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MAJOR PROJECT ON SCIENTIFIC RESEARCH ON ARID LANDS

UNESCO AND ARID ZONE RESEARCH

The problem of the arid zones

The problem of the arid zones can be summed up by the following numerical comparison: whereas cultivated land represents barely one-tenth of the land surface of the globe, the arid and semi-arid areas cover more than one-third. In other words, for each acre of cultivated land, there are three or four acres which are practically unused by man because they are desert or covered with sparse vegetation permitting only a precarious subsistence economy at best. Yet, the world's population, which now exceeds 2,600 millions, is increasing more and more rapidly and at the present rate will double itself in fifty years. Meanwhile, the mass of the people are coming to realize that their living conditions are far below those enjoyed by a privileged minority, and they are striving to improve their lot as quickly as possible. This dual increase - in the population figure and in its needs in a world with limited natural resources - raises a fear lest essential foodstuff and mineral supplies may run short in the fairly near future.

Hence the necessity of urgently developing and exploiting the resources of areas which man has so far somewhat neglected, having found more favourable conditions elsewhere. These areas consist mainly of the humid tropical, frigid and arid and semi-arid zones.

The last are of special importance not only because of their vast extent but also because they concern a large number of countries where the necessity for quickly developing resources is acutely felt.

Most fortunately, man's need to exploit the arid and semi-arid areas occurs at a time when the great advance of scientific research gives him grounds for hoping that he will be able to solve the problems arising.

The problems involved in developing these areas are multifarious, and are conditioned by economic, social and political considerations. They will not be the same in a geographically badly placed area with an extreme climate in which nothing beyond the exploitation of mineral resources can at present be contemplated as they are in a less inhospitable area which man himself has reduced to a desert-like state by irrational exploitation of the soil and vegetation, but whose present economy could be improved.

But the problems of economic development are conditioned above all by certain physical possibilities or impossibilities: can the water resources be increased? Can the existing vegetation be extended? Can the necessary energy sources be found? Can man be assured of sufficiently healthy living conditions? The answers to these questions depend on basic scientific and technical research in the field

of physics, chemistry, geology, hydrology, climatology, biology, pedology, ecology, sociology and so on. Impelled by curiosity or driven by necessity, people everywhere have long been engaged in certain of these branches of research, and with far from negligible results. However, they are still a long way from having solved all the main questions. A big effort matching that made in other fields of science is required in arid zone research, and the development of these areas will depend more on future studies than on the results already achieved.

The rôle of Unesco

The scientific problems involved in this case, though varying from one country to another, bear striking resemblances for all arid and semi-arid areas, for they are conditioned in the final analysis of phenomena within the range of physical and biological science. This means that studies made in one particular place will be applicable and adaptable to other places geographically remote from it.

Furthermore, the countries where the problem of arid zone development is most acute are usually those with the poorest scientific and economic resources and the greatest need of urgently enjoying the benefit of work done in better-equipped countries.

The universality of the results of arid zone research and the advisability of pooling them on behalf of all countries make this work an ideal field for international action, especially by Unesco, which is required under its Constitution to promote scientific research in order to improve man's living conditions.

It was back in December 1948, in Beirut, that the Unesco General Conference adopted a resolution proposed by the Indian delegation which instructed the Director-General to investigate various proposals concerning the establishment of international laboratories for arid zone research. The question was considered in 1949 on the occasion of the United Nations Conference on the Conservation and Utilization of Natural Resources, and in December of that year a committee of experts was convened in Paris to make detailed proposals for a Unesco arid zone programme. It took the view that the time was not ripe to create a specialized international institute, and recommended instead that Unesco formulate a special programme for assisting arid zone research. The expert committee's recommendations were sent to Unesco Member States for comment, and in line with the recommendations and the comments received an Interim International Arid Zone Research Council was convened in Paris in November 1950, its seven members being selected by the Director-General from nominations received from the Governments of Egypt, France, India, Israel, Mexico, the United Kingdom and the United States of America. It drew up the Unesco arid zone programme and recommended that Unesco establish an Advisory Committee to advise it on arid zone research. The recommendation was immediately carried into effect, and the Advisory Committee held its first session in Algiers in April 1951.

The programme, as based on successive resolutions by General Conferences and administered in accordance with the Advisory Committee's recommendations underwent continuous expansion from 1951 up to 1956.

