They provide us with a case where production shapes and intensifies public consumption. This is done through the great promotional power of the producing countries and the Transnational Corporations.

4. One institutional development in the advanced industrial countries of great significance to the ECWA Region and other Third World regions is the continued growth of the Transnational Corporation. This is not a sudden development, but the intensification of a process that has been going on for many years. The TNC has nearly put an end to the textbook slogan of the "sovereignty of the consumer" — that is, that it is the consumer who, through the pressure of his needs and wants and purchasing power, determines what the producer produces.

The TNC in the modern industrial society determines what to produce and how to produce it, and then creates the demand for the product through advertising. Often the consumer, especially in the developing country, is not aware that he needs or wants a certain product — until advertising operates on him and makes him feel that he needs and wants the product very badly<sup>(3)</sup>. The implications of this aspect of the work of the TNC for the resources, the production pattern, and the development and life-style of the ECWA Region cannot be exaggerated.

5. Finally, there is one development in the industrial world which one might call the phenomenon of "maturing pains", to refer to the problems attendant on advanced development and maturity. The concept relates to a late phase of economic development, the way the concept of "growing pains" relates to an early phase.

Two features of this phase demand our attention in the present context: the depletion of non-renewable resources, and pollution of the environment. Obviously, both are environmental problems. And both are of direct relevance to the ECWA Region, as to many other developing countries. This is so because the depleting nature of hydrocarbons has called for conservation policies among the oil and gas producing ECWA countries — policies which have, understandably, exerted a pressure on prices. And the seriousness of pollution in many industrial zones in the advanced market economies has urged the countries concerned to try to redeploy some of the polluting industries. The process is not that simple or open. But new arrangements for partnership in the production of several products of such industries are afoot or already completed, involving the establishment of plants in developing countries.

The hydrocarbon sector provides one major instance where the two problems of depletion and pollution combine to cause anxiety to the Region. The question of depletion is obvious. To it must be added the pollution caused by the transportation of oil by tankers, the cleaning of tankers near the coast-line, the flaring of gas, and so on. (However, these matters are discussed at length in a separate Project paper).

The pricing of oil and the volume of oil production, and the question of depletion of non-renewable resources, or of excessive pressure and strain on renewable resources and on the earth's living space, have recently been issues of keen concern to the industrial countries. The seventies have been alive with examination of these issues and with forward looking studies centering on the earth's capacity. The North-South dialogue has been one meeting ground between the developed and the developing groups of countries to discuss the issues of concern to both, though there has not been much meeting of minds. The oil-producing countries in the Region have been active in the dialogue, but

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(1) See W. W. Rostow, "The Nationalization of Take-off", in William H. Polk, ed., *The Developmental Revolution: North Africa, The Middle East and South Asia* (Washington, D.C., 1963, esp. pp. 54 and 55) for an example of advice offered to developing countries to encourage them to buy more gadgets and utensils. Rostow's justification is that such strong promotion would usher the developing countries into the modern world sooner, and would urge labour to work harder to earn more income with which to buy the new goods.

(2) See International Institute for Strategic Studies IISS, *The Military Balance 1979-1980* (London 1979), for details of arms purchases and orders by ECWA countries. It is sufficient to indicate here that aggregate orders for 1979/80 exceed \$10 billion.

(3) A one-week monitoring by the author of TV advertisements in two ECWA countries revealed that over 80 per cent of these advertisements promoted products produced in industrial countries. In all instances, these products had substitutes that, to all intents and purposes, were perfect duplicates or nearly so, whether jeans and sneakers, toothpaste and shampoo, or chewing gum and canned meat.

all the countries in the Region are keenly interested in the out-come of the dialogue.

The Third World has insisted that the dialogue should cover all issues in controversy between the "North" and the "South", not just the supply and pricing of oil. The other issues center around the pricing of primary products, the indebtedness of the Third World, the terms-of-trade between the industrial and the developing countries, and similar matters. Like the North-South meetings, UNCTAD meetings have touched on many issues involving primary products (supply-demand matters, price compensatory schemes), indebtedness by the developing countries, aid by the industrial countries, and international trade. Both groupings are of direct and close relevance to the Region, as well as other developing regions.

It is not intended to report here on these groupings and their deliberations, but rather to refer to them as expressing certain international relations affecting the ECWA countries and falling within the context of the present paper. The international relations involved are of great significance for economic development, resource development and utilization, and the environment generally. The development patterns and life-styles of ECWA countries, whether or not oil-producing, are influenced tangibly by the nature, the directions, and intensity of relations with the industrial countries, concerning such matters as primary products policies, terms-of-trade, and the transfer of technology.

A number of developments which are also of relevance to the present discussion have run the other side of the dividing line, that is in the ECWA Region. A brief survey of them will now be undertaken, including the pattern of development characterizing the Region's countries insofar as it relates closely to or is particularly sensitive to international relations and their workings.

1. The postwar period (that is, the thirty years following World War II) has witnessed great concern in the Mashreq (and other Arab) countries with development<sup>(1)</sup>. But development has been largely taken to mean economic growth. Thus, the rate of growth has been the center of attention, and efforts have concentrated on raising it as much as possible. Not enough attention has been devoted to the other aspects of development in their variety and richness, nor to the content of production and the need to submit it to a system of priorities conforming to pre-set social objectives, nor yet to the question of the identity of the beneficiary or beneficiaries of development — that is, the groups that benefit from development, in the final analysis. Concurrent with the concern with the rate of growth has been over-concern with the income gap between the developed and the developing countries, and with the search for policies and resources capable of narrowing this gap. Obsession with the gap has launched the Region's countries in the nearly hopeless pursuit of an income mirage, instead of turning their attention to the satisfaction of their peoples' many and increasing basic needs<sup>(2)</sup>.

The ECWA countries are not to blame for this dual concern, as it had been merely a projection of the emphasis placed in the industrial world on the rate of growth and the income gap, though there it had been in a different context, and from the point of view of the advantaged. The economic advisors and the bureaucrats in general in the ECWA countries (as in most other developing countries), like the political decision-makers in modern education, had been trained in Western or Western-style educational institutions and had been nurtured on the concepts and schools of thought of the West. Furthermore, they were continuously influenced by Western cultural and practical ideas, whether through the media or the wide range of Western products, or through travel in Western countries. Quite naturally, they acquired the same ideas and notions and took the same positions with regard to the nature of development. Furthermore, they were sensitized to the same issues and areas of priority, among which the rate of growth and the income gap ranked highest in the present context.

As in the developed countries, the implications of this concern have been both obvious and grave, but more grave in the ECWA Region because of the much lower level of economic performance and utilization of resources. Influenced by the desire to imitate the more advanced countries, urged on by the desire to maximize the rate of growth without sufficient parallel attention to the production mix leading to this rate, pressurized by the supremacy of the profit motive and by the marginality of social considerations as a guide to the content and directions of production, and to no small extent shaped by the nature of their relations with the industrial countries and dependent on them, the economies of the Region have developed the structure that we witness today, which is far from optimal, given the true developmental needs of the Region and the necessity for it to acquire greater independence in its decision-making. The present structure and content of production, however, must not be blamed solely on the factors just mentioned. In addition, there has been insufficient realization internally of the priorities that true, basic development calls for, and the pursuit of policies not capable of leading to such development. A few illustrations will suffice to prove the point.

There is a *prima facie* case for notable performance in the area of agricultural production in the Region. This involves the harnessing of rainfall and other water resources available, the proper utilization of cultivable land in existence and the reclamation of more land to put under the plough and the proper training of agricultural technicians,

(1) The writer has depended heavily in the following discussion of growth and development on his two volumes: *The Economies of the Arab World: Development Since 1945*, and *The Determinants of Arab Economic Development* (both published by Croom Helm Ltd., Publishers, London, 1978), as well as on his paper "A Critical Assessment of Arab Economic Development, 1945-1977", E/ECWA/POP/WG.12/BP. 14 of 13 November 1978 (in ECWA, *Population Bulletin of the United Nations Economic Commission for Western Asia*, No. 17).

(2) See Sayigh, *The Determinants of Arab Economic Development*, Ch. 1, for a differentiation between growth and development and the conditions set for comprehensive and meaningful development.

in order for the Region to be at least self-sufficient in agricultural production, particularly in the production of foodstuffs. Unduly excessive attention to export crops, compared with attention to crops for use in and by the Region, faulty agricultural and agrarian reform policies, technically faulty cropping practices which ignore the balance between topography, soil, water, and climate, and insufficient encouragement to the rural sector in general, have together led to the present unsatisfactory situation.

This situation is first characterized by a low degree of land utilization, evidenced by the fact that only 6.5 per cent of the total land area of the Region (8 per cent for the Arab world as a whole) is cultivable, and that this proportion has witnessed negligible additions in the postwar period (less than 3 per cent of the Region's total cultivable area); that 3.9 per cent of the total land area but 60 per cent of the cultivable area is actually cultivated (3.7 and 45.4 per cent respectively for the Arab world as a whole); and that only 1.13 per cent of total land area or 29 per cent of cultivated area is irrigated (0.6 and 16.4 per cent respectively for the Arab world as a whole). Population pressure on agricultural land resources must be understood in the context of **cultivated** area, not total land area, if it is to be truly appreciated. This pressure is 4.7 inhabitants per cultivated hectare for the ECWA Region (3.2 for the whole Arab Region<sup>(1)</sup>) Furthermore, the pressure is even higher if we take into account the shortage of water and of manpower skills and other vital inputs.

In the second place, water resources are scarce, especially in the Arabian Peninsula, but in addition to scarcity, there is irregularity in rainfall, and a failure to harness the water available to the maximum. Side by side with this gloomy picture, there is a fast-growing population, which increases naturally at about 2.5 per cent per annum. The situation is further characterized by heavy and growing dependence on foreign suppliers of foodstuffs. Thus, the Arab region as a whole imported a large part of its food requirements, or some \$6,850 million worth of foodstuffs in 1977, as against net imports worth \$2,728 million in 1973<sup>(2)</sup>. The growth rate of net food imports between 1973 and 1978 is some 13 per cent at constant prices, and this in a region with an unexploited agricultural potential in terms of area, and a very large potential in terms of productivity.

