



Report of the Workshop on Chemical Hazards for African Countries, Nairobi,

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UNITED NATIONS ENVIRONMENT PROGRAMME — WORLD HEALTH ORGANIZATION

IN CO-OPERATION WITH
LEAGUE OF ARAB STATES AND
COMMONWEALTH SECRETARIAT

REPORT OF THE WORKSHOP ON CHEMICAL HAZARDS FOR AFRICAN COUNTRIES

CONVENED BY THE

UNITED NATIONS ENVIRONMENT PROGRAMME
AND THE WORLD HEALTH ORGANIZATION
IN CO-OPERATION WITH THE LEAGUE OF ARAB STATES
AND THE COMMONWEALTH SECRETARIAT

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I. OPENING SESSION

1. The Workshop on Chemical Hazards for African Countries, convened by the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) in co-operation with the League of Arab States and the Commonwealth Secretariat, was held at the United Nations Office, Nairobi, Kenya from 14 to 18 September 1987. Mr. J. W. Huismans, Director, International Register of Potentially Toxic Chemicals/UNEP gave the introductory and welcome address. Short remarks of welcome were also given by Dr. Marcella Davies, WHO Representative for Kenya, and Mr. Mahdi Mustapha El Hadi, Deputy Secretary General, League of Arab States. Hon. J.P. Korellach, M.P., Assistant Minister for Environment and Natural Resources of the Republic of Kenya opened the Workshop. In his address he emphasized the need for protecting man and the environment from the hazards of chemicals and referred to the World Bank statement that "it is important that the use of pesticides financed under World Bank loans should be consistent with pest management practices and accompanied by safeguards to protect users, the general public and the environment".

2. Representatives of 23 African countries participated in the Workshop. In addition there were observers from ministries and departments of the Government of Kenya, non-governmental organizations and international organizations. The full list of participants is contained in annex I to the present report.

II. OBJECTIVES OF THE WORKSHOP

3. The objectives of the Workshop were:

- (a) To review and assess the magnitude of chemical hazards in Africa;
- (b) To review and assess the current status of capabilities for dealing with these hazards;
- (c) To explore possibilities for co-operation between individual countries and on a regional basis with the involvement of the United Nations system;
- (d) To identify priorities for action.

III. WORKSHOP PROGRAMME

4. Countries had been requested to prepare country papers giving national background information, national experience of health and environmental problems due to chemicals, activities related to chemical safety and pollution control, legislation and national capabilities, national priorities and recommendations (see annex V). Twenty of the participating countries submitted country papers. On the basis of these country papers, together with FAO, UNEP and WHO documents and discussions with responsible officials of these organizations, a consultant prepared an overview paper on the situation regarding chemical hazards in the African region which formed the basic working document of the Workshop. This overview paper is reproduced in annex III to the present report.

5. An analysis of the country papers indicated that the main concerns of countries in the region were: pesticides; occupational health; chemical safety; and environmental pollution. The Workshop had plenary sessions at which papers relating to the above four areas were presented and discussed and group sessions at which the subjects were discussed in greater detail. The participants and observers formed themselves into four discussion groups; only two groups sat concurrently so that each participant/observer was a member of two groups. The agenda, programme of work as contained in annex II was adopted and Workshop officers were elected, as contained in annex I, of this report.

IV. CONTROL OF ENVIRONMENTAL HEALTH HAZARDS AND PROMOTION OF CHEMICAL SAFETY

6. Most countries, whether developing or industrialized, are faced to a varying degree with a number of environmental hazards which may affect human health; they include environmental pollutants and hazardous substances. A recent WHO survey showed that of the 60 countries which are in moderate-to-rapid industrial development, only 10 met most of the control programme requirements, 30 had only some, while 20 had very little or no capability at all. The constraints to the solution of environmental hazard problems were in general lack of sufficient local data on health effects of a wide range of potential hazards, continuing conflict between development aims and environmental goals, and fragmentation of responsibilities for control.

7. Environmental health is inter-sectoral in nature in that it concerns all parts of the human environment. Environmental hazards control which focuses on prevention or control of the effects on health of environmental pollution and the use of chemicals is just one aspect of it; others are water supply and sanitation, housing, hygiene, food safety and occupational health.

8. The most important elements of consistent and effective national programmes are:

- (a) Fostering of environmental considerations and awareness at the policy level;
- (b) Step-wise programme development;
- (c) Optimal inter-sectoral co-ordination;
- (d) Environmental education.

9. What is most needed, however, is an effective infrastructure and organizational capability. The following elements are essential for the development of this infrastructure and capability: awareness and promotion; information systems; policy and legislation; planning and programme development; institutional strengthening and resources (human and financial).

10. Past experience of WHO in the implementation of activities to control and prevent environmental hazards has shown that the main problem areas are:

- (a) Environmental considerations for development;
- (b) Drinking water quality;
- (c) Fresh water quality;
- (d) Coastal water quality;
- (e) Urban air quality;
- (f) Domestic combustion of biomass fuel and coal;
- (g) Hazardous waste management;
- (h) Localized hazardous environmental pollution sources;
- (i) Safe use of chemicals;
- (j) Chemical accidents;
- (k) Radiation protection.

11. When it concerns chemical safety, primary prevention is the only effective means for the long-term solution of the problems. This necessitates pre-testing of chemicals, selection of less-toxic and less-hazardous alternatives and ensuring safe production and use. A multidisciplinary approach with appropriate legislation backed by implementing capability and advisory toxicological services is necessary. The legislation should take into account the long-term effects such as cancer and degenerative diseases, even at low exposures, in addition to the conventional acute and chronic toxicity.

12. Expert trained manpower, of which there is a global shortage, is essential for ensuring chemical safety. Programmes for training such manpower are needed.

13. Research is well established in certain fields of toxicology. However, there is a need to strengthen research programmes in the fields of predictive risk assessment and control technology.

14. The awareness of the public, target groups and decision makers about the hazards of chemicals has to be increased by suitable education and information programmes.

15. Monitoring and surveillance programmes at national and regional level for following up the most important exposures and for assessing health and environmental risks should be established.

V. CHEMICAL HAZARDS TO HUMAN HEALTH AND THE ENVIRONMENT IN THE AFRICAN REGION

A. An overview

16. When presenting his overview paper (see annex III), Mr. C. Satkunanathan highlighted the main areas of concern in the region: exposure to organic dusts, silica dust and asbestos in the occupational environment; emission of sulphur dioxide, arsenic and fluorine compounds into the ambient environment; exposure in the indoor environment to suspended particulate matter, polycyclic aromatic hydrocarbons, carbon monoxide, nitrogen dioxide and formaldehyde contained in emissions from the burning of biomass fuels; pollution of surface and ground waters by fluorides and nitrates; aflatoxins in maize, and possibly in alcoholic beverages and indigenous medicines; and the misuse of pesticides.

17. Pesticides appear to be the major problem and there is a need for compliance by all concerned with the International Code of Conduct on the Distribution and Use of Pesticides promulgated by the Food and Agriculture Organization (FAO).

18. Legislation for the control of chemical hazards is inadequate or non-existent; even where legislation exists, sufficient trained manpower and laboratory facilities are not available for its implementation. Maintenance of laboratory equipment is a problem; the development of simple tests and use of simple equipment may partly solve the problem. Attention was drawn to FAO and UNEP programmes for the training of laboratory technicians and maintenance technicians and for providing analytical laboratories for food and pesticide analysis. The overview paper was discussed both in plenary and in the various discussion groups.

19. The Workshop noted that although there were minor differences, the problems caused by chemical hazards are similar throughout the region and similar to those faced by other developing countries. Most of the countries have some experience of control of chemicals because they all have systems of drug control; otherwise control of chemicals is either very limited or absent. Chemical safety for consumers is not developed and the use of toiletries and herbal concoctions has created problems of consumer protection. The hazards of environmental pollution have not yet been sufficiently recognized.

20. The following sections (B-G), contain a report of discussions on the overview paper in plenary and in the four discussion groups.

B. Pesticides

21. It was recognized that there was a need for the use of pesticides in public health and agriculture. However, integrated pest management programmes including biological and environmental controls should be further developed and their applications more strongly promoted in order to reduce reliance on chemical pesticides.

22. There is little primary manufacture of pesticides; most of the pesticides used are imported or formulated locally from imported active ingredients. Formulation appears to be more hazardous than actual manufacture and small factories more hazardous than large ones.

23. A few countries have legislation which is well implemented to control the manufacture, import, formulation, transport, storage, labelling, packaging, use, sale and disposal of pesticides. Other countries may with advantage follow these examples and use the International Code of Conduct on the Distribution and Use of Pesticides to set up their own registration and control procedures. It was noted that FAO has identified countries without pesticide registration procedures and would provide assistance to them.

24. Countries would find it useful to set up national registers of pesticides containing relevant information with the assistance of the International Register of Potentially Toxic Chemicals (IRPTC).

25. Neighbouring countries may find it desirable to harmonize their legislative and administrative procedures to prevent uncontrolled transport of banned or restricted pesticides across their borders.

26. Insufficiently trained scientists and inadequate laboratory facilities are the main constraints in the implementation of existing legislation. Maintenance of expensive, sophisticated instruments is a problem. The use and further development of simple tests where possible and the setting up of well equipped and maintained subregional laboratories were seen as partial solutions to the problem. The assistance of international agencies may be required for this. It was noted that FAO had conducted several technician and maintenance technician courses in African countries and has also helped to set up analytical laboratories especially for food and pesticide analyses.

27. There have been reports of poisoning by pesticides. Accurate figures, however, are not available, but experience in other developing countries indicates that the number of cases of pesticide poisoning would be large. The poisoning is due to faulty equipment, non-use of protective clothing, ignorance by the user, lack of information (on the nature of the hazard) on the label and lack of supervision. Training of extension officers who can provide correct information to the user in the field and the use of simple educational materials such as those developed by FAO are very important.

C. Occupational health

28. The Workshop considered the subject on the basis of the following definitions:

(a) Occupational health service. An occupational health service is a service established in or near a place of employment for the purposes of:

(i) Protecting the workers against any health hazard which may arise out of their work or the conditions in which it is carried on;

(ii) Contributing towards the workers physical and mental adjustment, in particular by the adaption of the work to the workers and their assignment to jobs for which they are suited;

(iii) Contributing to the establishment and maintenance of the highest possible degree of physical and mental well-being of the workers (Occupational Health Services Recommendation, 1959 - ILO No. 112).

(b) Workers, workplace, health. The term "workers" covers all employed persons, including public employees. The term "workplace" covers all places where workers need to be or to go by reason of their work and which are under the direct or indirect control of the employer. The term "health", in relation to work, indicates not merely the absence of disease or infirmity, it also includes the physical and mental elements affecting health which are directly related to safety and hygiene at work (Occupational Safety and Health Convention 1981 - ILO No. 155; Occupational Safety and Health Recommendation 1981 - ILO No. 164).

29. In the context of occupational health and safety, chemical safety was considered to cover the prevention and management of adverse health effects, both short-term and long-term, to humans and the environment arising from the production, storage, transport, trade and use of chemicals and from collection, handling and disposal of chemical wastes.

30. Occupational health hazards fall into seven main categories which vary in degree of severity namely: mechanical agents, physical agents, chemical agents, biological agents, and physiological, psychological and social situations. Of these, hazards from chemical agents are the most varied and intricate and therefore deserve special attention.

31. There are large differences in the level of occupational exposure to chemicals in different branches of economic activities. For African countries the distribution of the exposed workers is different from that in industrialized countries. There is little manufacture of chemicals but there is large importation of chemicals for direct use or formulation. These products are then used frequently in the rural environment where most of the people live and where most people work on peasant farms and in small-scale industries. The workers are largely unsupervised and poorly equipped so that the exposure levels are unacceptably high and are increased by such factors as poverty, ignorance, lack of skills, and poor practices and poor attitudes towards chemicals. The workers involved include men, and women and children; serious concern was expressed about the use of child labour. In rural areas, the working environment, the general environment and the living environment merge into one.

32. Acute and chronic effects of the chemicals, such as irritation of the skin or respiratory tract, neurotoxicity, pneumoconiosis, byssinosis, dermatoses, and cancer, are important; the effects of chemical disasters should also be borne in mind. Hazardous chemicals should be contained within the working environment in the factory and controlled there rather than released into the general environment. The tools for primary prevention include:

- (a) Use of chemicals of low toxicity;
- (b) Pre-market tests;
- (c) Siting of factories;
- (d) Licensing of production, sale and use;
- (e) Process design and maintenance;
- (f) Control of transport, emission, sources and waste;
- (g) Setting of exposure limits;
- (h) Labelling;
- (g) Training and information.

