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IMPLEMENTATION OF GENERAL ASSEMBLY RESOLUTION 3337 (XXIX) INTERNATIONAL CO-OPERATION TO COMBAT DESERTIFICATION

PLAN OF ACTION TO COMBAT DESERTIFICATION SECOND PRELIMINARY DRAFT

Note by the Executive Director

In his capacity as Secretary-General of the United Nations Conference on Desertification, the Executive Director submits for consideration by the Governing Council the second preliminary draft of the Plan of Action to Combat Desertification. This draft is also being submitted to the senior consultants to the Conference on Desertification and to four regional meetings held as part of the preparations for the Conference. The final draft, incorporating the comments of the Governing Council, the senior consultants and the regional meetings, will be submitted to the Conference for consideration and approval.

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TABLE OF CONTENTS

	<u>Page</u>
Introductory Note by the Conference Secretariat	ii
	<u>Paragraphs</u>
Chapter I. Origin and Scope of the Plan	1 - 7
Chapter II. Objectives and Principles	8 - 16
Chapter III. Recommendations for Action	17 - 77
A. Assessment and Planning	21 - 27
B. Population and Health	28 - 35
C. Water, Land and Livelihoods	36 - 54
D. Alternative Energy Sources	55 - 57
E. Insurance against the Risk of Drought	58 - 60
F. Strengthening Indigenous Science and Technology	61 - 62
G. Supporting Measures	63 - 64
H. Institutional Arrangements	65 - 74
I. Role of International Organizations	75 - 78
Chapter IV. Financing the Plan	79 - 82

(ii)

INTRODUCTORY NOTE BY THE SECRETARIAT OF THE
UNITED NATIONS CONFERENCE ON DESERTIFICATION

- i. In accordance with the provisions of General Assembly resolution 3337 (XXIX) on international co-operation to combat desertification a draft Plan of Action to Combat Desertification is to be presented to the United Nations Conference on Desertification (29 August - 9 September 1977), for consideration and adoption. The present draft of the Plan of Action has been prepared for consideration by the four regional preparatory meetings for the Conference. Together with the reports on the regional consultations, this draft will also be presented for review at the Fifth Session of the Governing Council of the United Nations Environment Programme acting in its capacity as the intergovernmental preparatory body for the Conference.
- ii. A preliminary draft was circulated for comment in August 1976 to Governments, the United Nations system, intergovernmental organizations, research institutions and other bodies, and the panel of senior consultants, appointed by the Executive Director of the United Nations Environment Programme, to advise the Secretariat of the Conference. The present draft has been elaborated, taking into account the comments and suggestions received, and with the assistance of the advisory group of experts on the Plan of Action.
- iii. The text remains preliminary in both its scope and content. Further drafts will be prepared in the light of discussions at the regional meetings and at the fifth session of the Governing Council of UNEP, acting in its capacity as the intergovernmental preparatory body for the desertification conference. The final draft is to be issued on 1 June 1977 as one of the principal documents for the Conference. It is expected that these later versions of the Plan will include an indication of the order of magnitude of the funds required for the regional and international action in the immediate period of the Plan's implementation; i.e. from 1978 to 1984.
- iv. The present text has been written taking into account the consolidated action recommendations for the United Nations Water Conference (E/C.7/L.52). It has also been prepared in the light of discussions during the twenty-second session of the Advisory Committee on the Application of Science and Technology to Development (E/AC.52/XXII/CRP.17). The Plan, because of the timing of the preparation of the present draft, only partly reflects the findings and recommendations of the component reviews, the overview, the case studies and the feasibility studies. The Plan in its subsequent draft will take full account of these and other preparatory material for the Conference, as well as the discussion at the regional preparatory meetings.

CHAPTER I. ORIGIN AND SCOPE OF THE PLAN

1. More than one-third of the earth's land area is arid. Much of it has become desert since the dawn of civilization, and many vulnerable areas are even now being turned into desert because of man's actions. This process has intensified during recent decades. The spread of desert conditions threatens the future of 680 million people, or that 16 per cent of the world's population who live in the drylands. In the past half century, on the southern edge of the Sahara alone, as much as 650,000 square kilometres of land once suitable for agriculture and grazing, has become desert. The Sahelian drought of 1968-1973 and its tragic effect on the peoples of that region drew world attention to chronic problems of human survival and development on the desert margins.
2. In conformance with the Charter of the United Nations, a number of resolutions by the United Nations General Assembly have addressed these problems. The first All-African Seminar on the Human Environment, convened in August 1971 under the auspices of the Economic Commission for Africa (ECA), made specific recommendations for steps to be taken to combat the spread of deserts in Africa. At the third session of the ECA Conference of Ministers, Resolution 264 (XII) on desertification drew attention to this menace and urged that ECA take steps in collaboration with the international community to seek solutions to the problems. General Assembly Resolution 3202 (S-VI) of 1 May 1974 recommended that the international community urgently take concrete measures to stem the spread of deserts and assist the economic development of affected areas. Economic and Social Council Resolution 1878 (LVII) of 16 July 1974 requested all the concerned organizations of the United Nations system to pursue a broad attack on the drought problem. Decisions of the Governing Councils of the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) emphasized the need to undertake studies on the extent of drought, and to draw up appropriate action programmes against the spread of deserts.
3. The General Assembly then decided, by Resolution 3337 (XXIX) of 17 December 1974, to initiate concerted international action to combat the spread of desert conditions, or "desertification" as it is now called. To give impetus to international action, the General Assembly decided to convene a United Nations Conference on Desertification, now scheduled for 29 August - 9 September 1977, which would produce an effective, comprehensive and co-ordinated Plan of Action to Combat Desertification.
4. Deserts are areas of sparse or absent vegetation and low biological productivity primarily due to deficient rainfall. Desertification is seen as the extension or intensification of such

conditions. In preparing for the Conference, attention was focused on tropical, subtropical and temperate drylands. The Plan of Action covers areas where desertification is occurring now and others vulnerable to future desertification, including arid, semi-arid and sub-humid areas. The distribution and relative intensity of desertification problems are shown on the Desertification Map of the World (A/CONF/74/).

5. Recognizing that the physical and biological effects of desertification are important to the world community mainly because of their impact on human beings, the Plan of Action focuses on the problems of people affected by desertification.

6. Desertification is an aspect of the widespread deterioration of ecosystems under the combined pressures of adverse and fluctuating climate and excessive or ill-advised exploitation. Such exploitation has diminished or destroyed the productive potential of food and fibre-producing ecosystems at a time when increased productivity is needed to support growing populations in quest of development. Important factors in modern society - the struggle for development, population growth and change and the effort to increase food production - interlock in a network of cause and effect. Progress in development, planned population growth, and improvements in food production must therefore be dealt with together. The deterioration of productive ecosystems is an obvious and serious threat to human progress. In general, the quest for ever greater productivity has intensified exploitation and has carried disturbance by man into less productive and more fragile lands. Overexploitation gives rise to degradation of vegetation, soil and water, the three elements which serve as the foundation for development in many nations. Desertification is a self-accelerating process, feeding on itself, and as it advances, rehabilitation costs rise exponentially. In exceptionally fragile ecosystems, such as those on the desert margins, the loss of productivity through the degradation of soil can easily become irreversible, permanently reducing their capacity to support human life. Action to combat desertification is required urgently before the cost factor rises beyond practical possibility or before the opportunity to act is lost forever.

7. This Plan of Action presents a set of recommendations for initiating and sustaining a co-operative effort on the scale required to combat desertification.

CHAPTER II. OBJECTIVES AND PRINCIPLES

8. The immediate goal of the Plan of Action to Combat Desertification is to arrest the processes of desertification and, where possible, to reclaim desertified land for productive use. The ultimate objective is to sustain the productivity of arid, semi-arid and sub-humid areas vulnerable to desertification. A campaign against desertification should, therefore, take its place as a priority among efforts to achieve optimum and sustained production. For developing countries affected by increasing aridity, the implementation of this Plan of Action implies more than a campaign against desertification. It is an essential part of the broad process of development.

