Man-made process

Chris Sherwell reports on a study of man's involvement in the spreading desert

HOWEVER discomfiting it is for Western man to learn that he wastefully squanders his resources, his lesson is not nearly as painful as the one being learned by his contemporary living in the arid zones of the underdeveloped world. For there, that most precious and finite of resources, the land itself, is actually being lost, and at an alarming rate.

Some wealthy countries experience the same problem. Fifty million of the 163 million acres managed by the United States Bureau of Land Management, for example, are in 'poor' or 'bad' condition. But the US has the wherewithal to combat the phenomenon: the causes of desertification are understood imperfectly, but well enough for something to be done.

The real problem is conjuring out of nothing the political will to implement a comprehensive plan that deals with the poor countries' marginal lands. It is a problem which will confront the massive UN Conference on Desertification starting at the end of this month in Nairobi, when just such a plan will be drawn up. As with past jamborees of this sort—on Water earlier this year, Human Settlements last year or the Environment in 1972—a flood of papers is besieging the conference. One of the more important was published last weekend by the Washington-based Worldwatch Institute*.

Entitled *Spreading Deserts—The Hand of Man*, it is, as its title suggests, unequivocal about causes and solutions. It calls desertification an ecological phenomenon but says it is a human problem. "People cause it, people suffer its consequences, and only people can reverse it." Governments may find it difficult to devote substantial resources to combating a "seemingly long term and nearly invisible problem like ecological deterioration", but the consequences of desertification—undernutrition and famine, unemployment and migration, deepening poverty and human desperation—are "neither distant nor invisible".

Some of the statistics cited in the study confirm the need for action. About 14% of the world's population—630 million people—live on arid or semi-arid lands. Of this number, some 12% live on lands already almost useless and face the loss of their livelihood.

The decline in the quality of the land has meant a decline in the quality of people's diet, chronic ill-health, swollen ranks of urban migrants and lost economic potential. Indeed, cumulative degradation of rangelands and non-irrigated farmlands in the arid zones has, according to the study, held their combined annual productivity "more than \$12 billion below its potential level"; of sixteen underdeveloped countries in the arid areas, for example, only two significantly increased their per capita grain output between 1950 and 1975.

This decline is more popularly portrayed in another way. Along the southern fringe of the Sahara alone, 650,000 km² of land once suitable for agriculture and grazing has been lost in the past 50 years. Some 100,000 ha of range and cropland are lost to desert each year along the Sahara's northern margins. Elsewhere—in the Middle East and in Western Asia—the process's hold is "particularly long-lived and advanced". It is also taking place, as the accompanying map shows, in many of the western hemisphere's drier regions.

However, although natural desert encroachment is a real enough threat in some areas, the process of desertification is more correctly one where human action causes the desert to spread. A product of land-use patterns as well as climatic fluctuations, desertification will occur where land is abused in arid and semi-arid zones regardless of the actual proximity of the climati-

cally-created deserts. The effects of severe and prolonged land abuse are, of course, intensified by extended droughts. But to review the current theories and knowledge on world climate, says the study, is not only to "sense the urgent need for research efforts" on climatic trends; it is also to "see without question that people and their livestock are helping to downgrade the carrying capacity of arid lands and to create new spots of desert".

Desertification is not new; what makes today's problem especially acute, says the study, is the scale of suffering when the rains fail, and the scale of destructive human pressures. Rudimentary modern medicine has helped produce the 3%-a-year increase in population prevailing in the areas, which means more people are reliant upon the pastures and croplands there. At the same time the modern political and social order has grown inimical to the existence of the desert dweller, restricting nomadic groups who are well-adjusted to a harsh environment and encouraging sedentary agriculture.

The results are all too obvious. More people with more herds cultivate more areas to feed more mouths. Soils deteriorate, yields decline, pastures disappear, grazing land grows more distant and land around more intensively used water holes perishes. People become a threat to themselves: what they do to ensure individual survival in the short term is detrimental to the society's long term survival. As the Worldwatch study sees it, social systems and ecosystems are on a collision course; populations in the arid areas have reached the ecological danger point.

The study is also clear about what needs to be done. For a start, herd

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*Eric Eckholm and Lester R. Brown, *Spreading Deserts—The Hand of Man* (Worldwatch Paper 13, Worldwatch Institute, Washington; August 1977).

sizes should be reduced. Livestock should be valued for its quality rather than its abundance. If animal numbers in the Sahel were maintained at half the 1971 level, with modern management techniques the region's output of meat and milk could be double that level. Farming in the sedentary zones should also be improved, to halt its spread onto pasturelands. Farmers need knowledge and equipment to grow sufficient food using the best lands without loss of fertility; back-up for subsistence farmers has hitherto been neglected in favour of cash crops, which have themselves exacerbated the lot of the rural poor.

