MICHIGAN STATE
UNIVERSITY

The African e-Journals Project has digitized full text of articles of eleven social science and humanities journals. This item is from the digital archive maintained by Michigan State University Library. Find more at:
http://digital.lib.msu.edu/projects/africanjournals/

Available through a partnership with

African e-Journals Project

Michigan State University
LIBRARIES

Scroll down to read the article.

Journal of Social Development in Africa (1996), 11, 2, 89-106

The Human Dimension of Desertification in the Drylands of Africa +

M B K DARKOH *

ABSTRACT

Desertification is land degradation in drylands. The United Nations Environment Programme estimates that one third of the drylands in Africa are affected by desertification at moderate or high degree and that 73 per cent of the total agriculturally used drylands are already degraded. While physical factors such as drought, desiccation and climate change can, and do, play a part, man however, is the primary agent of desertification. Man's role in causing desertification is revealed in the failure of his resource management practices. This paper emphasises that man's exploitative land use which serves as a *primum mobile* for desertification is itself a short-term response to socioeconomic and other pressures. The conclusion reached is that the fight against desertification can only succeed if the welfare of the people in the affected dryland area can be put at the centre of the development agenda and those adaptive strategies of their livelihood and production systems that confer drought resistance and/or lessen their susceptibility to drought and famine bolstered. Also, in an era of free trade and liberalisation, developed countries need to ensure that their policies help to alleviate instead of perpetuate poverty, and lead to the achievement of sustainable development and environmental protection within Africa.

Introduction

From all available accounts, the problem of desertification is serious and getting worse in the drylands of Africa. The extent of desertification as revealed by UNEP's 1991 assessment is alarming. About 61 per cent of the continent's rainfed croplands, 18 per cent of its irrigated lands and 74 per cent of its rangelands are

---

* The author was formerly Professor of Geography at Kenyatta University, Nairobi, Kenya. He is currently Professor and holds the chair of Geography at the University of Papua New Guinea. His contact address is: P O Box 320, University Post Office, NCD, Papua New Guinea, South Pacific. Fax: (675) 3267187, Telephone: (675) 3267610.

+ **Acknowledgement**

This is a modified version of a keynote paper presented at the National Workshop to Combat Desertification in Namibia at Windhoek Namibia, July 4-7, 1994 at the invitation of the Desert Research Foundation of Namibia and Namibia's Ministry of Environment and Tourism. The original paper was entitled "Desertification in Africa with special reference to Eastern and Southern Africa." The author is indebted to the Desert Research Foundation of Namibia, especially Dr Mary Seely, Kathy Jacobson and Stephanie Wolfers.

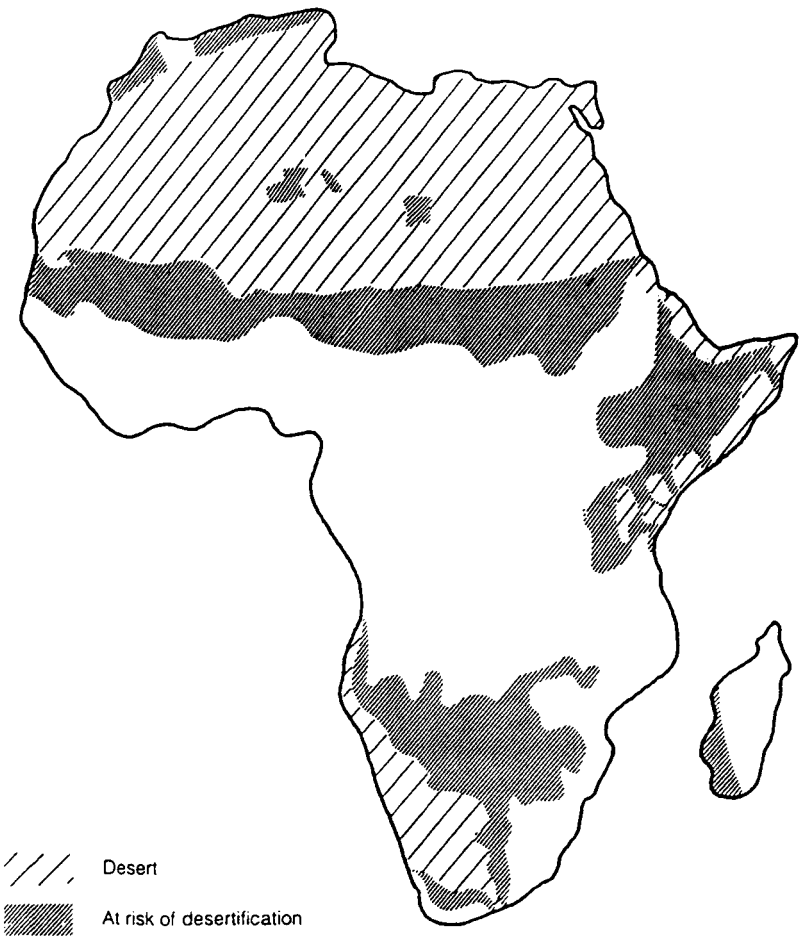


Figure 1 AFRICA: Areas at Risk of Desertification

affected by desertification at moderate or high degree (UNEP, 1992a). Nearly three-quarters of the total agriculturally used drylands in Africa have lost at least 25 per cent or more of their productivity during the last few decades. And, the process is still going on. The areas at risk are the Sudano-Sahel, Mediterranean Africa, and Africa south of the Sudano-Sahel, particularly East Africa and the Kalahari region countries (Fig 1). In 1986, for example, nearly 170 million rural people were affected directly by at least moderate and severe desertification in the three principal regions of Africa's drylands (Tolba, 1986). This is equivalent to one-third of the total population on the continent in that year.

