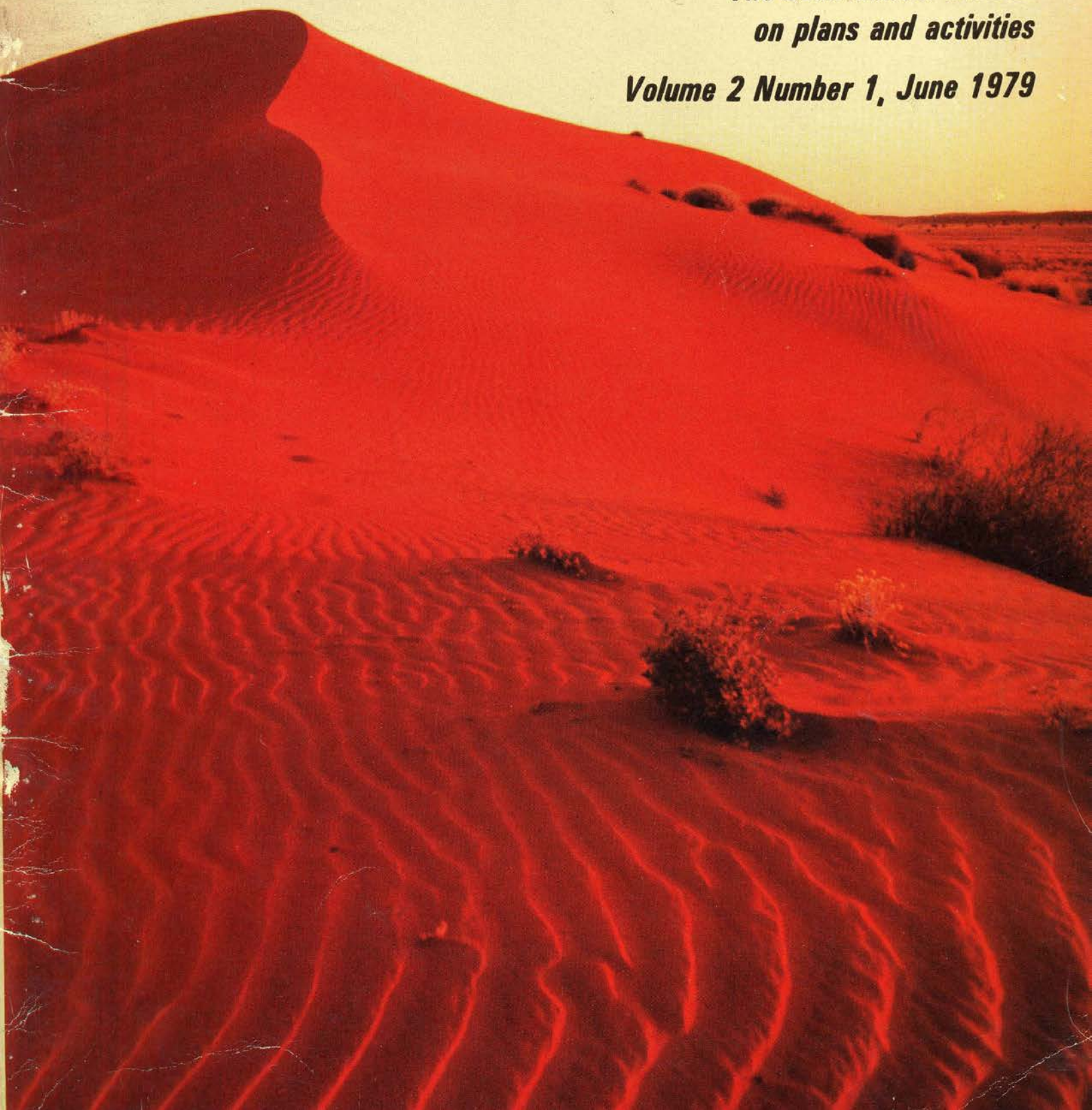
UNITED NATIONS ENVIRONMENT PROGRAMME

DESERTIFICATION CONTROL

The semi-annual bulletin on plans and activities

Volume 2 Number 1, June 1979



* *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 advancing desert.*

* *95 States participated.*

* *50 United Nations offices and bodies, 8 inter-governmental organizations and 65 non-governmental organizations participated.*

* *The United Nations Conference on Desertification prepared a Worldwide Plan of Action to Combat Desertification with 28 specific recommendations.*

* *Immediately after the adoption of the Plan of Action the Executive Director of UNEP convened the Consultative Group for Desertification Control to assist in mobilizing resources for the activities under the Plan of Action. This group is co-sponsored by UNEP, UNDP, FAO, WMO, UNIDO, WFC, UNFPA, IFAD and UNESCO.*

Establishment of the Desertification Unit: As per recommendation of UNCOD (Para. 130 of the Plan of Action, A/Conf. 74/36, part one) to create a clearly identifiable but small number of highly qualified staff, and endorsement of above by GC VI. (UNEP/GC. 6/19, Decision 6/13 E, Para. 5), the Desertification Unit was established within UNEP in May 1978. At the time of this Bulletin going to press, the Unit consists of the following staff: BESKOK, T.E. (Turkish, Forester); CISSE, D. (Malian, Sociologist); DAR, A.K. (Indian, Economist); HØGEL, J.C. (Danish, Chief of Unit); KARRAR, G. (Sudanese, Principal Officer); OMER, N.U. (Afghan, International Relations); ROZANOV, B.G. (USSR, Principal Officer); VERSTRAETE, M. (Belgian, Climatologist).

Cover photograph by courtesy of the Australian High Commission, Nairobi:
Sand dunes on a cattle property in the Simpson Desert, Northern Territory, Australia.

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UNITED NATIONS ENVIRONMENT PROGRAMME

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Published in 1979 by
UNITED NATIONS ENVIRONMENT PROGRAMME
Nairobi, Kenya

ISSN 0379 - 2455

Printed in Kenya by
General Printers Limited,
Homa Bay Road,
P.O. Box 18001, Nairobi.

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INTRODUCTION

Desertification is an old process. Poets and wise men have witnessed its steady action over the centuries. But only recently has man endeavoured to stop the spread of the disease. The rhythm acquired by the process and its multiplying effects, the results of the interaction between human activity and natural phenomena, are too evident nowadays to remain unnoticed by the public.

Desertification, as Mr. P. Thacher says, is probably the greatest single environmental threat to the future well-being of the Earth. It is a process of aridification in dry lands, of deterioration of the biological potential, which can lead to desert-like conditions. Large areas of our planet and millions of people are being affected by it in different degrees. Surprisingly, the areas of highest vulnerability are not those immediately adjacent to deserts, but the semi-arid zones subjected to human pressure. UNEP has focussed its attention in these regions, and the ultimate solution will be found at the national level, "when governments make the political, financial and social commitments required to stop desertification".

H.E. Guillermo Nannetti Concha speaks to us about the need to adopt sound soil policies. It is less costly to prevent the causes of soil degradation than to combat its effects. Governments must adopt a comprehensive approach in relation to agriculture, land ownership, forestry, water and soil conservation, bearing in mind that soil is "the basic natural resource of the economies of countries and its use has a social function that entails obligations". The "social function of property" proclaimed by modern Constitutions must be applied to soil conservation and the adoption of protective measures.

For sixteen years soil conservationists have been carrying out intensive experimentation and research in Cobar, Australia, where vegetation is now returning and the carrying capacity increasing in bare and eroded lands that were severely damaged by overstocking, rabbit and scrub infestation and droughts.

Nina Darnton describes what is being done in Kenya to combat desertification in an arid region inhabited by nomads which was long ago a flourishing greenland. A group of researchers has been working for three years, sponsored by UNESCO and UNEP, on the *Integrated Arid Lands Project*. "The problem is simply that there are more people and animals on this land than it can support", says Dr. Lamprey, the UNESCO coordinator of the project. The aim, according to one of the experts, is "to save this land, to encourage the modification of certain animal husbandry practices, but to do this without destroying the traditions and culture of the people".

What the ants are saying should interest all of us. They have seen our generation pass through the millennia, building green civilizations that collapse and leave behind barren earth and drying streams, "the home of scorpions, ants and centipedes".

You are going to read about these and other things in this third issue of our *Desertification Control Bulletin*.

Jens Høgel
Chief, Desertification Unit

"Water and fire complement each other, thunder and wind do not interfere with each other, and the forces of mountain and lake are united in their action. Thus only are change and transformation possible, and thus only can all things come to perfection."

From the I Ching, (China, 1150 B.C.)

DESERTIFICATION: THE GREATEST SINGLE ENVIRONMENTAL THREAT

by P.S. Thacher

I have had only two brief experiences with deserts. Both gave me false impressions which I suspect many of us share.

As a boy in New England I saw the so-called "Desert of Maine" in the north-eastern corner of the U.S. It is too small to show up on most maps, but left an indelible impression on my mind of sand spewing forth, as though from a cold volcano, which would gradually cover all the trees of New England.

