Ghana: Food Security and Ecosystem Resilience

Introduction

The vision of the Ministry of Food and Agriculture is '*modernized agriculture culminating in a structurally transformed economy and evident in food security, employment opportunities and reduced poverty*' (MFA, 2019). The policy framework to support the achievement of this vision includes the Food and Agriculture Sector Development Policy (FASDEP II) and the Medium-Term Agriculture Sector Investment Plan (METASIP 2010-15). These operate within the framework of the Ghana Shared Growth and Development Agenda which highlights agriculture and forestry as key sectors for action, and the Ghana Vision 2020.

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)

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

GHANA	2018
Total population (million)	29.46
Total area (km^2)	274,000
Population density (persons/km^2)	129.5
Per capita income, 2015 (US $)	1,480

Agriculture in the Ghanaian Economy

The population of Ghana in 2018 was 29.4 million growing at an average annual rate of 2.2 per cent (**Error! Reference source not found.**). Most people live in urban areas with only 44.6 per cent living in the rural areas. The contribution of agriculture to GDP was 19.7 per cent in 2017. In 2018, 33.9 per cent of the population was employed in agriculture compared to 47.5 and 18.6 per cent in services and industry respectively (World Bank, 2017) (World Bank, 2018). Land area is 274,000 km^2 and agricultural land takes up 69 per cent of the total land area (World Bank, 2017). See **Error! Reference source not found.**.