To sum the situation up, between 1960 and the end of 1978, food production failed to catch up with population increase, except in Saudi Arabia and Syria, and barely so in P.D.R.Y. (If the rest of the Arab region is considered, it is only in Sudan, Libya, and Tunisia that food production over the same period exceeded population increase.)<sup>(3)</sup> A dramatic way of presenting the food problem is to state that the Arab region's aggregate commodity exports in 1978 totalled \$96.5 billion, but only \$9.1 billion if oil is excluded.<sup>(4)</sup> Thus, food imports amounted to 75 per cent of the non-oil exports of the whole Arab world.

Finally, the fact that food consumption has risen considerably in the 1970's in real terms, over and above population increase plus the rise in income, must not be taken as an indication of an equal improvement in welfare for the general mass of the people. This is because of the highly skewed pattern of income distribution. The relevant statistics are not to hand, but we can say on the basis of general observation and a few pertinent indicators that only a small proportion of the Arab population has increased its food intake considerably and has upgraded the quality of the food it consumes, leaving the bulk of the population only slightly better off in this respect.

The case of developments in the agricultural sector has just been used to illustrate some major shortcomings of development in the Region in the postwar period, which have socio-economic as well as environmental implications. A second illustration comes from a closely allied quarter: the denuding of the rural sector of many of its energetic and enterprising inhabitants through their massive movement to towns and cities. This is the problem of excessive urbanization, which again has serious socio-economic and environmental implications.

We need not go into a discussion of the nature and power of the push factors in the countryside, and the pull factors in the urban centers, as these have received considerable attention and study in the Arab world and other Third World regions. As far as the ECWA Region is concerned, urbanization has recently reached serious proportions, in addition to the fact that the Region has had vast cities which are thousands of years old. These came into being well before industrialization and city amenities began to appear and to exert their strong attraction. But the postwar period has come to generate added force to the pull already experienced. Furthermore, we now witness a situation which is characterized, not only by very populous cities, but also by one principal city — usually the capital — constituting a very large proportion of the total urban population. A few illustrations show the enormity of this imbalance. In Bahrain, Manama city constituted 42 per cent of the total population in 1970 (the year to which all the data refer), but 100 per cent of the urban population. For Baghdad, the proportions are 22.6 and 49 per cent respectively, for Amman, 21 and 46.7

(1) Percentages calculated from data in FAO, **1978 Production Yearbook** (Rome, 1979), Tables 1 and 2. "Cultivable area" is taken from estimates in country documents, as quoted in Sayigh, **The Economies of the Arab World**, op. cit., Ch. 14, Table 14.2, p. 669. "Cultivated area" is what the FAO **Yearbook** labels "arable and permanent crops" area; it excludes "permanent pastures" and "forest and woodland" areas. Areas cropped more than once are counted only once.

(2) Data obtained directly from FAO, Rome, in November 1978.

(3) FAO, **(1976 Production Yearbook**, Table 6, and **1978 Production Yearbook**, Table 6.

(4) Data on exports from UNCTAD, **1979 Handbook of International Trade and Development Statistics**, Tables 1.1 and 2.2. (All data are for 1978 except for Oman where they relate to 1977). Oil exports are from IMF, **International Financial Statistics**, September 1979, (Exports are quoted in local currencies in IFS, but have been converted to US dollar values by the writer).

per cent, for Kuwait 77.2 and 95 per cent, for Beirut 28 and 50.7 per cent, for Riyadh 5.2 and 26 per cent, for Damascus 13.6 and 31.6 per cent, and for Cairo 17 and 78 per cent respectively.<sup>(1)</sup>

This overcrowding has not been matched by the provision of jobs and amenities, nor has it been compensated for in the rural sector by the training of farmers and the provision of agricultural supportive inputs. Far from it. The Region has therefore had to suffer both in its rural areas and its urban centers. This has had very serious environmental implications, in addition to those of social discomfort and disharmony, and economic hardship. In the urban centers specifically, there have been sizeable incursions into agricultural land for use as housing space. Improper and/or insufficient sewerage facilities have become a menace to health which is also unpleasant to the eye and to the nose. Pollution of rivers running nearby, and of coastlines, though not as high as in the Rhine or in Lake Michigan, is no far behind in intensity. Messy and unsanitary slaughterhouses, crowded living quarters, garbage heaps — all are environmental problems that endanger public health as much as they violate aesthetics. And the longer development priorities and policies ignore these problems, the more difficult to solve they become, if only because of their cumulative effect and the way speedy and continued urbanization tends to pre-empt radical solutions.

A third illustration drawn from the developmental experience of the Region relates to industry. The Region, like the Arab region in general, placed heavy emphasis on industrialization in the postwar period, as a basic corollary and manifestation of independence, and in imitation of the advanced regions of the world which the ECWA countries had set as an example to emulate. However, by and large, industrial policies were not guided by the necessity of developing basic industrial capability if industrialization was to proceed in a healthy manner (through the implanting and the development of engineering and technical skills, engineering industries, technological capability, factory discipline and industrial organization, appropriate attitudes, and so on). Furthermore, the choice of industries to establish was not only or even mainly guided by a defensible system of national and regional priorities, high among which would be the satisfaction of basic needs. (It must be pointed out in this connexion that the concept of basic needs does not relate to a static range and magnitude, since these needs increase in sophistication and variety, and grow in scope, as more of them are satisfied to a fuller extent). In addition, the growth of the industrial sector in the Region has remained modest in quantitative terms, with the sector's contribution to GDP ranging between 5 and 20 per cent between the lowest and the highest cases, and averaging about 8 per cent if not lower.<sup>(2)</sup> Likewise, the sector is a relatively small employer, accounting for about 9 per cent of the active labour force.

The final illustration to present from the Region's postwar development experience falls in the area of services, or the tertiary activities. Justifiable emphasis was placed in the postwar period on such basic sectors as education and health, transport and communication, and banking. However, quite frequently, some other sectors distinctly less oriented or contributive to development received investment resources and human effort well beyond their deserts. We refer here to personal services, entertainment, brokerage, real estate, commission (intermediate) trade, and the like. "Government" too, as a sector, received unduly large resources often beyond the true services it rendered. The aggregate "contribution" of this last category of sectors to GDP is large and to that extent misleading, since it creates the impression of more development being achieved than is truly warranted. Furthermore, the use of resources involved in the process, whether human, financial, or physical, is not fully justified by the dictates of the social good.

2. There is no need to go further in illustrating how the structure and pattern of production in the Region has failed to adequately serve the interests and needs of the population, except in indicating that in the oil-exporting countries excessively high dependence on the oil sector (in the earning of income and of foreign exchange) has been registered, while the sector remains a very modest employer. In fact, the distortion of the sectoral structure has increased considerably since the correction of oil prices in the autumn of 1973, and the production in most producing countries of a volume of oil in excess of their financial needs, taking into account their own interests and those regional and international responsibilities that they can reasonably be expected to shoulder.<sup>(3)</sup>

The integration of the hydrocarbon sector with the national economies seems on the surface to be increasing considerably, thanks to the undertaking by oil ministries and national oil companies of more operations, such as oil extraction and transportation, refining, and industrialization of oil and gas, as well as the undertaking of extensive development programmes by the economy as a whole. However, deeper down, there is less true integration than appears to the eye. For, in the process of building the exploration or production capacity, or of tankering or refining capacity, but especially in the building of petrochemical production capacity, huge resources are diverted to the industrial world. Furthermore, in the case of petrochemicals, many of the plants are being constructed by and will be owned and run jointly with foreign concerns, which obviously reduces the degree of integration of the industry with the national economies and increases the Region's integration with and dependence on the industrial world. Finally,

(1) See "Primate Cities in the Arab World", paper submitted to the ECWA Seminar, on Population and Development in the ECWA Region, 18-30 November, 1978, Amman, Jordan.

(2) See United Nations Economic and Social Council, ECWA, **Survey of Economic and Social Development in the ECWA Region 1970-1978**, pp. 139-141, but especially Table 2 p. 141, for the complexity of calculating the share of industry in the GNP and GDP. (Egypt, which joined ECWA during 1977, is not included in the data in this source, but later information cites the share of industry in Egypt to be around 20 per cent of GDP).

(3) There have been several authoritative, official statements over the past two years indicating that the oil production of a few Arab oil-producing countries is beyond their aggregate financial needs. (For an examination of the question of volume of production, see Yusuf Sayigh, "Arab Oil Policies: Self-Interest versus International Responsibility" in **Journal for Palestine Studies**, Vol. IV No. 3, Spring 1975).

the extensive dependence on foreign labour at almost all levels of skill reduces the degree of integration. Obviously, these developments have serious implications for the physical and human environment of the Region and for the reduction of dependency in its international relations.

The subject of oil cannot be left without reference, even if briefly, to depletion and conservation issues, which are serious environmental matters. The central point here is the need to reconcile conservation desiderata, which would justify a smaller volume of production, with consideration for the world economy which is very closely geared to oil. Very serious thought is currently being given to this point.<sup>(1)</sup>

3. So far we have dwelt on production. Developments in the ECWA Region with respect to consumption in the postwar period also reveal more than one serious imbalance. The first relates to the distribution of wealth and income, which is of relevance to the pattern and volume of consumption. It is demonstrably true through socio-economic indicators that the labouring classes, in the rural areas and in urban centers, are better off in real terms today (food, clothing, health services, housing) than they were at the start of the period under consideration.

Yet, it is also demonstrably true, although accurate statistics are not available, that the rich are becoming richer faster and to a much larger extent than the poor are becoming less poor. The middle class is growing in size and is becoming better educated, and more influential and better-off, but inflation in recent years has cut deeply into its purchasing power. And, in any case, the peasants and labourers together remain the dominant proportion of the population.