Many years later I rode on horseback from the great pyramids outside Cairo to the "Step Pyramid" of Saggara looking over the eternal sands that had covered the artistry of more than 3,000 years, from the earliest burials of the pharaohs down to examples of Greek statuary dating from the Ptolemaic period (third century B.C.); one could not fail to recall the English poet, Shelley's, traveller:

I met a traveller from an antique land
Who said: Two vast and trunkless legs of stone
Stand in the Desert . . . . Near them on the sand,
Half sunk, a shatter'd visage lies, whose frown
And wrinkled lip, and sneer of cold command,
Tell that its sculptor well those passions read
Which yet survive, stamp'd on these lifeless things,
The hand that mock'd them, and the heart that fed:
And on the pedestal these words appear:
"My name is Ozymandias, king of kings:
Look on my works, ye Mighty, and despair!"
Nothing beside remains. Round the decay
Of that colossal wreck, boundless and bare
The lone and level sands stretch far away.

Once again my impression was of a relentless movement of sand which covers all in its path, expanding by waves to bury man's best efforts.

In recent years the news media, in their effort to portray complex subjects in popular terms, and using simple, attention-getting phrases, have reported events in Africa in terms of "spreading deserts". While deserts may occasionally spread, the term is usually inaccurate and therefore misleads the public as to causes of and answers to what may be the greatest single environmental threat to the future well-being of this planet, especially at a time when demands for food are still escalating, namely the loss of arable soil.

I find I was not alone in the traditional perception of a process of desert formation, generally desert encroachment into land used for food production, a process which could be popularized as spreading deserts. Even in knowledgeable circles this perception survived as recently as 1973 when,

for example, it was the basis for the briefing of astronauts who undertook a critical—for desertification—Skylab 4 mission from November 1973 to February 1974. Largely as a result of human observations from space the concept became what it is today: a process of aridification in dry lands often adjacent to deserts, a process of deterioration of the biological potential which can lead to desert-like conditions.

The causes of deterioration are many and were intensively studied during the preparations for the UN Conference on Desertification in 1977. The process itself has been described best by Dr Tolba: "The desert does not usually move forward in a straight line, but spreads like a skin disease, in blotches and spots. . . . ."

The desert threatens us. We must put up a shield. That shield is the forest.

Sada Weinde, Senegal

Since the UN Conference on Desertification in August 1977, the term "desertification" has taken on a new and different meaning, but important to our understanding if Earth, the "Water Planet", is not to become barren, its surface as lifeless as Mars.

The geographical area of concentration under the Plan of Action approved at the UN Conference on Desertification

is not the deserts of the planet. The deserts themselves represent a battlefield already abandoned, where natural processes have all but eliminated biological productivity, where the cost of reversal is prohibitive. Indeed, in economic or energy terms soil must be viewed as a non-renewable resource, like fossil fuel, since once lost it cannot be regained except at costs so high as to be beyond the reach of society in all but a few locales.

Today, less than one quarter of the land surface is truly arable, ready for intensive farming, and between a third and a half of the land surface of the planet has lost or is losing its full biological potential because of desertification. UNEP's effort is focussed on stopping the spread of the disease which now has been well diagnosed, and in which man is, as always, the main actor, in the dry lands most vulnerable, where the pressures of people and animals, periodic droughts, on land already at risk, lead to deterioration which is for all practical purposes irreversible.

Some 600 to 700 million people, about 14% of the world's population, live in the area of risk. Of these some 60 million are immediately affected by desertification. The dry lands of the world can be defined by a variety of factors—climate, vegetation, society and others. Based on climatic data more than a third of the land surface of the planet is desert or semi-desert. Based on data on soil and vegetation the desert or semi-desert area is even larger, about 43%. All in all there are some 54 million km^2 (30% of the world's land surface) of potentially productive—but threatened—dry lands. These areas may be found in more than one hundred countries and a small, but increasing, percentage is being observed systematically by techniques advocated by UNEP's GEMS.

Within this vast zone of vulnerability UNEP's efforts are concentrated in the areas at highest risk, where the battle to preserve grazing land and arable soil can still be won.

One of the major accomplishments of the 1977 UN Conference on Desertification was to call attention to the location of these strategic areas, and the results were surprising—especially for those who thought in terms of "spreading deserts", for many of the areas are far distant from deserts.

Looking at the Desertification Map of the World, a 1:25 million scale overview of hazards on a global scale, one immediately sees that the areas of highest risk are *not* immediately adjacent to existing deserts. This map was compiled for the UN Conference on Desertification by FAO with help from UNESCO and WMO, and it assesses, and plots, hazard on the basis of a combination of existing climate and land-surface conditions plus human and animal pressures. At the global scale human pressures are not, at least not yet, being exerted at the edges of deserts; instead they are more often felt in the semi-arid, rather than arid, areas where there is dryness—but not the hyper-aridity of deserts.

These areas contain enough potential for biological productivity to attract man and animals, especially man who too often seeks to exploit this potential for maximum short-term yield and, without appreciating hidden energy and other costs, sacrifices sustainable production and long-term benefit.

One of the 32 case studies prepared for the UN Conference on Desertification highlighted the dilemma. In the pre-drought period in the Sahel there had been a build-up of livestock, extension of cultivated areas, increase in population, and change in living patterns away from nomad pastoralism (with low animal and human densities) toward sedentary livestock raising and farming centred around watering places. With international development assistance large central water-holes fed by deep wells had played a key role in this "development". But although planners had intended that grazing around the water-holes would be strictly regulated to prevent overgrazing, this proved to be far more difficult than the technical task of providing water.

Nature is neutral. Man has wrested from nature the power to make the world a desert or to make the deserts bloom. There is no evil in the atom; only in men's souls.

Adlai Stevenson, 1952, USA

According to the Niger case study, "it proved impossible to refuse water to herdsmen" and grazing loads soon reached levels two or three times greater than the vegetation could sustain. Cattle were soon dying, not from lack of water but from starvation, and an area was devastated by trampling and grazing for 10-12 km around the watering holes, beyond the grazing range of cattle under stress. These areas can be seen from above as the "patches" of the disease of desertification. They are symptoms of faulty development, of the application of inappropriate technology which disregards the natural and human aspects of the region and thereby exacerbates the devastation of drought.

Since water is usually the limiting factor for agricultural productivity in the semi-arid areas at risk, irrigation is often an attractive scheme to harness photosynthesis through the abundance of sunlight. But even when soil conditions are right, this approach increases the long-term risk because of the heavy cost of maintainance. Any irrigation scheme runs with gravity, and the law of gravity applies to sediment as well as the water in which it is carried. In U.S. sediment studies during the 1950s cited by Eckholm in "Losing Ground", the annual soil run-off from forested areas was only a few hundredths of a ton per hectare, in contrast to 54 tons from lands cultivated for corn production (which could be reduced to 8 tons by skilful management). And, where gullies had formed on aban-

doned farmlands, the average run-off of sediment was 450 tons per hectare!

Obviously, irrigation requires high management skills, but these may be rare in areas where a "dry" culture has developed among the inhabitants. (Perhaps there is an appropriate ratio between density of population and sustainable production from irrigation; the continuing high rice yields from labour-intensive terraces in Asia would be unimaginable in less populated parts of the planet, even if there were adequate rainfall). In the long run irrigation must be seen as "inflationary". Large volumes of water must flow to prevent accumulation of salts in the soil (resulting from rapid evaporation rates). An accumulation of sediment leads to unavoidable siltation and "ages" the system, i.e. productivity is maintained at ever-increasing costs in terms of labour and energy. Numerous examples have been cited to show that the threat of siltation is frequently underestimated in all parts of the world. An Indian Government study showed that for 22 reservoirs built from 1933 to 1972 the actual siltation rate was, on the average, around eight times higher than the assumed rate. Some authors, like Pearson and Prayer in "Environment: North and South", suggest that the heightened siltation rates can be accounted for by man-induced erosion (deforestation and poor cultivation techniques) due to a lack of knowledge on the part of people in the area. As agreed by governments at the UN Conference on Desertification, however, the problem, especially in dry lands, is not so much that of lack of knowledge, as it is of lack of application of existing knowledge.

As the Overview for the UN Conference on Desertification made clear, "past failures to maintain balanced livelihood systems in dry lands are the outcome of an inability to apply existing knowledge of physical processes rather than from any lack of understanding of what these processes are". The resulting Action Plan calls for the establishment of national desertification commissions to develop national plans to combat the problem and thus recognizes that the key lies in eliminating institutional, social, political and economic constraints which impede the use of currently available technology.

UNEP for its part will continue to harness the knowledge and experience gained in all parts of our broad programme for use in the strategic areas at high risk. But since man is the chief instrument of desertification, in a difficult and changing environment, the ultimate answer will be found at the national level when governments make the political, financial and social commitments that are required to stop desertification. Ozymandias reminds us of the consequences of failure.