9. Desertification is not a problem susceptible to quick solutions. It calls for continuous assessment and long-term planning and management at all levels, supported by international co-operation. Such programmes, even when long-term should be started without delay. Since it is easier to prevent desertification than to reclaim desertified land, delay in the implementation of preventive measures can only increase the ultimate cost and decrease the chances for success. In many cases, technical solutions are available now. But, even with sufficient time, investment, and labour, their eventual implementation may be prevented by social, legal, and sometimes institutional factors.

10. Given the interdependence of the development process, population change and agricultural productivity, it follows that the effects of desertification on productive ecosystems can best be ameliorated if action is taken in all three sectors. In other words, efforts to combat desertification must be part of a broad programme for promoting social and economic progress. The United Nations has expressed a common aspiration to improve the quality of life for all people, especially in developing countries. This aspiration manifests itself in the Charter of the United Nations and in international declarations, decisions and recommendations, particularly of the past decade, especially in the Declaration for the Establishment of a New International Economic Order and the programme of action to achieve it, in the Charter of Economic Rights and Duties of States, in the International Development Strategy for the Second United Nations Development Decade, in the Declaration on the Human Environment and in the action plans of the United Nations Conferences on the Human Environment, on Science and Technology, Population, Food, Women, Trade and Development and Human Settlements. These represent steps taken by the international community toward the formulation of essential programmes for development in its broadest sense. To be successful, the effort to combat desertification must be seen as an integral element in this larger effort toward social and economic advancement.

11. Desertification frequently appears as the deterioration of land, water and other natural resources under extreme climatic conditions. Degradation implies that activities undertaken in an area have been unsuitable, either in degree or in kind, to the resources and the conditions that prevail there. Such activities may have been pursued because alternatives were lacking or because of attempts to maximize short-term gain at the expense of long-term productivity. While solutions probably rest ultimately in education, social and economic advancement and the adjustment of population growth to growth in resources, the proximate solution centres on improved land use. This involves three elements: a) an inventory of local land use capabilities, b) a determination of which uses are desirable in terms of land-use capabilities and socio-economic goals and constraints, and c) a system for implementing the resulting plan for the proper exploitation and protection of natural resources.

12. Social problems in land-use management are a principal concern of this Plan of Action to Combat Desertification. As the management of natural resources is a critical component of any strategy for physical, social, or economic development, the adoption of improved policies for the management of natural resources is essential to all ecosystems if their productivity is to be maintained. The recommendations in this Plan of Action for assessment and management of natural resources have general application but, in the context of this plan, they focus on areas vulnerable to desertification and on those desertified areas that admit to a degree of recovery.

13. The causes of desertification vary among the affected regions of the world owing to differences in their ecological characteristics and their social and economic structures and aspirations. Each region may require a distinctive approach to desertification problems. With natural resource management as its primary concern, this Plan of Action recommends methods for setting priorities for action against desertification, but it leaves the actual determination of priorities to Governments. There are, however, desertification problems which cross national boundaries, and the Plan of Action aims at strengthening regional and international capacities to deal with such transnational problems and to provide effective international co-operation when requested.

14. Action against desertification should be supported by goal-oriented research. This calls for the selection of those subjects on which research is still needed and of centres in affected countries that should be strengthened and supported to carry out the research required. This in turn necessitates an international co-operative research effort inviting exchange and advisory visits among centres and consultations to review progress and advise on further work. While much of this may be seen as applied research, some basic research may also be envisaged.

15. The basic principles guiding this Plan of Action are these:

- (a) All action shall be consistent with the provisions of the Charter of the United Nations.
- (b) The plan is to be carried out as an effective comprehensive and co-ordinated action programme against desertification, including the building up of indigenous scientific and technological capacities in the areas concerned.
- (c) All measures are to be primarily directed toward the well-being and development of the peoples affected by or vulnerable to desertification.
- (d) Efforts should be consistent with and, where practicable, form part of wider programmes for advancing economic and social progress.
- (e) Implementation is based on the recognition of cultural and ecological variety in the vulnerable areas, and the overriding need for a sensitive and flexible response.
- (f) A central theme will be the immediate adaptation and application of existing knowledge.
- (g) There is, however, the need for additional research to clarify a number of fundamental problems for the solution of which the requisite scientific knowledge is not yet available.
- (h) Additional research should be consistent with strengthening the scientific and technological capacity of the affected areas.
- (i) Improved land use, calling for assessment and planning, is a key to success in combatting desertification.
- (j) Improved land use should recognize the inevitability of periodic drought in drylands and their generally low agricultural potential.
- (k) Implementation calls for a concentration of the resources of the United Nations systems in launching this Plan of Action and in carrying out an integrated and worldwide programme of development research and application of science and technology to solve the special problems of desertification.

(1) Land management should take into account a number of ecological principles:

(i) units of land need to be managed as wholes (e.g. an entire watershed, the total of plant and animal communities, an area viewed as a complex of microtopographies);

(ii) the use of drylands should be carefully timed to conform with fluctuations in climatic conditions;

(iii) the use of land should be carefully allocated so as to give maximum sustained productivity; its use must be fitted to its capabilities.

(m) While populations currently affected by desertification urgently require short-term relief measures, long-term amelioration should not be delayed, since the cost of prevention is less than the cure.

(n) Attention should be given to the assessment of secondary environmental problems which may be triggered by measures intended to remedy a desertification situation, as well as the effects of development activities undertaken outside affected areas.

16. The implementation of the Plan of Action to Combat Desertification is expected to be carried out by Governments through their national institutions, with the support, when requested, of international, bilateral or private programmes.

CHAPTER III. RECOMMENDATIONS FOR ACTION

17. The following set of recommendations is proposed for co-operative national and international action to combat desertification. Taken alone no single recommendation would be successful against the broad problem of desertification. An integrated complex of measures is the only way to arrest desertification and restore the productivity of areas already desertified. Integration means that each recommendation is linked in some way to other recommendations. Ideally, all the recommended actions should be implemented together, but unfortunately many countries do not have sufficient resources to do this. Hard choices must be made in the allocation of scarce resources to action programmes. National priorities must be established before national and international financial and technical resources are committed to action programmes.

18. It is recognized that the countries affected or likely to be affected by desertification are at different stages with respect to their appreciation of desertification problems and their ability to cope with them. Depending on the level of national awareness and on the kinds of action already taken, countries will follow a certain sequence in their efforts to combat desertification, entering the campaign at an appropriate stage. The sequence of stages might be as follows:

- (a) First, establish whether desertification exists, and, if so, define its magnitude and impact as follows:--
 - (i) determine the criteria for identifying and assessing desertification;
 - (ii) establish a national body for assessment and monitoring of desertification;
 - (iii) assess the problem on the basis of the criteria and techniques adopted.
- (b) If a significant problem does exist, then:
 - (i) set up a system to monitor it;
 - (ii) draw up and implement programmes as outlined in the Plan of Action to Combat Desertification
- (c) Where remedial programmes have already been started:
 - (i) monitor the progress of the programmes, assessing their usefulness;
 - (ii) disseminate information on them to the international community.

For countries at an advanced stage, the second step might serve as a convenient point of entry, whereas countries that are still more advanced may wish to enter at the third step, or they may consider their current activities in the light of the recommendations in the Plan of Action.

19. Target dates for the implementation of recommended actions are proposed in the Plan. It is not always possible to specify time-tables in such a broad programme, especially when long-term actions are required. Nevertheless, whenever appropriate, target dates are suggested. The goal is to implement the Plan of Action by the year 2000, starting in 1978.

20. Given the premise that desertification is basically a problem of the misuse of natural resources under extreme climatic conditions, and bearing in mind that the actual situation in the majority of areas affected by desertification is not fully assessed, the proposals start with arrangements for assessment and planning. They then proceed to specific recommendations for improved land management and to action against desertification, concluding with supporting measures, international co-operation and comments on financing the plan.

