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Original Paper

Opportunities and Challenges of Forest Development in Ethiopia

Kitessa Gemechu Beleta[1]

[1] Ethiopian Biodiversity Institute, Forest and Range Land Plants Biodiversity Directorate, Addis Ababa, Ethiopia

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Abstract

Forests are essential for life on earth. They are not really simply the green cover; we require beautifying the earth. This research review aimed to overview the forest development opportunities and the challenges for forest development in Ethiopia. Published documents, reports from governments and non-governmental organizations on collective forest management were found via keyword searches in relevant literature data banks were used as data source materials. The global forest is declining at a rate of 13 million ha in each year. Tropical forest decline is particularly severe in Africa, Brazil and Indonesia. For example, Africa has lost around 3.4 million ha per year between 2000 and 2010. Ethiopia is thought to be losing 140,000 ha per year. Deforestation, which is occurring at an alarming rate, is one of such problems and a key factor challenging forest development. Deforestation, agricultural expansion and lack of strong coordinating forestry institutions are some of the challenges for forest development in Ethiopia. The causes of deforestation and forest degradation are dynamics, complex, and vary from place to place. There are several reasons for the depletion of forest resources, the following are considered major: Increases in population and consequent increases in the demand for agricultural land, settlements around forest areas, encroachments, forest fires, ranges of political, cultural, and socio-economic factors. Technical advances in energy efficiency are critical for developing countries like Ethiopia whose populations depend primarily on biomass fuels and Reduce demand for fuelwood via the dissemination and usage of fuel-efficient stoves and/or alternative-fuel cooking and the collaboration of researchers, educators, and developmental extensions are needed to rehabilitate the degraded forest land.

Keywords

Deforestation, Forest degradation, Forests, Forest Coverage

1. Introduction

Deforestation and forest degradation are the biggest threats to forests worldwide. Deforestation occurs when forests are converted into non-forest uses, such as agriculture and road construction. Forest degradation occurs when forest ecosystems lose their capacity to provide important goods and services to people and nature. Over half of the tropical forests have been destroyed since 1960s, and every second, more than one hectare of tropical forests is destroyed because of natural and man-made activities (Jeffrey, 1991).

Forests display a range of structures and composition rising from the interplay between a wide range of altitudinal, climatic, soil environments, and different interactions between humans. Forest is home for many living organisms; life in forests is governed by factors like air, water, and sunlight (EPCC, 2015). There are a variety of plants available in most forests: herbs, shrubs, and trees depending upon the climate of the region. Plants make their food by the process of photosynthesis and animals depend on plants and other animals for their food. Plants also depend on animals for processes like pollination and seed dispersal. Trees present in the forests hold the soil particles strongly with the roots and prevent them from erosion. It is not possible; to sum up, the importance of forests in just a few words (Douglass and Goodwin, 1980).

2. Material and Methods

Published documents, reports from governments and non-governmental organizations (NGOs) on collective forest management were found via keyword searches in relevant literature data banks were used as data source materials. Google, Google Scholar, Research Gate were used to undertake the literature search as a result, many articles, documents, book chapters and grey literatures such as conference papers, working papers, and reports in institutional series were obtained.

3. Some Definition and Concept of Forests

Based on management goals, land use, type of flora, composition, altitude, and other factors, the definition of the word “forest” differs from region to region and country to country. According to the FAO (2001), a forest is defined as land with a tree crown cover (equivalent stocking level) of more than 10% and an area of more than 0.5 ha, with trees reaching a minimum height of 5 meters at maturity. According to FAO (2006), forests have a minimum land area of 0.05-1 hectare, a tree crown covering more than 10-30% of the surface area, and a mature tree height of 2-5 meters.

A forest, according to FAO (2015), is defined as land with trees taller than 5 meters, a canopy cover of more than 10%, it excludes land that is primarily used for agriculture or urban development, included areas with young trees that have not yet reached a canopy cover of at least 10%; it also includes places that have become temporarily unhinged as a result of clear-cutting as part of a forest management technique or natural calamities, but are projected to rebound within 5 years.

Taking into account the wide range of definitions used around the world and the need for global efforts to mitigate the negative effects of deforestation and climate change, international organizations such as the FAO and the UNFCCC developed some common and workable definitions based on certain parameters such as crown cover, area, and tree height as threshold values, and they are now widely used for assessing forest area, growing stock, and afforestation.

3.1 Status of Forest Resources, Opportunities, and Challenges in Global Context

According to (FAO, 2015), the rate of global forest loss is decreasing; in the 1990s, the net loss of forest (natural and planted) was -0.18%, as indicated in (Table 1). The net loss of forest was reduced to -0.08% between 2010 and 2015; the total area of planted forest has increased by over 110 million ha, covering approximately 7% of the world's forest area.

