Draft

Ghana's Sixth National Report to the

United Nations

Convention on Biological Diversity

December 2018

Ministry of Environment, Science, Technology and Innovation (MESTI)

Contents

Section I. Information on the Targets Being Pursued at the National Level

☒ My country has adopted national biodiversity targets or equivalent commitments in line with the Strategic Plan for Biodiversity 2011-2020 and the Aichi Targets

☐ My country has not adopted national biodiversity targets and is reporting progress using the Aichi Biodiversity Targets for reference. (Move to section II. In section III, the Aichi Biodiversity Targets should be used for the purpose of this report as the national targets and progress should be assessed towards their achievement in the national context.)

Ghana Target 1
Create public awareness of the values of biodiversity to promote conservation, restoration and sustainable usage

Rationale for the national target

The continuing and increasing environmental challenges including biodiversity loss is due to inadequate information on the values of biodiversity, as well as the inability to connect the sustainable use of the resource to our livelihoods. The inadequate awareness of the adverse impact of human development such as unsustainable mining, agriculture, estate development and road construction on biodiversity puts responsibility on the nation to have the importance of biodiversity well communicated to protect Ghana's rich biological resources ranging from different plants species to animal species. Educating public from the local level to national level about the relevance of conserving biodiversity will enable the population to avoid over-exploitation species extinction.

Level of application

☐ Regional/multilateral
☒ National/federal
☒ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets.

Main related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
☒ 2	☐ 7	☒ 12	☐ 17
☐ 3	☒ 8	☐ 13	☐ 18
☒ 4	☐ 9	☒ 14	☒ 19
☐ 5	☐ 10	☐ 15	☐ 20

Other related Aichi Biodiversity Targets

☐ 1	☒ 6	☐ 11	☐ 16
☐ 2	☒ 7	☐ 12	☒ 17
☐ 3	☐ 8	☐ 13	☒ 18
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Other relevant information

Ghana in 2014 through the Environmental Protection Agency Ghana (EPA-Ghana), formally launched a waste segregation drive in some areas of the country (Accra) to create awareness on the waste management concerns the country as improper waste management can be very harmful to biodiversity on land and in water (example, disposal of untreated organic waste directly into waterbodies). This awareness led to the creation of Hazardous and Electronic Waste Management and Control Act in July 2016.

Forestry Commission in 2016/2019 introduced forest reforestation program that employed 15,000 fresh graduates to plant trees to protect some species from going into extinction, protect wildlife as well as introducing new and economically important species into the country's forest

reserves. Also, in the fight against illegal operations in forest reserves, the Forestry Commission intensified the operations by building the capacity of staffs to deal with illegal chainsaw operations in the forest reserves, intensified patrol by forest guards, and rapid response team to combat illegal operators in the forest and protect wildlife.

Relevant websites, web links, and files

- thbftonline.com/2018/business/agribusiness/gh¢144m-committed-to-greening-ghana-initiative/
- http://www.ghana.gov.gh/index.php/media-center/features/2405-how-ghana-fares-in-biodiversity-conservation
- http://www.epa.gov.gh/epa/media/news/ghana-action-plan-implementation-unesco-man-and-biosphere-mab-programme-launched
- EPA. (2017). Ghana: State of the Environment 2016 Report. Environmental Protection Agency, Ministry of Environment, Science, Technology and Innovation. Accra.

Ghana Target 2
Integrate and mainstream biodiversity values into national accounts and local development and poverty reduction strategies and planning processes with reporting systems

Rationale for the national target

There are weak linkages between the interrelationship between biodiversity and other development sectors. This requires decision makers to appreciate biodiversity values and be guided by those values to implement policy that enhance biodiversity conservation and wise-use. It is important to strengthen the interrelationship between biodiversity and other sectors to understand the benefits and implication of biodiversity on other sectors for a holistic assessment of the policies. The basis for this target is, therefore, to ensure that biodiversity conservation is integrated into all sectors, accepted and by all people within the country during their normal practices and at various levels of administration across all sectors.

Ghana from 2016 have integrated into the local planning policies to conserve biodiversity at various centres. This policy targeted all district and municipal assemblies in the country to devise mechanisms to protect biodiversity. MESTI policy strategies and action plans included the integration of biodiversity management in all sectors and at all level of governance. The policy was guided by principles that ensures stakeholders co-development and co-implementation of plans to conserving biodiversity, the value of biodiversity to national, local development and poverty reduction and research on biodiversity to make formulation and implementation successful.

The Forestry Commission (FC) introduced a programme themed “Green Ghana” with the aim of planting trees in schools (basic, second cycle and tertiary), along major roads, hospitals, and around waterbodies in the country. In the national capital, the University of Ghana under the Vice Chancellor’s green project received donations of different plant species from both governmental and nongovernmental institutions to promote biodiversity sustainability. WeCARE and Y&M Regeneration gave the university 4000 and 10000 different species respectively to support the project of conserving biodiversity. The FC trees on farm programme is also an initiative to encouraged farmers in areas where agriculture becomes the main threat to biodiversity not to cut down all trees on their farmland before planting their crops and provided free plant species to some farmers to incorporate trees within farming systems (trees on-farm).

Modified Taunga System is also a co-management strategy between FC and smallholder farmers to restore degraded forest cover and address timber deficit. The basis for this target is to ensure that biodiversity conservation is integrated into all sectors, accepted and by all people within the country during their normal practices and at various levels of administration across all sectors.

Level of application

☐ Regional/multilateral
☒ National/federal
☒ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets

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Other relevant information

Ghana before this target were protecting her biodiversity but was on a low pace. The Forestry Commission and the Wildlife division had control mechanisms for protecting both forest vegetation and animals such as arresting illegal chainsaw operators and punishing people who harvest animals from reserved forest. These control actions (inter-sectoral forest patrol and prosecution of illegal operators) have been intensified by the FC and the wildlife division to deter people from destroying biodiversity.

The Ministry of Fisheries and Aquaculture Development in collaboration with the Marine Police have also intensified their patrols on the Ghana's to waterbodies to arrest people that uses illegal fishing equipment and methods for fish harvesting.

Relevant websites, web links, and files

- www.ug.edu.gh/news/support-vc's-green-project-donation-10000-trees-ym-regeneration-ltd
- www.myjoyonline.com/business/2016/April-29th/farmers-in-forest-reserved-areas-introduced-to-additional-source-of-income.php
- Ministry of Environment, Science, Technology and Innovation. (2018). National Biodiversity Policy.
- Forestry Commission. (2016). Ghana Forest Plantation Strategy: 2016-2040.

Ghana Target 3
By 2020, Incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed.

The rationale for the national target
Biodiversity is a valuable asset to ecological integrity and economic transformation and if managed intelligently, biodiversity can serve as the catalyst for development and a conduit for poverty alleviation. Biodiversity must, therefore, be managed in the context of ensuring sustainability and equitable benefits to people – both current and future generations. Over the years, the world has experienced a tremendous increase in human numbers with a tripling of Ghana's population between 1981 and 2010 resulting in unsound environmental technologies to promote economic growth and unsustainable patterns of consumption of the goods and services provided by nature. Ghana's rich stock of biological diversity has drastically declined in the last 50 years and has resulted in the loss of population of various ecosystems.

Main threats to Ghana's biodiversity emanate from agriculture, infrastructural development, forest conversion, timber extraction, population growth and severe illegal activities including encroachments. These coupled with unsatisfactory biodiversity incentives has greatly reduced the economic, social, religious, cultural, aesthetic, recreational, ecological and environmental benefits obtained from our ecosystems.

Ghana's Constitution vests ownership of the land in the Stool or Skin (the traditional or customary leadership structures that preside over a particular ethnic group, clan or tribe, and the associated land and resources) but gives the Government the right to manage the naturally occurring resources for economic gain. This has resulted in a series of perverse incentives that, over the decades, have tended to drive 'illegal' resource use and degradation or deforestation of the forest resources.

Economic and social incentives like ecotourism, payment for environmental service schemes, and conservation enterprise and certification of biodiversity-friendly products if implemented wisely can ensure sustainability and conservation of our ecosystems.

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Other relevant information

Ghana's effort within the past to guarantee the feasible administration of its ecosystems for development has not been entirely successful. The management of biodiversity to ensure it operates as a public good, a private decision-making tool and create conditions necessary for policy implementation has been met with little effort.

Approaches to biodiversity conservation in Ghana include both *in-situ*, i.e., use of both traditional (sacred groves) and modern methods (protected areas), and *ex-situ* (gene banks, zoological and botanical gardens. Ghana has introduced several measures, both economic and social to enhance activities for the conservation and sustainable use of its ecosystems. Incentives, grants, and subsidies such as ecotourism, national awards and traditional laws and sanctions have been greatly monitored to ensure their effectiveness in promoting the sustainable use and conservation of our biodiversity and their contribution to the socio-economic development of the country.

Relevant websites, web links, and files

- The state of biodiversity in Ghana: Knowledge gaps and prioritization. http://gh.chm-cbd.net/biodiversity/status-ghanas-biodiversity/ghanas-biodiversity-current-status

Ghana Target 4
By 2020, Governments, business and stakeholders develop plans for sustainable production and consumption and keep the impacts on resource use within safe ecological limits.

Rationale for the national target
Attainment of Ghana's biodiversity goals in relation to the Aichi targets demands an all-inclusive partnership and cooperation by all sectors of society. The government, educational and scientific institutions, environmental non-governmental organizations, businesses, indigenous people, individual citizens, and youth need to provide an integrated front to ensure biodiversity conservation and sustainability. Ghana will need to explore and apply the most extensive range of strategies and tools to successfully safeguard its biological diversity. To do this we need to expand existing relationships, forge new ones and harness innovation. This will require all kinds of knowledge ranging from physical and social sciences to traditional and practitioner knowledge and economics.

Global initiatives for ecosystem management are constantly growing and have the added benefit of developing long-lasting solutions to promote the conservation and sustainable use of biodiversity. Conserving and enhancing biodiversity will benefit wildlife and plant species, provide significant social, environmental and economic benefits and ensure maintenance of ecosystem services thereby contributing to the well-being of the citizens.

Level of application
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Other relevant information
To aid in the conservation of Ghana's biodiversity, legally protected areas have been established such as Ramsar sites (Songor Ramsar Site) and some ecotourism sites such as Kakum National Park. Other programmes and initiatives employed to ensure biodiversity conservation includeReduced Emissions from Deforestation and Forest Degradation (REDD+), Voluntary

Partnership Agreement (VPA), Cocoa Farming and Biodiversity in Ghana Project, Climate Change Initiatives, Food and Agriculture Sector Development Policy, Forestry Development Master Plan, Sustainable Land and Water Management Project, Biodiversity Offset Schemes, Biosafety Implementation Programme.

Relevant websites, web links, and files

- National Parks in Ghana: http://www.ghana.travel/nature-and-wildlife
- REDD+, Voluntary Partnership Agreement: http://www.fcghana.org/

Ghana Target 5
Reducing the rate of loss of all-natural habitats, including forests, to at least half and where feasible brought close to zero, and degradation and fragmentation significantly reduced.

Rationale for the national target
Natural habitats in Ghana which includes forests, wetlands, fresh and marine water resources, and grasslands provides a home to a myriad of flora and fauna and the loss of these habitats results in the extinction of some species. Species that are unable to survive outside their natural habitats are lost and this compromise nature's balance.

Ghana lost about 33.7% of her forest cover representing 2,508,000 ha between 1990 and 2010. Through plantation development, overall forest cover, however, has increased to 9,294,349 ha as at 2015 but of major concern is the loss of primary forests. The World Conservation Monitoring Center reports of about 1185 species of birds, mammals, amphibians and reptiles in Ghana. There is an increasing pressure and urge to exploit protected forest areas and this call for the strengthening of institutional capacities for the implementation of this national target.

Wetlands serve as habitats for several birds, mammals, reptiles, amphibians, fish and invertebrate species as well as provide other ecological functions. Ghana's over 80 wetlands are under serious threats mainly as a result of anthropogenic activities. Increasing demand for land for farming, settlements and industrial activities as well as pollution from domestic and industrial wastes have led to the degradation of wetlands in Ghana.

Marine and freshwater resources also serve as habitats for several flora and fauna but are threatened mainly as a result of pollution from domestic and industrial wastes. It is reported that about 57 fish species in Ghana are threatened as at 2017 according to the World Bank. Reducing the rate of loss of natural habitats and its degradation and fragmentation will present significant benefits to flora and fauna which will lead to the sustainability of ecological services and benefits.

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Other relevant information

Government agencies, non-governmental agencies and other relevant stakeholders have increased their efforts to reduce the rate of loss and degradation of natural habitats in the past few decades. However, the results are not encouraging. Ghana is a culturally diverse country where most traditions promote the protection of habitats such as water bodies, wetlands and forest areas. Patches of these natural habitats are often regarded as sacred areas where encroachment and pollution is frowned upon and not permitted. There is, therefore, a need for collaborative effort between government agencies and authorities of local communities in achieving the Aichi Biodiversity Target 5 which has been incorporated into the National Biodiversity Strategy and Action Plan (NBSAP).

The NBSAP is within the framework of national development, Sustainable Development Goals, National Climate Change Action Plan, Forestry Development Master Plan and the international conventions that Ghana has signed to. Achieving this target will involve efficient resource allocation, capacity building and strengthening linkages and promoting coordination between the different stakeholders.

Relevant websites, web links, and files

- National Biodiversity and Action Plan
  https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf
- Ghana Forest Information and Data
  https://rainforests.mongabay.com/deforestation/2000/Ghana.htm
- Ghana- Fish species threatened
  https://tradingeconomics.com/ghana/fish-species-threatened-wb-data.html

Ghana Target 6
All stocks managed and harvested sustainably so that overfishing is avoided

Rationale for the national target
Ghana's fishery sector plays an important role in contributing to economic development of the country in terms of provision of jobs, food security, poverty alleviation, gross domestic product (GDP) and foreign exchange. The marine capture fisheries directly employ more than 135,000 fishers and approximately 2.6 million people are reliant on them. The current per capita fish consumption in Ghana is 28 kg which preponderate both Africa's current mean consumption of 10.5 kg and world's current of 18.9 kg.

In all Ghanaian households, fish accounts for 22.4 percent of the total food expenditure with this value rising to 25.7 percent in poor households. 1.2 % of the national GDP is contributed for by the fisheries sector and accounts for 5.4%% of the GDP in agriculture and 10% of the labour force. Illegal, unreported and unregulated (IUU) fishing practices nevertheless threaten biodiversity and the welfare of fisheries in the long term as well as the livelihood of the people who rely on it.

For the country to continue to reap the benefits from fisheries, it is prudent that unsustainable fishing practices are avoided in order to maintain and promote healthy stocks, by-catch is monitored to avoid catching non-target creatures and implement or reform and enforce policies to stop overfishing.

Level of application
☐ Regional/multilateral
☒ National/federal
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Other relevant information

Fishing in Ghana is characterised by gender distribution where the main fishing activities such as fish harvesting at the artisanal, semi-industrial and the industrial levels are undertaken by men with women playing crucial roles in post-harvest activities such as storage, processing and trade.

Relevant websites, web links, and files

- Fishery and Aquaculture profile of Ghana http://www.fao.org/fishery/facp/GHA/en
- Ghana-Convention on Biological Diversity https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Ghana Target 7
By 2020 areas under agriculture, aquaculture and forestry managed sustainably, to ensure conservation of biodiversity

The rationale for the national target
Agriculture which remains one of the main sources of income to most Ghanaians (40.65%) continue to thrive on important ecosystem services such as pollination, carbon and nutrient cycling, rock weathering and the self-purifying ability of water bodies. Agriculture can also aid in the supporting and conservation of biodiversity by providing habitat and food for wildlife. However, activities such as the conversion of forest lands for agricultural intensification and hunting of game has declined the abilities of the agricultural lands and forests to conserve biodiversity.