A. ASSESSMENT AND PLANNING

Recommendation 1

21. Before undertaking any action against desertification, it is desirable to assess and evaluate desertification in the local situation, its magnitude and extent, its causes and effects. It is necessary to know exactly what parts of the country are affected or vulnerable.

It is recommended that desertification be assessed and evaluated as it affects both land and people in countries experiencing or likely to experience it.

22. To implement this recommendation, national action is desirable. A system of survey and monitoring should be established or strengthened to assemble information on dryland resources and populations and to carry out continuous monitoring of dryland dynamics, including the human condition. The assembly and evaluation of information should be a continuous process providing a feedback mechanism for national planning and action. To carry this out, national action should be considered to:

- (a) Improve networks of meteorological and hydrological stations in areas subject to desertification in order to allow closer and more continuous monitoring and assessment of climatic and hydrologic conditions as they relate to the desertification process. In

most of the areas of the world where desertification takes place such networks are deficient. They could be considerably improved through appropriate action by national meteorological and hydrological services, with the assistance of the World Meteorological Organization (WMO) if requested. In areas of sparse population where staffing of stations may be difficult the use of automatic observing stations could be considered. National meteorological and hydrological services should provide continuous assessments of conditions based on these data.

(b) Monitor desertification by observing atmospheric processes, the state of vegetation and soil cover, dust transport, the shifting of sand dunes, the distribution, migration and abundance of wildlife, the condition of livestock, the phenology of crops, crop yields, and changes in irrigated lands.

(c) Compile desertification maps and see that they are revised through periodic resurveys using modern techniques, including remote sensing.

(d) Monitor socio-economic, demographic and health conditions of population affected or threatened, by strengthening census procedures where necessary. Such monitoring should address these variables and indicators:

(i) Population: size, density, age and sex composition, rate of growth, migration patterns;

(ii) Human and environmental health: incidence and prevalence of malnutrition and disease, identification of psychological factors affecting health, the physical and psychological development of children;

(iii) Food: its availability, eating habits and food taboos, status of nutrition education;

(iv) Human settlements: housing, drinking water and sewage disposal, sanitation, fuel and electricity;

(v) Education: literacy rate, mean educational level;

- (vi) Sociocultural patterns: national or tribal composition, income and standard of living, social impediments to advancement, extent and impact of social welfare activities;
- (vii) Man as a land user: how land is used and worked, what obstacles exist to carrying out the changes called for by measures to combat desertification.

23. The recommendation also implies regional action, such as:

- (a) The implementation of regional schemes suggested by studies on the feasibility of regional or transnational co-operation in the monitoring of desert processes, including the use of satellite imagery (1978-1980).
- (b) The organization of a system for the exchange of information gained from monitoring among the countries of the regions concerned (1978-1979).

24. Finally, the recommendation calls for international action to:

- (a) Make available to Governments on request, a consulting service for assistance in organizing systems of desertification monitoring (1978-80).
- (b) Provide technical assistance to Governments on request, for the establishment, expansion and improvement of networks of meteorological and hydrological stations in areas subject to desertification (1978-82).
- (c) Compile, publish and distribute a desertification atlas containing maps at a scale adequate to show detail. Such an atlas should be periodically revised (1978-82).
- (d) Promote the establishment of dryland biosphere reserves that could preserve genetic diversity and provide a baseline for monitoring (1978-82).

Recommendation 2

25. Introduction of improved and effective land management in areas subject to desertification involves a broad range of social, economic, institutional, legislative, technical and other measures. Among various criteria which might guide the proposed changes the most important are: desertification hazards as defined by climate, the availability of water, land capability, and other environmental constraints, and by population and its pressures, social and economic goals and constraints, cultural and behavioural patterns, health conditions, location and relationships with other areas. The wide diversity of socio-economic structures and

environmental conditions in dryland regions demands flexibility and suggests that blanket proposals are unsuitable. Each dryland area has established its own land-use practices on the basis of local conditions and aspirations, and these constitute the starting point for proposed changes. At the same time, some general principles of land-use planning and management, as well as of land-use surveys, might be recommended internationally on the basis of existing knowledge. Whereas the present Plan of Action is concerned only with areas affected or likely to be affected by desertification, changes in land-use management proposed for those areas should be consistent with broader national or regional development plans.

It is recommended that in areas affected or likely to be affected by desertification, changes in land-use practices based on ecologically and economically sound principles should be introduced in conformance with social equity and geared to economic and social development.

26. To implement this recommendation national action is desirable to:

- (a) Strengthen national capabilities in land-use planning and direct them towards problems of desertification. Many nations have national or (in federal systems) state/provincial economic planning commissions. It is logical for land-use planning to be one of the major responsibilities of high-level planning groups concerned with national or state/provincial development. Where such a planning group does not exist, it should be established at a high level of government, with authority to formulate policy and plans and to guide the implementation of those plans. In carrying out such action, these factors should receive consideration:
 - (i) Local-level planning should be encouraged whenever possible or appropriate. It is also important to call upon all available talent to participate in the planning process.
 - (ii) Land-use planners should have access to expertise in law, economics, demography, sociology, urban planning, ecology, geography, agricultural sciences, hydrology, climatology, remote sensing, statistics, and cartography. However, the planner's primary training should be in the theory and techniques of assessment,

planning and management of human and natural resources. Where such training is not locally available arrangements should be made to train planners elsewhere.

- (iii) The land-use planning group should be supported by a natural resources survey and monitoring programme.
- (iv) However, action against desertification should not wait on the formation of a unit composed of specialists in all pertinent fields of land-use planning. When desertification problems are apparent, a start should be made by calling upon the best talent and information available for the formulation and implementation of plans to combat desertification, which are consistent with national goals.

(b) Inform the public of the consequences of the misuse of land and other natural resources and of the need for land-use planning and management so as to ensure general public awareness of and participation in planning and action to combat desertification. Successful land-use planning and management depends on public co-operation. Plans or actions to change land use should take account of the wishes, needs, wisdom, and aspirations of the people for whose benefit the plan is ultimately intended. This can be done only by involving the people in planning and implementation, by consulting them and obtaining their agreement. To ensure public participation in planning and action to combat desertification consideration should be given to:

- (i) the development and operation of a system of community education and public discussion on problems of desertification and measures to combat it, using existing facilities for public information, extension services and education;
- (ii) the establishment or strengthening of facilities for public participation in land-use planning and management;
- (iii) programmes of education in the use of land and other natural resources in rural schools, training centres and extension services, as well as in appropriate institutes and universities.

(c) Survey natural resources and the human condition in areas affected or likely to be affected by desertification. To be realistic, land-use plans must be based on accurate data. To provide control for data collection, the social

and environmental objectives for an area must be precisely defined, thus producing a frame of reference for the survey work. Considerable information is already available for most areas of the world. The first task of a land-use planning group and its associated survey programme is to assemble and analyse this current information. The survey should then be designed to fill gaps in existing information and to update it through continuous surveying or monitoring. A land-use plan must be flexible enough to accommodate changes in the area covered, as revealed by monitoring.

- (d) Formulate a land-use plan for an area small enough to be managed effectively within the resources immediately available. This can serve as a pilot area for testing plans, training managers and correcting planning errors. Out of this will arise a comprehensive land-use plan embracing a broad area. At the heart of land-use policy is the difficult determination of what people realistically hope to achieve with the resources at their disposal. Once a relatively complete inventory of natural resources and the human condition is available, the land-use planning group will identify the management options for each section of the area within its purview. Management options concern the types and intensity of use which are physically and biologically appropriate to the resources of the section. The planners will choose from among these options the use which is most consistent with local nutritional needs and the socio-economic goals and constraints of the people living within the jurisdiction. The codification of these goals and constraints in relation to land-use constitutes a land-use policy. A comprehensive land-use plan would assign all sections of the area to particular uses, such as crops, livestock, game ranching, forests, recreation, mining, industry, roads and urbanization.

