

Ethiopia: Food Security and Ecosystem Resilience

Introduction

The Ministry of Agriculture and Natural Resources aims to create an agriculture sector focusing on high productivity and emergency management while empowering marginal groups such as women and the youth. The Ministry oversees the following sectors: food security, agricultural water use, small-scale irrigation, forests, wildlife and rural technology. It is also responsible for agricultural development and the implementation of early warning systems making it key in ensuring food security. Other institutions involved in the sector include the Agricultural Transformation Agency.

Agriculture in the Ethiopian Economy

By 2017, the population of Ethiopia was 104.9 million growing at an average annual rate of 2.5 per cent. About 79.7 per cent of the population lives in the rural areas. The contribution of agriculture to GDP was 34 per cent in 2017. In 2018, agriculture, mostly at a subsistence level, employed 67.3 per cent of the population compared to 23.1 and 9.6 per cent in services and industry respectively (**Error! Reference source not found.**) (World Bank, 2018).

Table 1: Key indicators Source: (World Bank, 2017) (UNDESA, 2018)

ETHIOPIA	2018
Total population (million)	107.54
Total area (km ²)	1,104,300
Population density (persons/km ²)	107.5
Per capita income, 2015 (US \$)	590

Relevant SDG 2 indicators

- 2.1.2** Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)
- 2.4.1** Proportion of agricultural area under productive and sustainable agriculture

About 36 per cent of Ethiopia's total land area of 1 million km² is agricultural land (**Error! Reference source not found.**). Average rainfall is 848 mm per year, but it can be erratic; and dry spells and debilitating droughts have been known to occur, the most recent being 2015-2016 (FAO, 2016).

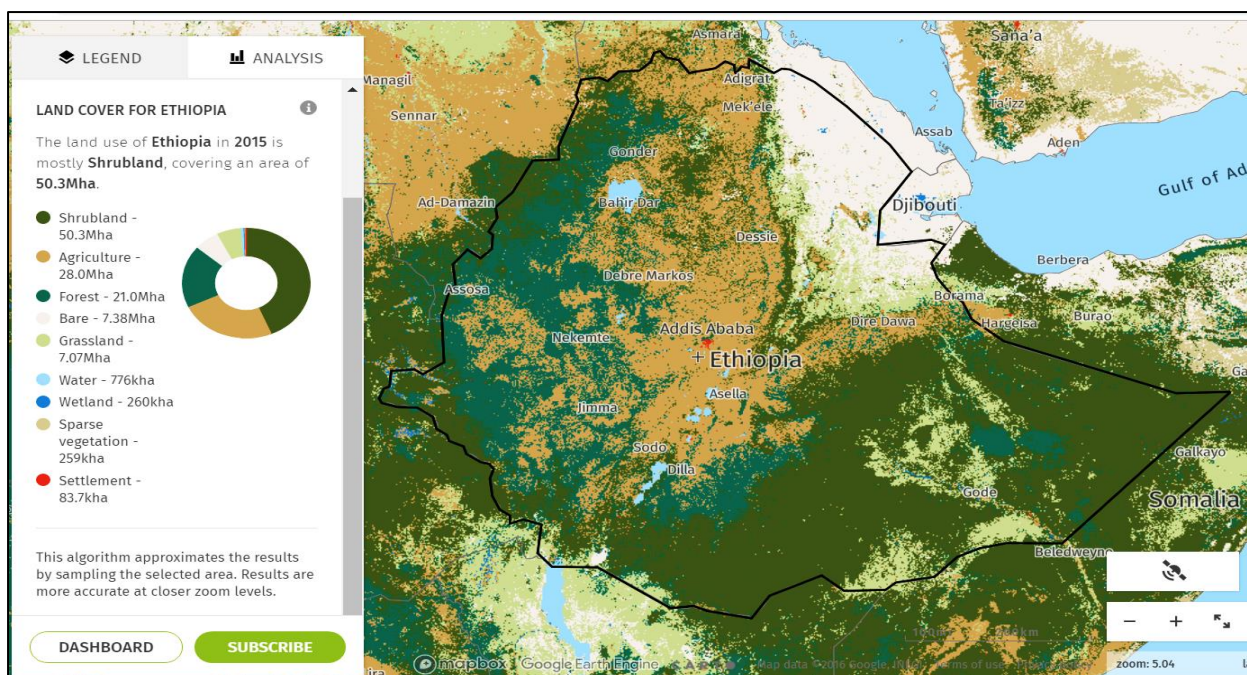


Figure 1: Ethiopia’s land cover (2015). Data source: Global Forest Watch

Food Security Situation

Food insecurity is a chronic problem in this country. Just under a quarter (21.4 per cent) of the total population between 2015 and 2017 was undernourished as shown in Table 2. Undernourishment has severe impacts in children leading to stunting, wasting or overweight. Stunting and wasting may affect the child’s cognitive development. Being overweight in childhood can lead to non-communicable diseases such as diabetes and heart disease in adulthood thus leading to a high health burden (Akombi, et al., 2017). More recent data from early 2019, approximates 8.13 million people to be severely food insecure mainly in southeastern agro-pastoral areas as a result of poor rains and cumulative outcomes of the 2016/17 drought (FAO, 2019). **Error! Reference source not found.** highlights the main livelihood zones in the country.