Meanings

This is not the place to reopen the debate on what is desertification. UNCED's 1992 definition of *desertification* as land degradation in drylands resulting from various factors including climatic variations and human activities, is currently the most widely accepted definition. Some studies have distinguished three types of desertification: drought, desiccation and land degradation (IMPACT Team, 1992).

Desertification, however, should not be confused with drought or dessication. Drought refers to short-term (1- to 2-year) deficits in rainfall which can generally be accommodated by existing ecological, technical and social strategies. Dessication refers to longer-term (decadal-order) deficits in rainfall that seriously disrupt ecological and social patterns and require a national and global response.

Drought and dessication do not automatically give rise to desertification. Much depends upon resource management practices: when human mismanagement of land weakens the natural system, drought and dessication often lead to desertification.

Land degradation is a slow decline in a land's productivity, for whatever reason. *Human activities* include overcultivation, overgrazing, deforestation, poor irrigation practices and any other inappropriate land use and human management of ecosystems.

Drought and Dessication

Every year, drought occurs in some part or other of the arid and semi-arid lands (ASAL) of Africa. In fact, major droughts regularly affect large portions of these drylands. Examples include the most severe drought in recorded history in 1968-73 and other droughts in 1982-85 and 1990-92.

In the Sahel, during the past three decades (1961-1991) annual rainfall has been between 20 and 40 per cent less than it was during the three previous decades. Over the last 25 years, the Sahel has undergone severe desiccation and increasing deterioration of the soil quality and vegetative cover (Nicholson, 1978; UNSO, 1992).

Climate Change and Desertification

Recent studies have pointed out that within contiguous Africa, there has been a net shift of land area towards aridity, especially toward hyper-aridity and a consequent net-loss of semi-arid and dry-sub humid areas. The most recent calculations made by the Climate Research Unit of the University of East Anglia (Hulme & Kelly, 1993: Kelly & Hulme 1993: Hulme, et al, 1992) show that, overall, the ASAL areas have decreased from 52.4 per cent of mainland Africa to 51.5 per cent between 1961 and 1990 – a reduction of 25 million hectares. The amount of hyper-arid land, however, has increased by more than 60 million hectares. This of course, is not tantamount to the mistaken observation by some researchers that the desert is advancing, which now has been disproved by Hellden (1991) and Tucker, et al, 1991. The findings further show that not only can a considerable amount of the year-to-year variation in the areal extent of the Sahara be statistically explained by the rainfall data, but that there is a residual component of some 41,000 km2 per annum which is not directly related to annual rainfall variations and which could possibly be explained by the cumulative impact of a series of dry years or deterioration in the vegetation cover caused by human activities.

Climate change clearly is occurring and contributing to desertification and land degradation in Africa. What is not clear, however, is how much of the desertification can be blamed on natural climate change and how much on human activity. Separating the relative roles of these two forces, so that the most appropriate response can be applied, is a pressing challenge.

Human Causes

According to UNEP (1992), the anthropogenic causes of desertification are overcultivation, overgrazing, deforestation and poor irrigation practices. These factors are fuelled by local forces such as poverty, population pressure, and poorly conceived national policies and external forces such as protectionism and import restrictions in developed countries and the state of the world economy. The process may be aggravated by climate change, especially prolonged drought and dessication (Kelly & Hulme, 1993; Hulme & Kelly 1993; Williams & Balling, 1994).

Desertification, however, is not a mysterious or detached technological problem; it is the ecological manifestation of a resource management system gone awry – a process that fails to provide people with basic needs and secure livelihoods and thus compels them to abuse the land in order to survive.

Overcultivation

In sub-Saharan Africa, the main causes of land degradation or desertification are well-known: overcultivation, overgrazing and deforestation; but while the reasons are known, they are not so easily corrected. Efforts to do so must contend with severe demographic, economic and social constraints.

One key reason is that there are many more people to feed. In most of sub-Saharan Africa, populations are increasing by 2.7 to 3.3 per cent a year, but farming methods and land use have not improved. Since the beginning of the century the population of the region has more than quadrupled (see Fig 2) and in many areas pressures on available land have reached disaster levels.

Agriculture is the economic backbone of sub-Saharan Africa and subsistence rainfed farming and livestock production provide the livelihood of most of its people. However, food production is often constrained by limited arable land. Some estimates say that as much as 80 per cent have serious fertility limitations (World Bank, 1989).

