Global Journal of Agricultural Research
Vol.10, No.3, pp.38-46, 2022
Print ISSN: 2053-5805(Print),
Online ISSN: 2053-5813(Online)

Review On Land Degradation and Its Management

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Citation: Getachew Bar and Isral Zewdie (2022) Review On Land Degradation and Its Management, *Global Journal of Agricultural Research* , Vol.10, No.3, pp.38-46

ABSTRACT*: Land is the essential component which provides us food, shelter, and fiber. It is non-renewable resource which is degrading day to day. The present review focuses on effect of land degradation on agriculture and environment; and how we can manage our lands from further degradation. Agriculture is an important sector of economy and plays a significant role like GDP share, foreign exchange earnings, and employment. Land degradation is an environmental process in which biological, economical, and quality of land is lost due to alteration in chemical, physical, and biological properties. Factors like climatic, natural, and anthropogenic deteriorate the quality of land and degraded it for agricultural use. Agriculture sector is directly linked with land while most of the agriculture land is degraded by some factors. The most frequent causes of degradation are poor farming practices, inappropriate irrigation, overgrazing, urban sprawl, commercial development, and land clearance. Due to rapid changes in climatic conditions, deforestation, desertification, erosion, salinization, water logging, and organic matter depletion lead to land degradation. For restoration of land, it is important to minimize these activities and properly managed all factors. We can manage our land by ground covers, alternate fuels, timber replantation, and dams and by making the policies. Improvement and reclamation of degraded lands the domestic structure must be integrated in all related areas which gives direction for asset in sustainable land management and stimulating community response towards sustainable land management. Furthermore, organic agriculture may be an alternative to save our land from degradation.*

KEYWORDS: agriculture, degradation, environment, land, management

INTRODUCTION

Agriculture is an important sector of economy and plays a significant role like GDP share, foreign exchange earnings, and employment that growth of agriculture is very important because it is an important economic sector, which gives the basic constituents to the population. Itis observed that increased agriculture productivity and output tend to share substantially to all economic development sectors (Anwar *et al.*,2015).

Factors such as weeds, poor nutrition soil degradation, and land degradation influence the agriculture productivity. Land degradation is an environmental process in which biological, economical and quality of land is lost due to alteration in chemical, physical andbiological properties. Land degradation may be caused by erosion, loss in soil organic matter, soil acidity, deforestation, desertification, salinity, soil compaction, and such more phenomena that make agricultural land unfavorable for crop production (Turner *et al.*,2016).

Land degradation occurs in all kinds of landscapes over the world. It is one of the serious global environmental issues increasing in severity and extent in different areas of the world (De *Jong et al*.2011;Jamal *et al*.2016).Land degradation is currently affecting about 40% of earth's surface ,and another 12 million hectares to become degraded every year(Kapur,2016;Pacheco *et al*.2018).Human dominance on earth's land its natural resources have enormously amplified over the past century and have markedly changed the normal functioning of natural ecological processes on 75%of the land on Earth(UNCCD,2017).

In terms of land use types ,over 20% of all cultivated areas,30% of forest and 10% of grasslands are undergoing degradation. In actual facts, the degraded lands homes for the most poverty-stricken rural population (Kapur,2016) and hence more than 2.6 billon people are presently facing the direct impact of land degradation in over a hundred countries (Gisladottir and Stocking,2005). On the other hand land degradation is a continuing deterioration of environment (Bai,2006; UNEP,2017).It occurs in the form of total loss in vegetative covers and loss of its economic productivity or biophysical by exposure of soil surface to water and wind erosion, and by water logging, soil and salinization, leading to decline in biological, chemical and physical soil property. Land degradation is also an ecological sensation that disturbing arid lands and effect the economic and natural excellence of an agronomic land (Mantel, 1997). Different factors or combination of anthropogenic activities like climatic variations and unsustainable management of land leads to land degradation (Bai *et al*.,2008).