The work plan was concentrated in each of those years on a major group of research problems: in 1952 it was hydrology and underground water, in 1953 plant ecology, in 1954 energy sources, with special reference to solar and wind energy,

in 1955 human and animal ecology and in 1956 climatology and microclimatology. For each of those subjects, the Advisory Committee recommended the preparation and publication by Unesco of special studies reviewing the research work done. The studies cover all the available information and bibliography on the questions dealt with and represent a critical evaluation showing the gaps in research programmes. They have also served as background documents for scientific symposia on the same subjects, organized jointly by Unesco and a Member State with a view to enabling leading world specialists to meet, present their research results and compare ideas.

Apart from concentration on particular subjects, work of special interest has also been undertaken on the Committee's recommendation: survey of institutions conducting arid zone research, preparation of maps showing the distribution of similar climatic conditions in arid and semi-arid areas, research on the utilization of salt water etc. In addition, a guidebook has been prepared for the assistance of those whose task it is to assemble the basic research data required in developing arid or semi-arid areas, with a view to facilitating co-ordinated research or enabling partial research work on those areas to be suitably directed.

Member States have been invited to submit the names of experts in the various fields of arid zone research with a view to setting up panels of voluntary consultants to advise on the organizational questions involved in executing the programme.

One of the main activities included in the programme has been the provision of financial assistance for basic research projects and for symposia or scientific publications relating to the arid zone, the projects being submitted to the Advisory Committee by research institutions or individual research workers with the support of the National Commission of the country concerned.

The arid zone programme, as outlined above, met with increasing success in the course of its development and everywhere inspired new interest in the problems with which it grappled. It was therefore not surprising when the Director-General, at the end of 1956, proposed that it form the basis of a Unesco "major project".

Major Project on Arid Zone Research

A major project has been defined as a "special Unesco activity selected from a priority area(It) must be of sufficient magnitude to ensure, within a given time, substantial and practical results in the solution of important problems and will generally involve the co-operation of different disciplines". Viewing scientific research designed to improve living conditions as a "priority area", it was possible, as a logical consequence, to group activities relating to the arid zone in a "major project" as from the budgetary period 1957-1958.

In practice, this modification of the programme essentially implies a substantial increase in the funds allocated for arid zone activities, the concentration of certain aspects of those activities on a geographical area over a fairly long period, and participation in the programme by other Unesco departments in addition to the Department of Natural Sciences.

The Ninth General Conference, which met in New Delhi in November 1956, adopted these proposals in its resolution 2.61, which specified that the General Conference, considering that the improvement of living conditions in those Member States which have extensive arid areas depends in great part upon the application of the results of scientific research, noting the decision of certain Member States in the region stretching from North Africa through the Middle East to South Asia to devote increased financial and other resources to the improvement of research on arid zone problems, noting also with approval the results achieved by the arid zone programme since its inception in 1951, had decided to approve the establishment for a period of six years of a major project for the improvement and co-ordination of research on arid land problems, especially in the above-mentioned area, and authorized the Director-General to promote the major project in consultation with the United Nations and the other Specialized Agencies and taking into account the advice of the Advisory Committee.

Thus the major project keeps to the general framework of the arid zone programme, especially as regards the collection and dissemination of information concerning arid zone research through the preparation of reviews of research and the organization of symposia and the encouragement of new research by the allocation of subventions for worthwhile projects, but at the same time it broadens the programme by providing the possibility:

- (a) of taking the initiative in promoting essential surveys and research on specific problems, the latter being conducted in the most suitable places and by the most suitable methods;
- (b) of contributing substantially towards the development of appropriate research institutes in the area from Morocco to India and by helping them to draw up their research programmes, train their staff and obtain necessary equipment;
- (c) of granting a substantial number of fellowships for training specialists in countries in that region, and organizing training and refresher courses;
- (d) of stimulating interest in arid zone problems by encouraging the establishment of national co-operating committees to work with Unesco;
- (e) of directing some of the activities of other Unesco departments towards arid zone problems: production of films, filmstrips and press and radio material by the Department of Mass Communication; pilot studies on the settlement of nomads by the Department of Social Sciences; production of audio-visual material on the conservation of natural resources by the Department of Education, etc.

It should be stressed, also that other Unesco activities are being integrated within the general framework of the Major Project more closely than hitherto. For example, the Field Science Co-operation offices - especially those for the Middle East and South Asia - are making themselves responsible for executing certain projects in the programme and are themselves organizing meetings, symposia, courses and seminars on the arid zone and acting as liaison centres and clearing houses.

