

UNITED NATIONS CONFERENCE ON DESERTIFICATION  
IN RETROSPECT

Margaret R. Biswas

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## ABSTRACT

The United Nations Conference on Desertification was the first time the nations of the world turned their concerted attention to a comprehensive plan to halt and reverse desertification. The global annual loss to desertification is in the order of 60,000 km.<sup>2</sup> It is man's action that degrades the land by misuse as he seeks to wrest a living from fragile ecosystems. A change to a more arid climate could be a cause, but no firm evidence is available that the climate is so changing. Conference deliberations concluded that the causes and the technical solutions to combatting desertification are known. The key to combative measures is to be found in proper land use. If desertification is to be brought to a halt by the end of the century, considerable financial resources will, however, be necessary.

The paper includes a comprehensive summary of the unpublished statements of the various national governments regarding their problems, an analysis of the Conference, and a brief discussion of action taken since the Conference.



## CONFERENCE BACKGROUND

The drought in the Sahel from 1968-1973 focused government and public attention on the problem of desertification in general. In response, the United Nations' General Assembly resolved to initiate concerted international action to combat the spread of desert conditions and called for a world conference to give impetus to international action. The United Nations Conference on Desertification (UNCOD) was convened in Nairobi, Kenya, from 29 August to 9 September 1977 and attended by representatives of 95 governments, almost all the United Nations organs and specialized agencies, liberation movements, and 65 non-governmental organizations.

Mostafa Tolba, the Executive Director of the United Nations Environment Programme, served as the Secretary-General of the Conference. Julius Kiano, Minister of Water Resources Development of Kenya, was elected President, and M.S. Swaminathan, Director-General of the Indian Council of Agricultural Research, was Chairman of the Committee which considered the Plan of Action that emanated from the Conference. The preparations for the Conference were carried out by a small but highly competent Secretariat, in particular the 21 assistants to the Secretary-General. An ad hoc interagency task force and a panel of 23 scientific consultants from 13 countries provided advice to the Secretariat. The purpose of the Conference was to generate action and found its focus in a Plan of Action to Combat Desertification.

Desertification is the diminution or destruction of the biological potential of the land and can lead ultimately to desert-like conditions: grazing lands cease to produce pasture, dryland agriculture fails, irrigated fields are abandoned due to salinization, waterlogging and other forms of soil deterioration. Desertification is a self-accelerating process, feeding on itself, and as it advances, rehabilitation costs rise exponentially.

The Conference did not deal with the natural occurrence of deserts, but concerned itself with human activities that degrade land that would otherwise be productive. Of the identified causes of desertification, most can be traced to human mismanagement of soil, water, energy, flora and fauna - - the five basic factors of a land use system. Excessive pressures of land use such as overgrazing, farming marginal lands, and improper irrigation, cause

damage beyond the resilience of the ecosystem. When drought appears, the degraded condition is accelerated and dramatized. Man's activities have desertified an area about the size of China. (Centre for Economic and Social Information, 1977).

Desertification hazards, including deserts, though directly affecting only one third of the land surface and one sixth of the world's population, have their indirect influence on the whole world through:

- 1) reduction of food producing capacities of the world and causing imbalances in world food market and reserves;
- 2) causing unplanned mass immigration with socio-economic and socio-political repercussions on adjoining countries;
- 3) causing dust storms that bring to the global air-masses circulation added loads of particulate matter whose impact on global climate has not yet been assessed;
- 4) loss of genetic resources of plants and animals.

## CONFERENCE ISSUES

In his message to the Conference, the UN Secretary-General Kurt Waldheim stated that the problem of desertification can only be met by the concerted effort of the international community. More than one-third of the world's land surface is desert or semi-desert, and contains about 15% of the world's population. One estimate shows that man-made deserts around the world extend over an area larger than that of Brazil. Yet man continues to despoil additional land. Sometimes it is the unplanned impact of science and technology that is at fault, but more often it is because man has no alternative but to scratch out an existence in marginal areas, and permit over-grazing so that his cattle may live longer. Deserts are creeping into most regions of the world, with about 680 million people affected. One study prepared for the Conference places 78 million of these people on lands already almost useless. As many as 50 million people dependent on agriculture will not escape the loss of their livelihoods. Continued loss of productive land could only impede the effort to promote social and economic progress. (See Tables I and II.)

The solution to this situation lay in the development and application of proper land use practices and management of water resources. This involved both a technological and a human aspect. One consists of measures designed to sustain land productivity or to rehabilitate degraded lands. The other is concerned with the commitment of the people who live in vulnerable lands and who will determine the success or failure of efforts to combat desertification. The present Conference together with previous ones dealing with Food (Biswas & Biswas, 1975); Population (Biswas & Biswas, 1974); Water (Biswas, 1977); and Human Settlements (Biswas, 1978); form a series of meetings concerned with global problems whose solution by the cooperative effort of the world community forms the road to prosperity.

Mostafa Tolba, the Secretary-General of the Conference, outlined the principle points of the problem as identified by hundreds of scientific experts, advising the Secretariat. First, the problem of desertification is a serious threat to the welfare of mankind. Degradation of land has accelerated in recent decades, precisely at a time when population growth and rising expectations began to demand enormous increases in food production. It is estimated that between 50,000 and 70,000 square kilometers of useful land

TABLE I

ESTIMATES OF DRYLANDS POPULATION  
BY REGION AND LIVELIHOOD GROUP  
(in thousands; Meigs classification (1953) including extremely arid, arid,  
and semi-arid area.) (Secretariat of the United Nations Conference on  
Desertification, 1977).

<u>Region</u>	<u>Drylands Total Population</u>	<u>Urban Based</u>	<u>Livelihood Populations in Drylands</u>	
			<u>Cropping Based</u>	<u>Animal Based</u>
<u>Mediterranean Basin</u>	106,800	42,000 39%	60,000 57%	4,200 4%
<u>Sub-Sahara Africa</u>	75,500	11,700 15%	46,800 62%	17,000 23%
<u>Asia and the Pacific</u>	378,000	106,800 28%	260,400 69%	10,300 3%
<u>Americas</u>	68,100	33,700 50%	29,300 43%	5,100 7%
	628,400	194,200 31%	397,100 63%	37,100 6%

TABLE II

ESTIMATES OF POPULATIONS AND LIVELIHOODS RESIDENT  
IN AREAS RECENTLY UNDERGOING SEVERE DESERTIFICATION  
(in thousands) (Secretariat of the United Nations Conference on Desertification,  
1977)

<u>Region</u>	<u>Total Population</u>	<u>Urban Based</u>	<u>Cropping Based</u>	<u>Animal Based</u>	<u>Area (km<sup>2</sup>)</u>
<u>Mediterr- nean Basin</u>	9,820	2,995 31%	5,900 60%	925 9%	1,320,000
<u>Sub-Saharan Africa</u>	16,165	3,072 19%	6,014 37%	7,079 44%	6,850,000
<u>Asia and the Pacific</u>	28,482	7,740 27%	14,311 54%	6,431 19%	4,361,000
<u>Americas</u>	24,079	7,683 32%	13,417 56%	2,979 12%	17,545,000
	78,546	21,490 27%	39,642 51%	17,414 22%	30,076,000



are going out of production every year, largely due to desertification.