Mr. Peter Shaw Thacher *has served as Deputy Executive Director of the United Nations Environment Programme Secretariat at its Headquarters in Nairobi since August 1977. He previously served as Director of UNEP's European office in Geneva, Switzerland, and earlier was Director for Global Programmes. Before the establishment of UNEP in 1973 he served as Programme Director in the secretariat of the United Nations Conference on the Human Environment and was responsible for the preparation of several subjects considered at the Stockholm Conference in June 1972 ("Identification and control of pollutants of broad international significance" and "International organizational implications of action proposals").*

Mr. Thacher is a retired US Foreign Service officer who, before joining the UN Secretariat in February 1971, was Counselor for Science, Technology and Environment at the United States Mission to the United Nations in New York. He also served as Deputy US Representative to the UN Committees on Outer Space and on the Seabeds, and as an advisor on other UN bodies dealing principally with the application of science and technology, as well as the Preparatory Committee for the UN Conference on the Human Environment.

Mr. Thacher was first appointed to the European Headquarters of the Marshall Plan (ECA) in Paris where he served from 1948 through 1950. After assignments in the Far East and Washington he was appointed in 1956 as a member of the US Delegation to the eleventh Session of the UN General Assembly, and thereafter was assigned to the US Mission to the UN in 1957 where in succeeding years his principal area of concern was disarmament and outer space; he participated in negotiations leading to the Outer Space Treaty in 1966, the subsequent Convention on Assistance and Return of Astronauts in 1967, the Non-Proliferation Treaty in 1968, and the Seabeds Arms Control Treaty in 1970. He assisted in numerous studies and working groups such as the UN study in 1969 on the effects of use of chemical and bacteriological weapons, and studies on practical benefits of space technology including remote sensing, and was Parliamentary Secretary of the INTELSAT Conference in 1969.

After service in the United States Navy during World War II, Mr. Thacher studied civil engineering and architecture at Yale University from which he received a Bachelor of Arts degree in 1948. He was born in New York City in 1926.

Mr. Thacher, who is married and has three children, resides in Nairobi, Kenya.

* * * *

SOILS POLICY

by Dr. G.N. Concha

As the traveller approaches the Colombian coast on the Caribbean, the colour of the sea suddenly changes: the tropical blue turns to amber yellow for a hundred kilometres—as far as the eye can see.

This change in the colour of the water is caused by suspended particles of "vegetal soil" torn by tropical rains from the slopes of the Andes and carried in a basin of 1,550 km to the Caribbean by the waters of the Magdalena River.

This is only one example of a widespread phenomenon that has, at times, taken place so rapidly that old people remember the time—not so long ago—when the land was fertile in areas of the Andes that now look like fragments of a dead planet.

The extent of soil erosion, which is taking place everywhere in the world, is immeasurable. Scientific experts state that the Andean countries of Latin America have lost 50 per cent of their arable land as a result of erosion.

In the annual report on the state of the environment submitted to Congress in December 1978, the President of the United States disclosed that, in the last 200 years, the United States had lost one-third of its arable land and that, every year, erosion carried 4 billion tons of vegetable soil to the sea.

According to the United Nations Environment Programme, between 5 and 7 million hectares of agricultural land are lost throughout the world every year, primarily as a result of soil erosion. By the end of the century, it is estimated that 100,000 km^2 will be lost annually.

In view of this situation, many of the decisions adopted by the Conference on Desertification stressed that international action must be designed not only to combat, but also to prevent, desertification.

Erosion is the cause and desertification, the effect, of a process of soil degradation that is threatening mankind's future.

Preventing the cause of this process is less costly and of greater benefit to society than combating its effect; efforts should, however, also be made to halt the spread of the desert and, if possible, reverse it.

In order to take preventive measures, States must adopt a "soils policy".

At its sixth session, the Governing Council of the United Nations Environment Programme endorsed this idea. Accordingly, it urged member States to adopt a soils policy and requested UNEP, as the catalyst of the United Nations system, to assist member States in planning and implementing such a policy.

At its seventh session, the Governing Council decided that it was essential to explain the concept of a "soils policy" and to identify its components at a meeting of high-level experts which would define the legal, scientific, technical, cultural and institutional elements of such a policy.

The meaning and scope of this decision should be given careful consideration.

The concept of a "soils policy" may be understood either in a broad or in a precise sense.

In the broad sense, a soils policy would require the adoption by States of a comprehensive position relating to agriculture, land ownership, forestry, water and soil conservation.

This is how it was 25 years ago. Already you see, only a third of the area is under forest; there are no goats left. We have here a degeneration that is the result of too severe a struggle for existence. When a man, cold, hungry, and sick, simply to save what is left of life, to keep his children alive . . . clutches at anything to satisfy his hunger and warm himself and destroys everything, heedless of the morrow.

Dr. Astrov in Uncle Vania, *Anton Chekhov, Russia*

There is a silence where hath been no sound
There is a silence where no sound may be
In the cold grave, under the deep, deep sea,
Or in wide desert where no life is found.

Thomas Hood, England

The out-dated land tenure system forces people who are eager for land to cultivate poor soil where rapid erosion is likely to occur.

However, the first stage in the implementation of a soil policy is the adoption of a pragmatic approach.

In the precise sense, a soils policy would require the adoption by States of the decision to review, define, adopt and implement measures relating to the conservation, reclamation and rational use of land.

States may adopt such a soils policy, regardless of their political systems or policies related with the ownership of means of production.

Soil conservation is a new science that requires a new policy.

From the legal point of view, account must be taken of the fact that, since soil is the basic natural resource of the economies of countries, its use has a social function that entails obligations.

The theory of the "social function of property", which is embodied in most modern constitutions, must be applied to soil conservation and to the compulsory adoption of protective measures. The application of this theory has broad implications in environmental law.

It is obvious that such legislation will be ineffective if the soils policy is not accompanied by incentives and sanctions.

Incentives might include facilities for official, low-cost credits for specific activities and, in certain cases, construction subsidies for the adoption of basic soil conservation measures.

In addition, there should be effective information and extension services to train farmers and advise them in soil conservation techniques.

Sanctions might include payment orders and fines for uncooperative farmers and even the expropriation, "in the public interest", of land where conservation measures are not properly applied.

It is evident that the adoption of a soils policy calls for the identification of the conservation measures and activities required in different regions, depending on their topography and climate. To this end, universities and scientific institutions must co-operate in carrying out the necessary research and experiments.

The need for such research and experiments, which are essential in all cases, is all the more pressing in tropical mountain zones.

As stated above, a soils policy requires the establishment of agricultural advisory services that will assist farmers in taking protective measures. Consequently, a soils policy requires intensive educational and training activities, not only for the training of researchers and technical and information experts, but also for the creation of collective awareness through the teaching of the basic elements of conservation in the entire educational system, from primary school to adult and university education.

At the same time, a soils policy calls for the dissemination by the mass communications media of information designed to create a public spirited attitude towards soil conservation.

A soils policy also requires proper institutional arrangements, including the setting up of administrative units entrusted with the task of planning, managing, coordinating and assessing such a policy at the national and local levels and the establishment of credit, extension, research, experimentation, training, education and information agencies.

This is, in broad outline, the topic that will be discussed by the meeting of the group of experts to be held under the auspices of UNEP and FAO, in accordance with decision 7/6 B adopted by the Governing Council. UNEP will thus be fulfilling one of the basic responsibilities entrusted to it as vigilant of the world environment.

Dr. Guillermo Nannetti Concha, *the Ambassador of Colombia to the Government of Kenya and permanent representative to the United Nations Environment Programme and the United Nations Centre for Human Settlements (Habitat), was formerly a university professor, the Minister of Education, a member of the UNESCO Executive Board, a member of Parliament and the Ambassador of Colombia to Sweden, Poland, Finland and Ethiopia.*

I looked at the earth
It was a barren waste
At the sky—there was no light
I looked at the mountains—they were shaking
And the hills were rocking to and fro
I saw that there were no people:
Even the birds had flown away.
The fertile land had become a desert
It's cities were in ruins
Because of the Lord's fierce anger.

Jeremiah 4/20-26

AUSTRALIA COMBATS DESERTIFICATION

Cobar, like many small pastoral and mining towns in the semi-arid regions of inland Australia, suffers from desertification.

The land is bare and eroded from many years of overstocking, rabbit infestation and poor management. Rainfall is infrequent and unpredictable. Soils are poor in nutrients. Gullying and sheet erosion are common, and it is impossible for pasture plants to gain a foothold and germinate, grow and reproduce. Many areas are infested with inedible scrub.

But during the last 16 years, after intensive experimentation and research by soil conservationists, the situation has begun to improve giving cause for some optimism.

Contour furrowing and water spreading have been introduced and vegetation is returning to the bare eroded ridges and scrub infested flats. Carrying capacity is increasing and a pilot rehabilitation scheme on affected landholdings, supported by the New South Wales (NSW) State Government, has begun.

