

NOTES, NEWS & COMMENTS

Research and Training Programmes for Desertification Control

Introduction

A considerable amount of scientific and technological literature containing basic information on the ecology of arid lands has been accumulated during recent years. But whereas this scientific and technological information provides solutions to many of the problems of desertification, and such solutions have been applied with success in a number of advanced countries, this has not been the case in most of the developing countries that face the hazards of desertification. The resulting situation underlines the importance of providing the necessary support towards the widest possible development of national scientific capabilities that would foster the successful application of available scientific knowledge, and the special value of experimental (pilot) units for such purposes.

The importance of national capabilities in science and technology was stressed in Recommendation 18 of the United Nations *Plan of Action to Combat Desertification**, which refers to: 'action to be taken to utilize and strengthen national capabilities in science and technology, with particular attention to planning and management for rational utilization of resources, as part of the campaign against desertification'. National scientific capabilities seem to have two principal roles in this context: (a) application of available knowledge in solving local problems of desertification and related issues of resource development of arid lands, and (b) contribution to international endeavour to add to the stock of scientific information and fill gaps in knowledge. Support of national scientific capabilities in developing countries presupposes the need for training technical personnel.

But there are still gaps where our knowledge needs to be supplemented. These are especially evident in areas of integrated and multidisciplinary research that embraces the broad vista of natural sciences involved in the understanding of 'resource' ecosystems, their responses to various manipulations, and the effective socio-cultural factors that constitute the relationships between human society and the local ecosystem of which it is an integral part. Specific programmes of research need to address these gaps. Progress in applying systems analysis techniques to the study of natural systems in their total complexity (Biosphere-technosphere-sociosphere) provides tools for truly integrated studies and for predictive studies of alternative land-use practices.

In response to this need, the United Nations General Assembly in operative paragraph 10 of its resolution 35/73 (5 December 1980) called upon UNEP, in its coordinating and catalytic role, to institute, in cooperation with the organs, organizations, and other bodies of the United Nations system, specific programmes of research and training at the national, regional, and international, levels, and to invite private foundations and other grant-making institutions to cooperate financially and technically in the implementation of those programmes.

* Cf. *Report of the United Nations Conference on Desertification*, United Nations Environment Programme, Nairobi, Kenya: A/Conf. 74/36, iv + 139 pp., mimeogr. See also the account of the Conference by Ralph Townley in *Environmental Conservation*, Vol. 5, No. 1, pp. 60-1, 1978, and Margaret R. Biswas's 'The U.N. Conference on Desertification, in Retrospect' (*Ibid.*, No. 4, pp. 247-62).—Ed.

National Programmes

A national research programme in this context should embrace three principal groups of activities: (a) monitoring studies and resource surveys and evaluation, (b) problem-solving studies, and (c) resource development studies. This will require the establishment or development of national networks of monitoring parameters of climate, soil, vegetation, population, etc., and national machineries for survey of resources and evaluation of their economic potentials. It will also require the establishment of pilot experiments to test in the field methodologies of resource development. A national network may produce periodic information bulletins, maps of desertification-prone areas, resource inventories, assessment reports, etc. These would provide planners of national development with valuable tools.

Problem-solving studies may address issues related to three principal livelihood systems that are prevalent in desertification-prone lands: namely, rain-fed cropping, irrigated farming, and pasture lands. Resource development studies may include two major components: (a) basic information studies, and (b) applied research studies. Basic information studies may address such subject-areas as climate and climatic change, water problems, soils and surface deposits, plant ecology, animal ecology, and ecosystem research. Applied research studies may concentrate on such themes as: ecology of semi-arid regions, conservation of soil moisture, conservation of soil, physiology of plants, plant introduction and propagation, industrial crops, forestry, rain-fed farming, irrigated agriculture, non-conventional water sources, and livestock, as well as social, political, and cultural factors, and energy.

Sound decision-making on land-use must be based on interactions of scientific and technological feasibility, economic viability, social and cultural acceptability, and operational and administrative practicability. There are gaps in our comprehension of the complex actions and responses involved. This may be due to factors that are not confined to arid lands, as for example disciplinary practices in the sciences and differences in concepts and methodologies between natural and socio-cultural sciences.

Any such multifaceted research programme to be carried out will require appropriate research staff; for its results to be applied at the field level, it will require a variety of trained technicians in field experimentation and in demonstrations and extension services. Success of such application requires active participation of many people. Training programmes should be tailored for the different target-groups, namely: (a) decision-makers, including policy-makers and managers; (b) scientists or technologists; (c) field staff, including technicians; (d) local leaders with reference to public participation; and (e) pupils and students in formal education. The first need is to ensure an immediate programme of training to enable countries in drought-prone areas to: (a) establish a land-use service, (b) monitor the spread of desertification, and (c) prepare and update land-use and capability maps and surveys.