Second, the problem is urgent. As land suffers degradation, the costs of reclaiming it, modest at first, rise steeply until a threshold is passed beyond which reclamation becomes economically impractical.

Third, the causes of desertification are known, and in particular, the reasons for its recent acceleration. A change to a more arid climate could be a cause, but no firm evidence is available that climate is so changing. Rather it is man himself who must be viewed as the agent of desertification. It is man's action that degrades the land by misuse or overuse as he seeks to wrest a living from fragile ecosystems under unpredictable and often harsh climatic conditions, and under a variety of social and economic pressures. Too frequently man acts in this way because no better alternatives are apparent to him.

Fourth, man has now in his possession both the wealth of knowledge and adequate technical means to bring desertification to a halt. The key to combative measures is to be found in proper land use.

Finally, desertification must be seen as a human problem, rather than one concerned solely with the deterioration of ecosystems. If man is its agent, he is also its victim. The degradation of land is invariably accompanied by the degradation of human well-being and social prospects. All efforts to combat desertification must therefore centre on the welfare of man.

The views of the scientific advisors, based on the case studies carried out as part of the Conference preparations, provide grounds for optimism - desertification can be halted. It was interesting to note that there were few developmental activities in which countries, even the poorest, are already as well equipped as they are for the struggle against desertification. Countries can describe their scientific and technological needs and deficiencies in precise detail. The Plan of Action places a strong emphasis on popular participation. In the educational and community efforts through which popular participation is stimulated, technological capacities are extended to the grass roots.

Desertification can be halted by 2000 and the Plan of Action was formulated with this goal in mind. Action against desertification cannot, however, yield results unless governments perceive it as an integral part of their established plans for social and economic development and as part of their collective effort to meet the requirements of the New International Economic Order. A powerful current of contemporary thought views a firm and self-reliant agricultural base as an essential prerequisite to national development. From this perspective productive lands and waters are the key national resources. Dr. Tolba concluded that enough is known to combat desertification right now. Governments have already begun to act and are ready to work together to overcome a problem that affects at least two-thirds of the countries of the world.

The specific objectives of the Conference, as stated by J. Kiano, President of the Conference, are to arrest and even reverse the process of desertification with the aim of achieving zero desert growth within the next 10 to 15 years. Another target is to create, promote and sustain productivity in arid and semi-arid regions to increase food production along with incomes. Provisions for relief to drought-prone areas should also be made.

Daniel Arap Moi, Vice President of Kenya and Minister of Home Affairs observed that desertification processes represent, in total impact, the greatest single hazard to endurance of the biosphere as a tolerable matrix for all forms of life. It may be said human activities causing such degradation of the environment reflect the past lack of environmental education. Extensive areas have been stripped of vegetation, and it is imperative to initiate programmes of revegetation and devise alternative sources of energy. Although land use and management are of major concern, of foremost importance is the development and management of water resources.

According to Yania Abdel Mageed, the Secretary-General of the United Nations Water Conference, the key factor for reversing the process of desertification is water. He pointed out that all the recommendations emanating from the Water Conference were relevant to this Conference as all the problems of water development and management are more acute in arid and semi-arid areas, usually subject to desertification because of the relative scarcity of water and lower level of resource development and greater weakness of infrastructure.

Africa has the largest expanse of dry land, namely 18 million km<sup>2</sup>, and the corresponding areas in Asia and Australia being 16 and 6 million km<sup>2</sup>.

The problem of the Sahel, he observed, is not so much the lack of resources as it is one of the lack of development of available resources. Major rivers like the Senegal, the Niger, the Logone, and the Chari have a combined mean annual runoff of about 140 billion cubic meters of water, almost twice as much as the Nile at Aswan. Possible withdrawals of groundwater sources are estimated at an additional 15 billion cubic meters of water, of which only a very small part is at present utilized in a number of open shallow wells. The problem is a question of working for an all round social and economic development, in which water development has a major role. Food self-sufficiency of the Sahelian countries can be attained only with irrigated agriculture of crops like sorghums, sugar cane, wheat and garden crops. There is a need for large quantities of water for the construction of roads in the Sahelian countries sometimes as large as 800 cubic meters of water per kilometer of road. Mineral development also requires large quantities of water.

Problems in arid countries should not be viewed in isolation from surrounding countries. It is conceivable that a prolonged drought in African countries can upset trade patterns among adjoining countries in Africa in the humid zone or even in Europe.

L. Maynard, of the United Nations Sahelian Office (UNSO), explained that UNSO was established in 1974 to assist the drought-stricken countries and their regional organization, the Permanent Interstate Committee for Drought Control in the Sahel (CILSS). UNSO has been successful in mobilizing \$250 million out of \$442 million for planned projects. Further, UNSO participates in the activities of the Club du Sahel, which serves to sensitize the world community to the continuing requirements for development in the Sahelian countries.

H. Soares of the Permanent Committee for Drought Control in the Sahel, said CILSS was created in 1973 and was comprised of 8 member states: Cape Verde, Chad, the Gambia, Mali, Mauritania, Niger, Senegal, and Upper Volta.

Its activities include the mobilization of resources for development and setting up working groups and strategies to deal with drought-related problems. A total of 86 projects integrating afforestation, development of pastures and combating of soil erosion, are envisaged at a cost of \$173 million. These activities are supported by the Club du Sahel composed of members of CILSS and donors. At a recent meeting in Ottawa, the Club adopted a strategy ensuring food self-sufficiency in the CILSS countries. CILSS has created the Sahel Institute to coordinate research and training in member countries.

#### OFFICIAL STATEMENTS MADE BY NATIONAL GOVERNMENTS

##### AFRICA

Senegal regards CILSS as the best organization to execute anti-desertification projects south of the Western Sahara. In the Sahel where 25 million people are daily confronted with drought and little rainfall, there are no alternatives. River basins must be managed immediately. Senegal needs water as well as a greenbelt to halt the approaching desert which will soon engulf the city of Dakar.

Three-quarters of Mauritania is desert and much of this now comprises shifting sand dunes due to the disappearance of vegetative cover. With increasing soil degradation and lack of rainfall, the plight of 80 percent of the people engaged in agricultural and pastoral activities has worsened. Nomadic populations have been compelled to leave the countryside for towns in the south, creating socio-economic problems. The government is establishing wind-breaks to protect grazing lands from fire, drilling wells, and fixing sand dunes by reforestation.

Like Mauritania, Gambia is still suffering from severe drought. While man is in the possession of knowledge and technical means to halt desertification, those who face the brunt of this phenomenon are the ones who have little or no access to it.

In Upper Volta, there has been an anti-desertification programme since 1963. Nearly 300,000 hectares have been restored and equal importance has been given to education of the peasants. A remote sensing centre will soon become operational at Ouagadougou.