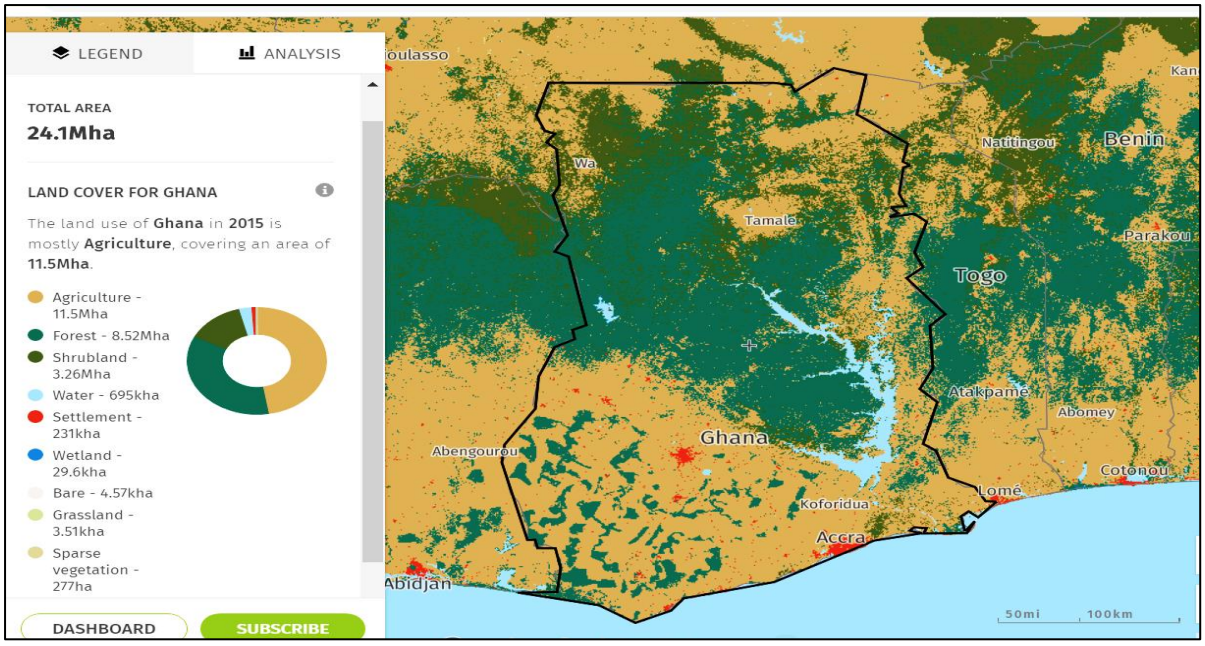

Figure 1: Land cover in Ghana (2015) Data source: Global Forest Watch

Food Security Situation

Food security is a perennial problem as poor storage, inefficient distribution and lack of agro processing facilities lead to massive post-harvest losses. Climate change is also an issue with rains being delayed, excessive heat, flash floods and droughts being reported around the country, for instance in the Afram plains region and Wenchi among others (see **Error! Reference source not found.** for the main livelihood zones). The prevalence of undernourishment has been on the decline - from 9.3 per cent between 2004 and 2006 to 6.1 per cent between 2015 and 2017 as highlighted in Table 2. But it is still a problem. It is estimated that about 37 per cent of the working age population in 2012 in Ghana were stunted as children; and that in totality, the result of child undernutrition resulted in a US $2.6 billion loss to the country in the same year (NDPC, 2016). More recent data indicates that in 2014, the proportion of moderately or severely stunted children under 5 years was 18.8 per cent (UN Stats, 2019).

The National Climate-Smart Agriculture and Food Security Action Plan of Ghana (2016-2020) provides the framework for food security. Other relevant policy documents include the Food and Agriculture Sector Development Policy (FASDEP), the Medium-Term Agricultural Investment Programme (METASIP) and the Agriculture Sustainable Land Management Strategy and Action Plan all support food security in Ghana.

Table 2: Food insecurity trends in Ghana (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 less than 5 years of age (%)		Prevalence of overweight in children under 5 years of age (%)	
	2004-2006	2015-2017	%	%	2012	2017	2012	2017
Ghana	9.3	6.1	7.9	4.7	22.7	18.8	2.6	2.6
Western Africa	12.3	13.1	25.1	8.1	31.9	29.9	2.6	2.4
Africa	21.3	19.6	25.9	7.1	32.6	30.3	5.0	5.0

Ending Hunger

Genetic Diversity

By 2018, there were 22 local breeds kept in the country (up from 11 breeds in 2000), but none of the genetic material of these local breeds is stored. Furthermore, the risk of extinction of 21 of these breeds was unknown (UN Stats, 2019).

Ghana has a national program on plant genetic resources led by the Plant Genetic Resources Research Institute (PGRRI) and collaborates with the regional Genetic Resources Network of West and Central Africa (GRENEWECA) whose goal is to contribute to sustainable agricultural development through the conservation and use of the diversity of local PGRFA.

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

The plant breeding sector is a major user of genetic resources aiming for adaptation and improved productivity of the principal crops. Main users of stored genetic materials are the Crops Research Institute (CRI), Savanna Agricultural Research Institute (SARI), the Universities, Cocoa Research Institute of Ghana (CRIG) and Oil Palm Research Institute (OPRI). Crops whose varieties have been released by breeding programmes include yam, maize, rice, cassava, sweet potato, cowpea, plantain and soybean (Bennett-Lartey & Oteng-Yeboah, 2008).

Renewable Energy

Ghana is a new and small oil and gas country and the increase in fossil fuel consumption is leading to a decline in the share of renewable fuels in the total energy mix. The renewable energy share in 2016 was estimated at 41.96 per cent of the total final energy consumption down

Relevant SDG 7 indicators

7.2.1 Renewable energy share in the total final energy consumption

from 71.62 per cent in 2000 as shown in Figure 2 (UN Stats, 2019).

The policy framework for the sector includes the National Energy Policy 2010 and the Renewable Energy Act in 2011.

