



UNITED NATIONS ENVIRONMENT PROGRAMME

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DESERTIFICATION CONTROL

The semi-annual bulletin on plans and activities

Volume 1 Number 2 December 1978



- * *The United Nations Conference on Desertification (UNCOD) was held in Nairobi from 29th August to 9th September, 1977.*

- * *This was the first worldwide effort ever initiated to consider the global problem and responsibilities posed by the advancing desert.*

- * *95 States participated.*

- * *50 United Nations offices and bodies, 8 intergovernmental organizations and 65 non-governmental organizations participated.*

- * *The United Nations Conference on Desertification prepared a Worldwide Plan of Action to Combat Desertification with 28 specific recommendations.*

- * *Immediately after the adoption of the Plan of Action the Executive Director of UNEP convened the Consultative Group for Desertification Control to assist in mobilizing resources for the activities under the Plan of Action. This group is co-sponsored by UNEP, UNDP, FAO, WMO, UNIDO, WFC, UNFPA and UNESCO.*

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INTRODUCTION

Here is the second issue of the Desertification Control Bulletin. Many people from all over the world are involved in efforts aimed at stopping desertification. In this issue we have tried to bring you a variety of perspectives:

- the Executive Director of UNEP, who has been entrusted with the responsibility of following-up the Desertification Conference, reviews the problem from his vantage point in a speech reported here.
- a writer who is not an expert in desertification provides a journalistic account of a visit to a desert-control centre in a country aware of its problem and trying to overcome it.
- a participant in a seminar on desert control provides a first-person account of his experiences in a country striving to share its work in this area with other nations.

It is our hope that these articles will contribute to raising public awareness on the subject of desertification. The Desertification Conference considered the heightened consciousness of the general public a prerequisite for successful reversal of the shrinking land resources trend.

* * * *

Since the publication of the first issue of the Bulletin, the

Desertification Unit has been established within UNEP. Its aim is to assist the Executive Director in ensuring follow-up to the Plan of Action approved by the Desertification Conference.

The unit will, when fully staffed, consist of eight professionals, some of whom have been put at its disposal by UNDP, UNFPA, and the UN Sahelian Office (UNSO). Close cooperation is envisioned with all UN agencies interested in desertification, particularly with the other co-sponsors of the Consultative Group on Desertification Control: UNDP, UNFPA, FAO, UNESCO, WMO, UNIDO and WFC.

The current members of the unit are Dr. Gafaar Karrar, Professor Boris Rozanov, Mr. Nadjib Omer and the undersigned. We are further recruiting an economist, a sociologist, a forester and a rangeland/livestock expert.

Any queries or proposals concerning the activities of the unit, including the preparation of the Desertification Control Bulletin, should be addressed to:

The Executive Director
UNEP
P.O. Box 30552
Nairobi
Kenya

Jens Høgel,
Chief, Desertification Unit.

MAN-MADE DESERTS

The Sahara is growing at about 1.5 million hectares per year. Every year Africans lose the equivalent of Jamaica to the desert; every decade, the Sahara gains an area equivalent to Czechoslovakia. The advance of the Sahara is rarely a matter of huge sand dunes smothering an oasis—though that does indeed happen. The desert does not usually move forward in a straight line, but spreads like a skin disease, in blotches and spots, wherever overgrazing or unwise cultivation destroys the surface vegetation and lets soil turn into shifting sand. But desertification is not a remote ecological process: it is above all a human problem. In the terrible Sahel drought of 1968-73, 15 million villagers lost more than half their crops. Two million nomadic herdsmen saw half their livestock die—and in Mali, nine out of every ten animals were reduced to stinking corpses.

—Dr. M.K. Tolba, Executive Director of UNEP.

Can Desertification be Stopped?

What does desertification really mean? What causes it? How urgent is the problem? How does it affect human beings? What can be done to combat it?

These were some of the questions that Dr. M.K. Tolba, Executive Director of UNEP, addressed in the September 9, 1978 keynote address to the Cairo International Workshop on application of science and technology for desert development.

The World Conference on Desertification, he said, conceived desertification as a process of ecological degradation in arid, semi-arid and sub-humid lands by which the productivity of land is lost or substantially diminished: grazing lands cease to produce palatable pasture, dryland agriculture fails and irrigated fields are abandoned due to salinization, water logging and other forms of soil deterioration.

Three examples of this process were drawn from Egypt. One was the case of the Mareotis land which lost its fertility and productivity and turned into a barren wasteland. Another was the sand encroachment from the Western Desert over productive land. The third was desertification through water logging and salinization.

The cause of this process, Dr. Tolba pointed out, particularly its acceleration in recent decades, is not necessarily climatic changes. It is due rather to interactions between societal pressures and fragile ecosystems. Under excessive pressures of land use—such as overgrazing, farming marginal lands, excessive irrigation and impeded drainage—damage is caused beyond the resilience of the ecosystem. The result is desertification.

The problem is urgent. Every year, for example, about 60,000 square kilometres of productive and fertile land are lost.

The suffering of people living on the fringes of the deserts was brought into sharp relief by the Sahelian drought which focused world attention on the encroaching desert. This led to two major decisions by the international community: first, to initiate concerted international action to combat desertification; and second, to convene a United Nations Conference on Desertification to produce an effective, comprehensive and co-ordinated *Plan of Action to Combat Desertification*.

The immediate goal of the *Plan of Action*, which was produced by the United Nations Conference on Desert-



*Dr. Mostafa K. Tolba,
Executive Director of UNEP*

ification and endorsed by the United Nations General Assembly, was to stop desertification and, where possible, to reclaim desertified land. It underlines the importance of establishing and developing national capabilities for combating desertification, since such action is implemented primarily at a national level.

The main thrust of the *Plan of Action* is the application of existing knowledge in science and technology to the development of programmes aimed at halting further desertification; reclaiming desertified lands; and properly using and developing the resources of areas prone to desertification as a means of combating the process. Such programmes must be ecologically and socially appropriate to the specific area.

A comprehensive national plan to combat desertification should comprise two basic elements: first, monitoring and assessment; and second, land-use policy and planning. The activities of the first should provide the basic information needed for the second. The resulting plan would be aimed at achieving the following goals:

- halting further degradation of productive land;
- reclaiming desertified areas;
- maintaining optimal sustained productivity of land;
- resolving conflicts among competing users;

- developing non-agriculture land-uses such as oil, mineral, recreation or urban settlement;
- providing for basic human needs including environmentally sound and socio-culturally acceptable habitats for local population.

The implementation of such national plans, Dr. Tolba emphasized, requires four activities as prerequisites for success. One is training and education that stresses the inter-disciplinary scope of environmental problems and ensures public participation. Another is legislation concerning water resources and rights, systems of land-tenure, etc. Certain laws need to be reformed or new ones formulated that would be socially acceptable and equipped with an effective machinery for implementation. The third is attention to socio-economic aspects to ensure support for programmes

DESERTIFICATION

On the Southern fringes of the African Sahara 650,000 km² (65 million hectares) of once productive land have become desert during the last 50 years; about 60,000 km² (6 million hectares) of productive and fertile land are lost annually; some 600-700 million people (14 per cent of the world population) live in threatened drylands; of these about 60 million are immediately affected by desertification.

—Dr. M.K. Tolba, Executive Director of UNEP.

designed to prevent ecological degradation. The fourth is the application of available scientific and technological knowledge.

The above requirements and actions, Dr. Tolba said, call for the creation of a national machinery consisting of several components, each with its own structure but all coordinated to function within the framework of the national plan of action. There should be a body at a high level in the government structure to act as a policy and planning authority. Among its principal objectives should be strengthening indigenous capabilities in the fields of scientific research for combating desertification, application of available scientific and technological knowledge and adaptation of technologies to fit prevailing ecological conditions.

There may also be the need for a technical group to provide substantive support to the authority. It would also ensure coordination in the implementation of the national plan, carry out data processing and synthesis and provide the much needed channels of communication and feed-back between national institutions for research and data collection on the one hand and the policy-making authority on the other.

Since desertification often transcends national boundaries,

so must the fight against it. Dr. Tolba pointed out that regional cooperation would be required. The UNCOD approved a number of recommendations in the *Plan of Action* calling for worldwide cooperation. It also received various proposals for regional cooperative action including six studies on the feasibility of transnational projects related to combating desertification.