The Second Growth and Transformation Plan (GTP II) includes agricultural transformation as one of the main economic growth strategies. Other related policies include the Agricultural Development-Led Industrialization (ADLI) policy and the Emergency Food Security Reserve Administration Establishment Council of Ministers Regulations No. 67/2000.

Table 2: Food insecurity trends in Ethiopia (FAO, IFAD, UNICEF, WFP and WHO, 2018)

Location	Prevalence of undernourishment in the total population (%)		Prevalence of severe food insecurity in the total population (2015-2017)	Prevalence of wasting in children under 5 (2017)	Prevalence of stunting in children under 5 years of age (%)		Prevalence of overweight in children under 5 years of age (%)	
	2004-2006	2015-2017	%	%	2012	2017	2012	2017
Ethiopia	39.7	21.4	-	9.9	44.2	38.4	1.8	2.8

Location	Prevalence of undernourishment in the total population (%)		Prevalence of severe food insecurity in the total population (2015-2017)	Prevalence of wasting in children under 5 (2017)	Prevalence of stunting in children under 5 years of age (%)		Prevalence of overweight in children under 5 years of age (%)	
	2004-2006	2015-2017	%	%	2012	2017	2012	2017
Eastern Africa	34.4	31.2	29.2	6.0	38.5	35.6	4.5	4.4
Africa	21.3	19.6	25.9	7.1	32.6	30.3	5.0	5.0

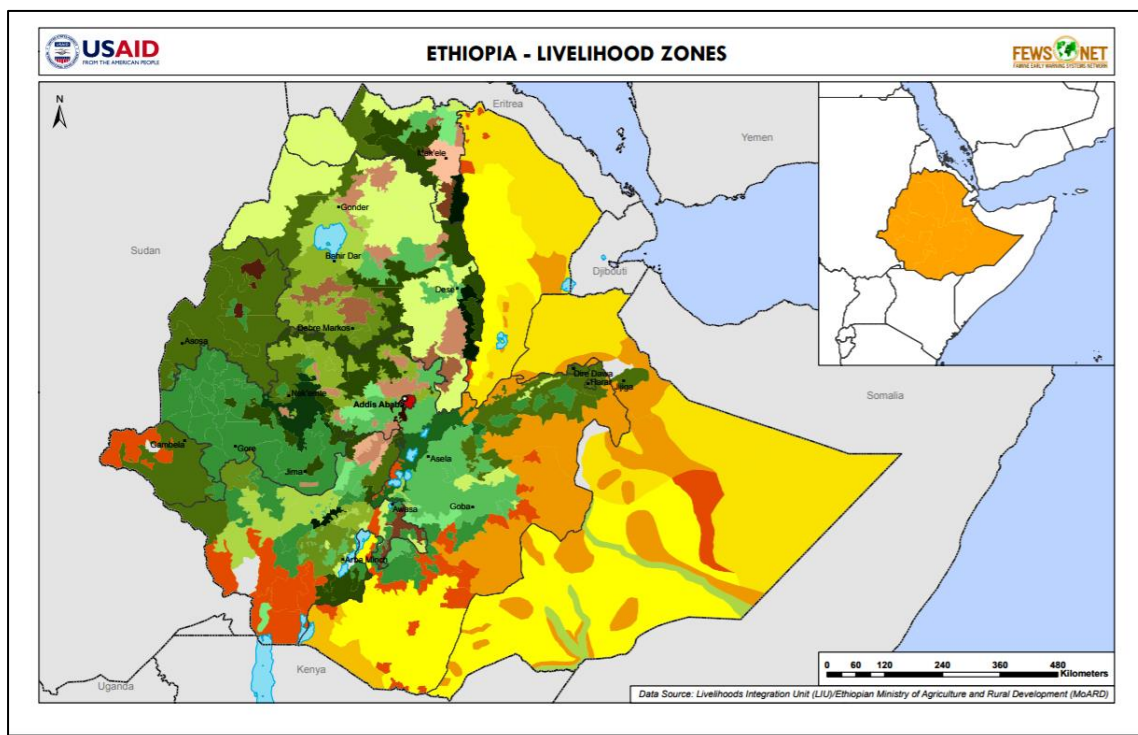


Figure 2 Ethiopia Livelihood zone fews.net. This site provides a full list of livelihood zones by region with map legends. Livelihood Zone Map illustrates the country by zone, showing areas where people generally have the same options for obtaining food and income and engaging in trade.

