

The Role of and Need for a Sound Land Use Policy for a Sustainable Agricultural Development

The Case of Ethiopia

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1. Abstract

Natural resources in general and land degradation in particular have a great effect on developing countries to which Ethiopia is no exception. This is owing to the fact that most developing countries depend heavily on their natural resources. In such cases a viable and sound land use policy is the fundamental basis for sustainable land management and hence sustainable agricultural development. Basically sustainable land management combines technologies, policies and activities aimed at integrating socio-economic principles with environmental concerns so as to simultaneously maintain or enhance production and services. This implies that sustainable land management calls for viable and sound land use policies wherein all land users are subject to a number of obligations to rationally utilize and preserve farming land areas of economic significance and to make good any damage to the environment. Therefore, before any development venture, be it small or large scale, is launched, particularly agricultural development, a clear and comprehensive land use policy should be developed and adopted for the Ethiopian conditions. This should be developed taking into account the dimensions of environmental compatibility, social acceptability and economical viability in land use and management. In verifying such compatibilities and viabilities, environmental impact assessment and natural resource accounting can be judiciously used to suit local situations in particular and the nation in general. This paper outlines the current land use and environmental degradation problems in Ethiopia and suggests strongly the need for formulation of sound land use policy for sustained development and future food-security Ethiopia.

Key Words : Land use policy, sustainable agricultural development, environmental degradation, Ethiopia.

2. Introduction

In a predominantly agrarian country like Ethiopia, one of the most ominous threats to the food supply and thus sustainable development is environmental degradation. Environmental degradation in Ethiopia is evidenced by the deterioration of croplands, grasslands and forests (Alemneh, 1990). Accordingly there are three predominant human activities identified as contributing to the vicious cycle of environmental degradation, drought and famine: overgrazing, overcultivation and deforestation. Alemneh (1990) elaborates further that in the famine-ridden

areas of the Ethiopian highlands, the impact of human activity on the environment is so striking owing to intensive cultivation, overgrazing, deforestation, and overpopulation. Also, the political and economic forces that relate to the peasant agriculture have exerted enormous pressure on the ecosystem. Besides, one of the peculiarities of Ethiopian agriculture is that it is dominated by technologically resource-poor farmers and pastoralists.

The World Bank (1987) explained and described the core of environmental degradation and collapse of peasant farmer production in Ethiopia that ended in famine as follows:

- the rate of forest exploitation for fuel, construction and other needs exceed supply
- timber is sold to other rural and urban areas and there is an increased reliance on dung and crop residues for fuel; nutrient retention and cycling in the soil are reduced
- all tree cover is removed; dung and crop residue become a major source of fuel; the destruction of soil nutrients accelerates and crop yield declines. This is the crux of the problem in Ethiopian agriculture. Without looking for options for maintaining of the soil resource base, people have an infinite right to use and misuse the resource.
- dung is the only source of fuel and a major source of cash; the topsoil is deprived optimum organic matter content to the extent that it is depleted and dramatic erosion is common
- soil organic content needed for production disappears; collapse in peasant farming usually triggered by drought that could have been previously tolerated; this leads to the final stage of massive starvation and emigration to urban areas.

Basically the major cause of environmental degradation in Ethiopia is soil erosion which is occurring at an alarming rate warranting for the formulation of appropriate technical packages, land use policy and legislation that would lead to a more effective farmer participation in conservation and rehabilitation activities. An assessment on soil erosion in Ethiopia has been made by several workers of whom Hurni (1986) used the USLE model to quantify soil loss in the Ethiopian highlands. He found that the extent of erosion is significantly related to vegetative cover on the soil.

Using experimental plots studies, Hurni estimated the total soil loss due to the absence of vegetative cover for different land use systems in Ethiopia as indicated in Table 1.

The figure estimated by Hurni suggests that soil loss does significantly vary according to land use. This implies that the extent and occurrence of soil erosion is directly related to and determined by the amount of vegetative cover on the land.

Under Ethiopian conditions, the amount of vegetative cover is greatly affected by the utilization of the land for cropping, livestock grazing and forestry activities to meet the dietary requirements of peasant farmers.

Soil erosion as a core factor in environmental degradation in Ethiopia is attributed primarily to the cultivation practices and human pressure on the land. Alemneh (1990) estimated that 2/3 of the Ethiopian highlands have a slope exceeding 30% and are not suited for intensive cultivation as currently practiced. Lacking proper soil and water conservation practices on such steep slopes will definitely aggravate the problem of soil erosion. Moreover, vulnerability to erosion can arise from the number of plowing during field preparation (3-6 times depending on the crop), the absence of contour ploughings, terracing or perennial crops which grow throughout the year and the lack of manure or crop residue to increase soil fertility through organic cycling.