According to Chad, the principal causes of desertification in the Sahel include nomadic pastoralism, excessive deforestation, irrational exploitation

of agricultural resources and bush fires. Because of the drop in rainfall during 1972 to 1973, the harvest reached only 70 percent of the average production. The average ration of cereal per head of population was consequently reduced from 150 kg. per person to 63 kg. The result has been migration from north to south and to cities. The annual growth rate of urban populations has increased to 12 percent from 7.2 percent in 1972, accentuating desertification around the cities. Nomadic agriculture must give way to sedentary agriculture.

To rehabilitate areas affected by the drought, Mali's strategies include increasing the production of cereals, attaining self-sufficiency, progressively replacing millet and sorghum with rice, and reconstituting the herds to their 1970-1971 level. Measures have also been taken to restore depleted flora and fauna.

Niger's recovery policy from the six years of drought includes a long-term programme to improve yields of cash crops, introduce selective seeds, fertilizers, and agricultural equipment, and extend irrigation. Only 5000 ha. out of a potential of 150,000 ha. are irrigated. As part of the programme for grazing lands, cattle farmers will be trained and research will be undertaken on the composition of stock. Human health schemes will also be incorporated. A second phase will concentrate on marketing. A positive aspect of the drought was that meat-deprived people of Niger began to appreciate fish, which led to the development of the fisheries industry.

In Nigeria, there is a growing realization of the need for a multi-disciplinary approach to desertification problems. As a result of the Sahelian drought of 1971-1973, Nigeria has given priority to shelterbelts and other afforestation projects. A shelterbelt across the whole northern border of Nigeria should be completed in less than 10 years. In Nigeria, 90 percent of the population are farmers or nomadic herdsman, indicating the land-use pressure brought to bear by population densities. Traditional farming methods and grazing of a high-density population render soil vulnerable to wind and

water erosion. In addition, total annual potential evaporation exceeds total annual precipitation. 15.6 million people inhabit the 12 percent of the country which is semi-arid.

The Organization of African Unity stated that assistance from industrialized countries during the Sahelian drought was not commensurate with their resources. Man was the fundamental cause of the desertification process but he acts as he does because he is compelled to do so. Colonial powers systematically drove indigenous populations to less fertile lands, resulting in over-utilization of the land. This, and the use of napalm, defoliants and the like, which have made deserts of once-fertile areas in Vietnam, Algeria, Mozambique, and Angola, must be stopped.

In Ethiopia, wars are a contributing factor to desertification. Ethiopia called for a consideration of the political, social and economic implications inherent in an aggravated desertification condition. Scarcity of essential commodities or resources triggers intense competition, and when the scarce commodity is land and/or water, the resulting competition can be brutal. It is possible that some of the conflicts in desertified areas can be traced to just such competitions. Ethiopia supports the setting up of an international technical assistance scheme particularly for the provision of expertise and coordination of scholarships and workshops for the purpose of enabling national governments in areas prone to desertification to plan, execute and/or evaluate programmes.

Kenya pointed out that desertification due to natural causes by its nature is normally a slow process and allows time for adjustment. But in the case of man-made causes, the process is fast, the consequences more serious and sometimes adjustments are not possible. At least two thirds of Kenya is classified as arid or semi-arid and approximately 70 percent of the country is used as rangeland. Even more damaging than pastoral activities is the destruction of vegetation by man in the cause of economic activities. In Kenya, vegetation is being

destroyed through the clearing of vast areas of agriculture, by fires, by wrong range management practices, but, above all, through indiscriminate burning of trees and shrubs for charcoal. United Nations agencies should accelerate their programmes for providing alternative sources of energy to firewood and charcoal.

Ninety-three percent of Tanzania is rough grazing and forested land. As in other countries, modern science has enabled population, both human and bovine to increase rapidly. As a result, previously satisfactory systems of indigenous agriculture and animal husbandry have broken down. The traditional transhumanic bush fallow farming, which ensured a sustained yield, has had to give way to static agriculture for which sustained yield farming systems have not yet been evolved. Similarly, systems of transhumanic pastoralism and seasonal grazing reserves have been broken down by cattle populations which have increased due to veterinary science and technology which provides new sources of water. An increase in population in the more fertile highlands will force many people to resettle in the semi-arid areas around their homelands increasing population there. Also, migrants cling to their previous farming systems and food habits, however unsuitable.

All traditional farming practices usually involve complete removal and burning of vegetation. Soil improvement is thus difficult (through loss of organic matter, mineral salts, etc.) In addition, on steep slopes, torrential rains cause soil erosion. Because of this situation farmers are often forced to abandon their shambas (farms), after two or three years, and shifting cultivation is a resultant. Sometimes, farmers' fires start bush fires. The meager forest reserves are also exploited as fuel. In Dodoma district between 250 and 300 man days per year may be lost by a household in collecting firewood and poles - the situation is worsening as forests dwindle away from the villages. All this contributes to desertification.

Tanzania maintained that industrialized countries, in their excessive demands upon the natural resources of the whole world, are bound, if not morally, then by sheer necessity to continue to benefit from developing countries, to put back some of the

resources, in order to restore the ability of the developing countries to support their peoples, directly and indirectly through external trade. The most important contribution industrialized countries can offer Tanzania, is not so much services of their personnel, but the tools which enable developing nations to do the job themselves to the extent of their often underrated ability. They need equipment and foreign exchange to maintain it, and facilities for research to be undertaken by themselves, but also with the support of truly more expert people. This is in keeping with the policy of self-reliance aimed at freeing themselves from dependence on those countries which continue to exploit them through the present economic order.

More than half of the territory of Somalia is arid or semi-arid. In time, the livestock and human numbers have exceeded the carrying capacity of range lands and devegetation has set in. Measures to relieve the process include: famine forage reserves, fodder production enclosures, drought relief, soil and water conservation, and revegetation. Measures to remove the causes of the process include: grazing control through seasonal and rotational reserves and co-operation ranches; nomad resettlement; and research. National efforts with international support enabled saving 268,000 lives during the 1974-75 drought.

Agriculture is the way of life of most Sudanese. It represents 40 percent of the gross national product and 98 percent of exports are agricultural products. In many areas, desertification threatens because the soil has been overcultivated and irrationally used. Desertification has affected 90,000 km<sup>2</sup>; it affects 5,000 to 6,000 km<sup>2</sup> per year. Traditional life has changed for the worse in all affected areas, resulting in family dispersion and other social problems. Projects to halt desertification include dune fixation, greenbelts around villages, measures against soil erosion, protection of water holes, and the rational utilization of rangelands. The problems are of such dimension, that the Sudan cannot face them alone.

In Egypt, where 95 percent of the people live on 3.5 percent of the land, reclamation of the desert land is the starting point of reform to modify population growth and achieve development in other sectors. Irrigated land



in reclaimed parts of the desert, however, faces problems of salinity, alkalinity, rising of the water table, and industrial and chemical pollution such as fertilizers and pesticides. In addition, cultivated land is being lost to housing and industrial construction, and the removal of its surface layer for brick manufacture. A phenomenon that must be halted is the deposition of up to 70 tons per square mile a month of drifting sand on the lands of the Nile Valley.