33. National chemical safety procedures should be based on sound legal, technical and administrative structures.

34. The main constraints in the region are absence of clear policies, inadequate legislation, lack of technical standards, trained manpower, information and research support, risk analysis service including analytical laboratories, inadequate occupational health services and lack of co-operation between the various sectors.

35. The elements of an action plan for occupational health and safety are:

(a) National policy and procedures. ILO Conventions Nos. 155 and 161 provide guidance on policies for occupational health services;

(b) Intersectoral co-operation. This is essential as chemical safety requires a multidisciplinary approach;

(c) Enactment of improved legislation. At present the legislation is inadequate and fragmented;

(d) Enforcement of legislation. Trained personnel and laboratory services are necessary for this purpose;

(e) Practical preventive action. Preventive measures should be focused on the most vulnerable groups. Pesticides pose the most serious problem, and primary and secondary methods of preventive action should be taken. In the rural areas, however, primary methods (engineering) may not be feasible and secondary methods such as personal protective clothing and equipment may need to be used;

(f) Training. As there is lack of trained personnel, the setting up of a training institute for a subregion or a country should be considered;

(g) Information. Data on chemicals and their effects as well as information on the export of banned and restricted chemicals are not easily available. IRPTC could assist in removing these shortcomings.

D. Chemical safety

36. The concept of chemical safety as a continuum, covering safety activities involving chemicals and directed to avoiding adverse effects at every stage, has been recognized in African countries. A number of definitions had appeared during the course of the Workshop and the Workshop agreed on this definition: "Chemical safety is undertaking all activities involving chemicals in such a way as to ensure the safety of human health and the environment from harmful effects".

37. From the country papers and discussions, it is clear that many countries have legislative provisions with mechanisms for implementation for the control of chemicals such as drugs and pesticides. However, in some cases the existence of legislation does not prevent widescale unregulated sale and use of these substances. In the case of hazardous industrial chemicals and consumer products there are, in general, no mechanisms for control of major problems; those problems which arise are dealt with on an individual basis.

38. In terms of human health effects, there appear to have been no major incidents of poisoning by commercial chemicals; this may reflect inadequate reporting mechanisms rather than a true absence of problems because there is exposure of large uninformed populations in urban and rural areas. There have undoubtedly been many cases of pesticide poisoning. Instances of poisoning by impure distilled spirits, which contain quantities of methanol, and by herbal concoctions often occur.

39. Environmental damage has been reported due to industrial and mining effluents and excessive use and deliberate misuse of pesticides. Adverse effects on vegetation due to sulphur dioxide stack emissions have been observed in one country.

40. Environmental problems due to agricultural fertilizers have not been generally reported, such as eutrophication of lakes and elevated phosphate and nitrate levels. However, a case of eutrophication in a reservoir has been reported. Natural contamination of water with fluoride and nitrates is a problem in parts of Africa.

41. For chemical safety, risk assessment, both retrospective and predictive, is crucial in dealing with and preventing adverse effects on human health and the environment. The components of risk (and hazard) assessment are:

- (a) The identification of adverse effects;
- (b) The estimation of their probability (frequency) and magnitude;
- (c) Calculation of dose - response to determine thresholds for effect;
- (d) Delineation of exposed populations including special high risk groups (young, old, pregnant women, diseased);
- (e) Determination of the conditions of exposure.

42. The principal elements of a national chemical safety scheme would be:

- (a) Development of legislation;
- (b) Setting of technical standards;
- (c) Inspection for compliance;
- (d) Intersectoral co-operation;
- (e) Training and education;
- (f) Research:
 - New research data;
 - Surveillance and monitoring;
 - Epidemiology;
- (g) Information services:
 - Toxicology;
 - Health and environment;
 - Emergencies;
- (h) Emergency preparedness (contingency plans).

E. Environmental pollution

43. Four aspects of environmental pollution problems were examined by the Workshop. These were:

- (a) Evaluation of the sources of pollution;
- (b) Access to and handling of relevant information;
- (c) Existing and proposed strategies to control environmental pollution;
- (d) Harmonization of environment and development objectives.

(a) Evaluation of the sources of pollution

44. The common sources of pollution throughout the continent are:

(a) Human and animal wastes (organic and inorganic constituents; and pathogens);

(b) Agro-industries (organic wastes and various organic and inorganic pollutants).

45. The pollution sources of local significance are:

(a) Gold, copper and aluminium mining, and smelting operations which give rise to emissions of sulfur dioxide, arsenic trioxide and fluorine compounds at the sites as well as into the atmosphere;

(b) Lead from various sources (fuel, paint);

(c) Fluoride, arsenic and nitrates in ground waters (for example in the Rift Valley);

(d) Biomass fuels (wood, crop residues and animal dung), the emissions from which contain harmful pollutants and are an important source of indoor pollution.

(b) Access to and handling of relevant information

46. National information systems are inadequate due to fragmentation and lack of communication and co-ordination. Data sources and types of information available from international organizations (WHO, ILO, UNEP, UNESCO, IPCS and IRPTC) are not as well known as generally assumed. Although information is regularly disseminated by these organizations, it apparently does not always reach the person or institution which needs it most.

47. Some countries have initiated national programmes for the co-ordination of information channels and the effective handling of data but much remains to be done.

48. Scientific and technical information on chemicals is essential for evaluation of their effects on man and the environment. Identification of chemicals is often difficult as they are sold under different trade names. Identification and evaluation of mixtures of chemicals is even more difficult.

(c) Existing and proposed strategies to control environmental pollution

49. Governments can initiate risk management of chemicals through education of the public and consumer/user on their safe use, subsidizing of safety measures, and passage and implementation of laws and regulations. Some countries have educational programmes for school children and adults using audio-visual aids.

50. Some countries have environmental pollution control laws and regulations but their effective implementation is hampered by inadequate laboratory facilities for compliance monitoring rather than by lack of manpower.

51. Since effective pollution control needs the services of several disciplines, national interdisciplinary (interministerial) committees have been established in some countries to direct pollution control programmes. The setting up of standards for production, importation, sale, use and disposal of chemicals as well as rigid adherence to these standards are essential for the success of a control programme.

52. Programmes for water pollution control are developed to varying degrees in many countries but programmes for air pollution control are virtually non-existent. Air pollution constitutes a serious threat in certain parts of the African continent. Power plants in one country can cause long range air pollution and risk to neighbouring countries, for example, power plant emissions from South Africa.

(d) Harmonization of environment and development objectives

53. Existing industries remain the major problem since effective pollution control measures cannot be easily introduced because of economic constraints. For new industries, techniques like environmental impact assessment or granting of consent, which take into consideration environmental and health effects, are used in several countries.

F. Accidents

54. Accidents involving pesticides and other chemicals have been reported. Sometimes no single country may have all the necessary resources to handle a major accident. Pooling of all available resources in the region or subregion and preparation of a common contingency plan to deal with accidents is therefore, desirable.

G. Poison control

55. Numerous cases of poisoning by pesticides and other chemicals have been reported. Information on the diagnosis, treatment and prevention of poisoning should be made available to sources as close as possible to the end user and be simple enough to be understood and used by paramedical personnel. IPCS is preparing documentation and information systems on poison control and prevention as well as treatment of poisoning by medical and paramedical personnel in developing countries.

VI. THE CAIRO PROGRAMME FOR AFRICAN CO-OPERATION

56. The Workshop noted that the First African Ministerial Conference on the Environment, held in December 1985, had adopted a five-year Cairo Programme for African Co-operation that sets out its general objectives as:

"To strengthen co-operation between African Governments in economic, technical and scientific activities, with the prime objective of halting and reversing the degradation of the African environment in order to satisfy the food and energy needs of the peoples of the continent".

57. The Conference also decided to establish or strengthen eight specialized regional networks, in the fields of environmental monitoring, climatology, soils and fertilizers, water resources, energy, genetic resources, science and technology, and education and training.

58. While welcoming these initiatives, the Workshop felt that an additional regional network on chemical safety would be desirable.

VII. INTERNATIONAL ACTIVITIES

A. WHO activities on chemical hazards

59. In presenting a paper on "WHO activities on Chemical Hazards", Dr. Helmer (Prevention of Environmental Pollution Unit, WHO, Geneva) said that specific activities have been developed by WHO in response to the various pollution problems and related human health hazards in member States. They cover different environmental media (air, water, food) and a large variety of chemical substances and biological hazards.

60. These activities include:

- (a) Monitoring of environmental quality and human exposure - a framework for monitoring programme development is available through the UNEP/WHO projects on air, water, food and biological monitoring as part of the Global Environmental Monitoring System (GEMS) which have the requisite methodology, including data quality assurance, available;
- (b) Assessment of health and environmental effects;
- (c) Inventory and assessment of sources (causes) of environmental hazards;
- (d) Legislation and standards;
- (e) Environmental health impact assessment;
- (f) Management and control of environmental hazards and chemical poisonings.

B. Activities of the WHO Regional Office for Africa

61. Mr. V. Aalto outlined the activities of WHO Regional Office for Africa in the area of chemical hazards prevention and said the problem areas were: pollution by human and animal waste; improper use of agrochemicals; mining and industrial activities; and pollution by naturally occurring fluoride and arsenic.

C. International Programme on Chemical Safety (IPCS)

62. Dr. E. Smith said that the International Programme on Chemical Safety was formally launched in 1980 and is a co-operative effort of the International Labour Organisation (ILO), United Nations Environment Programme (UNEP) and the World Health Organization (WHO).

63. Objectives of the International Programme on Chemical Safety are to catalyse and co-ordinate activities in relation to chemical safety and, in particular, to:

- (a) Carry out and disseminate evaluations of the risk to human health and the environment from exposure to chemicals, mixtures of chemicals or combination of chemicals and physical and biological agents;

(b) Promote the development, improvement, validation, and use of methods for laboratory testing and ecological and epidemiological studies and other methods suitable for the evaluation of health and environmental risks and hazards from chemicals;

(c) Promote technical co-operation with member States, in particular developing countries to:

- (i) Facilitate the use of available evaluations of the health and environmental risks and hazards from chemicals;
- (ii) Improve the capabilities of national authorities in conducting their own evaluations of health and environmental risks and hazards from chemicals when necessary;
- (iii) Strengthen infrastructure for safety aspects relating to chemicals - their production, importation, transportation, storage, use, and disposal;

(d) Promote effective international co-operation with respect to emergencies and accidents involving chemicals;

(e) Support national programmes for the prevention and treatment of poisonings involving chemicals;

(f) Promote training of the required manpower.

64. There is co-ordination with other WHO programmes and the six WHO regional offices. IPCS also works closely with other agencies e.g. Food and Agriculture Organization (FAO), the Council for Mutual Economic Assistance (CMEA), and the Commission of the European Communities (CEC).

65. The principal outputs of IPCS are Environmental Health Criteria (EHC) Documents, Health and Safety Guides (HSG), International Chemical Safety Cards (ICSC), Monographs on Pesticide Residues in Food, Monographs on Food Additives, Methodology for Risk Assessment, Medical Guides on Treatment of Poisoning and Training Material for Testing, Assessing and Preventing Chemical Hazards.

66. Technical co-operation especially with developing countries is implicit in all IPCS activities.

D. International Register of Potentially Toxic Chemicals
(IRPTC)

67. Introducing the paper on IRPTC, Mr. J.W. Huismans said that IRPTC collects, stores and disseminates information (data) on chemicals, identifies major gaps in the available information and encourages research to fill those gaps, identifies potential hazards of using chemicals and makes people aware of them, and assembles information on existing policies for control and regulation of hazardous substances at national, regional and global levels. It operates through a programme activity centre located in Geneva and national correspondents in over 100 member States of the United Nations; it co-operates with Governments, other institutions, international organizations, research establishments and the chemical industry.

68. The data on selected chemicals of international concern are entered into the register according to 17 attribute categories or data files, chosen for their relevance in evaluating the hazards associated with that particular chemical. Each file contains complete items of information in a condensed format, with the cited references.

69. IRPTC operates a query-response service which provides information on chemicals either from its own data profiles or from sources available to it. The request for information from IRPTC may arise in the normal course of events or in emergencies, e.g. spills.

70. The outputs of IRPTC are: Data Profiles; Legal Files (providing information on laws and regulations on chemicals); Waste Management File; the Bulletin; and the Sentinel.