We are more concerned, however, with the general phenomenon of rising consumerism and the emphasis in the consumers' budget on several types of imported goods (jewelry, entertainment goods, gadgets, luxurious clothing, fancy foodstuffs) which are of dubious urgency to welfare and often of dubious usefulness. The power of advertising and the media in general is becoming decisive in the shaping of the consumer's wants and effective demand — the latter through the influence of advertising on the outlay of effort for the earnings of income necessary for consumption.

The impact of imitation on ECWA countries of the consumption patterns in the industrial countries, portrayed seductively by the media — themselves also created and oriented by powerful business concerns in the industrial West — is a sequel to their imitation of production patterns and methods. The content of the consumption basket is largely determined by pressures created through aggressive advertising and aggressive promotion by large producers in industrial countries. The marketing of goods in the Region also follows the same patterns as in the industrial countries, due adjustments being made, and the Region witnesses more and more costs being borne by the consumer for the "services" of middlemen. This extended imitation process has three notable and grave implications.

The first is the shaping of the pattern of national and regional resource use in ways which in part are demonstrably not in the interest of true development and the promotion of life-styles not in harmony both with the environment and national culture. The growing acquisitiveness and consumerism are not in line with certain Arab or Islamic values, and they are hostile to the enhancement of the propensity to save and invest. They also run counter to the need to direct a certain volume of resources to national security in a situation of serious vulnerability to external enemies. The oil resource, which is the most precious but the most precarious because it is depletable, stands to suffer most as a result of consumerism. This is because unduly heavy pressure is exerted for larger production than truly necessary in order to finance that component of the imports which is not really essential. This development is obviously of grave direct implication for the environment.

The second implication relates to the future. It centers around the danger of the entrenchment of consumption habits and patterns. This would create difficulties for the governmental authorities in the future, in case they decided to urge greater discipline and self-denial in consumption, or the transformation of patterns in favour of the consumption of goods and services produced in the Region. The difficulty would be compounded by the fact that public consumption itself is influenced by the power of imitation and demonstration, and governments — like their public — would find it hard to adjust in the future in response to the need for a change of outlook and policy.

In the third place, the relationship with developed countries and TNC's with respect to the supply of goods and services in turning, under the circumstances, into one primarily of dependence. Here euphemisms are resorted to on a large scale, in both camps. The relationship is often called one of co-operation, or of mutual dependence or interdependence. But the truth is that it is one of dependence by the Region, given the pattern of allocation of technological and political power. The reaction could be one of indifference, as it is in many instances, or one of welcome, as it is in a few instances, or yet one of confrontation (or shy attempts at confrontation), as it is in fewer instances still. The question of response has been growing in urgency all the time, particularly since the autumn of 1973, and the active efforts by the developed countries and their TNC's to get back as much as possible of the price paid for oil imports after the adjustment of prices. This is being done through inflationary prices and increased insurance and shipping costs, as well as much costlier technology in all its material and human forms.

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(1) The most recent forum during which the issue was examined by Arab oil ministers, Western scholars and businessmen, and Arab scholars, was at the OPEC Seminar on oil markets held in Vienna 3-5 October, 1979. The papers and proceedings have appeared in a volume entitled **OPEC and Future Energy Markets** (Macmillan, London, 1980). Earlier, the issue was addressed by several speakers in the First Arab Energy Conference held in the first week of March 1979 in Abu-Dhabi, U.A.E., sponsored jointly by O.A.P.E.C. and the Arab Fund for Economic and Social Development. (As there is a special paper on energy questions, the present paper will not deal any further with them).

4. The fourth development to consider in the ECWA Region is the growing eagerness of the Region's countries, alone and jointly through regional institutional mechanisms, to effect technological transfer from the Western developed countries to themselves. It is a well known process involving in reality not the acquisition by the Region of technological capability (expressed in scientific knowledge and engineering and technical skills, inventiveness, adaptability, and related capabilities), but the importation of capital goods and expertise, often without the ability of the importers to make the appropriate specifications or to effect adaptations. Not infrequently, turn-key projects are designed, constructed, and even operated by non-nationals; the role of the national party is limited to wanting the project built and financing it. These matters and their ramifications are well known and need not detain us further.

There is growing awareness that the policies relating to technology predominating in the Region until the present moment are inadequate and damaging to the long-term interests of the Arab countries. These policies all of which are closely relevant to the socio-economic and physical environment must be looked at from several angles to be better understood. The first angle is that of education. Large strides have been made in schooling, and illiteracy among those of school-age has dropped considerably, though it is still widespread among the grown-ups and has even expanded in absolute terms over the past three decades. But educational advances leave a great deal to be desired in terms of quality, as most countries in the region realize<sup>(1)</sup>. Both the content of the curricula and the methodology of education are inadequate for the promotion of intellectual explorativeness and motivation. Research receives very little support, whether in the natural sciences, in the humanities, or the social sciences. Though sketchy, this picture shows that the ground is insufficiently prepared for the acceptance, development, and diffusion of appropriate modern technology, with all that goes with it in attitudes, skills, and innovational aptitudes and motivations.

Likewise, the training of manpower is still very deficient in quantitative terms, apart from its qualitative shortcomings. Thus, although enrolment includes some 60 per cent of school-age children in the whole Arab region, the rate of dropout between the first and second cycles of education is very high, with only about one-third of those enrolled in primary education continuing into the secondary cycle. Furthermore, "along with the large school enrolment in formal education goes a tiny enrolment in technical training. Thus, only 6 per cent of those in the secondary cycle as a weighted average, or 10.8 per cent as an arithmetic mean, are in second-level technical schools. While the 544 thousand in technical training out of 5 million in secondary schools are by no means all those receiving such training, the picture contains an indictment both of the system of education, and of the work ethic prevailing which militates against manual labour." We need only add that the development plan for 1975-80 for Saudi Arabia alone estimated its "incremental needs of skilled labourers to be some 498 thousand, or practically 92 per cent of the aggregate number being trained in secondary technical schools in the whole Arab world; or that Egypt, which is a "surplus" country with respect to skilled workers, expects shortages exceeding 600 thousand men and women in three years' time", that is in 1981<sup>(2)</sup>.

Of course, the reservoir of skilled manpower is much larger than the number of pupils actually in training would suggest. But the paucity of skilled human resources ought to be seen against the growing complexity of modern technology, and the very ambitious development plans in force for the years 1975-80 in the Arab region. Aggregate investment in these plans totals some \$326 billion<sup>(3)</sup>, which would call for a vast expansion in the reservoir and a considerable improvement in the level of skills as well. This is true even though the investment targets tend to be scaled down during execution in most instances. But the scaling down in itself is a function, in part, of the shortage of skilled manpower.

All this tends to underline the unpreparedness of the ECWA Region, like the rest of the Arab region, for wide, effective technological diffusion and the acquisition and implantation of technological capability. National and regional policies are to blame to a substantial extent. But a more searching look would show that the design of educational systems under colonialist rule, which was largely the prerogative of the foreign powers in control in the Region, was basically to blame. This is because these powers did not pursue, or show excessive zeal for, the building of educational and training systems capable of modernizing Arab society and making it less easily exploitable and governable.

The policies of technological transfer currently under consideration have implications for the physical environment, in addition to those aspects of the socio-economic and institutional environment just referred to. Thus, the multitude of mixes of productive inputs, used in the production of the hundreds of goods and services in the Region's economies, are obviously closely influenced by the technology in use. And the use of human skills and physical resources is therefore determined by the pattern of technologies, big and small, in use.<sup>(4)</sup>

Although it is difficult and dangerous to make sweeping generalizations here, it still can be said that the modern sectors of the Region's economies have not shown sufficient concern for the adoption of those technologies, and those input mixes, most conducive to the conservation and development of resources, and most in harmony with nature and

(1) See Sayigh, *The Determinants...*, op. cit., pp. 158 and 159, for 67 references to various studies and reports dealing with the quality and shortcomings of Arab education at the present. The matter was raised extensively during interviews by the author with the competent authorities in the field of education in the 12 Arab countries covered.

(2) Sayigh, "A Critical Assessment..." loc. cit., p. 10.

(3) Calculated from the development plans of all the Arab countries except Djibouti, Qatar and Bahrain.

(4) The most comprehensive and relevant study on the subject is A.B. Zuhair, ed., *Technology Transfer and Change in the Arab World: A Seminar of the United Nations Economic Commission for Western Asia* (Pergamon Press, London, 1978).

culture, whether in agriculture, in industry, or in the services. This is mainly because the adoption of technologies has been largely imitative. Most often it is technical considerations that have been taken into account, less so long-term economic, and least so socio-cultural considerations. And, it need hardly be reiterated, imitation is a function of the Region's long-standing international relations, with their strong imprint of dependency-creation.

Only brief reference has to be made, once again, to the costliness of the transfer of technology, as this point was mentioned earlier in another context. This means that more national and regional resources are being taken out than fair exchange would require (and more physical resources are being used up in the process) for the technology transferred, or said to be transferred, into the Region.

There is one final point that has to be made in connexion with the transfer of technology. This relates to industrial redeployment. In a sense, the relocation of some industries now in existence in the developed countries and their siting in developing countries can be called a case of technological transfer, owing to the new skills this relocation would impart to the host country. The matter poses a real issue for the ECWA Region, to the extent that many industries have established subsidiaries in this Region or have entered into partnership with local firms. There is first the question of terms for licence to use patents, but this is not the main concern of the paper, although it is a serious question. It is rather the real reasons for the redeployment that matter. These are three: the transfer of pollution effects to the new host country; the selection of industries that are large users of depleting resources or of renewable resources which are becoming costlier or more difficult to reproduce and/or to transport, and which are available in the host country; and capitalization on the cheapness of local labour, compared with labour in the home country. The three reasons need not all occur simultaneously, but at least one can be found in every instance of redeployment.

The profit and loss account has to be made for each case by itself, that is, the weighing of technological advantages received against pollution and the use of scarce resources. With regard to labour, there is the advantage of the creation of new job opportunities, but also the disadvantages resulting from the integration of part of the labour force in sectors or industries not fully an integral part of the national economy. This often raises the expectations of labour in the transplanted industries, and makes it difficult for labourers so employed to shift later into other fully-national industries. Labour outside the latter group of industries also becomes restless, as its terms of employment are usually more unsatisfactory than those applying in the transplanted industries.