Due to the increased protein demand of Ghanaians with affordability as a key factor, aquaculture has been recently adopted in order to make up for the fish requirements. Tilapia is a major species which is considered under aquaculture in Ghana and constitutes over 80% of aquaculture production whiles catfishes account for the remaining 20%. Aquaculture creates a source of livelihood, recreation, and food for the people. The presence of ecologically-unfriendly methods of feeding and harvesting these fishery products, however, creates a threat to the sustainability and conservation of aquatic species who play critical roles in the ecosystem functions and services delivery.

According to the United Nations Food and Agriculture Organization, 21.7% of Ghana is forested. 8.0% of these forests fall under primary forests which are the most biodiverse and carbon-dense form of forest. Continuous logging of trees in the forests has however led to Ghana losing about 1.6 ha of forested lands every year. In 2015, the combined effects of Agriculture, Aquaculture and forestry contributed to 17.02% of the Ghanaian GDP.

The combined effects of these ecosystems towards the sustaining and conservation of biodiversity are very important. Conservation of biodiversity by these ecosystems positively impact the environment by improving water quality and quantity, enhancing activities of pollinators, providing habitats, sustaining natural systems and increasing the resilience of these ecosystems, thereby conserving biodiversity.

Level of application
☐ Regional/multilateral
☒ National/federal
☐ Subnational

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☐ 4	☐ 9	☐ 14	☐ 19
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Other related Aichi Biodiversity Targets (

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☐ 2	☐ 7	☐ 12	☐ 17
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Other relevant information:

The Ministry of Environment, Science, Technology and Innovation (MESTI) with expert ideas of relevant stakeholders developed the National Biodiversity Strategy in 2000. The National Biodiversity Strategy was updated and reformulated by MESTI in 2016 through the constitution of a national task force, initiated studies, and conducted stakeholder's workshops to arrive at a mission of increasing resilience of ecosystems in Ghana by 2020 and providing essential services, in order to secure the country's variety of life, and contribute to human well-being, and poverty eradication. National register of community conserved areas available in digital form and in print.

Relevant websites, web links, and files:

- Employment in Agriculture in Ghana: www.tradingeconomics.com/ghana/employment-in-agriculture-percent-of-total-employment-wb-data.html
- Fisheries sector of Ghana: http://www.fao.org/fishery/countrysector/naso_ghana/en
- Ghana forest information and data: https://rainforests.mongabay.com/deforestation/2000/Ghana.htm
- Agriculture, forestry and fishing contributions to GDP; 2017: https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=GH

Ghana Target 8
Minimizing pollution, including excess nutrients, to levels that are not detrimental to ecosystem function and biodiversity (Aichi Target 8)

Rationale for the national target

Pollution is a major source of biodiversity loss in Ghana. Chemicals and particulates from land based activities, plastics, electronic wastes and air pollutants significantly threaten Ghana's ecosystems. Pollution has led to the loss of biodiversity in wetlands and water bodies, particularly in the coastal lagoons e.g Korle, Kpeshie, Sakumo wetlands and inland waters.

At the national level, the country has developed specific policies and action plans to address the problems of pollution, such as the National Environmental and Sanitation Strategy and Action Plan (NESSAP) in 2010, a Strategic Environmental Sanitation Investment Plan (SESIP); and a National Urban Policy Framework and Action Plan (2012). In the aquatic environment, regulations with biodiversity implications of pollution include the Fisheries Act (Act 625) of 2002 and the Marine Pollution Act (Act 932) of 2016.

The EPA Act, Act 490 and the Environmental Assessment Regulations LI 1652 are key instruments to ensure compliance with laid down environmental Assessment Regulations. As part of the regulations, sector specific effluent quality guidelines were developed. This is s being converted to standards. Work is 80% complete. The buffer zone policy is also a policy to reduce pollution of water bodies from diffuse sources. Buffer Zone Regulations are being developed to ensure enforcement of the policy, progress is about 70%. A Volta Basin Charter is also being crafted to guide the management of the Volta basin. The Ministry of Sanitation is developing a data base for the water sector. Rotterdam Convention and Basel Convention have been domesticated to ensure the safe handling, transport and management of chemicals. The Hazardous, Electrical and Electronic Waste Act 917 and Regulations LI 2250 have also been formulated.

At the international level, Ghana is a signatory to a number of international and transboundary conventions on pollution control including the MARPOL, Abidjan Convention and International Convention on Oil Pollution Preparedness, Response and Co-Operation, among others. The specific targets of Action Plan 8 in the 2016 National Biodiversity Strategy and Action Plan aims at creating awareness on pollution reduction measures, developing and adopting standards, guidelines and regulations, and improving environmental information management systems.

Level of application:

☐ Regional/multilateral – please indicate area concerned
☒ National/federal
☐ Subnational – please indicate area concerned

Relevance of the national targets to the Aichi Biodiversity Targets
Ghana has numerous regulations to minimise the impacts of pollution on the environment. The national target 8 focuses on strengthening compliance with and enforcing relevant laws on pollution control through strategies for awareness creation, developing and adopting guidelines and regulation, and improving environmental information management systems. These specific

targets link directly to the Aichi Target 8 that aims overall to bring pollution levels, including from excess nutrients, to levels that are not detrimental to ecosystem function and biodiversity.

Main related Aichi Biodiversity Targets

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☐ 2	☐ 7	☐ 12	☐ 17
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Other relevant information

In 1999, Ministry of Local Government and Rural Development (MLGRD) consulted with various stakeholders to develop the National Environmental and Sanitation Policy, which was again revised in 2010. The policy also covers all aspects of environmental health, including excreta disposal and solid waste management, with specified roles and responsibilities for the various stakeholders, including the Metropolitan, Municipal and District Assemblies (MMDAs), Ministry of Environment, Science, Technology and Innovation (MESTI), Ministry of Health (MOH), Ministry of Education (MOE), Educational Institutions and the Private Sector. Using bye-laws and regulations, the policy assigns the MMDAs direct responsibility for waste management, public health management, environmental monitoring, planning and monitoring. The Environmental Services Providers Association (ESPA), the umbrella body of private waste management companies, work with MMDAs under public-private partnerships to provide waste management services such as waste collection and disposal sites management.

The National Environmental Sanitation Strategy and Action Plan (2010 – 2015) was also developed into a comprehensive strategy to redirect current solid waste management approaches as it emphasised source segregation of waste, reuse and recycling. Although NESSAP provides credible plans and strategies to guide solid waste management, it was not effectively implemented over its proposed implementation period of 2010 to 2015.

Relevant websites, web links, and files

- EPA. (2016). Ghana: State of the Environment 2016 Report. Environmental Protection Agency, Ministry of Environment, Science, Technology and Innovation. Accra.

Ghana Target 9
Ensuring that invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment (Aichi Target 9)

Rationale for the national target

Invasive Alien Species (IAS) in Ghana have caused devastating impacts on the distribution and abundance of endemic species resulting in extinctions and affecting terrestrial, natural and cultivated ecosystems. National customs and quarantine practices do not have adequate safeguards, thereby increasing the likelihood of species being spread through increased travel, trade (both legal and illegal), tourism and agriculture. The proliferation of common invasive alien plant species such as *Calopogonium mucunoides*, *Broussonetia papyrifera* (Yorke), *Cedrella odorata*, *Chromolaena odorata*, *Leucaena leucocephala* and *Eichhornia crassipes* (water hyacinth) has already affected numerous water bodies and impacted on fishing, water transport, water supply, public health and hydropower generation. Inland and coastal waters are particularly being affected by invasive alien species introductions through importation of alien fish species for aquaculture and ballast water discharge in ports and coastal waters. Recurrent blooms of the algae *Enteromorpha flexuosa* continue to affect the western coastal waters. Specific targets under Component 2 of the 2014 National Biodiversity Strategy and Action Plan, will develop and implement communication protocols for early warning detection, develop and implement an IAS policy and strategy, implement projects and programmes on IAS in all habitats and implement sections of the Biosafety Act 2011 regarding IAS and Genetically Modified Organisms (GMOs).

Ghana is a signatory to key international and regional conventions and protocols that address IAS and related issues. Despite various attempts made at implementation, progress has been hindered by weak institutional and legislative instruments as well as inadequate inventories and poor monitoring data to track IAS. In 2014, the Ministry of Environment, Science, Technology and Innovation initiated the development of a policy instrument for IAS. A key goal of the country's draft national action plan is the development of early warning systems for early detection and strengthening capacity to promote the integrated management of IAS in all habitats. However, the document is still in draft form and incomplete.

Level of application

☐ Regional/multilateral – please indicate area concerned
☒ National/federal
☐ Subnational – please indicate area concerned

Relevance of the national targets to the Aichi Biodiversity Targets
Actions under the national target 9 towards establishing a comprehensively updated dataset and information on the drivers, pressures, current state of invasive alien species, their impacts and effective responses to assess the alien species invasion challenge in the country, inform policy for managing existing ones and prevent future incidents, is directly linked to the Aichi Target 9.

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Other relevant information

Invasive species management in Ghana have been prioritized based on their impacts on the environment and socio-economic conditions. Different lists have been presented over the years with different set of species being prioritized at different periods. Estimates of IAS are also varied, with the highest compilation made by the 2016 State of Environment Report which listed 102 IAS of different taxa, comprising of 47 terrestrial flora, 13 aquatic flora, and of the 27 terrestrial and aquatic fauna listed, 70% insects are mainly agricultural pests. The remaining are lower organisms and microbes that are among disease causative agents of plants, animals and humans.

There are several national policies and legislations relating to the control and management of invasive alien species, which are scattered in statute books and do not adequately or specifically address the problem of invasive alien species. They do, however, provide a starting point for updating, formulating and/or amending the range of legislative provisions relating to invasive alien species in the country. During the formulation of the draft National Policy on Invasive Alien Species Policy, for example, these existing sectoral polices were reviewed, involving broad stakeholder consultations including academia and research, regulatory, Metropolitan, Municipal and District Assemblies, (MMDAs), and Civil Society Organizations (CSOs). The policy was also subjected to Strategic Environmental Assessment (SEA) to identify the opportunities and risks associated with policy actions.

Ghana has signed on key international conventions for the control of IAS, such as the Convention on Biodiversity (CBD) and the Cartagena Protocol on Biosafety. Other non-binding instruments include the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), the United Nations Convention on the Law of the Sea (UNCLOS); as well as regionally relevant instruments such as the Agreement on the Conservation of African-Eurasian Migratory Water Birds, Agreement for the Establishment of the Near East Plant Protection Organization and the 1969 Revised Algiers (African) Convention. In addition to formal conventions and treaties, there are also soft law instruments on the subject, including the IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species (IUCN Guidelines), Chapter 11 of UNCED's Agenda 21 and the International Maritime Organization (IMO) Resolution A.868 (20) on Guidelines for the Control

and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens.

Relevant websites, web links, and files

- MESTI (2014). Invasive Alien Species Policy (Draft), Ministry of Environment Science Technology and Innovation, Accra, Ghana. Available at https://members.wto.org/crnattachments/2016/SPS/GHA/16_0951_00_e.pdf
- EPA. (2017). Ghana: State of the Environment 2016 Report. Chapter 16: Invasive Species, Environmental Protection Agency, Ministry of Environment, Science, Technology and Innovation. Accra.
- Global Invasive Database for Ghana http://issg.org/database/species/search.asp?st=sss&sn=&rn=Ghana&ri=19347&hci=-1&ei=-1&fr=1&sts=&lang=EN
- http://www.vertic.org/media/National%20Legislation/Ghana/GH_Biosafety_Act_2011.pdf
- http://archive.iwlearn.net/globallast.imo.org/wp-content/uploads/2015/03/Ghana-NATIONAL-BALLAST-WATER-MANAGEMENT-STRATEGY-2014.pdf

Ghana Target 10
Minimizing the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification, so as to maintain their integrity and functioning. (Aichi Target 10)

Rationale for the national target

Coastal ecosystems such as mangroves and estuaries are areas of high biodiversity and productivity that not only play key roles in the functioning and regulation of the marine ecosystem but contribute significantly to local and national economies. These low lying ecosystems are particularly vulnerable to changes in the quantity and quality of water and face serious threats from increased temperatures and sea level rise as a result of climate change. Increasing urbanisation, industrial development and farming activities are also destroying many of these habitats as they into other forms of land use. Local communities also over-exploit their resources for domestic and commercial use. As a result, between 1980 and 2006, 24/3% of the total mangrove area in Ghana had declined, with a few patches remaining in the Keta and Songor Lagoons along the eastern coastline and the Amansure catchment in the west. Recently, coral reefs which are also important areas of productivity were discovered off the shores of the Western Region. The specific targets of the national Action Plan 10 are to develop regulations to protect the newly discovered coral reefs and to develop and enforce relevant regulations protecting mangrove ecosystems and estuaries.

Ghana is signatory to international treaties that are directly linked to the conservation of coastal ecosystems, the Convention on Wetlands (Ramsar Convention) and the Convention of Migratory Species (CMS), as well as to regional agreements such as the African Eurasian Waterbird Agreement. The Convention for the Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region is a comprehensive umbrella agreement for the protection and management of the marine and coastal areas, however, Ghana has not appropriated the provision of the convention. At the national level, key policies for the management of these ecosystems are the National Wetland Strategy and Action Plan 2007-2016 due for review and being implemented by the Wildlife Division of the Ghana Forestry Commission, and the Buffer Zone Policy being implemented by the Water Resources Commission. Other related plans and policies that address issues of coastal management include the Coastal Zone Management Indicative Plan (1990); National Environmental Action Plan (1994); Integrated Tourism Development Plan (ITDP) (1996-2010); Draft Integrated Coastal Zone Plan (1998) and National Oil Spill Contingency Plan (2002, Revised Draft 2009). The plans and programmes contained in these documents are meant to provide for the preservation and sustainable use of coastal and marine ecosystems.

Level of application

☐ Regional/multilateral – please indicate area concerned
☒ National/federal
☐ Subnational – please indicate area concerned

Relevance of the national targets to the Aichi Biodiversity Targets
The mangroves and coral reefs constitute important breeding and nursery sites for commercial fish species. The country has committed to a number of international conventions and developed

related policies and Regulations towards protecting its coastal ecosystems, however, these need to be strengthened and properly enforced. This directly contributes to the Aichi Target 10.

Main related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
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Other related Aichi Biodiversity Targets

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Other relevant information

Wetland management has not been fully mainstreamed into the national land-use planning system and there are inadequate legislative instruments to promote sustainable use of resources within the wetlands. The Wildlife Division (WD) of the Ghana Forestry Commission has direct mandate for managing Ramsar sites in the country. However, activities of a number of government agencies and non-governmental organisations also contribute to the conservation of coastal ecosystems in the country, including the Ministry of Environment, Science, Technology and Innovation (MESTI), Ministry of Local Government (mainly the District Assemblies), Environmental Protection Agency (EPA), Water Resources Commission, Forest Services Division of the Forestry Commission, as well as NGOs such as the Ghana Wildlife Society, Friends of Ramsar Sites and Friends of the Earth.

Local institutions have a key role in managing coastal ecosystems, especially in implementation at the local and district levels. The District Environmental Management Committees (DEMCs) of the District Assemblies are responsible for monitoring and coordinating environmental protection and conservation activities, and assisted by the Community Environmental Committees (CECs).