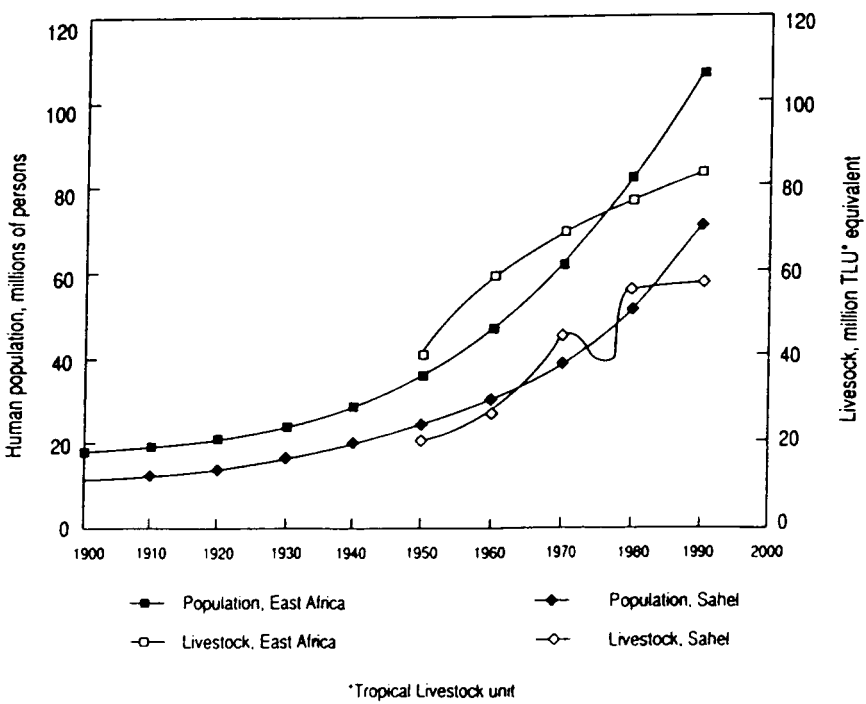
Demographic factors – population growth and distribution – play a key role in land degradation in the region. Many areas are subject to intensive population pressures, while others are only sparsely settled. But low population densities are usually found in the arid and hyper-arid zones, high mountain areas, and moist tropical forests – areas with low potential for agricultural production – particularly in view of the low technological level and limited financial means of the subsistence farmer. The existence of disease vectors such as the tsetse fly and malaria mosquito also effectively constrain human habitation of large areas even where other conditions are good.

The result is often concentration of a large part of the population in the limited proportion of land suitable for crop production. When population size is small and stable this arrangement may work reasonably well. But in recent decades, unprecedented increases in population size coupled with technologies in farming that in most cases have shown little change, and agricultural policies that are encouraging farmers to grow higher priced non-food cash crops, have led to excessive pressures in arable land and to spill-over into increasingly marginal areas – pastures, forest lands and steep slopes, applying excessive human pressures to fragile ecosystems and leading to accelerated land degradation.

In East Africa where the phenomenon of migration from overpopulated areas of high agricultural potential to underpopulated marginal areas of low potential has become widespread, the marginal dry farming lands are under severe threat of desertification (Darkoh, 1982a, 1994). These marginal lands are recipients of landhungry migrants in search of farming land and employment from adjoining high potential areas. It is these immigrants who often cause land pressure. They also import inappropriate technologies which disrupt existing indigenous management and coping systems.

Fig. 2

Evolution of human population and livestock in Sub-Sahara Africa between 1900 and 1990 (Le Houérou, 1991)



Source: UNEP (1992)

The environmental situation in these drier lands are further worsened by other human interventions, notably the introduction of large scale donor – and government sponsored development schemes – such as ranches, irrigation projects, settlement schemes, game parks and forest reserves.

These fragile marginal lands do not have the capability to support the overspill of population from the high potential areas. Neither can they support large-scale farming for non-food cash crops. Their real potential lies in livestock production and wildlife management. The number of farmers they can support is much smaller than the number of pastoralists. Pastoralism tends to protect the soil and water resources better than cropping and it also allows wildlife to continue using the land. Their conversion into 'bread baskets' can only be accomplished with attendant risks and problems. Arable production in these arid lands carries with it crop failure risks and dangers of land degradation and marginalisation of pastoralists.

With rapid population growth and use of increasing amounts of land for cash cropping rather than subsistence agriculture, the subsistence farmers in arid and semi-arid lands are putting more pressure on the remaining arable land. In traditional shifting agriculture, exhausted land was left idle for years to regain its productivity. This is often no longer possible. Now there are too many people and not enough land to afford those long fallows which are being progressively diminished with often disastrous results for land productivity. In the Niger, for example, the mean fallow period has fallen from seven years in 1960 to three years in 1986 (UNSO, 1992). In Central Sudan, farmers report a virtual elimination of fallowing (UNSO, 1992).

Mostafa Kamal Tolba, former Executive Director of UNEP, has estimated that the productivity of the savannas where most of Africa's population lives has dropped by 35 per cent largely because of overcultivation and bad land management (Tolba, 1989). There is good reason to believe that the proportion is particularly high in some densely populated countries such as Ethiopia, Rwanda and Burundi. The situation is especially serious with respect to rainfed croplands which provide the livelihood of most of the people and tend to be the most vulnerable to population and other pressures.