71. The IRPTC Bulletin is published twice a year, in English, French, Russian and Spanish, and contains information on new legislation on chemicals, risk evaluations, newly discovered hazards, accidents and the safe use of chemicals. The Sentinel is published jointly by IRPTC, IPCS and WHO and covers their activities as they relate to global assessment of environmental pollution and health.

E. London Guidelines for the Exchange of Information on
Chemicals in International Trade (1987)

72. Mr. J.W. Huismans traced the development of the London Guidelines from UNEP Governing Council decision 85 (V) of May 1977, requesting Governments not to allow the export of banned or severely restricted chemicals without the knowledge and prior consent of the importing countries. In 1984, the Governing Council adopted the Provisional Notification Scheme for Banned and Severely Restricted Chemicals. This Scheme has been now developed into the London Guidelines.

73. These Guidelines request States to exchange information on chemicals generally and require States:

(a) To notify other States of any control action taken by them to ban or severely restrict a chemical either directly or through IRPTC; and

(b) To provide relevant information to the State of import if a banned or severely restricted chemical is exported to that State.

74. The Governing Council in adopting the London Guidelines requested the Executive Director to pursue further the matter of prior consent and the UNEP and developed countries to assist developing countries in implementing the Guidelines and in participating in the discussions on prior consent.

75. There is a series of United Nations General Assembly resolutions on the same problem and a "United Nations consolidated list of products whose consumption and/or sale have been banned, severely restricted or not approved by Governments" has been published.

76. In the discussion that followed the presentation it was noted that some countries had already participated in the Provisional Notification Scheme for Banned and Severely Restricted Chemicals which preceded the Guidelines. Information on bans and severe restrictions on chemicals provided by IRPTC have been very helpful. Some developed countries have been helpful while some others have not been so helpful.

77. Difficulties were experienced in obtaining adequate and reliable information from companies and traders on imported products. Identifying and controlling the import of hazardous chemicals had also proved difficult because of lack of an efficient national infrastructure, laboratory facilities and trained personnel.

78. The concept of prior consent was an important one and required further international discussion. However, it was felt that developing countries may have difficulties in implementing any form of prior consent because of deficiencies in legislation and co-ordination among relevant national ministries. Even the identification of a competent national authority to effectively participate in prior consent procedures may prove difficult.

79. Developing countries need the assistance of IRPTC for the implementation of the Guidelines and for the establishment of national information systems on chemicals.

VIII. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

(a) General conclusions

80. Increasing import, production and use of chemicals in Africa present hazards to human health and the environment which have become a matter of growing concern for Governments and the community at large.

81. Hazardous incidents, accidents and environmental pollution involving chemicals have substantiated these concerns. The majority of the African countries lack the legislative procedures, institutional capabilities, infrastructure and response mechanisms necessary to deal with chemical hazards.

82. Information on the health and environmental effects is patchy but there are sporadic reports of serious acute and chronic toxic effects in human groups and ecological damage.

83. The nature of these problems is multifactoral and multisectoral, making adequate responses extremely difficult. There is, however, in African countries an awareness of the problems at the working level, a willingness to face up to them and a core capability in terms of competent people.

Implementation is hampered by a number of constraints. The Workshop recognized as major constraints:

- (a) Overriding short-term economic priorities and considerations;
- (b) Gaps in policy and legislation;
- (c) Lack of effective means of implementation, i.e. standard-setting, inspection, training, information systems, and laboratory and other services;
- (d) Deficiencies in national intersectoral, intercountry and international co-operation and co-ordination;
- (e) Uneasy relationships with industries.

84. The magnitude of the problems associated with chemical hazards today calls for early attention by all donors, financial institutions, United Nations specialized agencies, the Economic Commission for Africa (ECA) and the Organization for African Unity (OAU).

(b) Specific conclusions

(i) Pesticides

85. The importance of pesticides in ensuring the food supply for an ever-increasing population and in protecting human health and the environment from pests was emphasized.

- Poisoning by pesticides is widely prevalent and often severe.
- Not all countries are implementing fully the recommendations laid down by the Food and Agriculture Organization in the International Code of Conduct on the Distribution and Use of Pesticides.
- African countries are predominantly importers of pesticides and suppliers do not always conform to the FAO Code of Conduct.
- Integrated pest management, including biological and environmental controls, was considered important to reduce dependence on chemical pesticides and should be more strongly promoted.
- There is a recognized need for more information and training, particularly of extension workers and small farmers in the safe use of pesticides.

(ii) Occupational health

86. In general, national policies and working conditions relating to chemical safety do not meet the criteria set by ILO Conventions and Recommendations.

- Chemicals used, workers exposed and health effects caused are not systematically recorded, which makes setting priorities for preventive and control actions difficult.
- Legislation, exposure standards and inspection practices do not cover all the workers at risk. The most important uncovered groups are agricultural workers, workers in certain service occupations and small industries, workers in the informal sector, and groups of vulnerable workers, such as pregnant women and older workers.
- Workers and managers often fail to perceive risk adequately due to poor or misleading information and training.
- There are weaknesses in occupational hygiene and occupational health services.

(iii) Chemical safety

87. In the majority of countries an integrated approach to chemical safety and structured chemical safety schemes are lacking.

- Most African countries have adopted Primary Health Care as the best way of providing health services. However, chemical safety has not been hitherto generally recognised as a component of Primary Health Care, although some countries are trying to integrate the two.
- Capabilities for determining exposure to chemicals and human health effects are inadequate.
- There is a lack of awareness of the potentially damaging effects of chemicals on the environment.
- Laboratory facilities for toxicological and eco-toxicological studies are generally not available and this impedes the development of national capabilities for carrying out risk assessment.

(iv) Environmental pollution

88. The common pollution sources are human and animal wastes as well as agro-industries; local pollution problems arise from mining and smelting, lead from various sources, natural fluoride and arsenic in groundwater and various air pollutants.

- Pollution assessment is limited by inadequate laboratory facilities and supplies.
- Environmental impact assessments and other planning tools are insufficiently applied in industrial development.
- Pollution control measures cannot be easily applied to existing industries due to economic constraints.

B. Recommendations

89. The Workshop adopted the following recommendations:

1. Countries, industries and trade and international institutions should comply with the FAO International Code of Conduct on the Distribution and Use of Pesticides. This could be facilitated by the wider distribution of the Code and through workshops and training programmes on the Code and its application.
2. Countries should establish national information systems for chemicals. These should consist both of comprehensive registers of chemicals manufactured, formulated, distributed, sold, and used, and mechanisms for disseminating appropriate information to managers, physicians, workers and others.
3. Intersectoral, intercountry and subregional co-operation on common chemical safety and environmental problems, including major accidents which can affect neighbouring States, should be established. In order to facilitate this, structured activities, such as sponsoring chemical safety conferences, publishing newsletters and presenting courses -- as well as making arrangements for mutual technical assistance and consultation -- should be initiated in all identified subregions of Africa as soon as possible.

4. The London Guidelines for the Exchange of Information on Chemicals in International Trade should be implemented in full. In order to facilitate this, subregional workshops should be held, to assist the African countries in implementing the Guidelines. IRPTC also should assist countries in obtaining adequate and reliable information and establishing national registers for chemicals.

5. Laboratory facilities should be developed to meet national needs for analysis, quality control, testing and monitoring. Personnel from established laboratories should lend their expertise and experience to laboratories that are now being (or have recently been) established. Regional or subregional laboratories should be established for more sophisticated tests and quality control.

6. Human resources should be developed at all levels necessary to ensure effective control of human health and environmental hazards. This should include education and training programmes for workers, managers, health and safety professionals, and others. These training programmes should be appropriate to and practical for actual needs.

7. A new network, on chemical safety, should be established under the Cairo Plan of Action for the African Environment. It should give due consideration to all chemicals of environmental relevance.

8. Structured national policies and procedures for chemical safety with supporting legislative and implementation measures, should be established. Model policies and procedures from developing nations both within and outside the region should be identified and disseminated.

9. The scope of Primary Health Care (PHC) activities should be widened to include chemical safety. In order to facilitate this, physicians, nurses and other PHC workers should be trained in recognizing, correctly diagnosing, treating and preventing chemically-induced illnesses.

10. National occupational health services should be consistent with the requirements of relevant ILO Conventions. The basic right of the worker to know the risks of chemicals he or she deals with should be recognised. In order to facilitate this, right to know laws should be adopted in all nations in the region to ensure that workers are made aware of the health and safety hazards of the chemicals with which they work and how to minimize their risks of becoming ill or injured.

11. National occupational health policy should contain action plans for the development of legislation, standards, services, training and information systems which enable effective preventive and control actions to be taken at national, district and workplace levels. In order to facilitate this, regional and subregional conferences and publications should be held to enable representatives of different nations to share experiences and learn from each others' successes and failures.

12. In the development of occupational health services priority should be given to the populations at highest risk and to population segments, so far not covered, such as workers in agriculture, small industries, and the informal sector. Creative approaches for reaching these workers should be encouraged, such as mobile facilities, small companies pooling their services, and training existing health workers in occupational health.

13. Countries should establish policies and procedures for hazardous chemical waste disposal based on environmentally sound technology. Established national and international standards and guidelines that could serve as effective models for policies and procedures should be identified and appropriately disseminated.

IX. CLOSING SESSION

90. After general remarks on the Workshop by the Chairman, Mr. V. Aalto (WHO, Nairobi), Mr. W. Mansfield III, (Deputy Executive Director, UNEP), Mr. Mahdi Mustapha El Hadi (Deputy Secretary-General, League of Arab States) and Dr. E. Smith (WHO, Geneva), Hon. Henry Cheboiwo, M.P., Assistant Minister for Health of Kenya, delivered the closing address. Mr. J.W. Huismans (Director, IRPTC) thanked the guests, participants, observers, consultants and representatives of other organizations for their co-operation in making the Workshop a success. He also gratefully acknowledged the assistance and support of the League of Arab States and the Commonwealth Secretariat in the organization of the Workshop.

Annex I

LIST OF PARTICIPANTS AND OFFICERS

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23. Mr. T. Mpofu, Director of National Resources, P.O. Box 8070, Causeway, Harare, Zimbabwe.

* Had submitted country papers in advance of the Workshop but could not attend.

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OFFICERS

The following were elected officers for the Workshop:

Chairman	Mr. T. Mpofu (Zimbabwe)
Vice-Chairmen	Dr. A.E. Soyombo (Nigeria)
	Mr. M. Kabeya-Mukenyi (Zaire)
Rapporteur	Mr. C. Satkunanathan (Consultant)

Discussion Group I Pesticides

Chairman	Dr. J.N. Waiyaki (Kenya)
Rapporteur	Mr. L.G. Lam Thuon Mine (Mauritius)

Discussion Group II Occupational Health

Chairman	Mr. F. Munyeshuli (Rwanda)
Rapporteur	Dr. D. Ogaram (Consultant)

Discussion Group III Chemical Safety

Chairman	Mr. D. Bella (Liberia)
Rapporteur	Mr. A.M. El-Hindi (Sudan)

Discussion Group IV Environmental Pollution

Chairman	Ms. F. Sy (Senegal)
Rapporteur	Dr. C. Sahiri (Burundi)

Annex II

AGENDA AND TIMETABLE OF THE WORKSHOP

MONDAY, 14 SEPTEMBER 1987

8.30 Registration

9.30 - 10.30 Opening Ceremony (Chaired by Mr. J. W. Huismans)

- (a) Introduction and Welcome Address by Mr. J. W. Huismans, Director, IRPTC (UNEP)
- (b) Remarks of Welcome by WHO Representative for Kenya (Dr. Marcella Davies)
- (c) Remarks of Welcome by the Deputy Director General, League of Arab States (Mr. Mahdi Mustapha El Hadi)
- (d) Opening Address by Hon. J. P. Korellach, M.P., Assistant Minister for Environment and Natural Resources.