The research and training activities undertaken as part of the Major Project are further supplemented and extended by the Technical Assistance Programme of the United Nations and the Specialized Agencies, in which Unesco participates and which seeks to promote the economic development of the beneficiary countries. The Technical Assistance programme provides specifically for sending experts and equipment to Member States and arranging for the training of specialists there at the State's request. A substantial part of the technical assistance funds at Unesco's disposal thus goes to projects connected with arid zone development.

The Major Project was launched in 1957: in June of that year, a detailed work plan was prepared by the Advisory Committee and approved by the Executive Board of Unesco on the basis of the programme and budget voted by the General Conference. The formulation and execution of the Major Project involve activities covering the most varied branches of science and technology and the co-operation of a whole host of organizations and institutions, which means that they (the activities) have to be subjected to close scientific control. The Advisory Committee, by its nature and composition, is the ideal instrument whereby Unesco can ensure that that control is carried out in the most effective way.

Advisory Committee on Arid Zone Research

The Advisory Committee has held thirteen sessions since its establishment, the first in Algiers in 1951 and the last in Karachi in November 1957. The intervening sessions were held in Paris (second, fifth, seventh, tenth and twelfth), Ankara (third), London (fourth), Montpellier (sixth), New Delhi (eighth), Tucson and New Mexico (ninth) and Canberra (eleventh).

Under its terms of reference, the function of the Advisory Committee is to "advise the Executive Board and the Director-General on the preparation and implementation of arid zone projects within the programme of Unesco". It is also authorized to give advice on scientific and technical questions concerning the arid zone which may be submitted at the request of one or more Member States, the United Nations or a Specialized Agency.

The number of Committee members was originally seven but has since been increased to ten to take account of Unesco's increased membership. The members do not represent their governments but are scientists and engineers of different nationalities whose specialities have familiarized them with the scientific and technical problems of arid or semi-arid regions. They are appointed for three years by the Director-General in consultation with the Member States of which they are nationals. The Committee may itself make suggestions and proposals to the Director-General concerning the selection of its members. The Unesco Secretariat provides the secretariat of the Committee, which normally meets once a year and is convened by the Director-General. The United Nations and the Specialized Agencies are invited to participate in its discussions without the right to vote.

The Committee examines and comments on the work plans in course of execution and on drafts of future programmes, and it is on its recommendation that subventions are granted for research projects, special studies undertaken, symposia and courses organized and assistance given for the development of particular research and training institutes.

These recommendations have been a major factor in determining the cause of Unesco's work on arid zones, and the Committee as a scientific advisory body is an essential part of the Major Project machinery.

Results of the programme

It is no easy matter to give a full statement of the work done by Unesco during the past few years in developing arid zone research. The most tangible results can be listed first:

(a) Symposia

The following scientific symposia of an international scope and character were organized jointly by Unesco and a Member State:

Symposium on Arid Zone Hydrology, Ankara, 1952

Symposium on Arid Zone Plant Ecology, Montpellier, 1953

Symposium on Wind and Solar Energy, New Delhi, 1954

Symposium on Arid Zone Climatology and Microclimatology, Canberra, 1956.

The next symposium in the series is to take place in Teheran in October 1958 and will be on arid zone salinity problems.

Unesco has also provided subventions for symposia organized by various scientific institutes in Member States. Still other symposia on arid zone problems have been organized by the Science Co-operation Offices:

Symposium on the Zoogeography of the Middle East, Istanbul, 1951

Symposium on Desert Research, Jerusalem, 1952

Symposium on the Scientific Problems of Land Utilization in the Arid Zones, Cairo, 1953.

Symposium on Desert Biology, London, 1954

Symposium on the Protection of Nature in the Near East, Beirut, 1954

Conference on the Future of the Arid Zones, Socorro, 1955.

Symposium on Applied Geology in the Near East, Ankara, 1955

Symposium on Erosion and the fight against it in Arid and Semi-arid Areas, Karachi, 1957

(b) Publications

Unesco has contributed financially towards the publications of a number of works on the arid zone. Its own publications on the subject to date are as follows:

Reviews of Research on Arid Zone Hydrology

Proceedings of the Ankara Symposium on Arid Zone Hydrology

Directory of Institutions engaged in Arid Zone Research (in English only)