Relevant websites, web links, and files

- Food and Agriculture Organisation. (2016). Ghana Country Profile: Fishery Sector. Rome, Italy: FAO
- IBAT. (2018). IBAT for research and conservation planning country profile: Ghana http://www.tcpdf.org
- Water Resources Commission. (2011). Riparian buffer zone policy. Accra, Ghana: Water Resources Commission
- Wildlife Division. (2005). Managing Ghana's Wetlands: A National Wetlands Conservation Strategy and Action plan 2007-2016. Accra-Ghana

- World Bank. (2016). West African Regional Fisheries Program in Ghana: Ministry of Environment, Science, Technology and Innovation, Ghana
- https://www.ramsar.org/sites/default/files/documents/library/national_wetland_policies_-_ghana.pdf
- Serigatad, B et.al (2016) Marine Environmental Survey of bottom sediments in Ghana, Central coast. May 2010
- Bull-Mortentensen et al (2016) First observation of the structure and Mega faunal Community of a Large lophelia reef on the Ghanaian shelf ((Gulf of Guinea).
- Deep Sea Reasearch II 137 (2007) 148- (www.elsevier.com/locate/dsr2)

Ghana Target 11
Ensuring that at least 17 per cent of Terrestrial and Inland water, and 10 per cent of Coastal and Marine Areas are Conserved through Systems of Protected Areas (Aichi Target 11)

Rationale for the national target
Resources from terrestrial and aquatic ecosystems contribute significantly to the national economy; for example, the fisheries sector contributes about 1.2% of GDP employing over 135,000 people directly with in the marine sector and 2.6 million people relying on fisheries. Traditionally protected areas (sacred groves) also have spiritual value and cultural identity for people, especially in rural communities. The national Action Plan 11 aims to enhance the preservation and conservation of Ghana's biological heritage through systems of protected areas. Targets include updating and revising existing management plans for *ex-situ* conservation including non-native species, enforcing existing management plans for protected areas, revising regulation on wetland management, as well as establishing and improving facilities and plans for *in-situ* conservation. This also relates to the Sustainable Development Goal (SDG) 14 that highlights the need for conservation and sustainable use of the oceans, seas and marine resources for sustainable development through sustainable management and effective regulation to avoid significant adverse impacts including overfishing, IUU and destructive fishing practices and the conservation of at least 10% of coastal and marine areas by 2020.

Level of application:
☐ Regional/multilateral
☒ National/federal
☐ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets
The national target focuses on enhancing the preservation and conservation of the country's biological heritage through actions that will strengthen its management plans and improve capacity, which are directly linked to Aichi target 11.

Main related Aichi Biodiversity Targets
☐ 1	☐ 6	☒ 11	☐ 16
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Other related Aichi Biodiversity Targets
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Other relevant information

Under the Ministry of Lands and Natural Resources, the Forestry Commission has the protective mandate of all wildlife in the country. Its Wildlife Division has establishedd partnership systems to encourage the participation of local communities, civil society groups and other stakeholders in protecting important habitats and managing activities that contribute to the decline of threatened species. This is mainly through institutional mechanisms that include Protected Areas Management Advisory Units/Boards, Community Resources Management Committees, and Community Resource Management Area approach (CREMA). The biosphere reserve concept coordinated by the EPA is also supporting conservation in areas outside national protected areas as in the case of lake Bosomtwe Biosphere Reserve. hitherto was only protected by traditional regulations which were not effective due to modernisations and loss of cultural values.

Relevant websites, web links, and files

- EPA. (2017). Ghana: State of the Environment 2016 Report. Environmental Protection Agency, Ministry of Environment, Science, Technology and Innovation. Accra.

Ghana Target 12
Preventing the extinction of known threatened species and their conservation status, particularly of those most in decline, and improving and sustaining their status (Aichi Target 12)

Rationale for the national target

Ghana's rich biodiversity is under severe threat from changing climatic conditions and several anthropogenic pressures, including habitat loss and degradation from farming, urbanisation, extractive industries and overexploitation. The country has already lost important species such as the red colobus monkey and the Hawksbill marine turtle. Based on global diversity indicators tracked by conservation organisations, various compilations have been made of the numbers of species in different taxonomic groups, including those by IUCN. Out of an estimated 5429 plant species, 119 are threatened, three of which are critically endangered, 20 endangered and 96 vulnerable. Threatened faunal species include 56 fish, 11 amphibians, 7 reptiles, 22 birds and 20 mammal species. Also of national concern is the continued exploitation of bushmeat for market consumption that has endangered species such as the pangolin, despite hunting licence requirements. The Action Plan 12 under component 2 of the 2014 National Biodiversity Strategy and Action Plan specifically aims to create an inventory of threatened, vulnerable and endangered species using the REDD list category of IUCN and develop regulations to protect endangered species. Other related national policies and strategies for protecting threatened species include the National Wildfire Management Policy, National Wood Procurement Policy, Forestry Development Master Plan (2016-2036) and the Forest Plantation Strategy (2015 – 2040).

The country is signatory to a number of regional conventions such as the African Convention on the Conservation of Nature and Natural Resources, as well as international agreements such as the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on the Conservation of Migratory Species, that include special protection to animals and plant species threatened with extinction. In line with meeting its international reporting commitments, Ghana is one of 21 (out of 154 Contracting Parties) that has submitted a comprehensive list of its nationally threatened species protected within its borders with international support.

Level of application:

☐ Regional/multilateral
☒ National/federal
☐ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets
The national target to improve its conservation of endangered species but developing an up-to-date inventory of threatened species and strengthening the enforcement of national and international regulations, directly links to Aichi target 12.

Main related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
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Other related Aichi Biodiversity Targets

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Other relevant information

Under the Ministry of Lands and Natural Resources, the Wildlife Division has the protective mandate to manage all wildlife in the country. It currently manages 6.2% of the country's total land surface as protected areas where land is acquired and provided legal recognition. Currently, there are 16 protected areas that include 7 national parks, 6 resource reserves, 2 wildlife sanctuaries and 1 strict nature reserve. There are also 5 coastal Ramsar sites. In recent years, several specific policy measures have been initiated to strengthen its legal framework for managing wildlife, such as the Rapid Response Team to identify and address illegal activities in protected areas, as well as implement international conventions.

The Wildlife Division has designed partnership systems to encourage the participation of local communities, civil society groups and other stakeholders in protecting important habitats and managing activities that contribute to the decline of threatened species. This is mainly through institutional mechanisms that include Protected Areas Management Advisory Units/Boards, Community Resources Management Committees, and Community Resource Management Area approach. Community protected areas, or sacred groves, also contribute significantly to protection of various species through customary laws and community respect ancestors and gods.

Relevant websites, web links, and files

- Ghana - Bird threatened species, https://tradingeconomics.com/ghana/bird-species-threatened-wb-data.html
- https://www.indexmundi.com/facts/ghana/indicator/EN.HPT.THRD.NO
- http://earthsendangered.com/search-regions3.asp?search=1&sgroup=allgroups&ID=483
- https://tradingeconomics.com/ghana/plant-species-higher-threatened-wb-data.html

Ghana Target 13
Maintaining the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives (Aichi Target 13)

Rationale for the national target

Within the various terrestrial and aquatic ecological zones of the country are unique biological resources that define the wide diversity of local faunal and floral populations. For example, about 3600 floral species, including both indigenous and introduced, have been estimated for major regional centres of endemism. However, high deforestation rates – at two per cent annually – and increasing demand for aquatic resources, have affected levels of endemism in key hotspots. Biodiversity of crops and livestock is also declining, with some local yam species absent from the market and the proportion of West African short horn cattle declining from about 80% to 47% of national cattle herd in the 1990s. Some crops have rather benefited from introduced varieties and increased their diversity. The Action Plan 13 under component 3 of the 2014 National Biodiversity Strategy and Action Plan aims to support the preservation and conservation of genetic biodiversity of cultivated plants, farmed and domesticated animals and their wild relatives through strategies that (i) promote research on Genetically Modified Organisms (GMOs) and (ii) support collection and conservation of genetic diversity of plants and animals.

In addition to its commitments to related international conventions and protocols on conserving biodiversity, the country already has in place various strategies to maintain the genetic diversity of both domestic and wild species, mainly through *in-situ* systems such as traditional sacred groves and protected areas and *ex-situ* approaches using gene banks, zoological and botanical gardens. Under the management of the Forest Services Division are legally protected areas such as forest reserves, wildlife conservation areas and Ramsar sites. About one-quarter of the forest reserves are under strict protection without any form of exploitation. In addition, the National Biosafety Authority (NBA) supported by the Technical Advisory Committee is mandated to ensure safe conduct of all GMO contained and confined trials, as well as its introduction into the environment, import or placement on the market, export and transit.

Level of application

☐ Regional/multilateral – please indicate area concerned
☒ National/federal
☐ Subnational – please indicate area concerned

Relevance of the national targets to the Aichi Biodiversity Targets
The national target focuses on promoting research on GMOs and supporting the collection and conservation of floral and faunal genetic diversity, which links directly to the Aichi Target 13 which states that by 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Main related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
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Other related Aichi Biodiversity Targets

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Other relevant information

The national framework to ascertain biosafety, the Biosafety Act, 2011(Act 831) established a National Biosafety Authority (NBA) to lead the regulatory mechanisms of Genetically Modified Organisms (GMOs) in Ghana supported by a Technical Advisory Committee (TAC) that conducts scientific risk assessments on submitted applications. The NBA has the mandate to ensure an adequate level of protection in the field of safe development, transfer, handling and use of genetically modified organisms resulting from biotechnology that may have an adverse effect on health and the environment. The NBA collaborates with the Food and Drugs Authority, Environmental Protection Agency, Plant Protection and Regulatory Services Directorate, Ghana Revenue Authority and the Veterinary Services Directorate. Other institutions include Ghana Standards Authority, District Assemblies, Metropolitan Assemblies, Municipal Assemblies and any other Local Government Authorities

A number of research conservation facilities in the country have been used for supporting this national target, namely the (i) University of Cape Coast (Botany Department Herbarium), (ii) University of Ghana (Zoology Department Entomology Museum, Botany Department Herbarium and Botanical Gardens and Noguchi Memorial Institute of Medical Research), (iii) Kwame Nkrumah University of Science and Technology Botanical Gardens and Forestry Herbarium, (iv) Accra Zoo, (v) Kumasi Zoo (vi) Aburi Botanical Gardens, (vii) Bunso Plant Genetics Research Centre and Arboretum, and (viii) Akropong Centre for Scientific Research into Plant Medicine Herbarium and Arboretum.

There are 21 legally constituted wildlife conservation areas and two proposed ones – one national park and one wildlife sanctuary – that have provided supported conservation approaches thereby contributing to maintaining genetic diversity. Other innovative approaches include the establishment of Globally Significant Biodiversity Areas (GSBAs), Important Bird Areas (IBAs) and Community Resource Management Areas (CREMAs). Currently, there are 29 forest reserves that are GSBAs, where commercial exploitation is prohibited and community participation in management is encouraged. About 36 IBAs which cover approximately 11.5 km^2 have been identified. Efforts are being encouraged between relevant government agencies and major stakeholders such as industry, NGOs, traditional authorities and local communities.

Ghana Target 14
Restoring and safeguarding ecosystems that provide essential services, including ecosystem services (Aichi Target 14)

Rationale for the national target

Ghana's natural environment, its main source of raw material, plays a critical role in national socio-economic and sustainable development processes. Changes in ecosystem services, such as carbon sequestration, filtration of air and water, protection against flood risk, and soil formation as well as cultural and recreation services among others, are usually the result of the synergistic impacts from multiple interacting drivers over time. The trend in forest loss, for example, not only poses a major threat to the livelihoods of local communities but also to the ecosystem services that support the nation's predominantly agrarian economy. Another key forest service facing tremendous pressure from loss of forest cover is non-wood forest products such as bushmeat that has an estimated annual value of US$35 million and important as a source of protein and income generation. Mangroves also play key ecological and socio-economic roles, as they provide habitat for over 80% of commercial fisheries and other aquatic species. The measurement, valuation and monitoring of important ecosystem services is therefore critical for ensuring sustainability of its various benefits. To attain this, the specific targets identified in Action Plan 14 under Component 3 of the 2014 National Biodiversity Strategy and Action Plan, prioritise the mainstreaming of relevant natural resource related policies into sector and district development plans and programmes, restoration of degraded ecosystems through community participation, and the development and implementation of Payment for Ecosystem Services (PES).

The Ministry of Lands and Natural Resources has overall responsibility for formulating forest and wildlife policy and sectoral planning, such as the 2012 Forest and Wildlife Policy, in conjunction with other national policies on environment, land, agriculture, water, etc. It operates through the Forestry Commission to regulate the use of forest and wildlife resources, conserve and manage biodiversity, as well as coordinate related policies. The Wildlife Division implements policies on sustainably managing wildlife and their resources. Initially, the primary focus of the forestry sector planning was on forest timber management. More recently this has expanded to include causes of deforestation, needs for reforestation, promote the contribution of forests to food security and rural energy, and build capacity for national forestry administrations. The SDGs have also modified forestry planning to include issues of sustainability into its operational guidelines.

The Ministry of Food and Agriculture also has a responsibility to ensure that agriculture practise does not impact negatively on the efforts to restore and safeguard ecosystems as a result of agriculture expansion and intensification. The Fisheries Commission plays a key role in ensuring that, habitats for aquatic organisms are safeguarded for sustainable fisheries production.

Level of application:
☐ Regional/multilateral – please indicate area concerned
☒ National/federal
☐ Subnational – please indicate area concerned

Relevance of the national targets to the Aichi Biodiversity Targets
The national target to restore and safeguard essential ecosystems through mainstreaming related natural resource policies, improving community participation and developing an PES system, is directly linked to the Aichi Target 14 which states that by 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Main related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
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Other related Aichi Biodiversity Targets

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Other relevant information

The forestry sector is one of the country's most important in terms of job creation, income for local communities, foreign exchange earnings through timber export and protection of the environment. Over the past few decades, the sector has enhanced its policy and regulatory reforms that improved and developed the forest and wildlife resource
base and integrated good governance, transparency, equity, and poverty reduction in the forest and wildlife sector. The 1996 Forestry Development Master Plan (FDMP) became the entry point for raising awareness on issues related to forest and wildlife management as well as preparing specific programmes and projects.

For example, two interventions to promote sustainable savannah woodland and biodiversity management enabled efficient use of resources, supported improvement of living conditions for local communities, and created biological corridors for wildlife management. The programmes were implemented based on the integrated land use plans starting on mini-watersheds from headwaters areas, building on the experiences of the land and water management component of Ghana Environmental Resource Management Project (GERMP). The programme took account of the relevant physical factors related to the resources, as well as the market situation, and the culture, needs and capabilities of the communities which rely on the land resources for their livelihood.

One of the main principles of the FDMP is the participation of local communities in sustainable forest and woodland management. Through the Wildlife Division, civil society groups and other stakeholders are encouraged to contribute to the protection of important habitats and the sustainable management of ecosystems. Institutional mechanisms to achieve this include

Protected Areas Management Advisory Units/Boards, Community Resources Management Committees, and Community Resource Management Area approach.

Relevant websites, web links, and files

- https://www.fcghana.org/userfiles/files/MLNR/FDMP_June%2015%20Final_draft.pdf

Ghana Target 15
Enhancing ecosystem resilience and restoration to promote the contribution of biodiversity conservation to carbon stocks and ensure restoration of at least 15 per cent of degraded ecosystems.