Relevant SDG 2 indicators

- 2.5.1** Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities
- 2.5.2** Proportion of local breeds classified as being at risk, not at risk or at unknown level of risk of extinction

Ending Hunger

Genetic Diversity

Genetic selection as a means towards increased agricultural production is a strategy commonly used to address food insecurity. Indeed, one of the targets of the GTP II is livestock genetic and breed improvement, and the implementation of plant breeder rights. The Plant Breeders' Rights Proclamation, No. 1068/2017 allows breeders to earn royalties on crop varieties except where the

food supplies or public health may be endangered. Other policies include the Ethiopian Seed Enterprise Establishment (Amendment) Council of Ministers Regulation No.100/2004 and the Seed System Development Strategy 2016.

By 2018, there were 115 local breeds kept in the country. The number of plant breeds with sufficiently stored genetic resources in the same year was 72,510, an increase from 56,078 in 2000 (UN Stats, 2019). The number of local breeds at an unknown level of extinction stagnated at 76 between 2008 and 2018; while no local breeds are known to be ‘at risk’. Of the local breeds, 100 per cent are at an unknown level of risk of extinction (UN Stats, 2019).

Renewable Energy

Ethiopia’s renewable energy share in 2016 was estimated at 91.86 per cent of the total final energy consumption down from 95.95 per cent in 2000 as shown in **Error! Reference source not found.** (UN Stats, 2019). The renewable energy mix in Ethiopia includes hydropower, geothermal, wind and solar energy among others. Opportunities are being explored for solar-powered irrigation systems in Doyogena in southern Ethiopia (CCAFS and CGIAR, 2018).

Relevant SDG 7 indicators

7.2.1 Renewable energy share in the total final energy consumption

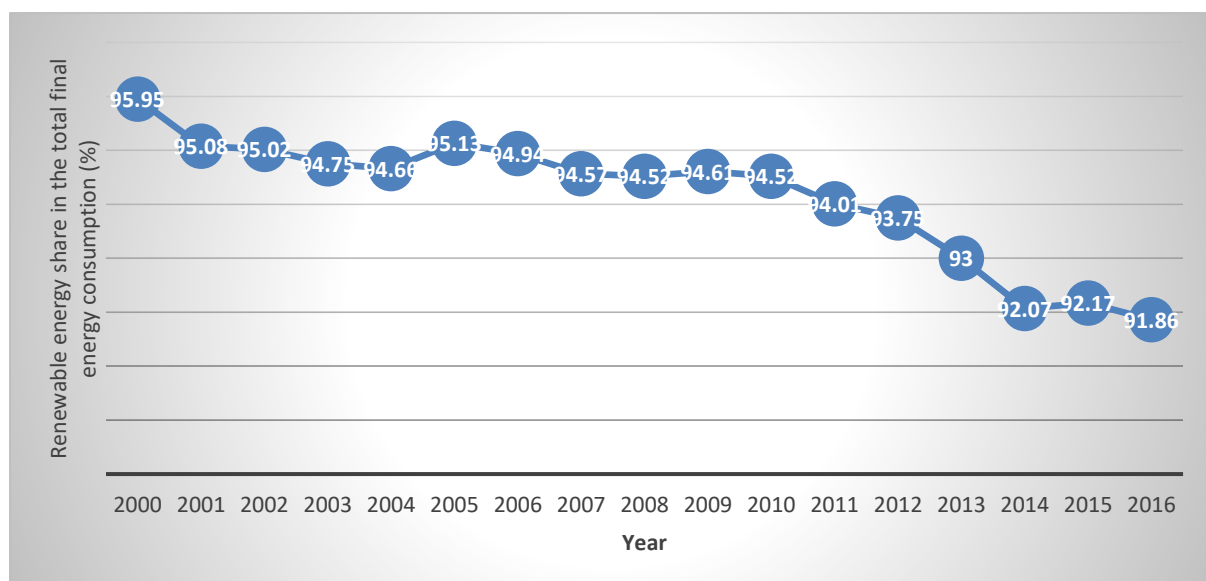


Figure 3: Trends in renewable energy share in the total final energy consumption (%) 2000-2016 (UN Stats, 2019)

Clean Water and the Marine Environment

Water Quality

Permanent water bodies cover 0.68 per cent of the total land area. Withdrawals as a proportion of available freshwater resources were estimated at 32.3 per cent in 2015 (above 25 per cent which is considered the threshold of initial water stress) (UN Stats, 2019).

Relevant SDG 6 indicators

6.3.1 Proportion of wastewater safely treated

6.3.2 Proportion of bodies of water with good ambient water quality

6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources.