Finally, Dr. Tolba dealt with financial resources. He said that although action to combat desertification will depend mainly on national resources, there is an urgent and pressing need for international financial support if national efforts are to succeed within a reasonable period of time. The Conference on Desertification and the United Nations General Assembly identified three possibilities for mobilizing international financial support.

First, the Consultative Group for Desertification Control could be used as a forum for mobilizing resources from donor countries and financial institutions and for directing these resources for national and international programmes.

Second, it is estimated that \$400 million annually is required for achieving and maintaining zero desert growth. At the request of the General Assembly, a group of highly qualified specialists in international finance suggested a number of sources for financing international programmes of development including combat of desertification and development of dry land resources. These likely sources include increased official development assistance, loans with concessional terms and a share of the revenues from exploitation of international commons, taxes on military expenditure and arms transfer.

Third, the General Assembly endorsed in principle the creation of a special account within the United Nations for implementing the *Plan of Action to Combat Desertification*.

In his concluding remarks, Dr. Tolba pointed out that the loss of productive land by desertification is one of the more serious examples of environmental degradation that faces the present world. It is made particularly severe by the growing demand for food resources to meet the basic needs of the ever-increasing world population, which requires more and more villages, towns, and urban conglomerates. This exerts an added pressure on food producing lands. Dr. Tolba reminded his audience that desertification is a truly global problem, affecting the survival of millions of people, living and yet unborn.

But, he added, the main bulk of the scientific knowledge and technological methods necessary for combating desertification and developing the resources of arid lands is available. Experience during the past several years, he said, tells us that success in halting this menace is achieved only through coordinated and integrated actions. These include the application of science and technology, the reform of socio-political institutions including land-tenure systems, sound and efficient management, and the mobilization of popular participation.

Developing the Desert: the Soviet Example

A VISITOR'S VIEW

by Enid Burke

The sun beat down mercilessly upon the group of 40 people as they moved slowly and clumsily over the sand dunes of the Kara-Kum desert. The heels of the women's shoes sank all too easily into the drifts of sand, and every now and then the slightest breeze would blow the fine particles of sand about, stinging the face and hands.

The Kara-Kum desert, like most deserts in the world, is a long way off the beaten track and not particularly enticing to visitors. We had left the pleasant, tree-filled town of Ashkhabad at dawn that day to catch the Aeroflot plane to Chardzhou in eastern Turkmenistan. From Chardzhou town, we travelled through the desert by bus for several hours and, on arrival at the Repetek Desert Reserve, were greeted by our host, Mr Sukharn Veyisov, Director of the experimental station at Repetek.

Our journey by plane had taken us over miles and miles of desert, dotted here and there with clusters of settlements that clung close to canals and ponds, making a sharp contrast to the empty brown sand hills all around.

Much of the Soviet Union's 210 million hectares of desert lies in this part of the country—Soviet Central Asia—and



After sand fixation has taken place, the next step is to experiment with growing desert vegetation. Pictured here is the weeping willow type of tree, Ammodendron conollyi.

Kara-Kum (black sands) is the biggest.

Deserts may not look enticing, but their lure, as scientists know well, lies in the promise they hold for the future—as grazing lands for cattle and sheep, as irrigated valleys of cotton, vineyards and corn or as industrial settlements. In a word, deserts can become centres of human activity, much as they were in the past in this part of Central Asia.

Today, modern man is faced with problems of the ever-decreasing size of forests, the ever-increasing human population, the constant demand for more land to build towns and the shrinking numbers of plant and animal species. More than ever, he needs to develop the deserts.

Giving weight to this argument, Dr. A. Babayev, President of the Academy of Sciences of the Turkmen Republic, said: "Deserts hold much potential in being developed for irrigated farming, pasture husbandry and mining industry".

Years of scientific research indicate that deserts hold valuable natural resources which, if rationally utilized, can greatly improve our lives, he pointed out. In the USSR, the move to develop arid lands for industrial and agricultural purposes has "fundamentally dissipated the former opinion about the futility of deserts in Central Asia and Kazakhstan," Dr. Babayev added. "They remain deserts geographically, but from an economic standpoint they represent a prospective region with a high economic potential."

The deserts of the Soviet Union account for virtually all the raw cotton and raw silk, 33 per cent of mutton, 16 per cent of wool and 20 per cent of vegetable oil produced in the country.

"Even in ancient times," says another Soviet scientist, Dr. A. Rustamov, "people who lived here hunted and kept livestock, while those near the oases were engaged in irrigation farming."

Man's influence over the ages, however, has been disastrous, having adversely affected the animal and plant kingdoms as well as the soil cover.

"The ones to suffer most were the animals that were hunted by man and forced to change their habitats," Dr. Rustamov explained, "with the result that the wild horse, wild camel and other big game which used to live in Central Asia, died out here. Excessive grazing, felling of trees and bushes for fuel, and moving sands all resulted in considerable changes in the landscapes and ecosystems of the arid zones. Shifting sands which often buried towns and settle-

ments were especially destructive.”

Dr. Rustamov pointed out that the basic task was to convert less productive ecosystems into more productive ones.

For this reason, the Soviet Union has set aside eleven desert reserves totalling about 625,000 hectares to protect all the main desert and semi-desert ecosystems and to provide facilities for long-term study and research which could lead to a wiser utilization of deserts than in the past.

Of these eleven reserves, the Repetek is among the best known to scientists. In fact, 80 per cent of the Turkmen Republic is desert, with an annual rainfall of 80 to 120 mm, falling mainly in winter and spring. The highest summer temperatures rise to 50° C and the winter average is 16° C. Maximum air temperatures in Repetek are among the

on for a long time to come. Even hunting, grazing and berry-picking are banned activities and there are no tourist or recreational facilities. It is part of the international network of desert biosphere reserves.

The only sign of “life” is the road — part tarmac, part murrum, connecting Chardzhou to the reserve.

One of the most dramatically visible experiments at Repetek is that of sand dune fixation, which scientists have been carrying out for the past five years. The experiments are under the guidance of Dr. Igor Svintsov, of the Academy of Sciences, who also met us at Repetek.

On arrival at the reserve, we were shown three methods of sand fixation to deal with moving and semi-stabilized sands. The first method is reputed to be a traditional, 100-



A tarmac road runs through the Kyzyl-Kum desert in eastern Turkmenistan where farming and some industrial activity has been established, thanks to the years of research carried out in experimental stations like the one at Repetek. In the background is a view of the Kopetdag mountains.

highest in the Soviet Union, with bare sand surface temperatures reaching a scorching 77° C.

While the Repetek reserve lies in the eastern part of the Turkmen Republic in relatively undeveloped desert conditions, the Kyzyl-Kum (red sands) desert in the western part of the Republic makes an effective “before” and “after” contrast with its man-made water ponds, irrigated farms of corn, cotton, tomatoes, melons, grapes and high-yield crops, its cattle and astrakhan sheep grazing on carefully nurtured brush and small grasses. The presence of underground water and the low salt content — as little as 2 to 3 grams per litre — makes irrigation possible here.

Repetek, of course, is deliberately isolated from all economic activity, like the other “zapovedniks” (nature reserves) in the USSR. Study and research has been going on here since 1928, when it was first established, and is likely to go

year old Turkmenian method, using a chess-board design. Any local plants are used to mark out the chess-board “squares”. The ones we saw were composed of sticks 50 cm long, which were buried in the sand to a depth of about 10 to 15 cm, in a direction against the prevailing winds. Incoming sand was allowed to accumulate inside the “squares”. In this method all work is done by hand, so considerable labour is required. The squares themselves measure 2 by 2m or 3 by 3m. This type of barrier can last as long as five years and is used to protect roads, railways and construction sites from moving sand dunes.

The second method differs only in design. Sticks are used to mark out rows rather than squares. This method is used where the sand needs less protection — semi-fixed — and costs half as much as the chess-board design as fewer sticks and less labour are required.



Sand dune fixation experimentation at Repetek Desert Reserve, Turkmen republic, USSR. This is the chessboard method in which sticks 50 cm long are used to mark out the squares. It is said to be a traditional method. Sand accumulates inside the squares.

