

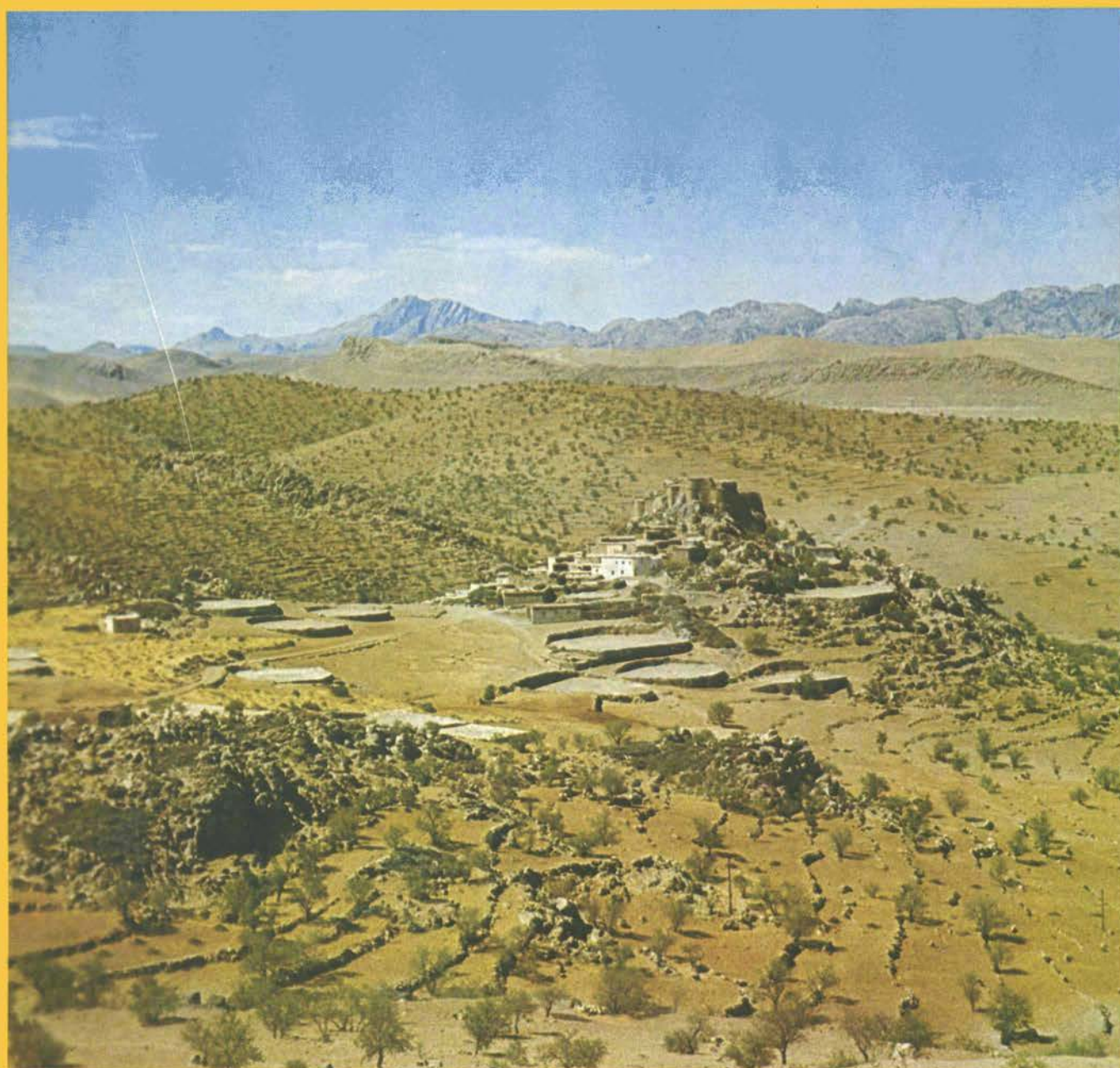
**United Nations Environment Programme**

# **Desertification Control Bulletin**

**A Bulletin of World Events**

**in the Control of Deserts, Restoration of  
Degraded lands and Reforestation**

**Supplement to Number 10, October 1984**



- The United Nations Conference on Desertification (UNCOD) was held in Nairobi from 29 August to 9 September 1977.
- This was the first worldwide effort ever initiated to consider the global problem and responsibilities posed by the spreading deserts.
- 95 States, 50 United Nations offices and bodies, 8 intergovernmental organizations and 65 non-governmental organizations participated.
- The United Nations Conference on Desertification prepared and adopted a worldwide Plan of Action to Combat Desertification (PACD) with 28 specific recommendations.
- The Plan of Action was approved by the United Nations General Assembly at its 27th session on 19 December 1977.
- Recommendation 23 of the Plan of Action invited all relevant United Nations bodies to support, in their respective fields, international action to combat desertification and to make appropriate provisions and allocations in their programmes.
- Recommendation 27 gave the responsibility for following up and co-ordinating the implementation of the Plan of Action to the United Nations Environment Programme

(UNEP) with its Governing Council (GC) and Administrative Committee on Co-ordination (ACC).

- Immediately after approval of the Plan of Action, the Desertification Branch was established within the UNEP Office of the Environment Programme to serve the Executive Director and ACC in carrying out their tasks in the implementation of the Plan of Action.
- One of the main functions required by the Plan of Action from the Desertification Branch was to prepare, compile, edit and publish at six-monthly intervals a newsletter giving information on programmes, results and problems related to the combat against desertification around the world.

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# Desertification Control Bulletin



United Nations Environment Programme

Supplement to No. 10 October 1984

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*Terraced agriculture in the arid Anti-Atlas mountains of Southern Morocco.*

*Photo: Daniel Stiles*

*Desertification Control Bulletin* is an international bulletin published at six-monthly intervals by the United Nations Environment Programme (UNEP) to disseminate information and knowledge on desertification problems and to present news on the programmes, activities and achievements in the implementation of the Plan of Action to Combat Desertification around the world.

Articles published in *Desertification Control Bulletin* express the views of their authors, not necessarily those of UNEP.

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### A Message from the Executive Director

The twelfth session of UNEP's Governing Council was a singularly important occasion for the United Nations Environment Programme. It was held at the new United Nations Office at Gigiri, near Nairobi, from 16 to 29 May 1984. The meeting was a milestone along the path towards the control of desertification because it was the forum for presentation of the Executive Director's General Assessment of Progress in the implementation of the Plan of Action to Combat Desertification. This report accounts for the seven year period since the 1977 conference. Two days, 17 and 18 May, were set aside for consideration and debate by the Governing Council of the findings and of the recommendation for future action presented in the report.

The purpose of this supplement to *Desertification Control* is to report on the outcome of the Governing Council's consideration of the General Assessment which has been succinctly expressed in the Council's decision 12/10 of 28 May 1984. The decision clearly identifies UNEP's future priorities in the fight against desertification. It is an ambitious directive that will lead the Desertification Branch of UNEP into many new and crucial areas and activities. Future work plans and budgets on how to implement this decision are now being formulated and the results will be communicated in future issues of the Bulletin.

Arresting desertification is one of the greatest environmental challenges facing humanity over the next two decades. UNEP's task in this big challenge has been defined. It is small in comparison to those of national governments in affected countries, of governments not affected but concerned with the threat of desertification and of organizations and bodies—national, regional and international that recognize the horrendous consequences of desertification. But, we in UNEP cannot succeed without the support and co-operation of the international community and the goodwill



of every person who reads this bulletin. As a poster on desertification prepared for World Environment Day declared, "People cause desertification— only they can stop it".

Mostafa K. Tolba  
Executive Director  
UNEP



## The Governing Council Decision 12/10 — Desertification

Recalling its decision 9/22 of 26 May 1981 on action to combat desertification,

Having considered the report of the Executive Director on the general assessment of progress in the implementation of the Plan of Action to Combat Desertification, 1978-1984 and the report of the Administrative Committee on Co-ordination, as well as the relevant parts of the Executive Director's annual report and his report on programme matters,

1. Expresses its appreciation to the Executive Director for his comprehensive and action-oriented report;
2. Also expresses its appreciation to the Administrative Committee on Co-ordination for its analytical report;
3. Notes with great concern that during the period under review desertification has continued to spread and intensify in developing countries, and particularly in Africa;
4. Reconfirms the validity of the Plan of Action to Combat Desertification, and the general appropriateness of the institutional arrangements established by the General Assembly for the follow-up of its implementation;
5. Endorses the view of the Executive Director that the implementation of the Plan has to be more focused on the most affected countries and on actions to arrest desertification giving priority to areas offering the best chances for substantial rehabilitation;
6. Expresses its satisfaction with the initiative of the Secretary-General of the United Nations in establishing the Office of the United Nations Secretary-General's Special Representative on the African Social and Economic Crisis, a crisis caused among other things by prolonged drought;
7. Appeals to all Governments, organizations of the United Nations system and other intergovernmental and non-governmental organizations to give due consideration to strengthening their financial and technical support to the countries of the Sudano-Sahelian region;
8. Takes note with satisfaction of the positive experiment undertaken by the United Nations Sudano-Sahelian Office as a United Nations Development Programme/United Nations Environment Programme joint venture in providing support to 19 African countries, on behalf of the United Nations Environment Programme, in implementing the Plan of Action;
9. Requests the Executive Director to approve for the United Nations Sudano-Sahelian Office concrete biennial programmes with specific goals to allow the governing councils of both the United Nations Environment Programme and the United Nations Development Programme to measure achievements within the framework of the implementation of the Plan of Action;
10. Decides to include Ghana and Togo among the countries eligible to receive assistance through the United Nations Sudano-Sahelian Office in implementing the Plan of Action to Combat Desertification;
11. Urges Governments of countries suffering from or prone to desertification to consider favourably giving priority to the establishment of national programmes to combat desertification and also to consider establishing appropriate national machinery for that purpose, bearing in mind as appropriate the recommendations contained in chapter VII, section C of the report of the Executive Director, and to give particular emphasis to designing such programmes in harmony with existing social, cultural and ecological systems of the peoples involved;
12. Authorizes the Executive Director to assist, as appropriate, Governments which so desire in the above endeavours;
13. Also authorizes the Executive Director to assist Governments in applying, in the context of the implementation of the Plan of Action, appropriate land use policies in arid, semi-arid and subhumid regions suffering from intensive soil degradation which diminishes the potential of the land;
14. Urges Governments and international bodies to consider:
  - a) Examining their ongoing and planned development projects to ensure maximum effectiveness in combating desertification;
  - b) Completing the national assessment of desertification and establishing mechanisms to monitor the status and trends;
  - c) Reviewing and revising accordingly policies and practices which serve as impediments or disincentives to successful desertification control measures at the local level;
15. Emphasizes the importance of regional co-operation as an effective means of increasing the efficient use of financial and technical resources, with particular emphasis accorded to co-operative research, training and information exchange;
16. Reaffirms the importance of the role of non-governmental organizations in the implementation of



