

HUMAN ACTION AND LAND DEGRADATION

HUMAN ACTION AND LAND DEGRADATION IN AFRICA

Monica Nyamwange
Department of Geography
East Stroudsburg University
East Stroudsburg, PA 18301

Abstract. This paper deals with land degradation in Africa within the context of human activities. Three aspects are addressed: identification and discussion of contemporary processes which are potential contributors to land degradation, review of actions pursued in rehabilitation of degraded environments, proposals on making environmental rehabilitation more effective.

The factors that explain the phenomenon of land degradation are viewed from two dimensions: these are natural factors and man-made factors. The natural factors pertain to climatic conditions. The man-made factors are overcultivation, overgrazing, deforestation and unskilled irrigation.

African countries have taken measures to address the issue of environmental rehabilitation. Most of these deal with soil conservation and afforestation. Despite these efforts, a lot still needs to be done if effective results are to be achieved. Consequently, the paper puts forth proposals on enhancing environmental rehabilitation.

I. INTRODUCTION

Land degradation is a major problem facing many African countries. For purposes of this paper, we are concerned with three forms of land degradation: deforestation, desertification and soil erosion. Deforestation strips vegetation from the soil and depletes its organic and nutrient content, leaving it exposed to the eroding forces of the sun and wind. It can become as dry as dust, and blow away in the wind. The remaining subsoil can become hard and impervious. It can no longer absorb rain, and the water flows away over the surface, carrying away soil and cutting gullies which become deeper and wider year after year.

Although serious problems of watershed destruction and resulting soil erosion have resulted from the deforestation of highland forests in Africa, Asia and Latin America, the bulk of the literature on deforestation refers only to the depletion of tropical moist forests. For instance, Brown et al (1989) estimates tropical forests to be shrinking by 11 million hectares per year, an estimate raised to 12 million hectares recently by the UN Environment Programme.² Furthermore, the problem is heavily concentrated in those countries which have large tropical forests remaining. Ledec (1985) reported the total volume of tropical moist forests in the world as being 11 million km² in the mid 1970s, of which 54% was in Latin America, 19% in Africa, and 27% in Asia and Australia.³

Various estimates of the rate of elimination of these forests exists ranging from 0.6% to 2.0% per year.⁴ Data are available on the annual estimated rate of depletion of forest cover during the 1980s.⁵ In Asia, for the 12 countries reporting, the median extent of annual deforestation was 1.2% per year. In Latin America, for the 23 countries reporting, the median rate of deforestation was 1.9% per year--far greater than in Asia or Africa. For Sub-Saharan Africa, of the 27 countries reporting, the median rate of deforestation was 1.2% per year, or the same as that of Asia.

The second form of land degradation is desertification which has been most prominent in the dry lands of the world. In the early 1980s the United Nations Environment Programme (UNEP) reported that a total of 1.5 million hectares of rangeland and cropland in developing countries were subject to desertification, affecting the livelihoods of at least 253 million people.⁶

The African continent is the most affected by the desertification process. The last 100 years have seen a 150 km wide belt of productive land on the southern edge of the Sahara turn completely unproductive. Since 1968 one-fourth of Africa's semi-arid pasturelands has also been rendered unproductive. Despite the focus on Africa, desertification is occurring in many other areas of the developing world, including China, northern Mexico, and northern India.

The third main form of land degradation is soil erosion. Brown et al (1989) estimates 26 billion tons of soil are lost annually in the world.⁷

Within Africa, soil erosion is extremely severe in the northern highlands of Ethiopia. Fifty percent of Ethiopia's area is in the highlands which, however, carry 80% of the population and 90% of economic activities. But about half of the highlands (270,000 km²) is already significantly eroded of which 140,000 km² are seriously eroded "and 20,000 km² of agricultural land so badly eroded that they are unlikely to sustain cropping in the future."⁸ Soil erosion problems are also severe in other African countries such as parts of Kenya, Tanzania, Lesotho and the republic of South Africa.

II. CONTEMPORARY PROCESSES CONTRIBUTING TO LAND DEGRADATION

The factors that explain the phenomenon of land degradation in Africa are viewed from two dimensions: these are natural factors and man-made factors.

1. Natural Factors

The natural factors pertain to climatic conditions. Drought has been a major factor contributing to land degradation in Africa. It is not a new phenomenon and historical data support scientific evidence that Africa has been in the throes of a progressive drying phase since about 5000 BP. Figure 1 (compiled by Nicholson, 1981) shows the general trend in West Africa since the end of the fifteenth century.⁹ Over much of the past twenty-five years there has been a general decline in the rainfall recorded in the region. Not only have there been years of extreme drought such as 1968-73 and 1983-84, but even in relatively wet years the total rainfall has often been less than expected due to a contraction of the rainy season.

Successive years of drought and reduced rainy seasons have left the land exposed and vulnerable to erosion by wind and even to water--when it has arrived. Loss of top soil has meant that even if rainfall has been adequate in some years, the capacity of the soil to produce has fallen, and low germination and growth rates have left the land open to further erosion.

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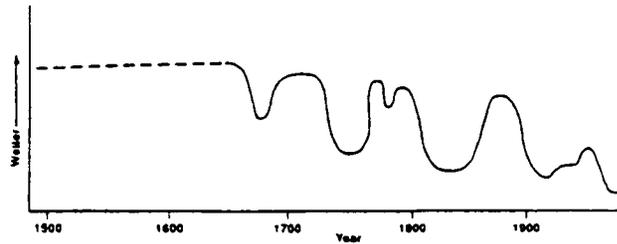


Figure 1. Summary of long-term rainfall changes in the Sahel and Sudan regions of West Africa
Source: Farmer and Wigley (1985).

Note: Data prior to 1990 are largely qualitative, from historical documentary sources (from Nicholson 1981).