In addition, couples must perceive the advantages of small families. Population growth, says the study, prohibits a return to the ecologically sustainable rotation systems, so new cropping systems, along with tree-planting programmes, are the only alternative. Also, to urge the resettling of nomads and the killing of goats is to oversimplify: a modernised version of the nomadic way of life may be necessary, with clan leaders, aided by specialised advice, regulating grazing and migration through large herding cooperatives.

A major goal of arid lands development, says the study, must be to prepare peoples and economies to live through the inevitable droughts without trauma. Protection against famine, it says, is not a simple technological problem. Its success depends on nothing less than "the broad shape of national development and the character of the prevailing socio-economic institutions".

Plainly the challenge is great. It is a challenge facing the UN Conference. If that fails, and past experience does not augur well, the people most affected will be left to face it alone. They have done so before. But their chances of successfully continuing to do so are not improving. □

Sudan scene

UNESCO map by P. Meigs

ICARDA gets down to business

THE International Centre for Agricultural Research in the Dry Areas (ICARDA), having shaken off its troubled origins, is poised to embark on an ambitious research programme under the guiding hand of Dr Harry S. Darling, now president of Wye College, who is preparing to move to Beirut as ICARDA's director general.

The most recent of the international agricultural research centres, ICARDA will focus on improving food production in areas with an annual precipitation of 300–800mm that is concentrated largely in the winter months. Its findings will affect a region extending from Morocco to Pakistan with crops covering some 70 million hectares in 20 countries.

ICARDA staff members like to say that the centre "was born running", because it absorbed some of the facilities and personnel of the Arid Lands Agricultural Development (ALAD) programme of the Ford Foundation. But it was soon faced with obstacles that brought it almost to a complete halt. After the decision to establish head offices in Beirut in Spring 1974, war broke out, and most of the staff scattered to Cairo, Aleppo and Damascus. Negotiations with Syria and Iran to obtain land for research stations were conducted chiefly by Canada's International Development Research Centre (IDRC), which had been appointed the executing agency for ICARDA; formal agreements were signed with Syria in June and with Iran in July last year. IDRC also reached an agreement with the Ford Foundation to insure that ALAD activities relevant to ICARDA's mandate, notably the collection, testing and exchange of plant genetic materials, were continued.

On top of its research on the region's crops, ICARDA has been designated as the world international centre for barley, lentils, and broad beans. Barley, one of the world's oldest crops, is particularly important in the region. But wheat is usually preferred because it has a higher gluten content and makes a more cohesive loaf of bread. Barley's two major advantages over wheat, however, should encourage its utilisation as human as well as animal food. One of these is that in regions with less than 500mm of annual rainfall it can outperform wheat; where rainfall is 375 mm or less, it is practically the only cultivable cereal. The other advantage, hinted at by current research, is that barley is susceptible to improvement, notably by an increase in content

of lysine, an essential amino acid that is absent or exists only in minimal amounts in most food grains.

At present, barley yields in the Middle East are very low, and four ALAD-ICARDA barley varieties introduced in nurseries in 1976 indicate that performances can be considerably improved. Research is under way to deal with problems of disease susceptibility, lack of winter hardiness, intolerance to high temperatures, and insects. These trials will be undertaken in the ICARDA stations near Aleppo and Tabriz.

The food-legume crops improvement programme also continued in 1976. It consisted mainly in breeding and distributing germ plasma of three major pulses: lentils, broad beans and chickpeas. The major emphasis is on the development of high-yield, stable varieties, and of lines suited to mechanised harvesting. There is a forage-crop improvement programme, and some of the ALAD research work in wheat, maize and grain sorghum is being continued; so is the evaluation of several hundred lines of triticale, a man-made hybrid of wheat and rye.

Next year, ICARDA is expected to expand its activities. These will include the study of environmental systems throughout the region, the establishment of principles on which to base the development of appropriate farming strategies, and research into socio-economic constraints that limit the actual and potential production of existing farming systems. Finally, a training programme to help apply research findings is being set up.

From its inception until the end of last year, ICARDA's total budget barely exceeded \$3 million. But now that 'running speed' is being resumed and total staffing has exceeded 50, more funds are required for operations and capital development. Interest in the programme is illustrated by the commitment for 1977 of a total of \$4 million, the major contributors being the USA with \$1 million, the IDRC and Canada with \$600,000, Iran and Saudi Arabia with \$500,000 each, and the World Bank and Australia with \$220,000 each. Estimated expenditures of \$4.85 million for 1978 and \$7.77 million for 1979 have been submitted to the Board of Trustees, which is made up of representatives of some of the region's governments, agricultural research centres and donor agencies.

Alexander Dorozynski