Rationale for the national target

Ghana's forest and woodland resources, as well as other ecosystems, provide diverse economic products and environmental services as natural sinks and stores of carbon. these ecosystems contribute to the biological mitigation of GHGs through the sequestration of gases, on a much smaller scale, mangroves also contain substantial carbon stocks. The Government of Ghana recognizes both the growing costs of natural resource degradation and the developmental threat of climate change. The cost of environmental degradation is estimated to be as high as 10 percent of GDP annually. The major direct causes of deforestation as summarized in Ghana's Readiness Preparation Proposal (R-PP, 2010) are:

i. agricultural expansion, including for cocoa;
ii. harvesting for fuel wood and charcoal,
iii. illegal logging,
iv. wildfires and biomass burning;
v. (iii) population and development pressure; and
vi. mining and mineral exploitation. In addition, the complex tree tenure and benefit sharing regime fails to provide incentives to communities to protect trees.

Climate smart agriculture practices, wildfire prevention and control measures, ensuring compliance with mining laws, adequate incentives for ecosystem management, improved city or town planning, Afforestation, reforestation and restoration of natural habitats, as well as sustainable fuel wood production and more efficient mechanisms for the use of wood fuel energy help to improve and consequently minimize the loss of carbon storage and sinks. Enhancing ecosystem resilience and restoration and environmental management practices not only provide economic gains and improved ecological services but also result in promoting biodiversity conservation and increased carbon sequestration. The need to mainstream the management of natural resources into national policy planning and the budgeting process has, therefore, become critical to ensure that the use of the resources is sustainable.

Level of application

☐ Regional/multilateral
☒ National/federal
☐ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets

Main related Aichi Biodiversity Targets

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Other related Aichi Biodiversity Targets

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Other relevant information

By means of the location of Ghana, the country has several aquatic and terrestrial biodiversity in genetic species and ecosystem levels. The main terrestrial ecosystems are the forest and savannah zones, in between these zones is the transition belt which host a mixture of both forest and savannah species. The aquatic ecosystem consists of freshwater, marine, and wetlands. Ghana needs to improve the management and resilience of its terrestrial and aquatic ecosystems in order to minimize the impact of climate change. Resilience is the amount of change a system can undergo (its capacity to absorb disturbance) and retain essentially the same function, structure and feedbacks. Ghana has about 500 km of marine coastline on the west coast of Africa, along the Atlantic Ocean in the Gulf of Guinea.

Environmental issues are cross cutting and the sustainable management of natural and renewable resources is essential to deliver the national Medium-Term Development Policy Framework (MTDPF). The MTDPF: Ghana Shared Growth and Development Agenda (GSGDA), 2014–2017, presents ten key focus areas for sustainable natural resources management, of which seven are directly linked to the natural resources management policy area. The remaining three key focus areas have links to the climate change policy area. However, the National Climate Change Policy (NCCP) contains two main focus areas as priority areas for climate change mitigation and adaption under the natural resources management in the country. These priority areas include increased carbon sinks and improved management and resilience of terrestrial and aquatic ecosystems (including marine ecosystems).

This target highlights the importance of mainstreaming the enhancement of ecosystems into policies to be able to build resilience and promote biodiversity and conservation and carbon stocks. This will be done by restoring degraded ecosystems in the forests, wetlands and aquatic ecosystems and develop and implement community-based incentive reward system for Ecosystem Services.

Relevant websites, web links, and files

- Forest Investment Programme (FIP)- enhancing carbon stocks in natural forests and agroforest landscapes https://www.fcghana.org/userfiles/files/redd/ESMF%20Ghana%20FIP_Final_13%20October%20%202014%20(2).pdf
- National Biodiversity Strategy and Action Plan https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf
- National Climate Change Policy Action Programme for Implementation: 2015–2020

Ghana Target 16
Operationalising the Nagoya protocol on access and benefits sharing

Rationale for the national target

The objective of Nagoya Protocol is the fair and equitable sharing of the benefits arising from the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding, thereby contributing to the conservation of biological diversity and the sustainable use of its components. The lack of adequate access and benefit backed by legal instrument has become a disincentive for the communities to protect the biodiversity and genetic resources thereof

This target is to develop and implement the legal framework for implementation of the Nagoya Protocol and build national capacities in Ghana for access and benefit-sharing (ABS), as well as support development of an ABS Agreement based on traditional knowledge and a Public-Private Partnership. This target makes use of the potential of the traditional knowledge, abundant in Ghana, to apply Nagoya Protocol provisions. The target aims to have a derivative of this genetic resource commercialized for revenue generation and other benefit to the local communities and country, as well as contribute to the implementation of customary biodiversity and sustainable use practices. It also seeks to ensure that relevant legal instrument and guidelines for ABS are developed and implemented. Relevant legal instrument and guidelines for Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress developed and implemented.

Level of application

☐ Regional/multilateral
☒ National/federal
☐ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets

Main related Aichi Biodiversity Target

☐ 1	☐ 6	☐ 11	☒ 16
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☐ 5	☐ 10	☐ 15	☐ 20

Other related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
☒ 2	☐ 7	☐ 12	☐ 17
☐ 3	☐ 8	☒ 13	☐ 18
☐ 4	☐ 9	☐ 14	☒ 19
☐ 5	☐ 10	☐ 15	☐ 20

Other relevant information

The Nagoya Protocol on Access to Genetic Resources and Equitable Sharing of Benefits arising from their utilization to the convention on biological diversity have been adopted by the parliament of Ghana. This protocol is to ensure that the country protects the intellectual property of its genetic resources and reduce the risk of bio- piracy. It will grant the country access to resources and other forms of support from the Convention on Biological Diversity Secretariat.

To Implement this, stakeholders need to have a clear and uniform understanding of their rights, responsibilities and obligations under the protocol. Therefore, the country must ensures that appropriate and adequate policies are drawn up, complemented by regulations that can be implemented effectively. For example, Prior Informed Consent permits issued by indigenous and local communities for the use of biological resources is recognised by biodiversity and intellectual property laws.

Ghana needs support to navigate the synergies offered by inter-related policies and to also explore mechanisms to raise money, such as the biodiversity offsets approach, which provides credits or allows conservation measures in one location to make up for biodiversity losses in another. These could also serve as incentives for meeting targets for biodiversity management. Ecotourism must also be promoted to generate resources for the conservation of biodiversity.

Relevant websites, web links, and files

- National Biodiversity Strategy and Action Plan
  https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Ghana Target 17
Developing and adopting a policy instrument, for the implementation of an effective, participatory and updated NBSAP.

Rationale for the national target
It is envisaged that as Ghana moves towards higher economic growth, the challenges to biodiversity conservation is going to be more daunting. The effort to provide an even higher quality of life for Ghanaians would place even more stress on the environment if nothing is done to ensure that the economic development of the country goes hand-in-hand with environmental conservation efforts.

Ghana signed and ratified the Convention Biological Diversity during the Earth summit in June 1992 and 1994 respectively. Article 6 of the Convention provides for countries to develop national strategies for the conservation and sustainable use of their biological diversity. In fulfilment of this provision in the Convention, the Ministry of Environment and Science in collaboration with relevant stakeholders developed the first National Biodiversity Strategy in 2002 as the principal instrument for implementing the Convention at the national level. The National Biodiversity Strategy has been revised (with Action Plans) to effectively guide the sustainable utilization of the country's biological resources and the integration of biodiversity issues into national development planning programmes. The new National Biodiversity Strategy and Action Plans (NBSAP) recognize the current threats to the physical and non-physical environment due to Ghana's socio-economic development and growth agenda. (Ghana has developed the policy and is in the process of drafting the M&E strategy)

There are several relevant policies and legislations governing management, development and conservation of natural resources in Ghana. Additionally, Ghana's ratification of international conventions and agreements form an important backdrop to the issues surrounding biodiversity and they are a significant pressure driving the development of a strong case for biodiversity conservation. Between 1902 and 2015 (over 100 years) there are records that indicate the presence of biodiversity related policies in Ghana. This NBSAP, therefore, draws its legitimacy from the succeeding national policies, legislations and ratified conventions for its implementation.

Level of application
☐ Regional/multilateral
☒ National/federal
☐ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets
Main related Aichi Biodiversity Targets
☐ 1	☐ 6	☐ 11	☐ 16
☐ 2	☐ 7	☐ 12	☒ 17
☐ 3	☐ 8	☐ 13	☐ 18
☐ 4	☐ 9	☐ 14	☐ 19
☐ 5	☐ 10	☐ 15	☐ 20

Other related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
☒ 2	☒ 7	☐ 12	☐ 17
☐ 3	☐ 8	☐ 13	☒ 18
☒ 4	☐ 9	☐ 14	☐ 19
☐ 5	☐ 10	☐ 15	☒ 20

Other relevant information

The threat to global ecosystems by human activities and the recognition that the solution to environmental problems require international collaboration has led Ghana to be Party to several international conventions and agreements related to biodiversity and environment.

There are currently about 216 such conventions globally but Ghana is signatory to 35 of them including all the major conventions on biodiversity. The ratification of these conventions has enjoined Ghana to initiate certain prescribed activities at the national level. Some of the conventions that have shaped and influenced conservation activities in Ghana in very significant ways include:

- The African Convention on the Conservation of Nature and Natural Resources;
- Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention);
- Convention on the Conservation of Migratory Species of Wild Animals (CMS);
- Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on Biological Diversity (CBD)
  Ghana has also developed and updated a number of releveant policies and these include
- Convention on Climate Change (National Climate Change Policy, Strategy and Action Plan
- FASDEP – Food and Agricultural Development Policy, 2015
- National Water Policy
- National Buffer Zone Policy, November 2011
- National Wildlife Plicy
- Forest and Wildlife Policy, 2012
- The National Land Policy
- National Spatial and Landuse development Framwork

Relevant websites, web links, and files

- National Biodiversity Strategy and Action Plan
  https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Ghana Target 18
Ensuring that the traditional knowledge, innovations and practices of indigenous and local communities and their customary use, are respected.

Rationale for the national target

Local communities have used biodiversity as a buffer against variation, change and catastrophe; in the face of plague, if one crop fails, another will survive. In coping with risk due to excessive or low rainfall, drought and crop failure, some traditional people grow many different crops and varieties with different susceptibility to drought and floods and supplement these by hunting, fishing and gathering wild food plants. The diversity of crops and food resources is often matched by a similar diversity in location of fields, as a safety measure to ensure that in the face of extreme weather some fields will survive to produce harvestable crops.

The national target aims to document, create awareness on traditional knowledge on biodiversity issues, legislate and integrate it into the formal science and national biodiversity conservation at all local levels. This will capitalize on, develop, expand and mainstream local adaptation measures into global adaptation strategies. Traditional knowledge is being further studied, supported and integrated into scientific research. Incorporating indigenous knowledge is less expensive than bringing in aid for populations unprepared for catastrophes and disasters, or than importing adaptive measures which are usually introduced in a top-down manner and difficult to implement, particularly because of financial and institutional constraints.

The chieftaincy institutions of Ghana are recognized by the Ghanaian constitution; Article 270 of the 1992 Constitution. It states that the institution of chieftaincy together with its traditional councils as established by law is guaranteed. Over the years, traditional leaders have been used as authorities that supervise the legislation for local communities on the rights on genetic resources. Community Resource Management Areas (CREMA), which is based on indigenous community decision-making processes are mostly overseen by the traditional leaders.

The government of Ghana has launched a campaign against the activities of illegal miners in its quest to protect the water bodies and its associated biodiversity. The recognition of traditional leaders in this initiative has been very significant as they are regarded as the managers of the land and leaders of high authority

Level of application

☐ Regional/multilateral
☒ National/federal
☐ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets
Main related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
☐ 2	☐ 7	☐ 12	☐ 17
☐ 3	☐ 8	☐ 13	☒ 18
☐ 4	☐ 9	☐ 14	☐ 19
☐ 5	☐ 10	☐ 15	☐ 20

Other related Aichi Biodiversity Targets

☒ 1	☐ 6	☐ 11	☐ 16
☒ 2	☐ 7	☐ 12	☐ 17
☐ 3	☐ 8	☐ 13	☐ 18
☐ 4	☐ 9	☐ 14	☒ 19
☐ 5	☐ 10	☐ 15	☐ 20

Other relevant information

The inhabitants of the Offin River Basin have learned to adapt to changes in water supply by reusing dishwater, laundry water and by harvesting rainwater for irrigation. Rainwater harvesting is a traditional farming method, abandoned after modern boreholes and wells were installed by communities.

Traditional taboos over water use that allowed for a day of rest for a water god or spirit have declined with modernization and the adoption of Christianity, but farmers are now planting drought-resistant crops or moving onto river plains where water is more readily available.

Laws that allowed timber companies to take over farmland led farmers to chop down trees rather than leave them standing were rewritten in 2002. Now farmers are reverting to tradition by incorporating trees into agricultural practises or by protecting trees, the study said.

There is much to learn from indigenous, traditional and community-based approaches to natural disaster preparedness. Indigenous people have been confronted with changing environments for millennia and have developed a wide array of coping strategies, and their traditional knowledge and practices provide an important basis for facing the even greater challenges of climate change. Although their strategies may not succeed completely, they are effective to some extent and that is why the people continue to use them. While indigenous communities will undoubtedly need much support to adapt to climate change, they also have expertise to offer on coping through traditional time-tested mechanisms.

Relevant websites, web links, and files

- http://www.fao.org/docrep/011/i0670e/i0670e14.htm
- https://forestsnews.cifor.org/19210/traditional-knowledge-fuels-climate-change-adaptation-in-ghana-study?fnl=en
- https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Indigenous-knowledge-crucial-for-effective-early-warning-systems-338380

Ghana Target 19
Knowledge on the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied

Rationale for the national target

The national target aims to:

- Ensure that the information on biodiversity is wide spread to improve biodiversity information dissemination.
- Fill the research gap within agricultural biodiversity
- Promote research and extension linkages on agro biodiversity, conservation and productivity
- Mainstream and share knowledge on the country's biodiversity has become necessary to ensure the sustainability of achievements. Awareness-raising, capacity-building, improved training curricula and appropriate integration into existing processes will effectively mainstream knowledge of natural resources and biodiversity into other relevant sector policies**.**
- To help document indigenous practices into bye laws

The current decline in Ghana's natural resources requires the effective mainstreaming of natural resource management into national policy planning, budgeted for appropriately. This will ensure that resources that are essential for providing important goods and services for social and economic development are used sustainably. Low knowledge and awareness on the importance of biodiversity is not widespread. The supply of information on forestry policies, laws and legislation has been scanty and skewed with little emphasis on the state of forests, and loss of forest and biodiversity. Coupled with this, civil society has been relatively weak in the forest and wildlife sector resulting in limited awareness and advocacy to demand; improved performance from the Forestry Commission. The general absence of transparency and accountability to key stakeholders has resulted in mistrust by community constituents.