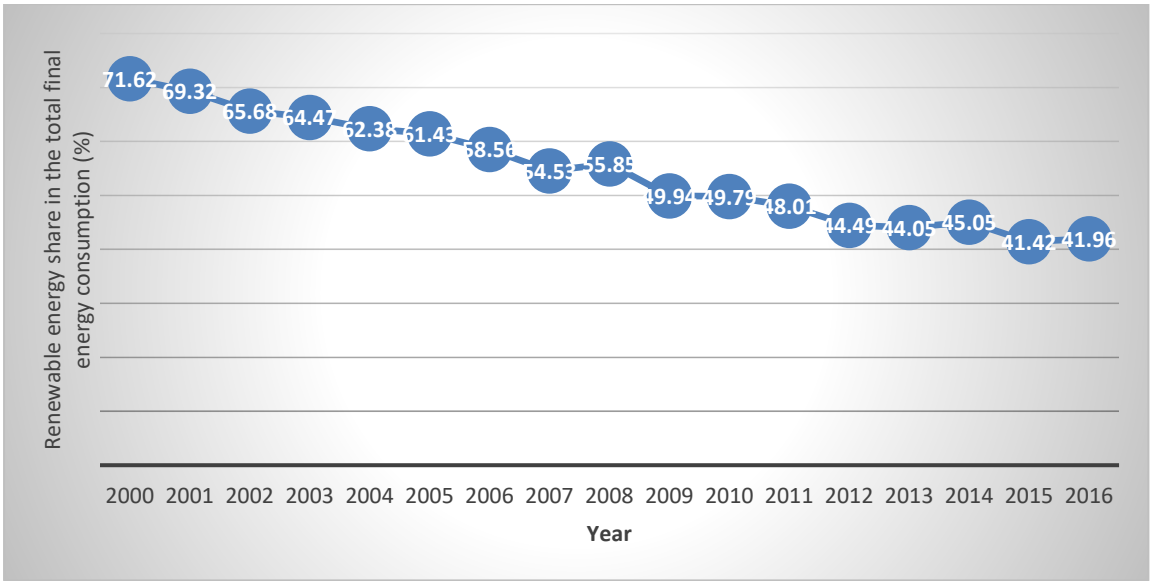

Figure 2: Trends in renewable energy share in the total final energy consumption (%) 2000-2016 (UN Stats, 2019)

Clean Water and the Marine Environment

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 ecosystems over time

Water Quality

Permanent water bodies in 2016 covered 2.66 per cent of the total land area. Withdrawals as a proportion of available freshwater resources in 2015 was estimated at 6.1 per cent (above 25 per cent is considered the threshold of initial water stress) (UN Stats, 2019).

Pollution by untreated effluent from municipal authorities is a major problem especially in coastal areas and near inland water bodies. This is an urgent issue since by 2018, 56.1 per cent of the population lived in urban areas; and only 20.2 per cent of these had access to improved sanitation (UNDESA, 2018). The proportion of open defecation in 2015 in Ghana was 18.75 per cent and the proportion of households using at least basic sanitation service was 14.3 per cent in the same year (SDGCA and SDSN, 2018) (UN Stats, 2019). Figure 3 shows the trends in open defecation in Ghana between 2000 and 2015.

In 2006, 0.28 km^3 of waste water was produced of which 0.028 km^3 was collected through the formal sewer system; and only 0.022 km^3 was treated. Wastewater treatment is an area of concern as it directly affects the quality of water. The wastewater discharged into the environment ends up in the rivers and streams and may be used to irrigate agriculture and there is the potential for public health impacts. In 2006, 740 ha of land was equipped for irrigation using untreated wastewater (FAO, 2017).