Egypt is studying an integrated project for generating electricity by means of providing the Kattara Depression in the Western Desert with sea water from the Mediterranean at Al-Alamein. The electricity will be used to desalinize sea water, and this water will provide for the establishment of agricultural and industrial centres, as well as mining and tourism. The transfer of Nile water to reclaim and irrigate vast expanses in the Sinai is also planned.

Egypt has established in co-operation with the United States an advanced remote sensing centre which serves both the African and Arab World. Setting up irrigation farms in which experimentation and training are integrated is suggested.

O. El-Kholy of the Arab League Educational, Cultural, and Scientific Organization (ALECSO) told the Conference that deserts cover more than 90 percent of the area of Arab countries. The desert has shaped Arab material and spiritual life, sociological patterns and habits, cultural heritage, and even language and literature. The impact of desertification on development programmes has been ruthless and millions of dollars are being spent in almost every Arab state to contain the process. The heritage of desert communities, and their experience, accumulated over centuries, in maintaining ecological balance should be studied.

Algeria maintained that it was only right that industrialized countries assume their responsibilities for the implementation of the plan of action because colonialists had forced the poor into areas where they had to over-exploit to exist.

In Tunisia, legislation measures have been enacted to protect waterways and encourage peasants through financial aid to plant trees. Tunisia stresses an integrated approach to the problem, providing housing and health services to improve living standards. To combat erosion, its most serious problem, Morocco has projects for soil improvement, land reclamation, and creating greenbelts. Libya is prepared to participate in such programmes as the setting up of model farms.

#### Middle East

Saudi Arabia pointed out that deserts are a way of life in a land where 97 percent of the country is arid or semi-arid. Rearing animals is virtually the only occupation, and grazing lands are allotted according to the needs of each tribe. Climatic conditions have had a great effect on grazing lands. Climate, human activities, human settlements and industry have all contributed to the desertification.

In Syria, overexploitation of forests and water, the absence of a water policy, misuse of land, overpumping of water, overgrazing, the extension of cereal cultivation into the steppe area and irrigation have played a role in the desertification process. Projects to prevent desert encroachment include range improvement and Bedouin rehabilitation in cooperatives; prohibition of cultivation in steppes, soil conservation, afforestation and applied research.

In Iraq, where salinization is a major problem, the training of technical and administrative staff has been given high priority in anti-desertification programmes.

Turkey explained that the population increase in its Central Anatolia region has led to a constantly increasing pressure on the vegetative cover, due to use as firewood, overgrazing and excessive expansion of cultivated land. The prevailing landscape is not desert, but wind erosion has created some wind-blown areas appearing as a sandy desert. In 1962, wind erosion measures were begun over a 10 year period. The results prove desertification can be reversed and include: the stopping of shifting sand dunes; the saving of agricultural areas, highway and inhabited areas; the building up of natural flora species from about a dozen to 180; the training of villagers

in soil conservation techniques; and the introduction of new crops such as sugar beets, cotton, cherries and vegetables.

The experience of Israel is that two most essential aspects for the success of the reclamation of the Negev Desert were: measures taken to provide suitable motivation to those participating in the programmes, and continuing applied research coupled with the needs of communities through an efficient extension system. Israel stressed the need for applied research with regard to desertification. Economically feasible technology is still in many cases unsatisfactory. For example, that planting more trees is the only answer we can offer to the energy problem of people in areas undergoing desertification hardly demonstrates technological success. Desert trees and bushes even of the same species are notoriously heterogeneous and we still have no means for economically propagating pure lines of improved genetic material. All UN agencies should allocate for research from 1 to 3 percent of the budget of each project.

In Iran, with the exception of the Caspian littoral and parts of the west, the entire country is climatically vulnerable to desertification. In recent decades, adverse effects of agricultural and pastoral technologies have been increased by unprecedented population growth and rises in economic demand. Where people have over-exploited, they have been responding to economic pressures, which in most cases originate in processes outside the affected arid lands - in cities and areas of denser population and investment potential. The recent rapid growth of urban centres with their concentration of services has widened the gap between city dwellers and inhabitants living on the margins of the desert.

To combat desertification, it is necessary to modify land use patterns without prejudicing the viability of the small scattered populations that perform the production processes, and without whom these marginalized resources would be lost to the economy. The stabilization and afforestation of sand dunes is perhaps one of Iran's greatest achievements. The use of petroleum mulch technology for the stabilization of sand dunes has well passed the experimental stage. Since 1969, 58,000 hectares of sand dunes have been sprayed by petroleum mulch and afforested. Approximately 300,000 hectares of cultivable lands have been protected in a continuing program.

### Asia excluding the Middle East

In the non-irrigated areas of Pakistan, which is mostly arid, desertification is taking place due to wind and water erosion. Over-grazing and shifting cultivation have damaged the ecosystems. Inappropriate cropping patterns leave the land without vegetative cover during summer rains, with the result that millions of tons of fertile topsoil is washed away. The problem is further aggravated by the fragmentation of holdings, due to increasing populations. Out of 16 million hectares in the irrigated plains of the Indus River, 6 million hectares are seriously waterlogged and 5 million hectares are saline. Massive sub-soil drainage and reclamation undertaken since 1958 have failed to provide solutions. Research is being conducted to develop solutions appropriate to local conditions.

India pointed out that its problem was unique; that the Indian desert is the most densely populated in the world with 61 persons per km<sup>2</sup>, as against 3 persons per km<sup>2</sup> in most deserts. Since the population is expected to exceed 900 million by 2000, depreciation of the soil must be prevented. To achieve the goals of the conference, four areas need added stress. First, research needs to be stepped up on medium-term weather forecasting and on weather modification. Second, the problems of women and children in the desert, who often walk miles for water and firewood, need greater attention. Since the children by the very nature of the nomadic life are left out of the traditional school system, schools must move out to them. Mobile training teams should facilitate the education of women. There is also an urgent need to develop simple devices from local materials to reduce the drudgery of rural women. Third, there is need for more intensive research on shrubs and trees for arid areas, which can fulfill the triple needs of fuel, fodder and fertilizer, such as leguminous plants. And fourth, there is need for more research on the kinds of agriculture industries and rural industries that can be promoted in arid areas.

In Bangladesh, 1.5 million out of 6.6 million acres have been affected by desertification. However, it is not possible to arrest the process without regional cooperation as 80 percent of the river flows are generated outside the country. If there is upstream withdrawal during the dry season, the

soil becomes drier. It is the belief of Bangladesh that states can cooperate for harmonious exploitation of shared water resources and prevent desertification.

China emphasized that from many Third World countries the desertification problem is inseparable from prolonged aggression and plunder by imperialism, colonialism, and hegemonism. These conditions have to varying degrees continued after their political independence, and have kept these countries from using their resources to achieve the development necessary to solve the desertification problems. The basic prerequisite in the Third World countries' fight against desertification was the establishment of a new international economic order.