Level of application

☐ Regional/multilateral
☒ National/federal
☐ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets

Main related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
☐ 2	☐ 7	☐ 12	☐ 17
☐ 3	☐ 8	☐ 13	☐ 18
☐ 4	☐ 9	☐ 14	☒ 19
☐ 5	☐ 10	☐ 15	☐ 20

Other related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☒ 16	
☐ 2	☐ 7	☐ 12	☐ 17	
☐ 3	☐ 8	☒ 13	☐ 18	
☐ 4	☐ 9	☐ 14	☐ 19	
☒ 5	☐ 10	☐ 15	☐ 20	

Other relevant information

Within Ghana, there is a national programme called 'Coordinated Programme for Economic and Social Development of Ghana which spells out strategies and enablers for accelerated growth for Ghana from. The document identifies science and technology research and development as among the enablers for accelerated growth and productivity of all sectors of the economy. Strategies for achieving the objectives within which issues of biodiversity conservation are covered are:

a) the promotion of science and technology activities that would facilitate conservation and sustainable utilisation and management of natural resources in support of national development through the promotion of research and measures to protect and conserve biological diversity;
b) the promotion and the enhancement and maintenance of the quality of the environment and the integration of environmental concerns into all development policies by developing the capacity to monitor, predict and mitigate the adverse problems such as alien species colonisation.

The Forestry Commission is the foremost institution of state with a specific mandate to manage and develop the forest heritage of Ghana for the optimal sustainable flow of benefits to all segments of the Ghanaian society. Under the Forestry Component of the Natural Resources and Environmental Governance Technical Assistance (NREG TA), the Ministry of Lands and Natural Resources (MNLR) has engaged the services of a firm to help design options for tree tenure regimes with accompanying benefit sharing mechanisms in Ghana in consultation with a wide range of stakeholders. The result of this consultancy is expected to contribute significantly to Ghana's drive at halting deforestation, enhancing its forest estate and promoting good forest governance.

Other Policies such as the State of Environment Report and the National Climate Change Policy (2014), Forest and Wildlife Policy (2012), National Environment Policy (2014) and many other depend on the knowledge of biodiversity trends status in order to achieve sustainable development goals for the implementation of these policies

Relevant websites, web links, and files

- http://www.fcghana.org/userfiles/files/MLNR/Tree%20Tenure%20final%20(2).pdf
- https://www.pef.org.gh/documents/climate-change/national-climate-change-policy.pdf
- gh.chm-cbd.net/implementation/documents-relation-cbd/national.../gh-nr-04-en.pdf
- State of the Environment Report

Ghana Target 20
Mobilizing increased financial resources for effectively implementing the strategic plan for biodiversity 2016- 2020 from all sources

Rationale for the national target

Article 20 of the CBD requires each Party to provide financial support, in accordance with its capabilities, for the national activities, which is being undertaken to implement the Convention. Article 20 also commits the developed nations to provide "new and additional financial resources" to assist developing countries with their biodiversity conservation and management programmes. Some of these funds are currently being channelled through the GEF.

The successful implementation of Ghana's Biodiversity Strategy and Action Plan require a significant financial investment. It is important to emphasise, however, that many of the recommendations contained within the Plan can be implemented through policy and legal changes. The strategy is to use the existing funding sources, on-going development activities and make existing government programmes more sensitive to biodiversity concerns. The plan developed innovative funding mechanisms to implement most of the programme outlined in the programme. The plan also seeks for bilateral/multilateral aid for stand-alone, biodiversity projects an undertake debt-for-nature swaps. It developed partnerships with the private sector, NGOs and other civil society institution.

Level of application

☐ Regional/multilateral
☒ National/federal
☐ Subnational

Relevance of the national targets to the Aichi Biodiversity Targets

Main related Aichi Biodiversity Targets

☐ 1	☐ 6	☐ 11	☐ 16
☐ 2	☐ 7	☐ 12	☐ 17
☐ 3	☐ 8	☐ 13	☐ 18
☐ 4	☐ 9	☐ 14	☐ 19
☐ 5	☐ 10	☐ 15	☒ 20

Other relevant information

Funding for activities is provided from the national annual budget and development partners. Ghana has facilitated all these policy frameworks below

- Promoting PPP for Green businesses or nature based businesses
- Ghana has adopted the green procurement policy at the Ghana National Procurement Authority
- The Ministry of Finance has developed a PPP strategy framework

Relevant websites, web links, and files

- National Biodiversity Strategy and Action Plan https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Section II. Implementation Measures Taken, Assessment of Their Effectiveness, Associated Obstacles and Scientific and Technical Needs to Achieve National Targets

Sustainable Fisheries Management Project (SFMP)

The Sustainable Fisheries Management Project (SFMP) is a five years project, which commenced in 2014 under the auspices of USAID. The project seeks to rebuild targeted marine fish stocks that have seen drastic declines in terms of landings over the last decade. The small pelagic fisheries are the prime target of the project as they are important for food security as far as Ghana is concern and are the mainstay of the small-scale fishing sector. As part of the SFM Project, all measures which seek to promote sustainable coastal resource management are what is being encouraged by all partners. For instance, Stichting Nederlandse Vrijwilligers (SNV) (Netherlands Development Organization a non-governmental organisation has initiated various ovens which are environmentally friendly and fuel efficient to reduce the rate of deforestation, particularly mangrove trees which services as fuel wood for fish smoking by women groups across the coastal communities. Among the ovens is *Ahotor* (*Comfort)* stove, which is efficient and produces less smoke.

Currently, the project has been able to support the restoration of Mangrove trees through community own support. *Hen Mpoano*, Dasgift, and other local NGOs are currently spearheading initiatives such as degraded Mangrove tree restoration and improved stoves, respectively in the Western region. The project promotes ecosystem-based and adaptive management approaches. Additionally, improvements in the value chain of smoked fish, important to tens of thousands of women fish processors and marketers.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

Aichi Target 6
Ghana National Target 6

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

The project adopts a participatory approach in stakeholder engagement and specific activities driven by community members themselves. Among them is the Mangrove restoration initiatives, which is driven by Community Based Organisations (CBOs) and committees constituted by local NGOs and groups working in line with sustainable coastal resource management. *Hen Mpoano*, one of such non-governmental organizations as part of its conservation and restoration efforts of mangroves and fisheries resources has through the active involvement of the community people embarked on mangrove replanting activity in the Ankobra wetland ecosystem.

The local NGO, a partner under this SFMP has made tremendous gains as far as this project is concern through community-driven initiatives and participatory mapping processes. To achieve the project goal, platforms such as stakeholders' workshops, dialogue, and role play, have propelled the project to its current 4 years phase. As far as the impact of the project is concern, women groups are currently relying on fuel efficient stoves which use briquette and other energy sources for smoking fish. Details can be obtained via the links below.

Relevant websites, web links and files

- https://www.crc.uri.edu/projects_page/sfmp/
- http://henmpoano.org/?s=SFMP
- http://www.snv.org/project/sustainable-fisheries-management-project-sfmp
- https://www.crc.uri.edu/download/GH2014_ACT032_HM_FIN508.pdf

Other relevant information

Greater Amanzule Wetland Project

The Greater Amanzule Wetland (GAW) conservation project covers approximately 50,000 hectares of land stretching from the Ankobra Estuary in the Nzema East and the Ellembelle districts in Ghana to the Tanoe-Ehy marsh at the Ivory Coast border. It contributes to the achievement of the overarching goals of improved natural resources management and increased capacity for low greenhouse gas emissions development.

The GAW is rich in biodiversity and supports numerous livelihood activities. Over 50 communities comprising more than 7,000 farming and fishing families depend directly on the GAW resources for food, fuel-wood, fish, shellfish and drinking water. *Hen Mpoano* as part of their sustainable fisheries management strategies has constituted committees, known as conservation committees across the three coastal districts of the Western region, namely: Ellembelle, Nzema East and Jomoro to oversee to the conservation of the Greater Amanzule Wetlands to serve it biodiversity agenda while contributing towards sustaining the livelihood of communities fringing it. T

he wetland has been threatened over the years driven by anthropogenic activities. Flora and fauna surveys conducted by the Wildlife Division of the Forestry Commission recently recorded over 59 plant species with more than 59 percent covering peat swamps and mangrove forests. The faunal surveys identified 40 mammal species, 78 bird species, and 17 amphibians and reptile species. The beaches connected to the GAW also present suitable sites for nesting of sea turtles. Therefore, in line with sustainable fisheries management approaches, the local NGO is undertaking this agenda to sustain fish stock in the western region.

Elasmobranchs Conservation

This is a one-year pilot intervention on large pelagic fish conservation such as the sharks, skates, and rays. The project which is under the auspices of Shark Conservation Foundation (SCF) is a continuation of the Elasmobranchs and Billfish project which ended in 2017. This initiative also seeks to conserve large pelagics fisheries under similar module as SFMP. Again, this initiative adopts coastal ecosystem management approach facilitated by stakeholders, particularly local community and traditional authorities. IUU monitoring forms strategic aspect of the project.

Currently, along with the coastal waters of the Western region, *Hen Mpoano* is spearheading the project in collaboration with key and relevant stakeholders.

Relevant websites, web links and files

- http://henmpoano.org/elasmobranchs-and-billfishes/

Obstacles and scientific and technical needs related to the measure taken

Non-compliance of the close season and trans-shipment of fish (*Saiko*) are identified as the key challenge as far as the Sustainable Fisheries Management project is a concern. In 2017, an estimated 100,000 tonnes of fish were landed through *Saiko*, 80,000 tonnes of which were landed in the Central Region port of Elmina alone. This equates to around 40% of the total landings of Ghana's artisanal fishing sector, and more than twice the official landings of small pelagics in the country.

Trans-shipping of fish is banned in some West African countries, such as Senegal, Cote d'Ivoire, and Guinea. In Ghana, the practice is authorized under special permission and can only occur in port under the supervision of an agent of the Fisheries Commission. But recently, a new form of trans-shipment has developed between industrial vessels and the artisanal canoes, where the canoes buying frozen fish from trawlers at sea. Although it is deemed illegal and prohibited under the Fisheries Act 625 of 2002 (Section 132), the business has grown to reach its tipping point due to the lucrative nature of it. As a mitigation measure, the Government has put in place fisheries enforcement unit to clamp down on any illegal fishing activity. Within the West-Africa Sub-region, a West Africa Taskforce (WATF) unit has also been commissioned to ensure regional harmonization of licensing, penalties and access conditions. The task force member countries are Benin, Côte d'Ivoire, Ghana, Liberia, Nigeria, and Togo.

The Ghana government as part of its effort to reduce overexploitation of fisheries resources has decided to implement a close season concept in 2019, an initiative which failed to commence on August 7, 2018, following the concerns raised by players in the sector.

Relevant websites, web links and files

- http://www.crc.uri.edu/download/GH2014_POL005_FC_FisheriesMgtPlan2016.pdf
- https://stopillegalfishing.com/news-articles/fifth-west-africa-task-force-meeting-strengthens-regional-collaboration-stop-illegal-fishing/
- http://ghana.gov.gh/index.php/media-center/features/4761-rebuilding-the-fish-stock-in-ghanaian-waters-for-a-sustainable-fisheries-industry-in-ghana

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Tree Crop Policy of the Ministry of Food and Agriculture

The Policy seeks to provide a comprehensive and holistic approach for the sustainable development of the Tree Crop sub-sector and for proper targeting of support to the Tree Crop value-chains. The Government of Ghana vision for the development of the tree crops is all-inclusive and aims at promoting sustainable growth of the entire subsector, considering all the differences between the crops and the various production areas. Strategically, the policy seeks to address SDG 1, 2 and 15. In Ghana, for instance, there are vast tree crops which when properly managed, can earn the country enormous benefits in terms of job creation, foreign exchange earnings and provide good micro-climate to support fauna and flora activities. One strategic objective as far as this policy is concern is to promote Sustainable Practices for Environmental Protection.

Thus, the strategy seeks to address both the negative environmental effects of Tree Crop cultivation, including pollution, deforestation, loss of biodiversity, declining soil fertility and erosion, climate change, bushfire, and the positive effects such as carbon sequestration and soil conservation. In order to achieve this, the government has instituted the following measures:

- to set-up a conservation and re-afforestation programme,
- Promotion of Agro-forestry practices,
- Monitor and address climate change issues,
- Promote biodiversity,
- Increase collaboration for Social and Environmental Impact Assessment, Support private initiatives for environmental protection and Mitigate the impact of production and processing.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

Aichi Target 2 & 7
Ghana National Target 2 & 7

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

The Tree Crop Policy, which has been in existence since 2008, has been widely accepted by most farmers through the support of civil society organizations. A participatory approach was adopted for the formulation of proposals for the policy and strategy documents. Several workshops and meetings were held at all levels (district, regional and national) with various

stakeholders of the Tree Crop value chains with the aim of gathering information, collecting data and lessons learned from experience.

Validation workshops at regional and national levels involving the major stakeholders of the sub-sector were also organized to collect and integrate comments into the preparation of the final document. Membership of the Tree Crop Policy Working Group was drawn from the ~~major~~ MDAs involved in the Tree Crop sub-sector: MOFA, MOTI, EPA, GIPC, COCOBOD, and ADB. Indeed, this policy formulation relied on fair institutional representation and based on the principle of promoting of outgrower scheme models, development of FBOs and Value Chain committees, and the mitigation of other agricultural activities on the environment through regulation and promotion of sustainable management practices.

The policy formulation process considered private sector participation in extension delivery and has so far enhanced access to an increased rate of adoption of GAPs. At the community level, programmes have been set-up to develop and distribute certified planting materials. Through community nurseries, various FBOs or out growers have received certified planting materials for planting. In the area of conservation and re-afforestation programme under the policy, various research into the propagation of indigenous tree crops, such as Dawadawa, Shea, Baobab, Tamarinds and Cashew in the Savannah regions has been done. Among them is the Shea tree, which has a long gestation period of over 20 years. But recent research has shown the possibility of reducing the gestation period by several years.

Other activities which makes this policy biodiversity-friendly is the promotion of land-use management plans within the districts and villages, and building capacity for planning within the communities, advocating for a specific legislation on land use plan, organize environmental education on bushfires and conservation measures at the district/village level in collaboration with the District Assemblies, Ghana National Fire Service (GNFS) and the Community Environmental Management Committees. These actions have contributed to the development of the Land-Use and Spatial Planning Act, Act 925 (2016). These approaches have made the policy effective and continue to encourage tree crop production as social security cover for farmers.

Relevant websites, web links and files

- http://gis4agricgh.net/policies/ghana's%20tree%20crops%20policy.pdf

Other relevant information

Ghana has a national programme on Plant Genetic Resource for Food and Agriculture (PGRFA) with the Plant Genetic Resources Research Institute (PGRRI) as the focal institution. In fact, Ghana is one of the first countries in the world to set up a national collection of Plant Genetic Resource for Food and Agriculture (PGRFA) in 1964.

In Ghana, activities related to on-farm conservation of plant genetic resources are mostly led by the Crops Research Institute (CRI) and the Savanna Agricultural Research Institute (SARI) from CSIR. PGRFA ex-situ conservation activities in Ghana are carried out by various institutions, including the Plant Genetic Resources Research Institute (PGRRI) responsible for the national gene bank. The institute conserves orthodox seeds including 9987 accessions in cold storage at -

20ºC and 5-7% moisture content and living plants in orchards and the arboretum of about 166 species; Crops Research Institute (CRI), Savanna Agricultural Research Institute (SARI) and Department of Crop Science in Legon have cold storage facilities to conserve seeds at 5ºC. The Botany Department of the University of Ghana, Cocoa Research Institute, Crop Science Department of Kwame Nkrumah University of Science and Technology (KNUST), Crops Research Institute (CRI), Biotechnology and Nuclear Agricultural Research Institute (BNARI), School of Agriculture of the University of Cape Coast and Forestry Research Institute of Ghana (FORIG) all have facilities for in vitro conservation of PGRFA.