10.30 Break

11.00 - 12.30 Organizational Matters (Secretariat)

- (a) Introductions
- (b) Election of Chairman, two Vice Chairmen and Rapporteur
- (c) Administrative briefing (Dr. R. Helmer/Dr. E. Smith/Mr. H. Gopalan)

12.30 Lunch

14.00 - 15.30 International Activities in Chemical Safety

14.00 Chairman's opening remarks

14.10 WHO Activities on Chemical Hazards (Dr. R. Helmer)

14.30 International Programme on Chemical Safety (Dr. E. Smith)

15.00 International Register of Potentially Toxic Chemicals (Mr. J. W. Huismans/Mr. S. Milad)

- 15.30 Break
- 16.00 - 16.45 Discussion on Presentations by Dr. R. Helmer, Dr. E. Smith and Mr. J. W. Huismans
- 16.45 - 17.30 Formation of Discussion Groups (4) Election of Chairmen (4) and Rapporteurs of Discussion Groups
- Briefing of Discussion Groups by Chairmen and Secretariat members regarding purpose of Discussion Groups
- 18.00 - 19.30 Reception, UNEP Headquarters

TUESDAY, 15 SEPTEMBER 1987

- 9.00 Control of Environmental Hazards - WHO Strategy for Technical Co-operation with Member States (Dr. R. Helmer)
- 9.20 WHO Regional Office for Africa and its activities in Chemical Safety (Mr. V. Aalto)
- 9.40 Discussion
- 9.50 Concepts and Application of Chemical Safety in Industrialized Countries (Prof. J. Rantanen)
- 10.20 Discussion
- 10.30 Break
- 11.00 Chemical Hazards to Human Health and the Environment in the African Region (Mr. C. Satkunanathan)
- 11.45 Discussion
- 12.30 Break
- 14.00 - 15.30 Discussion Group 1 (Pesticides: Dr. J. N. Waiyaki) in Session (Room No.4)
- Discussion Group 2 (Occupational Health: Prof. J. Rantanen) in Session (Room No.5)
- 15.30 Break
- 16.00 - 17.30 Discussion Group 1 in Session (Room No.4)
- Discussion Group 2 in Session (Room No.5)

WEDNESDAY, 16 SEPTEMBER 1987

- 9.00 Slide Show on IPCS Activities (IPCS/Finnish Institute of Occupational Health, Dr. E. Smith/Prof. J. Rantanen)
- 9.30 UNEP Film on Pesticides
- 10.30 Break
- 10.30 - 12.30 Discussion Group 3 (Chemical Safety: Dr. E. Smith) in Session (Room No.4)
- Discussion Group 4 (Environmental Pollution: Dr. R. Helmer) in Session (Room No.5)
- 12.30 Lunch
- 14.00 - 15.30 Discussion Group 3 in Session (Room No.4) Continued
- Discussion Group 4 in Session (Room No.5) Continued
- 15.30 Break
- 16.00 - 17.30 Discussion Group 1 in Session (Room No.4) Continued
- Discussion Group 2 in Session (Room No.5) Continued

THURSDAY, 17 SEPTEMBER 1987

- 9.00 London Guidelines (Mr. J. W. Huismans)
- 9.20 Discussion
- 9.30 Discussion Group 1 in Session (Room No.4) Continued
- Discussion Group 2 in Session (Room No.5) Continued
- 10.20 Break
- 11.00 - 12.00 Discussion Group 1 in Session (Room No.4) Continued
- Discussion Group 2 in Session (Room No.5) Continued
- 12.00 - 12.30 Discussion Group 3 in Session (Room No.4) Continued
- Discussion Group 4 in Session (Room No.5) Continued
- 12.30 Lunch
- 14.00 - 15.30 Report on Discussion Groups by Chairmen
- Chairman's remarks
- 14.10 Discussion Group 1

- 14.30 Discussion Group 2
14.50 Discussion Group 3
15.10 Discussion Group 4
15.30 Break
16.00 - 17.30 Discussion on Conclusions and Recommendations

FRIDAY, 18 SEPTEMBER 1987

- 9.00 - 12.00 Workshop Evaluation, Conclusions and Recommendations
12.00 - 13.00 Closing Ceremony (Chairman, Mr. V. Aalto)
- (a) Chairman's remarks
 - (b) UNEP's remarks (Mr. W. Mansfield)
 - (c) WHO's remarks (Dr. E. Smith)
 - (d) Closing Address Hon. Henry Cheboiwo, M.P., Assistant Minister for Health
 - (e) Vote of thanks (Mr. J. W. Huismans)
- 14.00 - 15.30 Press Conference
- 1. Mr. J. W. Huismans
 - 2. Dr. E. Smith
 - 3. Dr. R. Helmer
 - 4. Mr. V. Aalto
 - 5. Mr. H.N.B. Gopalan
 - 6. Mr. T. Mpofu (Chairman)
 - 7. Mr. M. K-Mukenyi (Vice Chairman)
 - 8. Mr. A. E. Soyombo (Vice Chairman)
 - 9. Dr. D. Ogaram (Rapporteur)
 - 10. Mr. C. Satkunanathan (Rapporteur)

Annex III

UNEP/WHO WORKSHOP ON CHEMICAL HAZARDS FOR AFRICAN COUNTRIES

14-18 September 1987

NAIROBI, KENYA

CHEMICAL HAZARDS TO HUMAN HEALTH AND THE ENVIRONMENT
IN THE AFRICAN REGION - AN OVERVIEW

BY

C. SATKUNANANTHAN
UNEP/WHO CONSULTANT

This report is based on:

- (a) Country reports submitted by 20 countries in the African region which participated in the Workshop on Chemical Hazards for African Countries, held in Nairobi, Kenya, 14-18 September (appendix I);
- (b) Report of a consultant who visited four of these countries (appendix I);
- (c) Documents made available by IPCS, IRPTC (UNEP), WHO and FAO;
- (d) Discussions held with responsible officials of IRPTC (UNEP), WHO and FAO (appendix II). The author gratefully acknowledges the assistance given by these officials.

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I. THE PROBLEM

1. Chemicals are essential to modern life; they protect and enhance the quality of our life and the environment. However, although they have made possible many of the benefits modern society enjoys, they also pose many hazards to man and his environment. These hazards have been recognized over the years: Roman slaves working in mercury mines used bladder skin masks in a futile attempt to avoid inhaling the toxic mercury fumes; sixteenth-century grinders suffered from a lung ailment which they called "grinder's disease" caused by silica dust; in 1661, John Evelyn, an Englishman, presented a petition to King Charles II complaining against pollution of the atmosphere of London by the arsenical, sulphurous and other "vapours" and suggesting that the brewers, dyers, lime-burners, soap and salt-boilers who were responsible be removed from the city. He even attributed the annual decrease of 10,000 in London's population to this pollution.

2. Although such isolated instances of chemical pollution have been with us for several centuries, it is only during the last few decades that the problem has become so acute that people have become concerned about the urgent need to protect man and his environment from the adverse effects of chemicals. New chemicals have been introduced into the environment and existing chemicals continue to be used without adequate knowledge of possible adverse environmental or human health effects.

3. About 5 million chemicals are known today; 1000 more are added every year. Sixty-five thousand, of which about 5,000 are drugs and cosmetics, are in common use. Testing the toxicity of a chemical and evaluating its effects on human health and the environment are time-consuming processes requiring large resources of trained manpower and finance. Clearly, it would be impossible to test all 60,000 chemicals. Many countries and international agencies have therefore developed criteria for the selection of chemicals for testing. However, the universe of chemicals is not as daunting as it seems. Only 9.5 per cent of the 55,000 commercial chemicals listed by the United States Environmental Protection Agency account for 99.9 per cent of the total reported production volume. Petroleum derivatives form the majority of this volume (1).

II. PUBLIC CONCERN

4. Public concern about the hazards of chemicals and the need to handle them safely was heightened by a number of major chemical accidents in the last two decades. These include:

(a) The release of toxic 2, 3, 7, 8 - tetrachlorodibenzo-p-dioxin into the atmosphere from a factory at Seveso, Italy, in July 1976;

(b) The release of toxic methyl isocyanate at Bhopal, India, in December 1984, when more than 2,500 people died.

(c) The release, as a result of an accident, of radioactive substances from the nuclear reactor at Chernobyl, USSR, in April 1986, and the spread of radiation far and wide;

(d) The discharge of toxic chemicals into the Rhine river from factories in Switzerland, in November 1986.

III. GLOBAL NATURE OF THE PROBLEM

5. The Chernobyl reactor accident and the spillage of toxic chemicals into the river Rhine have highlighted the transfrontier nature of pollution. Small accidents and emissions carry pollution from town to town within a country or to an adjacent country; large accidents and emissions create international pollution problems.

6. The United Nations Environment Programme has prepared a list of "environmentally dangerous chemical substances and processes with a global impact" (June 1982). The substances so classified are:

- (a) Cadmium;
- (b) Carbon dioxide;
- (c) Chlorofluorocarbons and related compounds;
- (d) Lead;
- (e) Mercury;
- (f) Nitrogen dioxide and photochemical oxidants;
- (g) Sulphur dioxide and derivatives;
- (h) The process of eutrophication (2).

7. In 1984, the list was amended to include the production and use of coal and other fossil fuels, oil pollution, and injudicious use of pesticides, in addition to chlorofluorocarbons and related compounds.

8. The list is reviewed and updated periodically (about every three years) in the light of more recent studies and comments received from Governments, international organizations, non-governmental organizations, industry, and a group of experts.

9. A group of experts convened by the UNEP International Register of Potentially Toxic Chemicals (IRPTC) in Geneva in December 1986 examined the comments and recent studies and suggested that:

(a) The following should be added to the list:

- (i) Chlorinated hydrocarbons and derivatives;
- (ii) Groundwater pollution by chemicals;
- (iii) Hazardous wastes;
- (iv) Major chemical accidents and/or catastrophes.

(b) The text on carbon dioxide be expanded to include other greenhouse gases which exert similar effects and/or intensify effects of CO₂ on the climate;

(c) Mercury and oil pollution should be considered for future deletion as pollution problems caused by them are clearly on a downward trend as a result of legislation and controls by Governments on a world-wide scale;

(d) The title should be changed to "Selected Environmentally Harmful Chemical Substances, Processes and Phenomena of Global Significance" (3).

IV. MANAGEMENT OF RISKS OF CHEMICALS

10. Governments may manage the risks of chemicals by:

(a) Educational processes to increase public awareness of the risk, demonstrate the correct way of handling the chemicals and discourage hazardous activities;

(b) Economic measures such as subsidizing safety measures;

(c) Regulatory legislation.

11. Whatever course is adopted, management has to be exercised from the point of manufacture through export, import, storage, transport, use and eventual disposal.

12. The first step in the management process is the recognition that a chemical to which the public is exposed may be hazardous. This would lead to collection of toxicity and environmental impact data and evaluation of these data to determine whether the chemical in fact poses a hazard to man or his environment. The degree of hazard would determine the management process to be used, whether educational, economic or regulatory. If the regulatory process is decided upon, then the machinery for implementation, such as monitoring laboratories and legal processes have to be set up.

13. Chemicals pervade the whole environment and their control requires the involvement of several ministries and government departments, such as health, agriculture, industry, fisheries, environment, coast conservation and marine affairs. Since environmental issues are multidimensional and multisectoral in nature, the role of non-governmental organizations (NGOs) in assisting and supplementing government institutions is clearly recognized. In India itself, there are over 500 active NGOs. In many countries (Australia, Hong Kong, India, Japan, Malaysia, New Zealand, the Philippines and Sri Lanka) NGOs have been effective in promoting environmental education and creating environmental awareness among the people. Global and regional NGOs, such as the International Union for Conservation of Nature and Natural Resources (IUCN), the International Council of Environmental Law (ICEL), the Asian Environmental Society (Japan) and the Environmental Liaison Centre (Nairobi) have made outstanding contributions in the environmental field (4).

V. THE AFRICAN REGION

14. The region covers a large area - longitude 20°W to longitude 58°E and latitude 37°N to latitude 35°S - and the countries differ vastly in their geographical location, physical features and climate. Moreover, the differences in their physical size (2,000 square kilometres to 1.2 million square kilometres), population (500,000 to 96 million), population density and stages of development add to the range of environmental problems they face and the solutions necessary. Each country's priorities in chemical safety are therefore bound to be different, the economy of most of these countries is mainly agricultural with mining, petroleum and manufacturing industries continuing to develop into important sectors.

A. Occupational health

15. Mining operations include coal, petroleum, natural gas, aluminium, chromium, copper, diamonds, gold, lead, nickel, phosphate and tin. A wide variety of industrial and consumer goods are manufactured - acids, alkalis and salts, fertilizers, cement, sugar, paper, industrial gases, feedstocks for plastics, synthetic rubber, synthetic fibres, resins, solvents, pharmaceuticals, paints, soaps, detergents, cleaning preparations, toiletries, textiles, wood products, beer, vegetable oils and food products.

16. The occupational health problems are those usually found in the above industries and processes; there is exposure in particular to sulphur dioxide, carbon monoxide, carbon disulphide, hydrogen fluoride, hydrogen sulphide, chlorine, hydrochloric acid, phosgene, arsenic, antimony, chromium, nickel, lead, trichloroethylene, ammonia, methane, asbestos, mercury, vinyl chloride and inorganic and organic dusts. The organic dusts from wood, sisal, bagasse, cotton, grain, tea and coffee are apparently quite a problem.