The results of all this are seen throughout the region. In northern Ethiopia, subsistence farmers are trying to cultivate land that cannot support them adequately even when there is enough rain. In the meantime, some 40,000 km2 of farmland has been almost irreversibly degraded into what could be described as stony desert (Milas & Asrat, 1985). In Rwanda, population pressure and overcrowding in the country's limited agricultural land have reached such proportions that in 1990 there were 6.2 Rwandese for every cultivable hectare (Sai, 1994). As a result of this, landholdings have become so fragmented that families up to eight people were living off plots as small as 0.13 hectares in some prefectures. In Gogoland in central

Tanzania, human habitation and population pressure have led to the virtual disappearance of uninhabited areas of bush. The peasants have been driven from the exhausted flat lands, and are now cultivating on the rocky hillsides and upper pediments. Insufficient fallow time between cultivation periods has led to the impoverishment of land while cattle grazing has removed the last vestiges of vegetation cover (Darkoh, 1982b). And, in the Save catchment in the communal areas of Zimbabwe, mounting population pressure is prompting small-scale farmers to extend cultivation from valley slopes right to the adjoining streams (Darkoh, 1985). Everywhere, the results are familiar – severe erosion, rapid loss of productivity and sedimentation of vital water storage facilities. Where drought has intervened, it has brought social and ecological disaster.

UNEP's (1984) general assessment of progress in the implementation of the Plan of Action to combat Desertification predicts that deterioration of rainfed croplands will worsen over the next fifteen years. This problem is already particularly serious in the Sudano-Sahel and existing high rates of population growth are rapidly increasing the pressures on rainfed croplands throughout the region.

A caveat must be introduced at this stage, however. Though predominant, population as a factor creating vicious cycles of land degradation and impaired productivity, does not act alone (UNSO, 1992; Darkoh, 1994). It acts under the stimulus of other factors which include food security, poverty (which translates into inability to invest in land management), systems of land ownership and tenure, land shortages and landlessness. Other forces driving population in sub-Saharan Africa are national policies which put a premium on the development of cash crops, sedentarisation of nomads, villagisation, low prices for agricultural commodities and nationalisation of land by the State. Furthermore, caution is needed in making hasty generalisations on the effects of population growth and density since African drylands have been shown to offer good examples in recent years of, *"more people, less erosion"* (Tiffen, et al; Darkoh, 1994).

The Vanishing Rangelands

Rangelands in eastern and southern Africa are fast disappearing. Population pressures in rainfed croplands and increasing encroachment of cultivators on adjacent rangelands are diminishing the areas of available grazing, thus intensifying overstocking and overgrazing.

Traditional systems of pastoral resource management have been undermined by the processes associated with colonialism, modernisation and population growth. These same factors have disrupted the mobility and seasonal grazing patterns of nomads and their herds and reduced the area they formerly occupied. Denied

access to traditional dry-season grazing reserves, herdsmen have been pushed onto marginal lands. Overuse of such restricted marginal areas has eroded the basis for their livelihood and initiated a downward spiral of marginalisation, impoverishment and environmental degradation.

In recent years, large sections of the nomadic livestock economy in sub-Saharan Africa have experienced rapid commercialisation. The main causes are the explosive growth in the size of the urban population and an associated steady increase in the levels of meat consumption, coupled with new opportunities for export offered by more developed and affluent neighbouring, as well as distant, countries.

The combination of the dynamic new market forces and the reduced distances of pastoral migration because of the factors outlined above and also their more settled lifestyle and economy, have initiated a process of structural change in the course of the past three decades throughout the region (Janzen, 1991). In almost every country, this process is now gathering further momentum and increasing its scope, due in no small part, to the State's direct and indirect development measures being offered to nomadic herdsmen to adopt a sedentary way of life. The most serious repercussion of such commercialisation and sedentarisation policies is the increased pressure on natural resources in many areas. The main causes are the reduced distances which livestock now roam, and the heavy concentrations of men and animals around new high capacity watering places. Also, sedentarisation or villagisation without improved lifestyles and management practices have done little to prevent land degradation in the region.

Like the population factor, however, the connection between land degradation and pastoralism is seldom direct. Except in limited areas where populations are high among settled communities, and where continuous expansion of arable land, wildlife sanctuaries and forest reserves restrict available grazing land, grazing has probably inflicted much less damage than drought and dessication in the rangelands (UNSO, 1992). UNSO (ibid) further notes that the problem is not just one of too many animals relative to available grazing areas, but that the state of the rangeland ecosystems in arid and semi-arid areas has more to do with the highly irregular supply of rainfall than anything else.

Poor Irrigation Practices

Bad irrigation is turning large areas of precious irrigated farmlands into wet, salty wasteland, causing declining yields and often total loss of productivity. In the Sahel, and to a limited extent, northern Kenya and parts of Zimbabwe, for instance, as much land is being lost as is being brought under irrigation.

The problem is usually inadequate drainage. If irrigation water cannot drain-off, the soil becomes waterlogged and crops cannot grow in permanently saturated soil. Salinization and alkalinization also are serious problems in some irrigated areas in the Sahel, eastern and southern Africa.