## Governing Council Decision 12/10 – Desertification

- action-oriented projects, and the need for continuing support for their actions;
17. *Reaffirms* the central role of the United Nations Environment Programme in catalysing, co-ordinating and assessing the implementation of the Plan of Action at the international level;
  18. *Calls* upon all countries, in particular the developed countries and those in a position to do so, to increase their assistance to countries suffering from desertification, including the financing of sub-regional and regional programmes, and to contribute to the Special Account created under General Assembly resolution 32/172 of 19 December 1977;
  19. *Welcomes* General Assembly resolution 38/163 of 19 December 1983, and fully supports the intention of the Executive Director to request on behalf of the Secretary-General all Member States that have not yet done so to provide as soon as possible their comments to the Secretary-General in order to allow the General Assembly to consider taking a decision at its fortieth session on measures designed to obtain additional and predictable financing;
  20. *Invites* all Governments, particularly those of donor members, to become more involved in the work of the Consultative Group for Desertification Control, especially in the process of formulation of projects to be presented to the Group;
  21. *Requests* the Executive Director to consider the implementation, in permanent consultation as the case may be with the Governments concerned, the Consultative Group for Desertification Control, regional organizations and regional intergovernmental meetings, of the recommendations for regional action and overall support contained in chapter VII, sections D and F, of his report;
  22. *Decides*:
    - a) To request the United Nations Development Programme, the United Nations Fund for Popula-
- tion Activities and the other United Nations organs concerned to implement their agreement in the Environment Co-ordination Board in 1978 to provide additional staff support for the Desertification Branch;
- b) To authorize the Executive Director, should no response, or only a partial response, to that request have been received within six months, to seek from the Governing Council, if necessary, the appropriations to enable him to make use of up to five posts, as required, from those frozen for 1984-1985 to supplement the present establishment of the Branch;
  - c) To request Governments in a position to do so to second qualified and experienced personnel to the Desertification Branch at their own expense, the numbers, duration of assignment and specific functions of such personnel to be at the discretion of the Executive Director;
23. *Further decides* to give the Desertification Branch a greater degree of autonomy in fulfilling its functions by establishing it as a programme activity centre, with the priority tasks of building up and disseminating to Governments a data base on desertification control, including case studies, evaluations, national focal points concerned with developing national programmes, projects being undertaken, sources of expertise within countries, individual experts with relevant experience, non-governmental organizations active in the field, etc., drawing, where possible, on information already available within and outside the United Nations Environment Programme, notably the Global Environment Monitoring System and the International Referral System for sources of environmental information;
  24. *Invites* the General Assembly to expand the role of the Consultative Group for Desertification Control to include explicitly responsibility for advising the Executive Director on:
    - a) The progress and effectiveness of activities implemented under the Plan of Action, identifying constraints and possible solutions
- to problems, taking account of relevant evaluations and case-studies;
- b) Programme priorities of the United Nations Environment Programme;
  - c) Measures required to improve implementation of the Plan of Action on a regional and world-wide basis;
25. *Requests* the Executive Director to examine and clarify the functions and outputs of the Inter-Agency Working Group on Desertification, and to recommend to the Governing Council at its thirteenth session appropriate changes for action to ensure full consultation and co-operation between the agencies of the United Nations;
  26. *Authorizes* the Executive Director, in accordance with the relevant resolutions of the General Assembly, to submit on behalf of the Governing Council a progress report on the implementation of the Plan of Action to Combat Desertification, based on the relevant parts of his annual report and the comments of the Governing Council thereon, to the General Assembly at its thirty-ninth session through the Economic and Social Council;
  27. *Also authorizes* the Executive Director to submit on behalf of the Governing Council, in accordance with the relevant resolutions of the General Assembly, a progress report on the implementation of the Plan of Action to Combat Desertification in the Sudano-Sahelian region, based on the relevant parts of his annual report and the comments of the Council thereon, to the General Assembly at its thirty-ninth session through the Economic and Social Council;
  28. *Decides* that a further overall assessment of progress in the implementation of the Plan of Action to Combat Desertification should be carried out in 1992;
  29. *Requests* the Executive Director to report to the Governing Council at each of its sessions on progress in the implementation of the Plan of Action to Combat Desertification.



## Back to the war

### UNEP's Governing Council Pledges its Recommitment to the Global Struggle Against Desertification

James Walls

The war against desertification is being lost, the Executive Director of the United Nations Environment Programme, Mostafa K. Tolba, told UNEP's Governing Council at its Twelfth Session, held last May in UNEP's new headquarters in Nairobi. His words found an echo in Kenya itself, now in the third year of the worst drought in recent memory.

Yet the advance of deserts can be stopped, as Dr. Tolba also said to his Governing Council. As he expressed himself:

A headline recently appeared in a major western newspaper which said: *March of Deserts Unstoppable*. This fatalistic message is not the one we wish to convey . . . when plans are realistic, they are workable, and when people are properly motivated, they can combat desertification.

In its two weeks of deliberations, the Council responded with determination to the Executive Director's call for a recommitment to the struggle against one of mankind's most formidable enemies. Among other measures it approved, the Council would enlarge the mandate of the Consultative Group on Desertification Control (DESCON) and bring UNEP's Desertification Branch up to full strength.

#### *A model for all problems*

The occasion was the first major review of progress made under the Plan of Action to Combat Desertification, that Plan that had been approved at the United Nations Conference on Desertification, which met in Nairobi in October, 1977.

The review was extensive, the Governing Council taking a special two days to complete it. The discussions were sometimes exciting, sometimes tedious. As they continued, an observer might have gained the impression that desertification was a problem that became a kind of model for all problems, that it was an issue embodying the essence of development even though its focus was on agriculture rather than on industry and

the project, must be involved in planning and execution.

No actions require the application of these two principles more expressly than campaigns against desertification. Projects designed to preserve the land can reverse their effects and cause desertification when not embedded in a planned context. Furthermore, the realization has grown that the land will be ravaged when the people who work it lose their



*The new United Nations Office complex in Nairobi which was inaugurated at UNEP's twelfth Governing Council in May 1984.*

even though campaigns against desertification are directed toward mere maintenance and preservation rather than toward the production of new and advanced infrastructure and the release of new ways of life.

Four decades of development experience, with its mix of successes and failures, have led to a conviction, first of all, that development planning must be holistic, that is, it must strive to consider every possible effect, and second, that the people most intimately concerned, those who will live with

control over it. As the Governing Council agreed:

. . . practitioners of nomadism (have) historically evolved prudent grazing control systems. Recently, however, nomads (have) been compressed into smaller areas . . . and the traditional way of life disrupted.

Again, like development in general, desertification can be combated only in a long-term outlook. Like development, the war on desertifica-



## Back to the war

tion is sabotaged by the diversion of resources to short-term needs. Thus, the solution to the problem of land loss becomes a model for development and for ways of financing it, and if ways can be found that are adequate to the issue, they will serve as a beacon illuminating solutions to the other massive problems of the developing world.

### *The United Nations Conference on Desertification*

In the postwar years, agronomists and soil scientists began issuing warnings that desertification was accelerating its depredations and that the loss of useful land was reaching rates that could be taken as ominous by the mid-1970s, a total area equal in size to Hungary or West Virginia was each year passing out of use as pasture, cropland or irrigated acreage.

These warnings attracted little public attention until they were given focus by a major international disaster. This was the Great Drought in the Sahel, that region of Africa bordering the Sahara on its southern side. Between 1968 and 1974, a succession of dry years ravaged that region, destroying vegetation and livestock and setting into motion huge streams of refugees whose lives and livelihoods had been shattered.

The drought was intimately connected with desertification, that insidious process whereby soil loses its nutrients or erodes away and the earth becomes sterile, barren of plants and incapable of supporting livestock. Indeed, the drought was spoken of as "an engine of desertification", although drought in general is temporary, cyclical, something to be expected in almost all climates, while desertification is insidious, unexpected and permanent.

In their reviews of desertification, scientists associated with the United Nations Conference on Desertification (UNCOD) concluded that this deadly process is caused by man, mainly by human misuse of fragile ecosystems. Thus, humanity was portrayed at UNCOD as both agent and victim of desertification. If this was a comment on human beings, it was, paradoxically, a hopeful conclusion. For if man was the villain who was bringing on desertification instead of something as inexorable as climatic change, then man might set things right again and bring desertification to a halt. Human beings only had to in-

roduce or return to proper land-use practices.

This was the optimistic outlook of the Plan of Action to Combat Desertification. The provisions of the Plan included a set of prescriptions for halting desertification in three distinctive ecosystems—pasturelands, rainfed croplands and irrigation systems. If the prescriptions were applied without delay, so the Plan declared, desertification could be ended by the turn of the century. And the Plan called for a review after seven years to check on the progress made toward that goal.

### *Six Years after UNCOD*

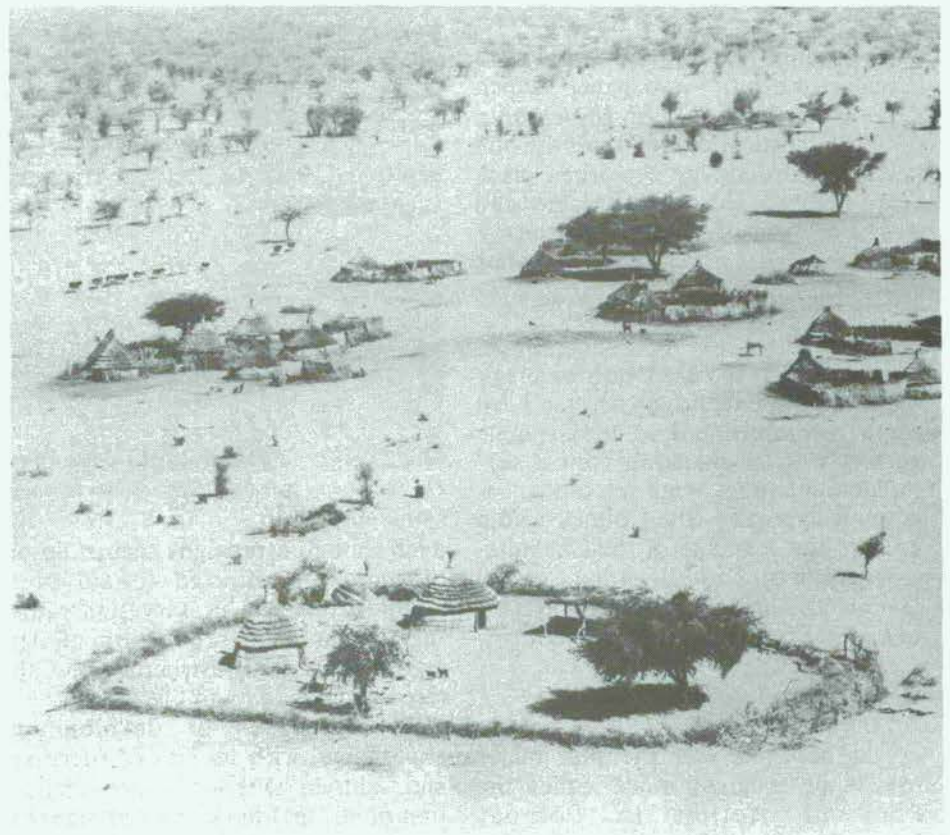
A comprehensive account of what had been accomplished since UNCOD in combatting desertification was co-ordinated by UNEP's Desertification Branch and presented by Dr. Tolba as a written report to those attending the Twelfth Session of the Governing Council. In his opening address he said to the Council:

**Those who held such high hopes after the Desertification Conference**

that we would now be on course toward achieving the goal of stopping desertification by the turn of the century will find the report depressing reading. The assessment finds no signs that the war against the spread of desert-like conditions is being won . . . The sufferings of the millions of the poor in the semi-arid regions should be on all our consciences.

It is, indeed, a problem more of people than of land, as he went on to emphasize. And the response made to the problem has been woefully inadequate, just as he had repeatedly informed the Governing Council—not to say the world at large—in the six years since UNCOD.

. . . the response by developed and developing countries alike has been totally inadequate. Many of the Plan's recommendations remain a dead letter. Virtually nothing, for example, has been done to implement the (Plan's proposed) transnational projects, and as of today, the Special Account set up by the General Assembly in 1980 has received only \$50,000.



*Six million hectares (60,000 sq km) of productive land are lost every year to the desert. As this village grows the patch of desert it is creating will also grow.* (Earthscan/Mark Edwards)



Land continues to be turned into desert at a rate of six million hectares a year. Useful land is losing its economic productivity at a rate of 21 million hectares a year. What is alarming is that this is even faster than the rate of loss as estimated in 1980.

... the poor who live in the world's drylands and subhumid tropics are locked into a cycle of destruction. They are bewildered and angry, and they are looking to governments, to the United Nations and to other organizations... for solutions.