6.6.1 Change in the extent of water-related

Wastewater treatment is an area of concern as it directly affects the quality of water. In 2014, the produced municipal wastewater in the 9 main cities of Adama, Addis Ababa, Bahir dar, Dire Dawa,

Gondar, Hawassa, Jimna ad Hara and Mekelle was estimated at 226 million m³, out of which only 0.35 per cent was collected. Only 7.5 per cent of the collected wastewater in the large cities like Addis Ababa is transferred through the sewerage system (MWIE, 2015). Most is collected by vacuum trucks and the rest discharged into the environment. This ends up in the rivers and streams from which water is collected to irrigate urban agriculture. For instance, in Addis Ababa about 1,240 ha of vegetables are irrigated with water from the Akaki river which receives most of the waste water from the city (FAO, 2016).

In 2016, it was estimated that only 6.5 per cent of households were treating water using appropriate water treatment methods (MWIE, 2015). The proportion of open defecation in 2015 in Ethiopia was 27.2 per cent and the proportion of households that do not use at least basic sanitation service was 7.1 per cent in the same year (SDGCA and SDSN, 2018); (UN Stats, 2019). **Error! Reference source not found.** shows the trends in open defecation in Ethiopia between 2000 and 2015.

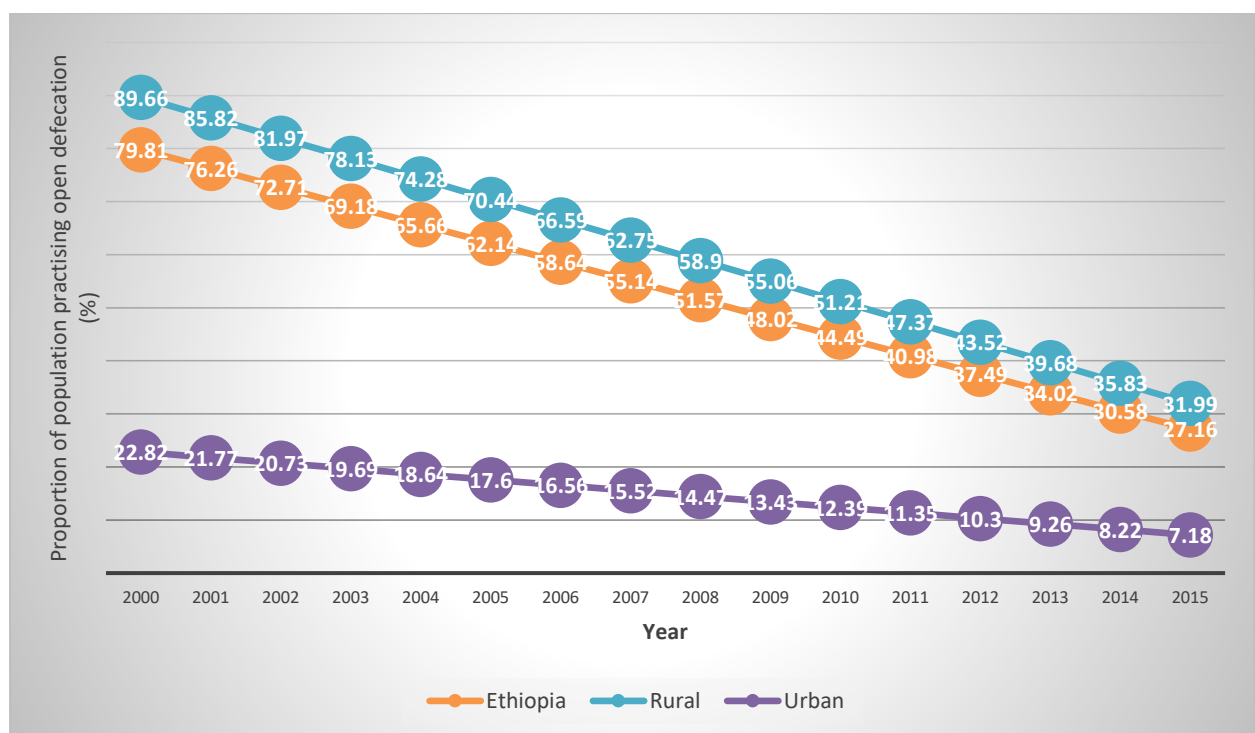


Figure 4: Trends in open defecation in Ethiopia 2000-2015 (UN Stats, 2019)

Sustainable Management of Coastal Zones and Fisheries

Ethiopia is a landlocked country and does not have coastal zones. The fisheries sector is primarily artisanal and not very developed. In 2017, total fisheries production was at 45,600 metric tonnes. Between 2000 and 2015, capture fisheries sector grew by 7.4 per cent while the growth in aquaculture averaged 12.7 per cent over the same time period (World Bank, 2017).