Some of the worst land degradation problems associated with irrigation are found in the drylands of East Africa. For example, in Turkana in northern Kenya, many irrigation clusters (largely donor-funded) have become population centres. There, farmers often are outnumbered by peripheral dwellers – those seeking work and those seeking to exchange livestock for grain. Adverse environmental impacts include deforestation, soil pulverisation and capping, and water contamination (Darkoh, 1992).

Deforestation

On much of the ASAL, forests are being cut much faster than they are being replaced, and consequently are rapidly diminishing. Forest cover is decreasing rapidly, due mainly to clearing for settlement, crops, extraction of timber for commercial and domestic use and removal for fuel and charcoal production around settlement nodes.

For example, fuelwood is a critical resource for the poor, who compete for it with richer users who demand charcoal-cooked meat, baked bread, beer and the like, all of which are dependent on wood. However, while the incidence of deforestation resulting from fuelwood requirements can have some serious effects, recent research has revealed that these effects tend to be generally localised. Most rural people only collect dead wood of selected species. Except in very densely populated areas, fuelwood is generally not a big problem in the rural areas (UNSO, 1992). The story, however, is different near major cities and refugee settlements.

In the Sahel, demand for fuelwood has created wide swathes of near or total deforestation around some major cities, including Dakar and Khartoum. These two towns now receive their charcoal supplies from a distance of over 500km. In northern Ethiopia, some 40 per cent of the land was covered with forest at the beginning of this century; now it is less than 4 per cent (Milas & Asrat, 1985). The proportion of forest lands in Madagascar has fallen from 80 to 16 per cent (World Bank, 1989). What was formerly prime forest has been reduced by centuries-old practice of *tavy* (shifting cultivation) to the degraded *savoka*, a Malagasy word, describing the second-growth stock, characterised more by its low qualitative than quantitative value (Darkoh, 1989).

Deforestation around refugee settlements is a common phenomenon in the arid and semi-arid lands. The UNHCR found that, based on 1989 estimates, roughly 11

million trees were cut for shelter needs during the initial period of refugee influxes in Africa (Cardy, 1994). This represents the deforestation of over 12,000 hectares. In addition, about 4 million tons of fuelwood were consumed by refugees in Africa. The factors affecting the extent of the environmental impact of refugees include the numbers of the refugees, the conditions under which they are settled, the available infrastructure and employment opportunities (Black, 1993).

In Mozambique, forests are being overexploited to provide much needed foreign exchange. In several areas, extensive *agrodeforestation*, in the form of elimination of trees from existing agricultural landscapes to make room for mechanised cultivation of monocultural crops such as sugar cane, tobacco, rice, ground nuts, pineapple, tea, coffee, etc, is taking place. In Tanzania, Zimbabwe and Mozambique, large areas have been cleared for planting tobacco and even larger areas for fuel with which to cure the tobacco crop.

Soil Erosion

Of the four main causes of desertification, three – deforestation, overcultivation and overgrazing – pose the principal threat to the livelihood of the peoples of the African drylands. All causes, however, lead to soil erosion, and the rates of soil erosion in the region are amongst the highest in the world.

The continent's precious topsoils are being lost at incredible rates. Data provided by GLASOD (UNEP, 1992b) shows that some 332.3 million hectares or 27.6 per cent of the susceptible drylands of Africa are already affected by soil degradation at different degrees. Ethiopia for instance has an overall average annual rate of soil loss at 830 metric tons per km2, but cultivated highlands feature rates of at least 2000 tons per km2 (Milas & Asrat, 1986). In some parts of the Sudano-Sahel, local soil erosion figures as high as 450 tons per km2 per year are not uncommon. In Madagascar over 250 metric tons of soil per hectare are lost annually to soil erosion by gullying and rill-wash. Ethiopia, Kenya, and Tanzania alone may be losing as much topsoil per year as the whole of North America.

A common thread is deforestation. Once the forest cover is gone, these often fragile soils become vulnerable to rapid destruction by wind and water.

In summary, the human causes of desertification, while not fully understood, are, nevertheless, better known than the physical causes. Changing paradigms and varying views seem to be working against a consensus of opinion. While some authors have focused on the more immediate causes, others have concentrated on the deeper root causes. The range of explanations proposed have depended on whether one or the other has been emphasised.

While the factors behind desertification have been studied extensively, one dimension that has escaped attention is the spatial scales (Lambin, 1993). Much of the controversy surrounding the subject relates to the discrepancy between cause and effect: the different spatial scales at which the effects are perceived and the causes (responsible for the threats) are unfolding. Desertification is best detected and probably only conceived on a continental and sub-continental scale – the macromanagement level. Yet, it is a product of innumerable landuse decisions at the local scale – the micromanagement level.

A large part of the ambiguity on the causes of desertification stems from the fact that different casual processes operate together at a particular place with different time and spatial scales: long-term climatic changes at a global scale, short-term climatic variability at a regional scale and short-term human action at the local level.

Economic and Social Cost of Desertification and Drought

While the causes of desertification in Africa are not fully understood, it is even more difficult to assess its impact. Part of the problem is the lack of reliable data. Few African nations have accurate statistics on most parameters of desertification. Part of the problem is that researchers give little attention to the socioeconomic indicators of desertification. To date, for example, there are no studies that have assessed and monitored human reactions to desertification. Moreover, it is difficult to separate the effect of changes caused by desertification from those of other events and policies.