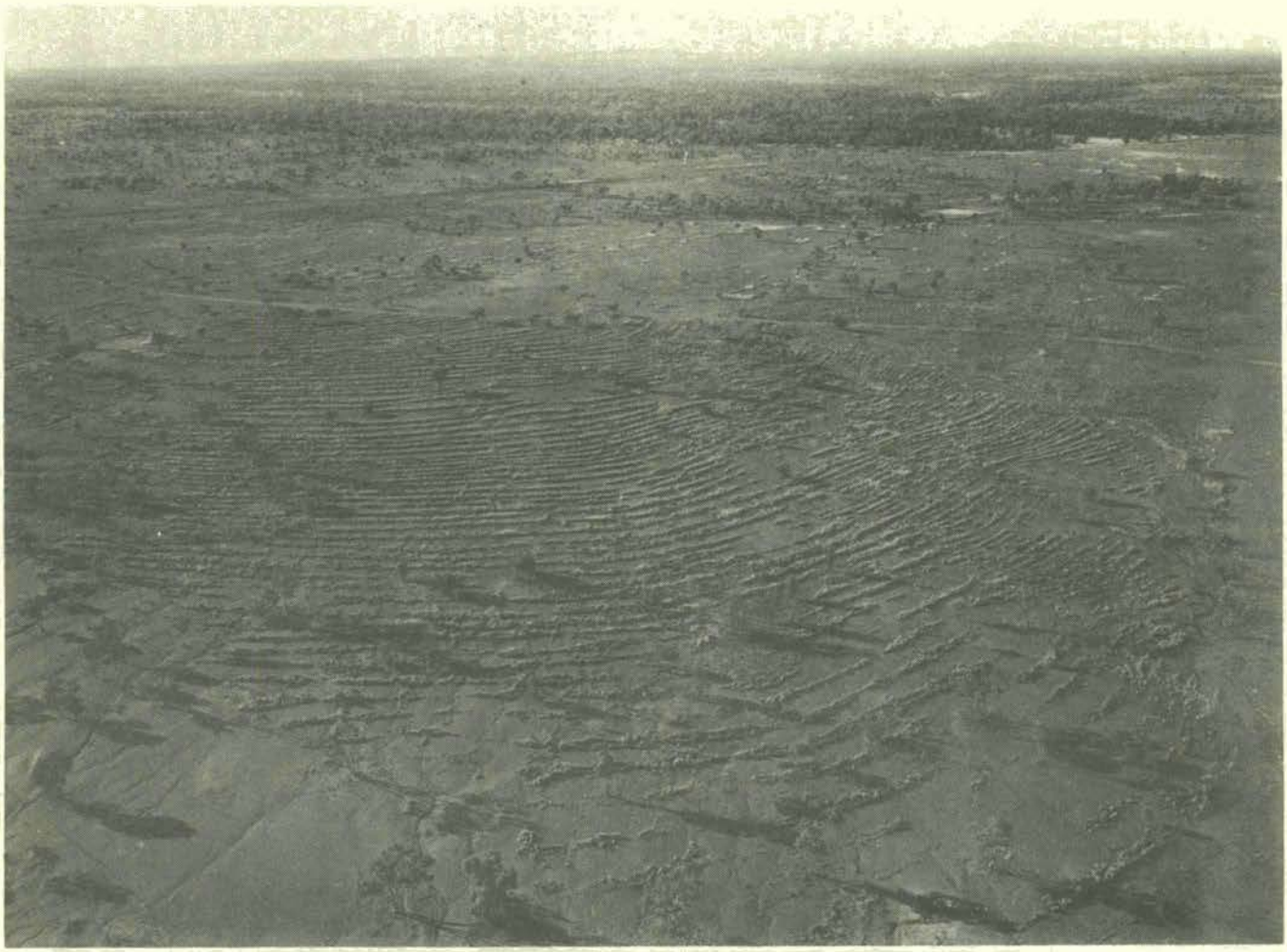
Cobar, first settled in the 1870s, is 700km west of Sydney in a semi-arid undulating area, known locally as the hard red country, because of the colour and type of its soils.

Rainfall averages about 325mm a year with very high temperatures in summer and heavy frosts in winter. Daily mean temperatures of 20°C are not uncommon. Landholdings range from about 4,000 ha to 40,000 ha carrying between 3,000 and 5,000 sheep.

Large numbers of sheep and cattle were introduced into the area in the early days of settlement. This overstocking, coupled with rabbit infestation and severe droughts, led to bad soil erosion. Inedible scrub also invaded the land, reducing pasture growth and soil stability as it competed for moisture and nutrients.

By 1968, after two years of severe drought, the plight of landholders was so bad that the NSW Government was called in and an inter-departmental committee was set up to investigate the problem.

Water ponding banks on a bare scalded area north of Nyngan, 134 km, east of Cobar, New South Wales. Yields of forage from the ponds have repaid their construction cost many fold.



A previously bare area treated with contour furrows at Cobar, New South Wales, ten years after treatment.

The committee found that reduced pasture growth and invasion of pastures by scrub had led to a serious decline in productivity in the district. Many properties were not economical and some land-holders were in such severe financial difficulties that they were being forced to leave their land.

Any remedies, the committee stated, must set out to increase the carrying capacity of holdings to enable landholders to meet their financial commitments. The quality of pasture available to sheep had to be improved so that reasonable yields of wool and good lambing percentages could be expected.

The committee came up with a 14-point plan to help the landholders overcome their problems. The plan included contour furrowing, water spreading of the flats for fodder crops and clearing further areas for pasture.

Meanwhile an experimental project begun by the NSW Soil Conservation Service in 1963 was showing encouraging results.

The service had taken over an 81-ha site near Cobar and set out to test ways of revegetating the eroded ridge country and to study the ecology of native and naturalised pasture species.

The site had been heavily grazed for many years, was suffering from serious erosion and devegetation and had a carrying capacity of only one sheep per 12 ha.

When the researchers found that very little water could penetrate the hard, eroded soils, they began testing various methods of opening up the soil. The aim was to let water in and to ensure it was retained, giving plants a chance to grow.

Three treatments—ripping (three contour rips with 1m between the individual rip lines), close furrows (contour furrows 1 to 1.5m apart) and wide furrows (contour furrows 3 to 6m apart)—were investigated.

By 1968 the scientists had found that furrowing, combined with the exclusion of stock from the area, was successful, but it was essential to prevent grazing in order to achieve any worthwhile regrowth. They also found close furrows more effective than wide furrows and grazing control ineffective on its own.

The furrows were ploughed near the contours with gaps

of 5 to 10m every 20 to 40m to allow overflow from the ends rather than breaks in the middle of the furrow.

The gaps were staggered so that overflow from one set was picked up by the furrows immediately below and so rainfall could gradually filter down through the system with the minimum of erosion.

The furrows not only trapped water but also soil and seeds and allowed pastures to regenerate. They were much more effective than rips as they allowed water to be retained for much longer.

In 1972 it was decided to graze sections of the experimental site on a rotational basis to measure the effect of controlled grazing as opposed to continuous grazing.

It was found that stock could be reintroduced to revegetated areas after a reasonable rest period to allow germination and growth, and from then on high stocking rates could be maintained without damaging the pastures.

Furrowed areas were stocked at an average of one sheep to 2.3 ha (compared to the previous 1 to 12 ha) and on two paddocks the stock rate was raised to one sheep to 1.5 ha over the five-year trial period.

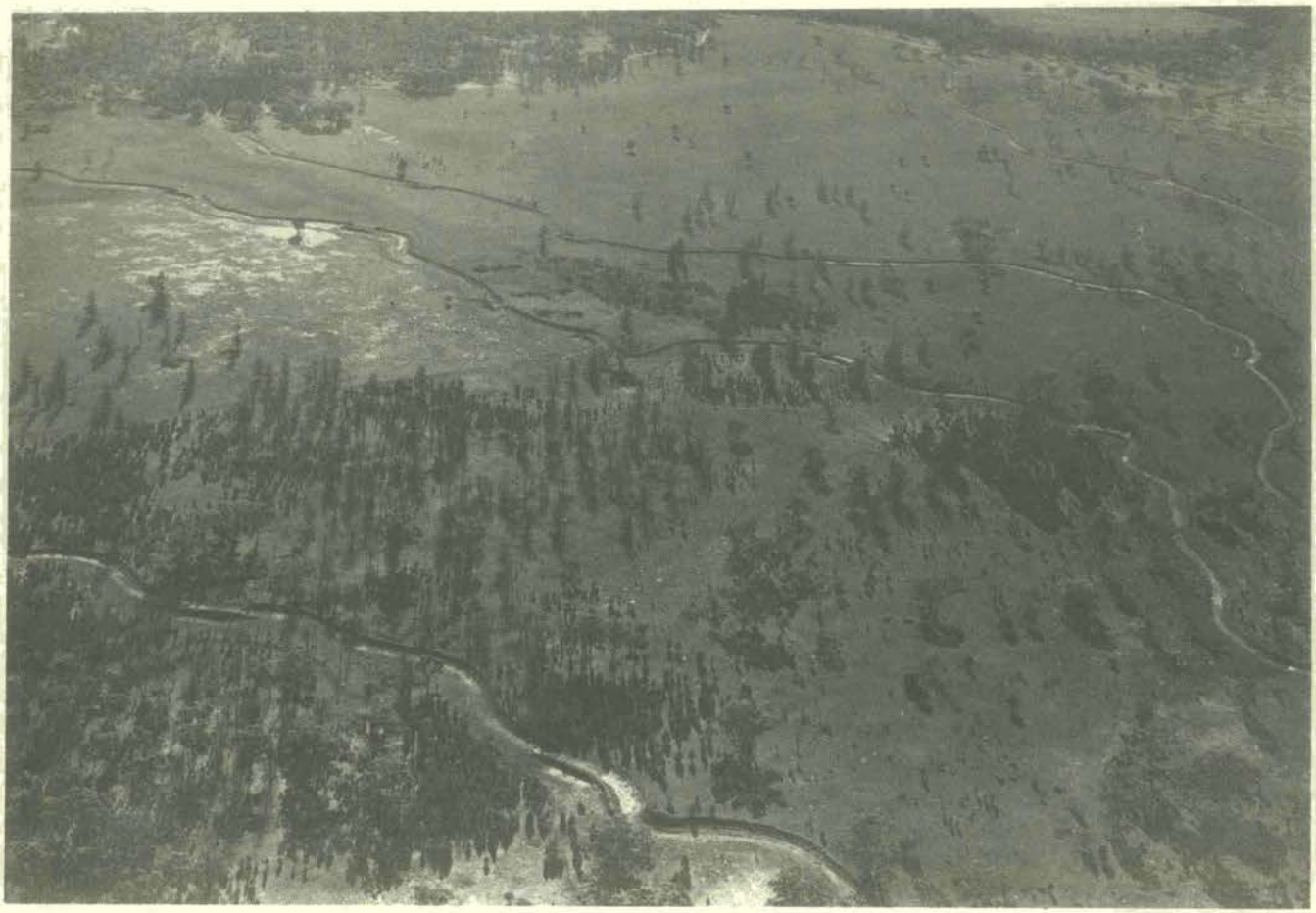
It emerged that sheep did not have to be removed from the fields during droughts and that even small showers during these periods produced enough run-off to give a copious supply of green feed when the surrounding country was dry and brown.