China believes that in launching campaigns against desertification, the policy of relying on and mobilizing the masses must be adhered to. In order to find an early solution to desertification, a certain amount of foreign economic and technical assistance can be sought. But such aid must respect the sovereignty of the recipient country, attach no conditions, seek no privilege nor exact huge profits. It is, moreover, useful to exchange experience, especially between the Third World countries.

The Philippines stated that an important aspect of the fight against desertification is the application of new methodologies and technology. Research programmes and feasibility studies should be further developed, and more pilot projects and demonstration centres with a strong education impact established. Also, existing technology has not been fully harnessed in dry land areas.

Japan offered to share with other nations its unique new technological innovations in sea water desalinization, and a new system of revegetation and afforestation. A pilot project is being implemented in the Middle East based on this new greening system, which uses the Asphalt Moisture Barrier Layer Machine to conserve the precious water resource available, and to prevent salinization of the soil.

### South America

Colombia observed that the case studies give reasons for optimism regarding the ability of science to arrest and reverse desertification. It is established that in Latin America, half of the arable lands have been lost to soil erosion. In Colombia where soil erosion in tropical mountain regions is a major threat, there is a daily loss of some 300 hectares of arable land as a result of erosion, and 2,100,000 hectares have been irreversibly lost. Immediate action to combat desertification must be directed towards a rational use of land. Land use policy must be a fundamental component of national development plans.

Venezuela felt the basis of the problem is the absence of strategies for the rational use of resources. Moreover, people, particularly in rural areas do not have a sufficient understanding of the problem. In Chile, arid ecosystem covers almost 50 percent of the country where 60 percent of the population lives. In Argentina, nearly 4 million persons live in the considerable arid and semi-arid regions. Deterioration in some parts has been so great that it will be too costly to reclaim them. Of the 2 million km.<sup>2</sup> which comprise Mexico, 55 percent is arid and semi-arid. Despite many efforts, the depletion of forests and overgrazing continues. In Ecuador, the phenomenon threatens the survival of one and one half million people and has led to the migration of the rural population to urban areas affecting national development plans. Although Brazil does not have deserts, the desert processes could spread in the semi-arid region of north-eastern Brazil. Preventative measures are being taken. One fourth of Peru's territory consists of arid or semi-arid areas. Peru said human considerations such as the cultural relationships and the increasing poverty of the Third World must be taken into account, if the desertification problem is to be solved.

### North America

In attempting to cope with desertification, the United States said it has learned five lessons: deterioration of its land and water persisted and increased until they were brought under effective regulation; the new laws and programmes must be developed with direct participation of the affected people; a definite philosophy of resource management must be followed; the management concept and implementation of programmes must be supported by strong institution of planning, assessment, research, and education and training, and finally; desertification required continued vigilance and action by governments.

There is hope in new methods and technologies such as satellites and new principles of resource planning and management. These include: greater use of saline water for food production; safe use of sewage for irrigation and soil amendment; desalinization of brackish groundwater; drought-tolerant crop varieties; and economic utilization of heretofore neglected desert vegetation. Technical advisory services, training and research in the areas of natural resources management and environmental planning will become part of United States foreign assistance. An international program devoted to energy alternatives for arid areas will be launched. In addition, the United States will support development of an arid lands information system which will provide access to world-wide research on arid zones. It is supporting the Sahel Development Program and the establishment of a Sahelian Institute. The meteorological satellite system will be upgraded and the LANDSAT program continued, with expanded worldwide use of the data. Finally, the US Peace Corps is prepared to train and place up to 1,000 volunteers world-wide to assist in reforestation, natural resources management and related anti-desertification programmes.

Although Canada has not been subjected to serious desertification problems since the 1930's, Canadian expertise is available for assistance. Recent monitoring has indicated the potential for serious desertification in the near future.

### Europe

Germany agrees that the knowledge to arrest desertification is available, but the key lies in land use systems. It believes profoundly in the mobilization of the considerable knowledge available in affected countries. In assistance to Sahelian countries, absolute priority is given to projects designed to ensure food security. Food supplies which the Sahel zone is receiving from Germany are utilized with development purposes in mind, that is "food for work" programmes and by purchasing food in surplus regions bordering emergency areas. Satellite photography such as is being used in Niger should be used more in the future, especially for collecting information regarding land use. Satellite photography and computerized planning systems to plan the optimal use of resources are promising. In countries affected by desertification,

all development projects, especially in agriculture, should be checked to see if they comply with anti-desertification measures. Projects benefiting people directly should have priority and integrated pilot programmes should be carried out. Programmes should be based on regional cooperation which ties in with the concept of technical cooperation among developing countries (TCDC).

Holland said there must be public participation as well as cooperation between experts in the field and authorities. The cooperation of non-governmental organizations should be sought. Measures to combat desertification should be built upon existing local rules, customs, and life styles. Fundamental human rights and freedoms as laid down in the Universal Declaration and other major human rights texts, such as the United Nations Conference on Human Settlements in respect with freedom of movement and settlement, should be respected.

Sweden called for consideration of the rights of poor groups such as nomads. There may be conflicts between nomads and farmers. Nomads should be enabled to maintain their life styles but alternative sources of income to livestock should be found, for example, small scale industries, extended cropping and fisheries. Switzerland emphasized the importance of education and training as it felt the problem was mostly one of social structure, while according to Italy, one strategy to combat desertification is to develop local research institutes and those promoted by the United Nations to acquire knowledge on arid and semi-arid regions.

About 20 percent of Greece consists of areas which are completely deprived of soil and have a vegetation consisting mainly of sparse phrygana. The development of tourism and the consequent increase of fires have aggravated the problem, destroying thousands of hectares of forests annually. Forest fires are an important cause of desertification in the Mediterranean region and a subregional center of combat forest fires should be created.



Soil erosion affects nearly half of Hungary, and the other half of the territory is exposed to secondary salinization or alkalization as well as waterlogging. Contamination of fertile soils with chemicals and waste products is increasing everywhere. Nearly 90 percent of the country is cultivated, so reduction of arable land must be halted as demand for food is increasing. Globally, a small portion of the finances spent on arms and military would contribute greatly to conquering desertification.

Romania stated that United Nations experts estimate that a project to establish a green belt to arrest desertification in the Sahel as elaborated by interested states, costs about 3 billion. If world military expenses which reached 350 in 1976 and are estimated to reach 500 billion in 1980, could be reduced by only one percent, it would create enough resources to finance the Sahel greenbelt project.

The German Democratic Republic felt this Conference, like other United Nations Conferences and political detente contributed to international cooperation. Of utmost importance in this context were effective measures of disarmament. Anti-desertification measures should be seen in connection with activities aimed at ensuring sovereignty of states over their resources, including the right to nationalization.