17. Byssinosis is an occupational respiratory disorder caused by inhalation of dust emitted from cotton, flax and soft hemp. Originally the term byssinosis applied only to the disease in workers exposed to cotton dust, but in recent years the identical disease has been found in flax and hemp workers. Studies made in Tanzania have shown that the prevalence of byssinosis in sisal workers and cotton mill workers was 39 per cent and 27 per cent respectively. The latter figure is in line with figures reported in other studies. The preventive measures suggested include:

- (a) Improved local ventilation, especially of carding machines;
- (b) Modification of the industrial processes;
- (c) Movable exhaust systems (5).

18. Cases of pneumoconiosis, asbestosis and of solvent toxicity have also been reported. Exposure of traffic policemen to carbon monoxide and sulphur dioxide is being studied in Sudan.

19. Some processes that are particularly polluting, such as gold ore roasting plants, which are the sources of arsenic and antimony, are monitored every month in one country; another country has reported that 73 per cent of its industrial establishments do not have anti-pollution equipment.

20. Several years ago a study was made of workers in a rayon factory using carbon disulphide. Two hundred and ninety-four exposed workers, 40 previously exposed workers and 163 controls were examined. The exposed workers had psychological disturbances which were permanent, permanent peripheral polyneuropathy and muscle claudications. They had all been exposed to levels of carbon disulphide higher than the threshold limit value (TLV) (6).

21. As noted above, few chemicals as such are manufactured locally; most of them are imported for direct use or use in the production of other goods in formulations. These are used frequently in the rural environment where most of the people live and work on peasant farms and small scale industries. The workers, who include men, women and children, are often unsupervised and poorly equipped so that exposure levels are high. Serious concern has been expressed about the use of child labour. In the rural areas the working environment, living environment and general environment tend to merge into one.

22. Some countries have legislation such as factories and mines acts to ensure the safety, health and welfare of the workers. However, the implementation of the laws is not satisfactory because of lack of trained manpower, laboratory facilities and the large size of some countries. Some have people with the requisite background who can be trained in occupational health. Some countries need more legislation. One country where asbestos is the main industrial pollutant has a code of practice for asbestos industries.

23. Implementation of legislation is sometimes difficult because of climatic, economic and social conditions. For instance, workers cannot often be persuaded to wear the protective clothing and use the protective equipment provided as required by the law due to the hot, humid tropical climate. It may be mentioned that the Food and Agriculture Organization of the United Nations (FAO) is trying to design protective clothing and equipment suitable for the tropics.

24. Some factories are working at well below their design capacities, even as low as 30 per cent, so that it is difficult to install pollution control equipment and maintain the legal standards of environmental quality. Even where the law provides for the closure of a factory for non-conformity to standards, the high rate of unemployment makes such closure socially and economically unacceptable. Therefore, persuasion and education are necessary to ensure compliance with the law.

25. The Finnish International Development Agency (FINNIDA) supplies information on occupational health matters to experts in East Africa. The occupational exposure limits for about 1,500 toxic substances specified by law in about 20 countries have been collected and tabulated by the International Labour Organisation (ILO) and computer processed with the assistance of IRPTC (7); these are useful to the African countries but the differences, among the 20 country standards and from World Health Organization (WHO) standards, tend to be confusing. The WHO standards are all health-based. Further, one has to bear in mind the different climatic conditions and possibly lower nutritional status of the worker in Africa. It is possible that more stringent standards may be necessary in Africa as suggested by a WHO Expert Committee (8).

B. Environmental pollution

26. The major pollution sources throughout the continent are:

- (a) Human and animal wastes;
- (b) Agro-industries (breweries, cocoa and coffee plantations, dairies, food processing plants, palm oil mills, paper and pulp factories, tanneries).

27. The pollution sources of local significance are:

- (a) Mining and smelting operations (copper, gold);
- (b) Various industrial establishments;
- (c) Naturally present fluoride and arsenic in ground waters (Rift Valley)

28. The pollutants include organics, pathogens, sulphur dioxide, arsenic and fluoride (natural and man-made) chromium, lead, mercury, pentachlorophenol, sulphuric acid and pesticides. In the bigger cities the handling, treatment and disposal of domestic wastes present major problems.

29. There are heavy emissions of sulphur dioxide into the atmosphere from gold ore and copper ore processing plants. These emissions amount to about 12 tons per day and 1250 tons per day, respectively, and are a menace to the residents near the plants. They also cause damage to crops such as cocoa and denudation of nearby vegetation.

30. Complete data on the effect of the sulphur dioxide on humans, livestock and vegetation in the areas is not available. However, there have been complaints of throat irritation from the residents, and cases of deaths of livestock, due probably to the pollution of grass and water by copper and cobalt, have been reported.

31. Arsenic trioxide amounting to about 6 tons per day is said to be released into the atmosphere from plants processing gold ores. The arsenic trioxide has caused chronic arsenic poisoning and an outbreak of a disease called locally as "black-skin disease" due to the black spots which appeared on the palms; the symptoms of headache, physical weakness, sleeplessness and defective vision were so severe that some inhabitants left the area. Analysis of biological (human) and environmental samples showed unusually high levels of arsenic. Significantly, rain water collected from the roofs had the largest concentration of arsenic.

32. Fluorine compounds emitted into the atmosphere from an aluminium smelter plant (200,000 tons per year capacity) pose potential problems.

33. Background monitoring of sulphur dioxide, fluoride and suspended particulates is carried out in certain areas and criteria have been prepared for particulates, sulphur dioxide, arsenic, asbestos and fluorides in ambient air. These criteria are expected to be made legal eventually.

34. Through the Global Environment Monitoring Programme (GEMS), FAO, WHO and UNEP have been involved in health-related monitoring of air, water, food and human tissues and fluids for nearly 10 years in a total of 78 countries. As an example of urban air monitoring, the suspended particulate matter level in Accra, Ghana, was found to be higher than the WHO-recommended level (9).

35. Transboundary pollution has been reported from the adjoining States of Cote d' Ivoire, Ghana and Togo where cocoa plantations stretch across State borders.

36. Biomass fuels (wood, crop residues and animal dung) are used by about half the world's population as a major, often the only, source of domestic energy for cooking and heating. The emissions from these fuels are an important source of indoor pollution, especially in rural communities in developing countries. They contain pollutants which affect health - suspended particulate matter, polycyclic aromatic hydrocarbons (which include a number of known carcinogens, especially benzo-a-pyrene) and gases like carbon monoxide, nitrogen dioxide and formaldehyde. Chronic obstructive pulmonary disease and nasopharyngeal cancer are the most important diseases identified. Infants and children develop acute bronchitis and pneumonia because their respiratory defences are impaired. Chronic carbon monoxide poisoning has also been observed. When pregnant women are exposed, there is a risk of birth defects developing in the foetus (8, 10).

37. Exposure to biomass fuel emissions is probably the single most important occupational health hazard of women in developing countries; a conservative estimate puts the number exposed world-wide at between 300 million and 400 million.

38. Investigations carried out in rural homes in Kenya showed high concentrations of suspended particulate matter, polycyclic aromatic hydrocarbons and nitrogen dioxide; the carbon monoxide concentration was lower than that in other developing countries (400 ppm compared to 3000 ppm, for example, in Nigeria). Hardly any formaldehyde was found (11).

39. As stated earlier, it has been decided to include hazardous wastes and ground water pollution by chemicals, in the list of "Selected Environmentally Harmful Chemical Substances, Processes and Phenomena of Global Significance" prepared by UNEP. (3).

40. The pollution of ground- and surface-waters is a big problem in the region; the sources of this pollution are factory effluents and pesticides and fertilizers washed by rain into rivers or leached into ground waters. Arsenic compounds in cattle-dips situated close to rivers are also washed into the river or leached into ground waters. Occasional large spillages from the mines have added to the pollution. This pollution presents hazards to humans, livestock, aquatic life and wildlife and creates complex industrial, social and recreational problems, as the river is the source of domestic and industrial water supply and supports several species of fish. Reduced fish productivity has been reported.

41. Toxaphene and lindane are used under strict control in Uganda. The disposal of spent dip-tank liquors presents problems of environmental pollution; the effluent from toxaphene dip-tanks alone amounts to 330,000 m³ per annum.

42. Fluoride (natural) levels in drinking water in the Rift Valley in Ethiopia have been found to be high enough to cause dental and sometimes even skeletal fluorosis (9). These two forms of fluorosis have long been found in Ethiopia in the region of the Rift Valley (12).

43. Nitrates (from decaying vegetation and excreta), fluorides and salts are the water pollutants of concern in Tanzania. The national standards adopted for nitrates and fluorides are less stringent than the WHO recommendations (13).

44. The main sources of organic pollution of the Nile in Egypt are the discharges of the sugar factories; the agricultural drains which discharge into the river may bring in residual pesticides and other toxic chemicals. Metals such as copper and zinc have been detected in industrial wastes (14).
45. Industrial development in the West and Central African region is limited and polluting discharges have little impact on the marine environment except in isolated cases. Heavy metals and organochlorine compounds have been detected in aquatic species and the release of effluents containing fluorides from a fertilizer processing plant and their effects on the marine environment have been investigated. Waste treatment in the 18 countries of the region is virtually non-existent. However a significant change in the impact on the environment is likely to occur because of the concerted efforts being made towards expanding industries to exploit the extensive natural resources of the region. It may therefore be wise to begin the planning process for industrial waste treatment now to avoid future environmental problems. The immediate needs in most areas are to find solutions to pollution from sewage (15).
46. Wood pulp for the manufacture of paper and paperboard is at present produced in Angola, Cameroon, Kenya, Madagascar, Morocco, Swaziland and Zimbabwe with an estimated annual capacity of 529,000 tons in 1981. Other countries with plans for the establishment of pulp mills include Congo, Gabon, Cote d' Ivoire, Malawi, Nigeria and Tanzania. The extent of environmental pollution by pulp mills in Africa has not yet been assessed. Most of them are modern mills and are said to have fairly well designed effluent treatment equipment. At present environmental pollution in Africa appears to come more from agro-based industries than from forest industries, but the situation may change with the growth of the latter (16).
47. With the increasing use of phosphate and other fertilizers, problems of eutrophication have begun to emerge; one reservoir is already facing problems of excessive weed growth. The eutrophication of the Sidi Mohammed Ben Abdellah reservoir in Morocco has been studied with the assistance of WHO; two models have been developed and several possible solutions, such as reduction of nutrient intake, control of damming, intensive fishing of zooplankton eaters and introduction of algae eaters, artificial increase of oxidants and water treatment are to be tested (17).

48. Maize is the staple food of many of the countries in the region and it is also widely used in the production of alcoholic beverages. Mould infections of maize therefore present significant hazards to human and animal health. Cob rot is the most important disease of maize in Zambia and zearalenone, a toxic mycotoxin has been identified in the diseased maize. Even as much as 7 per cent of maize had been found diseased and unacceptable. In Kenya it has been found that the intake of food contaminated with a high level of aflatoxin has led to fulminant aflatoxicosis resulting in a high death rate. The link between local alcoholic beverages and aflatoxins, the possible role of indigenous medicines as carriers of aflatoxins, airborne aflatoxins, and better methods of cereal storage need investigation.

49. In investigations carried out under the WHO/FAO/UNEP Joint Food Monitoring Programme (GEMS), aldrin, dieldrin, endrin, DDT-complex, hexachlorobenzene (HCB), hexachlorocyclohexane (HCH) isomers, gamma HCH residues and lead were identified in various food items, such as milk, butter oil, vegetables, fruits and sauces in Egypt.

50. The increased use of insecticides like DDT, dieldrin and endosulfan in Africa has caused concern about their possible effects on non-target organisms. Studies have been undertaken in Botswana, Kenya, Nigeria and Zambia on the side-effects of insecticides used for tsetse control. The results show that most applications of dieldrin (which is the insecticide most widely used against tsetse) are associated with a high level of deaths in many wild animal species including insects, fish, birds and certain mammals (16).

51. It is claimed that eradication of tsetse is almost always followed by uncontrolled settlement leading to severe soil degradation. The World-wide Fund for Nature (WWF) believes that such degradation will ultimately be as detrimental to human welfare as the presence of the tsetse itself. FAO and the European Development Fund now support implementation of rural development and land use plans which FAO considers to be priority conditions for any FAO supported tsetse control programme.