On five experimental fields sheep were grazed to 0.4 to 1 ha and moved to the next field after two to three months.

It became clear that the types of furrows were important. Wide-spaced furrows produced more perennial grass cover than close furrows, regardless of stocking rates. Under controlled grazing, close furrows produced more total pasture, while under continuous heavy grazing the wide furrows produced the most pasture.

In 1968 the NSW Soil Conservation Service began another experiment on a different property. This involved water spreading on flat areas between the ridges to grow fodder crops for stock and also keep back scrub infestation.

The flats were cleared of scrub by bulldozing, burning and ploughing. Specially-designed banks that diverted and spread the water were built. These banks collected water as it ran off the hard-eroded ridges and diverted it onto the ploughed area.



Water spreading banks distributing the flow from a large creek over about 400 ha of cropland at Nymagee, south-east of Cobar, New South Wales.

Instead of the water concentrating in gullies and rills in the centre of the flats, the banks spread out the water over a much wider area. They allowed as much water as possible to be absorbed with the minimum of erosion.

One sits oppressed under a bare tree
And strays into a gloomy valley.
The woman holds the basket
But there are no fruits in it.
The man stabs the sheep, but no blood flows.

From the I Ching, (China, 1150 B.C.)

It was found that the best spreading flows came from heavy storms not from steady rain, but rainfall of 20 to 25mm was enough to produce good flows in the area.

Crops and pastures sown as soon as possible after a good rainfall produced good yields and could increase stocking rates, provide food for breeding sheep, reduce erosion and make the land much more drought-tolerant.

The water-spread areas could support grazing for both short and long periods and could help upgrade farm management, improve livestock nutrition and allow other pastures to be rested.

By 1975 it was obvious that the two research projects by the NSW Soil Conservation Service had been a success. They had shown that furrowing could be an economic proposition and could produce a five-fold increase in stocking rates as well as increased wool production.

Despite a wool recession in the early 1970s, which played havoc with the recommended schemes of the inter-departmental committee, the position was reviewed again in 1975 and, because of the success of the experimental projects, the NSW State Government decided in 1977 to support a pilot rehabilitation scheme on land in the Cobar area.

The Government agreed to pay 50 per cent of the cost of any rehabilitation project with the balance being available in loans to landholders on a favourable basis.

So far four properties have been selected for the scheme—two to carry out contour furrowing and two for water spreading. Two more will be selected each year for the next five years.

The landholders have been chosen on an economic basis. It has been estimated that returns from improved productivity on these lands will be as good as, or better than, paying $A15 a sheep for an equivalent area of good breeding country.

During the pilot scheme, costs, returns and improvements will be carefully monitored.

Cobar is just one of many semi-arid areas in Australia that are suffering the effects of severe soil erosion and scrub infestation. In fact 74 per cent of the Australian continent is classified as rangelands—areas where rainfall is inadequate for crop production or pasture improvement.

To try to combat the problem every State government as well as the Federal Government has research staff looking into the problem, and special projects have been carried out in many areas of Australia.

But, in many districts, it has not been found economical to try to reverse the soil erosion and revegetate the areas.

Production is not large from these marginal pastoral properties, and costs, particularly fuel prices, are rising. Many people prefer to live in the more hospitable coastal regions of Australia. Continuation of present economic trends could lead to less use, if not abandonment, of these semi-arid areas.

However, at selected sites with skilled management, it is possible to combat soil erosion and devegetation and establish viable economic enterprises.

The pampa kills from below
The sun smites from above
And among sun, pampa and saltpeter
The poor spend their life. . .

Argentinian folklore

* * * *

PUSHING BACK THE DESERTS

by Nina Darnton

The Chalbi Desert, in Kenya's vast and arid North, was once a lake—2000 years ago. The people who lived on its shores were fishermen. Now they are nomads whose very existence depends upon the search for water.

Desert encroachment—the process that turns verdant regions into barren wasteland—has not stopped. It is even accelerating. For three years now, a group of UNEP/UNESCO sponsored scientists have been trying to find out why, and what can be done about it.

From a research station perched on the steep slopes of Mt. Kulal, they have moved down the mountainside and into the surrounding area. Here, in the driest region of Kenya, they set up their camps.

The site for the study, which is called the Integrated Arid Lands Project, is ideal for a research centre with international goals. In addition to the Chalbi, which is a salt desert, the arid lands contain sand, and lava that once flowed down the surrounding mountains. They are fairly typical of deserts throughout Africa, especially in the Sahel. The vegetation is varied, with both woodland and bushland, and on Mt. Kulal, compressed into a narrow region so that in a single day researchers can study differing vegetation that would otherwise be scattered over a wide area.

The Kenyan government recently signed an agreement to make "counterpart contributions." This will double the current staff of four full-time researchers. By 1980, it is envisaged, the project will be a joint cooperative effort between Kenya and the United Nations. The Kenyan contribution will consist of 5 million shillings over three years.

On a recent trip to the region, several government and UNEP officials, including Mr. Michael Njenga, Director of the National Environment Secretariat, were given a tour of the research area. The study was explained by Dr. Chris Field, the senior ecologist in charge of the research station, and Dr. Hugh Lamprey, the UNESCO coordinator of the project.

"In three years we've learned quite a lot about the problem", said Dr. Lamprey on the trip North. He gestured out the airplane window as the farmland below gave way to rangeland dotted by small dams and then, abruptly, to a starker landscape—brown soil, dams clogged with silt, and the parched bed of the Seya River. "This is the beginning of the desert", he said, "This is what we are trying to stop."

Dr. Lamprey explained that one basic understanding that has emerged is that ecological considerations are less than half of the problem and the easiest part to remedy. The larger part of the problem is sociological and that is more difficult because it touches upon the traditional attitudes and relationships of the people in the area.

"Whenever we do environment or development work", said Mr. Jens Høgel, Chief of UNEP's Desertification Unit, "we are always brought back to the realization that what stands in the centre is man."

Goats attempt to graze on sparse shoots of grass at the Rendille village of Kargi.

The traditions of the local people revolve around the accumulation of animals: grazing experiments at the research station at Balessa.

The researchers emphasize that while man is the ultimate victim of desert encroachment, he is also its main cause. It was not dramatic climatic change that, in living memory, turned the Huri Hills between Ethiopia and Kenya from verdant forest to grassland. And it will probably not be sudden climatic change that will turn the grassland into barren desert.

"The problem is simply that there are more people and animals on this land than it can support", said Dr. Lamprey, walking past a herd of goats that were attempting to graze on the occasional shoot of sparse grass that managed to push through the rocky soil.

But the solution is not simple, he explained. The traditions of the local people, the cow-keeping Samburu on the mountainside, the camel-keeping Gabra and Rendile in the lowland desert regions, revolve around the accumulation of animals for wealth and security. Although individuals own animals, the land is used communally and the land has its limitations. There are still many hostilities between ethnic groups and raiding of livestock is common. For security against attack, and because infant mortality was so high, families had many children. The combination of increased human and animal populations produces the overgrazing that is one of the first causes of desert encroachment.

Ironically, the problem has sometimes been worsened by the very technological aid that was aimed at rectifying it. The drilling of boreholes for water, for example, attracted nomads who would ordinarily have dispersed during a drought. They brought their animals to the boreholes in large numbers, seriously overgrazing the land. Increased veterinary help also increased the number of animals, which, in turn, increased the amount of land lost yearly to the desert.

In addition, there are several large areas, "no man's lands" between ethnic groups, which are not used because of fear of raiding. Good grazing still exists there. If people would move into these "zones of insecurity", as the researchers call them, the problem would not be solved, but it would be postponed.