Because Mostafa Tolba had said this before—and not only he but drylands specialists and scientists as well—the seven-year review had been advanced by one year. As originally scheduled by the nations meeting at UNCOD, it would have been undertaken in 1985 at the Thirteenth Session of UNEP's Governing Council, when seven years of experience under the Plan of Action would have been completed. Instead, the analysis preparatory to the review was carried out in 1983-1984, its timetable put forward by a compelling sense of danger and urgency. For the trouble with desertification is that it does not wait. The longer the delay in coming to grips with it, the harder it is to deal with it, and the more expensive becomes the restoration of degraded land.

### *Destroying the Future*

How has the present situation come about? How can it be that the war against desertification is being lost? A list of reasons has been drawn up to account for what must be considered a massive failure of will and intelligence. These reasons came up in the discussions in the Governing Council, where it was remarked that nations, including some of those most affected, have failed to grasp the magnitude of the problem, that the lack of funding to combat desertification reflects the low priority given the problem, that desertification is a new issue which has not yet made a place for itself on the international agenda. This list could be extended, but in Nairobi, two reasons in particular received special attention.

The first of these was the surprising assertion that development itself might be responsible for instances of desertification. Especially develop-

ment imposed from outside, as Dr. Tolba expressed it—unfamiliar technologies and the shattering of traditional land-use practices can have negative results on the conservation of useful soils. The views and the practices of those most concerned must always be taken into account, as he said. "Popular participation", as it is called, has become one of the cardinal principles of development in general. It is a principle from which campaigns against desertification are not exempt.

The second reason referred to national priorities, to commonplace but unfortunate circumstance that long-term perspectives lose out in competition with urgent and immediate needs. This is a condition of political life which must be demolished if desertification is to be combated successfully. In the words of the Executive Director:

The failure to make funds available lies in the reluctance to plan for the long term, for our children. Investment in anti-desertification by its very nature can only produce comparatively modest, though largely secure, returns over a period of decades. Overcoming this constraint depends on a new preparedness by governments to change their time horizons for planning.

Desertification presents a number of countries with no alternative. The failure to undertake long-term planning will in the end prove fatal to them. Their landscapes will become deserts—in the Sahel, mere extensions of the naked Sahara. Such countries:

are confronted by a process whose destructive effects are comparable with a nuclear weapons exchange; slower perhaps, but no less damaging to people and the web of life that supports them.

Such countries can look forward to no future. Their attention is centred on short-term needs when soon—just beyond the short-term—they will have no needs at all. Mostafa Tolba described the situation bluntly. Such countries, by failing to take desertification into account, "are destroying their future".

### *A Cause Worth Reconsidering*

The situation indeed gave rise to

apocalyptic pronouncements; desertification is that sort of issue. At the same time, a current of hard common sense ran through the debates in the Governing Council. As UNCOD had declared, so Tolba continued to insist that in dollars and cents terms, the war against desertification was well worth waging.

The resources that need to be mobilized are not massive; the current estimate of the investment required each year is \$4.5 billion... The cost of neglect has been shown to be five times greater than the total cost of action.

Yes, neglect presents its bill to be paid. UNEP estimated it at \$520 billion over a 20-year period *in loss of agricultural product alone*. Out of this, simple arithmetic yields a cost-benefit ratio of five-to-one. Yet all told, the economic benefit of halting desertification is vastly greater even than that. A loss of \$520 billion in agricultural production must be placed on the debit side of the global ledger *every 20 years*. In one century alone, this loss would add up to the incredible sum of \$2.5 trillion, and that without taking into account the ravages resulting from *further* desertification.

In such figures, desertification is shown to be a paradigm for all development issues. For development itself is a long-term concern, its advance hampered by the nagging pressure of short-term needs. It becomes apparent that the failure to deal with desertification has happened for many of the same reasons that have stalled development through much of the Third World. If the apathy and inertia surrounding desertification could be conquered, this alone might well break a pathway to the solution of more general development issues. Success in combating desertification could well put development back on the track.

### *Paths to Achievement*

The seven-year review may have constituted "depressing" reading, yet working against gloom was the insistence—the reiterated insistence of what was said at UNCOD—that desertification can indeed be stopped. All those involved in the review—scientists, administrators, UNEP and its Governing Council—agreed that



## Back to the war

the Plan of Action to Combat Desertification was still valid, that it still showed what must be done if desertification is to be brought to a halt. The Plan of Action is a comprehensive document—perhaps too comprehensive in the opinion of some. Dr. Tolba proposed to concentrate on seven of its measures over the next few years:

- To improve land-use planning in the drylands.
- To give priority attention to productive land at the highest risk.
- To concentrate on improved water management.
- To emphasize training and applied studies so as to improve national capabilities.
- To go down to the level of small community projects.
- To overcome political constraints to regional co-operation.
- To launch a meaningful effort at the international level.

A major thrust of all action will be to overcome the reluctance of governments to give high priority to campaigns against desertification and to engage in the long-term planning that such campaigns entail:

With so many . . . immediate and pressing problems, governments may feel they cannot afford to concentrate on long-term development projects like range management and agro-forestry which produce so few exportable surpluses. If this meeting is to be a success, we must show them why they cannot afford *not* to.

Planning lies at the heart of the struggle to contain the ravages of desertification. The loss of valuable land is a phenomenon that especially demands integrated, long-term, planning. A host of individual projects carried out to improve pastures and croplands—feeder roads, watering points, dams, power projects—have in the past actually given rise to desertification because their full impacts were not taken into account or because they were never incorporated into a system of planned use. Roads, for example, can play havoc with natural drainage. Deep wells and boreholes intended to open up new pastures can generate localized overgrazing if their use is not carefully regulated.

The Plan of Action calls on countries, in turn, to develop comprehensive national plans to combat

desertification. On the whole, this call has not been answered. Of the scores of countries affected by desertification, only three have drawn up national plans of action. Such plans would logically be followed by the establishment of national machinery to carry out what is called for in the plans. Only one country has set up such machinery.

A properly funded and strategically placed national machinery would act as a forcing house in the overall governmental process, ensuring that all development plans take account of desertification. It would also act as a point of leverage for raising additional funds from donor nations and multilateral organizations.

Some countries have actually rejected long-term planning against desertification as specifically in conflict with immediate development needs. Such countries have to be shown that this is not truly in their best interest. As Tolba put it, "economic self-interest, compassion, and concern for the fate of coming generations are the motivations" that must be appealed to.

Governments may also need concrete demonstrations that stopping desertification will in fact yield them benefits. This is one of the reasons for the move to the level of communities. In small-scale projects, success displaying unmistakable benefits can be achieved fairly quickly. The next step would be to publicize such successes. Decision makers must be shown what can be done.

But, as the discussion revealed, there was another powerful reason for centering attention on local communities. This was that "the people most affected are helped to help themselves". Without this:

The battle against desert encroachment cannot be won...Our assessment shows that the effectiveness of small-scale projects focused on local problems compares very favourably with the larger, most costly, downward-directed schemes promoted by governments and development agencies.

Examples of local successes could already be produced from China, for example, or from India or Ethiopia. When people were involved from the outset, when their basic motivations were touched, they joined enthusiastically in projects of reforestation, or



Stopping desertification depends on the people affected working together and becoming involved in their own destinies. Here, in Hazara, Pakistan, these women are cutting fodder for cattle which are being kept out of an afforestation area. (WWF/F. Mattioli)



terracing, or sand-dune control. And because it was their own work, assurances followed that the work would be maintained in the years to come.

### *In the Play of Time*

Only seven years have passed since the Conference on Desertification, yet that has been time enough to plunge the world into a situation quite different from what it was in 1977. The prosperity of earlier decades gave way in the late 1970s to economic recession, bringing with it a crisis of foreign debt that affected most of the developing countries and contributed to the stagnation of economic development. Nations entered an era of severe financial constraints. UNEP and its Governing Council were led to conclude that increased funding will probably not be available to combat desertification.

So it was that other issues captured the attention of a public which seemed to have forgotten about desertification. UNCOD generated a burst of concern over the accelerating loss of useful land, but the clamour and concern died away quickly. Before the Conference had even convened, normal rainfall had returned to the Sahel—or so it seemed—and the crisis of West Africa appeared to be over. With a sigh of relief, the international community could move on to other matters.

And besides, wasn't it true that money and machinery had been brought to bear on the Sahel in amounts suggestive of a permanent solution to the region's severe problems? The drought crisis had brought forth assistance to this remote area from donors who, prior to the crisis, had scarcely heard the names of the countries affected. With CILSS, the Intergovernmental Committee to Combat Drought in the Sahel, the governments of those countries had taken a cooperative, regional approach to their problems. And CILSS had summoned forth UNSO, the United Nations Sahelian Office, as a coordination mechanism for insuring permanent international support to the region. UNSO's mandate was soon expanded to deal with desertification as well as with drought, bringing a change of name to the U.N. Sudano-Sahelian Office and the acquisition of joint support from UNEP and the United Nations Development Programme (UNDP). UNSO, with its re-

gional focus on countries sharing common problems, came to represent a unique and distinctive approach within the international play of efforts to bring about development. The impact of UNSO worked in support of long-term perspectives and against the transient pressures of immediate needs.

A deteriorating global economy and the loss of the sense that desertification confronted the world with a gathering crisis combined to reduce the prospects that the war against desertification would be resumed with the fervor it required. Against this unhappy combination, however, other factors were at work to turn attention back to the loss of valuable land.

One such factor was a growing awareness that development was simply not going to take off without much greater attention being given to the agricultural base, which meant to pastoral and farming populations, to remote and generally powerless people. These were of course the very people whose lands and livelihoods were undergoing degradation, and shifting the gaze to them brought it fully to bear once more on desertification.

Second was the profound deception in the fact that the great drought had not ended after all. It returned in full force after UNCOD adjourned, as though the Conference had been merely an annoying interruption, opening its dry embrace to include the Horn of Africa and southern Africa as well. In fact 1983 might well take its place in Africa as the worst year for climate in living memory. The persistence of drought in Africa has indeed raised some critical questions. Was the climate changing? Had desertification advanced to the point where its feedback mechanisms had permanently transformed the African climate? These were questions to which no certain answer could be given.

Yet there in the play of time, unchecked desertification—joined with economic crisis and unchecked population growth—threatened the Sudano-Sahelian region with a disaster of shocking magnitude. There seemed to be some public reawakening to this harsh possibility, as the Governing Council realized. The extent that this possibility was understood would be measured by the intensity with which the war on desertification comes to be activated.

### *Girding for the Battle*

Besides agreeing that the Plan of Action was still valid, the Governing Council was in unanimous accord on another fundamental point. This was that UNEP was still the proper agency within the United Nations system to coordinate action under the Plan.

It was decided also that UNEP's mechanisms for carrying on the war must be strengthened. Almost seven years of experience was worth something, and what it showed was that UNEP could not be expected to have success in battle if it were not fully armed. All elements for the Environment Programme, Governing Council as well as Secretariat, must join the combat with fresh determination. Special attention must be given to the three bodies created in the wake of UNCOD to serve UNEP in its guiding role.

The first of these was the Interagency Working Group on Desertification. Questions about the effectiveness of the IAWGD led the Governing Council to review its functions—the thematic joint programming of the actions to be undertaken, coordination of this action within the United Nations family, providing information on coordinated action. These were necessary functions, as Dr. Tolba pointed out. Rather than disband the Group, as had been suggested, he urged that it be strengthened, and the Governing Council agreed that it should be.

Second was the Consultative Group for Desertification Control (DESCON) composed of affected countries, representatives of donor countries and international sources of financing. In the seven-year review, DESCON had been assessed as afflicted with low morale, its members having judged their own performance as insufficient. Yet DESCON need not be ineffective, as the Governing Council agreed. A reactivated war on desertification had to include a reactivated DESCON. Its fund-raising function remained essential to the war, and DESCON would continue the difficult assignment of finding financing for the long-term actions involved. The Council endorsed the Executive Director's proposal that DESCON undertake the additional task of reviewing progress under the Plan of Action and of advising the Executive Director on priorities and on



## Back to the war

approaches to the removal of constraints.

Finally, there was the Desertification Branch, an integral part of UNEP that had never been brought to full strength because of perennial financial constraints. The Governing Council was strongly in favour of a full staff, whether by financing all the posts originally envisaged or by seconding experts to the Branch from donor countries.