- (i) Initially at least, land-use planning may be imprecise, given the size of the areas concerned, the absence of previous plans and limitations in financial and technical support. These rough preliminary plans can be elaborated and specified later as survey and monitoring proceed. Errors will undoubtedly be made, but action should not be deferred for fear of making mistakes.

- (ii) Repeated evaluations and revisions of the land-use should be anticipated. The implementation of land-use plans should allow for continuing evaluation of the real impact of the project

socially, economically and environmentally, and authorities should be prepared to learn from initial mistakes and to correct them.

- (iii) Where the planners determine that a section of land has become unsuitable for human activities, they should propose complete protection, or a use which promotes natural recovery. This is particularly important in areas recently subject to severe degradation under the impact of human activities. Such areas may recover and be useful in the future if they are completely protected for a prescribed period.
- (e) Develop procedures for implementing a comprehensive land-use plan. A comprehensive land-use plan specifies the preferred use for each section of the area covered, but the current or intended use of the section is not always the same as that in the plan. The problem of enforcing or implementing the plan is the problem of changing a current or intended use to correspond with what is recommended in the plan.
 - (i) A process should be established by legislative action to resolve national, regional or local conflicts among competing users and uses of land. This process will involve compensation to landowners and users who suffer economic and personal hardships from the required changes in land use. It may also involve a system of incentives and penalties, such as grants-in-aid and differential taxation.
 - (ii) Systems of taxation, land tenure, water and mineral rights, agricultural credit, insurance, marketing, and transportation should be reviewed to ensure that they will encourage compliance with the comprehensive plan. Legislation relevant to exploitation and protection of natural resources should be reviewed and when necessary revised or supplemented to ensure consistency with the plan.
 - (iii) There are many possible enforcement or implementation schemes. Research and analysis are required to determine the best scheme for a particular country or province/state. Pilot projects that demonstrate the implications of a proposed land-use plan are an essential preliminary to large-scale efforts.

27. This recommendation also implies regional and international action to:

- (a) Organize the training of land-use planners at international training centres (1978-85).
- (b) Strengthen the African Institute for Economic Development and Planning (IDEP) for the international training of land-use planners (1978-82).
- (c) Strengthen the natural and human resources survey units in the countries concerned, upon their request (1978-80).
- (d) Organize pilot projects for the implementation of comprehensive land-use plans in each of five major regions affected by or vulnerable to desertification in co-operation with or in addition to national pilot projects (Sudano-Sahel, Northernmost Africa, West Asia, South Asia, Latin America; 1978-85).
- (e) Organize short-term training courses on the implementation of comprehensive land-use plans for extension officers of the countries concerned.
- (f) Make available to Governments, on request, a consulting service on land-use planning (1978-85).
- (g) Work out and distribute to Governments, on request, a methodology for land-use planning (1978-79).
- (h) Organize the training of survey specialists at existing international training centres (1978-82).
- (i) Develop and distribute to Governments, on request, educational programmes on the dryland environment and desertification for inclusion in the curricula of institutes, training centres and universities and of rural schools (1978-79).
- (j) Develop and distribute to Governments, on request, radio and television programmes on the dryland environment and desertification (1978).
- (k) Produce and distribute to Governments, on request, leaflets or booklets, in the languages of the countries concerned, on the dryland environment and desertification for mass education programmes (1978-79).
- (l) Make available to Governments, on request, a consulting service for national educational campaigns on desertification (1978-79).

- (m) Undertake comparative studies on existing laws and institutions concerned with the use of natural resources, including land, and develop guidelines for legislation (1978-80).

B. POPULATION AND HEALTH

Recommendation 3

28. Present rates of population growth are unprecedented in human history. Population growth intensifies pressures on the drylands by increasing the number of people who live in them - farmers especially and to a lesser extent nomadic pastoralists - and by increasing global food requirements, already on the rise because of rising living standards and heightened expectations. At the same time, population growth is accompanied by massive migrations from rural areas to the cities. In excessive proportions, rural migrants tend to come from the most active, working-age groups, creating the paradox of labour shortages in rural areas in the midst of population increase. Labour shortages, in turn, have contributed to the deterioration of agricultural works and have thus served as a cause of desertification. At the same time, waves of rural migrants have compounded the problems of cities, often overcrowded to begin with and unequipped to receive the migrants and provide them employment and the basic amenities of life. Demographic policies designed to resolve or ameliorate such problems, should be seen as a natural and necessary corollary to policies directed toward improved land use.

It is recommended that countries should adopt demographic policies that will support programmes for improving land use, giving priority to the maintenance of an adequate rural labour force and to the resettlement of those migrating from rural to urban areas so as to minimize economic and psychosocial distress.

29. Dryland farming populations in the developing world are growing at around three percent per year. Less in touch with modern medicine, nomadic pastoralists generally have higher death rates, with somewhat lower growth rates as a consequence. It would be unreasonable to expect either rate of growth to decline substantially in the immediate future - indeed, growth rates among pastoralists may well rise before declining. In this situation, a continued strong migration from the drylands to urban areas can be anticipated. Problems associated with migration and resettlement can thus be expected to persist.

30. National action is desirable to ease the transition of dryland migrants into urban areas. Many developing countries have already initiated programmes to this effect - to assure migrants of housing and other social amenities such as education and health services and

to supply them with counselling on employment opportunities. Countries affected by such large-scale migratory movements can anticipate that programmes to ease the transition of migrants will be needed until at least the end of the century.

31. At the same time, national action would be desirable to reduce the selective out-migration of the most active age groups from rural areas. Improved land-use practices, as recommended elsewhere in this Plan of Action, will assist this task by enhancing the prosperity of the dryland economies. After determining the size and character of dryland out-migration, countries so affected may wish to consider additional measures to reduce excessive losses among those in the most vigorous age groups. Such measures could consist in supplying services to dryland peoples, including the development of alternative sources of income.

32. This recommendation also implies international action to make available to Governments, on request, an advisory service on problems related to migration from the drylands and the resettlement of migrants. The international community should also provide, on request, financial and technical support to programmes designed to ease the transition of dryland migrants into urban areas.

Recommendation 4

33. Areas vulnerable to desertification are often remote, far removed from centres of political power. Their populations are frequently dispersed and difficult to contact. This results in deficient health services, especially among nomads.

It is recommended that programmes should be undertaken to provide dryland peoples with health care of a quality comparable to that provided to more accessible elements in the population, with particular emphasis on family health and family planning.

34. To implement this recommendation, national action should be considered to:

- (a) Provide voluntary family health and family planning services to dryland peoples so that they can exercise the human right of parents to decide freely on the number and spacing of their children in conformance with the Teheran Declaration on Human Rights, and to reduce rates of morbidity and mortality among both mothers and children, in conformance with the recommendations of the World Population Conference.
- (b) Provide dryland peoples with primary family health care, including attention to nutrition and the spread of communicable disease. The dryland situation

may require innovative methods for the delivery of primary health care, possibly including the use of mobile health units or "barefoot doctors".

35. This recommendation also implies international action, including that of non-governmental organizations, to provide advisory services to Governments, on request, on family planning and family health and to provide technical and financial support to programmes designed to deliver health care to peoples living in drylands.

C. WATER, LAND AND LIVELIHOODS

Recommendation 5

36. Water is the main factor limiting production and settlement in the drylands, and lack of water or its inefficient use are fundamental causes of many desertification problems. Improved water supplies, reduction in water losses, more efficient use of water and the development of new water resources are called for in many of the measures proposed to combat desertification.

It is recommended that efficient and environmentally sound water management and development be introduced as part of measures to combat desertification.

(This recommendation may be redrafted following the United Nations Water Conference in March, 1977).

37. To implement this recommendation national action should be considered to:

- (a) Improve data on the quantity and quality of available water, through:
 - (i) periodic assessments of surface and groundwater, preferably in terms of the water balance;
 - (ii) expanding and extending the network of meteorological and hydrological stations, and strengthening the organizations responsible for the collection and storage of data;
 - (iii) promoting the development and use of automatic recording instruments for remote stations;
 - (iv) developing the application of remote sensing in monitoring water supplies.