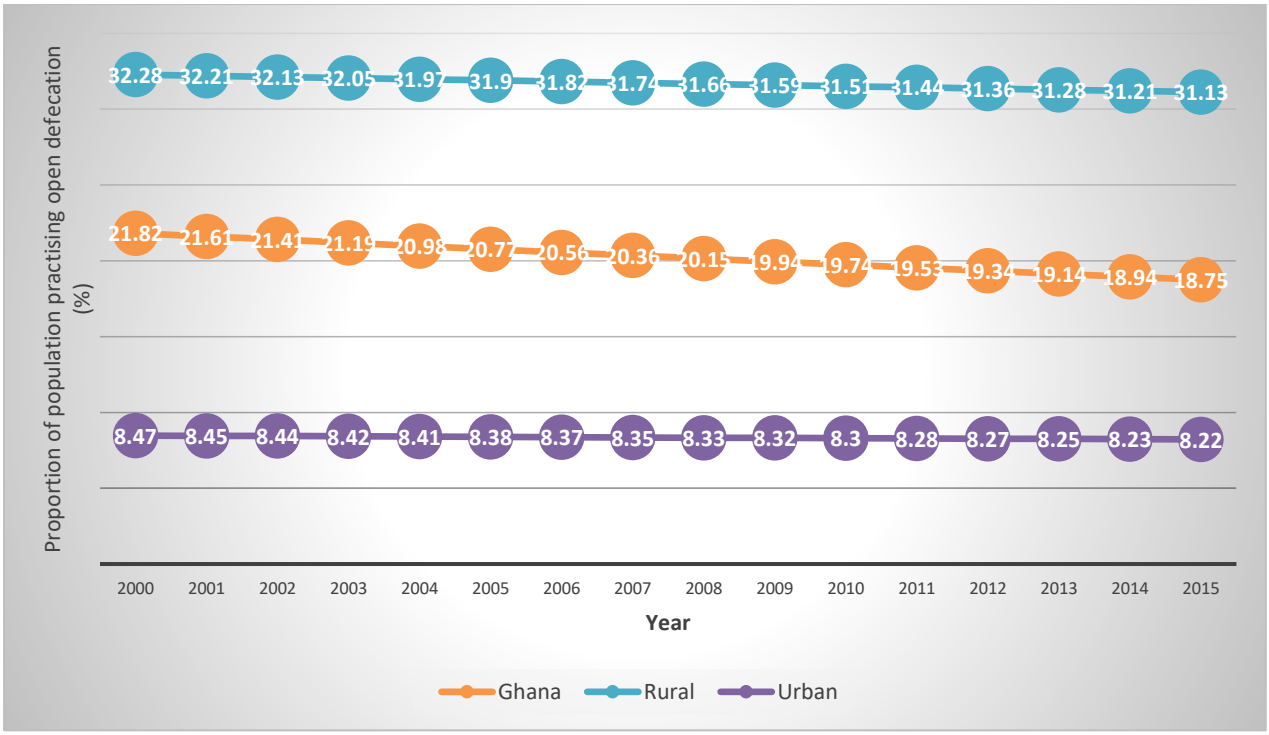

Figure 3: Trends in open defecation in Ghana 2000-2015 (UN Stats, 2019)

Sustainable management of coastal zones and fisheries

Total fisheries production in 2015 was 391,000 metric tonnes in 2018. Capture fisheries sector shrunk by 1.8 per cent between 2000 and 2015 while the aquaculture sector grew by 15.7 per cent (World Bank, 2017). Aquaculture is likely to be a growth area especially as marine stocks are increasingly being overfished.

Illegal Fishing

Overfishing is a major problem in Ghana and depleted stocks have resulted in the country having to import an estimated US $311 million in seafood and fish products in 2018 (USDA, 2019).

The Fisheries Commission is in charge of the fisheries sector and implements the Fisheries Act No. 625 of 2002 (and amendment in 2014) which sets down the regulatory framework for the sector, development of the fish industry and sustainable exploitation of the fishery resource. The Fisheries Act 2014 Amendment empowers the government to address issues of illegal unreported and unregulated fishing. Other guidance includes the Fisheries Regulations, 2010 (L.I. 1968) and the Fisheries (Amendment) Regulations, 2015 (L.I. 2217). Other relevant policies include the Fisheries Management Plan 2015-2019 and the National Policy for the Management of the Marine Fisheries Sector 2015-2019.

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

Ghana is a party to the UN Convention on the Law of the Sea since 1983 and belongs to other regional fisheries bodies including the Committee on Inland Fisheries and Aquaculture of Africa (CIFAA), Fishery Committee for the Eastern Central Atlantic (CECAF), Fishery Committee of the West Central Gulf of Guinea (FCWC), International Commission for the Conservation of Atlantic Tunas (ICCAT) among others.

Terrestrial Ecosystems: Land, Biodiversity and Forests

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

Tree and Forest Cover

Forests covered an estimated 9.34 million ha by 2015; and the coverage has been increasing over the years as highlighted in **Error! Reference source not found.**. Net forest area increased by 0.32 per cent in 2005 to 0.31 per cent in 2010 and 2015 each (Figure 4) (UN Stats, 2019).