5. Finally, it is necessary to turn, even if briefly, to the Region's foreign trade, and to foreign aid, as important aspects of its international relations which, additionally, are of close relevance to its pattern of development and life-styles.

Intraregional trade inside ECWA, like that inside the Arab region as a whole, constitutes a tiny fraction of its total trade. It stands at 5 per cent for exports and 9.1 per cent for imports for the ECWA Region, but at 6 and 9.2 per cent respectively for the Arab world as a whole<sup>(1)</sup>. The proportion has dropped over the past half-decade, owing to the vast increase in value of oil exports, and of imports, most of which by far in either case go to or come from the advanced industrial countries. Several observations can be made regarding the Region's exports and imports. Those that are of direct concern to us in the context of this paper are five.

The first observation is that there is a very high concentration on a small number of exports, as the range of production is limited. Indeed, ECWA Region's oil exports for 1978 totalled \$ 71,967 million out of total exports of \$96,530 million — or 74.6 per cent. Egypt, Jordan, and Lebanon, whose major export was not oil in 1978, also depended heavily on a very narrow range of exports, with cotton predominating in Egypt (22 per cent of the total) and phosphates in Jordan (23 per cent).<sup>(2)</sup> Lebanon is the only Arab country with a wider distribution in which fruits and vegetables, and textiles, predominate as groups of export goods. Lebanon apart, and with the increased importance of oil production in Egypt, we can say that primary products constitute a very large proportion of exports in all ECWA countries — and for that matter in all Arab countries — and that these primary products are on the whole exported in raw or crude form. Industrial production is small to begin with, and not sufficiently competitive anyway to carve a substantial place for itself among the Region's exports.

These exports, oil excepted, are unable to pay for more than a very small part of the imports.<sup>(3)</sup> As far as the non-oil exporters are concerned, the balance is financed by various forms of credit extended by the suppliers or thanks to financial help provided by the oil producers in the Region and by other sources, or yet alternatively by earnings from invisible exports or remittances by nationals working outside. The oil exporters, for whom the trade gap is the widest, finance their vast imports through their oil earnings. The size of the trade gap (oil apart) can be seen from the following summary of trade movements in 1978 (all data are for 1978 except for Lebanon, Oman, and PDRY in the ECWA Region, and for Mauritania, Djibouti, and Somalia in the remaining Arab countries, where the data relate to 1977):

(1) Calculated by Ismail Sabri Abdallah in "Alternative Patterns of Development and Life Styles for the ECWA Region: A Keynote and an Overview Paper", Part II, p. 27.

(2) See UNCTAD, *op. cit.*, Tables 1.1 and 1.2 for exports and imports, and IFS, September 1979, for predominant exports in each country.

(3) Oil and other exports are reported in IFS in local currencies. These have been converted to US dollars at the par rates/market rates of exchange.

	<u>ECWA Region</u>	<u>Arab World</u>	(In \$ million)
Exports	77,539	96,530	
Oil exports	<u>71,967</u>	<u>87,431</u>	
Non-oil exports	5,572	9,099	
Imports	49,401	77,539	
Non-oil exports as percentage of imports	11.3	11.7	

The grants and loans received by non-oil exporters, plus the movement of the bulk of the exports to the Western countries and of imports from them, together tighten the ties between the Region and the West, and help to perpetuate the present pattern of relations between the two regions. (Sight must not be lost of the role of other relations, like the importation of technology and cultural and political connexions).

A second observation relates to the Region's imports. These, unlike exports, stretch across a very wide range of goods, from foodstuffs to luxury goods, from machines, spare parts, and equipment, to clothing and household utensils. Foodstuffs and capital goods together constitute the vast majority of imports, if weapons are left outside this account for the moment. Total commodity imports which amounted to \$49,401 million for 1978 constitute a high percentage of all foreign exchange earnings and of Gross Domestic Product, as we shall see later. In fact, the Region includes countries with the highest imports per capita in the whole world.

Certain aspects of the high propensity to import are favourable, such as the large capital-goods component acquired for development purposes, or the importation of essential foodstuffs in countries where agricultural production cannot expand for legitimate environmental reasons. However, there are disturbing aspects as well. The excessive importation of luxury goods, expensive cars, costly furniture, unnecessary gadgetry, and the like is one illustration. Another is the importation of foodstuffs in countries which could provide much more of their food requirements by themselves if they pursued the appropriate investment, agricultural, and manpower policies. The defensibility of the outlay of very large sums on arms imports can also be subjected to questioning, unless these are within the capability of the population to handle and maintain, and are likely to be used for national and regional security, given a correct definition of "the enemy". Obviously, the hardening of the present pattern of imports gives rise to very serious misgivings, with regard to the promotion of production capabilities, the proper use and development of resources, and the development process and life-styles of the Region.

The prices of exports and of imports call for a third observation, since the export earnings and the import bill are of close relevance to the total availability of financial resources, and, by extension, of real resources to the Region. In general, exports suffer from under-pricing, partly because they are mostly primary and agricultural products which traditionally have been on the weaker side in the bargaining process with the industrial countries, and partly because, compared with import prices from the industrial world, export prices are on the weaker side in the terms-of-trade relationship.

This has become more pronounced with the importation of strong inflationary pressure from the industrial countries. Although controversy rages around this point, and the industrial countries accuse the oil producers in the ECWA Region of being the source of world inflation because of the radical adjustment of oil prices in 1973 and of corrections since then, the truth of the matter is that inflationary pressures were already strong by September 1973, that is before the adjustment.<sup>(1)</sup> Since then, the increases in oil prices, though seemingly high, have not been able to cope with continued inflation and the drop of the value of the United States dollar, the currency in which oil is priced and in which a substantial part of the oil producers' reserves are kept. Indeed, according to calculations by the Secretariat of the Organization of Petroleum Exporting Countries, OPEC, the average price per oil barrel now in September 1979 is less than one-third higher than it was in September 1973, owing to the erosion of the value of oil earnings due to inflation and the weakness of the dollar.<sup>(2)</sup>

Another aspect of the inflationary pressure is the resulting excessive costliness of imported technology (whether in capital goods or in technical expertise or in patents) to the ECWA countries, and the misleading effect which the oil earnings have when looked at in unadjusted monetary terms. This financial "optical illusion" tends to lead to

(1) According to IFS, February 1976, the export price index of the "Industrial Countries" stood at 144 points for the 3rd quarter of 1973 and at 147 points for the 4th quarter (1970=100); the import price index stood at 148 and 154 respectively. For the "World", the index for exports was 147 and 154, and for imports 146 and 152, for the two quarters respectively.

(2) Information obtained personally from the Research Division of OPEC in October 1979.

overspending and the ready acceptance of exorbitant prices for imports. Indeed, price discrimination is practiced against oil-producing countries precisely because of their ability to pay<sup>(1)</sup>. The resource distortion that follows, and its implications for the course of development, do not call for elaboration.

The fourth observation to make derives from the consideration of imports and exports in comparison with the Gross Domestic Product. The purpose of this exercise is to assess the degree of dependency on the outside markets, and how it has changed during the seventies.

We need do no more here than quote ECWA in its examination of "external dependence", which, according to its study, "is measured by the ratio of exports and imports of goods and services to gross domestic product at market/purchasers' value at current prices<sup>(2)</sup>. This study, however, did not cover Bahrain, Qatar, Democratic Yemen, or Egypt — the first three because of the insufficiency of relevant data for the period covered — 1971 to 1976, Egypt because it was not a member of ECWA during this period. The data as reported on below, however, include Egypt for which the necessary calculations were made by the present writer.

Without reproducing the findings in detail, it is sufficient to say here that the degree of dependence rose in every single instance but one where it fell very marginally for exports and for imports separately and combined, for every country (with the exception of Lebanon for which data for 1974-1976 were not available and no calculations could therefore be made for the three years in question), for the two sub-periods 1971 to 1973, and 1974 to 1976. In the second place, the degree of external dependence was higher for the oil economies, individually and as a group, than for the non-oil economies, except in the case of Jordan whose degree of dependence with respect to imports was the highest among the ECWA countries covered in both sub-periods. Furthermore, if exports and imports are combined, Jordan's dependence in the more recent sub-period is second to the highest, this being encountered in U.A.E. Finally, the degree of dependence for the oil economies with respect to exports and imports combined was greater than one hundred per cent, except for Iraq where it stood at 99%. In the case of the non-oil economies, it ranged between 46 per cent of GDP for Yemen and 64 per cent for Syria, of course excluding Jordan for which it stood at 146 per cent.

The overall conclusion to be drawn is that the 1970's have witnessed a substantial rise in the degree of external dependence for all the Region's countries considered, whether oil exporting or non-oil exporting. However, the rise has been steeper for the non-oil than for the oil countries. Below is a summary of the change between 1971-73 and 1974-76, for the ECWA countries examined combined:

	Exports	Imports	Exports plus Imports
<b>Oil Economies</b>			
1971-73	70.2	31.0	101.2
1974-76	79.2	36.4	115.6
<b>Non-oil Economies</b>			
1971-73	15.0	32.7	47.7
1974-76	24.0	54.0	78.0

This summary is disturbing whether viewed from the viewpoint of the oil exporters or the non-oil exporters, as it shows a greater dependence on foreign sources of supply (for imports) and a greater exposure to external factors (for exports). However, as the largest item of export is oil, and the external market for it is almost insatiable, the danger involved here is minimized. What is more disturbing is the high dependence on imports of the non-oil exporters, and the greater rise for this category of the degree of dependence between the first and the second sub-periods. Obviously, there are other manifestations of dependency outside the area of foreign trade, but we will not dwell on them here as we are presently discussing trade.