Table1. Global Forest Area Change (1990-2015)

Year	Forest (000 ha)	Annual change (000 ha)	Annualized change	References
1990	4,128,269			FAO 2015
2000	4,055,602	-7,267	-0.18	
2005	4,032,743	-4,572	-0.11	
2010	4,015,673	-3,414	-0.08	
2015	3,999,134	-3,308	-0.08	

A global survey estimates that more than one-quarter of the household income in rural areas of developing countries stems from natural forests and other natural areas (Angelsen et al., 2014). Although, the net loss of forest was reduced, poor governance, over forest resource allows and illegal loggings have been continuing in many tropical countries. From illegally harvested timber, the global market losses estimated to be between USD 30-100 billion annually, and government revenue losses amount to an additional USD 5 billion per annum (WWF & IIASA, 2012).

To address these challenges, multilateral and bilateral development partners, governments and the private sector have significantly increased support for the protection, restoration, and sustainable use of forests through various initiatives and programs over the last decade. The impacts of many programs are beginning to unfold and lessons are learned from moving from project to landscape level. Many developing countries are in the process of formulating their national plans for mitigation actions.

Implementing REDD+ and the expected ratification of the Paris Agreement has provided several new options and financing for countries to collaborate. Also, high-level political discourse on developing deforestation-free supply chains offers a new window of opportunity for including the private sector and leveraging limited public finance. Further, voluntary commitments in the context of Forest Landscape Restoration (FLR) should be support the operationalization of political objectives for the land-use sector and forests, including the investments in forest product value chains (NFSDP, 2018).

3.2 Forest Coverage of Ethiopia

Forests are a dynamic ecosystem consisting primarily of trees that protect the earth and support a variety of life forms (EPCC, 2015). Forests have a variety of species composition, structure, and physiognomy due to environmental factors such as climate, soil types, topography, and elevation (Bubb et al., 2004).

In Ethiopia, there is a scarcity of consistent and trustworthy data on forest resource coverage, standing stock, growth rate, production, and productivity. Estimates from other sources varied significantly; this is due to in part to the many definitions of forest used. Forest resources in Ethiopia cover over 17.35 million ha (15.7% of the country's land area), comprising bamboo, plantations, dense woodland, natural forests, and managed forests. The majority of the country's natural forests are found in the south-western and south-eastern regions (MEFCC, 2018).

Oromia, Gambella, SNNPR, Amhara, and Benishangul regional states have more natural forest resources respectively. Oromia, SNNPR, and Amhara regional states have over 93.5% of the country's total plantation resources (MEFCC, 2018).

Table 2. Estimates of Area Cover of Various Forest Resources in Ethiopia

Forest types	Area (ha)	References
Bamboo	519,124	MEFCC, 2018
Dense Woodland	10,739,286	
Natural Forest	5,266,419	
Plantation	827,613	
Total	17,352,443	

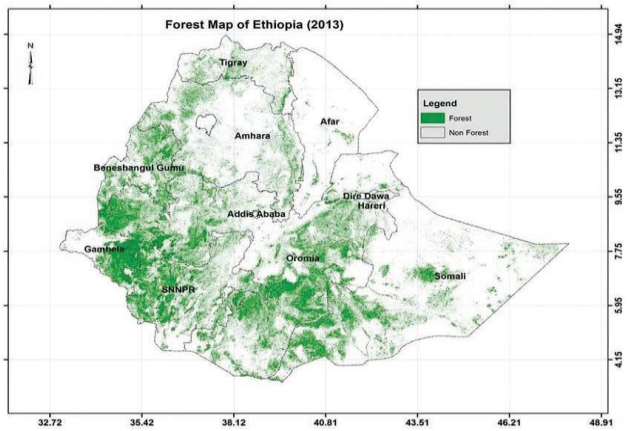

Figure 1. Distribution of the Forest Resources of Ethiopia

Source: EMA (2013).

3.3 Opportunities for Forest Development in Ethiopia

3.3.1 Forest Policies, Institutions, and Governance

The Ethiopian government has signed several of international conventions, such as: Convention to Combat Desertification (CCD), the Convention on Climate Change (CCC), the Convention on Biodiversity (CBD), the Millennium Development Goal (MDG), the Establishment of Oromia and Amhara Forest Enterprises, GTP, and Green Economy Targets, all have provided opportunities to develop degraded forest land areas.

3.3.2 Participatory Forest Management (PFM)

The PFM Program covers six forest priority areas in Ethiopia those are, Chilimo, Bonga, Borana, Belete Gera, Adaba-dodola, SOS Sahel. Sustainable Land Management (SLM), agroforestry, priority high forests, national parks, and sacred site forests are all examples of community-based forest management techniques. Trees planted around homesteads have a criticalroles for humans, as well as for animals. Example, trees planted near homesteads could give additional food sources as well as cash income for the communities (Tadesse, 2012).