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

2000	2005	2010	2015
39.15	39.78	40.41	41.03

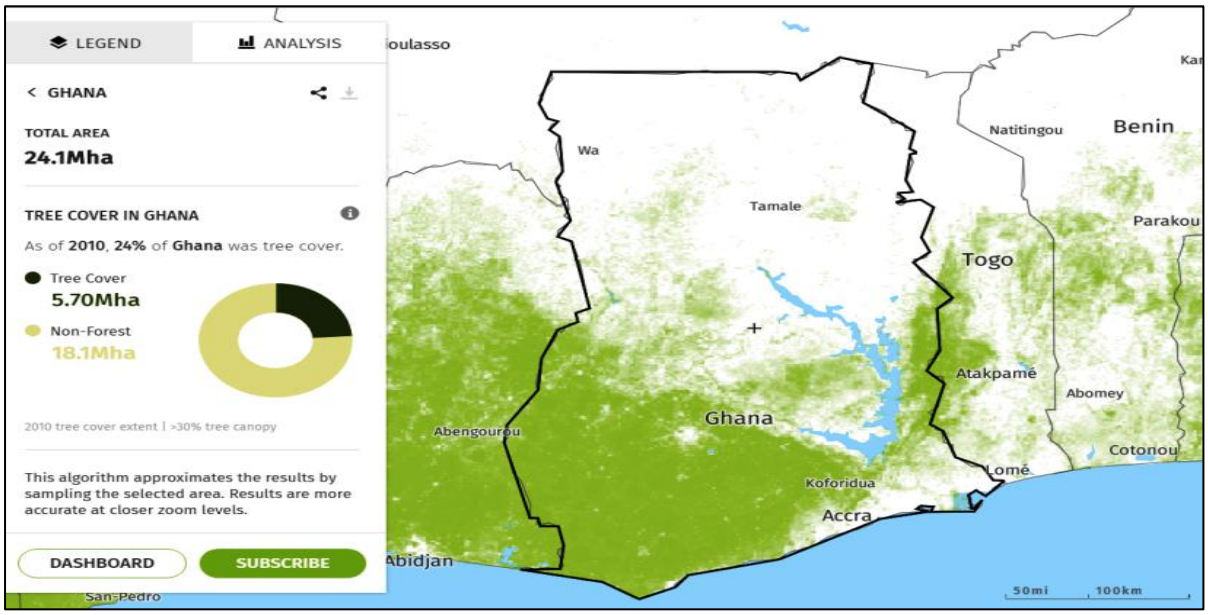

Figure 4: Ghana with a 30%+ tree canopy (2010). Data source: Global Forest Watch

Encouraging Sustainable Forest Management

The government has put effort into the wise use of the forest resource with emphasis on legal protection. By 2015, 1.39 per cent of forests were officially under legal protection. Forest area certified under an independently verified certification scheme increased from 1,770 ha in 2010 to 3,360 ha in 2015 and finally to 12,140 ha in 2018 (UN Stats, 2019).

Despite this, the environmental value of forests as measured by above-ground biomass has been declining. For instance in 2000, the above-ground biomass was 142.46 tonnes/ha decreasing to 130.58 tonnes/ha in 2005, to 129.64 tonnes/ha in 2010 and finally to 125.42 tonnes/ha in 2015 (UN Stats, 2019). See Figure 5.

The legal framework for forest management includes the Forest and Wildlife Policy 2012 and the Forestry Development Master Plan 2016-2036. The National Biodiversity Strategy and Action Plan 2016-2030 also aims to manage forests sustainably and reduce the rate of loss of natural resources including forests. Other relevant legal documents include the Forest Ordinance (Cap. 157) 1954, Timber Resource Management and Legality Licensing Regulations, 2017 (LI 2254), Forest Plantation Development Fund Act 2000 and the Forestry Commission Act, 1999 (Act No. 571 of 1999).