A fully staffed Desertification Branch would inevitably be charged with increased responsibilities. It would continue to act as the central information base and to provide a periodic compendium of activities. It would go on working with governments on the elaboration of national plans of action and on the establishment of national machinery to carry out what the plans intended. In addition to its accustomed activities, however, the Branch was henceforth to serve as a programming centre, coordinating the global attack on desertification in full cooperation with the specialized agencies.

### Interconnections

The suggestion seemed inevitable that the world's drylands, especially those suffering from drought, would be well served by agencies of the type of UNSO. The United Nations Sudano-Sahelian Office has received the endorsement of seeing its authority progressively extended, with the Twelfth Session adding to it the countries of Ghana and Togo, making a total of 21. Nor should the UNSO concept necessarily end there, as the Executive Director went on to say. Agencies working in UNSO's integrative style might be set up to combat desertification in South Asia and South America as well.

Its integrative style is the key to UNSO's success. Its recognition that desertification touches on everything else. When, in 1978, UNSO became an anti-desertification agency working on behalf of UNEP, inevitably it found itself working on the broad problems of development in the countries within its orbit. Such interconnections, constituting the Third World's *problematique*, were emphasized by Mostafa Tolba:

Everything—every event, every promise, every success—depends



Industry can also help—here at the Bamburi cement factory in Kenya afforestation around the plant prevents soil erosion.

on everything else. Environment issues are development issues, and vice versa.

Nowhere is the *problematique* more intractable than in the Sudano-Sahelian region. It accounts for the extreme difficulty of bringing desertification to a halt along the Sahara's southern rim. Grinding poverty, explosive population growth and the destruction of traditional ways of life are factors contributing to the devastation of once-productive land. The harsh conclusion follows that the pastures and croplands of the Sudano-Sahelian region can be rescued only through solutions to the region's wider problems.

The countries of the Sahel have seemed uninterested in efforts to reduce their rates of population growth. This was an issue raised at the Governing Council meeting—not only by Dr. Tolba but by the world Bank as well—and with a clear sense of urgency. As the World Bank said:

...in addition to external factors, two major constraints on the development of Sahelian Africa (are) a

steadily growing population and a limited and marginal resource base.

It is scarcely news that the countries of the Sahel have a thin resource base, this the result of their geographic and climatic circumstances. What is new is to see their resource potential coupled with concern over population growth that in most Sahelian countries has reached the explosive rate of 3 per cent per year. It is primarily in its agricultural base where the Sahel's resources appear as marginal, with much of the land so arid that it has provided sustained yields only to the thinnest of pastoral populations. The growth in people, so dramatically evident in recent decades, has severely crowded these dry landscapes, resulting in overstocking, overgrazing and a destructive competition for pastures. Since everything depends on everything else, family planning programs must be introduced into the Sahel as an essential means of preserving its pastures.



The dilemmas of development appear to be crystallized in the issue of desertification. Here the problems take shape in their clearest, most paradoxical forms. Desertification is a menace that must be dealt with—mankind has no choice in the matter. Especially in an era when the world as a whole is doubling its population in less than 40 years, the loss of its agricultural resource base invites unparalleled disaster. And yet mankind has neglected to deal with this threat, has stepped back from it as if hoping vainly that the problem would simply go away. In the poorest countries, social and political pressures for expenditures on immediate needs have been so overwhelming that accumulating disasters—those that come on slowly—have received almost no attention.

The accumulating disaster of desertification is not going to go away. It is a threat against which humanity has no alternative but to act. The loss of productive land must be halted and desertified land restored to use. In response to this necessity, financing to combat desertification must inescapably be located regardless of the difficulties in finding funds for the support of long-term actions. This is a dilemma that has made the desertification issue into a source of innovative financial proposals.

Special accounts have proliferated in recent years and so have become tired mechanisms. Donor nations have indicated their weariness with them, which undoubtedly explains the poor response to the Special Account set up by the General Assembly to combat desertification. Should the Special Account be eliminated? The Governing Council agreed to look at it three years hence to see whether its life should be prolonged. The fact is that more interesting mechanisms are in prospect. As the Executive Director said:

The governments have had before them for several years now, through the General Assembly, a range of suggestions, including the creation of an Independent Financial Corporation, which could help provide the additional resources so desperately needed. Such arrangements would also guarantee automa-

ticity and predictability in the provision of funding.

An independent corporation might well be structured to combat desertification as a long-term enterprise with non-commercial rates of return on investments in projects. Automaticity—or the receipt of funds without relying on grants and pledges—would characterize the support flowing from the corporation's receipts. Automaticity is also the great advantage of international taxation, for which a number of models have been proposed—as on international trade, or on arms production or sales. An international tax could readily be justified as a source of funding for combating desertification, since the world's agricultural lands constitute the ultimate commons. And yet, as Mostafa Tolba said, the response to UNEP's inquiries on such subjects "has been disappointingly slow". Nor is that surprising. An independent corporation would be something quite new as a means of financing action on development. An international tax would break precedent and introduce a new and startling factor into the international scene.

Somehow or other, sooner or later, the funds to fight desertification will have to be found. If later, then more funds will be required, since desertification is a progressive disease. The debate on funding will continue and will undoubtedly produce significant new initiatives. And yet a moment's thought reveals that sufficient funds—for desertification and for all other development needs—are available in the world as it is. In the few years left between now and the end of the century, as Mostafa Tolba has repeatedly pointed out, "\$15,000 billion for producing and purchasing arms to threaten our life support system" will be expended.

In today's world, caught as it is in the vice of financial constraints, the colossal expenditures made for armaments are being surveyed with an ever more critical eye. Nowhere is the folly of arms spending more evident than when weighed against the problem of desertification. To the extent that the ravenous demands of arms build-ups withhold funding from the battle against desertification, one could say that war is already ravaging landscapes while nations are merely preparing for it and well before the first shot is ever fired.

*If not Sooner, then Later*

After lingering on the problems of the Sahel, which seem so intractable, a reminder is perhaps needed that desertification is taking place in all regions of the world. The industrialized countries are not exempt from its attacks. When desertification occurs in the United States, however, the funds needed to deal with it can always be found once the political will has been aroused. This circumstance only reinforces the view that desertification, as a problem, is intimately linked with underdevelopment.

Nevertheless, halting desertification still means halting it everywhere, a feat that the Plan of Action suggested might be accomplished by the year 2000. This was no longer possible, as Mostafa Tolba and his Governing Council agreed. To have achieved that would have meant a vast and determined effort beginning without delay at UNCOD's close. That did not happen, and the world has gone on living with the loss of ever greater areas of useful land.

The measure of the Governing Council's recommitment to the war on desertification could be found in its setting a new date for bringing an end to this threat to human welfare. If not 2000, then 2010. What difference did it make that the latter year failed to round off a millennium? Any year could suit this supreme purpose. Desertification is going to be stopped, as the Governing Council resolved once again. The search for the means of halting it is to be renewed, reinvented, reinvigorated. After all—and after two weeks of intense discussion—that was what counted.



# Summary of the Activities and Output of the General Assessment of Progress in the Implementation of the Plan of Action to Combat Desertification, 1978-1984

*Daniel Stiles and  
Stanislaus S. Sangweni  
Desertification Branch  
UNEP*

### *Preparations for the General Assessment*

A very great amount of work, time and effort was put into the General Assessment of Progress in the implementation of the Plan of Action to Combat Desertification during the period 1978-1984. Several people from around the world were directly or indirectly involved in the many activities associated with the report. Work began as early as November 1980, when a High Level Team of Consultants on Desertification met to draw the guidelines for the occasion of "stock-taking, for reviewing objectives and modalities for action, and for setting strategies for the 15 years to follow". Subsequently the UNEP Governing Council at its ninth session (1981) endorsed the Executive Director's intention to submit a comprehensive report on the implementation of the Plan of Action before 1985. Accordingly UNEP Secretariat began in 1982 preparations for the general assessment comprising:

- a comprehensive assessment of the current status and trend of desertification;
- an evaluation of the effectiveness of measures taken so far to combat desertification;
- the identification of constraints in the implementation of the Plan of Action; and
- recommendations for action over the next 15 years.

A draft work plan for the general assessment was prepared and finalized by early 1982. It outlined the various studies, reports and documents that would have to be assembled as inputs to the main assessment report. In accordance with the workplan UNEP initiated actions at several levels. The major action was the circulation of a



*Dr. Mostafa Tolba addressing UNEP's twelfth Governing Council.*

questionnaire to 91 countries affected by desertification and 12 donor countries seeking information on population changes, land use and crop and livestock production over the period since 1977. The United Nations regional Commissions, UNSO, regional research institutions and expert consultants were also commissioned to prepare regional assessments on the status and trend of desertification, generalising on country data provided by the questionnaire and other secondary sources. Such regional assessments were prepared for the Sudano-Sahelian region, Kalahari desert countries south of the Sudano-Sahelian region, 12 Latin American countries, North Africa, the ECWA region, the Northern Mediterranean countries (Cyprus, Turkey, Bulgaria, Greece, Yugoslavia, Italy, Malta, Spain and Portugal), the ESCAP region, and North America and Mexico.

Measures were also taken to update

some of the documents prepared for the United Nations Conference on Desertification in 1977. These included 26 country reports submitted by governments and three (Niger, Tunisia and Chile) of the six case studies arranged through UNESCO as well as some of the associated case studies. The World Meteorological Organization also prepared a background study on "Climate and Desertification", updating an earlier study. Arrangements were also made to compile records of activities since 1977 by governments, UNEP, United Nations system as a whole, and by non-governmental organizations in support of the Plan of Action.

Other additional sources of information used for the general assessment included the reports of the 'United Nations University and the Plan of Action to Combat Desertification'; 'Provisional Methodology for Assessment and Mapping of Desertification' (discussed in detail in the last section



of this report); UNESCO's Man and Biosphere (MAB) Programme of Activities related to combating desertification; the annual reports of the Executive Director to Governing Council on implementation of the Plan of Action to Combat Desertification; and the Annual reports of the Environment Co-ordination Board (and then the Administration Co-ordination Committee) to the Governing Council on implementation of the PACD.

#### *Main Supporting Documents:*

Three main supporting documents were prepared from the documentation mentioned above and from other sources as follows:

- A global assessment of the status and trend of desertification;
- An evaluation of the effectiveness of implementation of the PACD; and
- A review of actions taken to finance implementation of the PACD and on possible institutional mechanisms for mobilizing additional resources in response to relevant General Assembly resolutions.

#### *Executive Director's Report*

All of the above documents, totalling some 4,000 pages, were synthesized to produce the final output of the assessment, a report of about 60 pages on: "General Assessment of Progress in the Implementation of the Plan of Action to Combat Desertification 1978-1984". The report was presented to the twelfth session of the UNEP Governing Council by the Executive Director, Dr. Mostafa Tolba. The outcome is contained in decision GC.12/10, printed at the beginning of this supplement.

During this long two and a half year process the Desertification Branch was assisted by an Advisory Panel made up of Prof. G. Aubert, Prof. A.G. Abdel-Samie, Dr. Ray Perry and Dr. Jeremy Swift. The preparation of the main supporting documents and the drafting of the Report of the Executive Director mentioned above was carried out by a team of senior consultants, namely Prof. Harold Dregne, Prof. M. Kassas, Prof. J.A.

Mabbutt, and Sir Egerton Richardson. In addition the Inter-Agency Working Group on Desertification, made up of UN agencies and bodies active in anti-desertification work were closely collaborated with. The Executive Director, Dr. Mostafa Tolba, closely supervised preparation of the report and personally contributed a great deal to its final form and substance in a series of meetings with the Desertification Branch, the Advisory Panel and the senior consultants. The Desertification Branch and UNEP wish to express their gratitude to the efforts of the Advisory Panel, senior consultants and to all other unnamed people who assisted in this monumental task.