To many of us in the group the third method was the most fascinating. A tractor sprays a sulphate-alcoholic mixture in broad strips to form a protective belt over the sand on the windward side. This non-toxic chemical, a by-product of celluloid, is sprayed over the sand in a thin film during spring and winter. Unlike the chess-board method where sand is allowed to accumulate *inside* the squares, in this method, a depression is created by the wind blowing away the sand between the strips. Within about two months of the spraying, a series of little valleys is formed. According to Mr. Veyisov, it has been observed that humidity is twice as high in areas covered with the chemical, since it helps retain the little moisture that falls on the sandy surface. He admitted, though, that the first method was more feasible and economical. The chessboard design is also used in the chemical spraying method.

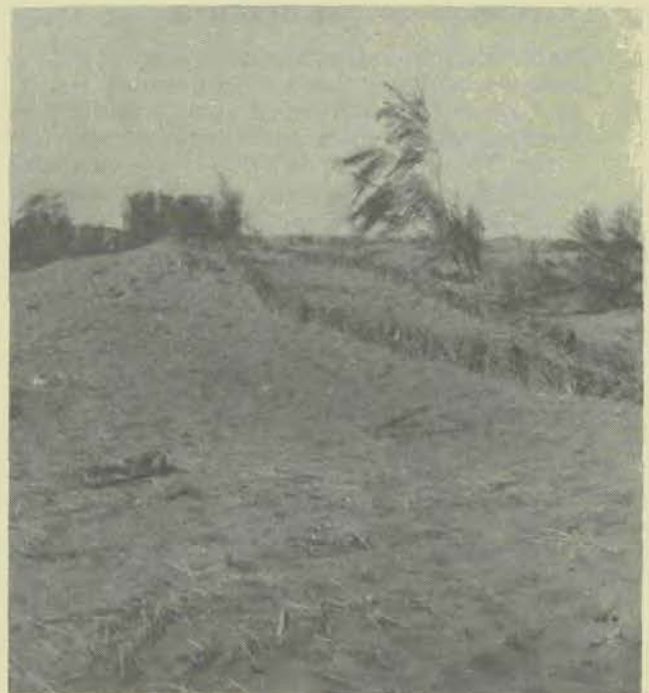
Once the drifting sands have been stabilized by one of the three methods, desert-type bushes and trees are planted inside the "squares" and "valleys", such as the *Ammodendron conollyi*, which resembles the weeping willow, and the thick-

branched, gnarled-looking *Haloxylon ammodendron*. Grasses like the *Carex physoides* with tiny bulb-like "flowers" that cover much of the reserve in spring, are also used to fill up the squares. With the planting of these "desert woodlands", it is possible to analyse the changes that can be brought about in the desert with the least ill effects to the environment. The knowledge acquired can also be used in further developing other parts of the Turkmenian deserts, as in the Kyzyl-Kum where farming and ranching are already taking place.

Careful monitoring and continuous research is essential in order to study the fragile desert ecosystems in the world, since any unplanned interference could lead to serious consequences, as history has shown.

An average of 100 scientists visit the station annually to study the experiments. Many members of the party, particularly government officials, felt that more non-scientists from other countries should be encouraged to come to Repetek and other desert reserves in the USSR to see for themselves what can be done to develop these areas.

Among the group were 20 participants who had just completed an extensive tour of Soviet national parks and reserves of their own countries. They expressed their delight at having been able to visit Repetek as well. Mr. Koumbaye Belyo, from Chad, was of the opinion that sand fixation methods could be applied to Chad's desert regions, and that vegetation types he had seen at Repetek could be introduced into Chad's dry areas. They included the eucalyptus, casuarina, the small-leaved *cisso* and the "nimes". Burmese



Signs of life in the Kara-Kum Desert. Far right, sticks similar to those used in the chess-board method are used to mark out rows instead of squares. In the background, a later stage of the experiments can be seen—planting desert-type vegetation.

visitor U Ba Ngwe also found Repetek an eye-opener, in relation to the semi-deserts of Central Burma. He believed that the 50 years of research and experiments carried out here could be useful in examining deserts elsewhere, particularly in developing countries, which could not afford the money to undertake such long-term desert studies.

The time-span of these studies makes it possible, according to Dr. V.V. Krinitsky, to "investigate the cycles of intricate natural phenomena covering long periods and to follow the changes in the structure of natural complexes".

Silent reminders of past civilizations are exhibited in the Repetek museum, where archaeological finds date back to the ninth century. The only living reminders of that flourishing age in what is now desert are the snakes, like the *Echis carinatus*, the Soviet Union's largest lizard the *Varanus griseus*, the tortoise *Testudo horsfieldi* and a grim-looking

black, poisonous species of spider. They survived the deteriorating conditions which proved too much for human endurance.

"While camping out during experiments, you can hear the click-clicking sounds of the lizard (*gekkonidae*) at night, which resembles the call sounds of little birds," Mr. Veyisov told us.

The reptilian and insect life may be shunned by humans, but they are vital links in the delicately balanced desert ecosystem which is being given a long (50 years and more) scrutiny in the hope that millions of people may learn to live comfortably in the deserts. When that time comes, they will be well equipped with the science and technology to prevent a repetition of the mistakes of our forbears which drove them away from the deserts.

EXTENSION OF THE DESERTS

According to estimates of Meigs (1953) and Petrov (1973) the total area of the world's deserts is 48,350,000 km², of which 5,850,000 km² are extremely arid, 21,500,000 km² arid and 21,000,000 km² semi-arid. This total area is equivalent to 36.3 per cent of the earth's land surface, and is inhabited by 384 million people, or 12.8 per cent of the world's population. These estimates of desert area are based on climatic data, whereas on the basis of soil and vegetation data, the total area of the world's deserts equals 43 per cent of the earth's surface (Schantz, 1956). The difference is accounted for by the estimated extent of man-made deserts (9,115,000 km²).

—M. Kassas, Cairo.

Training Seminar in China

A PARTICIPANT'S REPORT

by Carlos Zamora

The desert areas of China are being reclaimed and the shifting sand dunes are being controlled without expensive and sophisticated technology. Simple but effective techniques and methods are being used, aided by a vast amount of human effort. Traditional wisdom, and massive cooperation among the people have been the main forces in the battle against the advance of desertification. And they have overcome one of desertification's most terrible tolls: human hunger.

How this has been accomplished was the subject of the Seminar on Desertification Control in China, sponsored by the United Nations Environment Programme with the cooperation of the Government of the People's Republic of China. The seminar took place from 19 August to 19 September, 1978. A total of 18 participants from Argentina, Egypt, India, Libya, Nigeria, Peru, Somalia and Sudan participated in a comprehensive programme organized by the Lanchow Institute of Desert Research.

During 25 days the foreign guests traversed nearly 12,000 kilometres of land travelling by road, rail and air. This enabled them to have an overall picture of the desertification

process in China, as well as the methodology being used to arrest it.