Table 1. Estimated rates of soil loss in Ethiopia depending on the land cover

Land cover type	Estimated soil loss		
	Area in percent	Ton/ha.yr	Ton/year (in millions)
Crop land	13.1	42	672
Perennial crops	1.7	8	17
Grazing land	51.0	5	312
Currently unproductive	3.8	70	325
Currently uncultivable	18.7	5	114
Forests	3.6	1	4
Wood and bushland	8.1	5	49
Total loss	100	141	1493

Source: Hurni, 1986.

A major factor contributing to overcultivation is the explosive population growth in Ethiopia. Estimates and population projections made from the 1984 census reveal that the population growth rate in Ethiopia is staggering.

Table 2 shows that without a major fertility decline, Ethiopia will have to feed a population that is nearly three times greater in the year 2015. This clearly calls for a sound and viable land use policy for sustainable development, conservation based across all types of land use. For implementation of a land use policy, the strategy of formulating policies and making legislation at government level that is conducive to peasant participation in conservation activities. Appropriate technical packages at the local level must be aimed at conservation and at the same time meet the basic necessities of the peasant households.

Table 2. Reconstructed estimates of post-population, projected population and population growth rate

Year	Population (in millions)	Annual growth rate (%)
1950	19.2	2.0
1955	21.2	2.1
1960	23.5	2.2
1965	26.3	2.3
1970	29.5	2.3
1975	33.1	2.6
1980	37.7	2.8
1984	42.9	2.8
1990	49.9	2.8
1995	57.9	3.0
2000	67.8	3.2
2005	80.1	3.3
2010	95.5	3.5
2015	114.5	3.7
2020	138.2	3.8
2025	167.7	3.9
2030	204.7	4.0
2035	251.2	4.1

Source : Central Statistical Office,1988.

Therefore, considering the current status of the land use circumstances in Ethiopia vis-a-vis conservation and development, this paper is concerned with the following objectives :

- proposing land use policy which would take place in the general framework of public context yet in the specific actions of the land use types: family farm, forestry, wildlife, rangeland and recreation land
- Proposing possibilities of making mandatory regulations where lack of conservation damages property or misuse of the land leads to 'irreversible' degradation in terms of the resource: implementing a conservation based development strategy.

3. The Core of Environmental Degradation in Ethiopia

One of the ultimate causes of environmental degradation under the Ethiopian conditions is that land use decisions, made at the private household level, are oriented at economic factors. There are several economic factors, for instance, that influence a farmer's decisions to conserve or deplete the soil:

- the value the farmer attaches to future assets may reflect the farmer's attitude to risk and uncertainty and the level of household poverty and access to credit and off-farm income
- the costs of current soil conservation efforts to the farmer which in developing countries like Ethiopia may reflect the availability of labour, purchased inputs and credit for conservation efforts
- relative input costs and output prices which determine the current profitability of erosive versus less erosive cropping systems including fluctuations in these prices overtime.
- the future returns of the farming system as affected by technological improvements and by the impact of current cultivation techniques and crops on soil fertility and future yields.

In the other words, it means that poverty - environment linkages in developing countries like Ethiopia are not one-way relationships and thus affect the perception of the value of soil and water conservation as one aspect of environmental management. Further more, a worrying trend in many developing countries like Ethiopia is the concentration of the poorest groups in "ecologically fragile" zones, i.e. areas where environmental degradation or severe environmental hazards constrain and even threaten economic welfare and sustainable development.

By and large there are some important issues to be considered as causes of environmental degradation when looking for possible solutions in the form of development policy regarding land management in general and that of the fragile zones in particular:

- remedies for market imperfections
- avoiding distorting policies
- avoiding institutional failures

Following the 1974 Revolution, a land reform was implemented in Ethiopia. Apart from its failure and the agriculture crisis that followed the land reform, one of the very disappointing consequences of the land reform at least in the environmental context was that of the State Farms. State Farms in many cases have been created by clearing forests and thus have contributed to land denudation and soil erosion (Mengisteab, 1990). Poor crop rotation and drainage systems on State Farms have also destroyed the fertility of some of their holdings to the point that some farms had to be abandoned.

In principle, a stable land tenure system is advocated as one strategy to avoid land degradation (abuse of resources). Nevertheless, for the technologically resource-poor farmer (besides technical assistance through institutions), a guiding land use policy and legal provisions should be developed to assist him to use the resource wisely.