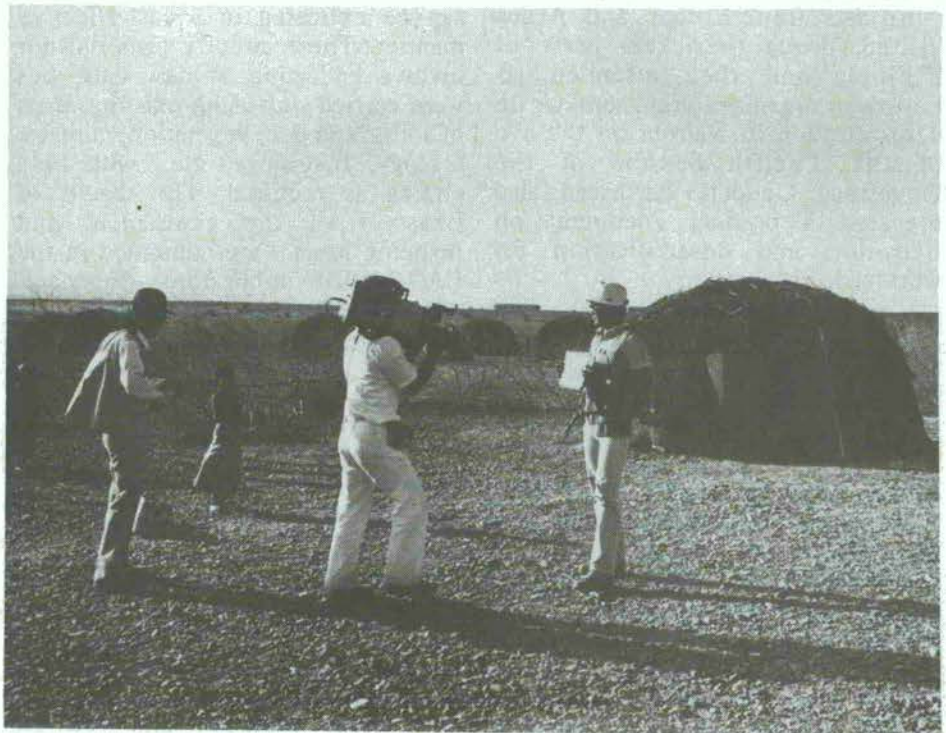
#### *Desertification Information Campaign*

UNEP used the occasion of the General Assessment to launch a comprehensive public information campaign. The overall aim of the campaign was to mobilize concern, in donor and developing nations alike, for the urgent need to combat desertification. Particular emphasis was directed towards communicating the global nature of the problem and to showing that desertification affects countries regardless of geopolitical or economic status. Another aim was to

counter the erroneous public image that the desertification problem is exclusive to the Sahel and other areas bordering on the true deserts. The campaign was designed to achieve maximum coverage in all the main forms of media communication. The campaign's principal outputs and activities are outlined below.

A commented multi-projector slide show was assembled, explaining the causes, consequences and solutions to desertification in different parts of the world (India, USSR, Ethiopia, Sudan, Egypt, China, Puerto Rico and Haiti). The show was presented to the Governing Council on the opening day, 16 May. It is now being put into a video cassette mode to enable distribution for use by educational television, NGOs, schools and other interested users. In addition, single projector slide shows are under production.

The Central Independent Television of Great Britain, with UNEP support, is making a film on desertification in Ethiopia, scheduled for transmission in mid-1985. As part of this activity a one hour documentary on drought and famine entitled "Seeds of Despair" was produced and transmitted in Great Britain and other European countries, which has elicited a great deal of



*As one desertification information activity UNEP staff assisted a television film crew from the Japanese NHK corporation to shoot a film on desertification in northern Kenya. (UNEP/Daniel Stiles)*



## Summary of activities and output

attention from the press and public. A film entitled "Stopping Desertification in Rajasthan" was made and transmitted to over 100 countries for World Environment Day, June 5 1984. The Television Trust for the Environment (TVE) was formally launched by Dr. Mostafa Tolba on 5 April in London. TVE, a non-profit organization, will produce a series of environmental television films throughout the 1980s. Several interviews with desertification experts were conducted and made into radio programmes by Link-up Radio. They were distributed and broadcast in many countries around the world. A press kit was prepared and distributed in English, French and Spanish around the world to newspapers and news services.

A group of international journalists based in Nairobi was briefed by Desertification Branch on the assessment and its findings and later on taken to northern Kenya by UNEP staff and shown human and environmental aspects of desertification. Articles in hundreds of newspapers in dozens of languages around the world were published, which led subsequently to attention by Japanese and German television corporations who sent teams to Kenya to film the area described in the studies. In addition, a group of journalists from Europe and Africa visited drought-stricken parts of Ethiopia and then attended an Earthscan organized press seminar on desertification in Nairobi on the eve of the Twelfth Session of the Governing Council. Earthscan also prepared a briefing document on irrigation and desertification for worldwide distribution.

Over twenty-five articles on the General Assessment findings were prepared and published in various environmental and UN journals and magazines. Several short news items appeared in many more journals giving a summary of the general conclusions of the assessment. A special number of *Desertification Control*, No. 10, was prepared and distributed on the occasion of the twelfth session of UNEP Governing Council.

In the above mentioned activities UNEP's Desertification Information Project acted as a catalytic agent and co-ordinator, providing seed money and organization. Many other

individuals and organizations, such as Earthscan, WWF-UK and Central Independent TV, generously donated their time and resources to make the campaign a success.

### *Desertification Hazard Maps*

The Plan of Action called for the preparation, publication and distribution by FAO, in co-operation with UNEP, UNESCO and WMO, of a Desertification Map of the World. Phase I developed a methodology for the assessment and mapping of the dynamics of desertification with respect to the processes involved and the potential risk in a given area, for which the term 'hazard' is used. The provisional methodology was then field tested and experimental maps at various scales produced. These tests were carried out in Mexico, Texas, USA, Bourkina Faso (formerly Upper Volta), Sudan, Tunisia, Syria, Pakistan, Turkmen SSR, and Australia. In addition, a pilot study was undertaken on the use of satellite digital remote sensing data in the Honda region of north-central Algeria. The objective of this study was to analyze multi-temporal Landsat data for an area already known and to identify spectral parameters that relate to desertification processes and which can be extracted in a cost-effective manner. These country tests did not involve collection of new data, but were carried out using existing maps of soils, land use, vegetation, climate, ecology, hydrology, etc., with field checks as required. The results of Phase I of the assessment and mapping project are contained in the FAO/UNEP publication *Provisional Methodology for Assessment and Mapping of Desertification* (1983).

Phase II began in 1983 with the objective of producing a draft world map of desertification hazards at a scale of 1:10,000,000. Since a map of desertification hazards would of necessity be based on a multitude of data, which would be updated continuously, it was decided that the most efficient approach would be to establish a Geographic Information System (GIS) database comprised of cartographic and attribute information using GIS methods and software currently being developed for the Global Environment Monitoring System. Maps could then be produced

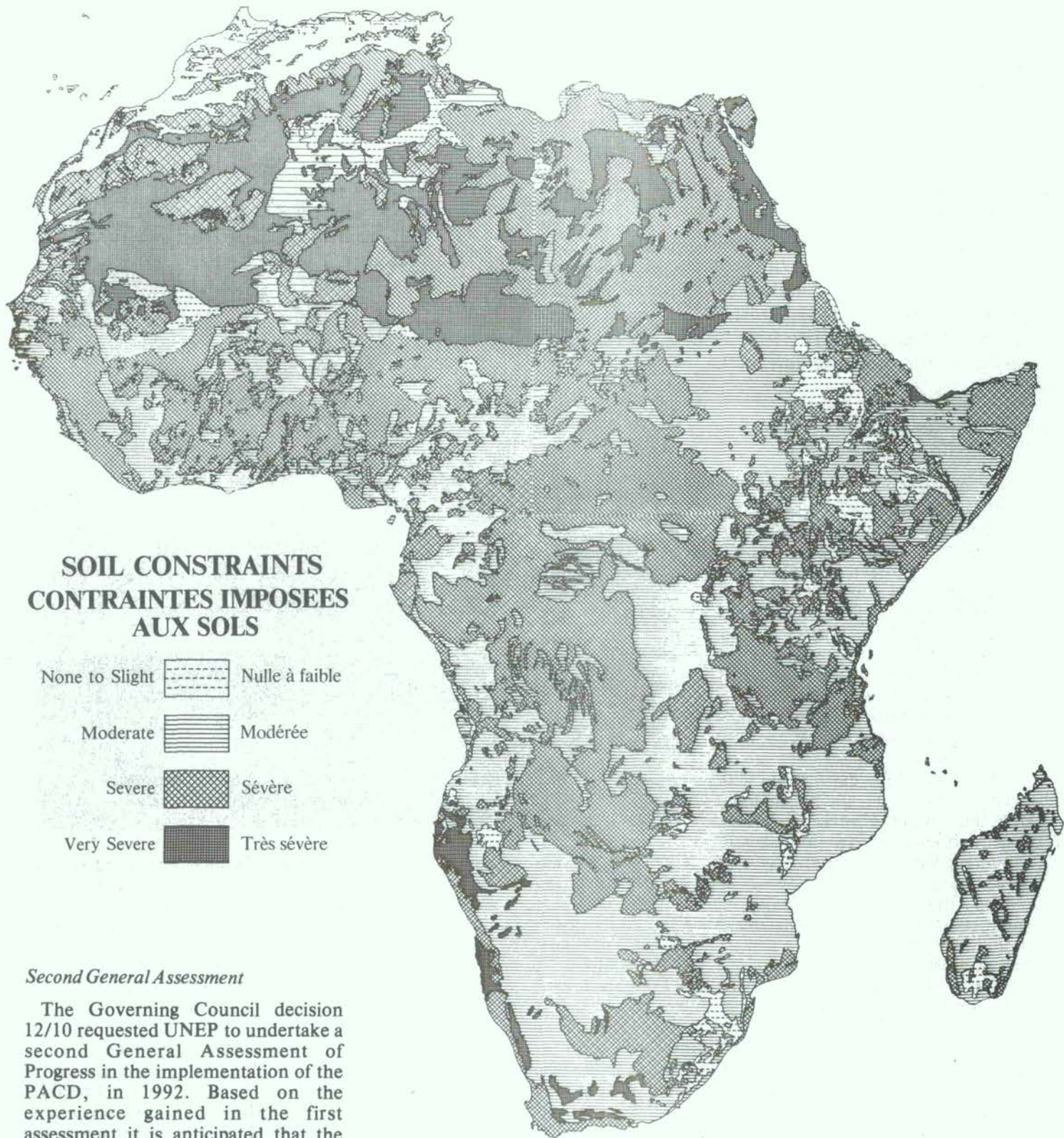
from this database using automated digital cartographic techniques.

The Environment Systems Research Institute (ESRI) of Redlands, California, was selected to prepare and produce the map, in co-operation with FAO and UNEP. As the project developed it was decided, because of data limitations and time constraints, to restrict the world map to soil elements used in assessing desertification and degradation. A map, however, of desertification hazards for Africa was also produced at a scale of 1:5,000,000. These maps were presented, along with an illustrated publication (*Map of Desertification Hazards: Explanatory Note*) at the twelfth session of the UNEP Governing Council held in Nairobi in May, 1984.

### *Future Action*

It was recognized by all concerned in the general assessment and desertification mapping exercises that available data and methods of collection, monitoring and analysis are still at a relatively rudimentary level. What is crucially needed is a systematic, co-ordinated desertification monitoring and assessment programme that will be used to build up a global database. Phases I and II of the Desertification Assessment and Mapping project have gone somewhat towards developing such a programme, but have raised a number of questions on the methods used. It is provisionally planned, therefore, to further evaluate the mapping results for two or three selected localities. A technical meeting is also planned to discuss further activities, and this will be followed by an international workshop in 1985. The workshop will assemble representatives of the scientific world, potential users of the information and maps (Governments, research institutions, etc.) and potential donors who would help to finance the programme so allowing a coherent and co-ordinated plan for the future to be formulated. The future desertification monitoring and assessment programme will, however, certainly be closely linked with the soon to be implemented Global Resources Information Database (GRID) of UNEP's Global Environment Monitoring System (GEMS).