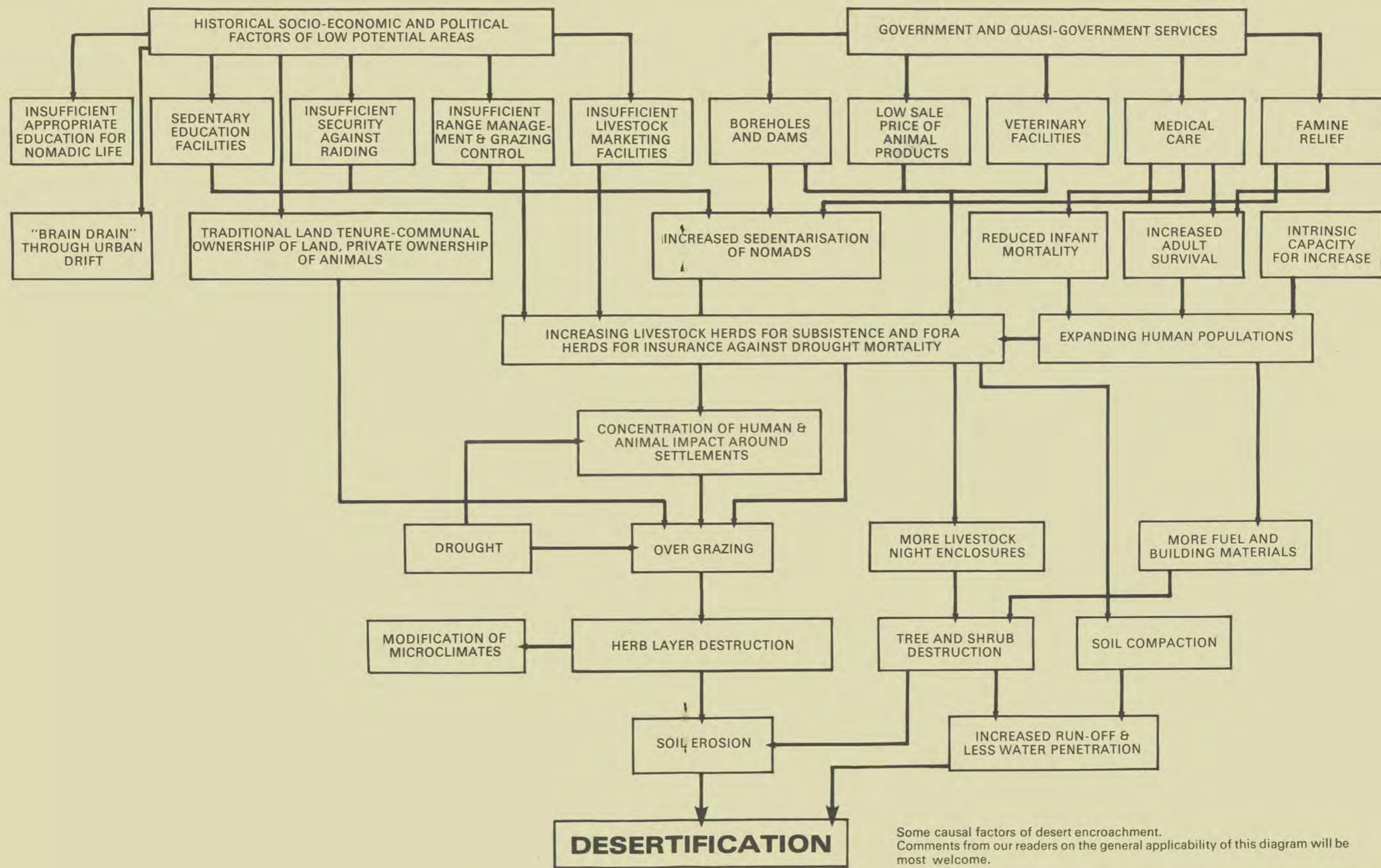
The seminar made use of lectures and technical materials, films, field trips, demonstrations of equipment and reports from the foreign participants on the desertification problem in their own countries and the measures undertaken to control it.

It became clear that China has made considerable progress in combating desertification. It has concentrated its efforts on the practical side of desert control. The opposite situation prevails in many other developing countries, where emphasis is on research or theoretical teaching in the universities, with little achieved in combating this complex problem.

The technical materials given and presented to the participants during the lectures held at the Lanchow Institute of Desert Research were on a high level and very instructive. Worthy of mention is the album "China Tames Her Deserts", a photographic record of the efforts by the people of various nationalities in China's arid areas to harness, transform and utilize the deserts. The lectures covered different aspects of the desertification problem such as, "China's Deserts and



A participant group in the seminar at the Lanchow Institute of Desert Research



Some causal factors of desert encroachment. Comments from our readers on the general applicability of this diagram will be most welcome.



Some participants examine a model of the desert at the Lanchow Institute of Desert Research

Preventive Measures of Desertification," "Section of Plant Species for Fixing Shifting Sands in Deserts and Semi-Desert Regions in China," "The Utilization and Improvement of Pasture in the Steppe Zone of China," "Principle and Technology for the Establishment of Forest Belt Systems in Oases," and "The Development and Utilization of Surface Water Resources in Construction of New Oases in Desert Regions." These interesting lectures promoted an exchange of questions, views and experiences.

In addition to lectures and group discussions there were screenings of an excellent series of films, illustrating methods of sand dune stabilization as well as techniques of dune leveling. The well known "chessboards", barriers of sticks or plants in a chessboard design used against the shifting sands and covering vast areas like huge carpets, are examples of their approach to controlling the advance of sand-dunes.

The instruments and equipment shown, especially at the Lanchow Institute of Desert Research and at Sha Po Tao Experimental Station, located in Ningsia Hui Autonomous Region, were quite modern. The "tunnel of wind" at the Lanchow Institute, also used in aero-dynamics for testing airplanes, shows clearly the lines of scientific research used in studying the laws that govern the movement of the sand.

The field training and study tour was obviously the most

interesting and instructive part of the seminar, promoting a continuous exchange of views and experiences between the local Chinese technical staff and the foreign guests. Through this the participants learned much about the geography of the surrounding deserts, the natural resources of the area, the social and economic aspects, and the preventive measures undertaken to combat and arrest the shifting sands. Among these is the planting of long, wide forest shelterbelts with a selection of appropriate plant species. This also serves the purpose of giving economic benefits as well as improving the quality of life of the people of the region. The participants also learned about water management techniques and how the skeletal soils of the Gobi desert have been transformed into productive, even flourishing, land.

The reports from the guest countries dealt with the specific problems of individual countries, and the actions these governments have taken to combat desertification.

In Peru, for example, the government has undertaken several actions to deal with the problem of desertification. These actions are legal, social and administrative. Peru has placed great emphasis on reclamation of land affected by salinity and poor drainage. And it has followed a policy of reforestation on the steep slopes of the Peruvian Andes to combat and arrest soil erosion.

The Seminar lasted for almost three days. A vast country such as China, with a desert area of more than one million square kilometres and varying conditions of desertification processes, requires several techniques to fight desertification. A relatively comprehensive understanding of the problem could hardly have been achieved in less time.

The emphasis of the seminar was on the practical rather than the theoretical. Such an emphasis was useful and suitable to the general experience-level of the participants.

The seminar was extremely instructive. The participants learned a great deal about desertification and how to go about combating it. They left with an understanding of the importance of effective coordination. This should be part

of a national machinery for the elaboration and implementation of programmes for combating desertification. The following conclusions emerged from the seminar:

1. Desertification is not a problem restricted to deserts, but to all areas or ecosystems where mismanagement of the environment due to human action prevails, leading to the impoverishment of the land and its natural resources.
2. China has demonstrated that arid or semi-arid areas, very fragile to desertification processes, can be reclaimed, using simple but effective methods and techniques rather than sophisticated and expensive technology.



Examples of dune fixation by the "chessboard" method in Libya.