Reviews of Research on Utilization of Saline Water

Proceedings of the Montpellier Symposium on Arid Zone Plant Ecology

Reviews of Research on Arid Zone Plant Ecology

Proceedings of the New Delhi Symposium on Wind and Solar Energy

Reviews of Research on Animal and Human Ecology

Guide-Book to Research Data for Arid Zone Development

Reviews of Research on Arid Zone Climatology

The following publications are in preparation:

Proceedings of the Canberra Symposium on Arid Zone Climatology and Microclimatology

Reviews of Recent Research on Arid Zone Hydrology

Reviews of Research on Medicinal Plants of the Arid Zone

(c) Subventions for research projects

The Advisory Committee has considered some sixty applications for subventions for research projects, of which only twenty-five were approved as being sufficiently original and general in nature and promising results within a reasonable time. The projects have been executed in all sorts of places, and have covered nearly every branch of science. Some of them have yielded notable results, while all have helped to swell the fund of human knowledge on desert problems and would probably not have been undertaken without Unesco's aid.

(d) Special assistance to particular institutions

As already stated, facilities exist under the Major Project for granting special assistance to appropriate institutes in the area from Morocco to India to enable them to consolidate themselves, formulate research programmes, train specialized personnel, fit out laboratories and thus become research or training centres of national or regional standing.

Assistance of this kind has been granted or recommended by the Advisory Committee to the following institutes after study missions conducted by certain of its members:

Egyptian Desert Research Institute, for equipping the hydrogeology, pedology, plant ecology and animal physiology laboratories and for the library;

Desert Institute, Beersheba, for equipping the human physiology, solar energy, climatology and demineralization laboratories, and for the library;

Institutes of Meteorology and Geophysics, Karachi and Quetta, for equipping the underground water research, microclimatology and solar and wind energy research laboratories;

Botanical Institute, Ankara, for equipping the plant ecology laboratory;

(e) Training of specialists

Training facilities are provided either in the form of study fellowships abroad or regional refresher courses and seminars. The Major Project at present provides for the annual award of ten fellowships through the Unesco Exchange of Persons Service. In addition, a series of training and refresher courses were recently initiated: a regional course on pedology and soil mapping, organized in conjunction with the Lebanese authorities at the Rayak Experimental Station in September 1957 and placed under the direction of Professor G. Aubert; a regional course on hydrogeology, organized in conjunction with the Egyptian Desert Research Institute in Cairo in December 1957 and placed under the direction of Professor A. Desio; and a regional course on plant ecology, organized in conjunction with the same Institute in February 1958 and placed under the direction of Professor L. Emberger.

(f) Special projects

Certain particularly important projects may concern an entire geographic region or even the entire globe, and involve close collaboration with other international organizations. For example, salinity problems in arid areas (which are to be the subject of a symposium in Teheran in 1958) are so important as to have warranted the creation of a special sub-committee to examine what action Unesco can take in this field. A clearing house system for exchanging information on the demineralization of salt water has been worked out and a survey is being made of laboratories concerned with the problem.

In addition, a massive scale three-year ecological survey of the breeding places of the desert locust, covering the entire stretch from North Africa to India (throughout which this insect causes its well-known depredations) is being planned in the form of a joint FAO-Unesco mission.

(g) Social science activities

Human problems are of primordial importance in the arid zone, and any development project which ignored them would be doomed to failure. These human problems have physiological or public health aspects which enter into the above-mentioned study programmes, conducted in collaboration with WHO and the competent international organizations. But they also have specific sociological, economic and legal aspects which concern the Department of Social Sciences. For example, a pilot project on the social adjustment of nomadic tribes to a settled existence is at present being undertaken in collaboration with the Iranian Government.

(h) Educational activities

An educational effort is essential at all levels to produce a general awareness of the importance of the arid zone problem. The "Guide Book to Research Data for Arid Zone Development" helps to give technicians, officials and administrators a clear idea both of the problem itself and of the many factors which have to be allowed for. The national committees set up to co-operate in the Major Project will also be of great help in this general educational task. But it still remains necessary to reach the mass of the population, and especially to instruct new literates in areas where the land conservation and reclamation problem is particularly acute.

To this end a contract has been signed with the International Union for the Conservation of Nature and of Natural Resources for sending a specialist to the Arab States Fundamental Education Centre at Sirs-el-Layyan (Egypt) to direct the production of suitable audio-visual material there.

(i) Public information activities

The promotion of public interest in, and understanding for, arid zone research in the various countries, and especially in the North Africa-South Asia belt, is an important item in the Department of Mass Communication's programme.