Most assessments of changes wrought by desertification have been made at the continental, regional and national spatial scales. Data obtained at such high levels of areal aggregation are of dubious accuracy. Few are based on thorough field surveys and their categories such as 'moderate', 'severe' and 'very severe' are not quantitative in the real sense. Most country reports contain such estimates. We are still a long way from finding suitable methodologies for accurately determining or assessing the socioeconomic impact and human dimensions of desertification. Researchers need to give more attention to these aspects.

The results of desertification in Africa include declining crop yields, lowered returns on the efforts and investments of hundreds of millions of already poor dryland peasants and herdsmen and those of the urban dwellers who form part of the same economy. Prolonged periods of drought under these circumstances lead to hunger, malnutrition and starvation, high infant mortality and accelerated rural migration. Loss of biodiversity in cultivated plants and domesticated animals, and in wild foods so important when agriculture fails at times of drought, is a direct threat to food security. Agrodeforestation is particularly a serious threat to

biodiversity preservation and sustainable development in the drylands of Africa.

The great drought in the Sudano-Sahel region of the early 1970s claimed over 250,000 lives and several millions of cattle and other livestock. Millions more were reduced to destitution, which provoked mass migrations to urban areas in search of work and relief.

The 1982-85 drought affected the entire sub-Saharan region. The worst affected country was Ethiopia where an estimated 1 million people starved to death from the combined effects of drought and civil war. In 1991-1992, a region of nearly 700 million hectares in Southern Africa was struck by drought, affecting a total of 130 million people. The size and scale of the drought threatened the social fabric and fragile economies of several of those countries.

Drought has accelerated the migration of farmers from the countryside to the cities, putting additional pressure on basic city services such as water and sanitation. Water-dependent factories and mines shut down, throwing thousands out of work. At the height of the 1992 drought, Bulawayo almost ran out of water.

The agro-economic effects of drought have included lower and variable per hectare yields, reduction in acreage of cropped lands, less high-yield flood cropping, diminished rangeland productivity, changes in pastures and in the composition and size of herds, and lower prices as herdsmen flood the market with sickly cattle seeking to sell them before they die. The effects of dessication on croplands and rangelands have been much more serious than those of droughts. In the Sahel, many peasant and pastoral communities have, *"simply ceased to exist after the dessication of the last 20 years"* (UNSO, 1992).

Unfortunately, there are no exact and reliable figures available to quantify the economic costs of desertification either for individual farmers or society as a whole. However, some partial estimates have been made. One unpublished World Bank study estimates that the equivalent of 20 per cent of the annual GDP of one Sahelian country could be lost through capital depletion of natural resources (Cardy, 1993). In Namibia, the monetised costs of land degradation at household level aggregated over a standard period for a communal area (Uukwalundi) have been estimated at US$2,065-2,565 (Quan, et al, 1994). In Madagascar, average loss from soil erosion is estimated at U$100-150 per hectare each year, the equivalent of 70 to 100 per cent of the average Malagasy's annual income (Randrianarijaoa, 1983). In Ethiopia, soil erosion is estimated to result in annual loss in grain production of 1 million tons (Miias & Asrat, 1985). In Zimbabwe, the financial cost of erosion on a per hectare per year basis varies from US$20 to US$50 on arable land, to US$80 on grazing land (Ponzi, 1993). Throughout the ASAL, soil erosion is destroying the productivity of the land. This is especially worrisome as in these countries food production often cannot keep up with population growth and food imports constitute a substantial fraction of the national budgets.

One effect of soil erosion has been a declining or stagnant production of food and cash crops for millions of small farmers. The resulting shortages of food and cash has led to a search for supplementary income-earning opportunities through part-time jobs and migration to urban areas. In addition, farmers sometimes have had to contend with the problem of reduced yields by growing less nutritious substitutes such as cassava.

Deforestation, apart from precipitating and accelerating soil erosion, is having tremendous socioeconomic impact in Africa. Fuelwood availability has become a major problem in several parts of the Sahel. Where dry dung is used in place of scarce fuelwood as in Lesotho, Ethiopia and other parts of the Sahel, the soil is robbed of its natural replenishment. The resulting loss in soil fertility reduces harvests, although the magnitude of this loss is not easily quantifiable.

More readily documented, however, is the social cost in terms of scarcity and hardship – especially, for women and children who do most of the wood collecting. In northern Ghana, for example, one full day is now required to gather three days worth of wood (Eckholm, 1984). Women, with babies on their backs, may walk five miles to their husband's bush farms to gather headloads. In central Tanzania firewood has become so scarce that the average household spends more than 250 working days per year gathering its fuelwood supply (Mnzava, 1979). Similar worse situations are found in Ethiopia, Lesotho and Somalia, among others. In some densely people parts of Burkina Faso, trips of four to six hours, three times a week, are required for fuelwood for cooking (Eckholm, 1984). In North-East Province of Kenya, the job of collecting firewood has changed from a task that once took an hour to a chore which now takes a whole day (Darkoh, 1991).

Ecological and social mismanagement of irrigation schemes accounts for a good share of the productivity losses the UN attributes to desertification. Through their role in the spread of schistosomiasis, poorly planned irrigation projects can involve health costs that, for the infected individuals at least, surely outweigh the benefits.