- (b) Develop schemes of water management, preferably as part of national policy, to secure and integrate projected needs for domestic use, agriculture, livestock, industry and other uses.
- (c) Promote the efficient use of water generally by developing and adopting appropriate technologies and policies, including water use in public facilities such as sanitation and waste disposal.
- (d) Provide adequate domestic water supplies, free from contamination.
- (e) Improve the supply and quality of surface water and its management, through:
 - (i) catchment management and the revegetation of watersheds, in conjunction with measures to reduce flood hazards and siltation;
 - (ii) establishing local water harvesting schemes;
 - (iii) promoting the construction of small earth reservoirs;
 - (iv) reducing reservoir losses through seepage and evaporation;
 - (v) improved means of water distribution, including the use of polyvinylchloride pipes and channels and linings made from local materials;
- (f) Promote measures to improve the supply and quality of groundwater and its management, through:
 - (i) controlling the development and siting of wells and pumps;
 - (ii) improved maintenance of wells and pumps;
 - (iii) continuous monitoring of groundwater level and quality as part of managed use;
 - (iv) preventing groundwater pollution, including the intrusion of saline groundwater into aquifers;
 - (v) the use of solar and wind energy for pumping;
 - (vi) the promotion of schemes for groundwater recharge and the subsurface storage and purification of water.

- (g) Introduce available technologies for water recycling, the use of brackish water, desalination and purification.
- (h) Promote research into weather modification, evaporation suppression, and the application of systems analysis to water resource planning and management in drylands.
- (i) Launch general campaigns for education in efficient and responsible water use, using public information services and seeking community participation through appropriate organizations.

38. This recommendation also implies regional action to develop water resources for rational use within regional economies, as suggested by the feasibility study on transnational co-operation in the shared use and management of large aquifers in North Africa and the Arabian Peninsula (1978-85).

39. Finally, this recommendation implies international action to:

- (a) Organize regional training courses on water management in local languages at training centres strengthened for this purpose (1978-1985).
- (b) Make available to Governments, on request, a consulting service on water management (1978-1985).

Recommendation 6

40. The degradation and destruction of dryland pastures is the most widespread form of desertification associated with animal-based livelihood systems, and has resulted in impoverishment and in physical and social hardship among many dryland pastoral communities. Regeneration of pastures and the establishment of systems of rangeland management to provide improved and sustained productivity are the main objectives of combative measures. Remoteness, scattered distribution and the traditional mobility of pastoral peoples have made it difficult to provide them with adequate health and social services. These and other related disadvantages must be remedied, with measures to assist sedentarization and resettlement where required.

It is recommended that measures be taken to ameliorate degraded conditions in dryland pastures, to introduce improved systems of rangeland and livestock management and to improve the lot of desert pastoral communities.

41. This recommendation calls for national action to:

- (a) Improve degraded pastures through:
 - (i) surveys of the condition of the pastures

- and the extent and intensity of desertification;
 - (ii) measures to aid regeneration, such as temporary protection from grazing, seeding or planting of desirable forage plants, and physical treatment to aid the re-establishment of plant cover in denuded areas;
 - (iii) water harvesting.
- (b) Establish improved grazing strategies, through:
- (i) assessing the productivity of pasture associations under a variety of conditions;
 - (ii) determining the impact of grazing on pasture associations and their requirements for regeneration under grazing;
 - (iii) devising methods of rotational and deferred grazing and planning drought reserves to maintain pasture condition under grazing.
- (c) Establish improved range management, through:
- (i) determining appropriate carrying capacities under a variety of conditions;
 - (ii) providing managed watering points to facilitate the recommended use of pastures;
 - (iii) establishing pilot or demonstration projects to demonstrate range management.
- (d) Improve livestock management, through:
- (i) the improvement of existing breeds and the introduction of new breeds and species;
 - (ii) the control of animal diseases and pests;
 - (iii) the development of improved methods of livestock management and their promulgation through extension services and demonstration projects.
- (e) Reduce drought risks, through:
- (i) the creation of drought forage stocks and drought grazing reserves;
 - (ii) the provision of means for removing stock from drought-affected areas;

- (iii) local water harvesting or irrigation schemes for the production of forage;
- (iv) integration with adjacent farming systems.
- (f) Strengthen the economic basis of the pastoral industry by:
 - (i) establishing marketing facilities and price stabilization schemes;
 - (ii) consideration of price controls to protect the livestock breeder in relation to other primary producers and the consumer.
- (g) Protect the rights of pastoralists through planned land use supported by appropriate legislation, information and education.
- (h) Promote the combination of controlled culling or ranching of wildlife with pastoralism.
- (i) Promote alternative livelihood sources, such as craft industries and tourism.
- (j) Provide health, welfare, and educational services compatible with dispersed and mobile populations, for example through the use of radio.
- (k) Assist with resettlement or partial sedentarization.
- (l) From the beginning, involve pastoralists in the planning and implementation of all measures that affect them.

42. This recommendation also implies international action to:

- (a) Employ regional centres in the task of developing drought-resistant, high yield and nutritious forage plants and of organizing mechanisms for their wide-spread distribution. Such centres should also apply themselves to research and activities directed toward the improvement and adaptation of livestock (1978-85).
- (b) Make available to Governments, on request, a consulting service for improving livestock and rangeland management (1978-85).
- (c) Make available for country use methodologies for:
 - (i) the measurement of livestock carrying capacity of rangelands and improved

pastures, taking into account seasonal variation and drought risk (1978-80);

(ii) determining the optimum size and composition of herds according to the measured carrying capacity of the land (1978-80);

(iii) planning and carrying out pasture rotation and deferred grazing (1978-80);

(iv) planning and carrying out the ecological and geographical stratification of livestock breeding, fattening and marketing (1978-80).

43. Areas of rain-fed farming in semi-arid and sub-humid lands have undergone extensive desertification through gullying and sheet erosion, the blowing away of soil, sand drift, and the growth of dunes. Degradation has followed extensive clearing, exposure and powdering of topsoil, and clean fallowing to store soil moisture. It is linked with the loss of soil fertility and the breakdown of soil structure after continuous cropping. A major factor in degradation has been the extension of farming into areas of high drought risk or on to marginal terrain, often under pressure of increased population. Some desertification has, however, resulted from the deterioration of structures for soil conservation due to labour shortages, for these are areas of strong out-migration to urban areas. In the tropics, degradation is associated with the shortening of cycles in farming and regrowth systems, again linked with population pressure.

44. The consequences have been lowered yields and loss of productive lands, with resulting economic, physical and social hardship, often associated with high rates of out-migration. Deterioration has adversely affected neighbouring animal-based livelihood systems. Combative measures for soil and water conservation must form part of comprehensive reclamation schemes, including for example the reforestation of watersheds. They may involve the removal of marginal lands from cultivation, the consolidation of holdings, and resettlement schemes linked to the provision of alternative forms of livelihood.

Recommendation 7

It is recommended that comprehensive plans for soil and water conservation be introduced to combat desertification in rainfed farming in drylands.

45. To implement this recommendation national action would be desirable to:

(a) Survey affected areas to determine land capability, degradation hazards and climatic risk, and put forward proposals for conservational land use.

- (b) ~~Assist the introduction of improved crop systems,~~
including cover crops, rotational systems with legumes,
and the use of organic and chemical fertilizers, to
reduce exposure of soil and maintain fertility and
soil structure.
- (c) Assist with the reconstruction and introduction of
works such as terracing for soil conservation and
water management.
- (d) Encourage the adoption of measures to counter erosion,
such as strip cropping and shelter belts.
- (e) Reclaim degraded lands, by such actions as stabilizing
sand surfaces, levelling dunes and checking gully
systems.
- (f) Assist the afforestation of watersheds and the pro-
tection of upland pastures from excessive grazing or
cutting for fuel.
- (g) Encourage diversification in farming systems, with
appropriate inclusion of livestock and tree planting.
- (h) Introduce alternative livelihood possibilities, such
as agricultural based industries and cash crops.