3.3.3 Reforestation/Afforestation Programs and Agroecology

Reforestation is the direct human-induced conversion of non-forested land to forested land through planting, seeding, and/or the human-induced enhancement of natural seed sources. Ethiopia has been implementing significant tree-planting programs as part of their millennium celebrations since 2007. According to certain local sources, Ethiopia's four regions, i.e., Oromia, SNNP, Amhara, and Tigray regional states planted a total of about 2.21 billion seedlings in 2009 (Tadesse, 2012). On a nationwide scale, more than 5.6 billion seedlings are expected to be planted in 2010. Since Ethiopia is located in the tropics, there is an access of rainfall and high temperatures as a result, it is suitable for seedling growth.

Figure 2. Planting Forest Trees as a Green Legacy

4. Challenges of Forest Development in Ethiopia

4.1 Deforestation

Deforestation is the conversion of forest to another land use or the long-term reduction of tree canopy cover below the 10% threshold or deforestation implies the long-term (>10 years) or permanent loss of forest cover (Tejaswi, 2007). Natural resource depletion is one of the most serious concerns affecting humanity in all countries. Ethiopia's forest resources, have been steadily declining over time (Tesfaye et al., 2017).

Since 1960, over half of the tropical forests have been destroyed; because of, livestock, insects, diseases, forest fires, and other human-linked activities. According to WBISPP (2004), the first national inventory statistics on the forest resources indicated that in Ethiopia there was a total of 59.7 million ha woody vegetation but, deforestation, which is occurring at an alarming rate, is a key factor challenging forest development. Over 15 million ha of tropical forest was deforested at an annual rate of 0.8% over the globe in 1980 to 1990. Africa recorded an annual loss of about 3.4 million ha from 2000 to 2010 (Badege, 2001). It is estimated that Ethiopia has lost 140,000 ha/year. Ethiopia is facing rapid deforestation and degradation of land resources. The current rate of deforestation is estimated to be 160,000 to 200,000 ha per year (Badege, 2001). Forest and woodland cover change in Ethiopia indicate that the average annual rate of deforestation is greater than 0.25% (Hansen et al., 2010).

4.1.1 Drivers of Deforestation

There are two types of drivers: direct and indirect drivers. Direct deforestation are an expansion of smallholder traditional agriculture, wood extraction, forest product collection and forest fires whereas, population growth, developmental activities, a range of political, cultural, weak governance, lack of law enforcement, land less ness, unclear allocation of rights, rural poverty, lack of investment and financial resources, migration, and civil conflicts are some of the indirect drivers of deforestations (Melaku et al., 2015). According to Abera and Belachew (2011), the cultivated area has increased from 9.44 million ha in 2001 to 15.4 million ha in 2009 in Ethiopia, Example, 1850 ha/year of Boswellia woodland is converted into agricultural land (Atkilit, 2011).

4.2 Lack of Strong Coordinating Forestry Institution

The institutional (developmental extension, researches, and educations) arrangements have been unstable structuring. Lack of stability in the organizational structure is often cited as one of the major bottlenecks for the lack of coordinated, effective, and long-term management and development successes in Ethiopian forestry (Demel et al., 2010; Mulugeta & Tadesse, 2010). Lack of strong coordinating Forest institution leads to Poor coordination, monitoring, low resources allocations (manpower, budget, and logistic), Poor inter-sectoral coordination, low policy implementation and low evaluation of forest development initiatives (Tadesse, 2010).

5. Conclusion

Forests are essential for life on earth. They are not really simply the green cover we require to beautify the earth. Ethiopia's agroecology encourages the restoration of degraded forests. That is to say, because Ethiopia is located in the tropics, it has access to significant rainfall and high temperatures, both of which promote seedling growth. Direct deforestation drivers in Ethiopia are an expansion of smallholder traditional agriculture following population growth in forest areas, expansion of enormous-scale development activities, population growth, wood extraction, and other forest product collection and forest fires. Underlying drivers include a range of political, cultural, and socio-economic factors, including unsound policies, weak governance and lack of law enforcement, landlessness and unclear allocation of rights, rural poverty, lack of investment and financial resources, migration, and civil conflict. Deforestation, agricultural expansion and lack of strong coordinating forest institutions are some of the challenges for forest development in Ethiopia. The country needs to invest in forestry (research, extension, and education) before the problems get out of hand. The collaboration of researchers, education, development/extensions, and the stakeholders are needed to rehabilitate the degraded forest resources in Ethiopia.

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References

Abayneh et al. (2010). *Tree-planting, millennium development goal*.

Abera, Y., & Belachew, T. (2011). Effects of landuse on soil organic carbon and nitrogen in soils of bale, Southeastern Ethiopia. *Tropical and Subtropical Agroecosystems, 14*(1), 229-235.

