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Population Growth Nexus Land Degradation in Ethiopia

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Abstract
Land degradation is one of the challenging environmental problems of Ethiopia. In addition, land degradation, low and declining agricultural productivity and poverty are severe and interrelated problems in the country. Land degradation is caused by many factors such as rapid population increase, deforestation, step topographic features, intensive rain fall, unbalanced crop and livestock production to mention few of them. The relation of population growth and land degradation is quite different in many parts of the world. In some parts of the world, population is considered as a problem. While, in other parts of the world it is considered as a resource. In Ethiopia, population growth is the repeatedly mentioned cause of land degradation in general and soil erosion in particular. Thus, this paper aims to give an overview on population growth and land degradation in Ethiopia by taking typical evidence from different parts of the country.
Key words: Population growth, soil erosion, soil fertility loss

1. Introduction

In Ethiopia, land degradation, low and declining agricultural productivity, and poverty are severe and interrelated problems. In the light of the increasing population, land degradation in Ethiopia is bound to proceed at aggravated rates unless significant measures are made in conservation and rehabilitation (MOA 2007). From the above point of views, there are studies which mentioned population growth as a cause for land degradation. For example, Paulos (2001) argued that the fast growing population of Ethiopia is playing significant role in hastening land degradation in a way that the increasing population abused land by deforestation and overgrazing for more cropland and grazing area. Berry (2003) also reported that the loss of land resource productivity in Ethiopia is due to the continued population growth. Similarly, Fitsum *et al*. (1999) pointed out that the major causes of land degradation in Ethiopian highlands are resulted from the growing population which is manifested in terms of overgrazing, deforestation, poor farming practices and using dung for fuel. Desta *et al*. (2000) also argued that the Ethiopian highlands have been experiencing severe land degradation problems that are emanating from the demands from the growing human and livestock populations. In this regard, Tilahun *et al*. (2001) also argued that declining vegetative cover and increased levels of farming on steep slopes in Ethiopian highlands is associated with population pressure have eroded and depleted soils in the area, so that soil degradation is now a widespread environmental problem. A study conducted by Temesgen *et al*. (2014a) in Dera District also reported that population growth is one of the major driving forces for the expansion of cultivated and degraded land at the expense of forest, shrub and grass land. Generally, studies conducted at longer time scales has shown that land degradation still has tremendously been influenced by both the increase and decrease of a given population (Lambin *et al*. 2003).

Contrary to the above arguments, there are studies which has shown that population growth does not always result in land degradation. For example, A study conducted by Woldeamlak (2002) in Chemoga watershed, East Gojjam revealed the increased of forest cover at a rate of 11 ha per annum from 1957-1998, even though it is eucalyptus plantation. Similar study by Amare (2007) and Amare *et al*. (2011) in Eastern Escarpment of Wello, Ethiopia and Munro et al. (2008) in Tigray highlands disclosed that vegetation cover improved since the 1980s owing to land rehabilitation efforts of the community supported by the government and multilateral donor agencies. While, Muluneh (2003) reported that population pressure in west Gurage land is both a cause of land degradation in the form of soil erosion and a factor for environmental enhancement in the form of increased tree density and other land conservation activities. Thus, land degradation is not necessarily related to high population density.

Land degradation is a temporary or permanent decline in the productive capacity of the land, or its potential for environmental management (Paulos 2001). It includes soil degradation, vegetation degradation and degraded lands. Because of the broad nature of land degradation, this paper gives particular emphasis to soil erosion and nutrient depletion. As indicated above, there are only few studies indicating the positive role of population growth for land conservation. As a result of this, the purpose of this paper is to look into in what way the growing population of the country accelerated soil degradation with special reference to soil erosion and nutrient depletion by taking typical evidence from different parts of the country.

2. Population growth nexus soil erosion and soil fertility loss in Ethiopia

2.1 Population growth and soil erosion

The growth of population beyond the carrying capacity has led to sever degradation and impoverishment of the land resources and rapid disintegration of the ecological and social conditions in many parts of the under developed countries (Belay 1995). In Ethiopia, the heavy reliance of growing population on an intensive kind of subsistence agriculture with simple traditional methods of production and prevailed for thousands of years with little or no modification has greater contribution for soil erosion (Gete *et al*. 2006) and the expansion of agriculture as a result of the ever growing population especially towards the steeper slopes accelerated soil erosion (Belay 1995). In the Ethiopian highlands, the population has grown very fast on the limited land area and every possible piece of land is put into cultivation to produce food without appropriate conservation and hence which results soil erosion (Hawando 1997). Soil erosion is taking place all over the country but because of the effect of overpopulation on land that is already fragile (steep and mountainous), and mismanagement of the land in the northern and central highlands are the worst affected (Paulos 2001). Overgrazing, cultivating steep hillsides, and cultivating marginal lands resulted from population pressure accelerate soil erosion (Fitsum *et al*. 1999; Desta *et al*. 2000; Bezuayehu *et al*. 2002).