Relevant SDG 14 indicators

- 14.2.1:** Proportion of national exclusive economic zones managed using ecosystem-based approaches
- 14.4.1:** Proportion of fish stocks within biologically sustainable levels
- 14.5.1:** Coverage of protected areas in relation to marine areas.
- 14.6.1:** Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing.
- 14.b.1:** Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries

Illegal Fishing

The main aim of the Federal Fishery Management Proclamation No.315/2003 is the development of fisheries while preventing over-exploitation of the fisheries resources. There is also a National Strategy and Development Plan for Aquaculture. The country is a member of the Regional Fishery Bodies Committee on Inland Fisheries and Aquaculture of Africa (CIFAA). Ethiopia signed the United Nations Convention on the Law of the Sea (1982) in 1994, but has not ratified it yet.

Relevant SDG 15 indicators

- 15.1.1 Forest area as a proportion of total land area
- 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
- 15.2.1 Progress towards sustainable forest management
- 15.3.1 Proportion of land that is degraded over total land area
- 15.5.1 Red List Index

Terrestrial Ecosystems: Land, Biodiversity and Forests

Tree and Forest Cover

Forests in Ethiopia in 2015 covered an estimated 12.5 per cent of the total land cover or 12.4 million ha (World Bank, 2017). According to (World Bank, 2017), deforestation between 2000 and 2015 occurred at an average annual rate of 0.6 per cent. Table 3 highlights this decline. Net forest area decreased by 1.1 per cent in 2010 and increased by 0.32 per in 2015 (UN Stats, 2019). See **Error! Reference source not found.** and **Error! Reference source not found.**

Table 3: Forest area as a proportion (%) of total land area 2000-2015 (UN Stats, 2019)

2000	2005	2010	2015
13.71	13.00	12.30	12.50

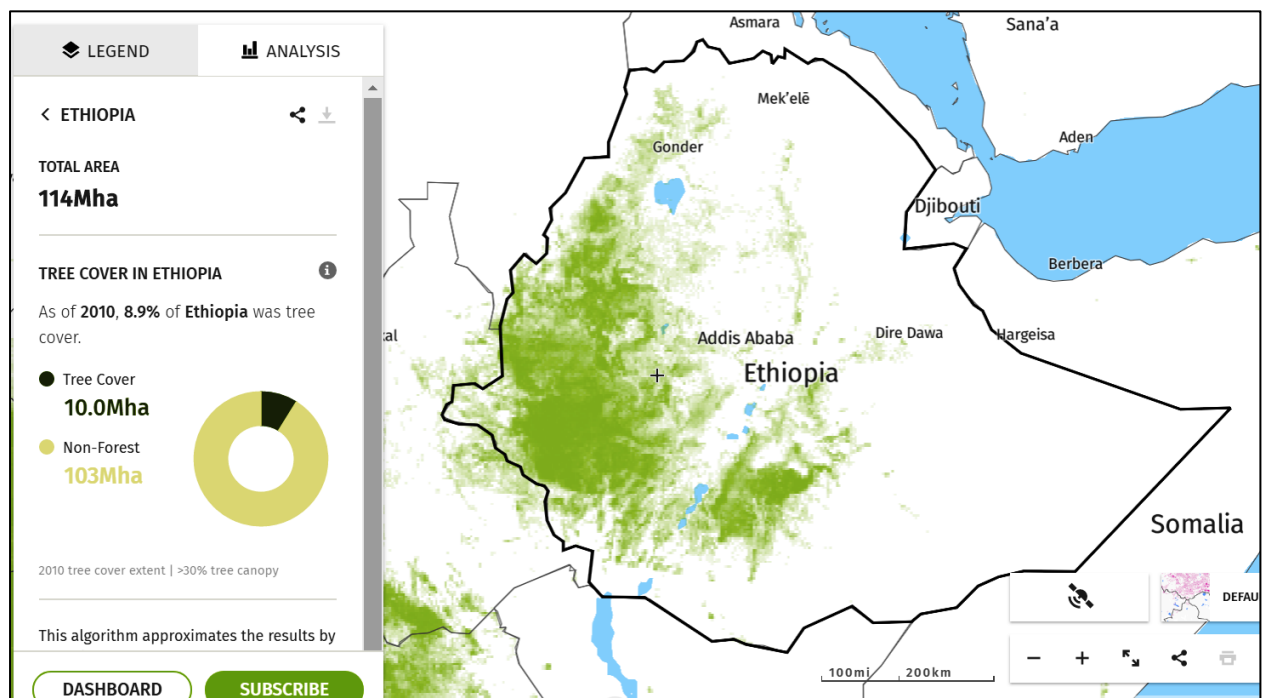


Figure 5: Ethiopia with a 30%+ tree canopy (2010). Data source: Global Forest Watch