There are also several institutions which conserve tree crops and other living collections in field gene banks. Utilization of PGRFA stored in ex-situ collections is high. Plant breeding is one of the most important ways of PGRFA utilization. The West Africa Centre for Crop Improvement (WACCI) of the University of Ghana has been set-up to bring improvement in crops in the context of changing climate and food insecurity. All these are measures currently in Ghana to conserve biodiversity. There are several national institutions and other stakeholder organizations which contribute to the national PGR programme. Through the PGRRI, this programme feeds into other networks including the 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 websites, web links and files

- http://www.fao.org/docrep/013/i1500e/Ghana.pdf

Obstacles and scientific and technical needs related to the measure taken:

In general terms, the national policy supports the conservation of crop wild relatives and other wild plants relevant to food production through the National Biodiversity Strategy. However, these species are normally not considered in Environmental Impact Assessments (EIAs). As a scientific solution to this challenge, more research stations and networks have been established in recent years by the government of Ghana. Among the network are the Genetic Resources Network of West and Central Africa (GRENEWECA). WACCI of University of Ghana has been established and revamped to breed and enhance the performance of crops. The existence of National Biodiversity Strategy and Action Plan for the conservation of biodiversity are all measures by Ghana to strengthen national strategies and policy for the conservation and sustainable use of these wild plants relevant to food production in Ghana.

The development of tree crops in forest areas in Ghana has followed a model based on the exploitation of forest resources, cheap labour, and flexibility of customary rights of access to land. Due to aging plantations and farmers, and reduced availability of forest lands, this type of exploitation is no longer feasible. Farmers now find it difficult to access new lands. Conversely, over the year's farmers in the Savannah regions have been confronted with soil erosion, declining soil fertility, bushfires, deforestation, and overgrazing and inappropriate crop management practices. Therefore, as a mitigating strategy by the government, a new model of sustainable farming systems where certain tree crops such as cashew plantations have been promoted among numerous farmers and a fair producer price being initiated to streamline its marketing. This seeks to improve the income of farmers and diversifying livelihood while conserving biodiversity.

Other initiatives include the replanting of old plantations such as Rubber, particularly among large scale and out grower producers of rubber in the Western region. The recent government policy of "Planting tree crop for Export" is also an initiative which seeks to affirm the Tree Crop policy to continue to serve its multipurpose agenda. Again, the Agriculture Ministry is currently promoting the adoption of integrated crop and pest management strategies as a biodiversity conservation measure.

Relevant websites, web links and files

- http://www.fao.org/docrep/013/i1500e/Ghana.pdf

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Environmentally Sustainable Production Practices in Cocoa Landscapes (ESP II)
The project is a continuation and the second phase of the "Environmental Sustainability and Policy for Cocoa Production in Ghana" a project which started in 2013 and ended in 2016. This current project is jointly implemented by UNDP and the Ghana Cocoa Board (COCOBOD), under the auspices of Mondelēz International. This is an on-going project which started in 2016. It is expected to end in 2020. It seeks to serve the SGD 13 and 15 and being implemented across 14 districts and 5 regions in Ghana. In the Eastern Region, the project is being implemented in New Juabeng, Fanteakwa, Suhum, West Akyem, and Tepa. In Ashanti Region: Amansie West, Mampong, Efiduase. In Central Region: Awutu Senya. Western Region: Dwabeso and in the Brong Ahafo Region, it covers areas such as Sankore, Asunafo North, Goaso and Asutifi West. The project aims to meet two broad objectives as follows: To ensure that cocoa farmers in the project adopt environmentally sustainable and climate change resilient cocoa production practices on their farms and managed them to sustainably conserve ecosystems and natural resources.

The Community Resource Management Areas (CREMA) concept form part of the module, ensuring long-term ecosystem protection at the district to community levels. The concept provides a platform that allows communities to jointly manage natural resources of a larger ecosystem with relevant stakeholders will ensure long-term sustainability and scaling up of interventions. Policy engagement with government on land tenure and tree tenure rights is an integral part of this project. Securing tree tenure rights for farmers engaged in the tree plantings on cocoa farms by establishing a tree registration mechanism with the Forestry Commission to incentivise farmers to implement and scale up Environmentally Sustainable Production (ESP) practices.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes
Aichi Target 2 & 15
Ghana Nation Target 2, 14

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:
☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above
Through participatory planning processes and trainer of trainee approaches, currently about 1,668 extension trainers, community animators, lead farmers and other implementing partners have so far been trained in 5 districts (Bia West, Juabeso, Sekyere East, Ahafo Ano North, Awutu Senya). The training was on tree integration and silviculture practices and multiple

benefits of enhancing tree and carbon stocks on farms and tree-tenure regulations. The trainees later provided direct farmer training targeted within their respective communities.

Over 34,914 farmers (38% females) have also been trained using the direct farmer training in both sustainable natural resource management practices and sustainable ecosystem management practices by cocoa extension agents supported by the project's field coordinators. As part of the tree integration program, so far, a total of 336,170 economic trees comprising of 5 species such as Mahogany, Ofram, Kokodua, Hyedua and Mansonia have been procured from commercial nurseries (198,000 seedlings) and from the Forestry Commission's Forest Investment Programme (137,170 seedlings), supplied and planted by 11,901 farmers (28% females) from 223 communities in 7 Districts, namely: Bia West, Juabeso, Sekyere East, Ahafo Ano North, Asunafo North, Awutu Senya and Wassa East.

Currently, support has been given to Ayum Asuokow CREMA established under the Phase I of the project which ended in 2016 to enhance their operationalization. In addition, work began on a second CREMA in Atobiase, Wassa East district.

Relevant websites, web links and files

- http://www.gh.undp.org/content/ghana/en/home/operations/projects/environment_and_energy/ESPII.html
- http://www.undp.org/content/undp/en/home/ourwork/ourstories/ghana--farmers-adopt-environmentally-friendly-practices-to-boost.html

Other relevant information

The adopting of the CREMA concept, which ensures inclusive governance (community members, traditional authorities) as far as Natural Resource Management is concern, has so far contributed to biodiversity conservation and boost farmers' cocoa yield in both cocoa and food crops. Close to 10,000 farmers adopt sound farming practices to help reduce climate change effects and preserve the environment. According to a cocoa farmer, he has seen over the years that this phenomenon of zero trees in cocoa farms is not only adversely impacting on cocoa production, but also affecting plant and animal life as well as water resources".

Relevant websites, web links and files

- http://www.undp.org/content/undp/en/home/ourwork/ourstories/ghana--farmers-adopt-environmentally-friendly-practices-to-boost.html

Obstacles and scientific and technical needs related to the measure taken

The project initial fear has to do with securing tree tenure rights for farmers engaged in the tree plantings on their cocoa farms. Ghana currently is implementing several forest sector initiatives such as the Voluntary Partnership Agreement (VPA), Reducing Emissions from Deforestation and Degradation (REDD+) under Forest Carbon Partnership Facility (FCPF) and Forest Investment Program (FIP), all of which depend on sound, fair and equitable land and tree tenure regimes in order to succeed. The various national afforestation programs invest huge capital in creating forest estates with the government, private sector, and community partnerships.

However, most analyses of the underlying challenges to achieving legality in the management of forest resources in Ghana and sustainable forest management, in general, conclude that 'existing tree tenure regimes is largely regarded as a disincentive to sustainable forest management as many farmers failed to own trees planted by them in previous projects.

As government's strategy to make the practice attractive to farmers and individuals, under the Forestry Component of the Natural Resources and Environmental Governance Technical Assistance (NREG-TA), the Ministry of Lands and Natural Resources (MNLR) has engaged the services of consultants and a wide range of stakeholders to design options for tree tenure regimes with accompanying benefit sharing mechanisms in Ghana. This has resulted in the development of a framework for tree tenure and benefit sharing, which currently seeks to contribute significantly to Ghana's drive at halting deforestation, enhancing its forest estate and promoting good forest governance. The rate of adoption of environmentally sustainable tree crop production is overwhelming, leading to a high yield of plantains and other food crops across the rainforest and semi-deciduous ecological zones of the country.

Relevant websites, web links and files

- https://www.fcghana.org/userfiles/files/NREG/Draft%20Final%20Report_30_05_16%20.pdf
- http://www.gh.undp.org/content/ghana/en/home/ourwork/crisispreventionandrecovery/successstories/farmers-adopt-environmentally-friendly-practices-to-boost-cocoa-/

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Ghana Cocoa and Forest Initiatives (CFI)
The World Cocoa Foundation and the Sustainable Trade Initiative in collaboration with the International Sustainability Unit of the Office of the Prince of Wales have partnered with governments of Ghana and Cote d'Ivoire and private cocoa companies to initiate the Cocoa and Forests Initiative (CFI). The CFI aims at providing the enabling environment for the cocoa sector players to positively contribute to the preservation of forests in Ghana and the country's economy.

The initiative takes a holistic approach to tackling the complex problem of deforestation in cocoa production with a prime focus on three thematic areas:

- sustainable production and farmers' livelihoods;
- forest protection and restoration, and
- community engagement and social inclusion.

The immediate focus of CFI is halting further deforestation and forest degradation from 2018 to 2020 in the six Hotspot Intervention Areas (HIAs) identified in the Ghana Cocoa Forest Landscape which has the highest deforestation rate covering 2.5 million hectares. These are the Ashanti, Brong-Ahafo, Central, Eastern and Western Regions of Ghana.

According to the project work plan, from 2018 to 2020, the Initiative will focus on eight main objectives to assure the conservation, restoration and rehabilitation of the different forest landscapes in Ghana including; Forest Reserves, National Parks, Wildlife Sanctuaries and Wildlife Resource Reserves, by end of 2019; to create "Deforestation Trust Fund" similar to the Plantations Development Fund in the cocoa landscape, for the co-financing of the actions in 2018-2020 and the national roll-out beyond 2020. Other thematic areas are the development of models for sustainable livelihoods and income diversification for cocoa farmers, including diversification, agricultural inter-cropping, development of shade-grown cocoa, and other income generation activities designed to boost and diversify household income, by the end of 2018. The project which started in 2018, is funded with 53 million dollars.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes
Aichi Target 5
Ghana National Target 5

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:
☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

Following the signing of Cocoa & Forests Initiative (CFI), Joint Framework for Action at the United Nation climate change conference in 2017 at Bonn during COP 23, the government of Ghana and industry partners have initiated the operationalisation phase of the Framework by drawing up a detailed National Implementation Plan (NIP). To generate expertise and support for the project, existing international and national policies and programmes including: the Ghana Cocoa Forest REDD+ Programme (GCFRP), the National Climate-Smart Agriculture and Food Security Action Plan (2016–2020), the Ghana Forest Investment Program (GFIP), Ghana Forest Plantation Development Strategy, the Sustainable Development Goals Commitments and Convention on Biological Diversity were relied on for lessons and guidelines. Various forms of meetings were held with stakeholders as part of the formulation process. These include Industry-Government Consultative meeting, Stakeholder meetings, Technical Working Group Meeting and Task Force meeting. Steering Committee and National Oversight Committee Meeting was also held to generate consensus and to secure inputs to streamline the implementation plan for the project.

A participatory approach was adopted to involve a wide range of stakeholders in the development of the National Implementation Plan. Through the Ministry of Lands and Natural Resources, the Ghanaian government worked with the conveners (IDH and WCF) to ensure the process remained inclusive and acceptable to all stakeholders. Subsequent to the initial meeting between government technocrats to analyse the Joint Framework for Action (JFA) and plot the path for the National Implementation Plan on January 23–25, 2018, a consultative meeting was held between government and industry partners in the cocoa and forestry sectors on February 15, 2018, giving government and industry the opportunity to discuss alignment on the National Implementation Plan.

The meeting allowed parties to debate on the detailed plan and agreed on a set of activities which was shared with civil society, donors and other sector representatives at a stakeholder meeting. Prior to drafting of the National Implementation, over 80 participants from government, industry, civil society, donor community, farmer groups, traditional authorities and more worked in groups to contribute to the draft NIP. The output of this meeting was used as a source document for the Technical Working Groups, which further refined and produced the first draft of the NIP. Task Forces were then set up to deep-dive into specific areas and further improve the plan with strong technical input before the Steering Committee carried out its final review. Reports on performance of the project can be assess at their link below.

Relevant websites, web links and files

- http://mlnr.gov.gh/index.php/national-implementation-plan-on-cocoa-and-forest-initiative-launched/
- https://www.worldcocoafoundation.org/initiative/cocoa-forests-initiative/

Other relevant information

Environmental Sustainability and Policy for Cocoa Production in Ghana (ESP I): This is a similar intervention adopted by UNDP in 2013-2016 within the context of sustainable agriculture, which ended successfully and currently seeing continuation till 2020.

Relevant websites, web links and files

- http://www.gh.undp.org/content/ghana/en/home/operations/projects/environment_and_energy/environmental-sustainability-and-policy-for-cocoa-production-in-.html
- http://www.gh.undp.org/content/ghana/en/home/operations/projects/environment_and_energy/ESPII.html

Obstacles and scientific and technical needs related to the measure taken:

The Cocoa and Forest Initiative like any other projects entail involuntary resettlement. This requires well thought-out social safeguards. Significant potential social and environmental impacts are important aspects as far as the project is concern. Mitigation guidelines used to address these impacts rest with staff at the National Secretariat who work in collaboration with REDD+ to oversee the implementation of actions to mitigate adverse environmental and social impacts within the CFI implementation areas. Resettlement policy has been developed as part of the strategy to reduce the environmental and social impact associated with the project. Closely aligned with the Ghana Cocoa Forest REDD+ Programme, the CFI intends to make use of their Resettlement Policy Framework (RPF), which clearly lays out how project stakeholders will address compensation issues relating to affected properties/ livelihoods, including land- and income-generating activities during implementation. Addressing deforestation and forest degradation presents several challenges due to the complex drivers of these issues. The REDD+ RPF includes a list of proposed strategies for addressing identified drivers of deforestation/forest degradation, which has been incorporated by the CFI. Provisions are made in the Resettlement Policy Framework to accommodate all potential situations, including cases that involve actual displacement/resettlement, and livelihood restoration assistance.

Relevant websites, web links and files

- https://partnershipsforforests.com/partnerships-projects/cocoa-forests-initiative/

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

West Africa Biodiversity and Climate Change (WA BiCC)
The West Africa Biodiversity and Climate Change (WA BiCC) program is a five-year program funded by the United States Agency for International Development (USAID) that aims to improve conservation and climate-resilient, low-emissions growth across West Africa. The project is regional in scope covering Ghana, Ivory Coast, Nigeria, and Sierra Leone. WA BiCC focuses on targeted geographical areas within the region to improve governance and policy over critical natural and human systems. By working through the core regional partners, Economic Community of West African States (ECOWAS), Mano River Union (MRU) and the Abidjan Convention, and with targeted national and sub-national institutions. WA BiCC is a 5 years project which started in 2015 and due to end in 2020.

WAiCC is Working towards promoting biodiversity in the Sub-region within the context of climate change by increasingly building the capacity of institutions at all levels to address the three core components. These are combatting wildlife trafficking, increasing coastal resilience to climate change and reducing deforestation, forest degradation, and biodiversity loss. The project is implemented by Tetra Tech ARD, in association with five subcontractors, also referred to as implementing partners: Palladium, Center for International Earth Science Information Network (CIESIN), PCI Media, Pact Inc. and Born Free USA including Wetlands International Africa (WIA), Pact World together with some non-governmental organization networks. The project has since been working with an amount of US$48.9million.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes
Aichi Target 1, 2 & 10
Ghana National Target of 1, 2 & 10.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:
☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above
The project implementation is conducted participatory with partners at the community, national and regional levels to strengthen policies and systems that will improve natural resource management and the health, and resilience of selected coastal and upland forest ecosystems.