52. Some legislation exists in most African countries to control pollution of food, air and water; implementation of the law, however, is not satisfactory because of lack of trained manpower and proper equipment. Although in some cases more legislation is required, the chief drawback appears to be the unsatisfactory implementation of existing legislation.

C. Use of chemicals

52. The increasing use and manufacture of pesticides, fertilizers and other chemical products has led to concern about the safety of chemicals and the need for a national chemical safety programme. Most of the countries agree that it would be advisable and feasible to incorporate these programmes in the already existing primary health care (PHC) programmes; in fact some countries have successfully incorporated occupational health in PHC. Some countries find it difficult because of lack of awareness of the problem of chemical safety at the highest levels of government.

53. The hazards of chemicals reported, included:

- (a) Hydroquinone in creams;
- (b) Paraphenylene diamine in hair dyes;
- (c) Methanol in alcoholic drinks;
- (d) Asbestos pipes for drinking water supplies;
- (e) DDT, aldicarb used to kill fish;
- (f) DDT to preserve kola nuts;
- (g) Food additives (monosodium glutamate);
- (h) Lindane contamination of water;
- (i) Accident to aircraft carrying malathion.

54. Pesticides and chemicals used or produced in factories and mines are controlled by specific legislation such as pesticides acts, factories acts and mines acts in some countries. Other chemicals are controlled by provisions contained in various general laws such as hazardous substances, poisons, food and drugs, control of goods, town and country planning and motor traffic acts. These laws are said to be fragmentary and though they grant wide powers, the penalties they provide are inadequate. In some countries, general legislation contains provisions for some aspects of chemical safety; the criminal code provides for the control of noxious trades and nuisances and the local government act for the control of nuisances by rubbish, noise, etc.

55. Environmental education is included in the formal educational curricula for children and in radio programmes and newspapers for the adults.

56. One country set up an Environment Protection Council (EPC) in 1974, to co-ordinate the work of all Government agencies on environment. It has a core of multi-disciplinary professional staff who plan and implement some of the programmes and co-ordinate others which are executed by or in co-operation with other agencies. It has eight standing technical committees of experts; its toxic chemicals committee has issued a national register of pesticides containing information on 43 pesticides. With the assistance of educationists, the EPC has drawn up programmes for formal and non-formal environmental education.

57. Another country established a National Environment Unit in 1982 which is developing environmental legislation and the National Register of Potentially Toxic Chemicals (NRPTC) in association with the IRPTC. It would be able to provide information on specific chemicals.

58. Yet another country has set up a chemical and pesticides safety programme in 1985, which would establish liaison with the International Programme on Chemical Safety (IPCS).

59. Lack of adequate information on toxic chemicals at the user level, the foreign language in which this information is sometimes provided and the low level of literacy create problems in the safe use of chemicals and in the handling of poisoning incidents. The proposed IPCS issue of a manual on treatment of poisoning for use by paramedical persons in the rural remote areas is therefore timely. The establishment of poison information and control centres appears to be an urgent need. Since the number of chemicals used in a country is not very large, the information on them could be stored in some durable copies at the village and district level and disseminated as necessary. This procedure is especially useful in places where communication systems are not well-developed. This elementary system could eventually develop into a full-fledged poison control and hazardous chemical centre with the increase in the number of chemicals and the development of faster communications.

60. Since one country alone may not have all the resources necessary to handle accidents involving toxic chemicals such as transport accidents, spills, it would be advisable to pool the resources of adjoining countries or of countries in the region.

61. Misleading advertising and the indiscriminate dumping of ineffective or hazardous chemicals (which have been banned or restricted in the exporting countries) in developing countries are matters that have been raised and discussed at international conferences over the past decade. The developing countries, particularly those in the African region, have for long been urging that the exporting countries should restrict the export of hazardous chemicals as the developing countries did not have the capacity to impose the necessary checks and controls themselves.

62. In 1977, the Governing Council of UNEP urged Governments to take steps to ensure that potentially harmful chemicals in whatever form or commodity which are unacceptable for the domestic purposes of the exporting country are not permitted to be exported without the knowledge and consent of appropriate authorities in the importing country (18).

63. In 1984, the Governing Council adopted a Provisional Notification Scheme for Banned and Severely Restricted Chemicals, which was developed into the London Guidelines for the Exchange of Information on Chemicals in International Trade (19,20) in February 1987. These guidelines are permanent in nature.

64. The London Guidelines request States to exchange information on chemicals generally and requires States:

(a) To notify other States, either directly or through IRPTC, of any control action taken by them to ban or severely restrict a chemical;

(b) To provide relevant information to the State of import if a banned or severely restricted chemical is exported to that State.

65. The Governing Council adopted these Guidelines in June 1987 and considered that additional measures are required to enable importing countries to give or withhold their consent to particular exports following receipt of adequate information from exporting countries and that these measures based on the principle of prior informed consent, should be incorporated in the Guidelines as expeditiously as possible.

66. The Council requested UNEP and the Governments of developed countries to assist developing countries in implementing the Guidelines and in participating in discussions on prior informed consent.

67. Countries in the region have difficulties in controlling imports of hazardous chemicals, particularly those which have been banned or severely restricted. Some have participated in the Provisional Notification Scheme and found the information provided by IRPTC useful; some developed countries have been helpful while some others have been less so.

68. The difficulties experienced by the countries were mainly:

(a) In obtaining adequate and reliable information from manufacturers and distributors;

(b) In identifying and eventually controlling hazardous imports due to lack of efficient national infrastructure, laboratory facilities and trained manpower.

69. Countries have also found the "consolidated list of products whose consumption and/or sale have been banned, withdrawn, severely restricted or not approved by Governments" published by the United Nations with the assistance of IRPTC, very helpful (21).

70. The provisions of the London Guidelines mentioned above (which were also in the Provisional Notification Scheme) have been included, as far as pesticides are concerned, in the International Code of Conduct on the Distribution and Use of Pesticides (22).

D. Pesticides

71. The global significance of pesticides in the environment is recognised and underlined by the inclusion of the "injudicious use of pesticides" in the list of "Selected Environmentally Harmful Chemical Substances, Processes and Phenomena of Global Significance", prepared by UNEP and referred to above (3).

72. It is further emphasized by the World Bank statement that: "it is important that the use of pesticides financed under World Bank loans should be consistent with pest management practices and accompanied by safeguards to protect users, the general public and the environment".

73. Ninety per cent of the pesticides in the world are used in agriculture and the balance in public health for vector control. In some countries in Africa over 55 per cent are used to control tsetse fly (the vector of trypanosomiasis), mosquito (the vector of malaria) and ticks.

74. The pesticides are sprayed on crops from the air and ground; they are also used to prevent pest infestation of stored grains, peanuts and other crops. There has been contamination of rivers and drinking water supplies by pesticides; residues have been detected in milk, fish, soil, grass and lake sediments and high levels have been detected in some cases.

75. There have been instances of accidental poisoning and suicidal poisoning by pesticides. Problems have arisen largely because of:

(a) Misuse, misdisposal of surpluses, residues and containers; re-use of containers for other purposes;

(b) Difficulties of using protective clothing due to climatic conditions;

(c) Mislabelling;

(d) Deterioration and/or conversion to more toxic products in storage.

76. The use of protective clothing by pesticide workers in the hot, humid tropical climate has always been difficult to enforce because of the extreme discomfort of the clothing available. FAO is trying to develop protective clothing which is impermeable and, which would also facilitate heat exchange.

77. Labelling, language and low literacy have been the chief causes of misuse and accidents from pesticides. FAO has prepared pictograms on labels which facilitate better recognition of the dangers of the pesticides.

78. One country in this region has a serious problem because of the uncontrolled import of chemicals, including pesticides, by local subsidiaries of multinational companies from their parent companies; countries also have had difficulties in controlling the entry of pesticides (possibly banned or restricted) which form part of an aid package.

79. Some countries have legislation to regulate the manufacture, use, storage, packing, sale and importation of pesticides and also follow the International Code of Conduct (see paragraphs 80-88 below), but implementation is beset with difficulties of trained manpower, equipment and transport where large areas need to be covered.

International Code of Conduct on the Distribution and Use of Pesticides

80. The Code was prepared by FAO in co-operation with other organizations of the United Nations system, including ILO, and a number of international non-governmental organizations representing a wide spectrum of interests were also involved, as were individual specialists. After review by the FAO Committee on Agriculture and the FAO Council it was unanimously adopted by the FAO Conference at its twenty-third session, in Rome, in November 1985 (22).

81. The objectives of the Code are to set forth responsibilities and establish voluntary standards of conduct for all public and private entities engaged in or affecting the distribution and use of pesticides, particularly where there is inadequate national law or no law at all to regulate these products. It addresses international organizations; Governments of exporting and importing countries; industry, including manufacturers; trade associations; formulators and distributors; users; and public-sector organizations such as environmental groups, consumer groups and trade unions.

82. It set out the standards of conduct and responsibilities of the above entities with regard to:

- Pesticide management
- Testing of pesticides
- Reducing health hazards
- Regulatory and technical requirements
- Availability and use
- Distribution and trade
- Information exchange
- Labelling, packaging, storage and disposal
- Advertisizing
- Monitoring the observance of the Code.

83. Under "information exchange", the Government of a pesticide-exporting country which takes action to ban or severely restrict the use or handling of a pesticide in order to protect health or environment domestically should notify the action it has taken directly or indirectly to the designated national authorities of other countries as provided in the Provisional Notification Scheme for Banned or Severely Restricted Chemicals (3).

84. Notification of control action should be provided as soon as possible after the control action is taken. For pesticides banned or severely restricted before the implementation of the Code, an inventory of prior control action should be provided to IRPTC unless prior information has already been provided. The FAO focal points and the IRPTC national correspondents in the various member States co-operate in this endeavour.

85. These provisions, which here specifically refer to pesticides, are also found in the Provisional Notification Scheme and the London Guidelines, which apply to all such chemicals (19, 20).

86. The Code is supported by a number of internationally accepted technical guidelines which provide the means of implementing the provisions of the Code.

87. FAO has identified countries without pesticide registration procedures and provides technical assistance to them. National training courses on the implementation of the Code are being provided for African countries which do not have either pesticides registration procedures or have high morbidity/mortality rates from pesticides. Laboratory facilities for quality control of pesticides, as well as pesticide residue analysis are being set up with the assistance of other aid agencies.

88. A mechanism for the detection of breaches of conduct in relation to the Code is being developed.

E. Information on Chemicals

89. Information sources and the type of information available in international organizations such as WHO, UNEP, ILO, the United Nations Educational, Scientific and Cultural Organization (UNESCO), as well as in IPCS and IRPTC, is not as widely known as one would expect. Even where information is regularly distributed by the international organizations, the information is not distributed to the relevant agencies within the country; sometimes the information goes to the wrong national agencies and stays there.

90. The activities of the local representatives of international agencies, such as the focal points of ILO, WHO, FAO and the national correspondents of IRPTC should be better co-ordinated and the information available on chemicals pooled. IRPTC has promoted this co-ordination for several years. IRPTC national correspondents and FAO focal points co-ordinate their activities on the information exchange component of the International Code of Conduct on the Distribution and Use of Pesticides referred to above.

91. The FINNIDA provides information to experts in East Africa (Kenya, Uganda and Tanzania).

92. Highly technical and scientific information on chemicals is not likely to be directly useful to developing countries as they lack the expertise to evaluate this very useful information. Such information is, however very necessary for an expert group of scientists to evaluate the effects of a chemical on man and his environment. This evaluation will be very useful for the developing countries and is available in the IPCS health and safety guides.

93. Accessing computers abroad for information on chemicals is very expensive for developing countries. IRPTC is therefore considering the possibility of transferring information from its main frame computers to discs for use on micro-computers.

94. The use of several chemical names and trade names for the same chemical leads to the problem in the identification of chemicals and chemical products. Quite often the same chemical is the active constituent of chemical products bearing several different trade names; by contrast, a chemical product bearing the same name and sold in different countries may not always contain the same active chemical. This can be crucial with regard to the treatment of patients poisoned by such products. Chemical products containing more than one chemical add to this identification problem.

95. It has to be recognized that information necessary to evaluate the effects of a chemical on man and his environment may not all be available because research work has not been done on all aspects. A perusal of the IPCS Environmental Health Criteria documents would show recommendations for further research in specific areas before an evaluation can be made.

96. It is not always possible for a country to identify a chemical and the amounts it imports as the customs tariff classifications refer to broad groups rather than individual chemicals.