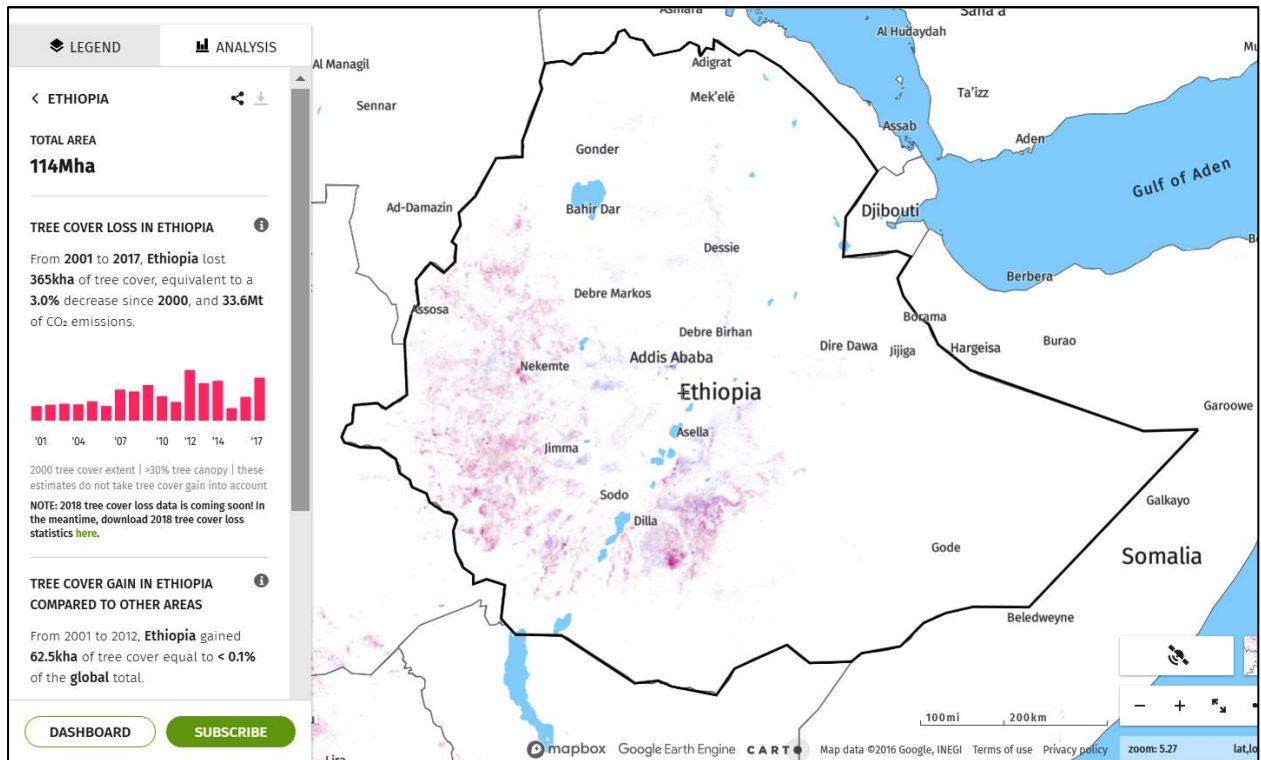


Figure 6: Tree cover loss in Ethiopia 2001-2017. Data source: Global Forest Watch

Encouraging Sustainable Forest Management

The environmental value of forests as measured by above-ground biomass is growing increasing from 31.08 tonnes/ha in 2000 to 30.46 tonnes/ha in 2005 before declining again to 29.85 tonnes/ha in 2010 (UN Stats, 2019). The country has a big tree-planting vision with the aim of restoring degraded lands, improving agricultural production systems and food security, water and energy.

The 2018 National Forest Law aims to ensure wise use of forests in acknowledgement of the socio-economic benefits to the population especially neighboring communities.

Protected Areas

Country data indicates that 33 mammal species, 32 birds, 14 fish and 41 species of higher plants are threatened (World Bank, 2017). On a scale of 0 to 1, Ethiopia scored 0.84 (between 2000 and 2019) on the IUCN Red List of Threatened Species index. This value implies that while most species are not expected to become extinct in the near future, there is still some level of biodiversity loss (UN Stats, 2019).

The proportion of freshwater biodiversity covered by protected areas was estimated at 16.18 per cent in 2018 and this has been constant since 2000. The proportion of terrestrial biodiversity covered by protected areas was estimated at 18.63 in 2018, which was an increase from 17.80 in 2000 (see **Error! Reference source not found.**) (UN Stats, 2019).