Deserts and semi-deserts cover about one fifth of the Soviet Union, with about one fifth of the population living there. Pastoral husbandry represents the major direction of economic development here. During the past 60 years, small households have been combined into large collective and state enterprises. On the basis of large-scale geobotanical research, the vegetation resources were defined and pastures were distributed among collective and state farms. The growing number and developments of towns and other human settlements and construction have increased the overall

human impact on the desert environment, resulting in increasing areas of moving sand. This kind of desertification is the subject of extensive research. In a final solution to the problem of water supply, the Soviet Union is planning a partial diversion of north-flowing and Siberian rivers south to desert areas. The environmental impacts of this diversion are being studied

### Australia

Australia is the oldest, flattest and driest of continents. In a total area of almost 3 million square miles (over 7½ million km.<sup>2</sup>), 74 percent of the land is arid or semi-arid. One of the most important lessons Australia said it has learned is that drought is part and parcel of a desert or near-desert situation. In Australia, drought is the norm, but continent wide drought is rare. An ad hoc crisis approach to desertification is inadequate. Policy must be based on sound evaluation of what the range or agricultural land can stand in the longer term. The problem is not simply one of food protection, or irrigation technology or pastoral management. It is a matter of understanding the inherent capabilities of the arid and semi-arid environment.

### International Organizations

The Holy See stated the Church had often carried out pioneering works in desert regions. The prevailing conditions of underdevelopment prevent the desert peoples from effectively combating not only the advance of the desert, but also disease, hunger, poverty, and ignorance. Priority is rightly given to the human dimension.

Population problems deserved special attention, and should be seen in the context of social justice which demands a more equal sharing of the resources of the earth. The Holy See stresses the parental right to decide on the number and spacing of their children. There must be respect for man's dignity in all measure. Emphasis is rightly placed on formal and informal education, on information and formation of public opinion, to ensure responsible community participation.

The United Nations Fund for Population Activities (UNFPA) told the Conference that in the past 3 years, family planning has been removed from the polemic of "population versus development" which had constrained its voluntary use. A recent United Nations survey, which covered 114 developing countries, shows that 83 have entrusted a central planning authority with the task of integrating population factors with development planning. Sixty-nine countries believe the current rate of population increase imposes constraints on development.

The World Health Organization stated that the people who suffer most from the spread of deserts are those without organized services. The major health problems are: malnutrition, communicable diseases, mental health, hygiene, and lack of adequate health services. Communities must be taught to resolve their own health problem. WHO has undertaken tasks to rectify these conditions.

The United Nations Educational, Scientific, and Cultural Organization said that deserts represent a wealth, the least exploited on earth. To develop these regions scientific approaches must be employed. A precondition for application of scientific progress is the will of countries to act, study and develop. In a number of countries, especially in Africa, this has been evident only in the last 10 years.

The United Nations Development Programme pointed out that while drylands are regions of low agricultural productivity, their total production is enormous. The degradation of range land and farm land have held the world-wide annual production of food and animal products to an estimated \$16 billion below their potential. In addition, it is calculated that gains toward food production would be 20 times the annual loss if the potential of other lands now being threatened by desertification were realized. By the year 2000, there will be a third more people to feed, and the world could lose in the meantime close to one third of its arable land.

There are also social consequences. Continued crop failure and destruction of livestock have caused families from desertlands to break up and go to already overcrowded cities in hopeless search of work. For many agricultural societies, the earth is sacred, and when it is destroyed, people lose more than food and a home; they lose a culture and a life style. The earth is the mother of the tribe, a mother that feeds the family throughout their lives

and after death, cares for their spirits. This raises questions whether those life styles have to be changed or whether by reclaiming deserts, we can help societies maintain and improve their traditional heritage.

The Food and Agriculture Organization emphasized that the fragile nature of arid land resources allows little flexibility in the choice of corrective action - in resource use and management. FAO programmes seek to increase these alternatives by integrated attention to: water resources development, range and pasture production, cropping practices and utilization, land use capability and limitation, rural development, soil and water management, and arid zone forestry.

In the extreme arid regions, the human, social, and educational impediments to the solution of many problems increase sharply. Here, gradual development of the people, their institutions and alternative occupations should lead to a rational use of resources in agriculture. The "Ecological Management of Arid and Semi-Arid Rangelands" is FAO's primary programme concerned with grazing land abuse.

The World Meteorological Organization has carried out regional agroclimatic surveys in the semi-arid regions of the world. WMO is implementing a major project in the Sudano-Sahelian region with a centre in Niamey.

Most delegations agreed that, as desertification resulted from misuse of land, the solution to the problem lay in proper land-use practices. Emphasis was placed on water conservation and good water management. The need to develop alternative sources of energy was also frequently mentioned. As desertification was not purely a technical problem, but also a social and economic one, the need for public participation was stressed. Since it was the poorest countries who were often the most vulnerable, international assistance was necessary. The delegates adopted a Plan of Action to combat what they saw as a global environmental problem.

## PLAN OF ACTION

The Conference adopted 28 resolutions comprising the Plan of Action (Report of the United Nations Conference on Desertification, 1977) to combat desertification focusing on arid, semi-arid, and sub-humid areas. The recommendations initiate a co-operative effort to re-inforce and integrate national, regional, and international actions. The goal is to implement the Plan by the year 2000, with the section on immediate actions being implemented from 1978-1984.

A central theme of the Plan of Action is the immediate adaptation and application of existing knowledge, particularly in the implementation of urgent corrective measures against desertification, in educating the people and the affected communities to an awareness of the problem, and instituting training programmes in collaboration with the international organizations which already have programmes in this area. Improved land use, based on assessment, planning and sound management through the application of known ecological principles to areas subject to desertification, is the key to success in combating desertification.

The Plan of Action is to be carried out as an effective, comprehensive and co-ordinated action programme against desertification. Everything done should be consistent with, and form part of, wider programmes for development and social progress. Since combatting desertification is primarily a national responsibility, the first 22 recommendations deal with national actions.

The Plan opens with a recommendation that desertification be assessed and evaluated. Assessment and evaluation lead to the formulation of land-use plans which, in turn, lead to principles of correct water management and to practices that should characterize the major dryland livelihood systems: pastoralism, rainfed farming and irrigation agriculture. It is recommended that public participation be made an integral element of all actions.

Not only should suitable systems of rangeland and livestock and wildlife management be introduced, but diverse systems of production should be

developed and living conditions improved, for example craft industries, tourism, and utilization of non-fodder plants of the rangelands as raw material for industrial purposes should be developed. Soil and water should be conserved and measures taken to prevent waterlogging, salinization and alkalinization in irrigated areas. Deteriorated lands should be reclaimed. It is recommended that existing vegetation be protected and denuded areas be revegetated. In areas likely to be affected, climatic, hydrological, pedological and ecological conditions should be monitored.

The Plan then turns to socio-economic considerations in the conviction that proper land use depends on the land users. Ecological degradation is due to an extent to the subsistence-level economies and inhabitants of these regions. Methods to equalize inequitable relationships must be evaluated. Actions and attitudes of people living in vulnerable areas should also be monitored and assessed. An effort should be made to provide them with social planning, comparable to more accessible areas. It is recommended that national capabilities in science and technology be strengthened. Conventional use of vegetation as a source of energy should be improved and research on unconventional sources vigorously pursued.

In many countries, activities to combat desertification are scattered among various ministries; and it is recommended that when none exists, co-ordinated national machinery be established. Programmes should be formulated in accordance with national development plans.