"Nomads can use this country rationally without overexploiting it only if they remain nomadic", Dr. Lamprey pointed out. "But for various reasons they have become sedentary. There are little settlements that grow up around water holes. These areas are overgrazed and desert is forming very fast."

A main cause of the settlement is lack of security. When the people do spread out they are often attacked. When they are settled they can be protected. And since the population is rising they need more livestock to support them.

"In drought", Dr. Lamprey continued, "the livestock die and some people become destitute. In the past they would have succumbed or left the area but now they are supported by famine relief. So you have these villages inhabited by refugees from destitution which the economy of the region is unable to support. They attract the amenities that grow up in these areas—shops, schools, medical aid. These then attract semi-nomads, and any semblance of rational land use is lost. They keep livestock

because they live mainly on milk. Women, children and old men increasingly settle, while the young men take the surplus animals to the surrounding country and continue the old nomadic movements."

Another cause of desert encroachment, according to the researchers, is the cutting down of trees for firewood and for bomas. After a time the bomas become infested with parasites and the people move to a new site and start again, cutting down more trees. They may do this as often as ten times a year. With the increased numbers of people, the land is being denuded much faster than vegetation can grow to replace it.

It is easy to get lost in the maze of interconnected causes and effects, but the scientists are attempting to find the way out.

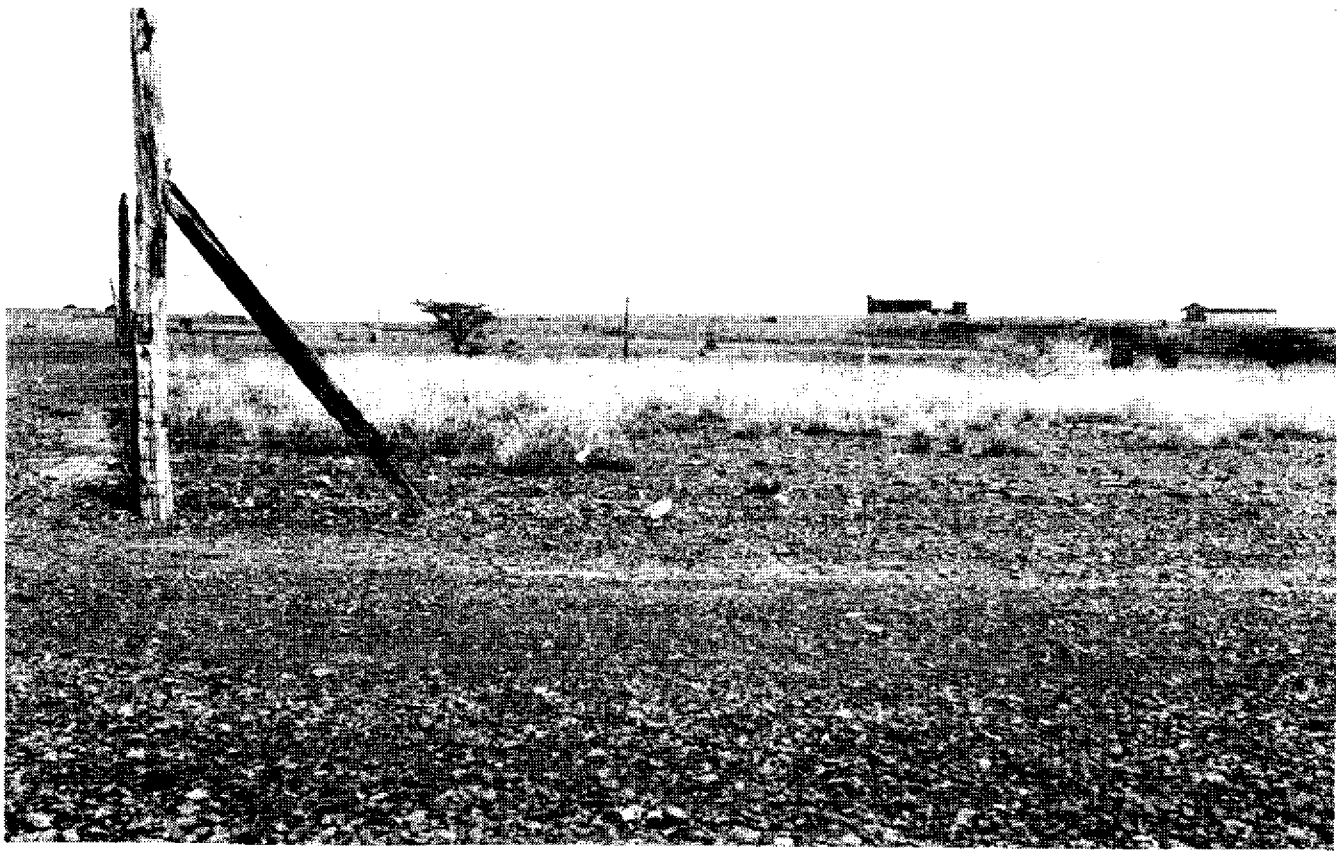
The answer seems, largely, to lie in better management of resources: rotating the animals to rest the grazelands, controlling the grazing intensity, preventing grazing around waterholes, discouraging the felling of large numbers of trees, and improving the marketing of the livestock.

The potential of the land for natural regeneration is evident in the "experimental exclosures" set up by the researchers. These are barbed wire fences marking out large rectangles to prevent grazing. In the eighteen months since these enclosures have been instituted the land has burgeoned with long shoots of indigenous grass—a striking patch of green on the desolate soil.

Some believe that one necessary adjunct to any development that can take place in the area is to encourage the people to enter the cash economy. "If they don't transfer some of their wealth into cash, then overstocking will continue", Dr. Lamprey points out.

Improving marketing possibilities is one way of encouraging this. Another is the diversification of the economy. The scientists explain that the region is rich in acacia senegal trees, which produce gum arabic used in the confectionery, pharmaceutical and stamp industries. At present, 80 per cent of the world's gum arabic is supplied by the Sudan. If Kenya entered the market, it would help to take some of the pressure off the land and also make the northern region more economically productive to the country.

Life is harsh in these desert regions and the people who inhabit them have developed traditions that are well suited to their survival. But as the conditions of their lives have changed, many of their customs have not. "Our aim is to save this land", said Dr. Chris Field, "to encourage the modification of certain animal husbandry practices but to do this without destroying the traditions and culture of the people."



Fenced off rectangles prevent grazing: in 18 months indigenous vegetation has returned

what the ants are saying

by Don Marquis

dear boss i was talking with an ant
the other day
and he handed me a lot of
gossip which ants the world around
are chewing over among themselves

i pass it on to you
in the hope that you may relay it to other
human beings and hurt their feelings with it
no insect likes human beings
and if you think you can see why
the only reason i tolerate you is because
you seem less human to me than most of them
here is what the ants are saying

it wont be long now it wont be long
man is making deserts of the earth
it wont be long now
before man will have used it up
so that nothing but ants
and centipedes and scorpions
can find a living on it
man has oppressed us for a million years
but he goes on steadily
cutting the ground from under
his own feet making deserts deserts deserts

we ants remember
and have it all recorded
in our tribal lore
when gobi was a paradise
swarming with men and rich
in human prosperity
it is a desert now and the home
of scorpions ants and centipedes

what man calls civilization
always results in deserts
man is never on the square
he uses up the fat and greenery of the earth
each generation wastes a little more
of the future with greed and lust for riches

north africa was once a garden spot
and then came carthage and rome
and despoiled the storehouse
and now you have sahara
sahara ants and centipedes

toltecs and aztecs had a mighty
civilization on this continent
but they robbed the soil and wasted nature
and now you have deserts scorpions ants and centipedes

and the deserts of the near east
followed egypt and babylon and assyria
and persia and rome and the turk
the ant is the inheritor of tamerlane
and the scorpion succeeds the caesars

america was once a paradise
of timberland and stream
but it is dying because of the greed
and money lust of a thousand little kings
who slashed the timber all to hell
and would not be controlled
and changed the climate
and stole the rainfall from posterity
and it wont be long now
it wont be long
till everything is desert
from the alleghenies to the rockies
the deserts are coming
the deserts are spreading
the springs and streams are drying up
one day the mississippi itself
will be a bed of sand

ants and scorpions and centipedes
shall inherit the earth

men talk of money and industry
of hard times and recoveries
of finance and economics
but the ants wait and the scorpions wait
for while men talk they are making deserts all the time
getting the world ready for the conquering ant
drought and erosion and desert
because men cannot learn

rainfall passing off in flood and freshet
and carrying good soil with it
because there are no longer forests
to withhold the water in the
billion meticulations of the roots

it wont be long now it won't be long
till earth is barren as the moon
and sapless as a mumbled bone

dear boss i relay this information
without any fear that humanity
will take warning and reform

(from **lives and times of archy and mehitabel, 1933**)

IMPLEMENTATION OF THE PLAN OF ACTION TO COMBAT DESERTIFICATION

CO-ORDINATION AND FOLLOW-UP

During the past year, considerable attention has been paid to the institutional arrangements at the international level for implementation of the recommendations of the Plan of Action to Combat Desertification and of the relevant resolutions and decisions of the General Assembly and of the Governing Council of UNEP. The Plan of Action, which was approved by the General Assembly in resolution 32/172 of 19 December 1977, called *inter-alia* for the establishment of:

- a Desertification Unit in UNEP
- a Consultative Group for Desertification Control. and
- an Inter-Agency Working Group on Desertification

1. Desertification Unit of UNEP

In accordance with Governing Council decision 6/13E of 24 May 1978, the Desertification Unit has been established within the Secretariat of UNEP, under the Bureau of the Programme. It comprises eight professional posts provided by UNEP (5 posts—3 established and 2 on an *ad interim* basis), UNDP (2 posts, including that of the Chief of the Unit) and UNFPA (1 post). The staffing of the Unit is now almost completed. In addition to the established staff and in accordance with the inter-agency agreement, the Unit is complemented by temporary assistance from other organizations of the United Nations system, as and when required, with at least twenty-four man-months of professional services.