2. Human Activities

Human activities are degrading the African environment in various ways, too often to its detriment and the detriment of the people. These activities include: overcultivation, overgrazing, deforestation and unskilled irrigation. Population growth as well as the economic situation of the people influence the manner in which people utilize land.

(i) The role of overcultivation in land degradation

Two pressures contribute to overcultivation: the need for more food to feed the increasing population and the need to grow more food for monetary gains, especially foreign exchange. This has led to land fragmentation, reduction in fallow periods, and expansion of cultivation into marginal lands which, traditionally, were reserved for livestock. The cultivation of these less productive and more drought prone lands has resulted in declining soil fertility and falling crop yields.

(ii) The role of overgrazing

Two pressures contribute to overgrazing: reduction in grazing land due to expansion of cultivation

into marginal land and increased herd size. Factors contributing to increase in herd size include:

- (a) development of markets that make cattle ranching a lucrative business
- (b) the growing population and demand for more food requiring greater food resources hence more animals, especially in populations who depend on animals for livelihood. It is to be noted, for example, that the nomadic population in the Sahel has been growing at the rate of at least 2.8% per annum, an increase of 1.5 million people in the region per year of population maintained mainly on livestock products.
- (c) increasing poverty due to lack of other sources of income has led to greater dependence on livestock.
- (d) livestock care has decreased livestock mortality and hence increased survival and increase in herd sizes
- (e) livestock congregate around wells and bore holes, overgrazing vegetation and compacting the soil around the well.¹⁰

Overgrazing leads to overall reduction in vegetation cover which translates into soil erosion and ultimately to desertification.

(iii) The role of deforestation

Deforestation is caused by uncontrolled cutting mostly for household fuel, building materials and encroachment of farm settlements onto forest land. For example, in the area around Bamako in Mali, acres of tree stumps are all that remain of forests cut for sale to a rapidly growing urban population either as wood, or as charcoal.

In rural areas, as a result of energy shortage, the land is increasingly deprived of its fertilizing elements which are being used for energy consumption. Cattle dung is practically no longer used as organic manure, since it has taken the place of fire wood.

(iv) Unskilled irrigation

Irrigation has its own advantages such as improving crop yields and removing arid lands susceptibility to crop failure during droughts. However, irrigation can do more harm than good if the water is not allowed to drain away from the soil. Poor drainage leaves the soil waterlogged. A high water table and continual evaporation from the soil surface can bring salt up from the subsoil and leave it in the top soil. This salinisation process eventually renders the soil unusable. This has been the case in the Bakalori scheme in northern Nigeria where injudicious use of water has resulted in waterlogging and salinity problems which have led to land going out of production.

(v) Poverty

It is not possible to have a clear picture of the relationship between land degradation and human action if the issue of poverty is pushed into the background.¹¹ The chronic poverty of the rural people causes them to overutilize available resources in order for them to meet all sorts of needs such as food and energy. To attain these, they cut trees, bring under cultivation marginal land, overgraze their pastures, and in the process degrade productive land.

The energy crisis in Africa, for example, leads back to the issue of poverty. If there were some

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movement towards social progress, the energy problem would be less acute, as it would be possible to turn to other sources of energy.

III. SOME ACTIONS TAKEN TO REHABILITATE DEGRADED LANDS

African countries have taken some actions to rehabilitate degraded landscapes. The following serve as illustrations:

- A. Algeria: The government is concentrating its efforts on holding the desert back by developing a Green Belt 1500 km long and 20 km wide. This project was started in 1971 and is largely the work of the Algerian army.
- B. Chad: In Chad, armed conflict and political instability have resulted in many schemes being abandoned. However, Acacia Albida trees have been planted on 3,500 ha. of farmland and Acacia Senegal has been planted over an area of 700 ha. But such areas are small in comparison with the millions of hectares at risk or already degraded.
- C. Niger: Acacia Albida trees and acacia windbreaks have been planted in Niger.
- D. Ethiopia: Ethiopia has suffered badly from deforestation of the highlands and the resultant erosion. Some action has been taken to introduce soil conservation structures, but effective action in most degraded areas was for a long time prevented by civil war.
- E. Kenya: In Kenya particular attention is being paid to agroforestry techniques which involve planting trees along the contour to hold the soil in place and provide a source of fuel, with cultivation of the intervening strips.
- F. South Africa: In the Republic of South Africa a good deal of reliance has been placed on conservation structures, especially in the European farming areas, but the most serious degradation has been in the homelands, where too many people have attempted to scratch a living from the land without the means to build up its fertility.

IV. PROPOSALS

Discussions in the foregoing sections have shown that land degradation has in recent times become prominent in the African continent. Although public policies and programs have been directed at alleviating the problems created by environmental degradation, a lot still needs to be done if effective results are to be achieved. Therefore, in addition to the measures already taken, the following proposals are put forth.

- A. Population control: A high rate of population growth becomes associated with overgrazing, overcultivation and deforestation which contribute to land degradation. Therefore, if this process is to be reversed, population control should form part of the whole package of environmental rehabilitation measures.

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- B. Public participation: There is need to involve the public in all environmental rehabilitation programs. An effective communication link between the planners and the planned will ensure understanding, acceptance and cooperation.
- C. Increasing of agricultural production: Ways of increasing agricultural production without overusing the land need to be implemented. In this regard, it is necessary to establish rural agricultural extension programs that provide credit, seeds, fertilizers and advice to poor farmers.
- D. Energy resources: It is necessary to find out ways of encouraging the use of appropriate and environmentally sound renewable technologies such as solar energy. This will reduce the demand for fuel wood, a major factor in deforestation.
- E. Education: Halting further land degradation can only be done through an educative process that will enable farmers to farm with conservation in mind.