*Second General Assessment*

The Governing Council decision 12/10 requested UNEP to undertake a second General Assessment of Progress in the implementation of the PACD, in 1992. Based on the experience gained in the first assessment it is anticipated that the second assessment will present an informative and accurate picture of the status and trend of desertification in different parts of the world. It is also fervently hoped that we can report on the regression of desertification and on success stories in the implementation of the Plan of Action to Combat Desertification.

*One of the maps produced by digital cartography as part of the Desertification Assessment and Mapping Project.*



### The man who planted trees

**Editor's note: At a time when we are trying to pull together the efforts of Governments and organizations we saw it fit to present this case which shows the power that one individual can have, "armed only with physical and moral resources".**

*The article is adapted from a UNDF feature by the late Jean Giono*

About 40 years ago, I was trekking across the mountain heights in that ancient land where the Alps thrust down into Provence. In the deserted region, everything was barren and colourless. Nothing grew there but wild lavender.

After three days of walking I found myself amidst unparalleled desolation. I had no water. I camped near the vestiges of an abandoned village. The clustered houses suggested there must once have been a well or a spring. Indeed, there was a spring, but it was dry.

It was a fine June day brilliant with sunshine. But over the unsheltered land, the wind blew with unendurable ferocity. It growled over the carcasses of houses like an enraged dragon. I moved camp.

After five hours of walking, I glimpsed in the distance, a small black silhouette and took it for a solitary tree. I started towards it. It was a shepherd. Thirty sheep were lying about him, on the baking earth.

He gave me a drink from his water-gourd and, a little later, took me to his cottage. He drew his water—excellent water—from a very deep natural well.

He spoke little. It is the way of those who live alone. He lived not in a cabin but in a real house of stone. It bore plain evidence of how his own efforts had reclaimed the ruins. The sound of the wind against its tiles was the sound of sea waves hitting the shores.

He was cleanly shaved. All his buttons were firmly sewed on. His clothes had been mended with meticulous care. He did not smoke. His dog, as



silent as he was friendly, without being servile.

It was understood from the first that I should stay for the night. The nearest village was a day away. The shepherd shared his food with me.

Then he fetched a small sack and poured out a heap of acorns on the table. He began to inspect them, one by one, with great concentration, separating the good from the bad. I offered to help him. He told me it was his job. After he had set aside a large enough pile, he counted them out by tens. When he had thus selected one hundred perfect acorns, he went to bed.

The next day I asked if I might be there for another day. He agreed. In the morning he opened his pen and led out his flock. Before leaving he plunged his carefully selected sack of acorns into a pail of water.

Instead of a stick, he carried an iron rod, thick as a thumb and five feet long. His pasture was in a valley. He left his flock in the care of his dog and climbed a ridge. I followed. I was afraid he would rebuke me for my indiscretion. Instead he invited me to go along. We climbed to the top of the ridge.

There he began thrusting his iron rod into the earth, making a hole in which he planted an acorn. He refilled the hole. He was planting an oak. I asked him if the land belonged to him. He answered, no. Did he know whose it was? He did not. Nor was he interested in finding out. He planted his hundred acorns with the greatest care.

I must have been fairly insistent in my questioning, for he answered. For three years he had been planting trees in this wilderness. He had planted 100,000. Of them, 20,000 had



sprouted. Of the 20,000 he still expected to lose about half to rodents and to the unpredictable designs of Mother Earth. There remained 10,000 oak trees to grow, where nothing grew before.

I began to wonder about the age of this man. Fifty-five, he told me. His name was Elzeard Bouffier. He had a farm in the lowlands once. There he had lived his life. He had lost his only son, and then his wife. Then he had withdrawn into this solitude. He felt that this land was dying for want of trees. Having no pressing business of his own, he had resolved to remedy this state of affairs.

I told him that in 30 years his 10,000 oaks would be magnificent. He answered simply that given life, he would have planted so many trees that those 10,000 would be a drop in the ocean.

Presently he was studying the reproduction of beech trees and had a beech-nut nursery near his house. The seedlings, which he protected from his sheep with a wire fence, were beautiful. He was also considering birches for valleys where there could be moisture below the surface.

We parted the next day. The war started in 1914 and I became a soldier. As soldiers do, I forgot everything but the war. I forgot about the old man and his trees too.

Five years later the war was over. I took to the road again, to the barren lands, following my wanderlust.

Elzeard Bouffier had not died. On the other hand, he was extremely spry. He had changed jobs. Now, he had only four sheep. He had got rid of his sheep because they threatened his young trees. He had imperturbably continued to plant.

The oaks of 1910 were then 10 years old and higher than either of us. His forest measured 11 kilometres by three. It had all sprung up from the hands and soul of this one man—a man who could be as effectual as God in realms other than that of destruction. Creation seemed to come about in a sort of chain reaction. I saw water flowing in the brooks that had been dry since the memory of man. As the water reappeared, so there reappeared willows, rushes, meadows, gardens, flowers and a certain purpose in being alive.

Hunters and forest officials came to see this wonderful "Natural" forest. When they saw that it was all the work

of one man, they did not meddle. They left him to himself. He worked in total solitude that towards the end of his life he lost the habit of speech. Or perhaps he saw no need for it.

The only serious danger to his work occurred during the Second World War. Cars were being run on wood-burning generators.

There was never enough wood. Cutting was started among his oaks. But railway lines were so far away that the effort flopped. The shepherd saw nothing of it. He was 30 kilometres away planting his trees, in peace. He ignored the war of 1939 as he did that of 1914.

I saw Elzeard Bouffier for the last time in the June of 1945. He was then 87.

I had started back along the route through the wasteland. But now there was a bus. I no longer recognized the scenes of my earlier journeys. Only when I heard the name of the village could I actually believe being in the region that had been all ruins and desolation once.

The bus put me down at the village which in 1913 had a few houses and fewer inhabitants. The living was bad. Living in excessively harsh climate in winter and in summer, there was no escape from unceasing conflict of personalities. Irrational ambition reached inordinate proportions in the continual desire for escape. The soundest characters broke under the perpetual grind. They had been savage creatures. Malice, mistrust and hatred had composed the spirit of the land. They were little removed, physically and morally, from the conditions of prehistoric man. There were epidemics of suicides and frequent cases of insanity. All around them, nettles were feeding upon the remains of abandoned houses, left beached in time. And over all there was the wind, the ceaseless rattling wind, to rasp upon the nerves.

Their condition had been beyond hope. They had to wait for nothing but death, a condition which rarely predisposes to virtue.

But everything had changed. Even the wind. Instead of the harsh, dry wind, a gentle wind was blowing, laden with scents. A sound like water came from the mountains; it was the forest wind. Most amazing of all, I heard the sound of water falling into a pool. A fountain had been built and it was flowing freely. What touched me

most was that someone had planted a linden by its side. It must have been four years old and already in full leaf, the incontestable sign of resurrection.

The village bore signs of labour for which hope is required. Ruins had been cleared away, dilapidated walls torn down and houses restored. The new houses were surrounded by little gardens where vegetables and flowers grew in orderly confusion. The war just finished had not allowed full blooming of life, but Lazarus was out of the tomb. I saw little fields of barley and rye. Deep in the narrow valley, the meadows were turning green.

One man, armed only with physical and moral resources, was able to raise this land from wasteland. The old and unlearned shepherd who fathered this miracle died in peace at the hospice in Banon in 1947.



# Desertification Control Training Course in China and its Relevance to anti-Desertification Activities in Kenya

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Environment and Natural Resources,  
Kenya.

The above UNEP-sponsored course was held in China in September, 1981 and was conducted by the Lanzhou Institute of Desert Research, Academia Sinica in conjunction with the Environmental Protection Office of China. I wish, first, to express my gratitude to UNEP for sponsoring me for this very important course and also to my country's Government for selecting me for the course.

Although the basic principles learnt from the course were primarily concerned with sand dune fixation, they were also relevant to the whole field of desertification control. The course, which lasted for roughly one month, was conducted in Chinese with simultaneous translation into English and French. Participants were drawn from many different countries, namely, Kenya, Peoples Democratic Republic of Yemen, Senegal, Somalia, Turkey, Tanzania, Peru, Mexico and Egypt and therefore represented diverse geographical and linguistic backgrounds. They were also of various professional backgrounds such as veterinarians, ecologists, range management specialists, agriculturalists, agricultural engineers, soil scientists, regional planners, foresters, architects and research administrators.

The course included field trips to enable participants to appreciate the extent, causes and problems of desertification in China and a series of lectures was presented by professors, research scientists in various disciplines and Government officials. In addition, lectures were also given by participants and on-site short talks were given by the local people themselves on their experiences. Often there were receptions and entertainments at the end of the day which made us feel at home. Site-seeing visits were also arranged for us at the



*Chinese scientists study the effectiveness of different plant species in sand dune fixation. The results of these studies are presented in lectures to trainees in the UNEP sponsored courses.*

end of the day on a few occasions. Lectures were accompanied by films and slide shows which aided explanation.

I had not appreciated how vast, once productive lands could be turned into expanses of unproductive shifting sands, principally by activities of man—ruthless plunder of the land resources—since in my own country there are no shifting sands as such. In Kenya, the word 'desert' is usually associated with severe aridity, high temperatures, absence of vegetation, low bioproductivity of the land and general hardship to the inhabitants. We soon realised, however, that sand dunes were another feature of the desertification process. As we left Beijing City by train to northern China, the scenery changed from that of green and warm beauty to that of dryness, gravel and undulating sands.

Our flight from Karachi over west and central China gave us a picture of a country with well organised settlement and agricultural systems. From the air, we could see a pattern of settlement showing groups of homesteads, farm-lands and an elaborate system of

canals. We later on learnt that these groups of homesteads represented the people's communes. This western and central part of China afforded a striking contrast to the desertified northern part. We also came to realise why a country like China attaches such a great importance to desertification control work. In China, 170,000 km<sup>2</sup> are already affected by the process of desertification. Of this total already affected, 120,000 km<sup>2</sup> were desertified long ago while 50,000 km<sup>2</sup> were desertified over the last 50 years. These areas already desertified support 35,000,000 Chinese people. There are a further 150,000 km<sup>2</sup> of land which is subject to desertification if improperly utilised.

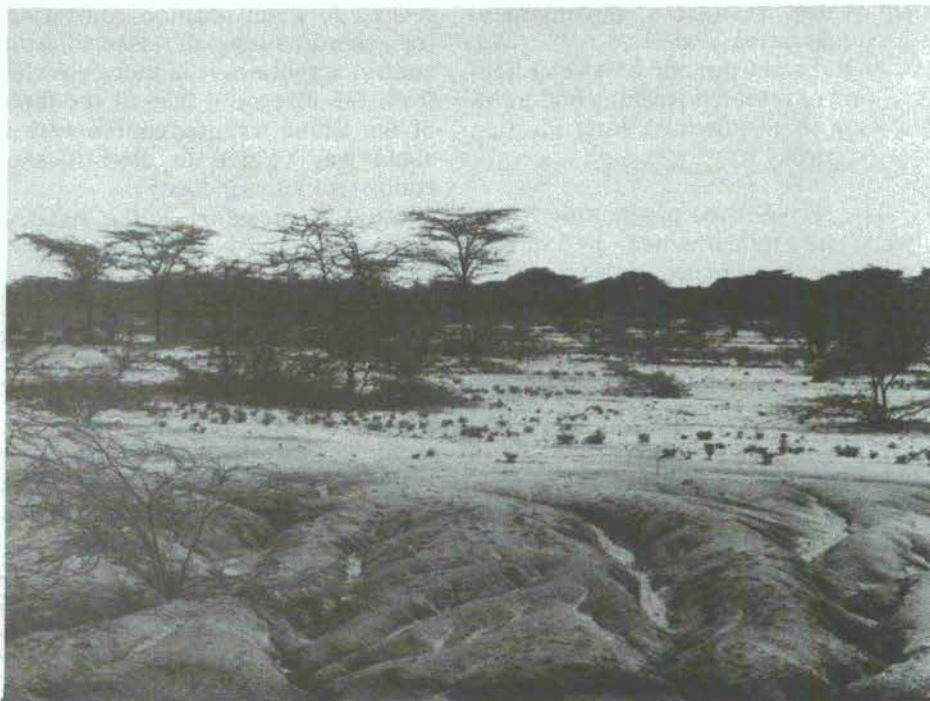
On the trips lectures were given at every station after or before field excursions. Travel from one station to another was by train, road or aeroplane. Before the end of the course, the group travelled as far as southern China. Most of the lectures were given by researchers from the Lanzhou Desert Institute which is the core of China's desertification control system. It was at the Lanzhou Institute where, after the trip to the desertlands of northern China, the group convened and gave lecture summaries of our experiences on desertification control work.

