



UNITED NATIONS ENVIRONMENT PROGRAMME

DESERTIFICATION CONTROL

Number 8, June 1983



- 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.

Editors

Turgut E. Beskök (Chief Editor)
Desertification Branch

Gaafar Karrar
Acting Head,
Desertification Branch

Henry Russell
Desertification Branch

Seifulaziz L. Milas
Information Service

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Cover: A northern Kenya pastoralist household on the move with the aid of their camels. Photo: Daniel Stiles.

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DESERTIFICATION CONTROL

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.

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

CAMEL PASTORALISM AND DESERTIFICATION IN NORTHERN KENYA

Daniel N. Stiles

Introduction

Northern Kenya is a region of semi-arid and arid land made up of volcanic plateaux, dessicated lake flats, highland grasslands, lowland acacia bush and shrublands, and a few isolated mountain islands topped by receding forests. Except for the mountain areas and some river valleys there is little or no cultivation. The region is environmentally marginal, and occupied by nomadic pastoralists.

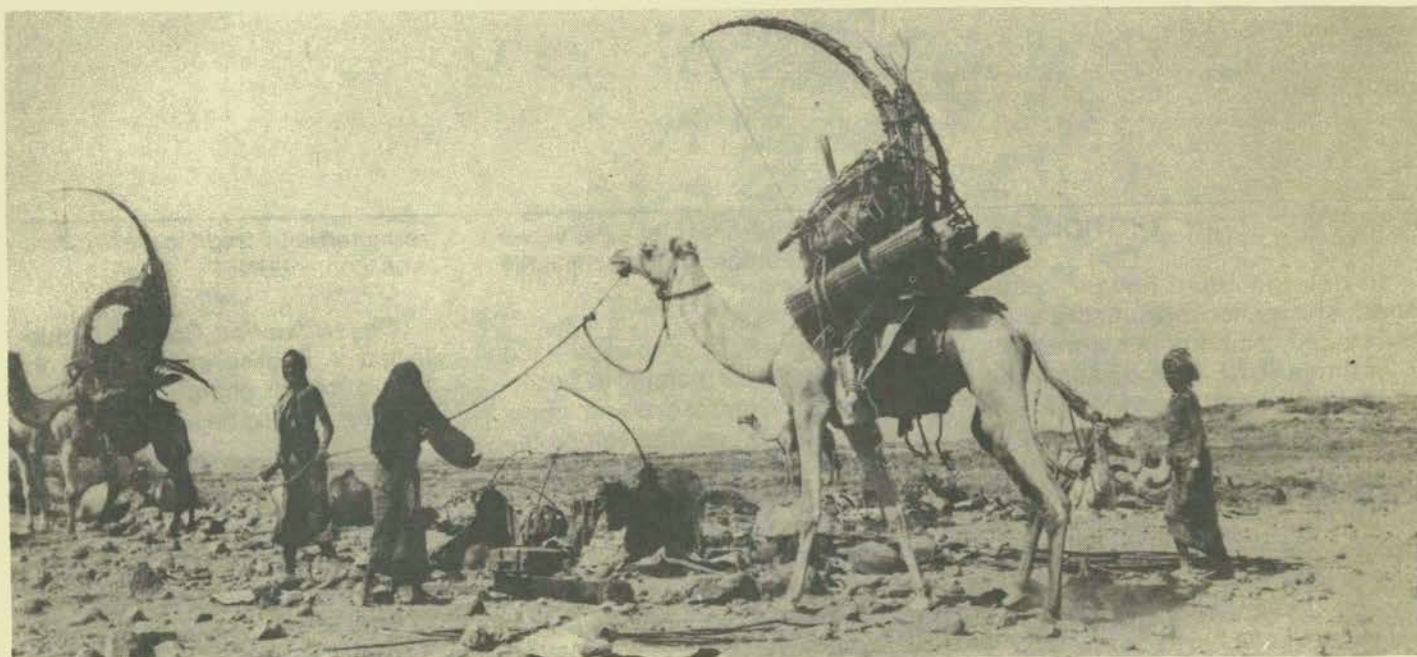
Archaeological evidence indicates that cattle and small stock first entered northern Kenya approximately 4,000 years ago when rainfall was higher than at present (Owen et al. 1982). Lake-level and pollen studies suggest that northern Kenya was well watered and covered by rich vegetation until about 3,000 years ago, when

lake levels began to fall as rainfall decreased. Since then there has been a fluctuating trend towards aridity interspersed with comparatively humid periods. The present dry phase began about 1,000 years ago. It is estimated that the Chalbi lake dried up some time around the twelfth century AD (Stiles 1982). The first camel pastoralists probably moved into the region from the north-east during the fourteenth century, though research on this question is only in its initial stages.

Some believe that overgrazing by livestock is not a cause of long-term desertification, and that desertification does not occur in areas now occupied by pastoralists (Warren and Maizels 1977; USAID 1980; Horowitz

1981). This belief is based on the point of view that rangelands have the long-term ability to recover their productivity after a drought period ends and stems from the uncertainty as to whether the recent well publicized droughts in the Sahel and eastern Africa are part of a long-term trend or represent only short-term climatic fluctuations. Evidence, both from the growing number of historical and archaeological sources documenting long-term environmental trends and from current literature on ecological degradation in the short term, would suggest, however, that desertification is rather a long-term and chronic phenomenon in pastoral regions (Spooner and Mann 1982). The adoption of a pastoralist economic system based

Camels permit people to be highly mobile, an important adaptive strategy in arid lands. Gabbra of northern Kenya pack their households on the "ships of the desert" for a move.



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on the camel, as opposed to cattle, is, in fact, the most reliable indicator that substantial environmental degradation (desertification) has occurred in a region.

The geological, palynological (pollen), and archaeological record shows a general drying trend over the past three or four millennia in northern and eastern Africa, which has been reflected in changing human adaptive responses (Williams and Faure 1979). The Sahelian disaster appears to be an example of what happens when an unbalanced ecosystem is struck by a drier than normal fluctuation during this long-term dry phase. It also demonstrates that cattle are relatively unadaptive to climatic stress in overpopulated, marginal areas. The same conditions that led to the Sahelian catastrophe exist today in northern Kenya, though in an earlier stage of development and on a smaller scale. The people in the far north of Kenya are, from west to east, the Turkana, Rendille, Gabbra, Boran, and Somali pastoral peoples. South of the Turkana and Rendille people live the Pokot, Ariaal, and Samburu pastoralists. Up until the beginning of the twentieth century the Turkana and Boran were full cattle pastoralists with families owning no camels at all. Now camels are common among the Turkana. The Boran are also accumulating camels, particularly those groups who have migrated to the south from the Ethiopia-Kenya border and lost the Boran traditions proscribing the use of camels for food (Dahl 1979). The Gabbra camel pastoralists have also reduced the proportion of cattle in their herds due to a general decline in the productivity of the rangelands, and some families own no cattle at all (Torry 1973 and author's personal field research).

Cattle pastoralists only add camels to their herds when there is good reason to do so. Camels are expensive to acquire, more difficult than cattle to husband, and increase labour requirements by their particular dietary needs and watering habits. People make the investment because camels are better adapted to degraded rangeland and provide a larger and more reliable food supply than cattle. The Pokot and Samburu cattle pastoralists have recently begun adding camels to their herds, an indication that for them desertification is not a short-term fluctuation, but a long-term trend. They are preparing for the future.

Kenya is the southern limit of the camel in Africa (Pratt and Gwynne 1977, p. 153) but that limit is still expanding. Camels did not move south earlier because they were not needed and the environment was not suitable. The change in these two conditions is illustrated by the presence of grazing camels around the shores of Lake Baringo and along the banks of the Uaso Nyiro river, something unheard of fifty years ago.

Several recent studies support the view that desertification in northern Kenya is due primarily to overgrazing and overstocking (Spencer 1973; Pratt and Gwynne 1977; Lewis 1977; Lusigi 1981). The pastoral system of Turkana District has to a large extent broken down under the strain of the droughts of the 1970s. The population density is almost three persons per square kilometre, and a large number of Turkanas are on famine relief or are becoming fishermen or cultivators in development schemes. There has also been a high rate of out-migration, mostly into Samburu country. The traditional system of pastoralism has been highly disturbed and it is extremely unlikely that it will ever fully recover, due mainly to development projects changing the entire basis of socio-economic life.

East of Turkana in Marsabit District the population density is less than one person per square kilometre. The lowland average annual rainfall is about equal in the two districts, at approximately 150-300 mm, but the pastoral system has been much less affected by the drought. Lower population density and a higher incidence of camel pastoralism is undoubtedly responsible for the relatively superior condition of the range and more intact state of traditional social and economic institutions in Marsabit District. This is in relative terms, however; in absolute terms the situation is not good.

The 'famine-relief syndrome' has already begun in Marsabit District as well. Famine relief and agricultural development projects result in population growth and sedentary settlement, two of the main causes of desertification in pastoral areas (Salzman 1980). Development projects involving agricultural food production in pastoral societies are meant to provide livelihood alternatives for people losing their herds through drought or disease. Rangelands that are no longer capable of sustaining enough livestock to provide for the growing

human population create dispossessed people. In former days, those people who could not rebuild their herds through the traditional social-security system involving kinship and stock associate ties would join client hunter-gatherer groups (Nilotic: *il torobo*; Cushitic: *wata*). That option has been eliminated today by famine-relief centres and out-migration to urban areas or to the agriculture schemes.

During the severe droughts of the 1970s, the cattle-keeping Boran, and to a lesser extent the Gabbra and Rendille camel pastoralists, lost a large proportion of their livestock. Rather than feeding these people in the long term on relief grain, the Government decided to resettle many of them as farmers in the Marsabit highlands. Large areas of land were cleared for maize farming. The new farms were successful in producing grain, but also had serious environmental consequences.

The water resources of the area are fed from the forested mountain land. Increasing deforestation here has seriously affected the hydrological balance, leading to chronic water shortages in the Marsabit highlands. There are pressures to clear more of the forest, which, if allowed to happen, would have serious consequences for lowland water supplies. The problems affecting Marsabit are also relevant to other mountain areas of northern Kenya (Synott 1979).

The Ecological Balance

Given the fragile ecology of the region, it would be more appropriate to develop a pastoral system that would reduce pressure on the rangelands and mountain forests while increasing long-range economic security for the pastoralists. The only way of achieving these objectives would be to stabilize population growth and prevent overstocking. Increased crop cultivation can only lead to increased pressures: destruction of forests, alienation of the better grazing lands, and population growth in excess of the ultimate carrying capacity of the land. The future of northern Kenya lies in pastoralism.

The problem is how to stabilize population growth and prevent overstocking. These two principal problems cannot be solved without the full co-operation of the pastoralists. To obtain their co-operation they must be involved in the planning stages of

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any proposed changes in the traditional pastoralist system. This would necessitate using pastoralist knowledge and values, which hopefully would lead to the creation of a new system to replace the old. It is imperative to evolve a whole system of livestock and rangeland management beneficial to both man and the environment. Stop-gap projects with isolated goals might produce short-term relief, but do not constitute a long-term solution if the human behaviour which leads to the desired results is not part of a system acceptable to the local population.

The present system must first be understood before something better can be devised to replace it. The pastoralists could benefit from education in areas which they do not fully understand. Preventing desertification is one such area. They know, of course, that overstocking leads to overgrazing, but the connexion between vegetation loss and environmental degradation is not always perceived. For instance, a sample of 167 Rendille and Gabbra elders gave the following answers to questions concerning soil loss (Gufu 1982):

Can soil be degraded?	%
Yes	15.6
No	84.4
Would overgrazing cause loss of soil?	
Yes	44.3
No	55.7
Would excessive tree felling cause soil loss?	
Yes	23.9
No	76.1

A substantial majority of pastoralists do not believe that overgrazing or tree felling cause soil loss, though these are among the principal causes of desertification.

It is important to begin by changing people's perceptions of, and attitudes about, the effects of their lifestyle on the environment and to convince them that change is needed. Working in co-operation with pastoralists, planners can use aspects of the traditional system to bring about changes for the better.

The Livestock

Cattle and small stock are the principal agents of desertification. To halt the process, the numbers of these animals have to be reduced. Government coercion has proved impracticable as



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Cattle need water at least every three days, so cattle pastoralists cannot live far from permanent water sources. This restriction on range puts increased grazing pressure on land near water points.

a permanent solution to livestock reduction; coercion is neither politically sustainable nor economically feasible in the long run. The real problem is the economics of offtake. The closely interrelated problems of offtake, marketing, investment opportunities, and economic security are among the greatest challenges facing those interested in improving the life of pastoralists and halting desertification.

The present system is based on maximization of herd size in order, *inter alia*, to have a steady food supply and a large enough herd to leave a viable number of survivors for restocking after a severe drought, epidemic, or raid. Livestock, however, are much more than simply a source of food for the East African pastoralist. Animals serve a function similar to money, and they are used to establish complex webs of social relationships which promote the owners' economic security and political influence (Schneider 1981). These last two points need to be fully appreciated by planners. Animals are repositories of value, and are used as a medium of exchange and a means of deferred payment. The value of a cow or goat changes little over time; the same cannot be said of money. For a pastoralist, livestock is the best investment.

It has been argued that offtake

rates could be increased if grain and other commodities were made more readily available to pastoralists by establishing local market outlets. Pastoralists in settlements far from shops will normally forgo selling an animal because of the distance involved in getting it there. The argument is that local markets would allow pastoralists to off-load cattle in exchange for grain and other commodities. What is often forgotten however is that if an animal cannot be sold in exchange for grain, the animal intended for trade is eaten. If one goat, for example were sold, enough money to buy about 40 kg of maize flour would be earned. The average family would finish off the goat in one or two days, but 40 kg of flour would last at least two weeks and it would provide significantly more calories. It is not certain therefore that more animals would be sold than would normally be eaten if markets were available to the pastoralists, especially during the dry season when milk is scarce. As long as animals are not dying from lack of pasture, readily available grain might even reduce net offtake, though the amount spent on other commodities would be a determining factor.

In any case, livestock sales are seen by the pastoralist as reducing his capital; thus no more animals will

be sold than necessary to obtain required commodities. Unlimited availability of consumer items will not normally lead to unlimited offtake. The pastoralist will still maintain a large enough number of animals to spread and increase his economic and political web, and in the long run will try to realize a net increase in the size of his herds even after all food and socio-cultural needs have been met.

If a net reduction of animal numbers is desired, an investment opportunity more attractive than livestock has to be offered. Would money in the bank be a good alternative investment? From two standpoints, the answer is no.

First, it would mean a herd owner reducing his political influence, jeopardizing economic security, and disrupting many social obligations. The head of a household has control over the family herds, but he does not "own" all of the animals. Many, if not most, belong to wives and children, having been given over the years as gifts on ceremonial occasions. He owns only a residual herd, and some of these animals might be loans or gifts from other pastoralists to create bonds, part of the social web referred to earlier. He would come under severe criticism by family members and the community as a whole if he sold off large numbers of animals belonging legally to others, especially to his sons.

Secondly, capital increases at a higher rate with livestock than with money. At present in Kenya a two-year-term account yields about 13 per cent, which is lower than the inflation rate. Thus there is a net loss in purchasing power at the end of the two years. There is also the financial loss of sacrificing interest accrued if the principal has to be withdrawn prior to term due to some emergency need, and emergencies are common among pastoralists. Cattle and small stock however, normally reproduce at a rate well above 13 per cent annually, and their monetary value increases with inflation. The value of a herd of 100 cattle, growing at a 15 per cent annual rate in a national economy with 20 per cent inflation, will be worth 35 per cent more in monetary terms in one year's time, assuming stable beef prices (a valid assumption, since meat prices are controlled in Kenya). A 35 per cent real gain on capital is obviously preferable to a 7 per cent loss.

Keeping livestock is a risk, though, and none know the risks better than northern Kenya pastoralists. They would be expected to be in favour, in principle, of some form of disaster-insurance scheme. Contributions would presumably be made towards insurance through proceeds from stock sales. To make the insurance scheme more attractive, the payoff could be in the form of stock units or a given weight of maize meal, items which increase in value with inflation. The exact mechanism would have to be developed in collaboration with the pastoralists themselves to ensure their acceptance of the new system. If the scheme were demonstrated to be effective following a disaster, pastoralists might then trust it enough to reduce herd size. Nevertheless, many problems would have to be overcome to develop an insurance scheme (Aronson 1978) and it would be difficult, though not impossible, to make it effective. Table 1 compares and contrasts camels and cattle in these important areas.

The Camel Alternative

There is a rather unorthodox solution to many of the problems concerning the halting of desertification. This solution involves actively encouraging and assisting all northern Kenya pastoralists to increase camel pastoralism and to reduce dependence on cattle and small stock commensurately. To state it in an oversimplified form, the pastoralists would be asked to sell cattle and small stock and reinvest in camels.

Historically, camel pastoralism has arrived in a region only after the desert has been created perhaps if the camel had arrived before, the desert would not have followed. The camel is a poorly understood and badly underestimated animal by everyone except pastoralists who have had experience with it. The camel has significant advantages over other livestock species in food production consumption of, and extent of damage to, vegetation and control of human population.

Table 1. Comparison of values of camel and cattle pastoralism

	Camels	Cattle
Annual milk production for human use, one cow (litres)	1,300 ¹ -2,500 ²	112-420 ²
Lactation period (weeks)	47-72 ^{1,2}	16-60 ^{2,3}
Herd of 100, annual production ⁴		
milk (kg)	24,820	6,615
blood (kg)	356	480
meat (kg)	675	960
total protein (kg)	1,100	410
total energy (kcal.)	18,730,000	7,882,500
Dry matter intake per day (kg/head)	10 ¹	7.5 ³
per year	3,650	2,737.5
Typical herd annual growth rate (%)	1.5 ⁴	3.4 ⁴
Maximum herd annual growth rate (%)	7.5% ⁴	15.0 ^{5,6}
Herd size necessary to sustain an average family (6 people)	28	64
Diet	Trees & shrubs ⁷ 70%	Grass ³ 80%
Mobility	High ⁸	Moderate ^{5,9}
Trampling affects	Light ⁸	Heavy ^{3,5}
Pastoralist degree of polygyny	Low ^{5,8}	High ^{5,9}
Human population growth	Low ^{10,11}	High ^{5,10}

Sources: (1) Field 1979; (2) Pratt and Gwynne 1977; (3) Lewis 1977; (4) Dahl and Hjort 1976; (5) Spencer 1973; (6) Schneider 1981; (7) Field 1976; (8) Torry 1973; (9) Gulliver 1955; (10) Sobania 1979; (11) Rainy 1976.