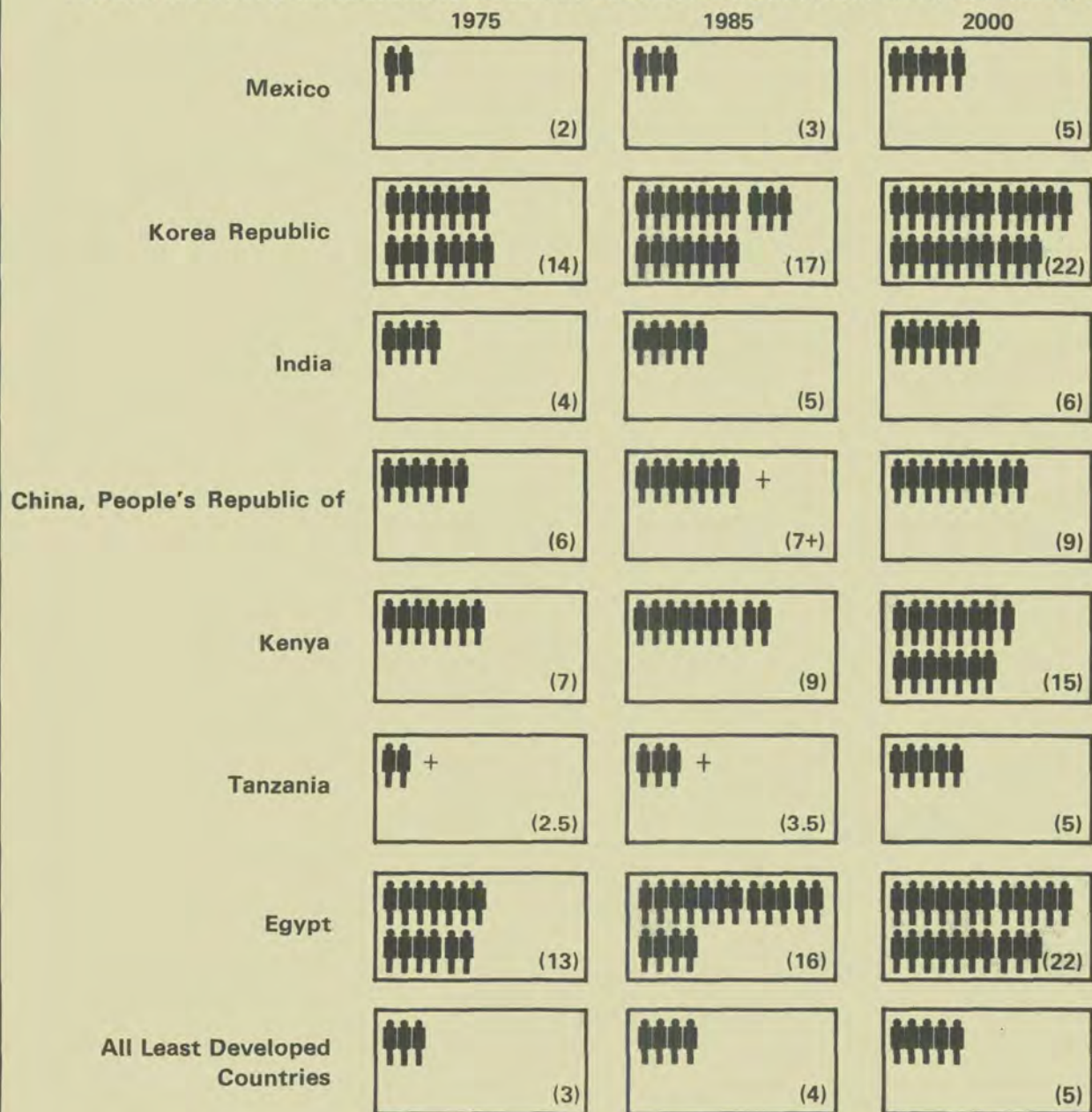


3. Countries of the Third World affected by desertification should be encouraged to develop local techniques and abilities, using their own natural conditions and resources, instead of bringing from abroad methods and expensive technologies not in accordance with their social and economic framework.
4. Developing countries affected by desertification should evolve national campaigns against it and appropriate action should be taken to utilize and strengthen national capabilities in science and technology, focusing on planning and management for rational utilization of resources.
5. Generally the countries of the Third World that face desertification have few economic resources and inadequate machinery to combat it. In order to implement the *Plan of Action to Combat Desertification*, to be carried out by governments through their national institutions, some international cooperative aid for technical and economic support will be necessary.

PRESSURE OF MAN AGAINST LAND

In developing countries the population continues to multiply but the hectares of cropland do not increase. The pressure of man upon agricultural land will steadily rise. By the year 2000, the food situation for some countries will be critical.

Persons to be fed from each arable hectare in selected countries, 1975, 1985, and 2000 A.D.



Explanation

Each rectangle represents 1 arable hectare.

The figures inside the rectangle represent the population needing to be fed from one arable hectare.

Assumptions:

- (1) That arable hectares will not increase significantly during 1975-2000 A.D.
- (2) That population growth during 1975-2000 will continue at the same growth rate as in 1965-75.

Provided by Haldore Hanson, Director General of CIMMYT

Follow-up to the United Nations Conference on Desertification

REVIEW OF ACTIVITIES

Study on Additional Measures

At the request of the General Assembly, a group of highly qualified specialists in international finance was invited by the United Nations Environment Programme to prepare a study on the subject of additionality and automaticity of resources for combating desertification. Their report (UNEP GC 6/9 Add. 1) will be discussed by the General Assembly at its thirty-third session together with an extract of the report of the Governing Council which reflects the differing views that were expressed in the council on this matter. (Decision 6.11).

The study enumerates a number of sources for financing international programmes of development including combat of desertification and development of dry land resources. These likely sources include:

- (a) Increased Official Development Assistance (ODA). This was conceived by the UN General Assembly to reach 0.7 per cent of the GNP of developed countries during the present decade. By 1975 the total ODA funds amounted to 0.35 per cent of the GNP, and in 1976 it fell down to 0.33 per cent. It is stressed that ODA resources should be increased to meet the target.
- (b) Loans with concessional terms to finance anti-desertification activities.
- (c) A share of the revenues from exploitation of international commons (ocean sources), taxes of polluters of marine environment, rents for telecommunication wavelengths and satellite parking space, international taxation on trade flows, and taxes on military expenditure and arms transfer.

Special Account

The Governing Council of UNEP also considered the report of the Secretary-General on the establishment and operation of a special account to combat desertification. This had been prepared pursuant to General Assembly Resolution 32/172 which had endorsed in principle the creation of a special account as one of a series of measures for financing the implementation of the *Plan of Action*.

This study will also be considered by the General Assembly

at its thirty-third session, having been considered and taken note of by the Governing Council and ECOSOC.

Consultative Group for Desertification Control

The first session of the Consultative Group for Desertification Control was held in Nairobi from 2-5 May, 1978. It was convened by the Executive Director of the United Nations Environment Programme (UNEP) in response to General Assembly resolution 32/172 of 19 December, 1977. The group is co-sponsored by UNEP, UNFPA, UNESCO, WMO, WFC, UNIDO, UNDP and FAO.

In his opening statement, the Executive Director stressed the significance of the meeting as the first concrete step taken by the international community towards implementing the *Plan of Action to Combat Desertification*. By establishing the Group, he said, the international community was creating not a new organization but a mechanism to assist in mobilizing resources and a forum for consultation to ensure that donor governments and organizations represented in the group would provide support for the implementation of the projects to be discussed at both the first and subsequent sessions of the group.

Apart from the co-sponsors, nine bodies of the United Nations System, 12 intergovernmental and other international organizations and 28 governments were represented.

The group adopted a policy statement regarding its future work. (See complete text following this Review.) It considered project proposals that were based on the six studies of the feasibility of regional cooperation in combating desertification approved by UNCOD, namely:

1. Green belt in North Africa.
2. Green belt in the Sahel.
3. Management of livestock and rangelands in the Sudano-Sahelian Region (SOLAR).
4. Major aquifers in North-east Africa.
5. Regional Programmes to monitor desertification processes and related natural resources in arid and semi-arid areas in South America.
6. Transnational project to monitor desertification processes and related national resources in arid and semi-arid areas in South-west Asia.

The group expressed its interest in the projects. It indicated readiness to consider elements of the various projects for possible support when they were refined and elaborated along the lines indicated during the discussions.

Measures to be Taken for the Benefit of the Sudano-Sahelian Region

In line with the Conference recommendation that everything possible be done to achieve the immediate implementation of the *Plan of Action* in the region, the General Assembly adopted resolution 32/170, "Measures to be taken for the benefit of the Sudano-Sahelian region". The resolution requested the Governing Council of UNEP to consider at its sixth session, on the basis of a report by the Executive Director, ways to improve institutional arrangements for the purpose of supporting, encouraging and coordinating efforts to combat desertification and the necessary measures and

MAN-MADE DESERTS

Man-made deserts, it is estimated, cover 9,115,000 square kilometres and about 60,000 square kilometres of land are turning into desert every year.

—Samuel Karumba, Nairobi.

modes of action for implementing anti-desertification projects and programmes in the region.

The UNEP Governing Council at its sixth session considered the Executive Director's report (UNEP/GC.6/9/Add.2), which presented three alternative proposals, and opted for the alternative of strengthening the organization and functions of UNSO, including its regional office at Ouagadougou, as a joint UNDP/UNEP venture to expedite the implementation of the *Plan of Action to Combat Desertification* in the region. (UNEP Governing Council decision 6/11/B dated 22 May 1978).