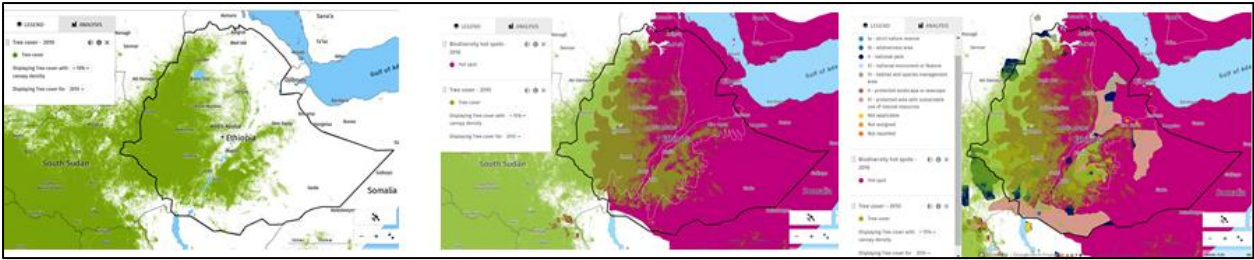


Figure 7: From left to right – Ethiopia with a 10%+ tree canopy cover (2010), then with hotspots (2016) and then protected areas (2018) Data source: Global Forest Watch



The endangered Ethiopian wolf (*Canis simensis*). Photo credit A.L.Harrington

Emerging Environmental Challenges

Waste Production and Management

Data from 2017 indicates that municipal solid waste generation in cities in Ethiopia is about 0.3 kg per capita per day and e-waste generated is 0.5 kg per capita (SDGCA and SDSN, 2018). In Addis Ababa only 65 per cent of the waste generated daily is collected and disposed of, 5 per cent is recycled, 5 per cent processed into compost and the balance is subject to illegal dumping. Uncollected waste presents health risks through contamination of soil and water. Of the waste collected, over 50 per cent is sent to the land fill and 15 per cent is recycled through informal processes (Mohammed & Eyasu, 2017).

Relevant SDG 12 indicators
12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment
12.5.1 National recycling rate, tons of material recycled

The National Solid Waste Proclamation No. 513/2007 deals with solid waste issues at federal state issue. The Federal Environmental Protection Authority (EPA) has the authority to regulate the sector together with the Ministry of Health which handles domestic waste and environmental health issues. Other related policies include the Environmental Pollution Control Proclamation 300/2002. At the international level, Ethiopia ratified the Basel on the Control of Transboundary Movements of Hazardous Wastes and their Disposal in 2000; and the Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade in 2003.

Climate Change

Ethiopia has ratified the United Nations Framework Convention on Climate Change and the Kyoto Protocol. It has prepared its National Adaptation Program for Action (NAPA) in 2007, the Ethiopian Programme of Adaptation to Climate Change (EPACC) in 2010 and the Second National Communication in 2015. It has also submitted Nationally Appropriate Mitigation Actions (NAMAs). Climate change is also

integrated into the Growth and Transformation Plans (GTP I and GTP II). The Climate Resilient Green Economy (CRGE) strategy 2011 is built on four pillars – agriculture, forestry, power and transport, industry and buildings. The agriculture aims to improve production for food security and farmer livelihoods while reducing emissions.

Relevant SDG 13 indicators

- 13.2.1** Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other
- 13.3.1** Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula
- 13.3.2** Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions

The Climate Change Education Strategy of Ethiopia 2017-2030 was developed to ensure the integration of climate change issues into the formal education system. **Error! Reference source not found.** highlights the state of climate change integration into the different education levels.

Table 4: Rating of existing level of integration of climate change education by level of education (%). Source: (MEFCC and MOE, 2017)

Level	Very Low or Low	Moderate	High or Very High
Primary schools	86.2	11.5	2.3
Secondary schools	78.5	17.6	3.9
Tertiary education	50.7	35.4	14.4
Average	71.6	21.5	6.9

Relevant SDG 15 indicators

- 15.a.1** and **15.b.1** Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems
- 15.c.1** and **15.7.1** Proportion of traded wildlife that was poached or illicitly trafficked

Financing Natural Resources Management

Official development assistance has been fluctuating as shown in **Error! Reference source not found.** reaching a high of US \$302.15 in 2015 (UN Stats, 2019).