In all the thematic areas of work page under the programme, polices, laws and regulations have been revised through participatory stakeholder's engagement platforms to create ownership. The program is strengthening national and regional networks and institutions through capacity

building to enforce trafficking laws. National Action Plans and community-led behavioral change campaigns are equally used as a tool to shrink the supply chains of wildlife trafficking.

As far as Improved Coastal Resilience in West Africa is concern, through integrated planning, local, national and regional capacity of implementing countries have has been strengthened to enhance the achievement of this strategic objective. The programme has so far built local, national and regional capacity to generate and use climate information in coastal planning, support the National Adaptation Planning process, and pilot and scale up coastal adaptation strategies that are effective.

In the area of reduction in deforestation, degradation and biodiversity loss, the programme, through its technical and knowledgeable management support, has been able build and improve the capacity of region implementing team for economic planning and development of Low Emissions Development Strategies, REDD+, and transboundary conservation strategies while simultaneously engaging the private sector through workshops, dialogue and supporting frameworks to integrate best practices for the sustainable management of natural resources.

This multiple methodology used is continuing contributing towards the achievement of the overall objective of the project. The project has so far produced numerous reports, which are available at their website.

Relevant websites, web links and files

- https://www.usaid.gov/west-africa-regional/fact-sheets/west-africa-biodiversity-and-climate-change-wa-bicc

Other relevant information

The Coastal Sustainable Landscapes Project (CSLP) 2015-2018
This was a 6-year project under the auspices of USAID and guidance of the US Forest Service International programmes. The project looked at addressing deforestation and encouraged farmers to plant trees and engages in agroforestry practices to reduce the impact of climate change. The project supplied various tree species to coastal communities including inland farming communities to plant as climate change adaptation and mitigation strategy. The project incorporated CREMA concept and mangrove planting as natural resource and biodiversity management strategies. Some aspect of the CSLP is not different from WABiCC as they all seek to work towards reducing climate change impact and conserving biodiversity. Owing to the success stories from project beneficiaries, it is envisaged that it will see its second phase under different partners at the local level in the Western region of Ghana.

Relevant websites, web links and files

- https://rmportal.net/frame/communities/cslp/coastal-sustainable-landscapes-project-in-ghanas-western-region/
- https://www.devex.com/jobs/usfs-coastal-sustainable-landscapes-project-director-504957

Obstacles and scientific and technical needs related to the measure taken:
Many communities along the coast of West Africa are susceptible to the impacts of climate change, including sea level rise, unpredictable weather patterns, and increased flooding. These impacts, which threaten properties and human lives, are further exacerbated by other human-induced risks stemming from the unsustainable use of natural resources. These include risks like unplanned development in areas vulnerable to high tides and floods, deforestation of mangrove forests that provide a natural buffer against those impacts, and upland forest degradation that silts in rivers and streams, leaving rain and tidal waters with nowhere to go.

Measurable results and lessons have already emerged from these activities, and the 13th Conference of the Parties to the Ramsar Convention, focusing on *Wetlands for a Sustainable Urban Future*, provided an excellent platform to share experiences with VAs as tools to identify and thus manage climate and human-induced risks in both coastal urban areas as well as rural coastal landscapes.

Experts in the programme emphasized the importance of engaging and involving communities in the identification and implementation of activities to ensure they understand and own the issues and outcomes, and that the process is not just for 'outsiders'. This is critical for the long-term sustainability and replication of interventions. Examples cited included the participatory land use mapping approach, community-led mangrove restoration activities, and rice-mangrove agro-silviculture led by rice farmers.

Relevant websites, web links and files

- https://www.wabicc.org/en/?s=project+challenges
- https://www.wabicc.org/ghana-organizes-1st-national-sea-turtle-conference/

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Agriculture and Natural Resource Management (USAID AgNRM).
The USAID Feed the Future Ghana Agriculture and Natural Resource Management Project (USAID AgNRM) is a five-year program (May 2016-May 2021) that serves as the main vehicle within the USAID/Ghana FTF strategy to address issues of environment and natural resource management in northern Ghana. The project seeks to provide scalable, integrated landscapes approach to support sustainable economic development and rural livelihoods; increase nutrition and climate change adaptation and strengthen northern Ghana's natural resources. The project is making tremendous progress in addressing food insecurity in northern Ghana by increasing demands for water, food, and energy situation in the north and also safeguarding of the natural resource base. However, as the natural resources across the north are stressed by climate change, the project seeks to address poverty reduction through sustainable increases in wealth and nutrition from natural and non-traditional agriculture products by addressing environmental, agricultural, governance, and natural resource management challenges.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

Aichi target 2 & 7
Ghana National Target 10, 14 &15

The project is driven by the successful Community Resource Management Area (CREMA) model promoted by the Wildlife Division of the Government of Ghana's (GoG) Forestry Commission, for sustainable resource management in Ghana. Overall, the model applies an integrated, landscape approach that aligns development and conservation and responds to the interdependencies of ecosystems and livelihoods. Landscape-level NRM requires an understanding of ecosystem services and values. The project is facilitated by workshops and exchanges; convene stakeholders and conduct ecosystem services valuation; and develop a baseline of carbon stocks and link to carbon markets. Strategic activities include adopted include strengthen shea, moringa, dawadawa, and tamarind value chains; organize/strengthen collector groups; leverage private sector investment for natural resource products (NRPs); promote conservation agriculture, home gardens, and agroforesty alongside traditional methods, improve water access to households, form and strengthen village savings and loan associations, increase access to nutritious foods and training on nutrition, increase understanding of land and water access rights, increase access for women to land and productive resources.

Other relevant information

CREMA approach has been adopted under Agriculture and Natural Resource Management project. The project assesses the available supply of ecosystem services within the northern region, as well as the beneficiaries of this supply. The project work to strengthen key tree crop value chains, including shea, using innovations in climate-smart agriculture as well as increase access to water for both household and productive uses using Winrock's Multiple Use Water Services (MUS) approach. Poor people need water for a variety of essential uses ranging from drinking, hygiene, and sanitation to food production and income generation. Existing approaches to water service delivery typically entail systems that are designed, managed and financed for

single use but the poor often rely on such single-use systems to meet multiple water needs. An alternative model for water service provision normally called multiple uses approaches to water service delivery is a consumer-oriented approach that takes people's multiple water needs as a starting point and involves planning, finance and management of integrated water services for multiple domestic and productive uses. Purpose The main aim of using the model was to guide prospective investments in the water sector by assessing the relative costs, benefits and poverty impacts of multiple-use approaches over single-use approaches. With CREMA communities become organized in relation to natural resource utilisation and biodiversity conservation.

Relevant websites, web links and files

- https://www.winrock.org/wp-content/uploads/2016/02/Multiple-Use-Water-Services-for-the-Poor-Assessing-the-State-of-Knowledge.pdf
- https://www.modernghana.com/news/763697/ghanas-crema-the-building-block-to-natural-resources-manage.html

Obstacles and scientific and technical needs related to the measure taken:

Poverty was deeply entrenched, and farming was dominated by smallholder farmers. Ghana has been faced with a fiscal crisis with high inflation averaging above 17% since 1998 this has resulted in high bank lending rates above 35 % and a declining gross domestic product coupled with power outages across the country have stifled growth and investment and growth and investment Deeping poverty level in the northern region. It was against this backdrop that Feeds the Future was adopted as a significant project in using new technologies such as urea deep placement direct, alternate wetting and drying method yielded an average of 4.3 tons per hectare in 2016 a 60% increase from 2013.

Relevant websites, web links and files

- https://www.feedthefuture.gov/country/ghana/

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

National Forest Plantation Strategy (2016-2040**).**
This strategy is consistent with the Forestry and Wildlife Policy objective 2 which seeks to promote the rehabilitation and restoration of degraded landscapes through forest plantation development, enrichment planting, and community forestry. The Government of Ghana in 2001 launched the National Forest Plantation Development Programme (NFPDP) which has been implemented to date by the Forestry Commission under various components, based on specific funding sources and implementation strategies. The project is expected to last until 2040. The programme aims at developing a sustainable resource base that will satisfy the future demand for industrial timber and enhance environmental quality, thereby relieving the pressure on the natural forest and increasing the forest cover. Specifically, the project seeks to restore the forest cover of degraded forest lands, reduce the wood supply deficit situation in the country to generate employment as a means to reduce rural poverty, to improve environmental quality and provide an opportunity for the country to tap the emerging benefits from the climate change market for carbon sequestration and to enhance production of food crops thereby contributing to food security in the country.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes
Aichi Target 5, 14 & 15
Ghana National Target 5, 14 & 15

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:
☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above
The NFPDP was developed out of the development of the Ghana Forest Plantation Strategy (2016-2040) through a multi-stakeholder consultative process. A validation workshop was held with representatives of Traditional Authorities, Members of Parliament, MMDAs, NGOs and CSOs. The NFPDP has various components based on funding sources and implementation strategies. The components are the Forest Investment Program (FIP), modified Taungya Systems, Community Forestry Management Project, Timber Industry Plantation Development Fund Plantations Private Commercial Plantation among others. The Government of Ghana (GoG) and Development Partners (DPs) mainly fund the activities of the programme.

The GoG also facilitate the creation of an enabling environment for investment in forest plantation development. These include the development of legislation, policies, and the establishment of institutional structures that promote investment in forest plantations, capacity

building within key agencies charged with supporting forest plantation development; research; etc.

The strategy is reviewed every five years to evaluate achievement and adapt the strategic objectives and actions to changing conditions and priorities thus ensuring that the GFPS stays on course to achieve its overall goal. SWOT and Contextual Analysis methodology was used to identify relevant issues and challenges relating to the forest plantation industry.

Relevant websites, web links and files

- https://www.fcghana.org/userfiles/files/Plantation%20Annual%20Report/FC%20AnnualReport%202016.pdf
- https://fcghana.org/userfiles/files/Plantation%20Annual%20Report/ghana%20forest%20plantation%20strategy.pdf

Other relevant information

African Plantations for Sustainable Development (APSD) Off-reserve Plantations.

African Plantations for Sustainable Development (APSD) Ghana Limited is a privately-owned company engaged in the establishment of fast-growing plantations for bio-energy production in the Atebubu District of the Brong Ahafo Region. The company operates a mechanized forest tree nursery with an installed capacity of 25 million seedlings annually. The company has so far invested about US$35 million in infrastructure, equipment and plantation development in Ghana. APSD Ghana Limited has acquired an off-reserve concession with an estimated area of 86,000ha. The company has so far established 8,337ha of Eucalyptus and Acacia plantations and employs a labour force of 1,106 predominantly sourced from the local communities within the company's catchment area.

In 2016, the company established 1,337ha of plantations. The company aims to establish efficient electrical power production based on fast-growing Eucalyptus and Acacia plantations. APSD plans to plant approximately 20,000ha of these trees species to feed two 30 MWe power plants based on five (5) to seven (7) year tree rotations.

Relevant websites, web links and files

- file:///E:/6NR%20Section%20II/Forest%20Commision%20AnnualReport%202016.pdf

Other relevant information

Forest 2020

The project seeks to address technical barriers across six countries to the sustained implementation of effective forests monitoring systems, capable of measuring forest change and providing information on the risk and drivers of forest loss. Ghana, Brazil, Colombia, Indonesia, Mexico and Kenya are the countries participating in the project being funded by UK Space Agency's (UKSA) International Partnership Programme (IPP).

The project is expected to fill key forest monitoring gaps and also develop a common monitoring system that will feed into the national forest monitoring system and be used for all forest-related programmes and projects in the country to facilitate the implementation and spatial monitoring of major forestry sector programs such as REDD+, Voluntary Partnership Agreement and plantation development.
Forest 2020, has been designed to help countries address technical challenges in protecting and restoring their forest resources, inadequate monitoring systems remain a barrier to effective implementation.

Ghana is currently implementing the Reducing Emission from Deforestation and Forest Degradation (REDD+) Programme, which is aimed at recording the country's ability to cut down emissions and claim carbon credits. Three ecological areas, which meet the criteria for the project, including coastal ecosystem monitoring, forest reserve loss and associated threats of deforestation and degradation and reforestation efforts in the country have been selected for a pilot. They are the Goaso-Offinso-Nkoranza-Techiman triangle noted for cocoa and the cultivation of other tree crops; the mangrove landscape in Ada, Keta, Songhor RAMSAR site and areas along the Elubo stretch from Takoradi.

The project would check the extent of the mangroves and monitor the changes in the landscape over time, as well as the landscape under persistent cloud cover across the south western portion of Ghana with the aim of increasing the accuracy of mapping of the land cover in these areas

Relevant websites, web links and files

- https://ecometrica.com/space/forests2020

Obstacles and scientific and technical needs related to the measure taken

Gaps in key data (i.e. growth rates of key plantation spp. and expected returns, site class delineation, the extent of private sector plantations, etc.)

- Inadequate plantation infrastructure
- Inadequate knowledge of best management practices for key indigenous species and mixtures
- Low productivity of existing plantations (site selection, quality of planting materials and silvicultural treatments)
- The poor tradition of maintenance of established plantations leading to poor wood quality and low yields
- Lack of genetically improved planting material within the country
- Low application of Geo-Information Technology in monitoring resource development
- Low capacity of timber processing industry in the utilization of small-diameter plantation logs
- Inadequate extension services
- Lack of sustainable financing framework for plantation development
- Weak enforcement of performance standards
- Weak legal and institutional framework for plantation development
- Lack of a unified legal framework for regulating plantation development, benefits sharing, financing etc.

- Lack of investment in research and development
- Illegal Mining activities (i.e. Galamsey, sand winning)
- Illegal logging (including chainsaw lumbering, pilfering etc.)
- Illegal charcoal production

Relevant websites, web links and files

- https://fcghana.org/userfiles/files/Plantation%20Annual%20Report/ghana%20forest%20plantation%20strategy.pdf

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Sustainable Land and Water Management Project**.**
The Sustainable Land and Water Management Project (SLWMP) is a ten-year project funded by the Global Environmental Facility (GEF) and is intended to expand the area under sustainable land and water management practices in selected watersheds. The project is intended to support the Government of Ghana to:

(a) Improve land management of selected micro-watersheds in Northern Ghana to reverse land degradation and enhance agricultural productivity, and
(b) Improve spatial planning through the integration of watershed management and development plans.

The Project has three components, namely:

- Component 1 – Capacity building for integrated spatial planning;
- Component 2 – Land and Water management; and
- Component 3 – Project management and coordination.

The project started in 2011 was due to end 2015 but has been extended to 2020 due to 2 phases of additional financing. Key responsible institutions in this project are MESTI, SADA, MoFA, EPA, FC-Wildlife and Forest Services Division, Farmer Groups, and District Assemblies.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes
Aichi 7, 10 & 11
Ghana National Target 11

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:
☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above
The Tools or methodology used involved:

- Engagement with relevant stakeholders
- Submission of Annual Progress Reports
- World Bank Project Implementation support mission
- Update of workplan and Procurement plan implementation
- Update of Results framework indicators
- Records keeping
- Disbursement Projections, etc.

Relevant websites, web links and files

- http://www.worldbank.org/en/news/feature/2018/06/15/in-ghana-resourceful-communities-transform-landscapes-livelihoods
- http://documents.worldbank.org/curated/en/104571468035989421/pdf/930800AM0P098500Box385393B00PUBLIC0.pdf
- http://www.epa.gov.gh/epa/projects/slwmp

Other relevant information

Feed the Future Ghana Agriculture Policy Support Project (2017) (APSP)-
Documenting Various Sustainable Land and Water Management Technologies into Forms that can be used for Extension Service Provision: The experience of Northern Ghana. This study was undertaken by the Faculty of Agribusiness and Communication Sciences (FACS) with the support of Feed the Future Agricultural Policy Support Project (FtF APSP) to document key SLWM technologies for use by MoFA and other organizations. The study established low levels of adoption of SLWM technologies across all the technologies identified in the three northern regions. This underscores the relevance of SWLM Project in the Northern Region.