The section on immediate initial action defines the steps to be undertaken at the national, regional and international levels immediately. This includes the following actions at the international level:

- establishment of regional integrated anti-desertification centers
- establishment of several international rangeland and livestock management centres;
- establishment of international centres on sand dune fixation;
- establishment of several integrated management-training-demonstration irrigated and rainfed agricultural farms;
- establishment of several integrated management-training-demonstration stations for revegetation/afforestation;
- establishment of regional networks of biosphere reserves;
- preparation, publication and distribution of a series of manuals on the specific topics of anti-desertification technologies and management.

### Institutional arrangements

Most delegations were opposed to any new international institution being created to implement the Plan of Action, but emphasized the need for coordination of all activities within and outside the United Nations system. There was a general consensus that the Plan as a whole was essentially environmental in character and that correspondingly, the United Nations Environment Programme (UNEP), with its Governing Council, Secretariat and the Environment Coordination Board be regarded as the most appropriate focus for coordinating and monitoring its implementation. The development aspect of the problem, however, called for the involvement and cooperation of all the United Nations agencies and bodies.

As to the institutional arrangements to carry out the actions proposed, the Plan calls for the establishment of national machinery where none now exists, which would formulate and execute programmes to combat desertification in accordance with national development plans. Emphasis is placed throughout the Plan on the development of regional capacities and institutions. At the international level, appropriate United Nations organs are to support action to combat desertification and to adjust their programmes and allocations accordingly. Inter-governmental and non-governmental organizations concerned with desertification problems are to be invited to participate in implementation.

Within the United Nations system, coordination of action against desertification is to be ensured by the Environment Coordination Board assisted by a working group on desertification. The regional economic commissions are requested to participate actively in meetings of the Environment Coordination Board dealing with desertification and to be responsible for coordinating, catalysing, and executing intra-regional anti-desertification programmes. The Conference recommended that the overall supervision of the implementation of the Plan of Action is to be entrusted to the Governing Council of the United Nations Environment Programme, with the consequent responsibilities which would be carried out by UNEP Executive Director. He would be assisted by a very small number of highly qualified staff within the UNEP Secretariat.

### Financial arrangements

On financing the Plan of Action, there was general agreement by the Conference on the need for increased funds. There was also consensus on inviting the General Assembly to request the Governing Council of the United Nations Environment Programme to prepare a study on possible additional resources including a special fund, funds in trust, and fiscal measures entailing automaticity. A divergence of opinion arose at the Conference on other measures of financing, with many developing countries, particularly those in Africa favouring the establishment of an anti-desertification fund, while other countries favoured a consortium approach. Some delegations indicated their preference for the establishment of consortium arrangements focusing on small-scale projects and involving a small number of donor and recipient countries and multilateral agencies. The Western group stated that yet another account would not necessarily make available more resources, as the money would come from the general aid appropriation of donor countries. Furthermore, new funds do not usually mobilize any additional resources, but merely entail administrative costs, and render coordination more difficult. The East European Bloc held the view that there should be more effective utilization of existing funds, without increasing the regular budget of the United Nations.

According to a part of the recommendation on financial arrangements, adopted by a majority vote, the Conference requires the Executive Director of UNEP to convene a Consultative Group which would consider carefully screened national or regional projects to combat desertification and coordinate their financing by resources raised by it. The Consultative Group for Desertification Control is to assist in mobilizing needed resources and function as a forum to ensure that these resources are invested in the most effective way; not as a fund. The Group, which is co-sponsored by UNDP, UNFPA, UNEP, WFC, UNESCO, WMO, and UNIDO held its first session at Nairobi from 2 - 5 May 1978. In addition to the co-sponsors, donor countries, organizations and affected countries are eligible to be core members of the Group.

At the first session a policy statement was adopted, and the Group considered the following transnational proposals, which were based on the six studies on the feasibility of regional cooperation in combating desertification approved by the United Nations Conference on Desertification:



- (a) Green Belt in North Africa;
- (b) Green Belt in the Sahel;
- (c) Management of Livestock and Rangelands in the Sudano-Sahelian Region (SOLAR)
- (d) Major Regional Aquifer in Northeast Africa;
- (e) Regional Programme to Monitor Desertification Processes and Related Natural Resources in Arid and Semi-arid Areas in South America;
- (f) Transnational Project to Monitor Desertification Processes and Related Natural Resources in Arid and Semi-arid Areas in Southwest Asia.

Desertification often transcends national boundaries, and its arrest may well involve joint action by two or more countries. In an effort to see if transnational action was feasible, the Conference proposed six experimental projects involving 30 countries. To carry out these major projects, a total of 41 agreements are required, since some countries are involved in two of them, some even three. Most of these agreements have already been obtained. The projected cost of all six projects is \$195 million. In some cases 20 to 30% of the cost will be borne by the countries themselves. Representatives of donor countries expressed the view that funding of the projects should preferably be on a bilateral basis, though not excluding alternatives such as consortiums.

Two of the important other activities relating to the Conference include: The Nairobi Seminar on Desertification under the sponsorship of the American Association for the Advancement of Science, held just before the Conference to review the Plan of Action; and the Orientation Workshop held just after the Conference. Most of the participants were government officials or specialists involved in desertification programmes in their own countries. The Workshop considered possible measures for implementation of the Plan of Action.

#### RESOLUTIONS

##### Resolutions adopted by the Conference:

Resolution 1: approved the Plan of Action.

Resolution 2: urged the United Nations and other international institutions to extend additional technical and financial assistance to the least developed countries.

Resolution 3: recommended that increased aid be given to the Sahelian countries.

Resolution 4: noting that the use of chemical and biological wars had been one of the factors contributing to desertification, condemned such techniques, as well as use of poisons in water as a weapon of war. Governments were to refrain from using or supplying arms or chemical products for military use that destroy the environment.

Resolution 5: condemned the policy of bantustanization as a serious factor in desertification and requested governments to undertake international action to prohibit the continuation of this policy.

Resolution 6: condemned the continued illegal occupation of Namibia by South Africa.

Resolution 7: denounced the case study "The Negev: a desert reclaimed".

Resolution 8: expressed its thanks to the host country of Kenya.

#### GENERAL ASSEMBLY RESOLUTIONS

After considering the Report of the United Nations Conference on Desertification, the General Assembly adopted three related resolutions. The first resolution urged additional financial and technical assistance to the least developed countries. The second resolution dealt with measures to be taken for the benefit of the Sudano-Sahelian region, including measures to improve institutional arrangements in the Sudano-Sahelian region. Since the United Nations Sahelian Office serves only the eight countries of the Sahel, certain delegations wanted a sub-regional office of UNEP to cover the entire Sudano-Sahelian region. The Executive Director of UNEP therefore immediately started negotiation with the Administrator of UNDP on how the Sahelian Office could be

expanded to cover the whole region as a joint UNDP/UNEP office. It has been decided that the Sahelian Office be expanded to serve 15 countries in the region. Another resolution endorsed the Conference recommendations.