Each of the participating country representatives gave a talk on desertification control activities in his country. These talks were followed by a healthy discussion and exchange of ideas and experiences. Such a discussion proved to be extremely important since it served to broaden the insight of participants on desertification matters. At the Lanzhou Desert Institute, participants saw the equipment that scientists use to study desertification processes with a view to understanding them and coming up with methods and ways of reversing them. Of particular interest to most participants was the wind tunnel, a simulating device used to study the behaviour of sand particles in the process of being dislodged and transported by wind.



From the lectures and field excursions participants learned, in broad terms, about a number of interesting aspects of desertification, including the following:

- (a) the historical and archaeological aspects of desert formation in the northern part of China; we witnessed sites of ancient towns or cities which were once supporting thriving civilisations which are now part of the desert as a result of the destruction of the environment.
- (b) desertification assessment: we learned how to recognize the onset of desertification resulting from overgrazing, excessive clearing for cultivation and firewood collection and also from salinisation and alkalisation. At the end of the course, participants were able to assess roughly desertification processes.
- (c) range management techniques such as assessment of livestock carrying capacity of the land and control of grazing applied in conservation and management of rangelands.
- (d) China's desertification control system which combines specialised research by experts with mass participation. During the field trips we saw how desertification control work was carried out in Brigades by the people themselves and the academics and also how indigenous people's experience and skills are combined with scientific knowledge and used in halting desert encroachment.
- (e) The use of plant genetic resources in sand dune fixation and desertification control work in general; in this regard participants:
  - (i) were given lectures on the selection of plant species for fixing shifting sands in desert and semi-desert areas.
  - (ii) saw how desertified lands were brought back to production through careful selection and introduction of plants indigenous to certain areas.
  - (iii) visited the Shanghai Botanical Gardens and witnessed a wealth of genetic resources useful to desertification control work.
  - (iv) saw how desertified lands are reclaimed through planting of sand control forests and shelter



*About 80 per cent of Kenya is made up of arid and semi-arid land. In some parts of the country soil erosion is a serious problem, caused by overgrazing and trampling by livestock. (UNEP/Danile Stiles)*

belts, protection of natural vegetation and through application of other principles of massive afforestation.

- (f) the application of research in various disciplines such as soil science, agronomy, forestry, botany, meteorology, civil engineering, ecology, range management and soil and water engineering in desertification control work.
- (g) the use of mechanical devices such as straw and clay checkboards in the reclamation of shifting sands and protection of communication lines.

The following section of this report will be devoted to discussing the relevance of the course to anti-desertification activities in Kenya.

About 80 per cent of the Republic of Kenya is arid and semi-arid. It is these arid and semi-arid lands that are already affected by desertification, although the process is spreading to many areas of Kenya since it is a symptom of a much wider problem of environmental mismanagement. In fact, over three-fourths of Kenya suffers from a moderate to high degree of desertification hazard. About 20 per cent of the total population of Kenya live in the arid and semi-arid areas and of the 20 per cent, 2 million people are

directly threatened by desertification of the lands they live on. Moreover, the arid and semi-arid areas currently support 50 per cent of the entire Kenya livestock population.

It is on the strength of the above facts that Kenya has in the past recognised and continues to recognise the problems of desertification and identifies itself with the international concern and effort to arrest the progression of desertification and indeed to reverse it by all means at her disposal. In Kenya the fight against desertification is based on the following broad resource management programmes/projects:

- (a) Arid rangeland management programmes/projects;
- (b) Wildlife in arid rangelands management programme;
- (c) Programmes/projects and measures concerned with agricultural development, income generation and land resources management in drylands;
- (d) Revegetation programme;
- (e) Dryland crop development programme;
- (f) Work by specialised institutions on desertification control and efforts to establish and strengthen information centres and mass media services for consciousness raising;
- (g) Settlement programme;



## Desertification control training course in China

- (h) Water resources development programme; and
- (i) Establishment or strengthening of research teaching and training in the field of desertification control.

The above listed programmes/ projects are implemented by various government agencies. In Kenya there is no established institute similar to the Lanzhou Desert Institute to carry out research specifically related to desertification control. However, there is a proposal to set up the Kenya Arid Land Research Centre which will be charged with the responsibility of carrying out research in the field of desertification control. Desertification work, by and large, is still therefore being done in a compartmentalised manner, although the National Environment and Human Settlement Secretariat of the Ministry of Environment and Natural Resources is responsible for formulating policies

related to desertification control and for coordinating all desertification control activities. It is therefore clear from the foregoing that all the facets of the China training course were in some way related to desertification control activities in Kenya.

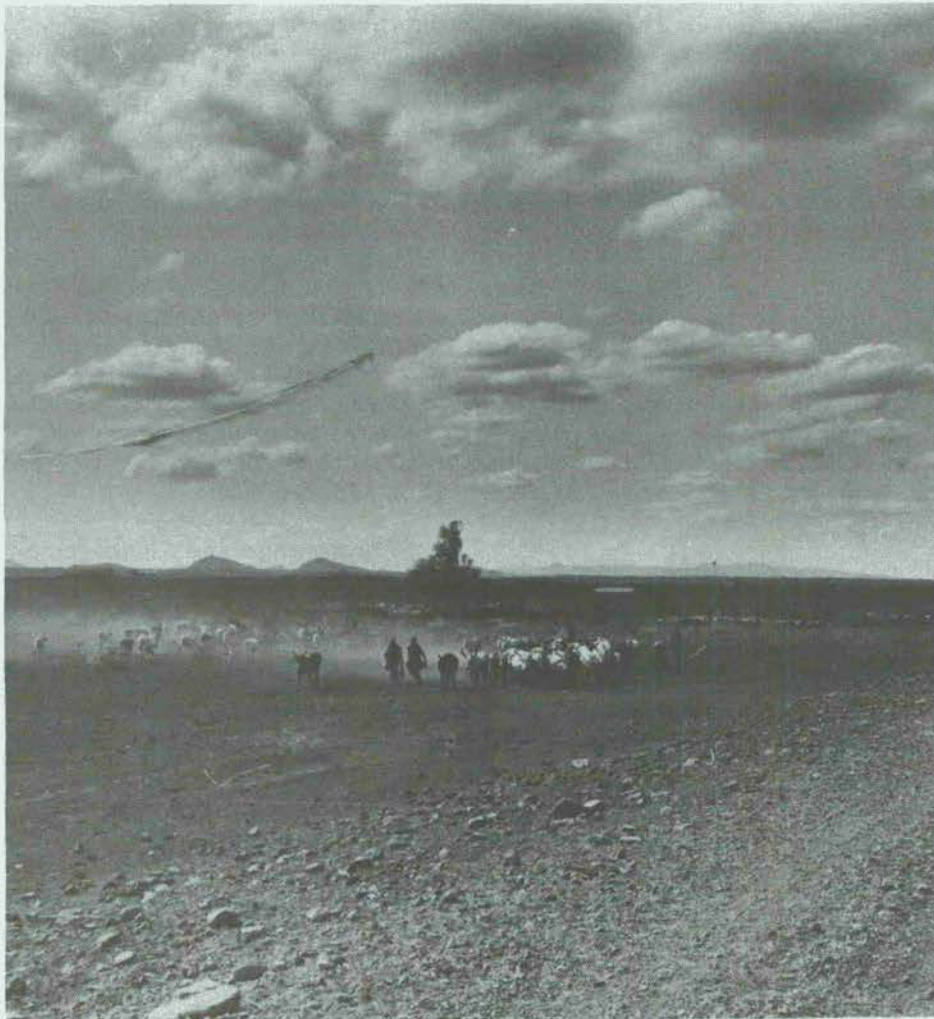
Kenya is presently at the stage of laying down the basic framework for desertification control work and as such it is important that people at the decision making level should be knowledgeable in all aspects of desertification control. This kind of broad-spectrum background necessary for planning and decision making was provided by the course. Also, since there is a proposal to set up an Arid Land Research Centre in Kenya, it would be in the best interest of the country to start orientating some Kenyan professionals in the field of desertification control research. The course provided a most relevant exposure to that kind of research. Thirdly, the course provided an invaluable

working knowledge to environmentalists since it cut across many disciplines relevant to environmental work.

There are many ways in which knowledge gained from the course can specifically be applied to anti-desertification programmes/projects in Kenya including the following:

- (a) the application of range management techniques in ranching and pastoral areas which are the areas most prone to desertification in Kenya;
- (b) the application of desertification assessment techniques to the Kenya Rangeland Ecological Monitoring Unit programme and more specifically to the proposed National Desertification Assessment and Monitoring Programme;
- (c) the application of knowledge on the use of plant genetic resources—selection and introduction of desert plant species—to revegetation and dry-land crop development programmes in Kenya;
- (d) the application of techniques to prevent and overcome salinisation and alkalinisation in irrigated areas in Kenya;
- (e) the application to the Water Resources Development Programme of water harvesting and conservation techniques learned from the course;
- (f) the use of knowledge acquired from the course in environmental education.

Although the knowledge acquired from the course is relevant to Kenya, there are problems to be overcome before the battle against desert encroachment can be won. First, an awareness must be created among the Kenyan population that desertification is developing in many areas and is a national issue, although presently it is noticeable only in arid and semi-arid areas. The population has also to be made aware that degraded and desertified lands can be brought back to production through reclamation. Secondly, desertification control work must be regarded as being beneficial and an important aspect of resource conservation. With the present attitudes of people and high level of awareness, I expect large public spending to initiate and finance desertification control programmes/projects in the near future.



*Desertification is a big problem in northern Kenya where pastoralism is the main economic system. If land degradation is not halted the people will lose their livestock and way of life. (UNEP/Daniel Stiles)*



# The UNEP/USSR Desertification Control Training Course and Applications in Morocco

A. Hafdaoui  
State Engineer, Chief of the  
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In this article I would like to discuss the course organized in 1981 by UNEP in the USSR on the ecology, management and productivity of arid zone rangeland. I take the opportunity to thank UNEP and the responsible staff in the USSR who were kind enough to organize this very interesting course.

In order to improve the techniques of controlling desertification in the developing countries, within the overall framework of environmental protection, and in accordance with the agreement between the USSR State Committee for Science and Technology on the one hand and UNEP on the other, international courses in desertification control have been organized for experts from the countries of Africa, Asia and Latin America.

The international courses organized to control desertification deal with the following problems:

- amelioration of saline soils;
- fixation of moving sands;
- ecology, management and productivity of grazing lands in arid and desert zones.

These courses are in line with the recommendations adopted by the United Nations Conference on Desertification (Nairobi, September 1977), as well as by the Intergovernmental Conference on Environmental Education (Tbilisi, October 1977) and by the UNEP/UNEP/COM International Symposium held in Alma Ata, USSR, in May 1979.

The course on ecology, management and productivity of rangelands in arid zones was organized in the USSR from 19 May to 25 June 1981. Twenty engineers and experts from nine countries participated in this course, in which:

- Forty-two lecture sessions were given by 48 instructors;
- three seminars were organized in which the various problems posed

by desertification in each of the participating countries were reviewed. We also discussed the means and programmes adopted for desertification control and rangeland improvement in the nine countries represented;

- four sessions of practical work were organized in the field;
- desertification control projects were visited in three Soviet Socialist Republics with an arid or semi-arid climate (Turkmenia, Uzbekistan and Kazakhstan).