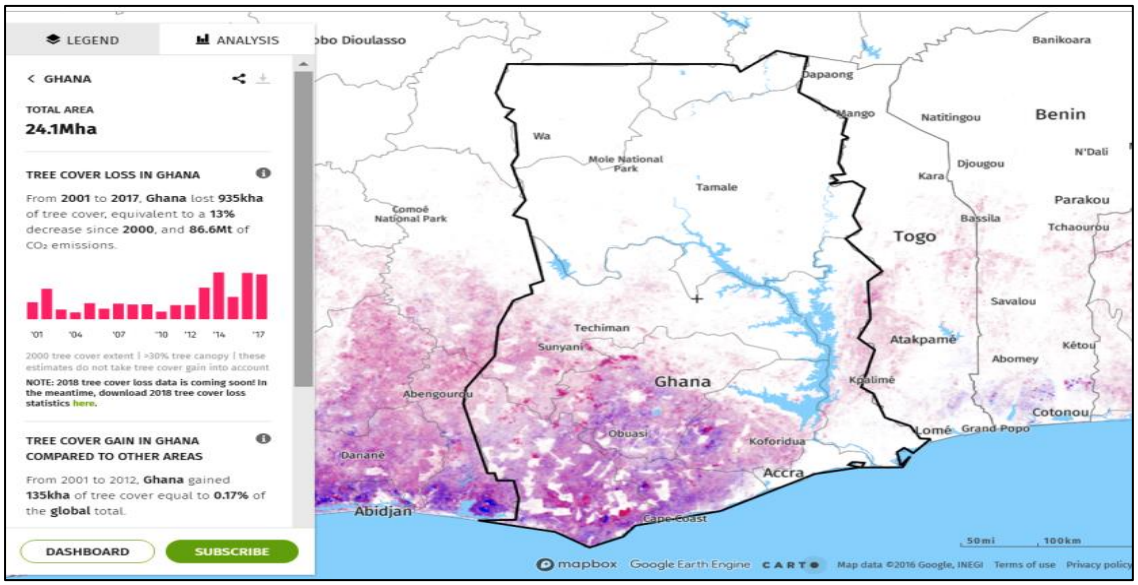

Figure 5: Tree cover loss in Ghana 2001-2017. Data source: Global Forest Watch

Protected Areas

The proportion of terrestrial biodiversity covered by protected areas (Figure 6) was estimated at 85.61 per cent in 2018 and this has been constant since 2000 (UN Stats, 2019).

Country data indicates that 21 mammal species, 23 birds, 58 fish and 119 species of higher plants are threatened (World Bank, 2017) Ghana's Red List Index, a measure of extinction risk has been relatively stable and between 2000 and 2019 was estimated at 0.84 (UN Stats, 2019). This value implies that while most species are not expected to become extinct in the near future, there is to some extent a certain level of biodiversity degradation (UN Stats, 2019).

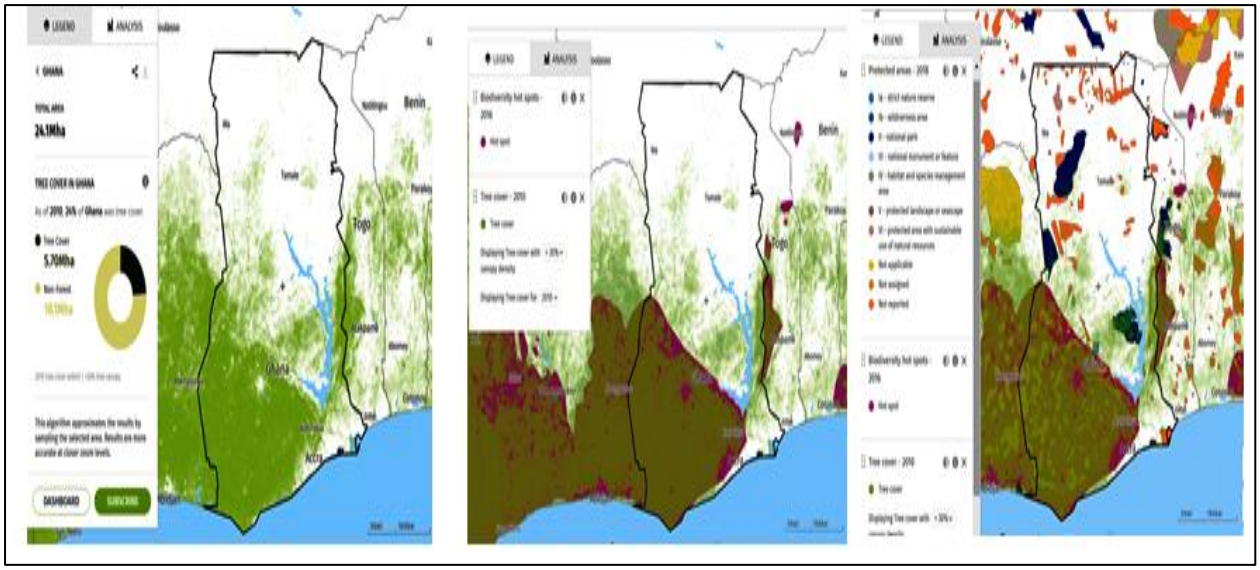

Figure 6: From left to right – Ghana with a 10%+ tree canopy cover (2010), then with hotspots (2016) and then protected areas (2018) Data source: Global Forest Watch