46. The recommendation implies regional action to develop, through regional institutions such as universities and their research establishments, improved agricultural techniques which resist desertification, drought-resistant and more productive crop varieties, and new cash crops.

47. Finally, this recommendation implies international action to:

- (a) Develop and distribute to Governments, on request, information on training farmers in rainfed farming techniques, on strengthening extension services, and on farmer-training (1978-80).
- (b) Develop and distribute to Governments, on request, a set of recommendations on: the use of improved fertilizers for dryland farming with special emphasis on organic manures and biological fertilizers that improve soil properties and the development of new plant varieties resistant to plant diseases and pests (1978-80).

Recommendation 8

48. Irrigated agriculture supports the closest settlement in arid lands, represents the most intensive form of primary land use, and is

potentially highly productive. Nevertheless, many irrigation settlements are severely affected by desertification. Waterlogging and secondary salinization or alkalization of soils has caused a reduction in crop yields and abandonment of irrigable lands, and farm incomes in these areas have commonly become too low for an adequate livelihood. Irrigation is costly and requires skilled techniques if its benefits are to be realized; however, many irrigators are inexperienced and lack extension services or support through capital or marketing facilities. These conditions lead to a lack of incentive or opportunity for self-improvement. Many problems arise from the close settlement associated with irrigation schemes, such as disease, inadequate housing and community services, and lack of alternative employment for the families of irrigators.

It is recommended that measures be taken to combat desertification in irrigated lands by preventing waterlogging, salinization and alkalization, by reclaiming deteriorated lands, by modifying irrigation and farming techniques to increase productivity, by developing new irrigation schemes where appropriate, and through improvement of the social and economic conditions of people dependent upon irrigation agriculture.

49. To implement this recommendation, national action is called for to:

(a) Improve water management through such measures as:

- (i) reducing water losses during storage and distribution, through improved design, construction and maintenance of canals and ditches;
- (ii) adequate watershed management to reduce silting and flood risks;
- (iii) the determination of the water requirements of crops and the establishment of appropriate irrigation schedules;
- (iv) advising farmers on the efficient application of water and associated tillage to retain soil moisture;
- (v) the appropriate design of field and crop systems in schemes based on groundwater, in an effort to sustain water supplies.

(b) Improve drainage and salt-leaching through such measures as:

- (i) investigating soil-water properties and the hydrogeology and salinity of groundwater

- before construction or reconstruction of irrigation schemes;
 - (ii) providing adequate drainage systems to maintain groundwater below the capillary zone;
 - (iii) providing adequate water for salt leaching;
 - (iv) undertaking the reclamation of salinized or alkalized lands;
 - (v) establishing a network of stations to monitor groundwater and salinity conditions.
- (c) Improve farming systems through such measures as:
- (i) soil surveys as a basis for devising appropriate crop systems in the light of available water;
 - (ii) establishing pilot or demonstration projects;
 - (iii) advising farmers on farming and irrigation techniques through extension services;
 - (iv) providing capital, and/or purchasing and marketing facilities, as through agricultural co-operatives;
 - (v) the encouragement of ancillary agricultural activities, such as rearing livestock or tree culture.
- (d) Provide potable water supplies, sanitation and health services
- (e) Provide appropriate housing and settlements with community services.

50. This recommendation also implies international action to:

- (a) Make available to Governments, on request, a consulting service for improved technology in irrigated agriculture. Elements of the United Nations now concerned with irrigation agriculture should be geared and co-ordinated to provide advice on the planning, design, and construction of irrigation systems, the reclamation of waterlogged, salinized and alkalized lands, the investigation and monitoring of soil-salt-water relations, and the control of water-related diseases (1978-85).

- (b) Make available to Governments, on request, advice on problems associated with social and economic conditions in irrigated areas (1978-85).

Recommendation 9

51. There is need to restore and maintain vegetation cover and to stabilize and protect soils in denuded areas, especially those affected by intense human impact, for example around settlements and near mining installations. This includes the requirements to stabilize moving sands and halt dune advance where land use, communications or settlements are threatened. Revegetation of desert uplands is necessary for soil and water conservation and flood control. On a larger scale, "green belts" to promote revegetation, soil conservation, planned land use and environmental protection are called for along desert margins and in other sensitive areas.

It is recommended that special measures for revegetation, soil conservation, and stabilization of moving sands be undertaken in areas of localized human impact, on watersheds, where resettlements, roads and farm lands are threatened, and along vulnerable desert margins.

52. To implement this recommendation national action is desirable to;

- (a) Stabilize and revegetate lands degraded by mining, industry, tourism or other dryland activities, and prevent further degradation through:
 - (i) legislation requiring responsible organizations to undertake reclamation, and controlling further developments through requirements for environmental impact assessments and obligations to meet the cost of required environmental protection and of pollution control;
 - (ii) research into methods for stabilizing and revegetating degraded surfaces in desert areas, including soil treatments and the development of drought-resistant and salt-tolerant plants.
- (b) Establish fenced reserves around settlements and along roads in other areas of intense human pressure, from which grazing, traffic and fuel-gathering are excluded.
- (c) Control open spaces in settlements through revegetation or the provision of alternative stable pavements and the planting of shelter belts.

- (d) Control traffic, particularly in and near settlements and at route intersections, through the surfacing and fencing of roads and by placing limitations on the use of cross-country vehicles.
- (e) Revegetate watersheds for improvement of the hydrologic balance and soil conservation, as part of general programmes of catchment management.
- (f) Check sand drift and arrest dune movement, with priority for areas where settlements, communications, farm lands, and important installations are threatened, through:
 - (i) surveying the extent of sand drift and dune advance, establishing the effective wind regime and sand sources;
 - (ii) checking sand drift by erecting fences, revegetating source areas and planting shelter belts;
 - (iii) stabilizing dune surfaces by the use of matting, mulches, or chemical or bitumenous coatings, vegetating dune surfaces, reshaping dunes and removing slip faces where necessary;
 - (iv) controlling land use in areas of stabilized dunes.
- (g) Reduce the impact of the collection of plant material and manure for fuel, through:
 - (i) restrictions on fuel-gathering in sensitive areas;
 - (ii) establishing plantations for the controlled production of firewood;
 - (iii) making available alternative heating and cooking devices.
- (h) Create "green belts" consisting of mosaics of revegetated areas and planted shelter belts in zones of conservation and controlled land use along desert margins and in areas of intense human pressure.
- (i) Strengthen national forest, range management, and soil and water conservation services and other organizations involved in implementing these recommendations, including their advisory arms.
- (j) Establish or strengthen education, extension and publicity services; undertake programmes to create an informed and

favourable public attitude towards reclamation and conservation in degraded areas; and, secure the co-operation and participation of communities in the proposed measures.

- (k) Establish pilot or demonstration projects to test the feasibility of large-scale undertakings, train the required staff, and demonstrate the likely benefits to come from larger programmes.

53. This recommendation also implies regional action to implement measures suggested by the feasibility studies on transnational co-operation for the establishment of "green belts" (1978-85).

54. Finally, this recommendation implies international action to:

- (a) Establish or strengthen training centres for the specialists required for revegetation, afforestation, and sand stabilization (1978-85).
- (b) Establish or strengthen revegetation centres for the production and distribution of plant material (1978-85).
- (c) Make available to Governments, on request, a consulting service on dryland revegetation and afforestation (1978-85).

D. ALTERNATIVE ENERGY SOURCES

Recommendation 10

55. The use of alternative or unconventional energy sources in drylands, usually so favoured with sunlight and wind, should be vigorously investigated as a means of preserving organic materials, of reducing the tedious human labour so often involved with fuel collection, and of providing the peoples of the drylands with simple, inexpensive and convenient devices to serve their daily lives.

It is recommended that research be vigorously pursued on the use of alternative or unconventional energy sources in the drylands that will yield simple, inexpensive and useful devices to serve the needs of dryland peoples.