Training institutions should attempt to tackle broad areas by e.g. providing workshops for policy-makers, integrated postgraduate courses for technical specialists, short courses for teachers to put environmental elements into the education programme, and symposia for regional

groups on specific subjects. They should also send staff to train community leaders in their respective homelands, with the objective of increasing public participation there. Training in areas which lend themselves to regionally or internationally applicable methods should be developed by the UN agencies. Areas in this category include assessment, monitoring, and evaluation, of desertification, economics of development of arid lands, common techniques in plant and animal husbandry, and land-use surveys and capability maps etc.

Regional Programmes

Scientific and technological issues related to desertification and the various facets of its problem often transcend national political boundaries. These issues may need to be examined (monitored and assessed), and to be resolved within regional (transboundary) extents. Resources in arid lands may be regionally shared (e.g. ground-water aquifers), or may be best managed regionally (e.g. transnational management of rangeland and livestock resources). Certain aspects of research and training would be unduly expensive if carried at a national level, and would be more efficiently (cost-effectively) carried out at a regional level.

It seems essential at least that each region should have a multipurpose institute which trains technicians in resource assessment and management for dryland areas. Such an institute should have government support and recognition, with an interdisciplinary focus—and with a practical methodology related to realities of the participating nations. The regional centres would be foci for developing and distributing new ideas, and for coordinating monitoring as well as training programmes and short courses, while also running pilot projects. The national effort would then focus on adapting this to specific physical and socio-political conditions. National components may receive technical and financial support through bilateral sources, private foundations, and non-governmental institutions.

The approach of having a series of national institutions of research and training, constituting a regional network, seems feasible. It could provide for mutual support and more efficient use of available resources than at present obtains, and would enable research projects to extend beyond national boundaries—indeed right up to the natural boundaries of the problems themselves. Criteria for selection of participating national bodies need to be flexible.

Modalities for cooperation and coordination at national and regional levels will ensure the most efficient

use of available resources of manpower, research and training facilities, and funds. Dimensions of regional networks need to be flexible, so as to avoid political and historical difficulties and to address ecological limits. Existing divisions include the present United Nations regions of the Economic Commissions. But sub-regions may be recognized—for instance, the continent of Africa may be subdivided into North Africa, The Sudano-Sahel, and Africa South of the Equator.

It would also be useful to extend networks from the developing countries into the industrialized regions. Joint activities, partnership arrangements for research, training, information, and dissemination and supply of equipment, should be organized.

International Programme

Regional networks should be linked together in a form of international or global network, the objective being to coordinate their work and avoid wasteful duplication. This should aim at establishing an information exchange system and ensure maximum benefits from it. Such an international network would need a *sponsor*, whose function would be to ensure coordinated planning and implementation of activities and the development of network linkages. The sponsor should also provide resources to support the desired programme development.

As is known, programmes and projects carried out by, or under the aegis of, the United Nations agencies and bodies, include extensive activities that relate to control of desertification and to development of natural resources in arid and semi-arid lands. These activities include several programmes and projects of research and training. Thus the aim is to develop an international Programme of coordinated research and training activities within the framework of the Plan of Action to Combat Desertification (see above), which should in particular include all relevant activities of the whole UN system. Such an international programme should: (a) be composed of several specific programmes of research and training at various levels, (b) have the participation of national and regional institutions in its field of action, and (c) function through a system of regional networks incorporated in a global network.

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An Urgent Call to All Science Teachers and Adherents: The World Campaign for The Biosphere

In 1972, a United Nations Conference on the Human Environment was held in Stockholm, Sweden, which publicized mounting concern (e.g. Pauling *et al.*, 1982). Such concern was over the rapid growth of our world's human population, continued military expenditures for nuclear weapons, the depletion of our world's resources, and other environmental problems. At the end of this Conference, twenty-nine principles were developed and over one hundred recommendations were formed in the hope that world powers would begin efforts to cease the continued degradation of our Biosphere.

It has now been more than a decade since that Conference. After such a period, what has been the outcome of these principles and recommendations? According to the Foundation for Environmental Con-

'To date, concerned actions to safeguard The Biosphere have been reactive rather than preventive in intent, and on scales pathetically below those on which problems have been spreading. As a result, many of these problems have become far more serious and less controllable than hitherto, while new ones continue to emerge. This lack of global organization, the character of which is marked by failure in interaction, is unworthy of free-minded people and unfair to Nature.'

The Foundation's analysis of the status of our environment is similar to the major findings and conclusions of *The Global 2000 Report to the President* (1980), which was