It occurs in the form of total loss in vegetative covers and loss of its economic productivity or biophysical by exposure of soil surface to water and wind erosion, and by water logging,soil and salinization, leading to decline in biological, chemical and physical soil properties. The continued vegetation loss due to human activities and Stalinizations also depletes the biodiversity, and it decreases the capability of natural ecosystem for CO2 sequestration with long-term influence of climate and global. Land degradation alters biogeochemical and hydrological cycles in earth (Brevik *et al.,* 2015).

The world's annual degradation cost is about 40 billion USD (ELD, 2013). It will remain an important issue for 21st century due to its negative effects on crop production, environment, and food security. It has become an important environmental problem (Scherr, 2012).Warming;the overgrazing to animals in rangelands is particularly very severe in arid lands.(Hamdy and Aly,2014).

There are many strategies to manage the soil degradation process by ground covers, alternate fuels, timber re-plantation, and dams and by making the policies. Moreover, organic agriculture may be an alternative to save our land from degradation. Rahm and Huffman (1984) stated that land degradation can be managed by conservation tillage and integrated soil fertility management (ISFM) strategies. The present review focuses on effect of land degradation on agriculture and environment; and how we can manage our lands from further degradation.

THE CONCEPT OF LAND DEGRADATION

Land is global environmental part that holds natural assets (aquatic portion, flora and topsoil) the natural geography, anthropological and progressions substructure and disbursements that function inside the ecosystem (Henry *et al.,* 2018). Land degradation can be defined as long-term injury to ecosystem productivity and functioning initiated due to disturbances from which land and its components cannot recover (Bai and Dent, 2006). Before 1000 years ago, terrestrial ruination has accompanied humankind at least consequently the extensive farming implementation (Dotter, 2013) and the intensification related populace (Bocquet, 2011). According to FAO's framework for land evaluation (FAO,2015), land is delineable area Earth's terrestrial surface which encompasses the physical environment including soil, spatial variability of landscape, climate, hydrology, vegetation and fauna ,as well as land management practices and the influence potentials for land use. The united Nation Convention to combat desertification (UNCCD) defines land as "the terrestrial bio-productive system that comprise, soil, vegetation, other biotas and the ecological and hydrological processes that operate within the system(UNCCD,2017).

Land has also been considered as a plate form on which most activities take place, the prerequisite for food and shelter, the natural repository for water and waste, and a major in the provider of breathable air(Long and Qu,2018).It is crucial natural resources for both survival and prosperity and serves as the principal sources of income for the farming community. Being a sole source of livelihood opportunities, it provides a sense of security to the community engaged in farming (Bedasa and Hussein, 2018).Land degradation refers to a process of soil degradation through water erosion and losses of vegetation cover leading to reduced productivity of the land in densely settled or exploitatively used regions (Nyssen*et al*., 2004).The UNCCD also forwarded a definition for land degradation as a global environmental issue comprising the reduction or losse of lands biological or economic productivity against background thresholds of land deterioration that includes a decline in the productivity of ecosystem goods and services obtained from land posing unlimited contests to both human and ecological systems (Nigussie *et al.,* 2018).

Accordingly, land degradation is the deterioration and persistent debility of the capacity of the land in supporting human and other life forms on earth (Hurni *et al*., 2010; De Jong *et al*., 2011; Jamal *et al.,* 2016).Generally, definitions regarding land degradation have been forwarded by different schools according to their the system made up of soil ,water, the biota together with the man-made landscape and their biophysical processes(Jaleta *et al*.,2016).Land degradation occurs in all kinds of landscapes over the world. It is one of the serious global environmental issues increasing in severity and extent in different areas of the world (De Jong *et al*.,2011;Jamal *et al*.,2016).Land degradation is currently affecting about 40% of earth's surface ,and another 12 million hectares to

become degraded every year(Kapur,2016;Pacheco *etal*.,2018).Human dominance on earth's land its natural resources have enormously amplified over the past century and have markedly changed the normal functioning of natural ecological processes on 75%of the land on Earth(UNCCD,2017).Latin America, Asia and Africa are said to be the world's major soil degradation hotspots (Gessesse*et al.*,2015).