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Food Production

The average female camel produces from five to ten times as much milk per lactation as a cow. It can produce up to a maximum of 21 litres of milk a day, while 5 litres is a very large amount for a northern Kenya cow. The total amount of protein and energy produced annually by a herd of one hundred camels under traditional management methods is about two and a half times the quantity produced by one hundred cattle. With changes in herd structure and management techniques it would be possible to increase food production from camels significantly.

The camel also has advantages over the cow in that its life span and milk-giving period is much longer; thus fewer calves will give rise to more milk-givers (Dahl and Hjort 1976). The average lactation period of a female camel is about one year, while that of a cow is about nine months or less (though variability is

great), and the camel continues to produce adequately through the dry season while the cow dries up to a trickle. This means that annual reliability of milk production is much higher with camels, an extremely important point if food requirements are to be maintained while reducing herd sizes. In general, one can conclude that cattle in semi-arid and arid lands under traditional herd management methods are very poor food producers (Pratt and Gwynne 1977).

Effects on Vegetation

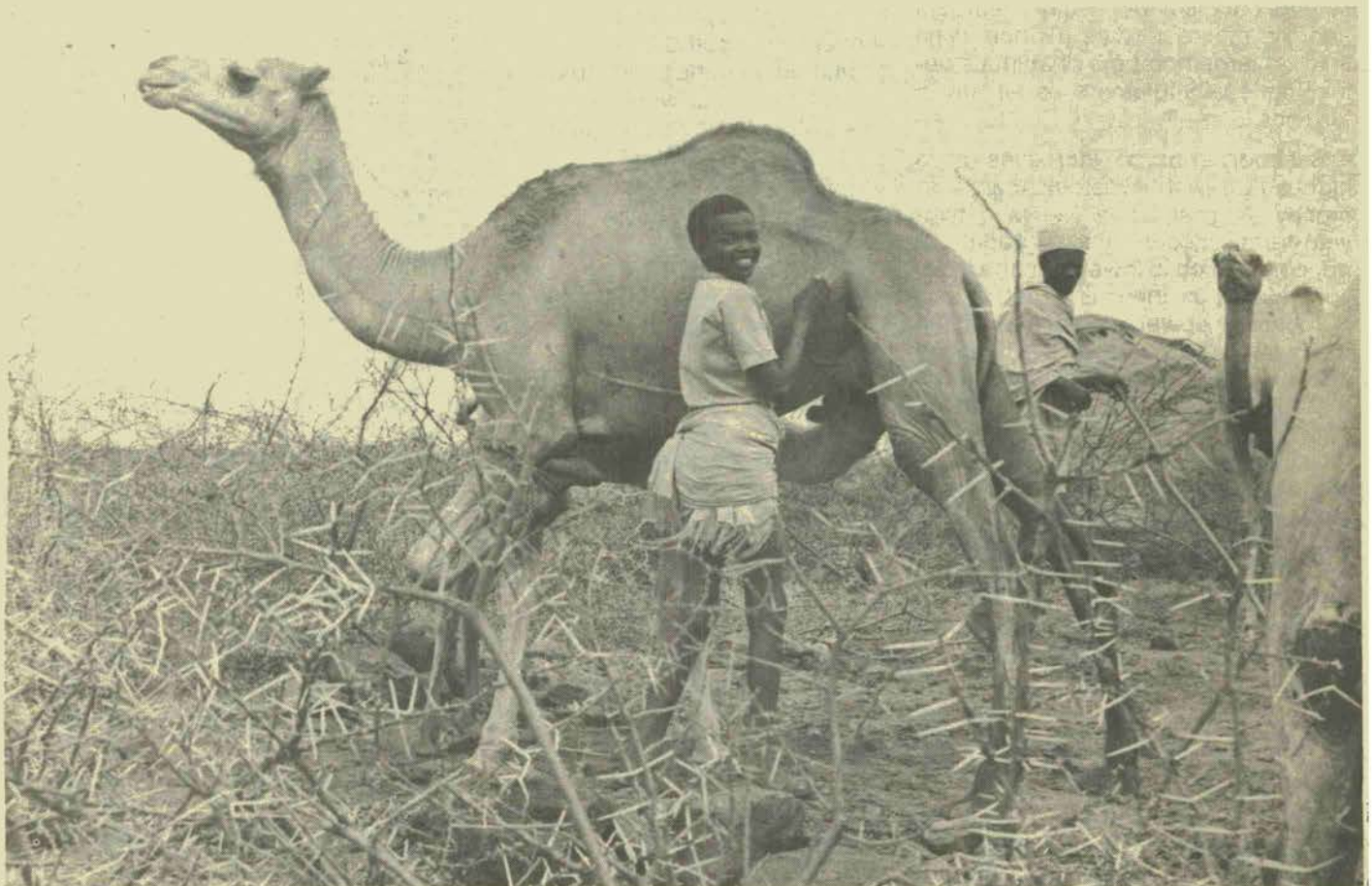
The camel has a much more varied diet than the cow. It prefers shrubs and trees, but can also do very well on grass (Field 1979b). The camel is better adapted to browsing, and because of its great height it can feed at various levels of vegetation up to about 2.5 metres. Camels can travel much further in a day than cattle, thus grazing vegetation around a settlement with lower intensity. Because

camels tend to disperse over great areas while feeding, the risk of overgrazing of pastures is lessened. The effects of trampling will be minimal, thus allowing growth of grass and seedlings in the understorey.

Cattle intensely utilize and trample grass in a relatively short radius around the settlement and between the settlement and the watering place. Because cattle must be watered at least every third day, a settlement with cattle is rarely located more than 40 km from water, and 10 to 20 km is normal. Camels can be located up to 80 km from water when the pasture is good (Torry 1973). Camel pastoralists can therefore exploit a much larger proportion of the available range than cattle pastoralists, thus lowering the probability of overgrazing in any given area.

A more even distribution of pastoral settlements over the land also means that woody plants will not be overexploited by man. When settlements cluster near permanent water

Camels give many times the quantity of milk that cows do, and they continue to provide it even during the dry season when cows dry up.



sources, localized barren lands are depleted. Trees and shrubs are cut down to make stock enclosures, cooking fires, houses etc., and the exploited area moves out concentrically with time. There is no possibility of plant regeneration because utilization rates are too high.

The camel is much more efficient than the cow in terms of vegetation consumed for milk produced. Given average grazing conditions, a camel can produce 1,900 litres of milk for human consumption a year (the average for the range in Table 1). The cow will produce about 300 litres for human consumption under the same conditions. A 400 kg camel will consume on the average 10 kg of vegetation (dry matter) a day, or 3,650 kg a year (Field 1979b), while a 300 kg cow will consume about 7.5 kg a day, or 2,737.5 kg a year (Lewis 1977). Approximately 1.9 kg dry matter is needed, therefore, to produce one litre of milk for family use with the camel as compared to about 9.1 kg dry matter for that same litre with the cow. The camel is almost five times more efficient in converting vegetation to milk for human use on an annual basis.

Since many fewer camels than cattle are needed to feed a family of six (28 : 64), one can estimate that the adverse impact of a subsistence camel herd on the environment would be of the order of one-third to one-fourth less than a subsistence cattle herd, since each camel is also much less destructive to the vegetation than each cow or bull.

Population Control

There appears to be a high degree of correlation between herd and human population growth rates in pastoral societies in northern Kenya. Where a certain number of animals are necessary to feed one person, human population growth cannot exceed herd growth, unless there are supplemental sources of food. Except for the Turkana, grain did not form a significant part of the diet of northern Kenyan pastoralists until the early twentieth century.

The growth potential of cattle herds is double that of camel herds, though the rates vary with conditions. Spencer (1973) and others have stated that cattle herds can double in five years under favourable conditions, while it would take at least ten years for a camel herd, though even twenty

years would be considered fast by most camel herders. These vastly different growth rates have implications for social institutions.

Cattle people are highly polygynous (90%); camel men rarely have more than one wife (10%). This creates a transference of women from camel societies to cattle societies, hence raising population growth in the latter (Spencer 1973). When a cattle man dies, his herd is distributed to all his married sons. Each son will eventually build up a large herd of his own. When a camel man dies, the herd is normally inherited by the eldest son, as it is considered unpropitious to split camel herds. Other family members have stock rights, but the herd will only be partitioned between married brothers when it is large enough to operate as two or more independent subsistence herds. This system slows marriage and family growth. Examples of explicit rules which slow human population growth are: (1) a Gabbra man cannot have a child until his mother is no longer able to conceive, and (2) the Rendille practise a form of separdine marriage, in which one-third of the women cannot marry until they approach the end of their reproductive years (Rainy 1976, p. 51).

The Boran and Samburu cattle-pastoral people greatly outnumber their camel-pastoral neighbours the Gabbra and Rendille, providing empirical evidence that cattle people maintain much larger populations. When a grain supplement is added, the resulting population growth creates an ecological imbalance such as that witnessed in Turkana District.

The actual situation is obviously much more complex, since all northern Kenya pastoralists have large numbers of sheep and goats, many households have both camels and cattle, and grain can be bought in villages and towns. These complications do not alter the general thesis that camels are better food producers and are better for the environment than other livestock.

In regions of highly variable climatic and environmental seasonal changes, a multi-species herd strategy is usually adopted to ensure the highest potential for an uninterrupted food supply. This conventional wisdom can be questioned, however, on the ground that more camels and fewer (or no) cattle and small stock would result in healthier rangeland entering a drought period; thus animals would be better fed and yield

more milk. Camels produce much more milk during dry periods, and a relatively small number of milk camels could supply most of the nutrition needs of a family, supplemented by meat from small stock. People would also suffer much less from herd-size fluctuations due to the high mortality of cattle during extended drought periods, while camels are much more drought-tolerant.

The transitional period of converting cattle pastoralists into camel pastoralists would not be simple, but the Samburu, at least, show interest in camels (Stiles 1983). The first step is to devise a multi-faceted programme in co-operation with the pastoralists to exchange cattle and small stock for camels. The necessary components would be:

- an educational and incentive package to motivate pastoralists, particularly the cattle herders, to reduce non-camel livestock numbers and reinvest in camels;
- camel-breeding stations to supply the needed camels. Camel reproduction rates could be increased significantly with proper feeding and veterinary care of the young;
- a marketing system with efficient administration, logistics, and a price support scheme to encourage pastoralists to sell more stock than just those used in trade for camels;
- herd-management and veterinary programmes to upgrade the quality of camels, and also to assist those pastoralists not familiar with camels.

There remain several problems to be overcome before camel pastoralism is a viable alternative. The Kenya Government desires increased meat production from northern Kenya for the urban areas of the south. The proposed scheme would result in increased offtake of beef and mutton for several years, but a limit of herd reduction would eventually be reached below which the pastoralists would be unlikely to go.

Camels do not do well in the highlands; cattle do. It would be neither realistic nor desirable for the Samburu of Mt. Kulal or the Leroghi Plateau to convert to camel pastoralism.

Once camel herds reached an optimum size that ensures economic security and satisfies socio-cultural needs, control would be necessary to maintain that level. Camels, too, can become environmentally deleterious in excessive numbers.

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"Progress" may destroy the social fabric of pastoral life, thus making any new system impossible. The Kenya Government is committed to improving social services and to diversifying the pastoral economy (Migot-Adholla and Little 1981). The paradox of pastoral development as it is currently conceived is that in the long run it is self-defeating. It implies growth in an environment that cannot sustain it. It also calls for bringing pastoralists "into the twentieth century", which in reality means forcing them to conform to what Westerners and the Westernized understand by "the twentieth century". Pastoralists in northern Kenya are already in the twentieth century, and with a few minor modifications to their way of life they have a system that has the potential to far outlast many others, while at the same time providing a rich and satisfying life for the individual.

Any argument in favour of preserving traditional social institutions and structures is accused of being unrealistic, backward, and of wanting to create "living museums" out of the people. Criticism of the view which advocates building upon existing social and economic foundations ignores the empirical evidence of what happens when these institutions break down: alienation, urban poverty, crime, family stress, and so on. It is still possible for northern Kenya pastoralists to escape that fate.

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THE STRUGGLE AGAINST ENVIRONMENTAL DEGRADATION—BOTSWANA'S EXPERIENCE

H.J. Cook, Professor of Environmental Science University of Botswana

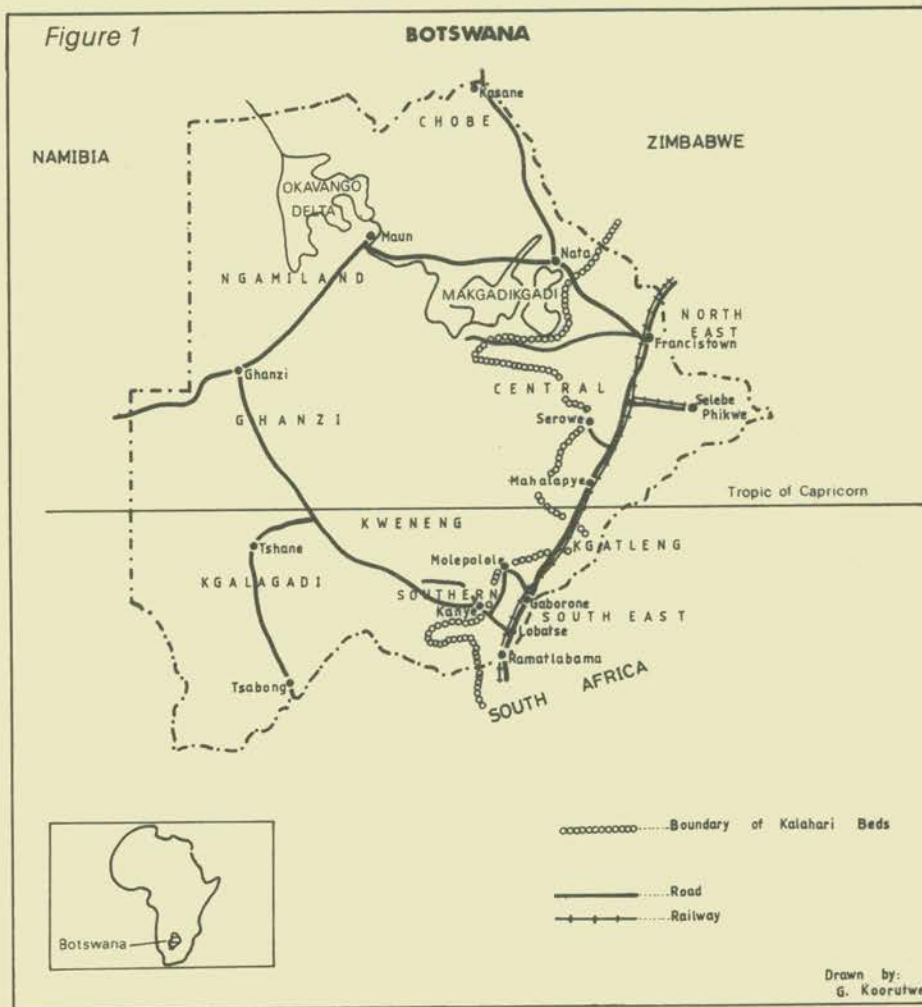
Botswana lies across the Tropic of Capricorn. It is a semi-arid country, 80 per cent of which is covered by the Kalahari Desert. This gives a mistaken impression, however, for the Kalahari is not a true desert. It is in fact covered by a vegetation mantle that ranges from woodland savannah in the north, dominated by the mopane tree (*Colophospermum mopanei*) to low tree and shrub savannah in the south and west with *Terminalia sericea* predominant. Almost everywhere grazing for wild animals and domestic stock is relatively plentiful. Like the whole of the country, except for the Okavango-Chobe area in the north, it is better described as an area whose major characteristic is an absence or paucity of surface water. The availability of water is of crucial importance and this depends on the amount and incidence of rainfall but also on the water-holding characteristics of the ground, both on and beneath the surface.

uneven spread. The prevailing high daytime temperatures throughout the year but especially in summer lead to high daily rates of open-water evaporation, which may reach 7.5 mm per day, and high rates of transpiration from freely watered crops, which can reach 5.5 mm per day. Drought is endemic and periods of poorer-than-average rain tend to occur with a quasi 20-year periodicity (Tyson 1978). Drought of varying degrees of

intensity depends on the seasonal spread of rainfall as much as on total annual amounts. Lee and Coughlan have described a method of assessing drought risk, classed as minor, major, and disastrous depending on the success or failure of one, two or all of the three two-month segments within a six-month rainy season. Using this criterion, four main stations show rather high drought-risk probabilities, as given in Table 1.

Climate and Water Availability

Rainfall is highly variable in space and time, and very unreliable in its incidence. Ninety to 95 per cent of rainfall is concentrated in the six-month period from November to April, and the annual mean ranges from 673 mm at Kasane in the north to 275 mm at Tsabong in the south, and from 532 mm at Gaborone in the east to 426 mm at Ghanzi in the west (Figure 1). Coefficients of variability for the same stations are Kasane 23 per cent, Tsabong 42 per cent, Gaborone 28 per cent and Ghanzi 38 per cent. Much rain falls in scattered convective showers, making for an extremely



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Table 1. Drought-risk probabilities in four main stations of Botswana (failures of two-month segments during six-month rainy period)

Station	Disastrous stress (3 failures)	Major stress (2 failure)	Minor stress (1 failure)
Kasane (north)	3:100	2:10	7:10
Ghanzi (west)	1:20	3:10	8:10
Francistown (east)	1:10	4:10	8:10
Ramatlabama (southeast)	1:25	3:10	7:10

Thus Botswana's climate does not present favourable conditions for settled agriculture, and in fact only about five per cent of the country is thought to be suitable for rain-fed cultivation.

The availability of water on the surface and underground is a function of the superficial and bedrock geology. Surface water is generally absent over the large areas of Botswana covered by the Kalahari sand beds, except for short spells in the rainy season when water may lie for several weeks in the pan hollows. In the east, beyond the sand boundary, the situation is not greatly improved, for although an organized system of drainage exists, it is only active after heavy rain. In remarkable contrast there exists in the much more thinly populated north of the country, in the Okavango Delta, an enormous water resource which has an annual inflow of $16 \times 10^9 \text{ m}^3$ of water. The future utilization of this water is a pressing problem (Botswana Society 1976). With the paucity of surface water in the country, groundwater assumes a very great importance. Seventy-five per cent of the country's human and animal population are dependent on it.