The Green turtle (*Chelonia mydas*) is endangered in Ghana. IUCN photo library Andre Seale

Emerging Environmental Challenges

Waste Production and Management

Ghana produces between 0.47 and 0.51 kg of solid waste per person per day of which 67.6 per cent is biodegradable material such as paper and organic material (Miezah, Obiri-Danso, Kádár, Fei-Baffoe, & Mensah, 2015).

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 Environment Protection Agency has stated standards for pollutants (solid, liquid and gaseous emissions) into the environment. The legal and policy framework include the Environmental Sanitation Policy 1999, National Environmental Sanitation Strategy and Action Plan (NESSAP) 2010–2015, National Environmental Quality Standards Regulations 2000 and Guidelines for the Development and Management of Landfills in Ghana 2002 among others.

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

Ghana ratified the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, the Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the Stockholm Convention on Persistent Organic Pollutants in 2003. In terms of compliance, the country is estimated to be compliant with the required process obligations under the treaties as follows: 16 per cent with the Basel Convention, 80.39 per cent with the Rotterdam Convention and 33.33 per cent for the Stockholm convention (UN Stats, 2019).

Climate Change

Ghana has ratified the United Nations Framework Convention on Climate Change and the Kyoto Protocol.

The institutional framework for climate change includes the Ministry of Environment, Science and Technology assisted by the National Climate Change Committee. The policy framework includes the Ghana National Climate Change Policy 2014, Ghana National Climate Change Master Plan Action Programmes for Implementation: 2015–2020 and the National Climate Change Adaptation Strategy

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

Climate change is integrated into the science curricula of Junior High and Senior High School levels, but there is still room for improvement including adopting a more interdisciplinary approach to teaching the topic (Boakye, 2015). There are also special graduate courses on climate change at tertiary level.

Financing Natural Resources Management

Official development assistance has been fluctuating as shown in Figure 7 reaching a high of US $194.19 in 2004 (UN Stats, 2019).