Desertification translates into a spiral of declining production, increasing poverty and diminished potential productivity. It exacerbates poverty which, in turn, exacerbates desertification, because, as the pressure increases, people are forced to exploit their land to survive. In doing so, they further diminish its productivity – and the cycle continues.

The result is seen today in the Ethiopian Highlands and all across the Sudano-Sahel: starvation, death, disease and the exodus of millions of environmental refugees moving to the urban areas or to other less degraded lands elsewhere in desperate search for survival.

The human cost is immense; entire societies and cultures are now threatened. The pastoralists of the Sahel are a case in point. For most, the loss of their livelihood means a life in relief camps or in shantytowns mushrooming around Sahelian cities and those of the countries to the south.

Finally, desertification and resource-scarcity can provoke social unrest, political and armed conflict (Ghai, 1992). Several governments, most notably the Haile Selassie regime in Ethiopia, have been swept from power by the suffering and unrest associated with drought and famine. With continuing degradation and increasing scarcity of natural resources, the struggle and competition for the remaining resources are likely to become a potent source of conflict among communities and countries in the African drylands.

Failed Plans and Actions

Almost two decades have passed since the international development community became sensitised to the global problem of desertification. Since then, a plethora of plans and flurry of activities at national, regional and international levels have been initiated to contain the problem and halt the desertification process, especially in the drylands of Africa. The efforts have met with limited success.

The factors underlying the lack of success are many: lack of political will; lack of funds; lack of people's participation; destructive land tenure policies; war; misdirected research priorities; and failure of African governments to make desertification a priority (Darkoh, 1989, 1993).

Governments and national policies still tend to promote inappropriate agricultural practices that are major contributors to desertification. Also, too much technical and financial assistance in these countries have gone to show-piece projects and into measures aimed at appeasing the more politically advantaged urban populations. By comparison, rural populations which tend to lack political clout, especially in the more remote arid and semi-arid regions are all but ignored.

An estimated 90 per cent of the activities related to desertification control in Africa are not directed to field projects, but rather related to planning and coordination, infrastructure and public awareness (Stiles & Brennan, 1986).

If the actions proposed at the Earth Summit in Rio are not backed by practical projects in the field, Agenda 21, the blueprint for action into the 21st century, and the recent Desertification Convention adopted by the world's governments (including several African governments) would fail, just as their predecessor, the United Nations Plan of Action to Combat Desertification (PACD), has failed.

Conclusion – A Way Forward

The rich natural resources of the savanna and forest lands of sub-Saharan Africa are being depleted at such a rate that they may be rendered essentially non-renewable and no longer able to support the needs of society if appropriate corrective measures are not applied. To stem the problem of desertification in the

region, more innovative ways are required to manage resources in a sustainable manner. Sustainable resource management in the region will require a combination of incentives and disincentives, economic benefits and law enforcement, education and awareness, employment creation and employment diversification, enhanced land tenure and family planning.

Sustainable development critically depends upon local communities' ability to control the resources from which they derive their livelihood. It, therefore, requires devolution of power and the transfer of at least some of the responsibility of resource management from central government agencies and institutions to local communities and institutions in the rural areas. These communities often bear the economic and social costs of land degradation and resource depletion, but most frequently do not enjoy the full benefits. The foundation of any sustainable development is community support. Such support can be gained only through involvement or participation, which includes hands-on interaction together with the capacity-building of the local communities. The need to facilitate some measures of empowerment to give the people of the drylands opportunities to shoulder the risk of change towards sustainable livelihoods, has become critical (Titi & Singh, 1994).

A sustainable development strategy should empower and put the welfare of those communities of herders and farmers at the centre of the development agenda. It should bolster those adaptive characteristics of their local pastoral and agricultural systems that confer drought resistance, avoiding those that increase famine susceptibility (Darkoh, 1996).

Structural Adjustment Programmes (SAPs) in Africa pose an enigma to environmental protection efforts. Many countries undergoing SAPs in Africa have suffered a drastic decline in income by 30 per cent during the 1980s (Khor, 1994). There is a growing body of evidence in Africa that structural adjustment degrades. The threats posed to environment, economy and social services in many African countries call for a fundamental revision in the design of SAP programmes.

Barriers to trade can also create impediments for the achievement of sustainable development. Developed country import barriers make poverty alleviation more difficult for export-dependent poor countries and may cause them to accelerate rates of natural resource exploitation by preventing diversification. Developed country tariffs that rise with the degree of processing of raw materials block exports and prevent value being added locally. The direct environmental effect is often to force these poor countries to over-intensively exploit their natural resources and eat away at their natural capital stocks. Protectionism in developed countries is perpetuating poverty and confounding employment and income-generation and natural resource conservation in the sub-Saharan African countries. Trade liberalisation can remove the price distortions created by import barriers and lead to

progress towards sustained development in these countries. The developed countries need to ensure that policies that guide protectionism, environmental standards and consumption in their own countries and those related to structural adjustment programmes, multilateral and bilateral trade-related practices and agreements and aid, help alleviate (instead of perpetuate) poverty and lead to environmental protection in these poor nations of Africa.