In terms of land use types, over 20% of all cultivated areas, 30% of forest and 10% of grasslands are undergoing degradation. In actual facts, the degraded lands homes for the most poverty-stricken rural population (Kapur,2016), and hence more than 2.6billon people are presently facing the direct impact of land degradation in over a hundred countries (Gisladottir and Stocking,2005). The global cost of land degradation just looking to agriculture approaches US$490 billion per year which is 3-6%of the global agricultural Gross Domestic Product (GDP) (UNCCD ,2015).

Land degradation is also a widespread problem in Ethiopia With over 85%of the land moderately to very severely degraded (Gashu and Muchie,2018),and about 75% affected by desertification(Gebreselassie*et al*.,2016).In the country, degradation of land stems from the historical development of agriculture and human settlement in the highland regions(Nyssen*etal*.,2015).Resent estimates using satellite imagery shows that lands degradation hotspots over the last three decades cover about 23% of the land area in the country, basically in large areas of Tigray,Wollo,andGonder among others(Tesfa and Mekuria, 2014).

The most frequent causes of degradation are poor farming practices, inappropriate irrigation, overgrazing, urban sprawl, commercial development, and land clearance. Moreover, land pollution includes quarrying of sand and stone and minerals and industrial waste. High density of population is not necessarily correlated with degradation of land (Eswaran,2001). About 50 percent of agricultural lands are going to be degraded from moderately to severely. Land degradation effects about 1.5 billion humans globally, 15 billion tons' soil disappears every year, about 12 million ha-1 lost every year due to desertification, and drought, about six million km2 dry lands leads towards desertification. The Biodiversity of about 27000 species lost annually due to degradation of land, about 110 countries have potentially at risk regarding dry lands, approximately 250 million people are affected and about 1 billion are under risk or threat. Global cost of desertification is $ 42 million (Hamdy and Aly, 2014).

Principal processes of degradation include erosion by wind and water, chemical degradation (leaching, salinization and acidification etc.) and physical land degradation (hard-setting, compaction and crusting). Some landscape units or lands are influenced by more than one degradation process (Eswaran,2001). There are different causes of land degradation i.e. Deforestation, Livestock grazing Pressure, water logging and salinity.

Effect of land degradation on agriculture

Land degradation is basically a huge worldwide issue due to its antagonistic influence on agriculture efficiency. It also has bad impact on ecological circumstance and nutritional safety. Ecosystem is also affected by degradation, because nonstop degradation has now faraway

getting categorizations: it expresses problematic situations for ecological growth, it splits adverse effects on the socio-economic circumstances and agriculture (Eswaran*et al*., 2017).Land degradation is an outcome of regular or atrophic aspects which can cause decrease in production. In framework of production, land degradation marks from a gap among land excellence and land usage (Beinroth*et al*., 1994). Globally above 20% of agricultural zones, 30% of plantations and 10% of savannas are effected by land degradation, this degradation caused by human actions like un maintainable land managing and environmental deviations(Bai and Dent , 2006) .

Recent studies suggest that about 5 to 6 million ha of agriculture land are permanently lost annually due to salinization and soil erosion and many other land degradation practices. Degradation cause yield losses which may develop more significant relation to the yield growth and loss in future, as the yield rates are projected to drop below 1% annually in coming decades. This is more sever in the semi-arid and arid regions because of combined resources; lack of infrastructure and economic factors (Hamdy and Aly, 2014). About 50 percent of agricultural lands are going to be degraded from moderately to severely. Land degradation effects about 1.5 billion humans globally, 15 billion tons' soil disappears every year, about 12 million ha-1 lost every year due to desertification and drought and about six million km2 dry lands leads towards desertification.