In order to avoid any possible duplication of activities within UNEP, all activities related to arid and semi-arid lands ecosystems and to combating desertification have been concentrated within the Desertification Unit. In addition, the Unit also serves as the Secretariat for the Consultative Group for Desertification Control and the Inter-Agency Working Group on Desertification.

2. Consultative Group for Desertification Control

Following the first session of the Group held in May 1978, the governments of Bolivia, France, Federal Republic of Germany, India, Iran, Iraq, Kenya, Libya, Mexico, Niger, Senegal, Sudan, United States of America, Upper Volta and Uruguay have formally expressed their interest in becoming members of the Consultative Group, while the governments of Denmark, Japan, Netherlands, Sweden and the United Kingdom have indicated the desire to be associated with the Group as observers.

The following organizations of the UN system became the co-sponsors of the Group: FAO, IFAD, UNDP, UNEP, UNESCO, UNFPA, UNIDO, WFC and WMO.

Two international organizations of the United Nations System—the United Nations Sudano-Sahelian Office and the World Bank—and four regional organizations—the Arab League Educational, Cultural and Scientific Organization (ALECSO), the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS) as well as the Arab Bank for Economic Development in Africa and the Arab Fund for Economic and Social Development in Africa—have agreed to be members of the Group.

The General Assembly in its resolution 33/89 of 15 December 1978 *inter-alia* took note of the establishment of the Consultative Group for Desertification Control and invited donor countries and international financial institutions to participate actively in the work of the Group.

A working meeting of the co-sponsors of the Group is planned just before the second meeting of the Consultative Group, which is now tentatively scheduled for early 1980.

3. Inter-Agency Working Group on Desertification

The functions and work modalities of the Working Group, which is the main co-operating body for the implementation of the Plan of Action within the United Nations system, were agreed upon in September 1978 and were endorsed by the Administrative Committee on Co-ordination (ACC) in October 1978. The functions of the Working Group, as approved by ACC, are to:

(a) Provide the forum for integration of organizations' inputs to specific anti-desertification projects, including field operational activities, in close co-operation and co-ordination with the activities of the Consultative Group for Desertification Control;

(b) Work out a phased plan of implementation of short-term and long-term objectives, review its implementation regularly and revise it as and when required on the basis of the progress achieved (this plan will be drawn up to cover geographical — national, regional and global activities — and subject areas) and ensure that thematic joint programming in the field of desertification is carried out in a manner appropriate to the matter under consideration and in accordance with general guidelines to be provided for such exercises;

(c) Regularly review the implementation of the Plan of Action by the individual organizations and bodies of the United Nations system and by the system as a whole with a view to recommending re-adjustment of on-going activities as and when required;

(d) Identify and formulate projects for co-operative ac-

tion in the implementation of the recommendations of the Plan of Action to Combat Desertification;

(e) Prepare for consideration by the designated officials for environmental matters, who will submit it to the Executive Director of UNEP, a draft of the annual report which he will propose to the Administrative Committee on Co-ordination for submission to the Governing Council of UNEP on the status of implementation of the Plan of Action to Combat Desertification;

(f) Assist the regional commissions in implementing paragraph 6 of General Assembly resolution 32/172, which requests the regional commissions to undertake follow-up actions to implement the Plan of Action to Combat Desertification.

The Working Group was also assigned the mission to prepare, for its second session in September 1979, a draft report on the implementation of specific recommendations of the Plan of Action within the United Nations family.

4. United Nations Sudano-Sahelian Office (UNSO)

The General Assembly, by resolution 33/88 of 15 December 1978, decided to designate UNSO, in addition to its current functions, as the arm of the United Nations to be responsible for assisting, on behalf of UNEP, the efforts of the 15 countries of the Sudano-Sahelian region to implement the Plan of Action to Combat Desertification. The enlarged mandate of UNSO englobes: Cape Verde, Chad, Ethiopia, Gambia, Kenya, Mali, Mauritania, Niger, Nigeria, Senegal, Somalia, Sudan, Uganda, United Republic of Cameroon and Upper Volta.

Pursuant to resolution 33/88, modalities for the joint UNEP/UNDP venture have been agreed upon by the Executive Director of UNEP and the Administrator of UNDP. On 8 January 1979, the two Executive heads signed a Memorandum of Understanding to that effect, and addressed a joint letter on the subject to the governments concerned.

The Governing Council of UNEP, at its seventh session in April-May 1979, having examined the Executive Director's report on the implementation of the Plan of Action to Combat Desertification, approved the actions taken with respect to institutional arrangements in the Sudano-Sahelian region and endorsed the modalities of the joint venture of UNEP and UNDP and further authorized the Executive Director to continue to contribute to UNSO, UNEP's share of the administrative and operational works of the joint venture.

5. Additional Measures for Financing the Plan of Action

The General Assembly, after considering the report of the group of high level specialists on the additional measures and means of financing the implementation of the Plan of Action to Combat Desertification, adopted resolution 33/89, in paragraph 7 of which it requests the Secretary-General to solicit the views of governments on the subject and to report on the results to the General Assembly at its thirty-fourth session.

6. Special Account

The special account for financing the Plan of Action to Combat Desertification was officially opened on 15 March 1979. At its seventh session the Governing Council of UNEP adopted a decision in which the Council calls for voluntary contributions to the Special Account.

7. Other Current Activities With Respect to Specific Anti-Desertification Projects

The *UNEP/MAB Integrated Project in Arid Lands (IPAL)* has been extended to Tunisia in addition to Kenya, and a proposal to extend it to the Sudan is under consideration. Phase II of the project in Kenya (establishment of a co-ordinating unit and launching of initial field work) was completed by the end of 1978. The Government of Kenya has now decided to give substantial support to the project. An evaluation-cum-programming of the project will be undertaken during 1979, with a view to promoting closer co-ordination with EMASAR and wider practical implementation of the results achieved.

The *UNEP/FAO project on Ecological Management of Arid and Semi-Arid Rangelands in Africa, the Near and Middle East (EMASAR)* has almost completed its second phase, and a phase III project will be considered after final evaluation of the status of the programme. As stated above, arrangements on closer co-operation and co-ordination between EMASAR and IPAL are to be discussed.

During 1978 UNEP successfully organized and held, jointly with the Governments concerned, *international training courses in desertification control* in China (stabilization of shifting sands) and the USSR (stabilization of shifting sands, salinity control under irrigation) for specialists from the developing countries. Consideration is now being given to establishing a permanent programme of such courses.

Preliminary negotiations have been concluded between UNEP, FAO and UNESCO on a joint project on *the methodology of desertification assessment and mapping* (at different scales according to the countries' needs), to be carried out in close co-operation with the International Society of Soil Science and the International Geographical Union, each of which has established a working group on desertification. The project is being formulated, and its implementation is expected to start in 1979.

UNEP has concluded preliminary negotiations on the global project on *integrated agro-industrial regional development as an anti-desertification strategy*, which will be financed mostly from the non-convertible currency por-

tion of the Environment Fund and executed by the Government of the USSR. UNIDO has agreed to participate in the project, and negotiations with other relevant United Nations agencies are under way. The project is likely to involve Afghanistan, Algeria, India, Iraq, Mali, Mexico, Peru, the United Republic of Tanzania, and possibly some other countries affected by desertification. The first and programming meeting of the participants for project formulation was held in Moscow in early February 1979.

UNESCO is finalizing the publication, with UNEP's support, of the *State of Knowledge Report on Tropical Grazing Land Ecosystems* as a basic tool for research design, training and integrated planning. It is expected to be available in 1979.

The Soil Section of the joint FAO/International Atomic Energy Agency (IAEA) Division of Atomic Energy in Food and Agriculture has prepared for implementation, probably subject to availability of funds, during the period 1980-1985, a broad outline of programmes on "*Desertification and the Loss of Soil*" including such topics as (a) Reducing the hazards of crop failures under dry farming conditions; (b) Improvement of pasture; (c) Measures of erosion control; and (d) Water quality studies. Many aspects of IAEA's programme are concerned with isotopic methods and radiation techniques which can make valuable contributions to applied research aiming at combating desertification, particularly in the areas of soil and water management and conservation studies, organic matter studies, soil salinity problems and use of isotopic methods in water resources development in arid and semi-arid regions of the world.