Addition studies shown that the annual soil loss from Ethiopia due to land degradation, as a results of population pressure, is 1.5 billon tons (Hurni 1993 cited in Muluneh 2003). Continuous cultivation in Ethiopian Highland aggravated soil erosion because the land where most of agricultural activities take place in steep slopes and the soil is carried away by heavy rains. Having this situation, the method of land preparation has favored erosion where together with the soil lost essential nutrients have been washed off (Kefeni 1992). A study by Fantaw (2007) in the South-eastern highlands of Ethiopia depicts that clearing of forests and their subsequent conversion into cropland reduces the soil C content and increase erosion rates. Amare (2007) also reported that as a consequence of crop cultivation on steep slopes and continuous grazing, the soil depth in Maybar area is significantly reduced.

In the highland parts of Ethiopia, the area of most intense population density, the area of greatest livestock density and the area of greatest land degradation, recorded measurements of soil loss by water erosion range from 3.4 to 84.5 tons per ha per year with a mean of 32.0 tons/ha/year (Berry 2003). Soil degradation in Ethiopia can be seen as a direct result of past agricultural practices (Badege 2001). Similarly, Temesgen *et al*. (2014b) also reported that the identified causes of soil erosion in Dera District, northern Ethiopia were cultivation of steeper slope, intensive cultivation without fallow, lack of soil conservation measures, lack of sense of ownership, deforestation, over grazing, use of crop residues for animal feed and fuel, and heavy rain fall in which most of them are enhanced by the growing population of the area. Thus, rapid population growth is a major cause of soil erosion in the country particularly in the highlands.

2.2 Population growth and decline of soil fertility

Intensification of agriculture in Sub-Saharan Africa without addition of plant nutrients has resulted in extensive nutrient depletion and subsequent land degradation (Breman and Swift 1997). Erosion is certainly a major nutrient depleting process in the East African highlands than other regions of Sub-Saharan Africa. One reason is that the highlands show regionally higher soil nutrient levels than soils in other regions of Africa and hence have more nutrients to lose. However, the major reasons are the general high population pressure and land-use intensity resulting in higher nutrient exports through crop removal with significantly lower percentage of arable land under fallow (Drechsel *et al*. 2001). The impact of population change on landholdings size in Tigray has led to a decline in practices such as fallowing which results depletion of soil nutrients (Corbeels *et al*. 2002). Additional study by Tilahun *et al*. (2001) has indicated that pressure from the growing population forces the farmers to cultivate marginal lands, and discontinue fallow and the use of crop residues to maintain soil fertility. In Ethiopian highland, farmers with relatively small farmlands do not adopt soil conservation practices easily since they think in diminution of farm land size. This has an impact on soil fertility management and soil conservation, which will then result in land degradation due to unsustainable intensification of the land (Paulos 2001). Similarly, the loss of soil fertility (nutrient depletion) in Amhara region is mainly due to population pressure and it is manifested through using dung and crop residues as household fuels and animal feeds, low use of chemical fertilizers, declining fallow periods, soil and organic matter burning, and soil erosion (Desta *et al*. 2000). All the above discussion indicates that high population growth is a factor to the decline of soil fertility in Ethiopia.

3. Conclusion

Rapid population growth by itself need not be a problem if it is supported and guided with appropriate land use policy. Otherwise it is a huge threat to the environment as observed in many parts of the Ethiopian highlands. In Ethiopia, land degradation is enhancing due to the country's rapid population growth. This is because of the poor implementation of population and land use policy of the country. Thus, increasing family planning activities, creating off-farm job opportunities, appropriate soil conservation measures, appropriate use of soil fertility

improving mechanisms, using energy saving stoves and also proper management of the land will reduce the problem. In addition, afforestation and reafforestation of trees should be encouraged. Furthermore, population policy and land use policy of the country should be effectively implemented to create positive relationship between population growth and environment and at the same time to enhance the livelihood of farming households of the country. More specifically, the Ethiopian government should strengthen a land policy to ensure land tenure security for farmers to protect their rights, in which farmers' landholdings should be registered and user certificates should be given to them to start land management and soil conservation activities in combating soil erosion.

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