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Effect of land degradation on environment

The effect of land degradation on the natural environment is due to the depletion of forests (Birhanu, 2014). Land degradation also leads to the diminution of livestock in both quantity and quality so that the living standard of the rural people as a whole is affected by any change in the livestock sector. Land degradation also results in enhancing the unemployment rate and out-migration; where there is low agricultural and livestock production. Insufficient land for cultivation leads to a reduction of farm size that creates disguised unemployment.

Land degradation is an ecological sensation that disturbing arid lands and effect the economic and nature of agronomic lands (Mantel and Engelen, 1997). Land degradation directly influenced cultivation, ecosystem, production, environment, nutritional value and biodiversity (Wasson, 1987) . It also influences the biophysical environment by distressing the land by anthropological or natural processes. The natural sources contain earthquakes, tidal waves, erosion, overflow of

water and cyclone. Degradation through anthropological activities mostly significantly affects the environment (Barrow, 1991).

Global estimations of land degradation demonstrated that Asia has extremely affected but Africa and Europe are slightly influenced (Zika and Erb, 2009). Early historical study demonstrated about nonstop effect of volcanic activity lead to land degradation and has a great impact on the environment (Leroy *et al*., 2009).

MANAGEMENT OF LAND DEGRADATION

Rahm and Huffman (2010) demonstrated about land degradation can be managed by conservation tillage because it required minimum employs and low cost. Integrated soil fertility management (ISFM) deals with the reclamation of problematic lands and makes them more productive. Through IFSM efforts we can increase nutrient uptake, improve soil fertility and inorganic nourishments which leads to improvement in land efficiency and productiveness. IFSM services not only increased the crop yield but also recover degraded zones (Divyalakshme, 2013).

According to Herz (2010) for the improvement and reclamation of degraded lands the domestic structure must be integrated in all related areas which gives direction for asset in sustainable land management (SLM) and stimulating community response towards SLM. Agro forestry is a land use system and one of agricultural intensification practices (Ketema*et al*. ,2020) where woody perennials are planted and purposely integrated with crop cultivation and/or animal rearing on the same land management unit (Birhanu ,2014; Marques *et al*.,2016). Different types of agroforestry system do exist such as alley cropping, silvopastoral, home gardens, multilayer tree gardens, multipurpose trees on croplands or shelterbelts where rows of trees are planted widely spaced in between annual crops or windbreaks and buffer strips of trees in different ways (Stavi and Lal ,2015).Management techniques such as fencing, fertilizer application, placement of salt and supplements, burning and water development can control overgrazing by animals and leads to improve soil fertility (Czegledi and Radacsi ,2005) .

Irrigation system management can also helpful to reduce land degradation, irrigation must be controlled i.e. drip irrigation to decrease soil and water erosion. Using low and high salt water was the most efficient way for maintaining the clay soil productive capacity. Often heavy irrigation can cause nutrient leach down and top fertile degrade. Management of irrigation water is key factor to improve soil quality (Crescimanno, 2001). Community-based societies must be recognized at native public level to link conversations among systematic data and specific consumers (Katsunori, 2003).

CONCLUSION

Land degradation has many negative impacts on agriculture and environment. Land degradation may be caused by i.e. water erosion, deforestation, soil compaction, desertification, salinization, water logging and other factors. So, it is important to minimize the losses caused by

land degradation. Land degradation can be managed by integrated application of organic and inorganic fertilizer, use of drip irrigation and reduce the use of heavy tillage implements. Special attention has to be given to properly manage the natural resources and ecosystems; so that, it can continue to provide the goods and services

Acknowledgement
I would like to thank my classmate for this valuable comments and correction in organizing this review paper I would also like to thank college of Agriculture and Natural Resources Mizan Tepi University and main library staff for creating suitable condition for internet service for summarizing this review.

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