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The Impacts of Land Degradation on Crop Productivity in Ethiopia. A Review

Sisay Taddese
Arsi University College of Agriculture and Environmental Science
P.O. Box 193, Asella, Ethiopia

Abstract
Land degradation has great threat to crop productivity for the future and it requires effort and resources to ameliorate land degradation consequence. It is one of the major causes of low and declining agricultural productivity and continuing food in-security and rural poverty. Therefore, the purpose of this revision could be to determine impacts of land degradation on crop productivity in Ethiopia. As the revision display, land degradation directly affects agricultural crops and plants, reduced availability of clean water, lessened volume of surface water, depletion of aquifers and biodiversity loss. The major causes and consequence of land degradation are the rapid population escalation, serve soil loss, deforestation, low vegetation cover and unbalanced crop and livestock production rearing. In appropriate land use systems and land tenure enhance desertification and loss of ecosystem. Generally, common problem of land degradation in Ethiopia puts disastrous impact on crop productivity, socio economic, environment and ecological setting of the country. Therefore to struggle the effect of land degradation, the stakeholders focused on developing physical and biological soil and water conservation structures, sustainable use of things and services from cultivation land and development of Silvopastoral system which can contribute to poverty lessening, making the farmers fewer susceptible to effect of land degradation.
Key note: Land degradation, crop productivity and Ethiopia.

INTRODUCTION

Land degradation in most developing countries was becoming a major constraint to future growth and development of rural livelihoods. About 40-75% of the world's agricultural land's productivity was reduced due to land degradation (Baylis et al., 2012). Across the world over 20% of cultivated areas, 30% of forests and 10% of grasslands were suffering from degradation, affecting about 1.5 billion people this degradation might be the result of numerous factors or combination of their including anthropogenic activities such as unsustainable land management practices and climatic variations (Bai et al., 2008). Ethiopia was one of the countries in Sub-Saharan Africa that was well-endowed in terms of its natural resources including biodiversity and particularly its agricultural biodiversity. Its location in the tropics combined with wide altitudinal variations allow the country to enjoy both temperate and tropical climate and grows over wide range of crops. This gives a wealth of biophysical resources including rich biodiversity, relatively fertile soils and good fresh water resources potential. However it had been affected by multifaceted environmental problems like land degradation and declining of biodiversity (Sisay & Tesfaye, 2003).

Biophysical and unsustainable land management practices were the immediate causes of land degradation. However, unsustainable land management practices, such as deforestation, forest degradation, soil nutrient mining and cultivation on steep slopes, were also identified as the direct contributors to land degradation. Population density, poverty, land tenure, and access to agricultural extension, infrastructure, and markets, as well as policies that promote the use of land degrading practices were outlined as the underlying causes of land degradation (Nkonya et al., 2011).

To control land degradation, conservation measures throughout history were mainly focused on physical conservation structures which had less contribution for the addition of nutrients removed and to control soil erosion as compared to vegetation measures. However, land degradation could be prevented through different mechanisms depending on the nature and form of degradation (Temesgen et al., 2014). If land degradation was not solved in short time the people rests into lack of enough food/food insecurity, climate change, total loss of soil fertility, hunger, gully formation, fragile land, decertification, poverty. The crop production of the target group is affected and in general the socio-economic, politics of the county is distorted. Land degradation by-product of environmental changes, has been factor that results in increasing the likelihood of migration, decreasing soil productivity, increasing price of farming inputs, and decreasing arable land area, all of which decrease a household's ability to provide sufficient livelihood for their family, thus, increasing the risk of outmigration, reduction of agricultural productivity, lack of enough food, reduction of economy, expansion of poverty and starvation (Feyera and Tsetadirgachew, 2015)

The possibility of perceiving impact of land degradation on agricultural land productivity from slight to severe was primarily determined by institutional and demographic factors as well as weakly by biophysical factors. The socio-institutional and demographic determinants of the effects of land degradation and soil erosion risks on agricultural productivity decline point to policy implications for public inclusive sustainable land

management practices and capacity building programs, as well as bringing back and indigenous land management practices to research and learning platforms for sustainable and desirable societal betterment (Tesfaye, 2017).

Soil degradation was a narrower term for declining soil quality, encompassing the deterioration in physical, chemical and biological attributes of the soil (Enters 1998).

Conserving soil and water was a solution to erosion and the other possible reason of afforestation could be a source of; wood-fuel, timber, trees act as wind breakers and was source of food for both human beings and livestock (Samson, 2016). To mitigate land degradation by restoring damaged land through soil conservation, silvopastoralism, better management of grazing systems and protection of sensitive areas. Success in fighting land degradation requires an improved understanding of its causes, impact, degree and acquaintance with climate, soil, water, land cover and socioeconomic factors (Assemu and Shigdaf, 2014). Therefore this review is targeted to revise the impact of land degradation on crop product and productivity in Ethiopia.