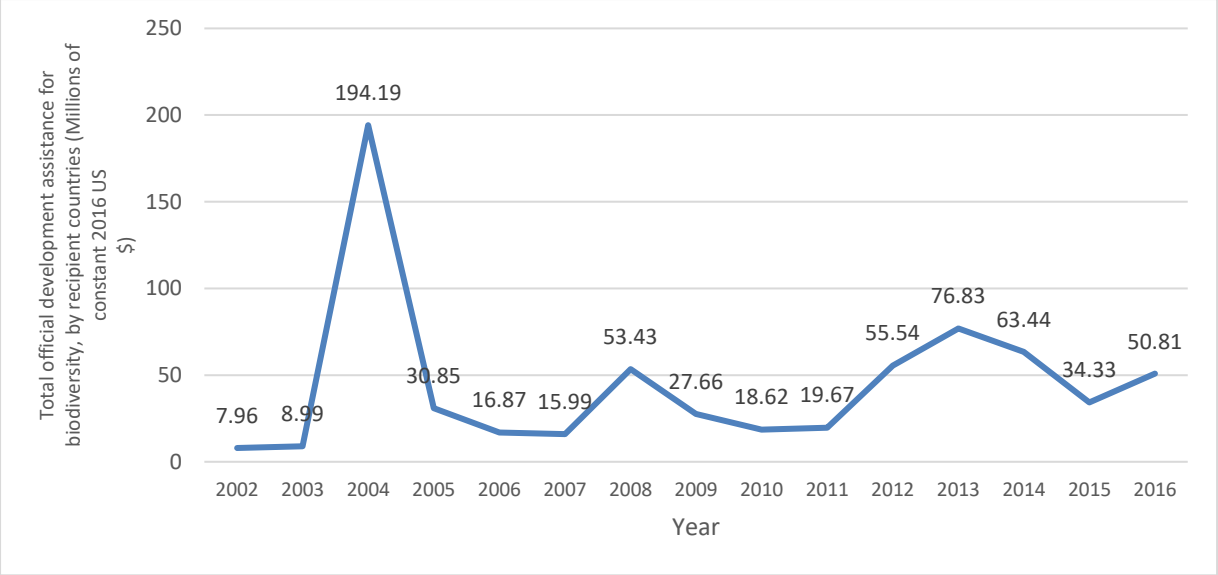

Figure 7: Total official development assistance for biodiversity (millions of constant 2016 US $) 2002-2016 (UN Stats, 2019)

Supporting Actions to End Hunger

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

Sustainable management of mountain ecosystems

Areas gazetted areas for the protection of biodiversity covered 79.99 per cent of mountainous biodiversity by 2018 (UN Stats, 2019). Some of Ghana's mountain areas are habitat to important biodiversity. For instance, the Volta region is important for butterfly species. Butterflies are well known for their importance to food security as pollinators in agriculture.

Sustainable Management of Biodiversity

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 Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020

The national collection of plant genetic material was established in 1964. The institutional framework includes the Plant Genetic Resources Research Institute (PGRRI) responsible for the national gene bank. Other institutions include Crops Research Institute (CRI), Savanna Agricultural Research Institute (SARI) and Department of Crop Science in Legon, Biotechnology and Nuclear Agricultural Research Institute (BNARI) and Forestry Research Institute of Ghana (FORIG). The gene plasm is used in plant breeding to enhance adaptation, improve performance of important crops or replenish stocks especially when depleted by climate or other disasters. This is an important factor in contributing to poverty alleviation, economic and livelihood sustainability and food security. For example, after the Bimbila war in the 1990s, stocks of yam (*Dioscorea rotundata*) from other areas was multiplied to obtain planting material to replace that which was all consumed in the war zone. The use of genetic material for participatory plant breeding as a means of improving crop varieties is being used for instance with cowpea farmers around Ohawu in the Volta Region of Ghana (Bennett-Lartey & Oteng-Yeboah, 2008).

Ghana became a signatory to the International Treaty on Plant Genetic Resources in 2002; and at the national level there is the 2011 National Biosafety law.

The Global Invasive Species Database lists 60 alien species in Ghana, 27 of which are found in agricultural areas (GISD, 2005). There is a draft Invasive Alien Species Policy 2014.

The national biodiversity targets have been aligned to the Aichi Biodiversity Targets; and the implementation of the national biodiversity strategy and action plan has been designed to be collaborative with sector ministries taking responsibility for their specific areas.

Integrated Water Resources Management

The Water Resources Commission is the institution responsible for the regulation and management of water resources and the main legal framework is the Water Resources Act 1996. A Riparian Buffer Zone Policy 2013 sets out objectives for managing freshwater bodies in Ghana. Other institutions involved include the Environmental Protection Agency among others.

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

On a scale of 0-100, the degree at which Integrated Water Resources Management (IWRM) is undertaken is 49 (UN Stats, 2019). National IWRM has been in place since 2012 and between 2007 and 2013; IWRM plans were developed for 7 river basins, 3 of which were updated in 2016. At the basin level there are River Basin Management Boards which coordinates water resources management at that level (UNEP-DHI, 2017)

Other strategic policy guidance is provided by the Water Sector Strategic Development Plan (2012-2025).

Transboundary Water Resources Management

The major transboundary water bodies are the Rivers Volta, Tano and Bia. The Volta River basin includes 6 countries Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, and Togo and the current legal framework for its management has been in place since 2007 – the Convention on the Status of the Volta River and the establishment of the Volta Basin Authority. A bilateral Memorandum of Understanding was also signed in 2007 between Ghana and Burkina Faso on the Joint Technical Committee for IWRM on the Volta River.

River Tano and River Bia, both shared with Cote d'Ivoire, are being supported by the Secretariat of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) to create a basin authority to enhance sustainable water resources management. Some of the issues facing transboundary usage of these water resources include flood management, illegal mining, agricultural and hydropower development.

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