The fifth and final observation to make relates to foreign aid. The poverty of several of the Region's countries, their trade deficits, and their determination to make substantial outlays for development have necessitated resorting to foreign loans and grants. Since the beginning of 1974, the Arab oil producing countries have become, as a group, the major suppliers of aid to the needy Arab countries, in absolute and in relative terms. Indeed, the Arab oil producers are today also major suppliers of aid to needy Third World countries as a whole, if the volume of their resources is taken into consideration, compared with the resources of the industrial world. According to the World Bank,<sup>(3)</sup> the OECD countries considered together effected net flows of official development assistance (ODA) amounting to no more than 0.31 per cent of GNP in 1977 (\$ 14.7 billion at nominal prices). The flows from the Arab members of OPEC for 1977 amounted to 4.82 per cent for Saudi Arabia, 0.62 per cent for Libya, 4.71 per cent for Qatar, 10.18 per cent for Kuwait,

(1) There have been several official complaints by some oil-exporting countries.

(2) UNESCO, ECWA, *Survey of Economic and Social Development in the ECWA Region 1970-1978* Document No. E/ECWA/80 of 29 April 1979), Table 2, p. 178. Data for Egypt were calculated from IFS, February 1976, and IFS, September 1979.

(3) The World Bank, *World Development Report, 1979*, Table 16 in the Annex, for OECD and OPEC aid. For aid from Arab development funds, see Ismail Sabri Abdalla, *loc.cit.*, p. 19.

and 10.97 per cent for the United Arab Emirates. In absolute terms, the flows from these countries were (in million US dollars):

2,373, 109, 118, 1,442, and 1,262, respectively, totalling 5,742. Understandably, the bulk of this aid has gone to Arab countries, but aid to non-Arab countries is quite substantial.

To this aid by governments must be added aid from the Arab development funds, of which there are four. Together these funds supplied the needy ECWA countries with a cumulative total of \$2,011 million. All except the Kuwait Fund for Arab Economic Development started operations in the 1970's.

As against OECD and Arab aid, to which we have been referring, the World Bank and the International Development Association, IDA, supplied some countries in the ECWA Region with \$183.50 million and \$289.00 million respectively, or a total of \$472.50 million in the year ending June 1979<sup>(1)</sup>.

The aid coin has a second side, the worrisome question of the accumulation of external public debt. While the accumulation of external public debt in the process of effecting resource transfers of significance for the purpose of investment in development work is defensible, the debt burden can become quite onerous, as it has in some cases in the ECWA Region. According to the World Bank, the external public debts of Egypt, Syria, Jordan, PDRY and YAR in 1977 amounted to \$8,099 mn, 1,528 mn, 645 mn, 291 mn, and 147 mn respectively (forming, respectively, 69.2, 20.7, 29.4, 50.3, and 14.6 per cent of the GNP of these countries). To add to the financial burdens and the external dependence involved, the international resources of these countries are low (except for YAR). Measured against their imports, these international resources cover for each of the countries listed respectively: 1.1, 2.3, 4.9, 2.3, and 16.8 months' worth of 1977 imports. The broad strokes of the picture of indebtedness and international resources, as well as the large amount of aid they are forced to seek, together reveal the large measure of dependency by the needy ECWA countries. However, two reservations have to be made. First, that the aid data quoted in this observation refer to other recipients as well, not only to ECWA countries. Indeed, the Region is a minor recipient of the total amount, except for Egypt. Secondly, and more importantly, aid supplied by Arab donors does not add to dependency: indeed, it can be said to result in a reduction in dependency, to the extent that it frees the recipient Arab countries from the necessity of resorting to the advanced industrial countries. This point is made on the basis that feelings of Arab nationalism and mutual solidarity tie all the Arab countries together, and aid from one of them to others is "a financial flow **within the family**".

Arab aid to other Arab countries is a healthy development, since it represents one aspect of regional self-reliance. Indeed, even before 1974 when Arab aid became substantial, aid from non-Arab sources to the Arab region as a whole, over the postwar period, constituted only about one-fourth of total investment within the region.<sup>(2)</sup> Together with developments since 1974, this suggests that foreign aid from the industrial countries, both those with market economies and those centrally-planned economies, has not been for the period as a whole a crucial factor in development in the Arab world, though it may have been for some individual countries. Today, regional resources are of much greater significance and are destined to play an even larger role.

Apart from the modest volume of non-Arab aid (again, except that directed recently to Egypt), there are two other limiting factors. The first is the unevenness of aid, which tends to disturb planning and the security of resources. The second is the submission of aid to political conditions or its political motivation to begin with. All this adds up to tip the relationship between the receiving countries and the creditor/donor countries in favour of the latter group, and to enable this group to tighten the dependency of the former group. Obviously, the dependency need not, in fact cannot, be restricted to the economic realm alone.

This section of the paper has listed and discussed a limited number of developments in the developed countries as a group, and in the ECWA Region, that are of relevance to the investigation of the economic, social, and environmental implications of the Region's relations with the outside world. (This world has been confined to the advanced industrial countries, since the economic and political intercourse of the ECWA Region with other developing regions is of much less import.) An attempt has also been made to indicate the main effects which the pattern of developed/developing region relations has had on the ECWA Region. The discussion was not designed to be systematic, that is, it has not moved within the framework of a formal system of thought, because that would have required much more space than this paper could provide, and would necessarily have had to include components not of direct relevance to the enquiry undertaken here. A few observations will now be made by way of conclusion to the section, drawn from the preceding discussion.

The relationship which has been longest and has had the strongest economic, social, cultural, and political impact on the Region, has been with the advanced industrial countries in Western Europe, specifically England and France.<sup>(3)</sup> That with the United States is more recent but, although that country's exercise of political control is not one

(1) Data from the World Bank, *Annual Report, 1979*, Tables 1 and 2.

(2) This generalization is made on the basis of Sayigh, *The Economies...*, op.cit., Ch. 14.

(3) For a discussion of Western Economic (and cultural) penetration and its impact on the Mashreq countries (i.e., the ECWA Region), see Galal A. Amin, *The Mashreq and the West: An Examination of the Role of External Influences in the Evolution of the Arab Economic System and Arab Economic Relations* (Center for Arab Unity Studies publications; Beirut, 1979. in Arabic). This work also has valuable references on the subject of Western influence.

of formal occupation and is indirect and/or by proxy, it is nonetheless the strongest now. The Region's relations with the Western countries considered together are of such breadth and strength that they perpetuate the imbalance for so long in existence in the system of relations between the center and the periphery of the International Economic Order. There are hardly any exceptions in the Region to this generalization. On the whole, there is little evidence of restlessness under the weight of this imbalance. The imbalance, it ought to be conceded, is to be expected, given the social and political order of things, and the distribution of power in the world.

The relationship prevailing has had marked economic effects, particularly in the choice of economic system, and in the emphasis on growth rather than widely-diffused, deep, self-reliant, sustained, and need-oriented development. Thus, development has been guided by profit motivation much more than by the dictates of the social good; and the profit in question is designed to accrue to strong interests in the Region and in the advanced industrial countries.

The association between these groups of interests is not always institutional and formalized; indeed, often it is a mere convergence of interests between suppliers and importers of goods and services, or between the producers of capital goods, consulting firms, or contracting companies on the one hand, and government departments or private groups desiring to build new projects in the less-equipped country on the other. The association has had serious implications for the choice and importation of technology, and therefore for the development of national talent and skill in the ECWA Region and for the use and development of physical resources.

In addition, the directions and content of production have been to a considerable extent shaped by the relationship between the Region and the industrial countries. Inevitably, the shape taken is one which primarily serves the interests of the producers and of their business partners in the developing countries, in the sense that the priorities and choice of goods and services to be promoted have on the whole been influenced by the compulsion of the profit motive guiding the two parties.

Certain protective or corrective measures have been taken by public authorities, but there is still much more scope for action. There have also been some determined attempts by governments to design, control, and operate the process of development. These attempts have been primarily guided by the social good, and the priorities by which they are inspired are different from those applying in the case of private businessmen. The results of these attempts have been mixed. But in one respect, both avenues to development have run parallel: this is their inability to lead to the acquisition by the national manpower of effective technological capability appropriate to the countries' and the Region's resources. Yet, here again, where governments have played an active role in development in its various phases, the drive for this acquisition has been only very occasionally a target consciously sought.

The consumption patterns have also been tangibly influenced by the relationship between the developed and developing regions. In the ECWA Region, with effective demand considerably strengthened in recent years, consumption has been turning into consumerism at a disturbingly fast rate, under the influence of emulation and brisk advertising by all the media in operation. The promotional campaigns have mainly been master-minded by the suppliers of imported goods or their agents and associates in the Region. The pattern of production, the directions of development, the use of resources, and society's life-styles are all vulnerable to the impact of the trend which is now being described. One can rightly say of some of the Region's countries that they have gone into the Rostovian stage of "high consumption" without having first got even to the outskirts of development — let alone "high development" <sup>(1)</sup>.

Finally the Region's international relations, and the deliberate pressures to which it is subjected, whether directly or through the instrumentality of Israel, together constitute a divisive influence. The Region's countries are dealt with in the economic sphere individually, and centrifugal forces are encouraged in the economic and political spheres, to obstruct any serious integrative efforts. Self-reliant development, which is only justifiable and possible in the regional context, cannot be promoted or achieved on a country-by-country basis. Dependency is likely to remain entrenched otherwise. Yet neither in this instance, nor with regard to the other developments and their implications, should blame be solely placed on the developed countries and the TNC's. Greater national and regional efforts are called for if the present unsatisfactory course of events is to be first stopped, then reversed. But the policy implications of the foregoing discussion will form the content of the next section.

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(1) We refer here to the concept as discussed in W.W. Rostow's *The Stages of Economic Growth* (Cambridge, 1960).

### III. Policy Implications of International Relations for ECWA Region's Development and Co-Operation

So far this paper has tried to trace the pattern of international economic relations between the ECWA Region and the rest of the world (but mainly the advanced industrial countries with market economies), insofar as this pattern has influenced matters like production, consumption, resource use, technology, development and life-styles. It has also tried to identify the main developments of relevance in the developed countries and in the ECWA Region, and to explore how the international relations aspects of these developments have influenced the Region economically, socially, and environmentally. Of necessity, the preceding discussion has been rather sketchy, as it was meant to serve as the background to the main enquiry in the paper, namely the implications of trends in international relations for production and consumption patterns, resource use, governmental ability to plan and control development processes, and intraregional and international co-operation.