The farmers in eastern Ethiopia, for instance, cultivate on hills/ mountains as steep as 70% or more (Tolcha, 1991) without any soil and water conservation practice, as a right to use and misuse. But our experience for the last 10 years revealed increased floods and siltation of lakes: *Lake Alemaya and Lake Adele*, were affected by the high runoff and sediment discharge coming from the surrounding watersheds. The cultivated fields are likely to be abandoned after 2-4 years of cultivation. When such steep slopes are put to cultivation without appropriate conservation practice, the land will be damaged irreversibly and rock outcrops will occur; a sign of bad land management. The off-site effects increasingly being felt: increased flood hazard in and around residual areas and siltation of lakes.

Apparently irrespective of the degree of land security, a sound land use policy, if developed and implemented, definitely will discourage cultivation of sites that need to be protected (vegetation covered); or else if cultivated at any expense, strict incorporation of conservation measures should be enforced as a law.

4. Land Use Policy Strategy

Formulating land use policy is very relevant in the over-all aim of securing the best possible productive use of land as a resource for meeting man's needs. The development of a satisfactory land policy concerns the quality and extent of planning of the use of land resources. In the Ethiopian agricultural context this is mostly done at the private subsistence farmer's level. The household decision is very relevant in this context. Given the level of knowledge of the private farmer to plan strictly in view of sustainable resource use, a guiding policy at the government level is essential. In implementing such policies a sort of legislative and regulatory measure would be needed to which every land user shall abide.

West (1982) emphasized that land use policy objectives coincide frequently with those of development in general. Hence the strategy of land use policy formulation should include the physical basis for planning and policy making, the spatial distribution of population, settlement in relation to the distribution of resources and proprietary and tenurial structures. It is to be remarked that the physical basis, via data on climate, topography, soils, ground water, infrastructure and settlement have a prime role in helping identify negative environmental trends through such evidences as the destruction of natural vegetation cover, the incidence of sheet or gully erosion, the silting of reservoirs and the inability of river channels.

Timmons and Murry (1972) suggested that there are ways by which the government (local, state and federal) may bring about policy adaptations to kinds of land use. These include:

- direct administration of land through public ownership
- public regulation of privately held land through legislation
- making specific agreements with specific districts / zones
- regulation induced by or incident to conservation payments and aids and educational activities and programs.

On the other hand, strict land use regulations are advocated (Hannah and Krausz, 1960). Such land use regulations include zoning, differential taxation and land use legislation. Zoning is most often used to regulate the use of land in and around towns and cities. Differential taxation is used by governments to keep prime land in agriculture, while land use legislation is the tool most often used by the state and federal government to protect fragile areas from destruction.

Ethiopia lacks a comprehensive land use policy other than the Water Laws proclaimed in 1994-proclamation No.92/1994-Negarit Gazeta No.78, 21 March 1994, pp.369. This law was advocated to regulate the use of water resources, by requiring a government permit for most water uses, with the exception of minor traditional uses. This first hand attempt is to be encouraged whereby similar laws should be enforced to support a land use policy that offers the private farmer a food secured future and sustainable development.

In developing a law on land use policy one should consider the following aspects:

- the close relationship between soil and water conservation and downstream river development
- cooperation between programs to conserve soil and water on individual farms and the big developments on major rivers
- the planning and installation of upstream programs. Programs and projects should be a cooperative matter between the regional government, the federal government and the local communities. Ways have to be devised how the local people themselves and their organization can be responsible for selecting, planning, implementing and maintenance of soil and water conservation programs and projects.

5. The Principle of Capita Selecta in Environmental Management

5.1 Environmental Impact Assessment

Basically environmental impact assessment is a way to contribute to environmentally sound development cooperation and is a tool for both planning and decision making. Moreover, environmental impact assessment is concerned with identifying, predicting and evaluating the foreseeable environmental effects both beneficial and adverse, of public and private development activities.

Environmental impact assessment can identify constraints between ecosystem use and ecosystem functions (De Graf, 1992). Accordingly with the help of environmental impact assessment alternative uses can be formulated which take into account man's material and immaterial needs, and result in sustainable exploitation of the ecosystem. De Graf (1992) outlined the main activities of environmental assessment should be:

- Formulation of alternatives
- Impact identification
- Impact prediction and measurement
- Impact interpretation or evaluation
- Selection of proposed action from a set of alternatives
- Identification of monitoring requirements and mitigating measures
- Communication of impact information to user.