Concept of Land Degradation

Land degradation was a complex phenomenon influenced by natural and socio-economic factors. In many economic analyses, there was a tendency to attribute soil fertility decline only to soil erosion. Erosion was treated as the sole contributing factor to soil/land degradation and yield declines, as the impacts of nutrient depletion on crop yields were underestimated or completely neglected (Kerr and Pender, 2005). Land degradation was a major cause of the country's low and declining agricultural productivity, persistent food insecurity, and abject rural poverty (FAO, 2006). Practicing the major soil and water conservation both physical and biological conservation rather than practicing only alone few of construction of canals, terrace, inter cropping and other in combination to manage the soil fertility, increase crop production and managing natural resources to maintain safe environment, reduce climate change and in general reduce/halt land degradation increase the economic growth of the country as whole (Feyera and Tsetadirgachew, 2015). Smallholder farmers possess vast amounts of indigenous knowledge of their local environment and were aware of land degradation indicators which they observed during their daily land use cores and have local ways of recognizing and describing them. Land degradation was prevented by use of practices such as application of organic manure, planting of trees, crop rotation, use of gabions and stone lines (Samson, 2016). Using an appropriate strategy to increase the productivity of the mixed crop-livestock system, improved management of grazing lands and woodlots, integrated soil nutrient management on cultivated land, application of long term strategies for land (environmental) conservation (coordination with different projects) and adopting a new policy and strategies to the natural resource improvement strategy (implementing a one-to-five farmers arrangement) should get attention in the countries long term strategies like Growth and Transformation Plan (Assemu and Shigdaf, 2014)

Cause of Land Degradation

The causes of land degradation were classified into biophysical factors such as unsuitable land use (land use for the purpose for which environmentally unsuited for sustainable use), socioeconomic factors such as poor land management practices, land tenure, marketing, institutional support, income and human health, and political factors such as lack of incentives and political instability (World Metrological Organization, 2005). Similarly, the major causes include rapid population increase, severe soil loss, deforestation, low vegetative cover and unbalanced crop and livestock production. In addition, topography, soil types and agro-ecological parameters were contributing factors in the degradation processes influenced by man (Temesgen et al., 2014). Socioeconomic and institutional factors were the underlying causes that affect land degradation through their impacts on farmers' decisions with respect to land use and land management practices (Mohammed and Teshome, 2015)

Moreover, land degradation had caused economic and environmental impacts in different country. These impacts can also have a significant adverse effect on the population and can harm national, regional and global development**.** The immediate impact of land degradation is on soil productivity leading to impacts on people's welfare. Soil degradation through erosion, nutrient loss results in undesirable physico-chemical soil properties and there by considerably depresses crop yield. The most important factors reducing soil productivity by soil degradation are reduced soil depth and soil water storage capacity and losses of nutrient (Mohammed and Teshome, 2015)

The strategies practiced prior by government to tackle the problem was the soil and water conservation measure to some extent but not fully practiced due to the fact that people have not full knowledge about it, the extension agents do not continually follow them due to the area lacks roads, even though the people not engaged to another activity outside of agriculture they sale wood and charcoal for surviving themselves and their family (Feyera and Tsetadirgachew, 2015)

The need to increase farmers' perception of soil erosion problem through the provision of knowledge on demonstration of gains and risk reduction characteristics of soil conservation practices. This was important

because, the extent to which farmers understand and feel the need for controlling soil erosion affects adoption of soil conservation measures positively. Therefore, this was important to design soil conservation practices, which couple modern scientific knowledge with indigenous technical knowledge to facilitate their dissemination and ensure their sustainability (Tesfaye, 2017).

Categories of Land Degradation

The land degradation type considers degradation of land through water, wind, chemical, physical and biological phase. The chemical degradation comprising acidification, salinization, fertility depletion, and decrease in cation retention capacity, and similarly, physical degradation comprising crusting, compaction, hard-setting and biological degradation were reduction in total and biomass carbon, and decline in land biodiversity (World Meteorological Organization, 2005). Moreover, high intensity of rainfall, type of soil, topography was the major natural causes of land degradation. In addition some aspects of the environmental degradation were caused by natural factors such as drought and landslide. The manmade land degradation includes production on steep slopes and fragile soils with inadequate investment in soil conservation or vegetation cover, declining use of fallow, limited recycling of dung and crop residues to the soil, limited application of external source of plant nutrient, deforestation and overgrazing. The cause also includes proximate causes such as population pressure, poverty, high costs of and limited access to agricultural inputs and credits, low profitability of agricultural production, farmers' lack of information about alternative technology (Mohammed and Teshome, 2015)