Ameha, A., Larsen, H. O., & Lemenih, M. (2014). Participatory forest management in Ethiopia: Learning from pilot projects. *Environmental Management, 53*, 838-854. https://doi.org/10.1007/s00267-014-0243-9

Angelsen et al. (2014). Environmental Income and Rural Livelihoods: A Global-Comparative Analysis. *World Development, 64*, S12-S28. https://doi.org/10.1016/j.worlddev.2014.03.006

Arevalo. (2016). *Unclear allocation of rights, rural poverty, lack of investment and financial resources, migration and civil conflict*.

Badege, B. (2001). *Deforestation and Land Degradation on the Ethiopian Highlands: A Strategy for Physical Recovery*.

BöHmer, H. (2011). Vulnerability of tropical montane rain forest ecosystems due to climate change. In *Coping with global environmental change, disasters and security* (pp. 789-802). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-17776-7_46

Bubb, P., Miles, L., & Sayer, J. (2004). *Cloud forest agenda*.

Demel et al. (2010). *Historical development of forest policy in Ethiopia*.

Douglass, J. E., & Goodwin, O. C. (1980). Runoff and soil erosion from forest site preparation practices. In *Proceedings of the US Forestry and Water Quality: What Course in the 80's* (pp. 19-20).

Ethiopian Biodiversity Inistitute (EBI). (2020). *Addis Abeba*.

Ethiopian Forestry Action Program (EFAP). (1994). *Addis Abeba*.

Ethiopian Mapping Agency (EMA). (2013). *Addis Abeba*.

Ethiopian National Forest Sector Development Program (ENFSDP). (2018). *Synthesis Report* (Vol. iii).

Ethiopian panel on Climate Change. (2015). *First Assessment Report, Working Group I Physical Science Basis*. Published by the Ethiopian Academy of Sciences.

Food and Agriculture Organization (FAO). (2001). *State of the World's Forests*. Italy, Rome. Retrieved from https://ftp.fao.org/docrep/fao/003/y0900e

Food and Agriculture Organization (FAO). (2006). *World reference base for soil resources. A framework for international classification, correlation and communication*. Italy, Rome.

Food and Agriculture Organization (FAO). (2010). *Global Forest Resources Assessment country report Ethiopia* (p. 43). Food and Agriculture Organization of the United Nations, Rome.

Food and Agriculture Organization (FAO). (2015). *Global Forest Resources Assessment (FRA)*. Retrieved from https://www.fao.org/forestry/fra

Forests and Wood Products. (2012). WWF & IIASA. In *WWF Living Forests Report: Chapter 4*. Retrieved from http://wwf.panda.org/about_our_earth/deforestation/forest_publications_news_and_reports/living_forests_report/

Friis, I. B. (1992). *Forests and forest trees of northeast tropical Africa: Their natural habitats and distribution patterns in Ethiopia, Djibouti and Somalia*. HMSO.

Hansen et al. (2010). *Woodland cover change in Ethiopia*.

Hoare, A. (2015). Tackling Illegal Logging and the related trade: What progress and where next. In *Chatham House Report*.

Labin, & Geist. (2006). *Drivers of change often comprise more fold factors and drivers such as interaction of economic, institutional, technological, cultural and demographic variables where economic factors are prominents.*

Melaku et al. (2015). Population growth, wood extraction and other forest products collection and forest fires. *Agrofor.syst.*, *80*(2), 173-184.

National Forest sector Development program. (2018). *Addis Abeba*.

Sayer, J. A., & Whitmore, T. C. (1991). Tropical moist forests: destruction and species extinction. *Biological Conservation*, *55*(2), 199-213.

Solomon, A., & Demel, T. (2017). Perceptions and attitudes of local people towards participatory forest management in Tarmaber District of North Shewa Administrative Zone, Ethiopia: The case of Wof-Washa Forests. *Ecological Processes*, *6*(17). https://doi.org/10.1186/s13717-017-0084-6

Tadesse, W. (2012). *The status of forestry development in Ethiopia: Challenges and Opportunities*. National Dialog on Sustainable Agricultural Intensification in Ethiopia and its role on the climate resilient green economy initiative in Ethiopia. Tejaswi, 2007.

Tesfaye, Y. (2011). *Participatory forest management for sustainable livelihoods in the Bale Mountains, Southern Ethiopia* (PhD dissertation). Swedish University of Agricultural Sciences, Uppsala.

WBISPP. (2004). *Woody Biomass Inventory and Strategic Planning Project Forest resource accounts for Ethiopia*.

WWF, I. (2012). *Living Forests Report*. Gland, Switzerland.

Zikargae, M. H. (2018). Analysis of environmental communication and its implication for sustainable development in Ethiopia. *Science of the Total Environment*, *634*, 1593-1600. https://doi.org/10.1016/j.scitotenv.2018.04.050