References

Black, R (1993) "Refugees and Environmental Change.Global Issue," Report prepared for ODA Population and Environment Research Programme, University of Bradford.

Cardy, F (1993) "Desertification – a fresh approach," in **Desertification Control Bulletin**, 22, p 4-8.

Cardy, F (1994) "Environment and forced migration," UNEP, Nairobi (mimeo).

Darkoh, M B K (1982a) "Population expansion and desertification in Tanzania," in **Desertification Control Bulletin**, UNEP, 6, pp 26-33.

Darkoh, M B K (1982b) "Desertification in Tanzania," in **Geography**, 67(4), pp 320-331.

Darkoh, M B K (1989) **Combating Desertification in the Southern African Region**, UNEP, Nairobi & Moscow.

Darkoh, M B K (1991) "Land degradation and resource management in Kenya," in **Desertifcation Control Bulletin**, UNEP, 19, pp 61-72.

Darkoh, M B K (ed) (1992) **African River Basins and Dryland Crises**, OSSREA, EPOS & The Department of Human Geography, Uppsala University, Sweden.

Darkoh, M B K (1993) "Desertification: the scourge of Africa," in **Tiempo**, 8, pp 1-6.

Darkoh, M B K (1994) "Population, environment and sustainable development: desertification in Africa," in **Desertification Control Bulletin**, UNEP, 25, pp 20-26.

Darkoh, M B K (1996) "Towards an adaptive and community-based approach to the management of natural resources in the drylands of Sub-Saharan Africa," in **Approaching Nature: Insights from the Study of Environment and Securities**, A Hjort af Ornas & C Krokfors (eds), Linkoping: EPOS (in press).

Eckholm, E (1984) "Poverty, population growth and desertification," in **Desertification Control Bulletin**, 10, pp 37-41.

Ghai, D (1992) "The social dynamics of environmental change in Africa," in **Whydah, African Academy of Science Newsletter**, 2 (a), p 1-8.

Hulme, M & Kelly, M (1993) "Exploring the links between desertification and climate change," in Environment, 35 (6), 1-11, pp 39-45.

Hulme, M, Marsch, R & Jones, P D (1992) "Global changes in humidity index between 1931-60 and 1961-90", in **Climate Research**, 2, pp 1-22.

Impact Team (1992) "A convention for Africans," in **Impact**, 6, pp 3-10.
Janzen, J (1991) "Mobile livestock keeping – a survival strategy for the countries of the Sahel," in **Applied Geography and Development**, 37, pp 7-20.
Kelly, M & Hulme, M (1993) "Desertification and climate change," in **Tiempo**, 8, p 1-7.
Khor, M (1995) "Structural adjustments degrades," in **Our Planet**, 7 (1), pp 20-21.
Lambin, E (1993) "Spatial scales and desertification," in **Desertiffcation Control Bulletin**, UNEP, 23, pp 20-23.
Milas, S & Asrat, M (1985) "Eastern Africa's spreading wastelands," in **Desertification Control Bulletin**, UNEP, 12, pp 34-40.
Mnzava, E M (1979) "Village afforestation: lessons from experiences in Tanzania," Forestry Department, Dar es Salaam (mimeo).
Ponzi, D (1993) "Soil erosion and productivity: a brief review," in **Desertification Control Bulletin**, UNEP, 10, pp 46-54.
Randriananrijaoa, A P (1983) "The erosion of Madagascar," in **Ambio**, 12 (6), pp 308-311.
Sai, F (1994) "Hope and warning in Africa," in **Our Planet**, 6 (3), pp 14-16.
Stiles, D & Brennan, R (1986) "The food crisis and environmental conservation in Africa," in **Food Policy**, 6, pp 298-310.
Tiffen, M; Mortimore, M & Gichuki, F (1993) **More People – Less Erosion: Environmental Recovery in Kenya**, Wiley & Sons, London.
Titi, V & Singh, N C (1994) "Adaptive Strategies of the Poor in Arid and Semi-Arid Lands; In Search of Sustainable Livelihoods," Working Paper, Winnipeg: IISD.
Tolba, M K (1986) "Desertification in Africa," in **Land Use Policy**, 6, pp 260-268.
Tolba, M K (1989) "Global environmental justice," statement by the Executive Director, UNEP, at Kenyatta University, Nairobi (Mimeo).
Tucker, C J; Dregne, H E & Newcomb, W W (1991) "Expansion and contraction of the Sahara Desert from 1980 to 1990, " in **Science**, 253, pp 299-310.
UNCED (1992) **Agenda 21**, United Nations Conference on Environment and Development, Geneva.
UNEP (1992) **Status of Desertification and Implementation of the United Nations' Plan of Action to Combat Desertification**, United Nations Environment Programme, Nairobi.
UNEP (1992b) **World Atlas of Desertification**, Edward Arnold, London.
UNSO (1992) **Assessment of Desertification and Drought in the Sudano-Sahelian Region**, United Nations Sudano-Sahelian Office, New York.
Williams A J & Balling, Jr R C (1994) **Interactions of Desertification and Climate**, WMO & UNEP, Nairobi & Geneva.
World Bank (1989) **Sub-Saharan Africa: From Crisis to Sustainable Development**, World Bank, Washington, DC.