56. This recommendation implies national action to:

- (a) Establish manufacturing facilities for the local production of whatever simple and efficient devices are produced by investigations into the use of

alternative energy sources in the drylands.

- (b) Establish distribution facilities to ensure that such devices reach the people who can use them, at a subsidized price when necessary. Distribution should be accompanied by instruction in the use of the devices which could be delivered by such agencies as extension services and fuel distributors.

57. This recommendation also implies international action to:

- (a) Carry out research on the use of alternative energy sources, especially wind and solar energy, in the drylands. Such research should be keyed to the production of simple, inexpensive and efficient devices for the use of dryland peoples (1978-85).
- (b) Carry out trials on the use of devices employing alternative energy sources and see that devices which prove efficient are brought to the attention of Governments, specially of those facing desertification problems (1978-85).

E. INSURANCE AGAINST THE RISK OF DROUGHT

Recommendation 11

58. As areas subject to desertification are at high risk of drought disaster due to natural climatic variations, the need for disaster relief and rehabilitation must be anticipated. If relief operations are carefully planned before the need arises, the operations will not only be more rapid and effective, but opportunities for social change created by disaster can be constructively used to promote programmes recommended in this Plan of Action. Explicit recognition of the risk of drought leads to insurance against the risk. Planning for disaster relief involves a set of financial and other measures to insure inhabitants of the areas at risk against loss of crops, livestock, means of livelihood, housing and food supply.

It is recommended to develop and adopt insurance schemes that provide facilities for coping with drought disaster and which promote the social and economic changes required to reduce long-term risks of desertification.

59. To implement this recommendation national action will be desirable to:

- (a) Establish or reinforce, whichever is appropriate, crop and livestock insurance schemes.

- (b) Create food, fodder, and fuel reserves against disaster.
 - (c) Plan in advance for disaster relief operations, bearing in mind the provisions of the present Plan of Action.
 - (d) Plan to take advantage of disaster to accelerate development programmes and to introduce changes.
60. The recommendation also implies international action to:
- (a) Review the activities of disaster relief organizations with a view to their playing an enhanced role, taking into account the present Plan of Action (1978-80).
 - (b) Encourage and support climatological research that shows promise of making possible long-range weather prediction. Special emphasis should be placed on investigations that will make possible the long-range prediction of drought.

F. STRENGTHENING INDIGENOUS SCIENCE AND TECHNOLOGY

Recommendation 12

61. A lack of scientific and technological capability in many developing countries affected by desertification constitutes a serious obstacle to successful national campaigns against desertification. For this Plan of Action to be successful, indigenous scientific and technological capabilities must be strengthened, especially since the struggle against desertification is a long continuous process, and an essential aspect of national development. Although it is expected that detailed recommendation in this respect will be considered in 1979 by the United Nations Conference on Science and Technology, it is nevertheless appropriate to undertake certain essential measures within the framework of the present Plan of Action, which could serve as an input to this later conference.

It is recommended that appropriate action be taken to strengthen indigenous capabilities in science and technology for the purpose of combatting desertification.

62. Although this recommendation concerns long-term action, the measures outlined should be initiated immediately if results are to be achieved within a reasonable time. The implementation of this recommendation calls for broad international support in the form of advice, technical and financial assistance, and training. This could be achieved through the mobilization of national and international resources, with the aid of agencies of the United Nations system and governmental and non-governmental organizations, including bilateral arrangements. National action would be desirable to:

- (a) Designate or organize national centres for the transfer of technology and the dissemination of information on current progress in science and technology relating to desertification, and to provide advisory services on how to strengthen extension services that give instruction on the application of new technologies.
- (b) Establish, co-ordinate or strengthen, whichever is appropriate, national institutions concerned with the problems of desertification.
- (c) Provide existing scientific and technological centres with the equipment, material and funds necessary for their efficient operation; international or other agencies are invited and urged to aid established institutions which find it difficult to operate due to lack of resources.
- (d) Establish or reinforce, whichever is appropriate, and with the help of international organizations, machinery for desertification monitoring (see Recommendation 1).
- (e) Strengthen existing extension services for the promotion of improved land-use.
- (f) Consider other recommendations of the present Plan of Action from the point of view of strengthening national capacities in science and technology, as this is an important factor in the implementation of most of the recommendations.

G. SUPPORTING MEASURES

63. Actions to be undertaken in information, education and training are ordinarily regarded as measures in support of the key activities proposed as recommendations in a plan of action, and are often listed separately. In the present Plan of Action to Combat Desertification, such supporting measures are not listed separately but are cited in the same section as the central action they serve to support.

64. Frequently, but not invariably, supporting measures will be regional or international action taken on request of a national Government to support that Government's goals and actions. As an example, consider Recommendation 9, paragraph 51, on revegetation, soil conservation and stabilization of moving sands. One proposed national action (52-j) to strengthen education, extension and publicity services can be regarded as a supporting measure. All suggested international action under this recommendation (52-a-b-c) can be regarded as supporting measures.

H. INSTITUTIONAL ARRANGEMENTS

Recommendation 13

65. Desertification is often a national problem, and accordingly a strong national machinery is necessary to combat it. In many countries, activities to combat desertification are scattered among various ministries and departments with no special arrangements to co-ordinate them. A variety of bodies with responsibility for the planning and development of arid and semi-arid zones often have powers that overlap. This constitutes an obstacle to technological progress and to the advance of measures for the recovery of desertification areas. In these circumstances it would be necessary to create national machinery for the elaboration and implementation of national programmes for combatting desertification.

It is recommended that where none exists national machinery to combat desertification be established.

66. To implement this recommendation it would be desirable to establish a national desertification commission or task force, consisting of high-ranking representatives of the appropriate ministries, agencies and institutes and community leaders and non-governmental organizations; or to assign the task of co-ordination to one of the existing national authorities (ministry, department or board). The function of this national machinery would be to co-ordinate and consolidate activities related to desertification, rather than impose a new administrative structure on an already overburdened civil service. Even so, this body must be administratively and scientifically supported by a small technical staff. Many countries have secretaries or commissions for the human environment or planning commissions which could provide the necessary staff support. In countries where the desertification problem is serious, past and current activities have already produced much data and information, these responsibilities may be vested in the Council of Ministers.

67. The responsibilities of such national bodies might include:

- (a) The analysis and evaluation of existing information regarding the problems of desertification;
- (b) The preparation of a national plan of action to combat desertification that would co-ordinate all national activities;
- (c) Arranging for the implementation of a national plan of action through national institutions;
- (d) Participation in international or regional programmes, and maintaining liaison with regional and international organizations on problems of desertification; and

- (e) Reporting to the Government on plans, results, obstacles or other related questions involved in efforts to combat desertification.

Recommendation 14

68. A facility for the effective co-ordination of international activity to combat desertification is needed. Taking into consideration existing international institutions and their fields of activity and the undesirability of creating new international bodies:

It is recommended that the Environment Co-ordination Board should be responsible for following up implementation of the Plan of Action to Combat Desertification, and that a Desertification Unit should be established within the United Nations Environment Programme to co-ordinate the implementation of the Plan.

69. To carry out this recommendation, the Environment Co-ordination Board should be requested to report to the General Assembly every two or three years through the Governing Council of the United Nations Environment Programme and the Economic and Social Council on the progress of implementing the Plan of Action to Combat Desertification. ^{1/}

70. The Desertification Unit would serve as a co-ordinating office for national, regional and international activity to combat desertification. It would be responsible for:

- (a) The effective co-ordination of international activity to combat desertification;
- (b) The preparation of periodic reports on the state of desertification;
- (c) The preparation of recommendations on problems of desertification; and
- (d) Liaison among agencies and countries concerned.

^{1/} General Assembly resolution A/RES/2997(XXVII) of 19 January 1973, establishing the ECB "decides that, in order to provide for the most efficient co-ordination of the United Nations Environment Programme, an Environment Co-ordination Board, under the chairmanship of the Executive Director, shall be established under the auspices and within the framework of the Administrative Committee on Co-ordination; further decides that the Environment Co-ordination Board shall meet periodically for the purpose of ensuring co-operation and co-ordination among all bodies concerned in the implementation of environmental programmes ..."