The appropriate conduct of such an enquiry is within the framework of political economy rather than technical economic formulations which leave aside socio-political and institutional considerations, as matters falling rather in the *ceteris paribus* basket. It is contended here that an understanding of international relations and of their implications for development and co-operation is not possible unless such relations are seen and understood in all their dimensions, not just the economic dimension. Furthermore, as far as the Mashreq is concerned, and for that matter the whole Arab region what is of direct and close relevance is those international relations that have for long existed with the Western industrial countries with market economies. This is because economic intercourse with the advanced centrally-planned economies has been not only limited, but also of very recent and brief duration; and economic intercourse with other developing regions is extremely limited.

The Region's relations with Western Europe are very long-standing. They became strong in the early decades of the nineteenth century, with the penetration of France and England. (If the whole Arab region is considered, then Italy and Spain have to be added). This penetration followed two courses — political and economic, which ran parallel, but in the final analysis converged into one main course. All through the past century and a half, the European countries involved so shaped and directed their penetration and economic impact so as to influence the patterns of production, consumption, resource control and use, technology, trade, and the building of infrastructure to serve their own interests first and foremost.<sup>(1)</sup>

This policy met with resistance at times, but also with collusion by certain economic interests in the Region and at times by governments themselves, as these governments largely represented and/or formed part of the interest groups. Thus, by the end of World War II, which marked the beginning of the era of independence for the majority of the Region's countries, the pattern of relations was firmly set. In highly condensed terms, it was one of overall control, with concentration on mineral resources, exchange of industrial goods for local agricultural produce, ownership of remunerative public utilities, and the building of those parts of the infrastructure of use to the foreign powers and their corporations operating in the Region (ports, roads, railroads). This list includes the main areas of concentration, but other areas were also penetrated, including trade and industry.

Oil came to occupy an increasingly important place from the late twenties, and it was a major factor in the entry of the United States into the area soon after<sup>(2)</sup>. The establishment of Israel and the continued Western support given to it have been closely connected to the Western concern for the security and continuity of what the powers concerned considered their interests in the Region. Given the distribution of power between the Western countries and the Mashreq countries, their relationship has been characterized by control and exploitativeness, as well as active support for political fragmentation.

Political independence has meant a readjustment in the pattern of relations, involving the retreat of overt political domination and of direct economic hegemony, in favour of alliances, partnerships, or associations between Western and local interests. These modalities have economic content and take economic shape, but are invariably predicated on political affinity. This trend has been helped by four factors: long-term past association which, though marked with conflict, has also left a propensity for co-operation — a sort of political love-hate relationship; the evolving of socio-economic systems patterned after those of the Western countries, though they have undergone many alterations and mutations; the fact that "all the formative influences" in the lives and conduct of the leaders,<sup>(3)</sup> particularly in the early postwar era, have been Western or Western-formed; and, above all, a deliberate, aggressive policy by Western interests to keep their foothold in the Region, even by force if necessary: thus the Suez war of 1956 and the threats in 1977-79 by United States authorities to occupy Arab oilfields if necessary, belong to the same category of

(1) General works on the economic history of the Region are very few, but a number of studies are in hand on individual countries. The interested reader can refer, for detailed bibliographical information to: American University of Beirut, Economic Research Institute, **A Selected and Annotated Bibliograph of Economic Literature on the Arabic Speaking Countries of the Middle East 1938-1952** (Beirut, 1954), and to subsequent annual supplements.

(2) Reference material on oil exploration and production in the Region is abundant. For a concise work on the history of the oil industry, see Stephen H. Longrigg, **Oil in the Middle East: Its Discovery and Development** (Oxford University Press, 3rd. Edition, 1968).

(3) To borrow Mohamed Heikal's phrase, used in a similar context. See his book, **The Sphinx and the Commissar, The Rise and Fall of Soviet Influence in the Middle East** (Harper and Row, publishers, 1978), p. 16.

"international relations. (1)

However, the gloominess of this picture must not suggest that the situation is irreversible. Indeed, it is the contention of this paper that international economic relations can be made healthy, in the sense of becoming free of coercion, equitable, and efficient. The choice of these three qualities is deliberate. The absence of coercion would introduce and enhance the pursuit of economic intercourse peacefully and through constructive dialogue. Equity is essential because it assures each party in a free economic intercourse of its fair share of the rewards. And efficiency is essential too because it would lead to the optimization of the use of resources in a world which is threatened by the depletion of increasing scarcity of resources, and where the protection of the environment, against both excesses in exploitation and under-development, is essential for the survival of humanity.

The optimism of the preceding paragraph will not be left standing as a mere assertion. What remains of the paper is devoted to a suggestion of courses of action capable, if taken seriously, of making international relations healthy, and advancing and bringing hope into the search for meaningful development and life-styles. The courses suggested are in fact the implications of the present trend of international relations, which is the subject matter of this section of the paper. We now turn to these implications which fall into the national (country), regional (Arab), and international spheres.

### 1. Understanding of Society's Basic Interests

The starting point, it is here contended, is the understanding and assessment by society of its fundamental and legitimate economic interests and those social and cultural values and forces of relevance. Unless this is achieved, society's sense of direction and its priorities would be grossly and dangerously confused. The course "development" has taken in most of the Region's countries, in the postwar period, has largely been marked by such confusion. While it is not possible in the brief space available to undertake a complete listing of the ills experienced, it is enough to say that, as in most developing countries, often the economies have registered growth without registering true development, and the improvement in economic aggregates and averages has not fully reflected itself in the well-being of the mass of the people. In the ECWA Region specifically, it would be unfair to say that the peasants and the urban poor are not better off in their living conditions now than they were at the start of the postwar period, but the improvement does not fully explain or justify all the resources devoted to development over the past thirty years.

This brings us straight to the first major component of the understanding of society's basic interests. It is the proper differentiation between growth, development, industrialization, modernization, and westernization. Over the years, there has been some overlap between these terms, not all of them together at once, but when paired together. Thus, growth and development often get used interchangeably, though they are widely different in content and consequence. Development was taken to be synonymous with industrialization in the early years of independence, though not so much currently. But it is still used as another term for modernization, and the latter in effect is understood as westernization, in spite of the cultural and political connotations of the latter term. (2) Without going into the semantics of the confusion, we believe it necessary to stress here that our concern is with development, as it was defined earlier on in the paper. (3) The concept as understood here involves the liberation of the productive forces of society and their harnessing in the service of the public good.

To achieve this function, the proper understanding of society's basic interests must be shared by the widest network of leaderships possible, that is by the political, intellectual, and economic leaderships (including labour unions, the press, farmers' associations, syndicates, students unions, and professional associations or societies), and by the public at large. This second component involves three aspects. The first is the social education of the people, which should go well beyond formal schooling to include sensitization to social values and objectives, national interests, political rights and duties, and related matters. The press and political parties can have great educative impact in this respect.

The second aspect is the mobilization of the population in support of the objectives and tasks of development. But mobilization, and commitment of the people, cannot be undertaken unless a third aspect is assured. This is widespread participation by the people, in political life in some appropriate form, in a manner that enables them to be a determining factor in the choice and change of governments, and by projection in the shaping of their country's

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(1) For reports on such threats and on the formation of special "intervention" Combat Units in the United States, as well as for the reactions of Arab authorities, see *Middle East Economic Survey*, a weekly which specializes in oil news and analysis. (Several issues during the period 1977-79).

(2) See, in this connexion:

— Denis Goulet, *The Cruel Choice: A new Concept in the Theory of Development*, (New York, 1975);

— Mahbub Al Haq, *The Poverty Curtain: Choices for the Third World* (New York, 1976);

— Alain Birou, Paul-Marc Henry and John P. Schlegel, eds., *Towards a Re-definition of Development* (Pergamon Press, 1977);

— Andrew Weintraub, Eli Schwartz, J. Richard Aronson, eds., *The Economic Growth Controversy* (Macmillan 1973);

— *Development Dialogue*, 1977:2, special issue edited by Marc Merfin, entitled *Another Development; Approaches and Strategies* (Uppsala, 1977); also, an earlier issue entitled *What Now: Another Development* (Uppsala, 1975);

— Sayigh, *The Determinants of Arab Economic Development*, op. cit. Of special relevance in the present context are several papers submitted to a seminar on New Concepts and Strategies of Development and their Relevance to the Arab World, held jointly by the Arab Planning Institute (Kuwait) and the Planning Center for Economic and Social Development (Damascus), 19-23 May, 1979, in Damascus.

(3) In the summing up of the Section II above.

economic decisions and development plans and efforts.

A third component is a corollary of the understanding of society's basic interests: it is the understanding of what is **not** part of these interests, or what is inimical to these interests. Thus, society must be made aware of the identity, nature, and power of foreign exploitative forces which (with their internal allies) work against society's economic, socio-cultural, and political interests and integrity. Once this is achieved, society will become largely immunized against those aspects of international relations which by their nature and operation endanger and damage society's legitimate rights and interests.

## **2. Social Restructuring in the Service of Society's Interests**

Proper understanding of society's basic interests is not sufficient for their protection and enhancement. Society must develop the mechanisms and institutions capable of organizing the protection and enhancement. Those parts of the machinery that concern us in the present context include planning, even if merely indicative, with what that involves by way of definition of developmental objectives, priorities, strategies, and policies; the modernization and proper development-orientation of the civil service; the building of the capability to protect the security of society and to safeguard its developmental achievements to the greatest extent possible; and the removal of obstructions to socio-economic mobility. The conception, design, and formation of all the parts of the machinery necessary must be undertaken within a socio-economic system which provides a favourable climate for the philosophy underlying the desired social objectives. Furthermore, the main forces in the system ought to be willing and determined to bring about not only the comprehension of society's basic interests as indicated above, but further to translate the understanding into reality.