Press articles and radio scripts have been prepared on numerous occasions, while other material has been included in Unesco's own information pamphlets and in a special issue of the Courier devoted to arid zone research. Films, filmstrips, photo-poster sets and an information handbook have been, or are being, prepared on the subject.

(j) Co-operation with other international organizations

The United Nations and some of its Specialized Agencies are interested in arid zone research and development: the former deals with problems concerning the economic development of water and energy resources, while FAO has a direct interest in the application of research results to the more efficient use of soil and water for agriculture and forestry, WMO in the progress of meteorological and hydrological science, WHO in public health, and so on. Thanks to effective liaison, it has been possible not only to delimit the respective fields of action but also to create a co-operative atmosphere conducive to the co-ordination of programmes and execution of joint projects. Co-operation has been developed on the same lines with international scientific and technical organizations.

However, the results described above are only the most tangible of those achieved by Unesco in its efforts to develop arid zone research. Speaking more generally, those efforts had made it possible to mobilize research on a world scale in attacking problems which had hitherto been given too little attention. In consequence, there is now a network of scientific contacts between specialists the world over and a public awareness of the arid zone problem, especially in the countries where it is acute, which needs to be sustained and developed.

Future projects - Programme for 1959-1960

A preliminary draft programme for 1959 and 1960 has been prepared by the Secretariat and submitted to Member States and the Advisory Committee for comment. It will be discussed by the Executive Board, after which a revised draft will be submitted to the General Conference in November 1958.

The following resolution (2.61) has been proposed to cover activities under the Major Project for 1959 and 1960:

"The General Conference

Considering that the improvement of living conditions in those Member States which have extensive arid areas depends in great part upon the application of the results of scientific research;

Noting with approval the results achieved by the Major Project on Arid Lands Research which was established under resolution 2.61 adopted by the General Conference at its ninth session;

Noting the action taken with respect to this project by the Member States in the region stretching from North Africa through the Middle East to South Asia by devoting increased financial resources to the improvement of arid lands research facilities and by co-operating in activities devoted to the dissemination of information on research results;

Noting the agreements between Unesco and the various Member States concerning this project;

Authorizes the Director-General, in co-operation with the United Nations and the other Specialized Agencies, to continue work on the Major Project by:

- (a) obtaining guidance and counsel from the Advisory Committee on Arid Zone Research;
- (b) stimulating the creation and work of local co-operating committees;
- (c) collecting and disseminating information concerning research on arid land problems;
- (d) promoting contacts between research workers, through holding congresses and meetings, and improving the quality of research work through organizing training courses;
- (e) assisting research projects undertaken by competent individuals and institutes and national and regional research projects;
- (f) assisting in the training of research workers, technicians and laboratory personnel;
- (g) promoting appropriate educational activities;
- (h) preparing studies of sociological problems involved in the development of arid lands;

- (i) continuing public information activities designed to create greater awareness of arid land problems; and
- (j) co-operating with Member States, international non-governmental organizations, foundations and institutes which may wish to take part in the Major Project."

At its last session, in Karachi, the Advisory Committee devoted a very considerable part of its work to discussing the 1959-1960 draft programme, and examined the basic principles and objectives of the Major Project in the light of the experience gained in 1957 and of the work plan for 1958 with a view to the formulation in precise terms of the programme policy to be followed in future years. The activities undertaken should, the Committee felt, be mainly directed towards scientific research and the training of specialists, as the natural fields for Unesco's work. It considered that the funds available for the Major Project, although bulking relatively large in the Organization's budget, were small in relation to the magnitude of arid zone problems, and that a very strict selection of prospective activities was necessary. For example, economic exploitation and development projects - which in any case were primarily the responsibility of Member States and other international organizations - should not be included in the Unesco programme. The Committee felt, on the other hand, that scientific research, which was universal by nature, should be strongly encouraged, since there were far more arid zone problems awaiting solution than had already been solved. At the same time, everything should be done to ensure that knowledge acquired in various countries on the subject should be pooled for the benefit of all. This emphasis on research should be particularly marked in the area in which activities under the Major Project were concentrated, and in which those problems were acute. The development of research in the area from Morocco to India was closely dependent meanwhile, on the training of specialists and technicians and the strengthening of existing research institutes.