The locating and extraction of deep groundwater depends on modern techniques of prospecting and borehole drilling, so that it has only assumed major significance as a key resource in recent times, when it has made possible a significant shift in the direction of grazing pressure. Elsewhere, groundwater may occur at shallow depths in the beds of ephemeral rivers and also in calcrete layers close to pans and fossil water sources. Such sources have long been accessible to shallow-well digging. The concentration of people and their livestock in eastern Botswana has been partly due to shallow

groundwater availability as well as to the more favourable climatic factor.

The Human Element

Though there is ample evidence of the occupation of the Kalahari margins by peoples who were predominantly pastoralist at least as early as the ninth century, the main occupation by southern Sotho-speaking groups seems to have started from about the sixteenth and especially the eighteenth centuries. The present Tswana people are their modern descendants. Throughout the eighteenth and nineteenth centuries the social, political and economic situation was very fluid. To the ever-present threat to stability posed by a marginal and fragile environment was added the urgent mobility engendered by wars and the massive forced migration of whole populations. Only towards the end of the nineteenth century was stability beginning to emerge, and it was at this time that the large Tswana states fully established themselves.

The ensuing relative political stability which characterized the period up to 1966 and which has continued since in the period of political independence has not, however, been matched by any real environmental stability. Fundamental changes have taken place in man's relationship to the land, especially with regard to the keeping of livestock and the utilization of grazing resources. These changes have been associated with three major developments:

1. a huge increase in human and animal numbers has taken place;
2. a great increase has occurred in the economic value of cattle (in the modern sense);

3. an extension of permanent cattle posts on to the Kalahari sand-veld has taken place.

At this point it is necessary to refer briefly to the traditional Tswana system of grazing-land utilization. The grazing lands of each community would normally be the extensive range areas beyond the 'lands' or cultivated zone close to the main village cluster, while beyond this again there would be a vaguely defined area regarded as a hunting reserve and also as seasonal grazing land during and for a varying length of time after the rains. The grazing lands were regarded as communal property but their allocation and utilization were controlled by the chiefs and their local overseers (*badisa*). Grazing was organized around cattle posts (*meraka*) which would normally be near a water source. This practice continues to the present day, and a typical cattle post still consists of a well or borehole or surface-water source, a number of fenced enclosures, and the huts of the herdsman. Cattle are taken out daily but there is a minimum of actual herding.

Accurate figures for livestock numbers are not available, but the following figures are thought reliable and are often quoted:

	Cattle	Small stock
1966 (end of last major drought)	1,237,000	550,000
1979	3,500,000	1,770,000

The human population has also grown at an alarming rate, and for this accurate census figures are available:

1971	574,000
1981	936,000

There has been an increase in the population of 63 per cent in 10 years, an annual growth rate in excess of three per cent.

The greater part of the human and livestock population is concentrated in the eastern part of the country, off the Kalahari sand-veld, though there are smaller clusters in Ngamiland in the north and the Matsheng group of

villages in Kgalagadi district. The sand-veld areas, the Kalahari proper, have remained largely unoccupied because of the absence of easily accessible permanent water. Utilization for the grazing was thus seasonal and impermanent. The large wild-animal herds were utilized as a source of food, and were equally important as a source of valuable trade goods—skins, furs, feathers and trophies. Both hunting and grazing were controlled by the chiefs. This situation has changed radically, and the speed of change has been accelerating in the last decade. The development of a market-oriented economy has given cattle a high market value, which has gone on increasing since the end of the last drought. The negotiation of EEC subsidies raised the price of Botswana beef 60 per cent above world market levels from 1971 onwards. Total sales revenue to beef producers has risen from 8.2 million pula in 1970 to 30.8 million pula in 1977, with only a 50 per cent increase in cattle slaughtered.

This remarkable opportunity to exploit the grazing to get rich occurred, moreover, in a decade of above-average rains, making ample grazing available everywhere, and the rapid increase in cattle numbers has been primarily due to an even further westward penetration of permanent cattle posts owned by large herd owners into the fragile ecosystem of the Kalahari sand-veld, together with increasing pressure on the already crowded communal grazing areas of the east (Carl Bro International AS. 1982). As already noted, the expansion on to the sand-veld has been made possible by the modern technology of water prospecting and borehole drilling, so that the age-old protection of the Kalahari—the absence of easily accessible water—has gone for ever. It should be emphasized that this movement has been mainly of large herd owners, not of the small herdsmen, who remain crowded in the east together with the 45 per cent of the population who own no cattle.

A further important aspect of this westward expansion concerns the question of water rights. Under Tswana customary law, surface water was a common good and available to all. An individual digging a well or sinking a borehole, however, acquired

rights to this water and control of its disposal. Since in a dry land where water is the key to the use of grazing, this gave to the individual sinking a borehole effective control of the grazing as well, water development became the demarcator of land use and only the wealthy have the resources to sink expensive boreholes.

The Problem of Environmental Degradation

Awareness of increasing pressure on the grazing resources and the creeping land degradation, especially in the east, has not been a product of the environmental and conservation polemics which have come to the fore since the 1960s. As early as 1943 Schapera drew attention to the problem, and the Protectorate Government made various attempts to control cattle numbers and spread grazing pressure. The severe drought of the 1960s brought the problem of land degradation into stark relief and concentrated both official and private thinking on the problem. Since then there has been a stream of research and consultancy reports, and a succession of conferences and symposia on this general subject. All the evidence brought forward points to the fact of land degradation over both the long and the short term. This descriptive evidence is of two kinds. The first type is exemplified by Campbell and Child (1971), who used three sorts of evidence which point to environmental deterioration: the writings of early travellers which give a picture of environmental conditions prevailing between 1825 and as late as 1935; oral accounts of change which have been observed to take place in specific areas; and the examination of the vegetation in most of the areas covered by the historical information in order to determine prevailing conditions and to verify the oral accounts of change. They listed many instances of the drying up of wells, springs and small streams, of the disappearance of large tracts of woodland and swamp, and changes in the distribution and occurrence of water-loving and dry-land species of wildlife, and they pointed out that these changes took place within a century during

which no evidence of fundamental climatic deterioration was discernible.

The second type of evidence of environmental deterioration is mainly concerned with the identification, measurement, and description of the effects of overgrazing on the rangelands. This may be achieved by repetitive observation and measurement of sample plots (Field 1977), or by comparisons of the same area at different times through the study of sequential air-photo cover linked to the examination of the present vegetation patterns and assemblages (Cooke 1983). All the reports of the Animal Production Research Unit (APRU) of the Ministry of Agriculture from 1975 contain a wealth of valuable data on this subject.

As the Evaluation Report on Livestock Management and Production in Botswana (Carl Bro International AS. 1982) concluded: "Virtually all range studies conducted over the past two decades point unequivocally to spreading conditions of overstocking and degradation of the vegetation."

The land degradation takes a variety of forms, and does not merely affect the vegetation. It includes the following:

- the extension of completely bare ground, especially around watering points, through excessive grazing and trampling;
- the disappearance of the more palatable grass species and their replacement by less desirable plants, which increasingly include woody and thorny shrubs;
- loss of the top-soil by wind and by sheet and gully erosion.

All these regressive developments can be plainly seen all over eastern Botswana. The move into the sand-veld of the Kalahari is a comparatively recent phenomenon on a large scale, and few studies are as yet available. Moreover, this expansion has taken place during a wet decade, and the present drought has not yet got a grip on the landscape. Nonetheless, Skarpe (1981), in one of the few studies on the sand-veld, on the Western State Lands, concluded: "Cattle keeping on a large scale in the fragile environment of the western Kalahari includes, especially with the present low standard of range management, a high risk of more or less irreversible land degradation."

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A closely related subject is the effect of progressive land degradation on local climates. Two studies in Botswana have drawn attention to important aspects of this. In 1971, Anderson reported a rise in mean maximum temperatures for the three months of August, September and October, which precede the main rainy season, for Mahalapye in the east and Ghanzi in the west, of 0.3°C and 0.2°C respectively for the period 1921-1946, but a rise of 0.7°C and 1.0°C for the period 1951-1970. He claimed that this sharp rise in temperature coincided with a great increase in grazing pressure, and he pointed to the danger of a heat inversion developing over Botswana which would lead to a decrease in rainfall. He also noticed a similar rise in mean minimum temperatures at the same stations, and he thought this might affect plant activity adversely through a rise in nighttime soil temperatures. Skarpe later reported evidence from sites in the western Kalahari, which show air temperatures at a height 45 cm above the ground surface lower by a significant amount over bare ground than over partially and wholly covered ground. This indicates a lower lapse rate over bare ground, which has serious implications (Table 2).

Otterman (1974) reported similar observations in the Negev, Israel. Cooler temperatures over bare ground were thought to be due to the higher albedo or reflectivity over bare sandy soil than over vegetated surfaces. This thermal depression effect results in a decrease in the lifting of air necessary for precipitation mechanisms to operate, and may result in local climatic deterioration. Flohn (1977) has developed this thesis referring to the work of Charney (1975), who showed that a drastic albedo increase, such as results from the clearing of high-albedo sandy soils, results in a sharp reduction in local rainfall. Figure 2 shows the very different reflectivities at either side of a fenced boundary near Gaborone, which divides overgrazed communal land from freehold farms, one of which is the National Agricultural Research Station at Sebele.

Attempted Solutions

The Botswana Government has shown a clear appreciation of the problems of land degradation and has allowed, indeed has promoted and encouraged, free and uninhibited investigation and comment, and has struggled to formulate and carry out meaningful programmes which have

as an ultimate objective the halting and reversal of unfavourable environmental trends. Many of the findings of the studies which have been carried out since 1970 have been brought together in three symposia organized by the Botswana Society, on Rural Development in 1970, on Sustained Production from Semi-Arid Lands in 1971, and on Drought in Botswana in 1978; in the successive reports of the APRU of the Ministry of Agriculture; and in a series of progress reports and consultancy reports concerned with the Tribal Grazing Lands Programme (TGLP).

The main efforts of Government have been concentrated in three related large-scale projects—the Livestock I programme, the TGLP, and the Livestock II programme. Undoubtedly the basic findings of APRU research from 1970 to 1975 played a major role in Government policy formulation. The 1975 APRU report summarized the findings of five years' integrated research into cattle production and the rangelands, and recommended a package of improvements which it claimed could double productivity (and presumably keep the range intact). The package was based on internal fencing, disease control, and water supply. The most significant recommendation was the one concerning fencing. On page 18 it is clearly stated that obviously these inputs require capital investment; however, as the two latter requirements are frequently satisfied at cattle posts, it is on the question of enclosure that the issue rests.

This recommendation was not new. Many authorities had referred to the necessity for enclosure; for example Van Rensburg, an FAO pasture research specialist stated that: "Botswana's veld is sick from neglect and exploitation. The situation has been aggravated still further by drought. Amelioration and improvement of this acute land sickness can only be brought about by sustained, controlled management practice and proper land use. This can only be accomplished under a responsible system of land ownership with sound development." He then went on to say significantly, "In some areas a number of farmers have already enclosed land with the intention of carrying out improved farming."

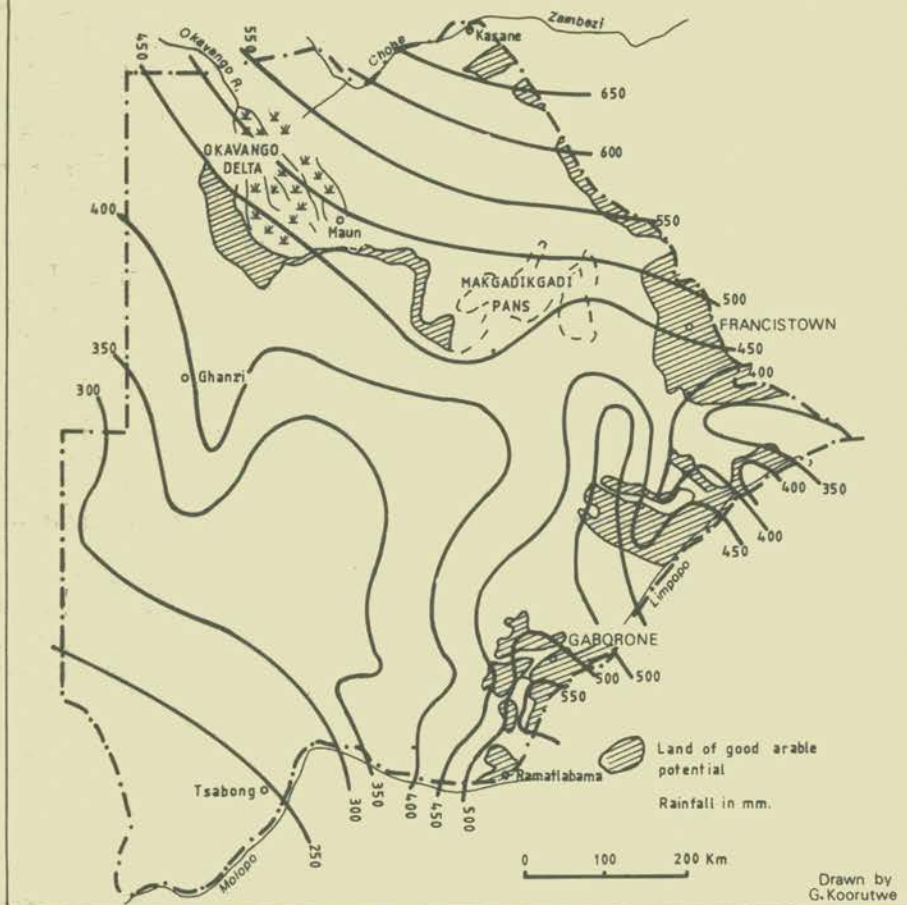
There is no space here to describe in detail the progress and problems of

Table 2. Daily maximum and minimum temperatures (°C) at different heights above ground surface in plots with different amounts of grass cover (%) at Dongdong

Height above ground surface (cm)	Grass cover (%)					
	0		15		50	
	Max.	Min.	Max.	Min.	Max.	Min.
6 December 1976						
120	46.5	20.5	44.5	20.5	45.0	21.0
30	50.0	19.5	49.0	20.0	50.0	19.5
5	52.5	19.0	58.5	20.0	60.0	18.5
6 February 1977						
120	38.5	21.0	38.0	21.0	36.5	20.0
30	41.0	21.0	41.0	21.0	41.5	20.0
5	44.0	21.0	45.5	21.0	51.0	20.5
17 July 1977						
120	30.5	7.0	30.0	7.0	30.0	7.5
30	32.5	6.0	33.0	6.0	34.0	5.0
5	34.5	6.0	37.5	6.0	41.0	6.0

Sources: C. Skarpe (personal communication); APRU, 1977.

Figure 2 **BOTSWANA** Mean Annual Rainfall & Arable Potential



After Pike 1971, Bowden & Stobbs 1963, Ministry of Agriculture 1979

the TGLP and the livestock-development programmes. Ample literature is available and is set out in the list of references. Brief summaries of the programmes and their fate must here suffice.

The Livestock I programme was launched in 1972 and represented the fulfilment of long-considered ideas relating to the utilization of Kalahari grazing land in a planned manner. It involved the projected expenditure of \$US 5.4 million, mostly lent by the World Bank and the Government of Sweden, and had the following aims:

1. to develop fenced cattle ranches and Karakul sheep farms on the state lands of the western Kalahari; and
2. to build a number of ranches elsewhere in the country and fatten cattle before slaughter.

In detail it was designed to provide 30 breeding ranches, five growing ranches, 25 sheep farms, 10 fattening ranches, trek-route improvements,

borehole-maintenance unit improvements, surveys, and applied research.

The aims and objectives of the very ambitious Tribal Grazing Lands Programme were set out in Government Paper No. 2 of 1975. An intense effort was made through the media, especially by the use of radio listening groups in the districts, to publicize the proposals and seek feed-back from the public, a remarkable pioneering effort in publicity. Basically the aim of the policy was to relieve the grazing pressure on the communal grazing areas in the east, and to spread the pressure over a much larger area. All land was to be zoned into three categories, viz. communal grazing areas, commercial areas and reserve areas. The larger cattle owners were expected to take up offered leases on demarcated ranches on leasehold tenure in the (so it was thought) empty areas of the Kalahari sandveld. This would relieve pressure on the communal grazing land, making possible the progressive improvement of land-management practices there. In the commercial areas the

leaseholders would be expected to practise sound management, including the erection of fences, provision of water supplies, and clearing of fire-breaks. Rents were to be charged and effectively collected. The District Land Boards (which had assumed the land-allocation duties and responsibilities of the chiefs in 1970) were to be responsible for zoning land and for issuing leases in the commercial areas.

The Livestock II programme came later and was designed to fit into the context of the Government's overall strategy for resolving the complex issues of protecting the range and promoting rural development, and to mesh into the TGLP. The elements of its design were to develop, over the five-year period 1977-1981, one hundred commercial ranches on land designated as commercial under the TGLP zoning exercise and fourteen communal grazing units; to make available small loans for livestock development by communal-management associations on communal land; to create an Agricultural Credit Division within the National Development Bank; to improve the livestock-marketing infrastructure; and to provide technical services, including research, monitoring and, very importantly, ranch-manager training. The total cost of this programme was estimated as \$US 13 million, of which just over half was to be provided through a World Bank loan.

The Results to Date

A great deal of effort and expenditure has been poured into these programmes during the past 10 years. Though it would be misleading to say they have failed, it is true to say that they have not come near to achieving their stated objectives.

Regarding the two livestock schemes, it is perhaps best to quote from the project-assessment documents published by the Swedish International Development Authority and the Ministry of Agriculture. Odell (1980) in her assessment of Livestock I states: "... LDP I in retrospect is very different from the project envisioned by Government and the funding institution in 1972. Implementation overall was negatively affected by soaring development costs, and the operation of BLDC's largest range has suffered from ... outbreaks of foot-and-mouth disease. Other serious problems over

BOTSWANA'S EXPERIENCE

the years, however, have stemmed from the project design itself. Not only has the model of package ranches proved bankrupt, but clearly in LDP I the complexities of developing improved livestock management were underestimated. The project's contribution to institution building has been minimal, perhaps even counter-productive. Furthermore, LDP I as designed, ignored political realities in Botswana. This has meant that the project has contributed to, rather than reduced, the destruction of the national rangeland resource."