Social restructuring as suggested here need not follow any stereotyped ideological organizational pattern: indeed, it should ideally be inspired by society's own creativeness, conditions and needs, and culture. The essential thing is that it should be oriented towards society's legitimate interests and should resist incursions into their terrain. It can only do that if it can count on the support of a socially-educated, mobilized, organized and politically participating population.

## **3. Reorientation of Education and Training**

As the proper understanding by the population at large of the true meaning of development is essential, and as its mobilization and participation are also essential for the acceptance of the efforts and sacrifices involved in development, so education and manpower training must be reoriented accordingly. By and large today education is viewed solely as a personal affair, meant for the enhancement of the individual's earning capacity and of his ability to climb the social and economic ladder as fast as possible. Without urging the uprooting of such attitudes, one can still insist that a sense of social responsibility must also be instilled. In other words, education must include in its content those basic social values which are necessary for the success of the drive for development.

Apart from this question, the educational systems must place greater emphasis, in their content and methodology, on the natural and social sciences, research, experimentation, and those issues and problems relating specifically to the Region. The pedagogical approach must be that of joint intellectual exploration by teacher and student; it must be problem-solving, and must be questioning rather than assertive. In its overall orientation, education in the Region's countries must emphasize the knowledge and appreciation of the Region's resources, and the urgency of developing them and using them properly. Equally important is the need to understand the nature of foreign interests that attempt to exploit the Region's resources primarily to their own advantage, and to see the necessity of safeguarding these resources.

Technical and vocational training has a more specific function, and it ought to be designed parallel with the planning activities of the Region's countries and any Arab regional indicative planning that might be undertaken. (More on this later). Essentially, two tasks are involved here: the continued re-training and upgrading of manpower in conformity with changing modern economic activity and the demands of appropriate technology; and the sensitization of manpower to the supremacy of human skill over the tools used in conjunction with labour, and the importance of using resources carefully and protectively.

Thus, the reorientation of education and training in broad terms aims at the development of the population in general, including manpower, as a human resource or the human environment, in the service of deep and comprehensive development and the search for life-styles more in harmony with the Region's values and culture, its environment, and its basic interests. However, education has another equally important function. This is the development of man as an end in himself, not just man as a unit in society and an instrument of development, and bringing out the best in man and enabling him to achieve a large a measure of fulfilment as possible.

## **4. Acquisition of Appropriate Technological Capability**

The repeated emphasis in the foregoing discussion on the penalty for not achieving this acquisition makes it unnecessary to elaborate the point much further. Thus, the technological implications of the Region's international relations for production, consumption, the use of resources and the environment, manpower development, and the Region's life-styles have been touched upon already. We need here to emphasize only the policy and implied action that may be suggested. These, in brief, center around two questions: what **not** to do, and what to do for the desired

acquisition of technological capability to be achieved.

Essentially, past and recent experience and analysis both suggest strongly that the Region should turn away from the course it has been pursuing. This course, it will be recalled, involves the "importation of technology" — capital goods, consultation and design and engineering services, and skilled labour. Such large-scale importation has been thought of as a sure short-cut to the transfer of technology.

This paper argues that, on the contrary, what is thought of as a short-cut may well prove a much longer path to true technological capability in the final analysis. It will also prove much costlier and lead to greater dependence on the TNC's and advanced industrial countries. There is no substitute for learning the hard way, namely developing the appropriate education, research and experimentation, and technical skills in the Region and/or by the Region's men and women. Trial and error are an essential part of the learning process, and time is necessary for this process. What is developed will necessarily be imitative at the start, but gradually it can become adaptative and then finally innovative. Throughout, it will be necessary to emphasize harmony between technology and environment — both social (human) and economic (physical).

The action and policy implications are related to education and training, planning, the patterns of production and consumption, employment, and mass communication — to name only a few areas; and they will have to be national (within individual countries) and Arab (within the Region as a whole).

### **5. Promotion of Employment**

The Arab region as a whole has a large reservoir of employable men and women who are not in active employment, although there are individual cases of severe shortages of skilled manpower. The unemployment is the result of the low level of skills, and therefore of employability, of insufficient concern with the employment component of projects and programmes in development plans, of shortage of capital in the input mix, of insufficient development of natural and man-made resources, of confusion in the promotion of sectors and priorities, and of the wrong choice of technology. The correction of the situation is imperative, since the provision of nearly full employment is of utmost significance to every society, not only for creating purchasing power for the employed to enjoy, but also for the sake of preserving human dignity.

Several of the causes behind the high level of unemployment and under-employment<sup>(1)</sup> flow directly from the pattern of economic international relations which were discussed in section II above. Consequently, the fight against unemployment and the human and economic waste it involves must take into account those aspects of international relations that are of relevance. These include the influence of international relations on production patterns and resource use, on technological choices, on tastes and the preference for imported goods and services, and so on. Planning objectives, priorities, strategies, and policies must therefore assign a high priority to the increase in the volume of gainful employment in the Region's countries, and to the course of action capable of achieving that. This course will have of necessity to touch upon and relate to several of the implications being discussed in the present section.

### **6. Reshaping Production and Consumption Patterns**

Enough reference has been made, for the purpose of this paper, to the manner in which production and consumption patterns have been adversely influenced by international relations and the internal economic forces echoing those relations. The paper has also attempted to show how the present patterns are inimical in part to the design and the pursuit of true development and fulfilling life-styles. If this is true, then the patterns must be reshaped.

This raises controversial questions of ideology and economic motivation. But we believe that there can be enough consensus about the need to change the content of production and consumption in certain directions, on general grounds of resource conservation and social interest, without the need to indulge in issues around which long and perhaps inconclusive debate can rage.

Nonetheless, there will have to be a clearer conception, at the decision-making and planning levels, of the grounds on which to redirect production and consumption, and the mechanisms to use in the process. Both the grounds and the mechanisms will inevitably vary in accordance with the socio-economic system in force. But regardless of system, there will have to be a certain not inconsiderable minimum of redirection by government and public bodies of influence. However, this need not be direct and coercive, but can be indirect, using motivational methods and reorientation via education and the media.

### **7. Arab (Intraregional) Co-operation and Integration**

The economic, social, and environmental implications of international relations do not perhaps express themselves on as many fronts and as forcefully as on Arab (intraregional) economic co-operation. (We use the term "co-operation" rather loosely, because what is thought by the Arabs as worth seeking goes much beyond mere

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(1) Statistics on unemployment (see, for instance, UNCTAD, *op. cit.*, table 6.10) underestimate the volume of unemployment because they are based on national official records which are marked for underregistration. Examination of the size of the active labour force in national statistics in the whole Arab World shows that, in the mid-1970's, unemployment amounted to about 25 per cent of the labour supply (able persons aged 15-65). See Sayigh, *The Economies...*, *op. cit.*, ch. 14.

co-operation, to complementarity and integration, and finally on to full economic unity. But "co-operation" is adequate for present purposes as a generic term used to denote the whole gamut of "economic togetherness".)

The influence of international politico/economic and socio/cultural relations of the past century and a half has revealed itself, as already indicated, in several areas. These are trade, the exploitation of certain resources (particularly hydrocarbons, phosphates, and agricultural land), the building of certain categories of infrastructure, the choice of technology, sectoral as well as production and consumption patterns, education and manpower training, the form of government, and ideas, systems and ideologies. This influence has also shaped the relations among the various countries of the Arab region and made these relations minimal, and it has almost totally diverted the region from the other developing regions. Instead, Western influence has led to the orientation of the region's countries towards the West, in a relationship of control-dependency, rather than towards each other<sup>(1)</sup>. We will now attempt to show that, in order to correct the distortions and imbalances resulting from the heritage of economic relations with the Western industrial countries and to contribute to the establishment of a more equitable new international economic order, the Arab region's countries will have to work in concert and to co-operate closely. Their co-operation will have to cover many areas as will be shown presently.

Perhaps the first policy implication is for development and intraregional close economic intercourse. Unless national development proceeds in the right direction — that is, towards comprehensive and fundamental development — and unless country efforts are strongly supplemented by co-ordinated and harmonized regional action, the Arab region cannot bring about a notable measure of freedom from dependency and increase its own ability to contribute to the establishment of the desired NIEO. In addition, it is at least equally important that national development itself cannot be optimally pursued without earnest and substantial regional co-operation and regionally conceived and designed development.<sup>(2)</sup>

The position taken here is that close regional co-operation can be extremely useful at three levels: the speeding up of national development; the emergence of a process of regional development and self-reliance; and the promotion of efforts to make relations between the region and the advanced industrial countries healthier. To achieve this three-pronged advance, that is nationally, regionally, and internationally, the Arab region's countries must accept a large measure of intraregional co-operation. This can only be achieved if these countries realize that such co-operation is not motivated only by "brotherly feelings" on grounds of the similarity of cultural heritage and of political aspirations, but equally so by self-interest in the economic field and also in the political/security field. Indeed, the rest of the Arab world constitutes the **economic and political strategic basis** for each of its constituent parts.

Owing to the central importance of the orientation of development in such a manner as to be a vehicle capable of transforming the region in the directions suggested, we will discuss in some detail the tasks that have to be performed for the purpose of transformation. Six of these will be examined.

The first task is the adoption by the region's countries of similar overall, socio-economic (and political) objectives and priorities. This can only be achieved through the regional organizations and institutions already in existence<sup>(3)</sup> of harmonious and complementary objectives and priorities, and the effective implementation of policies embodying harmony and complementarity. But first the various country leaderships and regional decision-making groupings have themselves to be persuaded to adopt these objectives, and to be willing to impose their convictions on the means at their disposal. These means are varied and far-reaching. Tremendous effort at mass reorientation and mobilization will be necessary in the process.

The second task is the co-ordination of national development plans, in such a manner that, at least minimally, they do not clash with each other, and that furthermore they permit some inter-weaving together. There are already some modest promptings under the auspices of the League of Arab States and the Council for Arab Economic Unity to have the Arab countries co-ordinate their national plans, but such efforts can only become meaningful if they are accepted and promoted at the political level, and are intensified and made operational.