The Committee accordingly considered that the Major Project's main objectives were:

- to initiate the systematic study of fundamental scientific problems of the arid and semi-arid zones,
- to collect and disseminate the scientific information arising from studies on arid zone problems,
- to maintain adequate liaison between the scientists engaged in arid zone research all over the world with a view to facilitating the co-ordination of their results,
- to strengthen institutes devoted to research and training in arid zone subjects in the North Africa-South Asia belt,
- to promote in the same area the training of scientists and technicians in arid zone subjects, and
- to create greater awareness of the problems of arid zone research and development in the area through education and public information.

The Committee approved the text of the resolution set forth above and made a series of comments and recommendations on the proposed 1959-1960 programme, indicating the general policy best calculated, in its opinion, to achieve the aims of the Major Project.

In general, these comments make little change in the proposed programme and are mainly designed to guide its execution. The most important recommendations relate to assistance to the national co-operating committees, the importance of scientific symposia and training courses, the forms of assistance to institutes in the Major Project area, an increase in the number of fellowships offered to countries in that area, the publication of a liaison bulletin on the arid zone, etc. The Committee also recommended that the important programme of arid zone development projects which forms part of Unesco's contribution to the United Nations Technical Assistance Programme, should be even more closely integrated with the general activities of the Major Project.

Thus the projects for 1959 and 1960 provide for a continuation, adaptation and development of the current programme of the Major Project based on the experience gained and results achieved.

Rôle of Member States in the North Africa-South Asia belt

The States in this area will be the main beneficiaries of the work done under the Major Project, and they are also free to apply for United Nations' technical assistance for projects connected with arid zone development. This implies an active rôle on their part without which it would be impossible to achieve satisfactory results in executing the programme.

The General Conference resolution notes that these States are devoting increased financial and other resources to perfecting the facilities at their disposal for arid zone research and the training of specialized personnel. It is obvious that, however much assistance Unesco may provide, it can never amount to more than a small fraction of the financial and human effort necessary for equipping and operating modern research and training institutes. It was for this reason that the Advisory Committee laid down strict criteria to ensure that Unesco assistance is only provided for needs which cannot be directly met by the local institutes themselves. It is thus the responsibility of the Member States to take all necessary steps to raise the level of their research institutes by supplying them with the necessary credits, equipment and qualified staff. It is also their task to see that the institutes are accessible to foreign scientists wishing to work there and to ensure communication of the scientific results obtained.

They have an equally important rôle to play in the training of specialists. They should see that the candidates nominated for Unesco fellowships are wisely selected, and they would also be well advised to award additional study fellowships themselves in the same fields. Finally, the organization of national and regional refresher courses and seminars in conjunction with Unesco also involves a substantial material and financial contribution on the part of the host countries.

It was, in fact, because of the scale and importance of the rôle of the Member States co-operating on the Major Project that the establishment of national co-operating committees was originally suggested. The tasks of these committees will be many. In the field of information, they will have to make the public aware of the importance of the arid zone problem, through the medium of the press, radio and cinema, and publicize Unesco's work. If necessary, they could translate and publish general documentation on the subject. As regards education, they could disseminate suitable educational material among new literates or in schools and organize seminars and study tours for young research workers, arrange discussions, lecture courses etc. The form the committees take in each country will depend, of course, on the administrative system and local traditions. They may be purely private bodies in some countries and official ones in others. But in any case they should enjoy the backing of the local authorities, who will find them valuable allies in their arid zone research and development programmes. The initiative for setting them up obviously rests with the individual Member State, and all Unesco can do in this connexion is to make suggestions and possibly provide initial help in accordance with the Advisory Committee's criteria.

The ultimate aim of the Major Project is the application of scientific research to improvement of living conditions. Unesco's efforts will thus find their ultimate expression in the arid and semi-arid zone development projects which the Member States are eventually able to undertake on the strength of the scientific results obtained and thanks to the specialists trained under the Major Project.

Rôle of the other Member States

The co-operation of all Member States engaged in arid zone research is essential to the success of the Project. Countries such as Australia, the United States of America, France, Mexico, the United Kingdom, the Union of Soviet Socialist Republics and others have large numbers of specialists dealing with arid zone problems, either because these problems arise in their own territories or in territories administered by them or because they devote large sums to scientific research. Their rôle will be to make their results generally available, lend the services of their leading specialists and intensify their work in all fields of arid and semi-arid zone research. In addition, their governments and private institutes will signally contribute towards the Major Project by offering fellowships and organizing study and lecture tours for the benefit of countries in the Morocco-India belt.

In this way, the Major Project on Arid Zone Research will have succeeded in mobilizing the efforts of the whole scientific world in grappling with one of the most important problems of our age.