71. A Working Group on Desertification should be established within the Environment Co-ordination Board that would:

- (a) Assist the Desertification Unit in the follow-up and co-ordination of the implementation of the Plan of Action; and
- (b) Help in the preparation of periodic reports to the Environment Co-ordination Board on the same subject.

Recommendation 15

72. In spite of the knowledge accumulated through past and current efforts to combat desertification, there remain gaps in our understanding of the processes and phenomena involved, and still larger gaps in our understanding of how to apply existing knowledge to particular ecological and socio-economic circumstances. There are many centres and institutes throughout the world, both national and international, that carry out research relating to desertification, but their programmes and methods may not always be co-ordinated, nor pertinent to the central problems.

73. Some of the gaps in knowledge will undoubtedly be filled in the course of applying present knowledge to the actions recommended for immediate implementation. But other gaps will require a long-term national and international research effort.

It is recommended that an International Desertification Research Council should be established to be serviced by the Desertification Unit, (see previous recommendation) to co-ordinate global, comprehensive research programmes, embracing existing national, regional and international research centres and institutes, for the rapid and economical acquisition and dissemination of new knowledge regarding the problems of desertification.

74. The International Desertification Research Council would include in its composition directors of institutes with research functions, and would co-ordinate the international research effort. The Council would be serviced by the Desertification Unit to be established in UNEP. The functions of the Council would include:

- (a) Establishing research priorities and allocating projects, giving special emphasis to the need to strengthen indigenous science and technology. The Council would also review progress and advise on the further implementation of projects.
- (b) Arranging exchange and advisory visits among research bodies. The Council would also establish a system for the prompt international exchange of information

on research findings and innovative desert technologies.

- (c) Advising on means of supporting selected research programmes, giving special emphasis to the research suggested in the Plan of Action to Combat Desertification, such as studies on:
 - (i) drought-resistant crops;
 - (ii) dryland livestock;
 - (iii) alternative energy sources, with special emphasis on solar energy and wind energy devices;
 - (iv) the optimization of water use;
 - (v) desalination techniques;
 - (vi) mechanisms for getting information and innovations into the field.
- (d) Selecting in each ecological region, embracing several countries of a region or of a continent, one of the existing national or international desert research centres to be designated as a regional co-ordinating scientific agency, with functions as in (e) below, but on a regional scale. Where necessary such centres should be given technical and financial support.
- (e) Designating one of the existing international desert or arid lands research centres as the co-ordinating centre for the international campaign to combat desertification; this centre would ensure that the research programme carried out through other institutions is comprehensive and co-ordinated, and its functions would include those under (d) above, as well as:
 - (i) the co-ordination and planning of research work and the assignment of research priorities;
 - (ii) identifying the particular capabilities of the institutions involved and allocating projects of international importance among them;
 - (iii) the dissemination of scientific information and new research techniques to the institutions involved; and,
 - (iv) organizing co-operation among the institutions for specific research projects, special inter-institutional task forces, workshops and scientific seminars.

I. ROLE OF INTERNATIONAL ORGANIZATIONS

Recommendation 16

75. The implementation of the Plan of Action to Combat Desertification will require close co-ordination of national, regional and international programmes. The services of the agencies of the United Nations system should be available, and their participation in the implementation of the Plan of Action must be ensured. The agencies of the United Nations system, in their respective fields of activity and within the scope of the Plan of Action, should give advice to Governments, on request, and should elaborate methodologies, co-ordinate and support scientific and technological research, facilitate the exchange of information, and provide financial and technical support for the implementation of the recommendations outlined here.

It is recommended that the General Assembly request the Secretary-General of the United Nations and the administrative heads of the United Nations Development Programme, the United Nations Environment Programme, the United Nations Industrial Development Organization and the United Nations Conference on Trade and Development, and invite the executive heads of the Food and Agriculture Organization, the United Nations Educational, Scientific and Cultural Organization, the World Meteorological Organization, the World Health Organization and the International Bank for Reconstruction and Development to support in their respective fields of activity international action to combat desertification in the context of the Plan of Action and to make appropriate provisions and allocations in their programmes.

76. The implementation of this recommendation would require a set of actions by the agencies concerned, including:

- (a) The revision of current activities related to the problems of arid zones, and to the problems of desertification in particular, with a view to adjusting and co-ordinating them to conform to the Plan of Action. The revision should be conducted in close co-operation with the United Nations body entrusted by the General Assembly, on the recommendation of the United Nations Conference on Desertification, with co-ordination and follow-up. Priority should be given to the application of existing knowledge rather than to research programmes.
- (b) The planning of advisory, financial and technical support for the Plan of Action, including budgetary

follow-up, in the following fields:

- (i) the training of land-use planners, natural resource and social survey specialists and other specialists as required;
- (ii) the financing and co-ordination of regional programmes for research in land-use planning and management and in the improvement of specific land uses in areas vulnerable to desertification;
- (iii) the financing and co-ordination of regional survey and monitoring programmes;
- (iv) the provision of financial aid to Governments, on request, which have formulated acceptable schemes for land-use management;
- (v) support for disaster prevention and relief programmes.

Recommendation 17

77. The participation of international institutions outside the United Nations system, both intergovernmental and non-governmental, will be an important factor in the successful implementation of the Plan of Action.

It is recommended that the United Nations General Assembly should request the Secretary-General to invite governmental and nongovernmental organizations concerned with desertification problems to participate in the implementation of the Plan of Action to Combat Desertification with a view to co-ordinating their activities with the worldwide programme.

78. To implement this recommendation such organizations may find it necessary to increase their efforts to raise the resources necessary for the financing of technical co-operation programmes and projects related to research and the development of strategies, plans and programmes, feasibility studies, and the strengthening of institutions engaged on combatting desertification.

CHAPTER IV. FINANCING THE PLAN

79. It is perhaps not now appropriate to consider the establishment of new funds for financing specific operations of the magnitude of a global programme to arrest and, where possible, reverse the processes of desertification. Nor would such proposals be necessary if existing development assistance funds have built into them the degree of flexibility required to respond to new and clearly demonstrated requirements. For the most part, what is required, as far as regional and international financing of the Plan is concerned, are shifts in emphases and in priorities as well as a regrouping of funding in some circumstances to respond to the needs of the Plan.

80. In addition to the constraints that naturally arise in a period of financial stringency, there is also the constraint of limited resources already committed nationally to activities that may be expected to show a higher rate of return. High returns cannot be readily demonstrated in a Plan designed to arrest the degeneration of fragile ecosystems. Nevertheless, longer term outlays to guarantee the regeneration of lost land and the avoidance of disaster may be justified when set against the loss of productive land and the burden of emergency and crash programmes to provide relief from drought and its ensuing social and economic dislocation. These are concerns shared by the international community.

81. It is with these considerations in mind that this Plan has been prepared. By the time the United Nations Conference on Desertification takes place it is anticipated that it will be possible to include in the Plan realistic and realizable orders of magnitude of the financing involved for regional and international activities for the seven years 1978-1984. This seems to provide a reasonable span of time for immediate action, as well as to give an indication of external support required for action in the least developed countries where domestic revenues are not sufficient to finance the counterpart services and facilities needed, nor is there capacity to direct scarce skills to these new and demanding tasks.

82. At this stage, therefore, it would seem appropriate to place emphasis, not so much on the orders of magnitude involved, but, rather the groupings of sources of funding that from their experience, involvement or concern, may be expected to assist in launching or underpinning different components of the Plan. The international community, both within and outside the United Nations system, has ample precedents in this. Lessons learned have been applied for example to the onchocerciasis control scheme in the Volta River Basin area, in the financing of international research centres through the Consultative Group on Agricultural Research and, more recently, in the approach taken by the United Nations Sahelian Office and by Club des Amis du Sahel towards Sahelian recovery.