The major cause of land degradation that influence the livelihoods of the rural people economy like soil erosion by heavy rain which facilitated by farming sloppy, clearing forest land for cultivation due to raising of human population, low level of education resisting to accept the new packages of soil and water conservation measure and sustainable management of natural resources (Feyera and Tsetadirgachew, 2015). The degradation of land and soil resource being degraded relates to national sovereignty concerns, while the indirect impacts of degradation transcend village, district and national boundaries and affect food prices, food security and ecosystem service provision in downstream locations, far away from the site of degradation. However, these complex multiscale linkages present a clear need to frame land and soil degradation as global issues that require international recognition particularly in driving investment in funding, technology transfer and capacity building to tackle the land and soil challenges (Lambin, *et al*., 2002).

Implication of Land Degradation

There were a number of shocks and stresses that trigger livelihood diversifications among the farmers in communities though farmland shortage was the top most important of all as access to it could have positive effect on others. Factors like soil degradation, population pressure, deforestation, low level of rural economy diversifications have complicated and, directly or indirectly, contributed to land scarcity as result land degradation (Feyera and Tsetadirgachew, 2015). Being land degradation was the common environmental problem in Ethiopia; land degradation puts disastrous impact on the socio cultural environment and ecological setting of the country (Temesgen et al., 2014)

Land degradation had also an effect on climate change by reducing carbon sequestration and increasing accumulation of greenhouse gases in the atmosphere through deforestation and soil erosion. It also can cause loss of bio diversity, ecosystem services which are difficult to measure as they are not normally given monetary value or bought or sold and thus are poorly reflected in estimate of losses (Mohammed and Teshome, 2015). Land degradation reduces agricultural value to 7%. In monetary terms, this decline is equivalent to $7.63 per hectare. If all of the agricultural lands are degraded, the loss for the country as a whole is $267 Million where 85% of the population depends on agriculture, this loss is substantial. Type of energy used in cooking stoves and bequest variables are good instruments for land degradation. The significance of type of energy used in cooking stoves suggests a two-pronged policy to stem deforestation and to disseminate more efficient stove technologies (Maria et al.,2012).

Consequences on Agricultural Productivity

Land degradation was a complex phenomenon influenced by natural, social and economic factors. It generally refers to the loss of the land's biological and or economic productivity. Land degradation remains an important global priority issue for the 21st century requiring renewed attention by individuals, communities, and governments because of its adverse impact on agricultural productivity and the environment, and its effect on food security and quality of life. The land degradation process appears particularly severe in developing countries, which has significant implications for climate change mitigation and adaptation. This was because the loss of biomass and soil organic matter releases carbon into the atmosphere and affects the quality of soil and its ability to hold water and nutrients (Mohammed and Teshome, 2015)

Degradation included yield losses may become more significant in relation to yield growth in the future, as yield growth rates are projected to fall below 1% per year over the next few decades. Land degradation's effects

on more sever in some regions and local areas due to a combination of resource factors (soils and precipitation) and economic factors (poverty, insecurity and lack of infrastructure) (Wiebe K. 2003).

Among main factors that affecting the crop production in Ethiopia was land degradation, which including soil erosion, deforestation, reduction of productivity, reduction of pasture land which affect the crop production and economy of the country. Other related factors like farm land size, education level, sex of household heads, experience of farmers, family size and quintals of fertilizer are also used the most issues underlined to contribute for crop production (Feyera and Tsetadirgachew, 2015). Continues land fragmentation and degradation disturb the balance between crop, livestock, and forest production (Assume and Shigedaf, 2014).

SUMMARY AND CONCLUSION

Land degradation occurs in the form of depletion or total loss of vegetative cover, and loss of its biophysical and economic productivity through exposure of the soil surface to wind erosion and water erosion, and through salinization and water logging, leading to deterioration of the physical, chemical and biological properties of soil. Communal difficult of land degradation in Ethiopia puts tragedies influence on livelihood, product and productivity, atmosphere and environmental situation of the country. The foremost sources of land degradation include prompted population increase; sever soil losses, deforestation, low vegetative cover and unbalanced crop and livestock production. In addition, to anthropogenic influence, landscape, cultivation system, land cover, soil types and agro-ecological restrictions are contributing factor in degradation process. This degradation had an impact on soil productivity by means of erosion, nutrient loss and inappropriate land use system with detrimental soil property thereby extensively decreases agricultural crop productivity. Therefore since land degradation had an adverse effect on crop productivity, it is better to use land sustainably through reduce or halt the cause of degradation and then if all this were functioned properly agricultural productivity can be secured.

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