F. Legislation

97. Specific legislation for the control of chemical hazards covering some areas of the environment - food, water, air (ambient and occupational), pesticides, hazardous wastes - have been enacted by some countries. General legislation such as criminal codes, local government acts and public health acts, cover some areas in other countries. While one country felt that environmental control could be well exercised with the existing legislation if more laboratory facilities and trained manpower were available, others expressed the view that more stringent legislation as well as more laboratory facilities and trained manpower were essential.

98. It should be emphasized that all the countries in the region need well equipped institutions with trained staff to carry out a successful programme of chemical safety.

99. Additional new legislation may not be always necessary for efficient chemical safety management. Existing laws can be consolidated and made more effective management tools through some marginal amendments concerning specific chemical safety components. A model for legislation may not be advisable, and different countries need to adopt different approaches and their priorities are likely to be different. Moreover, the legislation must be harmonized with traditional values. However, legislation in specific areas of chemical safety in a given country should share certain features of the legislation of adjoining countries with similar problems in order to facilitate a co-ordinated approach to chemical safety such as transboundary pollution in Cote d'Ivoire, Ghana and Togo mentioned in section B ("Environmental pollution") above.

G. Institutions

100. The need for public awareness of the hazards of chemicals and national and international commitment to chemical safety cannot be over-emphasized; the need for well-defined legislation to achieve chemical safety has been accepted. But legislation, however well-intended, cannot remedy past environmental degradation by chemicals, nor can it by itself prevent further ravages. An equally important commitment must be made to implement and enforce the legislation. In fact inadequate implementation and enforcement appear to be the critical shortcomings in the countries in the region. These shortcomings are due to lack of adequate equipment and of trained manpower to carry out constant monitoring and surveillance and to conduct the necessary legal processes. Large resources - both human and material - are necessary for proper implementation of the legislation; these are scarce even in some industrialized countries, let alone the developing countries.

101. Therefore, implementation activities are best carried out by existing institutions as an extension of their present activities, rather than by specially created new institutions; the latter are likely to draw trained personnel, already in short supply, from existing institutions; they also would need new buildings, equipment, laboratories and libraries. Consideration should be given to developing central well equipped and well manned laboratories and libraries, particularly in smaller countries.

102. The function of the institutions would be:

(a) Surveillance of the environment for, among other things, hazards from chemicals. These chemicals would include not only the new chemicals, but also the old ones previously believed to have been harmless. The presence of more than one chemical in the same medium needs close investigation because of possible synergistic effects;

(b) Full investigation - collection of information, research, environmental impact assessment, evaluation - once a hazard is suspected;

(c) Recommendation of legislation if the use of the chemical cannot be avoided and if risk to human life and environment warrants it;

(d) Monitoring environment for compliance with the law as part of the usual surveillance programme;

(e) Initiating legal proceedings depending on results of monitoring to prevent further environmental degradation; quite often persuasion is more effective and quicker than legal action;

(f) Increasing public awareness of the need to maintain a clean and safe environment, emphasizing chemical safety aspects;

(g) Providing facilities for diagnosis and treatment of poisoning by chemicals.

103. Several institutions are usually responsible for the environmental purity of one particular area or for the control of one particular chemical or class of chemicals as indicated below:

Food	- Health and agriculture departments
Water	- Water authority, environment authority and irrigation department
Air	- Environment or health authority and labour department

Soil	- Environment authority and agriculture department
Working environment	- Labour department
Industrial chemicals	- Industry department, labour department
Consumer goods Household products	- Consumer protection department and environment authority
Pesticides	- Industry and labour departments, water authority, environment authority, agriculture department, food department
Hazardous wastes	- Industry and labour departments, water authority, and environment authority.

104. For instance, a pesticide which is an industrial chemical, affects the working environment in factories, affects the ambient air of the farms on which it is used, becomes a contaminant in food and water, permeates household products and finally, in industrial and agriculture wastes. Similarly, lead may be present in food, water, the working environment, household goods and hazardous waste.

105. It is therefore, essential that the same toxicological evaluation and extrapolation procedures be used by all the institutions charged with protecting environmental quality in one form or another. To ensure this, some countries have appointed co-ordination committees consisting of representatives from all the relevant institutions. However, this co-ordination at the policy level should be coupled with co-ordination at the inspection and analysis level. It would obviously be wasteful if inspectors from several departments monitor the same industry or environmental area. This co-ordination is vital and can be only achieved by the countries themselves; international organizations cannot possibly help in this area.

106. Institutions responsible for chemical safety should preferably handle all aspects of the subject - surveillance, research, evaluation, legal recommendations, monitoring and compliance. The separation of surveillance and research from the other functions prevent the scientist from developing a full appreciation of the practicalities of the chemical safety problems. The various aspects mentioned above may be handled by individual units to maintain a certain amount of independence but should be grouped within one institution. This arrangement would be particularly useful in smaller countries.

107. Non-governmental organizations have played and continue to play an important role in chemical safety matters. They assist government institutions and supplement their work in promoting environmental education and creating environmental awareness among people from all walks of life. They make a significant contribution to developing and improving people's attitudes, scientific knowledge, technical skill, judgement and orientation regarding the environment.

108. It has been the experience of some countries that persuasion rather than prosecution achieves better compliance with environmental legislation, particularly in cases involving the working environment. This is undoubtedly due to the greater awareness among workers, employers and the general public of environmental hazards. With adequate support, non-governmental organizations could continue to increase this awareness.

109. Prevention and response to poisoning by chemicals (including pharmaceuticals and natural toxins) requires strengthening the available medical institutions and providing the necessary expertise.

H. Analytical equipment

110. The difficulties in the regular monitoring of the environment are due to:

- (a) Lack of equipment;
- (b) Inability to use existing equipment because of:
 - (i) Breakdown of water, electricity and transport facilities;
 - (ii) Breakdown of equipment;
 - (iii) Lack of spares.

111. Several countries in the region have emphasized their problems with regard to the maintenance of sophisticated analytical equipment; maintenance facilities are obviously poor. One country has even decided to go back to manual methods. Standardization of equipment may help but is not always possible.

112. Present day instruments and other equipment have the decided advantages of sensitivity, speed and accuracy. However, they are very expensive and, because of rapid advances in technology, tend to become obsolete in a short time. This results in difficulties in getting specialized spare parts should breakdowns occur. Therefore, the purchase of sophisticated equipment can be justified only if a large number of analyses have to be done in a short time. Perhaps in many cases, older methods and equipment may still give more reliable results without any breakdown. One country finds sophisticated equipment very expensive and buys the cheaper, less sophisticated types.

113. It should be noted that UNEP and FAO has conducted several technician and maintenance technician courses in African countries and have also helped to set up analytical laboratories, especially in the food and pesticide areas. As indicated earlier in another context, the co-ordination of the activities of FAO, WHO, ILO and UNEP at the country level may provide a solution to the problems of lack of equipment and equipment maintenance.

VI. NATIONAL PROGRAMMES

114. A preliminary assessment of national programmes for health protection against environmental hazards including chemicals using ten weighted indications, showed that none of the 44 member States of WHO in the African region met most of the requirements; 6 met some requirements and the remaining 38 a few requirements only (23).

115. A tentative WHO strategy for technical co-operation with its member States for the control of environmental hazards, including chemicals, identifies six major elements for a national programme:

- (a) Awareness and promotion;
- (b) Information systems;
- (c) Policy and legislation;
- (d) Planning and programme development;
- (e) Strengthening of institutions;
- (f) Resources (human and financial).

115. The priority problems have been generally identified as:

- (a) Environmental considerations for development;
- (b) Drinking water quality;
- (c) Freshwater quality;
- (d) Coastal water quality;
- (e) Urban air quality;
- (f) Domestic combustion of biomass fuel and coal;
- (g) Hazardous wastes;
- (h) Localized hazardous environmental pollution sources;
- (i) Safe use of chemicals;
- (j) Chemical accidents.

116. A similar list can be prepared for each country reflecting its national priority concerns.

Appendix I

LIST OF COUNTRY REPORTS

1. BOTSWANA
2. BURUNDI
3. EGYPT
4. ETHIOPIA
5. GABON
6. GAMBIA
7. GHANA
8. KENYA
9. LIBERIA
10. MALAWI
11. MAURITIUS
12. NIGERIA
13. RWANDA
14. SENEGAL
15. SUDAN
16. TANZANIA
17. TOGO
18. UGANDA
19. ZAMBIA
20. ZIMBABWE

OTHER REPORTS

Report on visits and discussions in connection with the proposed workshop on chemical safety for African countries by Dr. K. Fletcher, Ph.D., (Consultant Toxicologist).

Appendix II

PEOPLE AND INSTITUTIONS VISITED

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Appendix III

NATIONAL LEGISLATION*

1. BOTSWANA

- a. Factories Act, 1973
 - Safety, health & welfare of workers in factories.
- b. Mines, Quarries and Machinery Act
 - Safety, health & welfare of workers in mines and quarries.
- c. Atmospheric Pollution Prevention Act
 - pollution of ambient environment by industrial processes.
- d. Public Health Act.
 - public health and safety aspects
 - also covers the control of toxic wastes from factories.

Note: There is no legislation or body to monitor safety in the Agricultural Industry - Pesticides and Fertilisers.

2. ETHIOPIA

There are no rigid laws on chemical hazards; there is a statement in the National Gazette that no factory should release chemicals which are dangerous to the workers and the community.

The Ministries of Health and Labour are responsible for Occupational Health and Safety Services but their inspectors have no legal powers of enforcement.

The Ministry of Industry has, however, set up an Occupational Health and Safety sector at the Ministry level.

3. GABON

There are laws to control:
Pollution, Pesticides and Food Quality.

New legislation - "General Law on the Environment and Nature Protection" - which includes a section on Hazardous Chemicals, is under consideration.

* The information provided below was obtained from the country reports and may not be complete.

The Government has already set up several organisations which will eventually be given the responsibility to implement future laws on Environmental protection. These include:

National Sanitation Services;
National Laboratory;
Plant Health Control Service;
National Centre for Pollution Control;
Plant Protection Service;
University Centre of Health Sciences;
Specialized laboratories.

4. GAMBIA

- a. Pesticides Act, 1979.
(Pesticides Board, Crop Protection Department, Groundnut Producing and Marketing Board).
- b. General Laws on Health and Environment
(National Environmental Unit, 1982)

5. GHANA

- a. Factories, Offices and Shops Act, 1970.
- Safety, health and welfare at workplaces.
- b. Similar Law for Mines.
- c. Criminal Code, 1960 (Act 29)
- Control of noxious trades and public nuisances.
- d. Local Government Act (Act 359)
- Control of nuisances by rubbish, noise etc., through enactment of bye-laws.
- e. Road Traffic Offences Regulations and Road Traffic Regulations
- control of emissions from vehicles.

Note:

- (i) The Environmental Protection Council, a semi-autonomous body created in 1974 has the general responsibility for co-ordinating the work of the Government on environmental matters, such as emissions into the ambient environment from industrial processes.

(ii) There is no law regulating the importation of pesticides but,

- The Ministry of Agriculture is responsible for the procurement of pesticides for crop pest control;
- Ghana Cocoa Board imports and distributes pesticides for cocoa crop pest control and post-harvest pest control (fumigation);
- The Ministry of Health imports pesticides for disease vector control;
- The Ghana Standards Board regulates the quality and concentration of active ingredients of pesticides formulated locally.

Draft legislation on pesticides is being prepared by the Toxic Chemicals Committee of the Environment Protection Council.

6. KENYA

- a. Water Act
- b. Pesticides Act

The Pesticides Control Board which was established by Act of Parliament in May 1982 and became operational in October 1984 controls the importation, manufacture, sale, use and distribution of pest control products used in agriculture, veterinary practice, forestry, public health and the environment at large.

Note

There is no legislation for control of air pollution.

7. LIBERIA

Legislation on environmental pollution, occupational health and hazardous chemicals is scanty, inadequate and dispersed. A comprehensive bill on industrial safety is under consideration by the national legislature; legislation on occupational health is planned. There are no local standards on exposure to chemicals in the work place and adherence to international standards is only voluntary. However, specified information on the chemicals used in industry must be supplied to the Occupational Health Unit set up within the environmental health program of the Ministry of Health and Social Welfare.