#### ANALYSIS

The United Nations Conference on Desertification was the first time the nations of the world turned their concerted attention to a comprehensive plan to halt and reverse this widespread threat to the human race. Problems related to deserts and arid land studies were for many years covered by isolated activities including both United Nations and national programmes. But all of this was only effective in limited instances, and desertification continued to spread at an accelerated rate in most of the arid, semi-arid, and even sub-humid regions. The world annual loss to desertification is in the order of 6 million hectares (60,000 km.<sup>2</sup>): 3.2 millions of rangeland, 2.5 millions of rainfed cropland, and 125,000 of irrigated farmland. Areas of of greater size are partly damaged, and 100 countries are directly affected. If a third of the earth's agricultural land will at the present rate be degraded by 2000 and if by the same date food requirements will double, all countries are under threat (United Nations Environment Programmes, 1978.)

In view of the virtual technical impossibility of doubling the world's food-producing land area in the next 20 years, and the massive capital investments an attempt to do so would require, it is imperative that there be intensified efforts to halt the further deterioration of land productivity, to stop the loss of food-producing land, and to reclaim areas lost through desertification during recent years. This is the main objective of the Plan Of Action to Combat Desertification. The capital resources required are of the order of \$1 billion per year globally.

According to Dr. Tolba (United Nations Environment Programme, 1978) the global cost of corrective measures to prevent net losses of land through desertification is estimated at \$400 million annually, exclusive of national and regional cost of infrastructure and administrative and other programme-support machinery. This is the order of magnitude of the minimum amount of funds required to achieve and maintain "zero desert growth". The benefits which would accrue from this would be in

the region of \$1,300 million annually, representing a benefit-cost ratio of over 3:1. This, however, would only be "standing still." To reverse desertification through reclamation would require considerably greater expenditure. A target reducing the area of desertified land by 6 million hectares annually through reclamation would involve annual costs of close to \$1 billion. A programme for recovering land lost over the last 25 years would cost in the region of 20 to 25 billion, spread over a period of 25 years, with recovery of the lost land achieved in 40 to 50 years. These figures appear less startling when one considers that \$1 billion per day is the approximate global expenditure on armaments. Can we not spend as much per year on halting land deterioration as we spend per day on weapons?

Provided the financial resources can be obtained, a great many problems, however, remain. Implementation depends on the political will of national governments. The formation of national committees in several countries before the Conference was, therefore, encouraging. National policies of land use may need radical changes, especially land reform which was not discussed. There is to be a Conference on Land Reform held under United Nations auspices in 1979. In the Third World, the poor are invariably forced into the marginal lands, while more fertile lands are frequently in possession of absentee landlords.

Provided the political will and finances are there, implementation involves other difficulties. For example, public participation is essential but citizen groups in Africa are rare, and when they do exist, they do not command the clout of similar groups in the West. Although an African politician may grasp the urgency of forest conservation, he will have difficulty in explaining a ban on cutting trees to constituents who rely on firewood and charcoal to cook their food and believe it comes from God. Among most dryland populations, the main source of energy will continue to be woody plant material for many years to come. Similarly, although it is correct to state that technical solutions for combatting erosion are known, the technical solutions which can be applied, given the existing social and economic constraints, have still in many instances, to be developed.

Neither is the problem confined to the poor. The US General Accounting Office (GAO) studied 283 farms randomly selected in the Great Plains, Corn Belt,

and Pacific Northwest regions. Approximately 84 percent of these farms were losing over 5 tons of topsoil per acre from croplands each year, while 25 percent were losing more than 20 tons per acre per year. (GAO, 1977). If we have failed to teach the Iowa corn farmer who is an astute businessman how to conserve topsoil, how can we fault the nomad eking out a meagre living for overgrazing?

Numerous experiences, however, cited by national governments and the case studies prepared for the Conference testify to man's capability to surmount the problem of land degradation. 40 countries submitted 46 country reports. In all, 15 case studies were conducted in 12 different countries, and summarized in a document entitled A Synthesis of Case Studies. Those in Chile, India, Niger, Iraq, Pakistan and Tunisia were prepared by the United Nations. Additionally, Australia, China, Iran, Israel, The United States and the USSR contributed associated case studies. The six transnational projects in which a number of countries had agreed to participate and to which some had pledged support resulted in the Conference being a success almost before it began. There was also a positive reaction to these projects during the meeting of the Consultative Group on financing.

Considerable insight and guidance is also available from the remainder of the documentation prepared for the Conference which pulled together a great deal of fragmented information and is of the highest scientific quality. Four component reviews were prepared on climate, ecological change, human and social aspects, and desert technology, and summarized in a document entitled Desertification: an Overview. A world map of areas affected, and likely to be affected by desertification was prepared by FAO with the assistance of UNEP, UNESCO and WMO. Additional maps were also prepared. Since desertification is a dynamic process, the maps are to be further refined.

Activities around the World since the Conference also provide a note of qualified optimism. The United Nations agencies and bilateral donors are reshuffling their budgets to accommodate increased spending in this area. National programmes are being formulated or reviewed where they already exist, as in the Sudan and India. Serious discussions regarding disarmament have begun at the General Assembly. Since the Conference, additional

research is being undertaken by non-governmental organizations such as SCOPE, IFIAS and IIASA, and many universities. It is fair to say the Desertification Conference has generated more post-conference discussion than any previous UN conference. Such interest cannot help but be reflected in action.

The Conference was the first in the series of UN conferences convened lately which rejected the idea of any new international institutional body to follow its outcome, but did clearly spell out responsibility for implementation. It was the first UN Conference in the past three or four years that gave concrete guidance on how to mobilize some financial resources to begin implementation and further pointed clearly towards possible other sources of financing.

Perhaps the Conference differed most from previous UN conferences in the stature of its Secretary-General. Dr. Tolba had served the governments well as the Executive Director of the United Nations Environment Programme and demonstrated his outstanding capability for practical action. In addition, governments recognized his command of the subject, and were prepared to trust his recommendations as the correct road to further demonstrated resolve. Under his direction, the Conference convened in a spirit of unusual harmony and cooperation. There was an unusual degree of consensus on both causes and solutions. At no time did politics disrupt the proceedings, and political interventions were few and minor. Dr. Carillo-Flores, Secretary-General of the World Population Conference held in 1974, aptly described the atmosphere when he said privately that United Nations conferences have gone from being political to being technical and human. The inevitable confrontation between developed and developing countries did, however, surface in the financial debate. There was the desperate demand on the part of the developing countries for a fund "disguised as an account" and the customary resistance of the developed countries to increase financial assistance.

Globally, we have the basic technology, human resources and finance to solve desertification problems, especially in developing countries. The problem is a lack of awareness and political will both nationally and internationally. A World Conference is one of the few options available for creating awareness and political will at a global level. Nothing has done

more to raise global consciousness regarding the lack of basic needs of an impoverished billion than World Conferences held by the United Nations. The Desertification Conference will have a profound impact on thinking and practice for the rest of this century. During this time we can, as Dr. Tolba frequently stated, bring desertification to a halt.

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