In response to the UNEP Governing Council's decision that this proposal be given favourable attention, the UNDP Governing Council decided to designate UNSO, to coordinate the United Nations efforts to assist in the implementation of the *Plan of Action to Combat Desertification* in the fifteen countries of the Sudano-Sahelian region south of the Sahara and north of the Equator. This enterprise is to be carried out jointly by UNEP and UNDP (decision 25/10 of 27 June, 1978). It also requested the Administrator of UNDP to enlarge the organization and functions of UNSO and of its regional office in Ouagadougou and to develop modalities for this purpose with the Executive Director of UNEP. Subsequently, the Economic and Social Council endorsed the decisions of the Governing Councils of UNEP and UNDP. It recommended to the General Assembly that it enlarge the organization and functions of UNSO and its regional office

at Ouagadougou and invited the specialized agencies and other organizations and programmes of the United Nations system concerned to cooperate fully with UNSO in assisting the fifteen countries of the Sudano-Sahelian region in implementing the *Plan of Action to Combat Desertification*.

The modalities of the joint venture have been agreed upon by the Executive Director of UNEP and the Administrator of UNDP, and all necessary steps have been taken for the strengthening of UNSO's operational capacity to handle its enlarged tasks.

Implementation of the Resolutions Adopted by the United Nations Conference on Desertification

In resolution 32/172 the Secretary-General was requested to report to the General Assembly at its thirty-third session on the implementation of the resolutions adopted by the United Nations Conference on Desertification, especially resolution 2 on financial and technical assistance to the least developed countries and resolution 4 on the effect of weapons of mass destruction on ecosystems.

The report of the Secretary-General includes as annexes reports on the above-mentioned resolutions:

Financial and Technical Assistance to the Least Developed among the Developing Countries

Of the group of 31 countries presently identified by the General Assembly as the least developed among the developing countries, fourteen are strongly affected by desertification (Afghanistan, Botswana, Cape Verde, Chad, Democratic Yemen, Ethiopia, Mali, Niger, Somalia, Sudan, Uganda, United Republic of Tanzania, Upper Volta, Yemen Arab Republic). Six are appreciably affected, (Bangladesh, Burundi, Lesotho, Malawi, Nepal, Rwanda) and a number of the remaining countries are slightly or indirectly affected.

The UN Conference on Desertification recognized that, because of their limited resources, a number of developing countries, in particular the least developed countries, face special economic and social problems in countering the threat of desertification. A similar recognition underlay the provision of General Assembly Resolution 32/169.

While much has been done to draw the world's attention to the problem of desertification in the least developed countries, progress towards implementation of the above resolutions has been slow. This may be explained, underlines the report, by the fact that the relatively brief period since the conference, and since the adoption of General Assembly Resolution 32/169, has afforded affected countries little time to prepare and submit relevant project proposals. The report, however, gives a general picture of the existing situation as far as the organization and other bodies of the United Nations system are concerned.

Effect of Weapons of Mass Destruction of Ecosystems

The UN Conference on Desertification Resolution 4 expressed deep concern over the harmful effects of the use of

weapons of mass destruction, including chemical and biological weapons, on ecosystems. It particularly condemned the use of any techniques that cause the destruction of the environment and which destroy or diminish the potential of ecosystems and lead to desertification. With these considerations in mind, the Conference, in paragraph 5 of resolution 4, appealed:

"... to all States members of the organizations of the United Nations system to refrain from using or supplying to those who support this policy of destruction, arms or chemical products for military use that have a widespread, long-lasting or severe effect on the environment".

The Secretary-General has received no evidence of the use or supply of such arms or chemical products since the adoption of the resolution in September 1977. Since uncertainties exist, however, as to the nature of the arms or

chemical products that could have a widespread, long-lasting or severe effect on the environment, and in view of the deep concern expressed by the Conference and by the General Assembly about the effect of weapons of mass destruction on ecosystems, the Executive Director of the United Nations Environment Programme commissioned a study of the matter, in consultation with the Centre for Disarmament. A brief summary of the approach and broad findings of the study is annexed to the Secretary-General's report to the General Assembly's thirty-third session.

As can be seen, the requisite initial actions have been taken by UNEP for organizing and strengthening financial and other arrangements for implementing the *Plan of Action to Combat Desertification*. Obviously, it is still too early to assess the results and to forecast the future. Much will depend on the response of donor governments and financial institutions and on the action taken by the General Assembly at its thirty-third session.

POLICY STATEMENT BY THE CONSULTATIVE GROUP FOR DESERTIFICATION CONTROL

ADOPTED AT ITS FIRST SESSION AT NAIROBI, 2-5 MAY 1978

I Functions of the Consultative Group

The Consultative Group convened to assist in mobilizing resources intends, in relation to activities undertaken to implement the *Plan of Action to Combat Desertification*, to identify existing resources for combating desertification, assist in mobilizing additional resources and stimulate coordination between Governments and institutions concerned. To this end, it is expected that its members will:

(a) Exchange views and review information solicited by the secretariat dealing with the activities which the members are undertaking or financing, or planning to implement of finance, in the field of desertification control;

(b) Help identify sectors, activities and programmes which are of high priority and advance the *Plan of Action*;

(c) Exchange ideas and proposals for assisting in mobilizing additional resources for the activities undertaken within the framework of implementation of the *Plan of Action*;

(d) Review project proposals presented to the Consultative Group and provide their comments and suggestions for financing and/or for further work on project preparation and design;

(e) Exchange views and highlight successful examples and experiences in combating desertification; and thus will encourage the utmost coordination among the existing and

planned activities, national, sub-regional, regional or global, with a view to avoiding any duplication of such activities and realizing the maximum utilization of available resources.

Members of the Consultative Group may express an interest in providing financial or other support to projects, or provide comments, advice or assistance on further work needed on project preparation and design, as appropriate. In this way the Consultative Group will provide a forum which will help in financing anti-desertification activities and coordinating efforts of the various bodies having anti-desertification programmes.

The problems that will concern the Consultative Group are those related to anti-desertification activities and reclamation of desertified lands. The Group will decide for itself the areas of priority for its activity within the general framework of the *Plan of Action to Combat Desertification* and may also recommend initiatives where anti-desertification progress is lacking. Its work will be worldwide in scope and problem-oriented. The Group will also assist in the coordination of activities undertaken with the resources mobilized by it.

The Consultative Group will function as a forum, not a fund. It will review the implementation of the projects and associated activities supported by its members, as well as the allocation of resources mobilized by it to priority projects.

II Scope of Work

The Consultative Group will provide Governments and international organizations with opportunities to consider their support to national and inter-regional projects that aim at halting further ecological deterioration of productive lands in areas of the world prone to desertification and reclaiming desertified lands. These projects may involve:

(a) Assessment and monitoring of desertification and evaluating its impacts on people and environment including its economic and social consequences. This may require establishment of national or regional systems for monitoring;

(b) Application of available scientific knowledge and technologies in land-use planning and resource management in arid and semi-arid lands within the framework of the *Plan of Action to Combat Desertification*. Special attention may be given to:

(i) Water resources assessment, development and conservation;

(ii) Rangeland conservation and development with special reference to the various aspects of livestock production and wildlife management and utilization;

(iii) Management of rain-fed and irrigated agricultural lands;

(iv) Conservation of natural ecosystems;

(c) Strengthening national and international capabilities in science and technology that will enable developing countries to take full advantage of scientific knowledge and socio-economic insight in the planning and management of campaigns against desertification;

(d) Promoting national and international research programmes that aim at filling gaps in scientific knowledge, and introducing technological innovations related to combating desertification;

(e) Promoting national and international programmes for training, education and information related to desertification and land-use management in areas prone to desertification.

The Consultative Group is not, therefore, expected to sponsor the creation of international operational institutions. Rather, it should consider means of providing support to existing national sub-regional and regional institutions whose objective and field of action is desertification control. It will provide a forum for review of likely projects, identifying projects that are "backable" and assisting in mobilizing resources from donor countries or bodies to provide for those projects.

Apart from assisting in mobilizing financial resources in support of approved projects, members of the Group should consider especially providing support for activities including:

(a) Basic research;

(b) Special training programmes;

(c) Information exchange;

(d) Exploration of new areas of activities;

(e) Assistance needed for the preparation and design of projects proposed by countries for desertification control.