Bekure and Dyson-Hudson (1982), in their assessment of Livestock II, state that: "Given its present form and present conditions in Botswana, LDP II can achieve neither its specific objectives nor its general aim of usefully furthering the Government's Tribal Grazing Lands Policy."

The TGLP has almost ground to a halt. Only a few of the high hopes entertained at its inception have been realized. In fact, in retrospect, the whole programme and some of the

basic assumptions on which it rested seem too facile. Many assumptions were made without any basis in known facts. If one single misconception can be singled out as critical, it was the belief that there were large empty areas of grazing in the sandveld, where commercial ranches could be established. The true situation which came to light was that there had already taken place considerable penetration to these areas by the establishment of permanent cattle posts based on new boreholes (Hitchcock, 1976). Furthermore, the rights of the quite considerable population of indigenous inhabitants of the Kalahari had been forgotten or ignored.

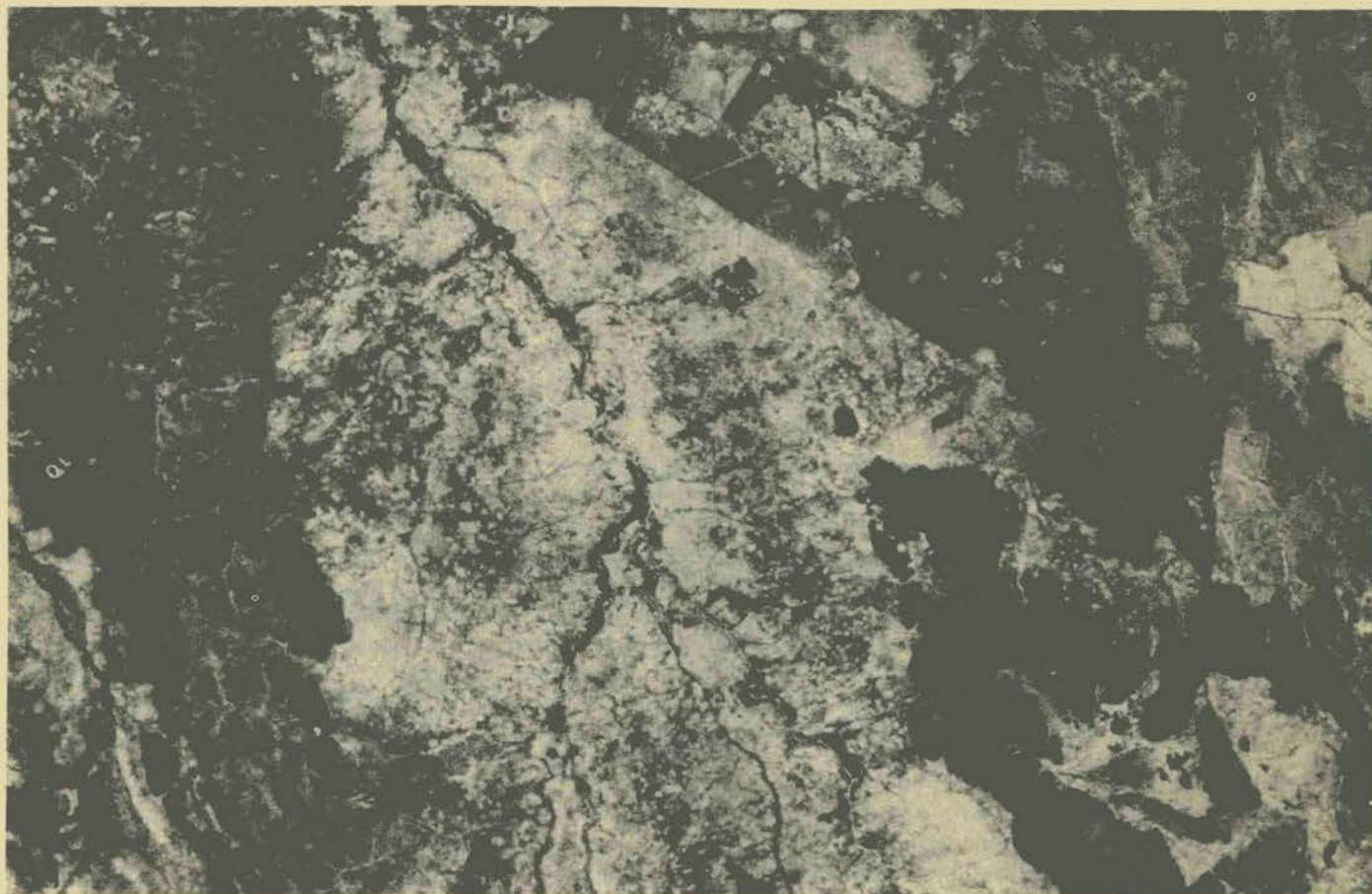
The question had arisen whether these people, mainly Basarwa (Bushmen) and the Bakgalagadi, had rights to the land, or whether their claimed rights can be extinguished by ranch allocation. As a result of these and other practical problems, ranch allocation and uptake has been extremely slow. Furthermore, important requirements listed in the original Govern-

ment paper regarding proper management and the charging of rents have been abandoned. At the same time little has been achieved in the communal areas where the grazing pressure has continued to increase. Here, however, there are signs that policy is moving towards a more pragmatic approach. Communal First Development Areas (CFDAs) are being identified, where improvements can be slowly implemented based on detailed research and planning, with local collaboration.

Conclusions

In brief, then, the problem of progressive land deterioration remains. Bekure and Dyson-Hudson (1982) state that in their opinion Botswana appears unable to control its stock numbers by managing offtake rates. The range faces continual risk of degradation and, since drought is common in Botswana, there is considerable economic waste.

Financial resources should be allocated for the provision of technical



advice and research to discover an appropriate strategy for livestock management. "Persistently to ignore this problem, as Botswana does at present, is absurd for a nation so concerned with both the image and the performance of a modern livestock-producing country" (p.41).

These are strong words, perhaps too strong. The Botswana Government has made great efforts to grapple with this intractable problem. At the core of the issue is the extreme reluctance of a pastoral people to reduce its cattle herds. People do not slough off their age-old customs and traditions so easily and quickly. But there are other aspects. The "expert" advice received in good faith by the policy makers has at times been wrong, ill-advised, and sometimes downright bad.

Furthermore, the country suffers from a chronic shortage of technical manpower at all levels to carry out over-complex programmes. This can only be remedied with time. Most of the technical remedies for the disease of land deterioration are well known. Their application depends on an intense environmental education effort at all levels from primary, through secondary and tertiary to extra-mural adult, and in intensive, closely controlled, close-contact extension programmes.

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PLANNING FOR INTEGRATED AGRICULTURAL RESOURCE MANAGEMENT AND DEVELOPMENT IN THE ECWA REGION

K. M. AZAM

*Economic Commission for Western
Asia
Baghdad, Iraq*

Desertification in the ECWA Region

A large part of the ECWA region, about 96 per cent, is arid and semi-arid and most of the ECWA countries suffer from various types and stages of the desertification process—as a result of degradation of vegetation, wind erosion, water erosion, deterioration of soil structure, reduction in soil organic matter, salinization and alkalization, waterlogging, and excess of toxic substances. An interpretation of the FAO-UNESCO Soil Map of the World has shown that as much as 98 per cent of the land area in the ECWA region is subject to desertification, out of which 65 per cent has been affected severely or very severely, while 35 per cent has been affected by slight or moderate degrees of desertification. While, to a limited extent, this resource deterioration may be attributed to long-term climatic changes, to a much larger extent it has resulted from faulty resource use and inappropriate management practices and institutional structures. Thus, the issues of resource management, conservation and development are of crucial importance to this region. Although in most cases the technology exists to combat the physical dimensions of resource degradation, its application is weakened by insufficient knowledge of the socio-economic context, incorrect identification of causes of the problems, and inadequacies in management skills.

ECWA Experts Meeting on Management, Conservation and Development of Agricultural Resources

The Plan of Action to Combat Desertification adopted by the United Nations Conference on Desertification and endorsed by the General Assembly confers upon the United Nations Regional Commissions important responsibilities with regard to assisting governments in undertaking intensified and sustained national action and in formulating, co-ordinating, catalysing and executing, within the scope of their competence, interregional programmes to combat desertification.

At its sixth session, held in Baghdad in April 1979, the Economic Commission for West Asia (ECWA) considered the issue of desertification and emphasized, in particular, the need to identify and implement a set of action-oriented problem-solving activities and to convene a regional meeting as a concrete step towards a concerted effort against desertification and the effective implementation of the Plan of Action to Combat Desertification. In this regard, the Commission adopted resolution 71(VI), "Combating Desertification in the ECWA Region".

In pursuance of the above resolution an expert meeting on management, conservation and development of agricultural resources in the ECWA region was held in Damascus, Syrian Arab Republic, in co-operation with UNEP, FAO and the Arab Centre for

the Study of Arid Zones and Dry Lands (ACSAD), from 9 to 15 May 1981. Twenty-nine substantive papers were presented at this meeting. They covered a wide range of issues relating to desertification matters, such as: assessment of the land and water resources in the region; review of programmes of various UN agencies related to desertification; various technical aspects of resource-use and degradation in the region; country situations; socio-economic and institutional aspects of resource-use problems; etc. The meeting also came up with a set of important and concrete recommendations.

Recommendations of the Experts Meeting

The present paper attempts to develop a logical framework for the analysis and implementation of activities to follow-up these recommendations. In this regard, it is important to point out that any well planned and environment-oriented programme aimed at the integrated management and development of agricultural resources would require much more than merely corrective measures; it may require a substantial reconstruction of national development efforts. With this view in mind, the actions recommended by the experts meeting may be set forth as given below to provide a logical and more or less sequential framework for the identification and formulation of integrated national and regional programmes of resource management to combat desertification in the region.



UN
 Reforestation is one goal of Jordan's Baq'a Valley scheme. Preparations, with seedlings for future planting in the foreground.

sary to know whether soil salinity/alkalinity in a certain area is the result of mismanagement or of unavoidable geological causes.

3. Stocktaking of existing programmes and projects

A stocktaking of existing programmes and projects, to determine their relevance to and effectiveness in combating desertification, is necessary to identify gaps and to formulate subsequent policies, programmes and projects. This should include the assessment of existing institutions to evaluate whether they are adequate to deal with desertification problems.

4. Formulation or reorientation of land-use policies

Generally, agricultural resource management is suffering from the lack of coherent integrated land-use policies on a national scale. This has been one of the major constraints on ecologically sound resource development. Most of the conservation work in the countries of the region has been implemented sporadically on an occasional basis; overall resource conservation and development strategies have not been developed and no country in the region has yet established an institutional infrastructure capable of formulating and carrying out programmes of the type and magnitude that are required. The development of adequate policies, supported by the necessary services to implement programmes effectively may take considerable effort, time and money. However, this process could be shortened and mistakes avoided by drawing upon the experiences of the other countries in the region or elsewhere.

5. Development of appropriate legislation

It is important to realize that law, in itself, is not an instrument of resource management. Most of the existing relevant legislation has been drafted for specific sectors and not from an integrated environmental perspective. The legislation has been generally negative in its impact, and has usually stressed what should not be done, without providing any guidance on how the problems should be solved. The legislation exists in a policy vacuum, and very little of it is applied. Effective legislation must take into account the social and economic reasons lying behind the abuse or misuse of resources. Legislation should then be drafted in the context of a comprehensive and constructive

1. Survey and assessment of land and water resources and delineation of agro-ecological zones

The insufficient amount of basic information on national agricultural resources is a major constraint in rational decision-making, comprehensive planning, and successful implementation of agricultural development programmes. If the degradation of land and water resources is to be avoided, proper resource-evaluation surveys based on the identification of agro-ecological zones should precede any development action. In this regard, it is important to adopt a common standardized methodology for the survey and assessment of national agricultural resources and the impact of desertification. It is also ap-

propriate to mention that an FAO/UNEP project is at present engaged in developing an internationally acceptable methodology for the assessment and mapping of the causes and dynamics of desertification at local, national and international levels. Also, a significant amount of work on agro-ecological zoning and land-evaluation methodologies has been carried out by FAO in recent years.

2. Identification of the causes of desertification

It is extremely important to identify correctly the causal links between desertification processes and consequences so that the real causes and not the symptoms are dealt with. For example, before launching any land-reclamation programme, it is neces-

ECWA REGION PLANNING

resource-management programme. It should provide workable alternatives to current abuse and misuse of agricultural resources. It is not simply a question of preserving the environment at the expense of the local population. Rather the challenge is to find a way of providing these people with the opportunity to make a decent living without degrading the resource base.

6. *Creation and strengthening of an institutional framework*

Past attempts at improved management and development of natural resources have been marked by a high rate of failure, not because of a lack of appropriate technologies but because of institutional inadequacies. The institutional structures created for or entrusted with the responsibility of solving ecological problems were either incorrectly designed or were not given the necessary financial and administrative authority to deal with the complexity of these problems. On a national basis few, if any, of the countries in the region have institutions carrying overall responsibility for the development of natural resources. Although most of these countries have ministries of agriculture, the responsibility for developing specific sectors such as agricultural crops, irrigation, soil conservation, range management, animal production and forestry lie within their individual departments or under different ministries, which tend to pursue their own special programmes without much co-ordination between them.

A rather common national response to the United Nations Plan of Action to Combat Desertification has been to look for specific projects to be conceived and implemented in isolation by the existing ministries/departments. Such a response has usually been inadequate, considering the characteristics and magnitude of desertification problems. The entire institutional framework for decision-making, planning and co-ordinating with regard to natural-resources management needs to be involved and must, therefore, be redesigned to take over this responsibility. However, it may not always be necessary to establish new institutions. It is more important to incorporate the ecological dimension effectively into the existing institutional framework. However, this can be achieved only if ecological problems are approached in an in-

tegrated fashion. Ecological problems result from the interaction of many physical, social, economic and even political factors, and can only be dealt with from this perspective.

7. *Development of research, education, and training*

Once the weaknesses in existing institutions have been identified and proposals for new institutions formulated, they should promptly be linked with supporting research, education and training institutions. The technical capabilities of these institutions should in turn be strengthened to enable them to cope with their new tasks. Some good recommendations in this respect were made at the ECWA Experts meeting. It must be emphasized, however, that education and training, in order to be effective, should be oriented towards the development of skills to meet the actual needs of each country. Agricultural research must be conducted with an understanding of the political, economic and social forces within rural communities. Otherwise the implemented programmes are almost certain to have a very limited impact and, indeed, may exacerbate existing problems in rural societies. Without a complete understanding of the options open to the majority of farmers and of the knowledge and skills that farmers possess, agricultural research is likely to reinforce the narrow objective of output maximization through modern production techniques that exploit and destabilize rather than provide sustained and people-oriented development.

8. *Planning for integrated development*

Adequate provision must be made in the national development process for the protection of the natural resource base, which has not yet been given adequate priority in national planning processes in the region.

In this regard, it is necessary to appreciate that the sectoral or unilateral approaches to overcoming land-use problems are generally counter-productive and can lead more often than not to further degradation of the natural resources. A number of examples of such approaches can be cited in the region, such as the extension of irrigated crop production on unsuitable soils, leading to waterlogging

and salinity problems; extension of rain-fed cultivation to marginal areas where there is a high risk of crop failure and soil erosion, and thus the danger of inducing desertification; increased application of veterinary practices for controlling livestock diseases without concomitant measures for increased feed production; haphazard or unplanned development of water-points for livestock in rangelands, leading to serious overgrazing and depletion of natural vegetation; and unplanned exploitation of forest areas and woodlands, causing deforestation and degradation of watersheds.

The central issue is the need to integrate all the factors that have contributed to the present situation into a comprehensive package of measures to ensure that lasting damage to land resources does not occur. For example, successful soil conservation needs more than just the application of erosion-control methods. It needs an overall land-use policy, in which, among other things, soil and water conservation is an integral part. Also in this context the complementary nature of the relationships between range and arable lands is of vital concern. Effective measures which integrate crop production with animal husbandry would undoubtedly lead to better overall management of the natural resources. Likewise, the complex relationships which exist between forests, ranges and cultivated lands dictate that an integrated solution be sought if effective management of any watershed is to be achieved. This implies, for instance, the development of multiple land-use systems which preserve the balance between the available land and water resources and their uses. An integrated system of planning for resource use has to be instituted to avoid any gaps or duplication of effort. The integrated development approach deals simultaneously with the three universal basic development objectives, which are usually handled separately, viz. (i) increased production, (ii) increased and fairly dispersed incomes, and (iii) conservation and development of natural resources. This, however, is a difficult task and would require both political will and a multi-disciplinary planning approach.

9. *Participation of the population in the implementation of development strategies*

The important problem in the field

of resource management and development in the ECWA region is not a lack of relevant technology or even of financial resources but the lack of defined strategies ensuring effective implementation of programmes and projects with full involvement of local populations.

Integrated development strategies should take into account the need for an adequate study and understanding of the prevailing socio-economic conditions. A traditional land user cannot be expected to participate in any proposed land-use changes unless he is convinced that such changes will lead to a substantive improvement in his living conditions. This emphasizes the need for an effective dialogue between the planner and the land user before any action to improve the management of the natural resources is designed and implemented. In this context, it is important to appreciate that where implementation strategies are harmonized with traditional systems, they have a better chance of acceptance. Compulsion alone cannot lead to the success of conservation programmes. Such programmes can only be effective where the authorities use demonstration, extension, and education programmes, coupled with

appropriate incentives, to promote the understanding, interest, and co-operation of the public in general and the land users in particular. Only through the effective participation of the local populations can resource-degradation problems be solved.

10. Regional and international co-operation

Common problems faced by the countries of the ECWA region could be solved more effectively by combining financial, technical and manpower resources available in the region and seeking solutions appropriate to national needs within a regionally co-ordinated programme. Co-operative regional training programmes are needed to support integrated approaches to natural-resources assessment and management. Such programmes could be arranged by existing regional training institutions to educate policy makers, planners, and managers as well as to develop scientific and technical capabilities. An important objective for regional co-operation should be the strengthening of existing regional institutions and the development of regional desertification centres for the transfer

of information and technology.

Conclusions

The above framework for the identification and formulation of integrated national programmes of resources management to combat desertification as derived from the recommendations of the expert meeting on management, conservation and development of agricultural resources in the ECWA region should serve effectively as guidelines for an effective regional desertification control programme to ensure the successful implementation of the Plan of Action to Combat Desertification on a regional basis.