8. MALAWI

- a. Control of Goods Act (Cap. 18.08)
 - import of goods including toxic substances is controlled by licence.
- b. Water Resources Act (Cap. 72.03)
 - discharge of effluents including toxic wastes is controlled by licence under the Water Pollution Control Regulation. The monitoring of water pollution is the responsibility of several government institutions - Fisheries and Water Departments, Bureau of Standards, City Councils and Water Boards.
- c. Fertilizers, Farm Feeds and Remedies Act (Cap. 67.04)
 - all agricultural and veterinary remedies and insecticides should be registered.
- d. Dangerous Drugs Act (Cap. 35.02)
 - the Pharmacy, Drugs and Poisons Board established under the Act controls the production, storage and distribution of all pharmaceuticals, drugs and poisons.

9. MAURITIUS

- a. Pesticides Control Act
 - regulates the manufacture, packaging, storage, sale and importation of pesticides through the Pesticide Control Board. Maximum residue limits recommended by FAO/WHO Codex Alimentarius Commission are followed. Application of persistent organochlorine pesticides like aldrin, dieldrin, BHC on crops is prohibited.
- b. Food and Drugs Ordinance
 - quality of food and drugs.
- c. Pharmacy Ordinance
 - quality of pharmaceutical products.

10. NIGERIA

- a. Factory Act (1958)
 - safety, health and welfare of workers: presently under review.
- b. Environmental Pollution Edicts in some States; the Federal Edict is still under review.

- c. A draft proposal for pesticides control.
- d. No specific legislation on chemicals control.

Note

Environmental and Occupational Health Division of the Ministry of Health has the responsibility for the promotion of environmental and occupational health in the Federation. There are environmental planning, protection units in the Ministry of Works and Housing.

11. RWANDA

- a. Importation, storage, handling and disposal of chemicals and pesticides are strictly controlled.
- b. New environmental legislation planned.

12. SUDAN

- a. Public Health Act, 1975
 - all aspects of public health.
- b. Environmental Health Act, 1975 and Regulations
 - water pollution, air pollution, disposal of empty pesticides, fertilizer and chemical containers.
- c. Food Act, 1973 and Food Additives Regulations, 1977
 - quality of food, list of permitted additives and their amounts.
- d. Pharmacy and Poisons Act, 1973
 - controls registration, sale, distribution and manufacture of drugs, pharmaceutical preparations and poisons, and lists poisons in three categories.
- e. Pesticides Act, 1974
 - controls registration, manufacture, importation, use and sale of pesticides.

Note

The Occupational Health Administration, Ministry of Health, is responsible for the protection of the working environment. An Environmental Policy Act is in the drafting stage and will be an "umbrella" for the various laws and regulations dealing with environmental pollution and thus fill the gaps in those laws and regulations.

The above laws and regulations are backed by institutions and laboratories for their implementation; however, there are constraints in their implementation.

13. TANZANIA

a. Water Utilisation Act

b. Industrial Licensing Act

Both are outdated and ineffective.

c. Pesticides Control Regulations, 1984

- Control of manufacture, importation, distribution, sale and use of pesticides;
- there are some omissions;
- implemented by the Tropical Products Research Institute in Arusha.

d. The National Environment Management Council (NEMC) was established in September 1986 under Act of Parliament (1983). Its functions include:

- formulation of policy on environmental management and recommend its implementation by Government;
- foster co-operation between the Government, local authorities and other bodies engaged in environmental programmes.

It is above all a policy-and decision-making body.

Note

The Ministry of Industries and Trade has established the Industrial Licensing Board which has the advice of a technical committee on the issue of industrial licences. NEMC is a member of this Committee.

NEMC is at present collecting all existing legislation on environment which will be scrutinized by its legal section with a view to determining whether any amendments/new legislation are necessary.

14. TOGO

The Plant Protection Service is the central body which initiates and co-ordinates all activities for the control of pesticides.

15. UGANDA

- a. Mining Act
 - controls prospecting and mining and prevents interference with water supplies due to these activities.
- b. Factories Act
 - safety, health and welfare of workers.
- c. Public Health Act
 - prevention of diseases, pollution and poor drainage.
- d. Food and Drugs Act
 - quality of food and drugs.
- e. Explosives Act
 - controls manufacture, import, export and use of explosives.

Some important powers of pollution control are contained in:

- f. Public Lands Use Act
- g. Water Act
- h. Town and Country Planning Act. A schedule to this Act requires the provision of full information on waste materials - solid, liquid or gaseous, by new industrial developers.

Note

There is no specific legislation on pesticides or hazardous chemicals. Ministries/departments responsible for importation and distribution of pesticides or other hazardous chemicals have their own regulations about their transport, distribution, storage, handling and disposal. However, the occupational health and hygiene department of the Ministry of Labour has initiated a "chemical and pesticides safety programme" (1985) involving relevant ministries and departments.

16. ZAMBIA

- a. Mines and Minerals Act, 1976
 - safety, health and welfare of workers in mines.
- b. Factories Act
 - safety, health and welfare of workers in factories.
- c. Control of Goods Act, Cap. 690
 - import, export, manufacture, distribution, purchase and sale of manufactured or raw commodities.

- d. Pharmacy and Poisons Act, Cap. 536
 - controls mainly the premises in which specified chemicals are sold without controlling the handling and use of the chemicals.
- e. Food and Drugs Act, Cap. 553
 - quality of food, maximum pesticide residues in food, etc.
- f. Public Health Act, Cap. 535
 - controls atmospheric pollution and contamination of water by fumes, gases, smoke, dust and industrial effluents.
- g. Town and Country Planning Act, Cap 475.
 - development of land and land uses.

The above legislation is all general in nature and does not define the amount of pollution. Although it confers wide powers, the penalties specified are inadequate to have any deterrent effect. Therefore, a draft Environmental Pollution and Protection Act is under consideration by Government; it covers all aspects of the environment including chemicals, industrial wastes, noise and radiation and provides for a single national authority with the necessary legal and administrative framework.

17. ZIMBABWE

- a. Air Pollution Act
 - standards for smoke and lead emissions have been laid down. The Act also provides for the control of fuel quality and exhausts from motor vehicles. The Ministry of Health implements the Act in the ambient environment and the Ministry of Labour and Social Services in the working environment.
- b. Water Act, 1976 (Chapter 41)
 - controls the pollution of water sources.
 - effluent and waste water standards have been laid down.
- c. Hazardous Substances Act
 - controls chemicals other than drugs.
 - classifies hazardous substances according to their toxicity.
 - has provisions for their importation, transport, use and disposal.

REFERENCES

1. Somers, E.: Protection and Control Measures for Chemical Safety: Paper presented at Workshop on Chemical Safety in South-East Asian Countries, WHO/SEARO, New Delhi, 29 October to 2 November 1984.
2. United Nations Environment Programme: List of Dangerous Chemical Substances and Processes. UNEP/GC.10/5/Add.3, 23 March 1982.
3. IRPTC Bulletin: 8(1), 5, 1986.
4. Economic and Social Commission for Asia and the Pacific: State of the Environment in Asia and the Pacific. Bangkok, Thailand, 1985.
5. Riwa P.G., and Kitunga L.J., East African Newsletter on Occupational Health and Safety, 28-29, April 1987.
6. El Sadik Y.M., Osman, H.A., Noweir M.H., and El Soliman M.H.M: Carbon disulphide poisoning in viscose rayon factory. Egypt J. Occup. Med., Vol. I, 35-52, 1974.
7. ILO Occupational Safety and Health Series, No. 37; 1980 (Occupational Exposure Limits for Airborne Toxic Substances)
8. World Health Organization, Environmental Protection Control in Relation to Development. Technical Report Series 718, 1985.
9. World Health Organization and United Nations Environment Programme: Global Environment Monitoring System (GEMS), Global Pollution and Health. WHO & UNEP 1987.
10. World Health Organization, Biomass Fuel Combustion and Health. WHO, EPP/84, 64, 1984.
11. World Health Organization, GEMS HEAL Project: Indoor Air Pollution Study, Maragua Area, Kenya. WHO/PEP/87. 1: WHO/RSD/87.32, 1987.
12. Felipe Solsona: Water defluoridation in the Rift Valley, Ethiopia. UNICEF, 1985.
13. Gumbo, F.J.: Water quality monitoring in Tanzania. Water Quality Bulletin, 10: 174-180, 1985.
14. El Gamal A. and Shafik, Y.: Monitoring of Pollutants discharging to the River Nile and their effect on the River water quality. Water Quality Bulletin, 10: 111-115, 1985.
15. UNIDO/UNEP: Survey of Marine Pollutants from Industrial Sources in the West and Central African Regions. UNEP Regional Seas Reports and Surveys, 1982.
16. Food and Agriculture Organization: National Resources and the Human Environment for Food and Agriculture in Africa. FAO Environment and Energy, Paper 6, Rome, 1986.
17. Abouzaid H., Lander L., and Falkowski T.: Eutrophication of the Sidi Mohamed Ben Abdellah reservoir in Morocco. Water Quality Bulletin, 9:37-41, 1984.

18. UNEP Governing Council decision 85(v) of 25 May 1977.
19. UNEP. Governing Council decision 12/14 of 28 May 1984.
20. UNEP. Governing Council decision 14/27 of 17 June 1987.
21. United Nations: Consolidated list of products whose consumption and/or sale have been banned, withdrawn, severely restricted or not approved by Governments. DIESA/WP/1/Rev.1, July 1984.
22. Food and Agriculture Organization: International Code of Conduct on the Distribution and Use of Pesticides. Rome 1986.
23. World Health Organization: Preliminary Assessment of National Programmes for Health Protection Against Environmental Hazards. PEP/85.8, 1985.

Annex IV

LIST OF WORKING PAPERS AND BACKGROUND REFERENCE MATERIAL PROVIDED
TO PARTICIPANTS

1. International Programme on Chemical Safety (IPCS)
2. International Register of Potentially Toxic Chemicals (IRPTC)
3. Chemical Hazards to Human Health and the Environment in the African Region - An overview by C. Satkunanathan
4. Control of Environmental Hazards - A WHO Strategy for Technical Cooperation with Member States; WHO Document WHO/EHE/87.1
5. Exchange of Information on Chemicals in International Trade (Decision 14/27 of the Governing Council of UNEP of 17 June 1987)
6. Concepts and Application of Chemical Safety in Industrialized Countries by J. Rantanen
7. Environmental Health Criteria Documents
8. Management of Hazardous Waste
9. Health Aspects of Chemical Safety - Workshop on Manpower Development and Training
10. FAO Code of Conduct on the Distribution and Use of Pesticides
11. UNEP Profile
12. UNEP Achievements
13. UNEP Environment briefs No. 1, 2, 3, 4 and 6
14. Country Papers:
 - Botswana by E. R. Thekiso
 - Burundi by C. Sahiri
 - Egypt by H. I. Nasr
 - Ethiopia by A. Fekadu
 - Gabon by A. M-Nziengui
 - Gambia by S. O. Fye
 - Ghana by R. A.-Ampadu
 - Kenya by J. N. Waiyaki
 - Liberia by D. Bella
 - Malawi by S. L. Chokotho
 - Mauritius by L. G. Mine
 - Nigeria by A. E. Soyombo
 - Rwanda by F. Munyeshuli
 - Senegal by F. Sy
 - Sudan by A. M. Abdurahman
 - Tanzania by L. A. Mbwele
 - Togo by A. Fousseni
 - Uganda by K.E. Okelo
 - Zambia by S. A. Goma
 - Zimbabwe by T. P. Bwititi

Annex V

GUIDELINES FOR THE PREPARATION OF COUNTRY PAPERS

- Part A National background information
- Physical characteristics (geography, area)
 - Population and distribution
 - Type of economy
 - Natural resources
 - Degree of industrialization
 - Patterns of chemical import, production and use
- Part B National experience of health and environmental problems due to chemicals
- Type of incidence of cases of human poisoning (such as domestic chemicals, industrial chemicals, pesticides)
 - Chemical accidents affecting health and the environment
- Part C Activities Related to Chemical Safety and Pollution Control
- General problems with chemicals
 - Public Health: Chemical and Biological problems
 - Production, storage, transport, handling and disposal of chemicals
 - Problems related to use of pesticides
 - Occupational health problems
 - Environmental Pollution: Control Measures
 - Measures taken to improve chemical safety at all levels before an agent becomes pollutant
- Part D Legislation and National Capabilities
- Legislation and its implementation related to chemical hazards
 - Institutional backing
 - Trained manpower
 - Specialized laboratories
 - Clinical toxicology units
 - Training facilities
 - Extent of integration of hazard prevention into other disciplines and into educational systems
- Part E National Priorities
- Awareness of chemical safety and environmental pollution
 - Resource (individual, institutional) development
 - Legislation
 - Implementation
- Part F Summary and Recommendations

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