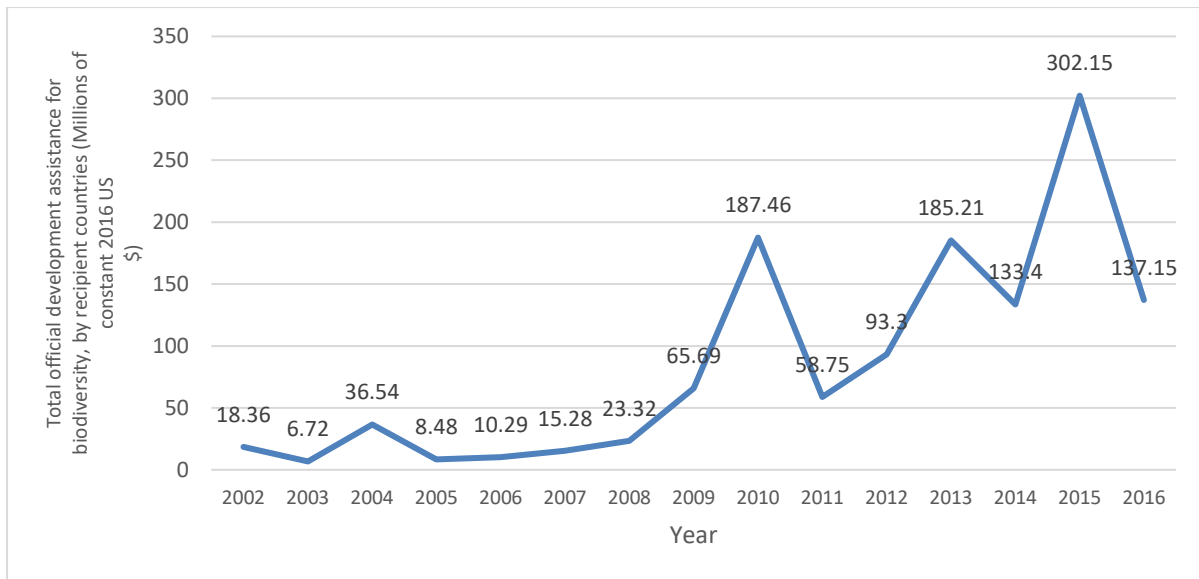


Figure 8: Total official development assistance for biodiversity (millions of constant 2016 US \$) 2002-2016 (UN Stats, 2019)

Supporting Actions to End Hunger

Sustainable Management of Mountain Ecosystems

The Ethiopian Highlands are highly productive with good rainfall and soils making it attractive to the 90 per cent of the population that live and derive a livelihood there (FAO, 1995). The human pressure for land for agriculture and settlement among others means that mountain habitats are increasingly being lost at an alarming rate. Gazetted areas for the protection of mountainous biodiversity covered 19.53 per cent between 2000 and 2006 increasing to 20.71 per cent in 2007 (UN Stats, 2019).

Relevant SDG 15 indicators
15.4.1 Coverage by protected areas of important sites for mountain biodiversity

Sustainable Management of Biodiversity

The Institute of Biodiversity Conservation (IBC) has the national mandate for the conservation and wise use of biodiversity and access to and sharing of benefits of biological resources. The IBC mains a gene bank for the preservation of indigenous crop varieties; and is a source of new genetic material for breeding research and development programmes for improved varieties. It is also a key partner in the identification and management of risks related to biodiversity reduction that are associated with widespread adoption of improved varieties. A related institution is the Ethiopia Seed and Other Agricultural Inputs Authority which is proposed for establishment.

Relevant SDG 15 indicators
15.6.1 Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits
15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species
15.9.1 Progress towards national targets established in accordance with Aichi

Other laws and policies include the National Policy on Biodiversity Conservation and Research 1998, and the Genetic Resources and Community Knowledge and Community Rights Proclamation (No.482/2006) and Regulation (169/2009).

There are about 35 alien invasive species in Ethiopia including *Acacia* species, *Eichhornia crassipes*, *Lantana camara*, *Parthenium hysterophorus* and *Prosopis juliflora* which are the major threats to

biodiversity degradation. These are threats to different ecosystems such as wetlands, agro-ecosystems, urban parks, rangelands, rivers and lakes. strategies such as integrated management strategies, participation of all stockholders and multidisciplinary research approaches within and across countries should be designed to reverse the situations.

The National Biodiversity Strategy and Action Plan 2015-2020 is in line with the Aichi Biodiversity Targets.

Integrated Water Resources Management

On a scale of 0-100, the degree at which Integrated Water Resources Management is undertaken is 30 (MWR, n.d). The Ministry of Water, Irrigation and Electricity has the mandate for the execution of IWRM in the country, but it has significant capacity limitations making the implementation of IWRM in the country weak.

There is a legal and policy framework which guides the sector. The Ethiopian Water Resources Management Policy 1999, the Water Sector Strategy 2001, Implementation Strategy for River Basin Integrated Development Master Plan 2001, Water Sector Development Programme 2002, and the River Basins Councils and Authorities Proclamation No. 534/2007. The current Water policy, sector strategy and development plans need updating as they are not aligned to the IWRM concept. However, two of the 12 major river basins have master plans which include some elements of IWRM. There are two River Basin Authorities established and three others are in process of establishment.

Transboundary Water Resources Management

At a transboundary level, Ethiopia is an active member of the Nile Basin Initiative. Some of the shared rivers within the Nile Basin include Blue Nile (Sudan and Ethiopia), Juba (Ethiopia and Somalia), Shabelle (Ethiopia and Somalia), and the Omo river (Ethiopia into Sudan). There is a dedicated Directorate for Transboundary River Basins within the Ministry of Water, Irrigation and Electricity.

Relevant SDG 6 indicators

- 6.5.1** Degree of integrated water resources management implementation (0-100)
- 6.5.2** Proportion of transboundary basin area with an operational arrangement for water cooperation

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