Appropriately applied, the strategy mentioned above will ensure that the problems of land degradation and desertification peculiar to the region are accurately surveyed and assessed, the causes of desertification accurately identified, and appropriate policies adopted. Effective national action can then evolve, taking advantage of the similar nature of the problem across national boundaries, which would allow nations to share experiences and knowledge for the combating of desertification.

A scene near Jabal Barouk, Mount Lebanon. A forester, watershed manager and road-building engineer discuss an afforestation project.



STONE DESERTS ON AFRICA'S ROOF

"It could be Africa's bread-basket," an international development official once said of Ethiopia's Central Plateau. This potential bread-basket, however, is being filled with stones. In a land hit by recurring drought and over-stretched land resources, the scourge of massive soil erosion is inexorably converting large areas of the highlands into stone deserts. The lowlands of the east and south also face severe problems of land degradation with drought aggravating the already existing pressures of over-grazing and deforestation.

Northern Ethiopia, particularly the highlands of Tigray and Wollo, have supported complex agricultural systems since as early as the first millennium (Moges 1979a). Population increase and degradation of arable lands in recent years have forced the people to cultivate the steep mountain slopes. This, in turn, has accelerated the processes of deforestation, land degradation and soil erosion, and increased the area's vulnerability to drought. This is a serious threat to the fertility of the region and a significant step towards desertification.

Much of the problem is due to the concentration of some 24 million livestock in the highlands. The country's human population and the livestock populations have doubled in the past few decades. Today, Ethiopia supports the largest livestock population in Africa (some 77 million head) (Hendry 1982). Most of the people are farmers; only about four million live in towns of 2,000 or more (Central Statistical Office, 1980). Average population density is about 25 per sq. km, but in the highlands the figure is much higher. The overall population, presently at the level of 32 million, is increasing at an estimated 2.5 per

cent a year and is projected to reach 54.6 million by the year 2000.

Ethiopia has plenty of arable land, mostly in the lowlands, and less than 10 per cent of it is cultivated. The heat, malaria, and sleeping sickness (trypanosomiasis) in the lowlands do not allow full utilization of these otherwise productive soils. Most of the population and their livestock are confined to the increasingly overcrowded highland regions.

Deforestation and Soil Degradation

Deforestation has been a central factor in Ethiopia's land degradation. Over 40 per cent of the country used to be covered with forests. As recently as two decades ago, 16 per cent of the land surface was afforested. By 1982 this area had dwindled to 3.1 per cent (Forestry and Wildlife Conservation and Development Authority). With the disappearance of forest cover, mountain catchment areas lose their capacity to retain rain-water. Most of the rainfall (580-1,320 mm) is concentrated in three months of the year. On the deforested slopes this leads to widespread soil erosion. The greater part of the rainwater runs off quickly, taking the top-soil with it.

Cultivation of steep slopes and other marginal lands for annual crop production under the pressure of a fast-growing human population is another factor contributing to soil erosion. Over grazing on steep mountainsides and semi-arid rangelands completes the picture of improper land-use practices leading to the degradation of land resources in the highlands.

A provisional soil-erosion hazard map prepared by FAO with the hazard graded on a scale of 1 to 7, shows

most of western Wollo and Tigray Administrative Regions, eastern Gondar and central Eritrea as subject to high (5), very high (6) or extreme (7) soil erosion hazards (FAO 1977). Observations in the region confirm that in many cases the hazard has become a reality (Milas 1983).

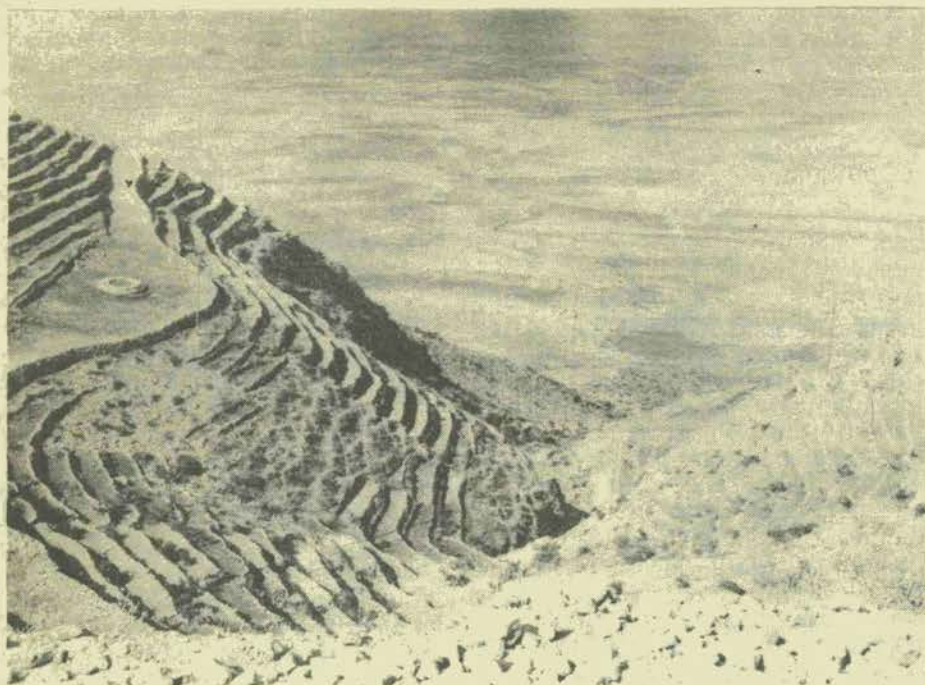
Recent research in the Gondar Administrative Region's Simien Mountains indicates an average annual soil loss of some 20 metric tons per hectare. National annual soil loss is estimated at more than one billion metric tons, which translates into the stripping away of a layer of soil one-metre deep over 79,000 ha (WFP/FAO/ILO Project Evaluation; 1981).

Soil erosion is damaging draining capacity and causing heavy siltation in lower river channels and reservoirs. It has also reduced the regulatory capacity of the mountain catchments, thereby increasing the severity of flooding. Formerly permanent streams now stop flowing in the dry season and in times of drought.

The almost total loss of forest cover in the northern highlands has had an additional adverse effect on soil quality. A population which depends upon wood fuel finds it in increasingly short supply. Where wood and charcoal are no longer available, domestic fuel is provided by burning crop residues and animal dung. Very little organic matter is returned to the soil. As a result, the soil is becoming exhausted and less capable of supporting its human and animal population.

Drought and Famine

Low agricultural productivity due to inappropriate methods of cultivation, land degradation and cultivation of in-



Terraced mountainsides in the Tigray Region; first steps in reforestation and soil and water conservation.

WFP/IRG Forestry Programme

creasingly marginal lands has meant that the region has long lived on the verge of hunger. Even a slight drop in production can turn this chronic food shortage into famine.

The particularly severe drought and famine of 1972-1974 killed over 200,000 people, that is, about five per cent of the population in the two northern regions of Wallo and Tigray (UNEP/FAO/ILO Project Evaluation). These two Administrative Regions have suffered most from the periodic droughts and famine since the last century. Each drought has tended to leave the land and the people more vulnerable to the next one.

The history of the region shows clearly that periodic droughts are to be expected and must be taken account of in development planning. The disastrous 1972-1974 drought was only the most recent. The records of the past twenty years indicate that drought occurs both in the highlands and in the lowlands, for periods of three to five years with intervals of five or six years (Moges 1979a). This pattern appears to be reinforced by the present drought which, since the failure of the mid-1982 rains, has become as severe in Wallo and Tigray as the 1972-1974 drought

During the present century, the country has suffered at least eight famines, all of which have had

devastating effects in the northern regions. The period from 1957 to 1977 was characterized by chronic food shortages and famine in Wallo (Moges 1979a). During this period the region experienced one of the worst famines in its history, probably equalling or exceeding the Great Ethiopian Famine of 1889-1892. However, the whole region, or parts of it have never been out of a famine situation in recent times. The 1971-1974 famine was just a cumulative result of fluctuating crop and livestock yields over the years.

Much the same is true of Tigray. In both Wallo and Tigray the causes of famine were in the past often aggravated by deeply-rooted patterns of social injustice and exploitation which, however, have been largely eradicated in recent years. The problem of sharecropping, which in many areas consumed a significant part of the production of the peasants, no longer exists. Low productivity, hunger and the threat of famine, however, continue (Moges 1979b).

Rangeland Deterioration

Ethiopia's rangelands, constituting about 42 per cent of the country's land area, are mainly located in the hot and dry lowlands and intermediate areas to the north, south and east of the Central plateau. They lie at alti-

tudes of less than 1500 metres with less than 700 mm mean rainfall and are usually suitable for grazing during only a limited period of the year. The pastoralists, therefore, tend to be nomadic or semi-nomadic.

These lowland areas have suffered the results of deforestation which occurred both in the region itself and in the highlands. The destruction of the highland forests has affected the hydrological balance of the highland water catchments which are the main source of water in the lowlands. When the highlands are denuded of forest cover and rainwater run-off is high, the regular water supply in the lowlands is depleted.

The rangelands of Wallo, Tigray and Hararghe were severely affected by famine during recent droughts. The loss of a large proportion of the livestock which are the main source of livelihood of the local population was the result not only of climatic variation, but of rangeland degradation due to increases in herd size, invasion by the cattle of highland farmers and seasonal burning of vegetation.

The 1972-1974 drought found much of Ethiopia's rangeland overpopulated in terms of people and livestock. The mainly pastoral human population of the region had increased, requiring a larger animal population to support it. During the good years, the pastoralists had built up their herds and when the drought occurred, drastically decreasing the carrying capacity of the rangelands, disaster was inevitable. Large numbers of livestock starved to death. An estimated 80 per cent of the cattle, 50 per cent of the sheep and 30 per cent each of the goats and camels of the affected regions were wiped out (UNCOD Country Paper, Ethiopia, 1977). In the meantime, as streams and water-holes dried up, they were often forced to concentrate near the few remaining sources of water, where they denuded the range and accelerated the trend toward desertification.

Government Action

The present Government of Ethiopia has shown great concern for this problem, the seriousness of which is shown by the fact that in almost every year since 1974-1975, the Government has been forced to provide famine relief for several million people, particularly in the chronically hungry northern regions and in the

STONE DESERTS

drought- and war-ravaged eastern rangelands. The authorities, with the help of large-scale external assistance programmes, are preventing actual famine where it would otherwise be inevitable, by providing timely and large-scale food relief to the affected population. In this regard, Relief and Rehabilitation Commission figures for the period July 1981–June 1982, show that some 4,861,000 people needed emergency food assistance. The figure as of 11 January 1983 was 5.1 million (Relief and Rehabilitation Commission).

These massive food-relief operations are clearly necessary. It is just as clear, however, that such operations cannot be more than a temporary expedient, and they are beyond the capacity of the Government's resources. The Ethiopian authorities are aware that more practical and long-range solutions must be found to guarantee the long-term survival of the population of these drought-prone areas by restoring the productivity of the degraded lands so that they can once more provide a reliable livelihood for their people.

The assessment of the situation of these drought and famine-prone regions by the Ethiopian Government has confirmed that the populations of large areas of Wollo, Tigray and eastern Gondar are far higher than the carrying capacity of their exhausted and eroded lands. As a result, desertification is advancing rapidly. The threat and the necessity of prompt action to control it is well appreciated. There is a high level of understanding of the adverse effects of inappropriate land use practices in causing desertification. To face the problem effectively, high priority is being given to land-use survey and planning, and to development projects which include a strong component of environmental protection and conservation. Most of these projects concern land use planning, agricultural development, irrigation, range management, reforestation, resettlement and extension services.

The responsibility for desertification control activities lies with the Central Planning Supreme Council which has overall jurisdiction for planning and co-ordination for development, and the Relief and Rehabilitation Commission which, besides being the executive agency for drought operations, is also concerned with desertification control. The Ethiopian Government's

desertification control activities fall into three main areas: resettlement, improved land-use planning and reforestation.

Re-settlement

The Government has instituted a policy of voluntary migration of the populations from the most degraded areas. The land is then rehabilitated by prohibiting cultivation and controlling grazing to permit self-regeneration of the natural vegetation, as well as through active programmes of reforestation and soil conservation.

Tens of thousands of people have already been moved from the most degraded areas of Wollo, Tigray and eastern Gondar to new homes in the more fertile lowlands of the south and west. The Relief and Rehabilitation Commission (RRC) has resettled about 61,000 people in the lowlands of Bale, Wollega and western Gondar. The settlers include some 16,000 family heads, some of whom are still waiting for their families to join them, and some 45,000 family members. The Commission also has had to resettle large numbers of drought victims and war-displaced persons from the south-eastern regions of Bale, Hararghe and eastern Wollo. According to recent RRC figures, a total of 139,261 people from various administrative regions had been resettled by mid-1982.

These are only a fraction of the numbers who will eventually have to be moved. Government officials say that in Wollo alone, as many as 110,000 families—500,000 to 600,000 people—may require relocation. On the basis of population and present conditions of soil-degradation it would be safe to assume that a similar number would need to be evacuated from Tigray and eastern Gondar. While the resettlement programme is considered essential, it faces a number of difficult problems, including lack of resources and, more importantly, the frequent reluctance of the highland peasants to face the heat, diseases and strange environment of the lowlands.

The Commissioner for Relief and Rehabilitation stresses that resettlement is voluntary. The important thing is to make the existing settlements successful. It is believed that when people hear of the increased prosperity and better living conditions of their friends and relatives in such resettlement projects as Asosa in the Wellega

Administrative Region, more of them will be interested in resettlement. To some extent, this belief is already justified by events.

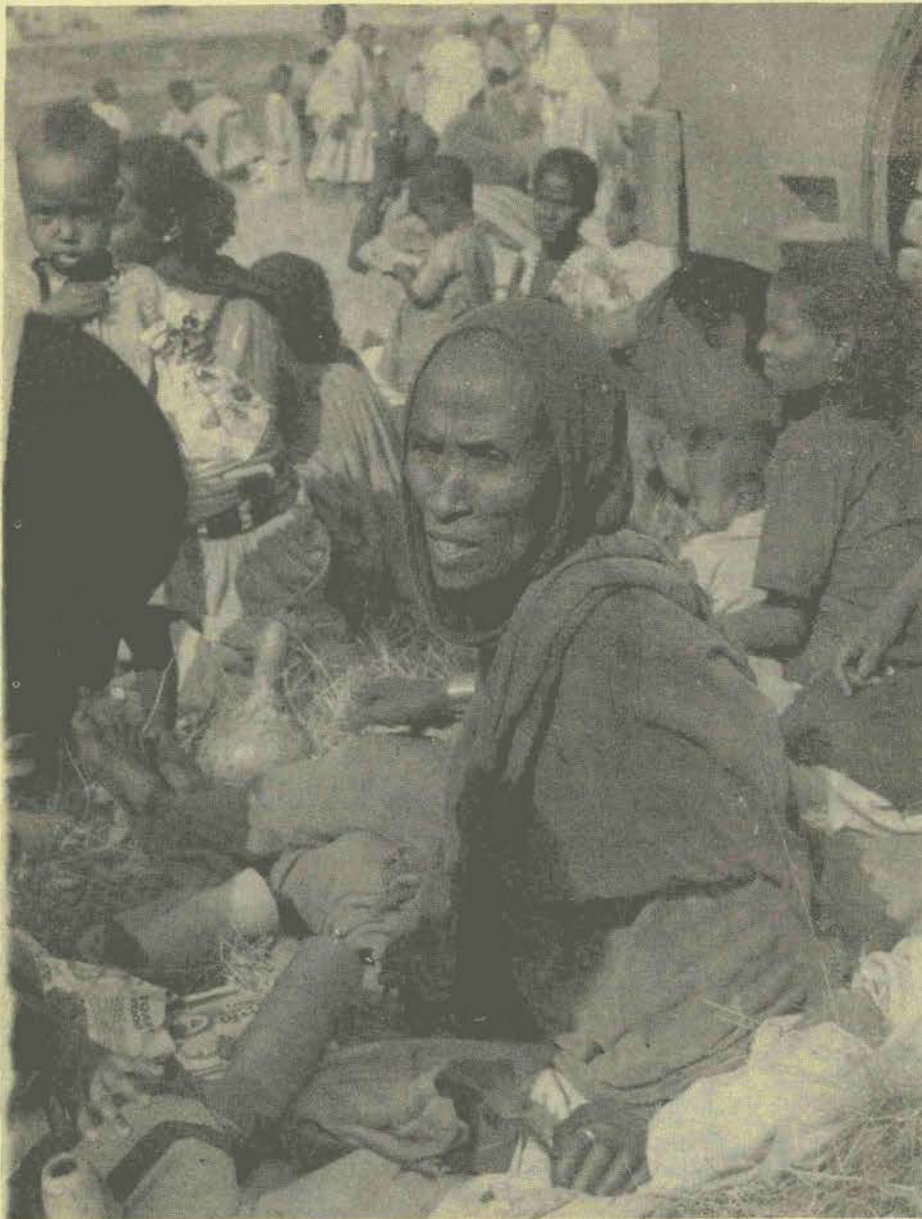
Land-use Planning

Another main thrust in Ethiopia's fight against desertification is the effort to improve agricultural productivity through improved land-use practices along with soil and water conservation. As part of this effort the Government has established the Sirinka Catchment Rehabilitation Pilot Project which has reforested threatened parts of the catchment area and introduced improved land-use patterns, agricultural techniques and crop varieties, to raise rural productivity while keeping soil-erosion to an acceptable level. The project aims at developing improved practices which can be replicated in other similar areas of the region and plans are under way to extend the project to include a further 1,500 sq. km of Northern Wollo.

Reforestation

By 1982 only 3.1 per cent of the country's land area (3,319,000 ha) was under forest cover and only 2.73 per cent was under natural forest (Forestry and Wildlife Conservation and Development Authority). Officials of the Forestry and Wildlife Conservation and Development Authority (FAWCDA) and the Soil and Water Conservation Department of the Ministry of Agriculture (SWCD) estimate that there is an urgent need to afforest some 2.5 million ha. However, due to the limited resources available and the need to make the most effective use of them, the programme is concentrating on 19 key catchment areas in six regions—Wollo, Tigray, Eritrea, Hararghe, Gondar and Shoa.