The course was organized in three phases:

1. Theoretical studies and general information phase—This phase took place in Moscow, where lectures with various themes were given on plant physiology, desertification, vegetation in arid and desert zones, arid grazing lands and the basis for classifying them, the influence of wild and domestic animals on rangelands in arid zones, grazing land ecology and production rangeland mapping, rangeland degradation and ways and means of improving rangelands;
2. Methods of rehabilitating grazing lands in arid and desert zones—This phase took place at Ashkhabad (Turkmenia) and Samarkand (Uzbekistan) and enabled participants to attend lectures that related to subjects such as grazing land monitoring, vegetation dynamics, evolution of desert grazing lands, utilization of saline or mineralized waters in the desert, establishment of grazing land reserves in arid zones, selection of seeds and their utilization to improve rangelands, etc. The participants went to the field and learned of some achievements in Sylvopastoral amelioration in the Karakum desert and of plots planted either with *Cochia prostrata* with *Haloxylon* as cover crops, or temporarily withdrawn from grazing by



One of the sand dune stabilization techniques demonstrated in the anti-desertification training course in the USSR. (UNEP/Steve Jackson)



practising simplified rangeland rotation in Norata district.

3. Methods of sheep rearing in reclaimed arid or desert rangelands—During this phase, which took place at Chimkent (Kazakhstan), the course focussed on the intensification of Karakul sheep rearing linked with improvement of the arid and desert rangelands of part of Soviet Central Asia, guided by the research of scientific institutes in the region. Practical work in rangeland assessment and mapping was also carried out in the field.

I would like to turn now to the application of the knowledge acquired in the UNEP/USSR training course, along with other knowledge and experience gained elsewhere. Three examples of anti-desertification type of work are being conducted by the Forestry Service in Beni Mellal province of Morocco and concern:

1. Production of grazing-crop seeds;
2. Sylvo-pastoral improvement;
3. Control of rainfall-induced erosion leading to desertification.

### *I. Production of grazing-crop seeds for rangeland projects in the La Deroua Nursery*

Within the framework of the policy for forested and unforested rangeland improvement, there is a felt need for grazing-crop seeds to establish grasslands. To meet these needs, the Minister of Agriculture and Agrarian Reform, through the Water, Forests and Soil Conservation Office, has set up two grazing-crop seed nurseries, one at M'Da (Kenitra province) and the other at La Deroua (Beni Mallal province). The seeds are used to establish grazing perimeters and for sylvo-pastoral improvements in different regions of the country. The grazing-crop seed nursery at the La Deroua Centre, located in the irrigated plain of Beni-Moussa (35 kilometres from the town of Beni-Mallal) serves to supply the central region of the country with grazing-crop seeds.

The ecological characteristics of the centre are:

- mean temperature of hottest months is 35°C;



*Broad, rich river valleys in central Morocco are irrigated to produce grazing-crop seeds for sylvo-pastoral improvements in different parts of the country. (UNEP/Daniel Stiles)*

- mean temperature of the coldest months is 5°C, with extremes of 44°C and 5°C;
- mean annual rainfall in normal years is 400 mm;
- very deep argillaceous-calcareous soils for the herbaceous grazing vegetation.

The area reserved for the centre is 32 ha.

The species cultivated to produce seeds are perennial and annual species, and are subjected to the following agricultural operations:

- ploughing, cover cropping, rolling and harrowing when sowing;
- spreading of sub-surface fertilizers (superphosphate);
- spreading of surface fertilizers (ammonitrate and urea);
- mechanical field maintenance;
- irrigation two to three times during the plants' life cycle, depending on rainfall;
- harvesting (mechanical or manual);
- storage of the seeds and their utilization.

Some of the more important seeds produced were varieties of *Panicum*, *Eragrostis*, *Medicago* and *Atriplex*.

### *II. Sylvo-pastoral development at Takbalt*

The forest canton of Takbalt is located in the Zaouit-Cheikh Rural Commune, Zaouit Cheikh Caidate, Ksiba forest district. It covers 5,300 hectares and the natural vegetation is composed of: *Quercus ilex* (L), *Olea europea* (var. *oleaster* L), *Pistacia lentiscus* (L), *Ziziphus lotus* (L), *Rhus pentaphylla* (Desf), *Ceratonia silica* (L), *Vitex aqunus castus*, *Lavandula stoechas* (L) and various grass species.

There are numerous flocks of sheep and goats in this forest range. Overgrazing and uncontrolled movements has led to the quasi-total disappearance of herbaceous species and to reduction of the branches of the shrub cover through repeated mutilation. Packing of the soil as a result of the frequent passage of animals and opening up of the foliage of trees has also facilitated the onset of erosion.

In the context of putting an end to the process which is leading to the disappearance of this forest, and hence to desertification and its consequences, it was decided in 1981:

- to restore the natural vegetation by prohibiting grazing;
- to improve the rangeland by the introduction of fodder species;



- to develop indigenous plant species;
- to use herbaceous Forage Units at the appropriate time (1 F.U. = energy provided by 1 kg. of barley).

The Takbalt forest range is in a semi-arid climate with a temperate winter. The L. Emberger rainfall/temperature index (q2) is equal to 40. Mean annual rainfall is 300 mm, with extremes of 200 and 400 mm. The mean temperatures for the hottest month (August) is 39°C and for the coldest month (December) is 12°C, with extremes of 45°C and 4°C.

The soils are argillaceous-schistose. This results from the breakdown of the parent rock, consisting of primary schist and foliate limestone. The soil is fairly deep by virtue of deposition along temporary water courses and in depressions of alluvial and colluvial deposits resulting from rainfall-induced erosion, but for the most part it is superficial, leaving the parent rock exposed on hill crests and knolls.

In the silvo-pastoral and reforestation operations, the soil is prepared by hand. This preparation, carried out to prepare for planting and for maximum water retention, involves digging ditches 0.5 m wide by 0.5 m deep for a given length, with side trenches 0.5 m wide by 0.5 m deep x 1 m long. The system is completed by constructing a rim of earth at the down stream end so that the maximum amount of water can be retained for the young plants.

The selection of species used is determined on the one hand by their biology and their adaptability to the ecological conditions of the region, and on the other hand by their nutritive and fodder value as well as their rate of growth.

Thus the following species have been used:

- 1). For reforestation of open spaces and on deep soil:

*Pinus halepensis* (Mill);  
*Tetraclinis articulata* (Vahl) Masters;  
*Eucalyptus sideroxylon* (A. cumu) Benth;  
*Eucalyptus gomphocephala* (D c).

- 2). For silvo-pastoral improvement on diversified soil:

*Acacia cyanophylla* (Lindl);  
*Ceratonia silica* (L);



In southern Morocco trees are essential for preventing soil erosion on the steep mountain slopes. (UNEP/Daniel Stiles)

*Atriplex nummularia* (Lindl) and *halimus*;  
*Eucalyptus sideroxylon* (L.);  
*Opuncia ficus indica* (var. *inermis*) (Mills).

The plants are produced at the forest nursery at Ksiba. They are grown in hexagonal prism-shaped blocks of earth 114 mm high with a conical cavity in the centre. These blocks are produced using block press machines. Only the carob trees (*Ceratonia silica*) are raised in black cylindrical polyethylene bags 30 cm high and 15 cm in diameter.

Following the work undertaken and the prohibition of grazing, the following results have been achieved:

- proliferation and colonization of the land by herbaceous species;
- reappearance of seedlings and of tree foliage;
- shoot formation of the fodder species introduced;
- reduction in the effects of erosion.

### III. Work to combat range-induced erosion in Boumia Region

The Boumia region is located in the upper catchment area of the Oued El Abid, across which the Bin-El-Ouidane dam has been built where the above mentioned water course

joins its major left tributary, the Oued Ahansal.

Annual rainfall, which is hardly more than 350 mm, occurs in the form of storms, which causes erosion of the friable schistose soil. The land surface is bare or scantily protected by forest vegetation consisting essentially of oak (*Quercus ilex*), Aleppo pine (*Pinus halepensis*) and juniper (*Juniperus oxyperus* (L))

If nothing is done, soil erosion will lead to desertification after the disappearance of the old pine groves which still exist, but which are unable to regenerate because conditions are not appropriate for the seeds to fix themselves and germinate. To try and reduce erosion and prolong the presence of the forest, the following activities have been undertaken:

- forest plantation;
- drystone ravine corrections;
- prohibition of grazing.

### Conclusion

The knowledge gained during the UNEP/USSR international seminar on arid rangeland ecology, management and productivity is applicable in the various fields of activity being carried out in Morocco (rangeland improvement, desertification control, utilization of saline waters in deserts, etc.)







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**Photographs for  
*Desertification Control Bulletin*  
Covers**

The Editor of *Desertification Control Bulletin* is seeking photographs for consideration as bulletin covers. All submissions should be addressed to:

The Editor  
Desertification Control Bulletin  
UNEP  
P.O. Box 30552  
Nairobi  
Kenya

**Technical requirements**

Photographs must be colour transparencies of subjects related directly to desertification, land, animals, human beings, structures affected by desertification, control of desertification, reclamation of desertified lands, etc. Submissions must be of high quality to be enlarged to accommodate an A4 format.

**Captions**

A brief caption must accompany each photograph giving a description of the subject, place and country, date of photograph and name and address of photographer.

**Copyright**

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*Desertification Control Bulletin* invites articles from the world's scientists and specialists interested in the problems arising from or associated with the spread of desertification.

*Desertification Control Bulletin* is an international bulletin published at six-monthly intervals by the United Nations Environment Programme (UNEP) to disseminate information and knowledge on desertification

problems and to present news on the programmes, activities and achievements in the implementation of the Plan of Action to Combat Desertification.

**Audience**

The bulletin addresses a large audience which includes decision makers, planners, administrators, specialists and technicians of countries facing desertification problems, as well as all others interested in arresting the spread of desertification.

**Language**

The bulletin is published in English. All manuscripts for publication must be in English.

**Manuscript preparation**

Manuscripts should be clearly type-written with double spacing and wide margins, on one side of the page only. The title of the manuscript, with the author's name and address, should be given in the upper half of the first page, and the number of the words in the main text should appear in the upper-right corner. Subsequent pages should have only the author's name in the upper-right corner.

**Metric system**

All measurements should be in the metric system.

**Tables**

Each table should be typed on a separate page, should have a title and should be numbered to correspond to its point of reference in the text. Only essential tables should be included and all should be identified as to source.

**Illustrations**

Line drawings of any kind should each be on a separate page, drawn in black china ink and double or larger than the size to appear in the bulletin. They should never be pasted in the text. They should be as clear and as simple as possible.

Photographs in the bulletin are printed black-and-white. For satisfactory results, high quality black-and-white prints 18 x 24 cm (8 x 10 in) on glossy paper are essential. Dia-positive slides of high quality may be accepted; however, their quality when printed black-and-white in the bulletin cannot be guaranteed.

All line drawings and photographs should be numbered in one sequence to correspond to their point of reference in the text, and their descriptions should be listed on a separate page.

**Footnotes and references**

Footnotes and references should be listed on separate pages at the end of the manuscript. Footnotes should be kept to an absolute minimum. References should be strictly relevant to the article and should also be kept to a minimum. The style of references should follow the format common for scientific and technical publications: the last name(s) of the author(s) (each) followed by his initials, year of publication, title, publisher (or journal), serial number and number of pages.

**Other requirements**

*Desertification Control Bulletin* publishes original articles which have not appeared in other publications. However, reprints providing the possibility of exchange of views and developments of basic importance in desertification control among the developing regions of the world or translations from languages of limited audiences are not ruled out. Short reviews introducing recently published books in the subjects relevant to desertification and of interest to the readers of the bulletin are also accepted. Medium-length articles of about 3,000 words are preferred, while articles longer than 4,500 words are not accepted.

**A reasonable fee is paid for articles accepted for publication, and 25 reprints are provided to the authors.**