The third task is a logical sequel to the second. This is the drawing up in broad terms of a regional indicative plan. The broadness of the term "indicative" is necessitated by the desire for practicality and the need to allow sufficient flexibility to the national authorities, if they are not to feel too constrained inside a regional straightjacket, conflicting with their notion of "sovereignty". Such a regional plan will therefore deal with those regional common needs enjoying high priority, including security and self-reliant development.

But a regional indicative plan will need a regional budget made up from country contributions in order to finance

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(1) We are referring here to the Arab region as a whole, but what has been said applies equally to the Mashreq or the ECWA Region. See Amin, *op.cit.*

(2) In this connexion, see: League of Arab States, Department of Economic Affairs, **Working Paper of the Three-Man Committee Formed by the Experts' Committee for the Strategy for Joint Arab Economic Action** (Cairo, 1978; monograph in Arabic). For the background of this **Working Paper** and an analysis of it, and for an evaluation of Arab Economic co-operative steps, see Yusuf Sayigh, "Arab Economic Integration and the Alibi of Sovereignty", paper submitted to the 11th Convention of the Arab American University Graduates held in Minneapolis, Minn., in October 1978. (An Arabic version was published in *Al-Mustaqbal Al-Arabi*, No. 6, March 1978).

(3) There are a few dozens of Arab regional economic organizations under the wide umbrella of the League of Arab States, as well as producers' unions, professional syndicates or associations, joint companies, and financial institutions. See Mahmoud Abdul-Fadeel, **Oil and Arab Unity** (a Center for Arab Unity Studies Publication; Beirut, 1979. In Arabic). The author peruses a report produced by the Council for Arab Economic Unity.

joint regional needs. This would be the fourth task or direction for the reorientation of development. Such a budget, like the plan it serves, would not only symbolize regional joint responsibility and readiness for a regional discharge of such responsibility, but would also translate the symbolic attitude into concrete action which would enable the region's countries to act together effectively.

The fifth task is the intensification and systematization of regional flows — the flow of aid from the capital-surplus to the capital-deficit countries, the flow of trade, the movement of labour at all levels of skill, and the undertaking of joint programmes and projects, in agriculture, industry, transport and communications, and in education, training, and research. Special emphasis ought to be placed on this direction of action. The fact that it is dealt with here in very concise terms is not to minimize its deep and wide significance for intraregional co-operation. Indeed, it is of central significance, particularly in the early stages of co-operation, before more demanding forms of co-operation become possible.<sup>(1)</sup>

Finally, in the sixth place, the content and machinery of development have to be reoriented. Development must become noticeably more oriented towards the satisfaction of basic needs and towards regional self-reliance and regional technological capability. But, as far as the notion of "basic needs" is concerned, it must be underlined once again that these have to be viewed not statically, but dynamically. This means that as they are satisfied, more of them will have to be satisfied — what used to be considered wants get transformed into basic needs. In addition better quality goods and services will become basic needs to replace lower quality goods and services of an earlier stage. In other words a dynamic understanding of the notion involves the acceptance of the inevitability of the widening of the list and the improvement in the quality of basic needs, the more and better these are satisfied.

With regard to machinery and approach, development must become much more broadly based and its pursuit must depend on the strength of the mobilization and participation of the people. In addition there is need for competent technical agencies or authorities to design development, execute it, and periodically review it and correct its course. All along these functions must engage the interest, participation and commitment of the general public, through appropriate institutional instrumentalities and modalities. Associated with the question of machinery is the building on a regional basis of institutions with teeth in them. By this is meant that it is not enough to have regional organizations with advisory or even co-ordinative functions. It is essential for the region's countries to pass on certain decision-making powers to some of these organizations, as the situation requires, and to give them budgets appropriate for their tasks.

Special mention must be made of the importance for intraregional co-operation and for both the imperatives and the objectives of such co-operation of the need for a regional view of the development of natural resources, particularly hydrocarbon resources. This is not the place to discuss the implications for oil and gas policies of such a view, as there is a separate seminar paper dealing with the hydrocarbon sector. But some mention must be made here, even if very briefly, of the centrality for successful intraregional co-operation of the design of oil policies in such a manner as to serve regional as well as national objectives.

The interdependence between security and development, both viewed from a regional angle of vision, cannot and should not be ignored. This is because security provides the protective fence for developmental achievements, and development provides the solid base for security. Likewise the pooling and allocation of resources to these two important ends must be made on the basis of availability and need in the region's countries. The interdependence makes the proper development of the oil sector and the adoption of the right policies with respect to volume of production and pricing and to conservation, matters of national import but also of regional relevance and import. This is so because the manner in which hydrocarbon resources are developed and exploited and their earnings used is a matter closely related to the region's overall self-reliant development, environmental balance, technological capability, security, and place in the international economic order and even in the whole world system. In short the Arab oil sector has become a major determining factor for the producing countries and for the region's internal situation, power, interests, and well-being, as well as for the region's relations with the rest of the world. This is as true for the ECWA Region as it is for the Arab region as a whole.

So far attention has focused on the implications of international relations for intraregional co-operation, and the avenues through which the Arab region, with the Mashreq being an integral part of it, acting as one unit can strengthen its drive for development and enhance its security. To this must be added brief mention of the impact of co-operation and of regional concerted action on the Region's external relations.

One aspect of these relations is industrial redeployment attempted by the advanced industrial countries. The ECWA Region can act more rationally and effectively with respect to redeployment policy, if it acts as one unit rather than leaving the decisions for the acceptance or rejection of migrating industries to individual countries, other things being equal. Another aspect is the struggle to remove dependency and obtain more equitable terms in the international division of labour and of benefits. A third aspect is the Region's ability, acting in concert, to achieve greater self-reliance and technological capability. No one country has by itself the financial resources, the skilled manpower, and the size of population and market to enable it to seek and achieve a large measure of technological capability and self-reliant

(1) It is only fair to indicate that regional financial flows have become quite substantial since 1974, averaging, according to calculations made by this writer some \$4 billion a year. (The recent calculations are based on Sayigh, *The Economies... op. cit.*, table 14.6, p. 697).

development.

There is growing awareness of this in the Arab region as a whole, and some important institutional arrangements are being made in order to pool the various countries' efforts into one regional effort for technological transformation. But there is much less effort devoted to the undertaking of development on a regional basis. This is all the more regrettable since the search for alternative avenues to and patterns of meaningful development and life-styles can best be undertaken, if it is to promise satisfactory rewards, by the countries acting together within a regional conceptualization and plan, and a regional institutional framework.

#### **8. Reshaping the International Economic Order**

This paper has emphasized the deleterious effect which the Region's international relations with the Western industrial countries have had on the Region's integrity and coherence, its patterns of development, its production and consumption patterns, its technological choices and capabilities, the rationality of its use of its resources and the harmony between man and his environment, and finally the dependence of the Region on the advanced industrial countries in a web of relations which is characterized by exploitativeness by these countries and marginality for the Arab countries. It follows naturally and logically that the Region is called upon, in self-interest as well as in fulfilment of true international responsibility, to work relentlessly for the reshaping of the International Economic Order.

The objective must be a new order motivated by different forces and values, and aiming at different objectives and end-results. To the greatest possible extent, the new order — it is now generally agreed in the Third World and among some leaders in the industrial world — must aim at achieving equality and the fair distribution of the fruits of the world's economic activity, in place of exploitation by the rich and powerful and marginality for the poor and weak. It must also aim at broad-based determination of the workings of the new order instead of its domination by a small closed group of industrial countries; concern for the social good in general, but particularly for the powerless and the disenfranchised, instead of the present overwhelming concern with private profit; broad-based acquisition of technological capability instead of the present quasi-monopolistic control of this capability by the advanced industrial countries and the transnational corporations with their extortionist pricing practices, and restrictive policies; more truly disinterested help by the advanced industrial countries to the developing countries in the drive of the latter group for development, including less burdensome capital transfers and the lightening of the debt burden; and finally more rational and efficient production and consumption promotion policies by the advanced industrial countries, in order to safeguard and develop the earth's resources and to achieve greater harmony and balance between man and his environment.

The specifications of the desired New International Economic Order as enumerated are a tall order indeed. Apart from the extreme difficulty of meeting them in a reasonably short time, given the complexity of the many intricate factors which are involved in the correction of the order now in existence, there is the central problem of willingness by the privileged industrial world to permit the correction to take place.

This is indeed the heart of the matter. For the economic and technical obstacles can be overcome with goodwill, patience, and the use of the many skills and instruments mankind has developed over the years. But the major obstacle is the political will of the powerful developed countries, which raises an additional moral issue. Is there a moral duty for the correction of the International Economic Order in the directions suggested? And is there enough awareness that in the long-run moral duty identifies itself with self-interest? If there is no such awareness, there will be little likelihood of the industrial world accepting to undertake radical corrective measures against what it considers its basic and vital interests.

The nature of North-South relations, or the relations between the developed and the developing countries, is a very live issue of our contemporary world. Often, the sluggishness of the realization by the advanced countries that the Third World has legitimate serious grievances, arising from the values, the structure, and the functioning of the existing International Economic Order, suggests to the developing countries that the only course available is one of confrontation, and that the two groups of countries are inexorably set on a path of collision. Yet there are hopeful signs that the confrontation might be reduced in intensity, though gradually. This hopeful note will be the truer, the stronger the developing countries become and the more clearly they see their relative place in the world order on the one hand, and the stronger the forces in the developed countries which recognize the injustice and wastefulness characterizing the present order and are willing to support the call for radical correction on the other.

The United Nations system itself, crippled as it often appears to be by the power of the leading industrial countries, is nonetheless a very valuable instrument for correction. This is because it provides an international meeting place and forum for the exchange of views which cannot though gradually, but have an educational value for all concerned. Finally, the possibility of confrontation if all else falls is in itself a deterrent which makes the resort to economic/political confrontation unnecessary the more credible the deterrent. It is all these factors together that permit us to end on a note of guarded hope.