The programme of the United Nations University on "*Assessment of the application of knowledge to arid lands problems*" is focussing on factors that prevent the effective use of knowledge, and on the subsequent development and implementation of means to overcome these difficulties. More specifically, the programme will assess past development projects in order to determine to what extent existing knowledge was applied, and the effect this had on the eventual outcome of the projects. The programme has already commissioned studies on the settlement of nomads, the criteria for the assessment of past development projects, the evaluation of various projects in specific areas and the obstacles to the application of knowledge from desert research institutions to local problems.

"Do we have enough knowledge to enable us to push back deserts? UNCOD, 1977. Professor Mohammed Kassas, Senior Adviser to UNEP Executive Director says: "Yes."

NEWS FROM NGOs

INTERNATIONAL SOIL SCIENCE SOCIETY WORKING GROUP ON DESERTIFICATION

The Working Group on Desertification has been established by the International Society of Soil Science (ISSS), at its Eleventh Congress in 1978, in response to the request of the Secretary-General of the United Nations to intergovernmental and non-governmental organizations concerned with desertification problems and their impact on development to participate in the implementation of the Plan of Action to Combat Desertification with a view to co-ordinating their activities within world-wide and regional programmes.

Degradation of soil or its complete destruction is one of the features of desertification. It includes wind and water soil erosion, loss of soil organic matter, deterioration of soil physical properties, soil hardening, decrease or loss of soil fertility; in irrigated lands it includes secondary salinization and alkalinization, as well as waterlogging. The problems of soil degradation and soil loss are central in the question of desertification which is closely connected with irrational or imappropriate and wasteful land use.

A tree that rises up blocks the path of death
Vicente Huidobro, Chile

Soil scientists all over the world have accumulated a large amount of knowledge on the processes and causes involved in degradation of soils in and around arid lands. This knowledge is scattered throughout various institutions and numerous publications. The same can be said about the technology of soil protection and conservation in relation to desertification.

The ISSS Working Group on Desertification was established with a view to:

1. Collect and evaluate the existing knowledge of the processes of soil degradation in and around arid lands with reference to desertification;
2. Study soil processes leading to and resulting from desertification;
3. Promote international exchange of information on soil problems related to desertification;
4. Participate in the activities of the international institutions of the United Nations system in the area of soils in relation to desertification;
5. Participate, at the national and international levels, in the implementation of the relevant parts of the Plan of Action to Combat Desertification, particularly in development of appropriate anti-desertification technologies of integrated soil management and the appropriate anti-desertification land-use planning and management.

To accomplish the above tasks, the Working Group on Desertification will, during 1979-1982:

1. Establish working contacts and core-membership within the national soil science societies;
2. Establish working relationships with national and international organizations concerned;
3. Prepare a bibliography on desertification impact on soils of arid and surrounding areas, as well as on anti-desertification soil technology and soil conservation;
4. Participate in the UNEP/FAO/UNESCO/WMO project on desertification assessment and mapping;
5. Prepare regional and international reviews on soil degradation due to desertification;
6. Organize a special session on desertification within the International Conference on Aridic Soils, Jerusalem, Israel, March 29-April 4, 1981;
7. Organize a special session on desertification at the 12th Congress of ISSS, New Delhi, India, 1982.

Following are the appointed officers of the Group, who can be contacted for further information or for the purposes of establishing co-operation with the Group:

Chairman: Dr. D.R. BHUMBLA, Agriculture Commissioner, Government of India, Krishi Bhawan, New Delhi, India

Vice-Chairman: Dr. A.M. BALBA, College of Agriculture, University of Alexandria, Chatbi, Alexandria, Egypt

Secretary: Prof. B.G. ROZANOV, Chair of Pedology, Moscow State University, 117234 Moscow, USSR (up to end 1979: c/o UNEP, P.O. Box 30552, Nairobi, Kenya).

FORTHCOMING INTERNATIONAL MEETINGS AND CONFERENCES RELATED TO DESERTIFICATION

1979 November (tentatively) . . . . . Jodhpur, India
Post-UNCOD Intergovernmental Technical Workshop on the Implementation of the Plan of Action to Combat Desertification in Asia and the Pacific Region
Information: ESCAP.

1980 Dates to be determined . . . . . Santiago, Chile
Post-UNCOD Intergovernmental Technical Workshop on the Implementation of the Plan of Action to

Combat Desertification in the Americas
Information: ECLA.

1980 January 15-19 . . . . . La Serena, Chile
International Congress on Arid and Semiarid Zones
Information: Mr. Walter Luzio, International Congress on Arid and Semiarid Zones, Universidad de Chile, Diagonal Paraguay 265, Torre 15, Piso 17, of 1703, Santiago, Chile.

1980 February 18-26 . . . . . Karnal, India
International Symposium on Principles and Practices for Reclamation and Management of Salt Affected Soils
Information: Dr. J.S.P. Yadav, Director, Central Soil Salinity Research Institute, Karnal-132001, Yarayana, India.

1980 August 25-30 . . . . . Fujinomiya, Japan
Pre-Congress Meeting of the IGU Working Group on Desertification In and Around Arid Lands
Information: Prof. J.A. Mabbutt, School of Geography, University of New South Wales, P.O. Box 1, Kensington, NSW, Australia—2033.

1980 September 1-7 . . . . . Tokyo, Japan
XXIV International Geographical Congress
Information: IGU, Geographisches Institut, Universitat Freiburg, 78 Freiburg, FRG.

1981 February 11-18 . . . . . Palmerston, New Zealand
International Conference on Soils with Variable Charges
Information: Secretary-General "Soils with variable charges" (ISSS Meeting), Soil Bureau, D.S.I.R., Private Bag, Lower Hutt, New Zealand.

1981 March 29-April 4 . . . . . Jerusalem, Israel
International Conference on Aridic Soils: Properties, Genesis and Management
Information: Dr. D.H. Yaalon, Department of Geology, The Hebrew University of Jerusalem, Jerusalem 91000, Israel.

1982 February 8-16 . . . . . New Delhi, India
Twelfth International Soil Science Congress
Information: Dr. J.S. Kanwar, Associate Director, ICRISAT, 1-11-256, Begumpet, Hyderabad 500-016, A.P., India.

EMASAR PHASE II

The FAO/EMASAR programme produced a series of documents for UNCOD with the following titles:

Volume I — Les pays Saheliens: Developpément et vulgarisation dans le domaine pastoral.

Volume II — Les pays Sahéliens: Education et formation dans le domaine pastoral.

Volume III — Plantes fourrageres spontanées de l'Afrique Tropicale sèche.

Volume IV — Indigenous arid and semi-arid plants of North Africa, the Near and the Middle East.

Volume V — Grassland Education and Training, with special reference to arid and semi-arid zones of eastern and southern Africa.

Volume VI — Middle East Grassland Education and Training, with special reference to Iran, Afghanistan and Pakistan.

Volume VII — Near East Grassland Education and Training, with special reference to Iraq, Kuwait, Somalia, Sudan, Syria, Yemen P.D.R.

Volume VIII — Sudan, proposals for grazing land development.

Volume IX — The countries of North Africa: Education and training in the rangeland sector.

The Desertification Unit has a limited number of these documents and will send them, free of charge, to interested parties on request.

Until the Desert knows
That Water grows
His Sands suffice
But let him once suspect
That Caspian Fact
Sahara dies. . .

Emily Dickinson, USA

ABBREVIATIONS

AGRIS	International Information System for Agricultural Science and Technology
ALECSO	Arab League Educational, Cultural and Scientific Organization
CARIS	Current Agricultural Research Information System, FAO
CGIAR	Consultative Group on International Agricultural Research
CILSS	Permanent Interstate Committee on Drought Control in the Sahel
CIMMYT	International Maize and Wheat Improvement Centre
DECARP	Desertification Control and Rehabilitation Programme, Sudan
ECB	Environment Co-ordination Board
EMASAR	Ecological Management of Arid and Semi-Arid Rangelands, FAO
FAO	Food and Agriculture Organization of the United Nations
IAEA	International Atomic Energy Agency
ICARDA	International Centre for Agricultural Research on Dry Areas
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
ICSU	International Council of Scientific Unions
IDRC	International Development Research Centre
IFIAS	International Federation of Institutes for Advanced Studies
IHD	International Hydrological Decade, UNESCO
IHP	International Hydrological Programme, UNESCO
ILCA	International Livestock Centre for Africa
ILO	International Labour Organisation
IRS	Information Referral System
IPAL	Integrated Project on Arid Lands, UNEP/UNESCO
IUCN	International Union for Conservation of Nature and Natural Resources
IUFRO	International Union of Forestry Research Organizations
MAB	Man and the Biosphere Programme, UNESCO
NGO	Non-governmental Organization
OECD	Organization for Economic Co-operation and Development
SOLAR	Transnational Project on Management of Livestock and Rangelands to Combat Desertification in the Sudano-Sahelian Region
UN	United Nations
UNCOD	United Nations Conference on Desertification
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Office
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
UNRISD	United Nations Research Institute for Social Development
UNSO	United Nations Sahelian Office
UNU	United Nations University
WFP	World Food Programme
WHO	World Health Organization
WMO	World Meteorological Organization