The national afforestation programme is based on the contribution of the World Food Programme (Food for Work) (64.2 per cent), the Ethiopian Government (21.4 per cent), and the Federal Republic of Germany (14.4 per cent). During the period 1974–1981 the programme used resources equivalent to Eth. Birr 61.2 million (approximately \$US 31 million) and reforested some 36,000 ha principally of denuded mountainsides in key catchment areas. The annual rate of tree planting ranged from 1,000 ha in three regions in 1975 to 13,324 ha in six regions in



Environmental refugees on the way to new homes in the south.

1982. These figures, however, are only for the work carried out under the WFP Food for Work Programme. There has also been a huge voluntary effort by peasants' associations which worked outside the Food for Work Programme and provided more than half the manpower required.

The afforestation effort is costly for a country with Ethiopia's limited resources, but none the less essential. According to FAWCDA officials the average cost is Eth. Birr 2,000 (\$US 1,000) per hectare, with about 75 per cent of the expenditure being consumed by direct soil and water conservation measures (terracing and check-dam construction), plant production and road construction. To

plant one hectare of mountainside requires an estimated 800 man-days and the construction 20 metres of new road. Under the Food for Work Programme the workers receive three kg of grain and 120 g of cooking oil per man-day.

Conclusions

Ethiopia has been severely affected by the continuing processes of soil erosion, land degradation and desertification, aggravated by drought. However, the Ethiopians have recognized the gravity of the threat and have taken well planned measures, within available resources, to contain and where possible to reverse it. They

have already proven through a score of afforestation and watershed-rehabilitation projects that they have the capacity to confront the problem and implement solutions to the extent allowed by severely limited financial resources.

One of the most promising developments in Ethiopia's combat against soil degradation and desertification is the rising level of desertification awareness and public participation engendered by the peasants' associations. The people have begun to recognize the threat to their land and are increasingly prepared to combat that threat. Ethiopia's 25,000 peasant associations with their seven million members offer a great potential for combating desertification. As already demonstrated by the WFP/FRG afforestation effort, they offer an equally great potential for the effective utilization of international co-operation in the combat against the common menace of desertification.

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NEWS FROM UNEP

Consultative Group for Desertification Control, Fourth Session, Nairobi, 15-17 February 1983

The Consultative Group for Desertification Control (DESCON) held its fourth session in Nairobi from 15 to 17 February 1983 to consider the mobilization of financial resources for 18 project proposals for the control of desertification. The Group also considered in a general discussion its own role and additional functions which it might serve beyond the consideration of project proposals for financial support. Several suggestions were made to improve the functioning of the Consultative Group.

The Group heard an opening statement from the Executive Director of UNEP, Dr. M.K. Tolba, in which he drew attention to the poor status of the Special Account and of the general financing so far contributed to combating desertification. He also informed the meeting on preparations for the first general assessment of progress in the implementation of the Plan of Action to Combat Desertification (PACD) to be undertaken for 1978-1984, and to the requirements of General Assembly Resolution 35/73, para. 10 dealing with specific training and research programmes for desertification control. He asked that the Group consider the recommendation of the Workshop held in November 1982 in Paris, which proposed the Group as a sponsor and international co-ordinator of an international programme on research and training.

A total of 18 high-priority anti-desertification project proposals from 24 countries was submitted to DESCON-4 for consideration. Out of these 18 project proposals, 12 were new and 6 were resubmissions from previous sessions; 13 projects came from Africa, with 10 from the

Sudano-Sahelian region, 2 from Asia and 3 from Latin America. They were designed to implement such activities as ecological monitoring, soil-erosion control, protection against sand encroachment, establishment of fuel-wood plantations, watershed-management schemes, and a regional training programme. The Group also had before it six working papers and three information papers which reviewed the financial status of projects considered at DESCON-2 and DESCON-3, and summarized project proposals for DESCON-4 which gave an account of the recommendations of the Plan of Action to Combat Desertification addressed by all the DESCON projects and presented general information on the total funds raised through the DESCON mechanism.

In its consideration of the progress report on the financing of past DESCON projects the meeting agreed that the following could be identified as impeding progress in the implementation of projects:

- a) the expressions of support during sessions were not keenly followed up by the recipient countries;
- b) at the national level, recipient governments do not in general seem to accord high priority to projects for combating desertification;
- c) the international community needs to develop a stronger interest in combating desertification. Donor countries and institutions do not demonstrate to the affected countries the high priority they accord to anti-desertification activities. Furthermore, they do not communicate with countries to confirm the promises made before or during DESCON.

Of the 18 project proposals presented to DESCON-4, only 5 projects received expressions of support from the Group during the meeting. The Executive Director took note of the poor response and asked the Group to advise him on what should be done for DESCON to satisfactorily fulfil its function, as a means to assist him in mobilizing financial resources for implementation of PACD.

The Executive Director opened the general discussion by introducing the working and information papers prepared by the Secretariat, which reviewed the status of projects submitted to DESCON at previous meetings. He indicated that the amount of financing raised through DESCON since its establishment was \$US 25 million, compared to \$1.8 billion needed annually for implementation of the PACD. During the general discussion, several delegations pointed out to the Group the activities of their respective Governments on a bilateral basis for the control of desertification. Many pointed out that the present world economic situation was not favourable for development assistance and that Governments in such times restrict their activities to those undertaken bilaterally in the priority order established by the recipient countries.

On the basis of discussion the Executive Director suggested the following two proposals in order to improve the functioning of the Group:

1. Potential donors should participate in the actual

designing of project proposals;

2. A 3-4 page project idea document giving the main objectives of a project proposal and its expected output as well as a tentative costing should be prepared one year before the meeting of the Group and sent out to potential donors for comments and preliminary expressions of support. If support was expressed, a full-fledged project document could then be developed and sent to members of the Group and returned to the Desertification Branch three months later. Final revised versions in the light of these comments should be presented to Governments and organizations at least six weeks before the meeting.

The meeting agreed in principle to both proposals.

The final issue to be considered was the recommendation of the Workshop on research and training. The Group accepted responsibility in principle for acting as sponsor and co-ordinator of the programme. The final decisions of Governments and organizations both on this issue and on the above two proposals would be sent within 2 months to UNEP.

The Eighth Meeting of the Inter-Agency Working Group on Desertification, Geneva, 6-8 April 1983

The eighth meeting of the Inter-Agency Working Group on Desertification (IAWGD) was held from 6 to 8 April at the Palais des Nations in Geneva. The meeting was attended by representatives of twelve agencies and organs of the United Nations system: ECA, ECWA, FAO, ILO, UNDP, UNDRO, UNEP, UNESCO, UNFPA, UNIDO, UNSO and WMO.

The meeting first discussed follow-up measures for the implementation of General Assembly Resolution 35/73, para. 10, which calls upon UNEP to institute in co-operation with the entire UN system specific programmes of research and training at the national, regional, and international levels. A note presented by the Secretariat summarized previous action and requested the meeting to comment on the final report of the Paris Workshop (2-4 November 1982) and to advise the Secretariat on required follow-up.

There was general agreement that the Paris Workshop (see the NEWS item below) was well attended and resulted in a comprehensive report. The recommendations of the workshop were subject to lengthy discussion. With regard to the issue of a co-ordinating body of the international programme of research and training, it was generally agreed, in principle, that a strengthened Desertification Branch should assume the role of sponsor of the programme. IAWGD would continue to play an important harmonizing and co-ordinating role as defined by the Administrative Committee on Co-ordination (ACC). Several representatives felt there was no need for another workshop at present but that it could perhaps be considered some years in the future. It was agreed that member organizations submit their written comments on the final report of the Paris Workshop with special emphasis on the areas in research and training programmes where they could take a leading role.

A note on the implementation of UNEP Governing Council decision 9/22A, para. 4, was presented to the meeting by the Secretariat. The decision calls for a General Assessment of Progress in the Implementation of the Plan of Action to Combat Desertification (PACD) in 1984 (see the NEWS item below). The various

representatives reported on inputs of their agencies to the General Assessment, including the up-dated UNESCO case studies, a paper on the test case studies from the FAO/UNEP Desertification Assessment and Mapping Project, and the WMO report on climate and desertification. UNSO reported on progress in the preparation of the regional study for the Sudano-Sahelian region, including their follow-up to responses to the desertification questionnaire.

The meeting then considered the preparation of teaching and management manuals envisaged by the PACD and of an annotated directory of institutions dealing with the problems of desertification and the development of arid lands. On the issue of manuals it was agreed that UNEP should send a consultant to all the UN agencies concerned, in order to identify gaps, discuss languages for the manuals and their channels of distribution, etc. With regard to the annotated directory it was agreed that it would be based on an inventory prepared by Arizona University and completed through the use of other available directories, and that UNESCO be given the role of lead agency in the preparation of the directory.

The meeting then reviewed the role of the UN agencies in the programmes/projects of the proposed programme budget of UNEP for the first biennium (1984-1985) of the System-Wide Medium-Term Environment Programme (SWMTEP). An agreement was reached whereby UN agencies concerned will provide UNEP in three months' time with their views on their involvement in the implementation of the sub-programme "arid and semi-arid lands ecosystems and desertification control". Contributions at this stage could range from a simple project idea to a fully

formulated project proposal, depending on the state of preparation within each organization.

At its closing session on 8 April 1983, the meeting considered and adopted its final report.

Seventh Meeting of the Permanent Joint Committee of the North African Greenbelt Project, 9-11 September 1982

The seventh meeting of the Permanent Joint Committee (PJC) of the North African Greenbelt Project was held in Tunis from 9 to 11 September 1982. The meeting was attended by representatives of Algeria (2), Libya (3), Mauritania, Tunisia, UNEP, UNESCO, the Arab League Educational, Cultural and Scientific Organization (ALECSO), the Arab Centre for Study of Arid Development (ACSAD), and Organization for Agricultural Development (OAD). The representative of Mauritania informed the meeting that his Government had decided to become a full member of the North African Greenbelt Project.

The Permanent Joint Committee first reviewed and discussed the documents presented by the Executive Secretariat. The representative of UNEP explained the process of preparation, submission and follow-up of the projects presented to the Consultative Group for Desertification Control (DESCON). It was pointed out that at DESCON meetings, when donors express their interest in a certain project they usually state that they would consider providing all or some components of the external technical or financial assistance needed for its implementation within the framework of existing bilateral assistance programmes with that country, provided that the recipient Government requests priority to be given to that project. Therefore, after interest is expressed for a certain project at a DESCON meeting, it was up to the

recipient Government to get in touch with the donors and include that project on their priority list when they sit to negotiate general bilateral assistance programmes. UNEP's role at this stage would only be to remind both parties of their commitments and enquire about progress.

It was suggested that failure to follow the above-mentioned steps may have contributed to the unsatisfactory developments with regard to external financing of the four national pilot projects within the North African Greenbelt which were prepared with the assistance of UNEP and submitted to DESCON-2 (Seed Bank and Bir Lahmar projects of Tunisia, Sand Dune Fixation and Jedidah Nursery projects of Libya). The Permanent Joint Committee concluded discussion on the matter with a recommendation that a strong tie should be established between the national pilot projects for control of desertification, especially the ones prepared for submission to DESCON, and the Executive Secretariat of the North African Greenbelt Project, and that their progress should be closely followed by and reported to the Permanent Joint Committee.

The meeting then reviewed and considered the 1984-1985 programme proposed by the second meeting of the Technical Advisory Committee. The PJC identified 7 of the proposed 13 studies for 1984-1985 as deserving high priority, including one on fodder shrubs and their economic value and studies on different species and ecotypes of *Atriplex* and their importance for development of arid and semi-arid rangelands. It considered all ten suggested seminars and all seven training courses for 1984-1985 important, and suggested that the member countries wishing to organize such activities should be free to choose the subjects from among those listed. The

representatives of member countries then volunteered to organize in their countries 10 seminars and 6 training courses divided among them over the two years.

The representative of Algeria invited the Permanent Joint Committee to hold its 8th meeting in Algiers, Algeria in early January 1983. The invitation was accepted.

ECA Regional Workshop on Combating Desertification in Africa, Khartoum, Sudan, 23-28 October 1982

A Regional Workshop on Combating Desertification was held from 23 to 28 October in Khartoum, Sudan. The Workshop was organized by ECA in response to paragraph 98 of the Plan of Action to Combat Desertification to review implementation of the Plan of Action in the African region. It was sponsored by UNEP, UNSO and ETMA (of USAID) in collaboration with the Ministry of Agriculture and Irrigation and the Institute of Environmental Studies (IES) of the Sudan.

The Workshop was attended by representatives of the following thirteen African countries: Angola, Benin, Botswana, Chad, Ethiopia, Guinea, Guinea-Bissau, Malawi, Nigeria, Senegal, Sudan, Tanzania and Zimbabwe, and six United Nations Organizations: ECA, UNEP, UNSO, FAO, UNESCO and WMO. Two governmental organizations, ETMA and IES, also attended as well as several observers.

Representatives of United Nations organizations presented papers on the anti-desertification programmes and activities of their organizations in the African region, and country representatives presented country papers. Also received was the report of the joint UNEP/UNESCO/ECA mission to the Kalahari region countries of Botswana, Lesotho, Mozambique, Tanzania and Zimbabwe from 9 June to 3 July 1982. Case studies were presented by ETMA and IES. A field study was undertaken on the third day of the Workshop (25 October) to the Sheikh El Sidiq area, White Nile Province, where the

participants observed a large area of highly degraded land adjacent to the Nile. The participants were also shown areas where the authority of the chiefs and elders of Sheikh El Sidiq village had contributed to effective conservation near the village. They had established two experimental woodland plots, where the regeneration of native species and the introduction of exotic species were under trial.

The Workshop identified two major constraints limiting the full-scale implementation of the PACD in Africa, namely: (1) insufficient number of trained technical staff, and (2) lack of financial support from national and particularly from international sources.

The Workshop made several recommendations for the effective implementation of the PACD in Africa. Delegates from countries in Southern Africa took note of the activities being carried out in the Sudano-Sahelian region. They recommended that programmes similar to those assisted by UNSO, UNDP, USAID (ETMA) and UN specialized agencies in the Sudano-Sahelian region be established by those organizations responsible in the Kalahari Desert region. The Workshop further called upon United Nations organizations and ECA to assist the member countries who have not done so to prepare national plans of action to combat desertification. UN organizations and ECA were also called upon to assist in establishing programmes for monitoring and evaluation, to ensure that projects listed in each country's action plan actually cover all aspects of environmental protection and improvement of drylands, and to identify problems encountered in project execution so as to correct them as soon as possible.

Certain countries should be considered for immediate aid in this respect.

Several specific recommendations for the prevention of deforestation of natural woodlands were made as follows.

Governments, organizations and local inhabitants should be encouraged to:

1. plant appropriate fast-growing exotic forest tree species for supplying fuel-wood, charcoal, fodder and shelter;
2. utilize other new and renewable sources of energy such as solar, wind, nuclear, and biomass;
3. utilize biomass residues such as cotton stalk, groundnut husks and bagow for energy supply;
4. encourage people to use alternatives such as kerosene, liquid gas, and biogas for their energy needs;
5. modernize the kilns used in production of charcoal;
6. introduce modern fuel-efficient stoves;
7. undertake country assessments of the fuel requirements and sustainable forest and residual fuel resources available to meet these requirements.

The Workshop also made the following recommendations: that workshops on desertification control for all regions of the African continent be held on a yearly basis; that UN and other organizations help in the training of African nationals; that such training should be conducted in countries which have developed advanced methods of desert control under African conditions; that extension and mass education programmes in African countries be strengthened through the supply of audio-visual aids and transport; and that there be an exchange of visits by the personnel involved in the control of desertification among African countries through the help of international organizations

such as ECA, FAO, UNEP, and UNSO.

Two resolutions of the Workshop were adopted. The first urged that Tanzania be included among the countries to receive assistance through UNSO and that the organs of the United Nations system expand the scope of UNSO and establish an UNSO-type operation to assist the country members of the Southern African Development and Co-ordinating Conference (SADCC) on behalf of UNEP, in combating desertification. The second urged Governments of African countries to provide information to UNEP or UNSO, as appropriate, on institutions and specialists within their respective countries concerned with desertification and drought. It further recommended that the participants draw to the attention of their Governments the importance of filling out the desertification questionnaire circulated by the Executive Director of UNEP. The questionnaire will assist him in undertaking an assessment of the progress in the implementation of the PACD since its adoption in 1977 and in determining whether such anti-desertification measures have been effective or should be modified and what new measures should be undertaken.

Workshop on Institutions of Specific Research and Training Programmes for Desertification Control, UNESCO, Paris, 2-4 November 1982

Thirty-nine specialists met at the Workshop on Institutions of Specific Research and Training Programmes for Desertification Control from 2 to 4 November 1982 at the UNESCO headquarters in Paris. Participants in the Workshop included representatives from 11 member agencies of the Inter-Agency Working Group on Desertification (IAWGD), the United Nations University, 16 research and training

institutions and associations of scientific organizations, one foundation and 6 invited consultants. The Workshop was held in response to the United Nations General Assembly Resolution 35/73, operative paragraph 10, which calls upon UNEP, in its co-ordinating and catalytic rôle, to institute, in co-operation with the organs, organizations and bodies of the UN system, specific programmes of research and training at the national, regional and international levels, and to invite private foundations and other grant-making institutions to co-operate financially and technically in the implementation of those programmes. The holding of the Workshop was recommended by the IAWGD to consider and recommend to the Executive Director of UNEP ways and means of implementing the General Assembly resolution.

The Workshop had before it the following documents:

1. "Inventory of Arid Lands Research Institutions and their Sources of Financial Support", prepared by the Office of Arid Lands Studies, University of Arizona.
2. "Review of Current Research and Training Activities for Desertification Control and Proposals for Future Programmes", prepared by a consultant.
3. A working paper on programmes for research and training prepared by the Secretariat.

Programmes for Research

Recommendations of the Workshop addressing research needs focused on integrated interdisciplinary research and, to a lesser degree, on sectoral research. Studies presented to the Workshop were used as a starting point for the identification of research areas that need to be stressed in an integrated programme to combat

desertification. No attempt was made to establish research priorities. With regard to integrated interdisciplinary research the value of a farming or land-use system approach was recognized. Furthermore, it was pointed out that anti-desertification measures were not likely to succeed unless they were part of a broader human-resource development programme taking into account the aspirations of and resources available to local populations.