III Organization

The Consultative Group should be organized in such a way as to enable it to fulfil its objectives and ensure its efficient functioning. To this end it will be convened by the Executive Director of UNEP, in consultation with the co-sponsors, to meet as required.

The Group will be co-sponsored by the United Nations Environment Programme, the United Nations Development Programme, the United Nations Educational, Scientific and Cultural Organization, the United Nations Fund for Population Activities, the World Food Council and the World Meteorological Organization. Other possible co-sponsors will be welcome. One of the co-sponsors will provide the chairman of the Group's meetings. Policy matters relating to the Group will normally be brought by the co-sponsors for discussion and resolution to the meeting of the Consultative Group as a whole.

In addition to the co-sponsors, donor countries and organizations (governmental, intergovernmental and private) and representative countries from among those affected by or prone to desertification are eligible to be core members of the Group.

Organizations and bodies in the United Nations system concerned, other intergovernmental bodies concerned, as

THREAT TO AGRICULTURAL LAND

All Nile irrigation schemes in the Sudan are threatened by the march of the desert. Also under threat are 2.5 million feddans of pump irrigation, 7 million feddans of mechanised crop farming, 75 per cent of the world's gum arabic production, pasture for about 10 million livestock—indeed most of the land destined to bring about an agricultural revolution in Sudan over the next 25 years.

—Andrew Lycett, Khartoum.

well as donor countries and other interested groups, will be invited to attend meetings of the Consultative Group in accordance with procedures to be proposed by the co-sponsors and approved by the Group. The Consultative Group should ensure liaison with all geographical groups, as well as complementarity and coordination of efforts.

Spokesmen for recipient countries which are not core members of the Consultative Group, but are intended to benefit from its programme, will be invited to attend meetings as appropriate and to contribute to discussions pertaining to relevant projects.

Because of the diversity of membership, it is desirable to conduct the Group's meetings and deliberations with minimum formality. The Consultative Group may, if it so chooses,

DESERTIFICATION ON THE MARCH

CROP PRODUCTION DECLINE Production of Kordofan Province, Sudan, 1960/61-1972/73

Year	GROUNDNUTS			SESAME		
	Total area cropped (feddan)	Total production (tons)	Production per feddan	Total area cropped (feddan)	Total production (tons)	Production per feddan
1960/61	184,000	73,000	0,400	112,000	38,000	0,384
1963/64	200,820	59,777	0,297	299,200	30,719	0,106
1966/67	211,200	45,657	0,216	282,000	31,500	0,083
1969/70	300,000	69,728	0,232	450,000	43,268	0,097
1972/73	810,000	73,690	0,090	778,940	14,722	0,090

—Henry Le Houéron—Paper delivered September 23, 1975 at Cambridge Conference on Desertification.

set rules of procedure for its meetings.

The administrative requirements and supportive technical services needed by the Consultative Group will be provided by the professional staff of the Desertification Unit established within the United Nations Environment Programme. One of the officers of the Unit will serve as the executive secretary to the Consultative Group and be the head of its administrative services.

IV Submission of Projects

The Consultative Group will receive project proposals through its technical secretariat (UNEP Desertification Unit). The submission procedure, including project guidelines, will be set by the Consultative Group. These projects may be:

(a) National projects, submitted by individual Governments;

(b) Sub-regional or regional projects, submitted by groups of Governments, or intergovernmental bodies, or multilateral financial agencies;

(c) Global projects, submitted by United Nations bodies or other international organizations.

Proposals for projects

Proposals for projects will be submitted to the Consultative Group with supporting studies that provide evidence of their technico-economic feasibility and operational

practicability. A detailed assessment of costs, with the necessary breakdown of budgetary items and sources of funding available, and a plan of operation showing phases of implementation will be included. Supporting studies will relate to the socio-economic constraints and benefits and socio-cultural and environmental impacts.

The Consultative Group must have access to well-informed scientific and technical advice. Due to the very broad scope of technical and socio-economic matters involved in programmes to combat desertification, reclaim desertified land and develop arid and semi-arid lands, the Consultative Group may find that one standing team of advisers (a technical advisory committee) cannot cope with all projects if the size of the team is to be manageable. Instead, *ad hoc* small panels of highly qualified advisers may be entrusted by the Consultative Group with the critical examination of proposed projects or activities or sets of related proposals. The panels may be reconvened to review progress and evaluate performance. Their initial reports will be submitted with the proposals for consideration by the Consultative Group. The organization of the technical and scientific advisory service will be developed in the light of experience.

The Consultative Group will assist in the relevant co-ordination of projects and activities undertaken with resources mobilized by it. Members of the Group may wish to suggest lines for activities, and may initiate studies for the elaboration of projects.

V Funding

In accordance with General Assembly resolution 32/172, the Consultative Group will provide a forum for assisting in mobilizing resources from donor countries and bodies. Donors may pledge their support towards the implementation of the set of projects endorsed by the Consultative Group, or may select to support chosen components (projects or parts of projects) of the programme. The donors may make their decisions in the light of consultations with other members of the Group. This is one way to ensure coordination.

The Consultative Group will:

(a) Explore and advise as regards the sources of funds to meet differences between net contributions and total requirements of the sponsored projects; and/or

(b) Seek to locate a residual donor or donors who will fill such gaps.

VI Reporting and Follow-up

The Consultative Group will receive information as prescribed in the approved operation plan of each project from the responsible body: Government, group of Governments, international agency, etc.

The secretariat of the Consultative Group will undertake to send review missions as prescribed in the approved operation plan of each project. These will include an expert or a panel of experts as appropriate. These experts will be chosen as individuals knowledgeable in the subject. Review

reports will be submitted to the Consultative Group.

The Consultative Group will ensure that relevant information and experience emanating from the projects will be internationally available.

* * *

First Meeting of the Working Group on Desertification

The first meeting of the United Nations Working Group on Desertification was convened at FAO Headquarters in Rome on 25-26 September 1978. The Group was established in response to Recommendation 27 of the *Plan of Action to Combat Desertification* adopted by the United Nations Conference on Desertification and endorsed subsequently by the General Assembly in its resolution 32/172 of 19 December 1977. The session was attended by the representatives of the following agencies and organs of the UN family: UN/IESA, UNDP, UNSO, UNEP, UNESCO, UNIDO, FAO, WMO, ILO, IFAD. The meeting has considered and agreed upon the functions and modalities of work of the Group which will be the main co-operating body for the implementation of the Plan of Action within the United Nations system. The Group will be serviced by the Desertification Unit of UNEP. The Group has also considered the preparation of the phased plan of implementation of both short and long-term objectives of the *Plan of Action* by the agencies of the United Nations system; the format of the phased plan was approved, on a trial basis.

NEWS FROM THE COUNTRIES

Information provided by Governments

People's Republic of China

Following the United Nations Conference on Desertification, the Chinese Government decided to set up an independent Institute of Desert under the Academy of Sciences of China. The research work will be focused on the following areas: the laws governing the movement of sand and wind; the development and use of water and oil resources in desert regions; the desalinization and use of water in desert regions and wind-proof measures for the protection of farm land, industries, mines and communications.

Republic of Cyprus

The Ministry of Agriculture and Natural Resources is

conducting large-scale reforestation programmes and projects designed to stop the denudation and soil erosion arising from physical factors. As a result, the desertification process is at present under control. The Ministry will serve as a national point of contact for cooperation on matters relevant to anti-desertification action, especially as regards the improvement of barren and uncultivable land, comprising 11.8 per cent of the island's territory.

Denmark

Denmark has extended emergency assistance to the countries in the Sahel Region since 1973. On a bilateral basis and through the World Food Programme, Denmark's assistance has totalled 17,5 mio. Danish Kroner. In add-

ition, multi-bilateral projects primarily aimed at anti-desertification measures have been undertaken in Mali, Zambia, Upper Volta and Niger. Discussions with Upper Volta regarding a Danish development loan mainly for the water-section are at an advanced stage. A similar loan may be given to Niger in the near future.