As regards environmental impact assessment methodologies, they are based on a checklist with environmental parameters that should be investigated for potential impacts. For practical purposes, a matrix is produced with project activities and a list of environmental parameters that could be used as guides in environmental impact assessment. These may include the following three major issues:

Physico-Chemical:

- Land
 - soil quality
 - slope stability
 - land use
 - mineral resources
 - erosion
- Water
 - water quality
 - flow regime
- Air
 - air quality
 - climate

Biological:

- Vegetation
- rare species
- endangered species
- aquatic plants
- fish and shellfish

Human:

- aesthetics
- public health
- physical safety
- housing
- employment
- archaeology
- recreation
- religious places.

Under the conditions of rural Ethiopia, sustainable agricultural development calls for quantification of the impacts of development projects particularly those launched on large scale. To put such important development guidelines into practice, provisions regarding policies and legal matters should be constituted and a way toward their implementation should be sought.

The use of environmental impact assessment for land use decisions is not an easy task. For instance Cavallin *et. al.* (1995) proposed a methodological approach whereby geomorphology is used to evaluate the interaction between development projects and geomorphologic assets and processes. This methodological approach gives less attention to other environmental components. Nevertheless, a geomorphology oriented approach in environmental impact assessment can be used if integrated with other environmental components.

Others contend that geomorphologic resources are relatively easy to assess and hence consumable resources (materials that have an economic value) can be used to express impacts in terms of monetary value (Rivas *et al.*, 1995). But it is to be recalled that this is also limited to the assessment of impacts on the materials considered as exploitable resources. The problem in assessing environmental impacts is that not every component of the system can be

expressed in monetary terms. The use of certain weighing / correction factor would be necessary to account for unquantifiable aspects in real monetary value.

6. Natural Resource Accounting

Even though developing countries are heavily depending upon their natural resources, natural resource assets seem not so valued and their loss entails no decrease in potential future production. This raises once again the question of sustainable development. There is a dangerous asymmetry in the way we measure, and hence the way we think about natural resources particularly for developing countries like Ethiopia.

It is felt that developing countries to which Ethiopia is no exception, could exhaust their mineral resources, cut down their forests, erode their soils, pollute their aquifers and hunt their wildlife and fisheries to extinction, but measured income would not be affected as these assets disappear. The underlying reason for this is that for developing countries in general the most common indicator of national economic development is the Gross National Product (GNP) per capita figure. As de Graf (1992) mentioned this indicator has several limitations in the context of sustainable development for developing countries which heavily depend upon their natural resources because it:

- doesn't show regional differences
- deals with officially recorded income-generating activities and incorporates insufficiently income from the informal sector
- emphasizes the material side of welfare
- does not take in to account the environmental degradation of the natural resources, from which income is derived. This necessitates in the calculation of GNP the use of a correction factor when irreversible loss of natural resources is clearly visible from environmental impact analysis, and the depreciation of the remaining stock.

The founding of a National Natural Resources council is strongly suggested. The founding of this Council would be justified because it:

- creates public interest in land use policy development, educates the rural people about the merits of wise resource use
- establishes broad participation in formulating a national land use policy yet modified to fit the various sections of the nation
- formulates the objectives and principles of land use policy. The same 'agency' shall be mandated to integrate, study, plan, evaluate, and recommend proposals and programs concerned with land use and control.

7. Conclusion

A sustainable relationship between human and natural resources would be fundamental and essential for stable development at local, regional and national level particularly for countries which depend heavily on their natural resources. To attain sustained relations there should be policy provisions (land use policy) which can be viewed as an integral part of the overall process of planned development.

In the past opportunities for expanding land under cultivation have compensated for slow yield growth. Nevertheless, continued attempts to expand the cropping frontier would accelerate deforestation and environmental degradation, and ultimately lead to falling yields and famine.

This suggests that along side other development strategies agricultural intensification might be an alternative. The adoption of improved technologies and agricultural intensification with large investments both private and government, should be guided by sound and comprehensive resource use policies to bring about sustained growth and food security in Ethiopia. Besides the formulation and implementation of a sound land use policy at government level, government actions needed for sustained resource management include:

- incentives : money injection in the form of credit facilities
- technical support for the technological resource-poor through training, education and technical assistance
- extension and education of the public about land, natural resources and development interdependence
- use of population growth control mechanisms.

Generally there should be a legislation whereby the land users are responsible including criminal liability for failure to abide by legal provisions concerning the rights and obligations in using the land.

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