Programmes for Training

The main concern with regard to training needs as identified by the Workshop was that efforts should be made to consolidate existing structures, skills, and programmes, rather than to multiply the number of institutions. A national institution in a region should be selected and recognized as the lead institution for regional and international training programmes. National training programmes which could be broadened to regional and international courses could be identified through the IAWGD mechanism. Furthermore, draft proposals for a series of training courses to be conducted at regional centres and, where appropriate, at designated national centres should be prepared. This requires first the review of existing material and the identification of gaps in the training literature.

The Workshop noted that research and training programmes developed particularly for regional or international implementation require an information exchange system to serve them so that their benefits are maximized. Several suggestions were made for effecting this exchange of information, including regular publication of abstracts or lists of major reports/studies, development of a computerized data base specific to arid-land development problems or a form of direct linkage of regional centres.

Implementation

The Workshop determined that in order to institute programmes of research and training at the regional and international levels some sort of linkage or network is required. At the regional level a network of national institutions of research and training was supported, which would include projects, research activities, non-governmental organizations and universities. Various institutes reported on their experiences as regional and national centres and advised the Workshop on approaches to co-operation and co-ordination.

It was recognized that regional networks should be linked together in the form of an international network. The Workshop conceived the role of such an international network as developing an international programme of co-ordinated research and training activities within the framework of the Plan of Action to Combat Desertification. The international programme should:

- be composed of several specific programmes of research and training at various levels;
- have the participation of leading national and regional institutions in their fields of action;
- function through a system of regional networks incorporated in a global network.

Furthermore, the Workshop felt that the programme would need a sponsor whose functions would be to ensure co-ordinated planning and implementation of activities and the development of the network linkages. The

sponsor should be involved in mobilizing the financial resources needed for the programme development. The Workshop discussed various options and agreed to recommend to the Executive Director of UNEP that he consider one of the following as a likely sponsor and international co-ordinator:

- a) the Consultative Group for Desertification Control;
- b) the UN Interim Fund for Science and Technology;
- c) UNEP: using a strengthened Desertification Branch and the Inter-Agency Working Group on Desertification or the proposed Clearing House facility;
- d) a scientific advisory group composed of the scientific sections of NGOs and agencies.

General Conclusions

The Workshop agreed that both research and training in developing countries suffered from the following deficiencies:

- a) they did not include sufficient consideration of the socio-economic and socio-cultural aspects related to land use;
- b) they usually lacked long-term continuity and stability.

The Workshop noted that even when improved practices are known and pilot projects have been successfully concluded, practices are not applied on a large scale. Among the reasons enumerated are the following:

- a) indigenous managerial capacities are not adequate;
- b) solutions are not politically popular;
- c) pilot projects are not strongly supported by the national administration or do not employ indigenous personnel in managerial positions or do not build national capabilities to pursue similar projects successfully;

- d) problems of applying improved practices in a somewhat different environment are not recognized and are not solved;
- e) there is not enough continuity and stability in research and administrative units to assure that information and experience acquired are utilized effectively.

Furthermore, trained persons in developing countries often move from their area of specialization to other areas or to administration. Every effort should be made to keep them in their fields and encourage them to stay.

Emphasis was placed on building national capabilities in research and training and in this respect it was unanimously agreed that national institutions should be strengthened through international support and that they should be made part of regional networks. Unanimous support was expressed for strengthening the Desertification Branch of UNEP in order to respond effectively and competently to requests for technical assistance, and to provide effective co-ordination within IAWGD. UN agencies were requested to identify areas where they have the lead, and to develop the programme of research training to the project level.

UNEP/ECWA Joint Programming Meeting, 28 February to 2 March 1983, Baghdad, Iraq

A joint programming meeting between UNEP and the Economic Commission for Western Asia (ECWA) was held at ECWA Headquarters in Baghdad from 28 February to 2 March 1983. The meeting reviewed ECWA programmes for 1983 and for 1984-1985 and discussed the inclusion of environmental concerns in programme elements and possible fields of co-operation and collaboration between the two organizations. Several

fields were identified in which UNEP and ECWA could fruitfully co-operate. In the desertification sub-programmes these included co-operation in preparation of national action plans and specific pilot anti-desertification projects, the establishment of regional research and training networks and programmes, and support to training courses and seminars.

A principal item under discussion between UNEP and ECWA under its Desertification Control Programme is the establishment of a regional desertification communication and development support centre. UNEP plans to conduct an inventory of national research and training institutions in the region, their activities and future programmes, existing gaps and further needs, as a base for the establishment of a Regional Research and Training network, as recommended by the Paris Workshop on Research and Training held in November 1982. The inventory will be made available to ECWA and could form a major input for a feasibility study.

Dates for a first regional Workshop on Research and Training were discussed and tentatively set for July 1983. Other items discussed included preparation of a technical manual; preparation of studies; the holding of expert meetings and workshops; and participation of ECWA in UNEP's country planning missions. ECWA could be helpful by encouraging Governments of the region to prepare national Plans of Action to Combat Desertification.

Promotion of exchange of Information and Expertise on Desertification

Pursuant to Governing Council decision 10/18, para. 5, UNEP and UNSO, in co-operation with the Comité permanent inter-états de lutte contre la sécheresse dans la Sahel (CILS), the UN

Economic Commission for Africa (ECA), the Organization of African Unity (OAU), and the Environment Liason Centre (ELC) (Nairobi), are undertaking a survey of national, regional, and international institutions, together with scientists and specialists in Africa involved in training and research on desertification matters and governmental organizations responsible for implementation of anti-desertification projects. The survey also includes compilation of information and experience on desertification-control technology, records of successes and failures, current programmes, identification of material of value from countries with similar ecological situations, and activities suitable for duplication. The information collected will be compiled into a directory which will be made available to all African countries affected by desertification with the aim of facilitating the exchange of information, experience, and expertise. It is envisaged that the countries involved will use the information contained in the annotated directory to design and implement their anti-desertification priority projects and to prepare long-term national plans for combating desertification. It should in the meantime be a useful guide and source for identifying institutions and individual specialists.

UNEP has arranged for consultants to visit Algeria, Egypt, Libya, Morocco, and Tunisia in North Africa, and Botswana, Lesotho, Madagascar, Zambia, and Zimbabwe in Southern and Eastern Africa for purposes of collecting the information required for the directory. For countries not visited by the consultants, information will be compiled from the documents available at UNEP, ELC, ECA, OAU and other relevant sources. UNSO has also retained the services of a consultant to undertake

the survey for Ethiopia, Gambia, Kenya, Nigeria, Somalia, Sudan, Uganda, and the United Republic of Cameroon; the Institute of the Sahel will be responsible for collecting needed information for Benin, Cape Verde, Djibouti, Guinea, Guinea-Bissau, Upper Volta, Mali, Mauritania, Niger, Senegal, and Chad.

It is intended during the latter part of June 1983 to hold a joint meeting of representatives of CILS, UNEP, ECA, and UNSO, including the consultants recruited to undertake the surveys. The meeting will consolidate the results of sub-regional surveys into an annotated directory for the whole of Africa. They will review the ways and means of ensuring maximum use of the document, and determine the follow-up action required. Publication and distribution of the directory is scheduled for October 1983.

General Assessment of Progress in the Implementation of the Plan of Action to Combat Desertification, 1978-1984

Preparations for the General Assessment of Progress in the Implementation of the Plan of Action to Combat Desertification (PACD) are entering their last year before the Executive Director is expected to present his report to the Governing Council at its twelfth session as endorsed by the Governing Council at its ninth session by decision 9/22 (para. 4). The General Assessment is called for in the PACD to measure progress in the implementation of PACD during the first seven years after the United Nations Conference on Desertification (UNCOD).

A preliminary "Basic Studies" stage is nearing completion. This stage includes the completion of various technical studies,

up-dates of UNESCO case studies originally submitted to UNCOD, and a paper on test case studies of the FAO/UNEP Desertification Assessment and Mapping Project. It also includes the collation and analysis of data received from completed desertification questionnaires which were sent in September 1982 to 101 countries affected by and/or concerned with desertification.

By the end of April 1983 forty-four questionnaires had been received. Responses to the questionnaire will enable UNEP to make for the first time a comprehensive assessment of the land and land-use characteristics of dry zones, the causes, state and rate of desertification, the economic cost of desertification, and the occurrence and effects of drought. Perhaps more importantly, responses to the questionnaire will demonstrate the degree to which governments have incorporated anti-desertification measures into their development plans, the priority they have assigned to desertification control, and the financial resources they have allocated for the purpose.

As a result of a comprehensive strategy developed by UNEP to assist certain governments in completing the questionnaire, responses are expected from more than 60 countries. Consultants were sent to fourteen countries which might have had difficulty

completing the questionnaire and from which responses are most critical for purposes of the Assessment. Forty-three other countries were asked to identify a national expert who was made responsible for completing the questionnaire. In addition, the nineteen countries of the Sudano-Sahelian region received assistance from the United Nations Sudano-Sahelian Office (UNSO) on behalf of UNEP. Responses together with information obtained from other reliable sources are currently being collated, analysed, and put in a computerized data store. The results will be used as a major input to the documentation for the General Assessment and to the Executive Director's report. They will also form a base line of comparison for periodical assessments to be made in the future.

Statistics from the questionnaire will be collated first on a regional basis and submitted to the Regional Economic Commissions, which are expected to prepare a Regional Assessment from them. The Regional Assessments will respond to the data from the questionnaire, taking into account information already available at the Economic Commissions.

Based on all this documentation, three main supporting documents will be prepared. They are: "Global Assessment of the Status of Desertification", "Evaluation of the Effectiveness of the Implementation of the Plan of Action to Combat

Desertification", and "Review of the Studies on the Financial and Institutional Arrangements for the Implementation of PACD". These main supporting documents will provide the input for the Executive Director's report.

A special meeting to consider the status of activities related to the General Assessment of Progress will be called by the Executive Director in July 1983 with the authors of the main supporting documents and senior consultants attending. In addition there will be two meetings of the Advisory Panel for the General Assessment in August and December 1983 to evaluate progress, review the three main supporting documents, and approve draft outlines of the Executive Director's report.

A special Desertification Information Project has been initiated within UNEP to publicize the findings of the General Assessment of Progress on the occasion of the presentation of the Executive Director's report

during the 12th Session of the Governing Council in 1984. One output of the project will be a multi-projector slide show which will dramatize the effects of desertification and effective means available for its control.

Special Account for the Implementation of the Plan of Action

The creation of a Special Account for financing anti-desertification activities was endorsed by the General Assembly resolution 32/172 and was established in March 1979. The Executive Director has on several occasions invited Governments to give favourable consideration to contributing generously to the Special Account. To date, only seven countries have pledged or contributed to the Special Account. These are: Brazil and Bangladesh—unspecified amounts; Chile—\$US 15,000; Sudan—\$US 10,000; Mexico—\$US 5,000; Panama—\$US 4,000; and Sierra Leone—\$US 9,524. The Special Account thus remains at present at \$US 43,524.

NEWS FROM UN AGENCIES

UNSO

UNSO assistance to the Governments of countries in the Sudano-Sahelian region for combating desertification in the first half of 1983 has emphasized planning, programming and project formulation, the mobilization of resources for individual desertification control projects, and special region-wide studies.

In late February, UNSO organized and led an interagency desertification-control planning and programming mission to Chad. The mission worked with the Government on plans and strategies for combating desertification and helped identify various anti-desertification projects for which external assistance is required. These are described in a two-volume report which will be issued shortly. With this mission UNSO has now sent planning and programming missions to all 19 countries covered by its desertification-control mandate.

Since the beginning of 1983, UNSO has also been providing assistance to the Governments of Djibouti, Benin and Guinea-Bissau in preparing strategies for desertification control. The strategy adopted in Guinea-Bissau focuses on comprehensive environmental protection. In Upper Volta, a national plan of action to combat desertification is being prepared following a seminar convened with the co-operation of the United Nations University. The seminar, in which officials from various government departments participated, was similar to the one previously held in Mauritania.

In late February also, an UNSO consultant mission visited Niger to up-date the case study on the Eghazer and Azawak region, which had been prepared for the United Nations Conference on Desertification held in Nairobi in 1977. The up-dating of the case study will provide a basis for comparing the state of desertification before and seven years after the adoption of the Plan of Action to Combat Desertification. This will provide an input into the General Assessment of Progress in the Implementation of the Plan of Action to Combat Desertification being prepared by UNEP. It will also provide a basis for the Government's presentation of development plans and requirements for external assistance to a donors' round table scheduled for late 1983. The Government of Niger has decided to place priority on the problem of desertification within the context of its general development strategy.

To assist further in the preparation of the General Assessment of Progress, UNSO has been in close contact with the Sudano-Sahelian countries concerning the completion of a UNEP desertification questionnaire. UNSO has helped a number of Governments in gathering statistical data through the staff of its regional office in Ouagadougou and consultants. UNSO has also engaged the services of a consultant to prepare a comprehensive assessment for the Sudano-Sahelian region, which will constitute one of the basic documents for the global assessment of progress in the implementation of the Plan of Action since its adoption in 1977.

As part of a programme for the promotion of the exchange of information on and expertise in desertification control among the African countries, UNSO prepared for the Sudano-Sahelian region a survey of information and experience on desertification control which would be of value to other African countries with similar problems and a directory of national and international institutions in Africa involved in research, training, or the implementation of desertification-control projects. A general meeting was scheduled for late May, with UNEP to combine the results of the work for the Sudano-Sahelian region with similar work carried out for other regions of Africa.

UNSO project operations included preparation, initiation, and implementation of several projects in different countries.

A recently formulated project proposal involves the reclamation of "Gardud soils" in the Kordofan Region of the Sudan. The Gardud soils are suitable for sustained high-yield agricultural production and would relieve pressure on neighbouring over-exploited areas. A programme initiated in the Sudan in late March provides training on range management and community organization for the protection and optimum utilization of rangelands. A project of land-use mapping is also under way, which has already mapped two of the eight provinces of Sudan, describing ecological units, land-use types, as well as populations, settlements, and infrastructure.

A rangeland planning mission went to Kenya in March, to help develop a rangeland-management strategy for northern Kenya. In Ethiopia, a joint UNSO/DANIDA mission reviewed a project proposal for the establishment of

fuelwood plantations in Debre Birhan and Nazret totalling 8,700 hectares, to be financed by the Danish International Development Agency (DANIDA) through the UNSO Trust Fund.

Other project-preparation work carried out by UNSO has included a consultant mission which visited the Gambia and Senegal in January and February to help prepare a project for the protection of mangrove forests. The mangroves, which thrive in brackish waters, are a source of fuelwood and food and provide protection against salt-water intrusion. A project is also being prepared for the rehabilitation of saline soils in the Senesaloun region of Senegal, where salinity has had a particularly adverse effect on the productivity of the land.

FAO

Several FAO programmes and field activities deal with the agricultural and forestry development problems of arid and semi-arid land areas. The following is a brief up-date of some continuing activities in arid lands which are related to the implementation of the Plan of Action to Combat Desertification. Particular emphasis is given to activities in the African region and especially to those which are related to the rational utilization of natural resources for food and agriculture.

1. Land and Water

FAO has long been concerned with the mapping and assessment of land and water resources, beginning with the FAO/UNESCO Soil Map of the World Project which was initiated in 1961 and resulted in a World Soil Map at the 1 : 5,000,000 scale. A related project is the FAO/UNESCO/UNEP Global Project on the "World Assessment of Soil Degradation" (Phase I), which drew up soil-degradation maps of Africa north of the Equator and the Middle East, showing present and potential soil degradation. FAO also initiated a study of potential land use by agro-ecological zones to obtain a first approximation of the production potential of the world's land resources. Plans for more detailed

development and testing of the methodology of this project are now under way.

A World Map of Desertification at a scale of 1 : 25,000,000 was prepared for the UN Conference on Desertification in 1977. It gives an impression of the present situation. There are, however, no precise figures available as yet on areas affected or likely to be affected by desertification. The situation, rather, has generally been assessed on the basis of existing geographical information. There are also no exact data on the speed of the desertification process, at either the global or the regional level.

Because the effective combating of desertification requires that specific control measures be designed in relation to the type of degradation which occurs at each specific site, it is important to assess the status, rate, and risk of desertification at local, national, and international levels. To accomplish this, FAO, in collaboration with UNEP, is conducting a three-year project on "Desertification Assessment and Mapping". The purpose of this project is to develop an internationally acceptable methodology for the assessment and mapping of the causes and dynamics of desertification.

The draft methodology has now been prepared and tested in several countries, and a group of experts met in October 1982 to discuss it. FAO will collaborate further with UNEP in the preparation of a desertification map based on this methodology.

2. Range Management

One of the major programme activities of the Grassland and Pasture Crops Group of FAO addressing the desertification issue is the EMASAR Programme (Ecological Management of Arid and Semi-Arid Rangelands). The principle objective of this programme is the development of a rational system for the integrated use, development, and improvement of arid and semi-arid grazing-land resources. The EMASAR programme, through

integrated field projects, has made a substantial impact, particularly in North Africa and the Near and Middle East. It has demonstrated that the rangeland can be improved by supplementing annual feed deficits on rangelands with feed from fodder shrub and tree plantations. This approach was tested and developed by FAO in Tunisia and is now being used in integrated rangeland projects in Libya.

Another means of supplementing the forage deficit on rangelands is through the rotation of pasture and forage crops with annual cereals in areas with at least 350 mm of rainfall. This has been successfully implemented in Turkey in association with the World Food Programme. The provision of extra forage by planting legumes on fallow land belonging to forest villagers has made possible the application of deferred grazing on the forest watershed grazing areas. This has resulted in marked improvement in the growth of the native range vegetation. Now that the forest villagers have seen the value of this integrated land-use programme, it is being expanded to cover other forest watershed grazing areas in Turkey.

Joint activities by FAO and the World Food Programme in Syria have led to the establishment of range and sheep co-operatives. Grazing rights to specifically defined range areas are granted to Bedouin pastoral groups, provided that they are prepared to follow a proper management plan. This includes some control of stock numbers, restriction of grazing during the summer period, and the establishment of fodder shrub plantations to provide supplementary feed. The programme is implemented on some million hectares of Syrian steppe. It is closely linked with the establishment of sheep-fattening co-operatives for the off-take of surplus male stock which helps reduce grazing pressure. The programme is now being extended to Jordan.

More recently in Somalia, again through the support of FAO and the World Food Programme, a national

range-management programme has been implemented. Significant results have been achieved in the improvement of the vegetation cover on rangelands which were drastically denuded after the severe drought of 1973-1974. The programme involved large drought and rotational range reserves in various districts. It has already received general acceptance by the pastoralists, particularly in the northern part of the country, where they have established a number of co-operative grazing associations. FAO is also providing assistance to the Range Training School at Burao, which gives technical training in range management.