Finland

At the Desertification Conference the Finnish delegation took the position that the struggle to combat desertification is a global environmental problem, and that Finland has technical know-how at its disposal which it is willing to contribute to common endeavours. In accordance with that position, the Council on Environmental Protection in Finland has now initiated a research programme to determine how Finland could participate in the implementation of the *Plan of Action to Combat Desertification* in the field of afforestation.

Federal Republic of Germany

The Government of the Federal Republic of Germany has been supporting measures against desertification, especially in the Sahelian countries, aimed mainly at self-sufficiency in foodstuff. It has concentrated on bilateral projects. As a result of the United Nations Conference on Desertification it intends to widen the scope of suitable projects. It also plans to coordinate its activities in the sectors of land-use planning, agricultural and livestock production, protection and restoration of vegetation and in the field of technology. Identification of suitable bilateral projects has begun and projects have been selected for Upper Volta, Niger, Mali and Senegal.

Hungary

National action programmes related to the problems of desertification are being coordinated by The Research Institute of Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences. Hungarian scientists have produced maps of erosion, alkalization and soil degradation and have developed methodologies for controlling secondary alkalization due to irrigation. Experts are available who could provide assistance in the application of these methods.

Iran

In implementing the action plan of the UNCOD the following activities have been executed by the Forest and Range Organization of Iran:

- Range management plans have been completed for 230,000 hectares of desert rangelands. Range improvement practices, including seeding, were also implemented in 4,000 hectares of the desert areas.
- More than 2,600,000 hectares of sand dune areas have been protected by sand dune stabilization, by transplanting trees and shrubs and by seeding. The

Bureau of Soil Conservation and Watershed Management has also executed programmes in order to control soil erosion and protect the degraded land within the watersheds of the major dams of the country.

Ireland

Although no allocations have been made specifically concerning desertification, some of the countries affected by desertification were included in Ireland's aid programme in 1978, two of which are listed as priority countries: Sudan and Lesotho. As a member of the European Economic Community, Ireland also participates in the European

DESTRUCTION OF PROTECTIVE FORESTS

Only a few years ago acacia scrub could be picked within 10 km of Khartoum. Now its inhabitants must travel 100 km outside the city to cut wood for fuel and charcoal.

—Andrew Lycett, Khartoum.

Development Fund, which carries out programmes of development assistance to the African, Caribbean and Pacific countries which suffer from desertification.

In November 1977, Ireland contributed £10,500 for the relief of drought in Gambia.

Norway

Norway achieves the implementation of the UNCOD *Plan of Action* in two ways: through its policy of multi-bilateral cooperation with United Nations specialized agencies and regional development banks, and through its policy of "partner countries".

"Partner countries" are selected from among the least developed countries and present their own national development plans and objectives. Kenya and Norway have agreed, for example, on Norwegian financing and technical assistance for an irrigation project in the Turkana region. In the realm of Norwegian financed multi-bilateral projects, on-going assistance programmes have been undertaken in Botswana, Chad, Gambia, Mali, Niger, Somalia, Sudan, Upper Volta and South Yemen.

Qatar

Activities for anti-desertification action programmes in Qatar have been commissioned to the Water and Soil Development Committee pending its integration with the proposed National Commission in Environment Protection. The Government of the State of Qatar gives financial contributions to many developing countries to help implement anti-desertification programmes. A few examples are the commitment of \$3,000,000 to the FAO Regional

Water and Land use project; and soft-term loans of \$3,000,000 to Cameroun and \$4,000,000 to Mali to finance building of the Song Loulou and the Sellingue Dams.

Senegal

The Government of Senegal has taken concrete steps towards establishing a structure on the national level for implementing the UNCOD *Plan of Action*. A Secretariat of State for Water and Forestry has been established. Its main aims are to combat desertification and to undertake reafforestation programmes. Ministries have also been established to deal with hydrological problems and research on agriculture and production in Senegal.

Senegal also takes an active part in the Organization for the Development of the Senegal River. (OMVS) This is a high-priority programme for member states of the organization: Mali, Mauritania and Senegal. It focuses on obtaining water control and monitoring the advance of the deserts. Efforts were also undertaken for the development of the Gambia River. A High Commission for the Development of the Gambia River Basin was set up in June, 1978 and a development programme is underway.

Somalia

The government of the Somali Democratic Republic has established the National Range Agency whose main responsibility is to devise and implement effective programmes in the control of desertification and improvement of rangeland. This agency has already taken steps in the delineation of grazing land, improvement of rangeland, afforestation of drought affected areas, sand dune fixation and the reduction of the number of animals, to maintain the proper balance between the animals and the available grazing land.

Sweden

Sweden considers the struggle against desert encroachment to be part of the general perspective of land-use. Thus, the Swedish contributions in this connection have been general programmes of soil-conservation, as exemplified by projects in Kenya, Lesotho, Tanzania, Ethiopia and India.

Sweden has allocated more than 50,000,000 Sw. Kr. to programmes in line with the recommendations of the

Desertification Conference. Of that amount, 16,000,000 Sw. Kr. have gone in aid of the least developed countries group.

The United States

The actions, programmes and plans of the United States to implement the UNCOD *Plan of Action* have taken the form of financial and technical assistance to the least developed among the developing countries. The specific details of this assistance have been reported in the June, 1978 edition of the Desert Control Bulletin.

USSR

The Soviet Union has organized courses for the training of the representatives of developing countries on different aspects of desertification control. More specifically; two month courses are being given on the theory and practice of sand dune stabilization and in the area of the amelioration of salt affected irrigated soils and improvement of pastures. In addition, a seminar on "The Ecology and Productivity of Pastures" will be convened during this year. The USSR is considering the organization of such activities on a long range basis within the framework of the *Plan of Action to Combat Desertification*.

Moreover, in cooperation with UNEP, the USSR is undertaking a project on the agro-industrial use of arid lands as a strategy to combat desertification. The financing for this project would come from the voluntary USSR contribution to the Fund of UNEP. These funds could also finance the sending of Soviet specialists for consultation on problems of combating desertification in the Sudano-Saharan region. The USSR is ready to send such specialists on the request of interested developing countries.

Cooperative Efforts

Since the publication of the last bulletin, the second joint Mexico/U.S.A. meeting of governmental officials and experts was organized in December, 1978. UNEP participated in this meeting, whose aim was to develop a cooperative programme of combating desertification in the border areas between the two countries, setting up an example of a transnational, sub-regional approach to the problem, as called for in the *Plan of Action to Combat Desertification*.

ABBREVIATIONS

AGRIS	International Information System for Agricultural Science and Technology
ALECSO	Arab League Educational, Cultural and Scientific Organization
CARIS	Current Agricultural Research Information System, FAO
CGIAR	Consultative Group on International Agricultural Research
CILSS	Permanent Interstate Committee on Drought Control in the Sahel
CIMMYT	International Maize and Wheat Improvement Centre
DECARP	Desertification Control and Rehabilitation Programme, Sudan
ECB	Environment Co-ordination Board
EMASAR	Ecological Management of Arid and Semi-Arid Rangelands, FAO
FAO	Food and Agriculture Organization of the United Nations
IAEA	International Atomic Energy Agency
ICARDA	International Centre for Agricultural Research on Dry Areas
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
ICSU	International Council of Scientific Unions
IDRC	International Development Research Centre
IFIAS	International Federation of Institutes for Advanced Studies
IHD	International Hydrological Decade, UNESCO
IHP	International Hydrological Programme, UNESCO
ILCA	International Livestock Centre for Africa
ILO	International Labour Organisation
IRS	Information Referral System
IPAL	Integrated Project on Arid Lands, UNEP/UNESCO
IUCN	International Union for Conservation of Nature and Natural Resources
IUFRO	International Union of Forestry Research Organizations
MAB	Man and the Biosphere Programme, UNESCO
NGO	Non-governmental Organization
OECD	Organization for Economic Co-operation and Development
SOLAR	Transnational Project on Management of Livestock and Rangelands to Combat Desertification in the Sudano-Sahelian Region
UN	United Nations
UNCOD	United Nations Conference on Desertification
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Office
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
UNRISD	United Nations Research Institute for Social Development
UNSO	United Nations Sahelian Office
UNU	United Nations University
WFP	World Food Programme
WHO	World Health Organization
WMO	World Meteorological Organization