In the Sahel, FAO is attempting to involve pastoralists and/or farmers in raising forage crops for additional livestock feed through the implementation of a regional project covering Upper Volta, Mali, and Niger. Suitable forage legumes such as Siratro are being grown with cereal crops to provide high-quality forage in areas with 450 mm of rainfall.

FAO has given strong support in the monitoring of rangeland conditions and trends within the overall framework of range-development programmes. FAO has assisted the Government of Botswana with the implementation of a successful national rangeland monitoring programme. In co-operation with the UNEP/GEMS programme, the FAO/EMASAR programme is executing a project in Senegal to study and monitor changes in the Sahelian pastoral ecosystem.

3. Forestry

The Forestry Department of FAO has always paid particular attention to the problems of arid lands. A number of problems have been studied by the regional forestry subcommissions (Asia and the Pacific, the Near East and Latin America, and the joint Subcommission on Mediterranean problems). The Forestry Commission for Africa devoted special attention to aridity problems south of the Sahara.

Training courses under the topics of watershed

management, sand-dune fixation, shelter-belts and afforestation were organized in Lebanon, Denmark, and India. A training course on fuelwood for rural women in Africa was held in Mali and two national training courses on sand-dune fixation and afforestation in arid zones were held in Senegal and Somalia in 1981 and 1982.

Several technical missions have been organized in Africa. Three missions dealt mainly with shelter-belts, sand-dune fixation, tree acclimatization, and the establishment of research stations.

Programming missions have been carried out in Morocco, Ethiopia, Cape Verde, the Seychelles, Algeria, and Egypt to develop projects with particular emphasis on arid-zone forestry. Assistance has been given to the African Greenbelt projects in Sudan and Tunisia. Publications are under preparation on shelter-belt plantation and the maintenance and utilization of fodder trees and shrubs in dry-land forestry. A manual on Management Techniques for Dry-Land Forestry for Energy Production is also being prepared.

Much of FAO's recent work on forestry has been of considerable influence in drawing attention to and analysing the fuelwood crisis. Its activities in this regard are now concentrated in the new programme on forestry for rural development. A report on Wood Energy and Rural Communities was prepared for the Eighth World Forestry Congress in 1978. Regional meetings on fuelwood have been co-sponsored with the United Nations Economic Commission for Latin America (ECLA) and ESCAP. A series of meetings, sponsored jointly with the Swedish International Development Agency (SIDA), identified the activities required to meet rural fuelwood needs and needs for other local forest products. This resulted in the establishment in 1979 of the SIDA-funded Forestry for Local Community Development Programme.

More recently a programme on Forestry and Rural Energy was prepared with the initial support of the Government of the Netherlands. It is expected to become a multi-donor programme which will enable FAO to mobilize greater resources applicable in fuelwood-deficit situations. National production and trade data on fuelwood are assembled and disseminated. Information is provided on fast-growing species suitable for energy production. Guidelines on charcoal production, wood-based power installations, logging, and transport equipment are in preparation. Studies are under way of the factors affecting the rural use of fuelwood.

FAO is executing about 40 national and regional technical assistance projects concerned with fuelwood or charcoal. These deal with the various separate phases of production and utilization such as fuelwood plantations, charcoal production, utilization surveys, the improvement of wood-burning stoves, industrial-energy production, and general forest-sector planning. Most projects also cover social and environmental aspects. Two regional projects and a training centre for Africa on fuelwood and charcoal production are being prepared.

4. Conclusions

The responsibility for co-ordination and integration of the many activities of FAO in the area of desertification has been given to the Interdepartmental Working Group on Environment and Energy. FAO is convinced that successful programmes in desertification must be of an integrated and inter-disciplinary nature and fall within an overall framework of rural development.

FAO also believes that the design and execution of projects in this field must be accomplished by maximum participation from the inhabitants of the area

affected. Training at all levels and the building of strong institutional capabilities are also essential to the long-term success of desertification activities.

Finally, an important requisite for the success of anti-desertification activities is a clear understanding of the ecological system and prevailing social factors in which the activity is to be carried out. Too often these factors are not given sufficient consideration in project formulation, which, invariably leads to difficulties in project implementation.

WFP

The World Food Programme's "Food for Work" programme has been in operation for 19 years. Nearly \$6,000 million worth of food aid has been distributed by the Programme as incentive for the implementation of development projects. Just over half of this amount has been used for land development, irrigation, reforestation, resettlement of people from overpopulated areas, and rural development generally.

Food for increasing agricultural production is given in two ways: as part payment of wages to workers or as encouragement to volunteers in self-help schemes, compensating them for time which they might have used for working on their own land or on other income-earning activities. Food for work has a strong appeal to poor people who are either unemployed or who have only seasonal employment.

Food for work provides an extra resource which can enable a government to undertake a development project which it would otherwise be unable to afford. In the 10 years since the Stockholm Conference on the Human Environment, WFP's help has often meant the difference between a development project remaining on paper or being implemented with the genuine participation of the local population in poor rural areas. Examples of the success of the "Food for Work" programme are many.

On the Mediterranean

coast of Egypt from Alexandria to the Libyan border there is a belt of arid land extending for about 480 kilometres. This semi-desert covers about 1.2 million hectares, most of it rough pasture, with an annual rainfall of between 100 and 150 millimetres near the coast, but decreasing sharply inland. The inhabitants of the area, estimated at about 130,000, are mainly nomads and semi-nomads who live largely by rearing sheep and goats. During the last two decades the Egyptian Government has paid particular attention to the economic and social development of this area, with its peculiar natural and sociological conditions.

The country has been granted some \$17.8 million worth of WFP food aid to encourage these people to undertake, on a self-help basis, the clearing of the ancient Roman cisterns, the building of individual reservoirs which are the only sources of water supply in the zone, the building of small dikes to divert rainwater into the reservoirs, the construction of houses, and the planting of orchards. This, it is hoped, will encourage the Bedouin of the region to change their way of life gradually from nomadic to semi-nomadic and to increase agricultural production in the area.

In Ethiopia the severe and prolonged droughts in 1972-73 brought famine to parts of Wollo and Tigray provinces and, partly because of the inaccessibility of much of the stricken area, perhaps as many as 200,000 people lost their lives.

The disaster was not only caused by drought; poor land use, overgrazing and the lack of any attempt to halt erosion were also determining factors. The Government initiated a series of activities aimed at combating soil erosion, increasing moisture retention, restoring the forest cover and producing fodder for livestock.

The World Food Programme's food for work gave a strong incentive for people to participate in these activities. Moreover, the gradual replacing of free relief handouts by food which had been earned helped to restore morale and pride among people who had become dependent on charity. The results have been dramatic. Since the closing of large areas to cattle grazing and the planting of thousands of hectares with trees, the vegetation cover has recovered tremendously.

The Northwest Frontier Province is one of the least developed regions of Pakistan. Because of its rugged terrain, communications are difficult and arable land is limited. Seventeen per cent of its total area is under forest, but with growing demands for timber and wood and in the absence of significant reforestation and watershed-protection programmes, the local ecology has deteriorated, with serious disturbance of the watersheds, accelerated soil erosion and loss of productive top soil. Excessive grazing by goats, sheep and cattle has been responsible for destroying much of the protective vegetation.

Over the past five years, however, some \$US 8 million worth of food aid has helped the Government to mobilize 200,000 workers in this traditionally food-deficit area, who have planted over 30,000 hectares of barren land with trees. They have also built 35 kilometres of roads and 436 kilometres of inspection paths. There has been significant improvement in the vegetation cover where forests have been closed to grazing, and there has been a 50 to 60 per cent increase in fodder and food crops as a result of improved cultivation practices. Another goal achieved through the incentive of food aid has been the planting by small farmers of 1.4 million fruit and nut trees on steep slopes which were being unsuitably used for crop cultivation. The WFP food parcels compensate the farmers for their immediate loss of crop production and when the trees begin to yield

the farmers' incomes are substantially increased.

The Programme's policy of linking aid with specific development projects, especially food for work with self-help programmes, has been described as "an unbeatable combination". It gives governments the necessary key to involving local people in depressed rural areas in work which will benefit themselves and the environment.

ILO

The ILO's Special Public Work Programme has now been in operation since 1979 and has built up a considerable store of experience. Within the ILO's Employment and Development Department this programme is particularly concerned with direct job creation in the poorest rural areas of the Least Developed Countries (LDCs) and other developing countries, through

the construction of a wide range of low-cost rural infrastructures. To date the ILO is involved in the technical and financial management of thirteen labour-intensive Special Public Works Programmes. In seven of these programmes, now well under way, in Burundi, Cape Verde, India, Mali, Rwanda, Tanzania and Upper Volta, there are substantial project components where desertification control is an important objective. These

include afforestation (11,390 ha), erosion (21,620 ha), construction of irrigation terraces (615 ha), soil and water conservation (1,140 ha), woodlots (160 ha), and fire breaks (140 ha). Expanded programmes in Burundi and Rwanda provide for the continuation of these activities through 1986.

Other ILO activities include a planned seminar on fuelwood and charcoal which was scheduled to take place in early 1983 in Thailand.

NEWS FROM GOVERNMENTS

NIGERIA

All areas of Nigeria which lie to the north of about latitude 12°N are regarded as arid and easily prone to desertification. The zone covers an area of about 125,000 square kilometres. The role that forestry could play in improving the environment in these arid lands has long been recognized. In pursuance of the Federal Government's interest in and commitment to combating desertification in the country, the National Committee on Arid Zone Afforestation was set up in 1977 and given the responsibility of formulating, monitoring and co-ordinating the execution of a tree-planting programme in the arid zone.

Since the inception of the programme, a total of 57 nurseries have been established by the National Committee and about an equal number of nurseries by the States Forestry Division. Over 16 million seedlings were being produced each year in these nurseries, although the current economic depression reduced the seedling production considerably in 1982. Twenty-four boreholes had been provided in the nursery sites where water was an important constraint on raising seedlings. Ten large fruit-tree nurseries were also established in order to

encourage local people to establish orchards.

Establishing communal and private plantations is highly encouraged by the provision of seedlings, cattle-fencing wire and treated fencing posts free to anyone who shows genuine interest in wood-lot establishment. Over 3,000 hectares of plantations have been established so far.

On the extension side, several thousand posters, leaflets, handbills and flip charts were produced in English and four other Nigerian languages and distributed. Publicity Land-Rovers equipped with cinema facilities were also provided for the arid-zone states.

USA

In response to widespread interest in problems of rangeland depletion and revegetation, a meeting was held on 21 December 1982 in Washington, D.C., to identify issues that might be addressed in a report of the Board on Science and Technology for International Development (BOSTID), Office of International Affairs, National Research Council.

Participants in the meeting included individuals from the US Forest Service, AID, and Native Plants, Salt Lake City, Utah. A study plan was developed for submission to AID.

Overgrazing, mis-management of livestock, brush and tree removal for fuelwood, and uncontrolled burning, coupled with natural climatic fluctuations, have accelerated processes of desertification in dry zones of developing countries. The causes of this process are well documented; however, solutions involve not only the application of science but the determination of individuals and institutions to carry out long-term land-rehabilitation projects.

One solution presented at the meeting was to rely solely on indigenous groups to manage their own rangelands. However, it was observed that the potential profit and status to be derived from owning a large herd had encouraged pastoral groups to increase their herds or alter their relationship with the ecosystem in ways that deplete range resources. It was also argued that massive revegetation programmes might exacerbate this trend through temporary dislocation of herds and people. Therefore, a rational examination of applicable scientific options in a variety of social and cultural environments would help to alert project planners to the need to take a wider view of potential project impact.

ZIMBABWE

In Zimbabwe, the first Saturday of December each year has been declared National Tree Planting Day. It started as a symbolic gesture but has now become a

"working day". Government ministers, officials, and the masses join together to plant wood-lots of four to ten hectares.

A programme of rural afforestation is in process of being launched by the Forestry Commission. This is necessitated by the fact that the indigenous forests are unable to meet the present and future demand for fuelwood. The primary objectives of tree planting are

- to conserve natural woodlands and forests by providing alternative wood resources; and
- to improve the physical environment.

The problems encountered in this programme include lack of fencing material.

Within the programme a department has been set up to increase environmental awareness among the rural population. While considerable progress has been made in bringing about some awareness and in mobilizing the general masses, many problems continue to be encountered. The most pressing is that of establishing mobile training units to serve Zimbabwe's rural population, which constitutes 80 per cent of the entire population. Zimbabwe is currently investigating possible financial assistance

from the international community to tackle this problem.

Fuelwood accounts for 85 per cent of the current energy consumption in rural areas. The rural afforestation

programme alone, no matter how successful, cannot cope with such a large demand; there is need to introduce alternative sources of energy. In this connexion the Government has initiated

several programmes. The Natural Resources Board of Zimbabwe promotes competitions for simple alternatives to fuelwood: solar-energy research is being carried out by the

University of Zimbabwe in conjunction with the Association for Appropriate Technology; wind power is being used in pumping water and the use of biogas is steadily being accepted.

BOOK REVIEWS

DESERTIFICATION AND DEVELOPMENT: DRYLAND ECOLOGY IN SOCIAL PERSPECTIVE

B. Spooner and H.S. Mann (eds.), Academic Press, 1982. 406 pp.

The United Nations Conference on Desertification, 1977, which followed the human tragedy of the Sahelian drought, has stimulated significant academic activity on the subject of desertification control. Among the many books and publications which have appeared in recent years is *Desertification and Development: Dry-land Ecology in Social Perspective*. The book takes a new approach by focusing on human factors as the pivotal force in all aspects related to desertification. As stated by Dr. S. Swaminathar, in his foreword to the book, we know less about human behaviour and perception than about the natural processes of desertification. Consequently, we are less capable of organizing human activity towards achieving planned objectives. The publication of this book coincides with national, regional, and international efforts to assess the progress since 1977 in the implementation of the Plan of Action to Combat Desertification. The book assumes importance in the context of what has happened and what has not happened since 1977.

The United Nations system as a whole, through the efforts of the Administrative Committee on Co-ordination (ACC) identified major constraints which have

retarded the effective implementation of the PACD. The book provides insights and some remedies for some of these maladies.

The eighteen chapters are appropriately divided into two major parts, one with a global perspective and the other dealing with regional programmes. Twenty authors are listed as contributors, and many of them are recognized world authorities on their subjects.

The first section of the book emphasizes the historical and political dimensions of world desertification. It also discusses many other topics, varying from the problem of determining optimal stocking capacities to the financing of anti-desertification measures.

The major part of the book, the second section, presents case studies which illustrate the major factors associated with desertification. The case studies, mostly from Iran and India, include research results and the work being carried out in some world arid-zone research centres. Also included are examples of how human organizational systems (such as land tenure) and socio-economic factors relate to the problem of desertification.

This is one of the many books on desertification published in recent years, but it merits special attention because of its unique human perspective on the problems of desertification and the means for its control.

DESERTIFICATION: HOW PEOPLE MAKE DESERTS, HOW PEOPLE CAN STOP AND WHY THEY DON'T

Allan Grainger

An Earthscan Paperback, 1982. 94pp.

Earthscan has published a report in paperback entitled

Desertification: how people make deserts, how people can stop and why they don't, by Allan Grainger. It reviews in general terms the causes of desertification, the circumstances surrounding the disastrous drought in the Sahel of 1968-1973 and the United Nations Conference on Desertification (UNCOD) in 1977. It then evaluates progress in the implementation of the Plan of Action to Combat Desertification approved at UNCOD and draws several striking conclusions.

According to the Earthscan report, Africa's Sahel region, despite a decade of development aid, is ripe for another disaster, similar to the one in 1973 which killed between 50,000 and 250,000 people and 3.5 million cattle. Herds approaching pre-drought levels are overgrazing the fragile rangelands; trees are being cut faster than they can regenerate; population is rising by 2.5 per cent a year; while cereals production increases by only 1 per cent.

The drought focused world attention on the precarious existence of arid-land dwellers. Developed nations formed the "Club du Sahel" to funnel money into the stricken region. The Sahel nations formed their own organization, CILSS, to prevent another such disaster.

Over the period 1975-1980, \$US 7.46 billion in aid was committed to the region. By 1979, per capita aid in the Sahel was \$US 40, while for Africa as a whole it was \$US 19. Both the Club and CILSS proclaimed that their main goal was food self-sufficiency for the region, but little of the aid has gone towards this goal.

Recently only 8 per cent of aid was being spent on rain-fed crops, 5 per cent went to livestock raising, and 1.4 per cent went to ecology/forestry projects. So the region's people, most of

whom make their livings in subsistence agriculture (89 per cent in Niger, 87 per cent in Mali), were getting little benefit from the money. The Club itself finds that reforestation rates are 50 times too slow.

The report claims that wealthy nations would rather spend money on roads, bridges, dams, and buildings. These may mean jobs for contractors and orders for equipment from back home. Such projects are easier to identify and keep tabs on. The affected governments are also happy to keep aid money, and especially food aid, in the cities, where the police, civil servants, and soldiers live. Farmers and pastoralists are politically the weakest citizens in arid lands, so desertification rarely becomes a "political" problem.

A major UN Conference on desertification in 1977 agreed on a precise plan of action, with national, regional, and international programmes. Although two-thirds of the world's nations suffer from desertification, very little has been done since then. In 1977, the UN set up a "Special Account" to combat desertification; but five years later only one contribution had come in— \$5,000 from Mexico.

Every year some 200,000 km² (80,000 square miles) of land— an area larger than Senegal— deteriorate to the point of zero economic return. UN Environment Programme Executive Director Mostafa Tolba said in 1982 that this rate was accelerating. Unless desertification can be halted by the year 2000, he warned, it would be out of control.

By 30 April 1983 the amount contributed to the Special Account totalled \$US 43,524. Contributions have been received from the following five Governments: Chile, Sudan, Mexico, Panama, and Sierra Leone. Brazil and Bangladesh have pledged unspecified amounts.

PHOTOGRAPHS FOR DESERTIFICATION CONTROL COVERS

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

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

Technical requirements

Photographs must be colour transparencies of subjects related directly to desertification: deserts, process of desertification, lands, 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 a 30 x 42 cm (12 x 17 1/2 in) 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.

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DESERTIFICATION CONTROL

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

Desertification Control

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 typewritten 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. Diapositive 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 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 50 reprints are provided to the authors.