Relevant websites, web links and files

- file:///C:/Users/user/AppData/Local/Packages/Microsoft.MicrosoftEdge_8wekyb3d8bbwe/TempState/Downloads/DocumentingVariousSustainableLandandWaterManagementTechnologiesintoFormsthatcanbeusedforExtensionServiceProvision.pdf

Increased Resilience to Climate Change in Northern Ghana through the Management of Water Resources and Diversification of Livelihoods - The Adaptation Fund Project
The project aims at addressing climate change induced decreases in the availability and increasing unpredictability of water resources, and the associated negative impacts of these trends on the livelihoods of rural communities in the three northern regions. The project targets 50 communities in 10 districts of the Upper East, Upper West and Northern Regions of Ghana. The main objective of the programme is therefore to enhance the resilience and adaptive capacity of communities to climate impacts and risks on water resources in Northern Ghana. This will be achieved through improvement in water access and increased institutional capacity and coordination for integrated water management to support other uses of water resources especially for the diversification of rural livelihoods This will be done so by delivering the following three complementary outcomes:

- Outcome 1: Improved planning and management of water resources considering climate change impacts on surface and groundwater sources
- Outcome 2: Climate resilient management of water resources by communities in Northern Ghana
- Outcome 3: Enhanced diversification of livelihoods of communities in northern Ghana

Relevant websites, web links and files

- http://www.gh.undp.org/content/ghana/en/home/operations/projects/environment_and_energy/Adaptation_Fund_Project.html

Obstacles and scientific and technical needs related to the measure taken:

The obstacles identified in implementation of SLWM activities include:

i. unfavourable weather patterns (unusually long dry spells) affecting crop growth and survival;
ii. poor survival of some seedlings (cassia) due to poor handling during transportation;
iii. bushfire and alien herdsmen

Relevant websites, web links and files

- http://documents.worldbank.org/curated/en/104571468035989421/pdf/930800AM0P098500Box385393B00PUBLIC0.pdf

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Full Sun to Shaded Cocoa Agro-forestry Systems (SCAFS)
Ghana's High Forest Zone constitutes a major cocoa production area, however most cocoa farms have ageing trees with declining yields and are highly vulnerable to climate related shocks such as drought. With limited access to land farmers often encroach upon protected forest areas to raise cocoa and food crops, increasing deforestation and CO2 emissions. To reverse this trend, SNV is working with farmers and businesses to introduce climate-smart farming practices, and cocoa traceability and siting systems that increase quality yields whilst managing sustainable farm expansion and reducing deforestation.
Many cocoa farmers have limited capacity to manage and adapt to challenges that negatively impact crop yields, and they are also faced with a lack of planned approaches to effectively rehabilitate and rejuvenate ageing cocoa farms. These issues increase the likelihood that farmers will expand cocoa production into protected forest areas. This project aims to improve cocoa yields and secure farmer livelihoods without encouraging expansion, and in turn, reduce emissions from deforestation in protected and off-reserve areas and ensure biodiversity conservation and enhanced carbon stocks.

The project aims for a more balanced approach to cocoa production and forest protection while supporting cocoa businesses to implement transparent deforestation-free supply chains in Ghana. The adoption of these practices will also help to address wider social issues such as food insecurity and sustainable incomes for local communities.
The project area covers selected areas of forest-cocoa mosaic landscapes in the western part of Bia National Park and Bia North Forest Reserve in the Bia West District of Western region of Ghana.

This project is being implemented in partnership with the Ghana Cocoa Board, the Forestry Commission Cocoa Research Institute of Ghana and Bia West District Assembly, and is funded by the German Federal Ministry of Environment, Nature Conservation, Building and Nuclear Safety (BMUB) over a period of three years (2016 – 2018).

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

Aichi 7,11 & 15
Ghana National Target 7

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

- Improved cocoa agroforestry model introduced through rehabilitation of overaged farms targeting 2,000 smallholders and covering an area of 4,000 hectares in 15 communities;
- Functional multi-stakeholder land use planning system established and operational in project communities; and
- Traceability system established to trace cocoa beans to farm level and also monitor no deforestation in supply chains among three private cocoa companies and smallholder cocoa farmers.

Relevant websites, web links and files

- http://www.snv.org/project/full-sun-shaded-cocoa-agro-forestry-systems-scafs

Other relevant information

Increased Cocoa Productivity for Improved Ecosystem Services

Cocoa production in Ghana is dominated by smallholder farmers with small farm size of an average of 5 acres. However, cocoa continues to generate about $2 billion foreign exchange annually and contributes significantly to Government Revenue and GDP. It employs and provide livelihoods for about 800,000 families located in the seven cocoa regions in Ghana. However, the sector is faced with challenges of unsustainable production systems, poor management of soil fertility, pests and diseases, and variable weather conditions, resulting in low production and income levels and a threat to forest cover.

In response to the urgent need to sustain Ghana's cocoa production and decrease its impact on the surrounding forests, SNV initiated the Cocoa Eco-project in collaboration with Kuapa Kokoo Farmers Union (KKFU) and International Institute of Tropical Agriculture (IITA) in 2013 for a 30-month project which completed in December 2015. Cocoa-Eco (Increased Cocoa Productivity for Improved Ecosystems Services) provides a solution to develop a sustainable cocoa intensification and diversification strategies for climate smart and land sparing cocoa farming systems.

The overriding objective of the project is to increase smallholder productivity for improved ecosystems services through identification and promotion of sustainable intensification and diversification strategies. Increased productivity of 6,000 smallholder farmers from 400kg/ha to a range of 800-1200 kg/ha and to establish about 4000 ha of cocoa agro-forestry.

The program had a target of 6,000 smallholder farmers located in selected cocoa growing communities in Ashanti, Brong-Ahafo, Central and Western regions in Ghana. SNV led the coordination of the project of the partners (IITA & KKFU) and other key stakeholders among which includes local capacity builders, direct beneficiary farmers, private sector, government agencies, academic and research institutions.

- Trained forty-five (45) Kuapa Kokoo Internal Control System (KKICS) officers and 1,056 “Lead” farmers in GAP, ICPM and Occupational, Health and Safety management via Trainer of Trainer Approach.
- Both KICS officers and “Lead” farmers trained about 6,000 farmers at various clusters on GAP, ICPM and OHS which resulted in improving farmer’s professionalism and modernization on their farms.
- Establishment of about 4000 ha new cocoa agro-forestry farms as a result of the project.

Relevant websites, web links and files

- http://www.snv.org/project/cocoa-eco-project

Obstacles and scientific and technical needs related to the measure taken:

- Increasing farmer access to extension support services to promote crop;
- Introducing improved cocoa agroforestry systems through the phased rehabilitation of old and unproductive cocoa trees and the incorporation of shade trees;
- Piloting a multi-stakeholder integrated land use planning system to facilitate the siting of sustainable cocoa expansion;
- Introducing a deforestation traceability system at farm level, to better monitor and promote deforestation-free cocoa supply chains in the High Forest Zone; and
- Implementing deforestation-free supply chains toolkit across the forest-cocoa landscape to monitor and promote sustainable cocoa production.

Describe a measure taken to contribute to the implementation of your country's national biodiversity strategy and action plan

Capacity Development and Knowledge Management for Civil Society Organizations towards the implementation of Multilateral Environmental Agreements and national and sub-national policy, planning and legal frameworks

A project implemented by the HATOF foundation with funding from the Global Environment Facility Small Grants Programme (GEFSGP) Ghana, the main objective of the project is to enhance capacity of civil society to contribute to the implementation of MEAs (Multilateral Environmental Agreements), national and subnational policy, planning and legal frameworks and to gain knowledge in best innovative practices and systems for sustainable development.

Specifically, the project seeks to;

- Enhance capacities of the CSOs to participate effectively in policy planning and formulation
- Develop capacities of CSOs as "Barefoot Consultants" to access bilateral and multilateral funds
- Establish "CSO-Government Policy and Planning Dialogue Platform" (which could be in partnership with the GEFCSO Network)
- Establish barefoot training institute to train local people and CSOs in innovative practices in sustainable agriculture, low carbon technologies, biodiversity enterprise development etc.

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes

Aichi Target 1
Ghana National Target 1

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

☒ Measure taken has been effective
☐ Measure taken has been partially effective
☐ Measure taken has been ineffective
☐ Unknown

Please explain the selection and where possible indicate the tools or methodology used for the assessment of effectiveness above

- Engage the media and CSOs and other relevant stakeholders
- Inception Report

Relevant websites, web links and files

- http://hatof.org/inception-and-training-workshop-on-multilateral-environmental-agreements-in-accra/
- https://drive.google.com/file/d/0B90e9V2nuzitaWwwekFtR0VyQkQ3Q2pkT2hoS0ZoQ1lzRnlN/view

Obstacles and scientific and technical needs related to the measure taken:

- The Media had no idea about the MEAs and some national policies
- CSOs have poor understanding of multilateral environmental agreements

Section III. Assessment of Progress towards each National Target

Progress Assessment Ghana Target 1

Create public awareness of the values of biodiversity to promote conservation, restoration and sustainably usage

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018.

Additional information

Ghana through the Environmental Protection Agency (EPA), Ministry of Environment, Science, Technology and Innovation (MESTI), Ministry of Lands and Natural Resource, Mineral Commission and Forestry Commission have implemented and are still implementing policies and programs that will sustain life through conservation of biodiversity. These governmental institutions have used methods like indoor stakeholder engagement and public education and hearing to create awareness of the importance of biodiversity conservation to Ghana. On November 9, 2018, the Ministry of Environment, Science, Technology and Innovation launched Ghana's Action Plan for the implementation of the program dubbed "Man and the Biosphere" to enhance capacity building and promote education for sustainable development. The main aim for this program is to manage biodiversity, help restore and support the adaptation and mitigation impact of climate change. Ghana through the "Man and the Biosphere" program have trained 230 individuals who depend directly the biosphere for livelihood in an alternate livelihood program to reduce the stress on the biosphere and also protect biodiversity in the Bia conservational area. In addition, more than 33,000 youths applied to take part in the Forestry Commission "Green Ghana program in 2018.

In 2018, the Ministry of Fisheries and Aquaculture Development (MFAD) used all platforms (print media, electronic media, stakeholder's engagement and documentaries) to educate fishermen in the fishing communities on sustainable fishing practices and. The MFAD proposed enforcing closed season on fishing in 2018 to help improve fish stock in the country but this has been postponed to 2019.

The Aburi Botanical gardens embarked on a campaign under the theme "promoting education and awareness about plant conservation the Ghanaian way" to ensure that all sections of the population within the community such as school children, religious groups, farmers and social clubs understand environmental systems and processes for biodiversity conservation and sustainable living.

Ghana's NBSAP has been completed as a framework to guide the implementation of biodiversity in the country and the Biosafety regulations on cause to being passed by parliament. In April 2017, HATOF Foundation with support from the GEF Small Grants Programme launched a national project on "*Capacity Development and Knowledge Management for Civil Society Organizations towards the implementation of Multilateral Environmental Agreements and national and sub-national policy, planning and legal frameworks*" which was implemented until October 2018. Five major awareness raising and capacity building workshops were carried out nationwide for over 150 environment CSOs from eight regions, and 24 journalists from 10 media houses on the Rio-Conventions including Biodiversity. The aim of the project was to enhance the capacity of CSOs and the media to effectively promote and contribute to the implementation of multilateral environmental agreements (MEAs) and national and sub-national policy, planning and legal frameworks and to gain knowledge in best innovative practices and systems for community landscape conservation, climate smart innovative agro-ecology, low-carbon energy access co-benefits, and soil, land and water management to safeguard the global environment and promote sustainable development. Five radio discussions on environmental abuse and biodiversity conservation were also facilitated on Adom Fm, Unique Fm and GBC in 2017 and 2018.
Under the "Man and the Biosphere" program, an annual national forum has been introduced in 2018 to enhance awareness on biodiversity issues on the Biosphere reserve concept.

Indicators used in this assessment

- Number of awareness creation programmes by governmental and nongovernmental institutions.
- Number of media campaign towards sustainable biodiversity carried out.
- Level of voluntary adherence to sustainable biodiversity practises.
- A national framework for implementing CBD available

Please describe any other tools or means used for assessing progress

Ghana in the year under review collaborated with CSOs to observe all days set aside to the celebration of biodiversity and all the celebrations were broadcasted by many media houses (print and electronic media) to make the education given about the importance of conserving biodiversity readily available to the population across the country.

Many farmers in farming communities like Agogo in the Ashanti Region voluntarily accepted the tree-on farm programme after educating the farmers about the importance of conserving biodiversity to themselves, the community and the country at large.

Relevant websites, web links and files

- https://www.myjoyonline.com/news/2018/August-4th/this-years-ban-on-fishing-postponed-to-2019.php
- www.google.com/amp/www.ghananewsagency.org/social/usaid-awards-fishers-for-outstanding-fishery-practices-114029-amp.html
- citifmonline.com/2018/02/28/govt-recruit-15000-people-tree-planting-exercise/
- fcghana.org/treefarm/
- https://www.bgci.org/education/article/0747
- http://hatof.org/inception-and-training-workshop-on-multilateral-environmental-agreements-in-accra/

- https://drive.google.com/open?id=0B90e9V2nuzitaWwwekFtR0VyQkQ3Q2pkT2hoS0ZoQ1lzRnlN
- www.conservealliance.org
- www.ghanawildlife society.org
- www.arocha.org

Level of confidence of the above assessment

☒ Based on comprehensive evidence
☐ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

The evidence is coming from the relevant government institutions such as the Ministry of Environment, Science, Technology and Innovation, Environmental Protection Agency, Forestry Commission, and Ministry of Fisheries and Aquaculture Development, and NGOs including HATOF Foundation, Ghana Wildlife Society, A Rocha Ghana

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

Monitoring was done at both local level (regional and district) and national levels. At the local level, well trained staff at the local level visited the communities on regular intervals to educate the population about the importance of biodiversity conservation. At the national level, there were supervising mechanisms to monitor the education given at the local level (by staff) and how the population are implementing the education given to them to achieve sustainable biodiversity.

Relevant websites, web links and files

- https://www.myjoyonline.com/news/2018/August-4th/this-years-ban-on-fishing-postponed-to-2019.php
- www.google.com/amp/www.ghananewsagency.org/social/usaid-awards-fishers-for-outstanding-fishery-practices-114029-amp.html
- citifmonline.com/2018/02/28/govt-recruit-15000-people-tree-planting-exercise/
- fcghana.org/treefarm/
- https://www.bgci.org/education/article/0747
- http://hatof.org/inception-and-training-workshop-on-multilateral-environmental-agreements-in-accra/
- https://drive.google.com/open?id=0B90e9V2nuzitaWwwekFtR0VyQkQ3Q2pkT2hoS0ZoQ1lzRnlN
- www.conservealliance.org
- www.ghanawildlife society.org
- www.arocha.org

Progress Assessment Ghana Target 2
Integrate and mainstream biodiversity values into national accounts and local development and poverty reduction strategies and planning processes with reporting systems

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

Biodiversity issues have been integrated into the coordinated programme as a statutory requirement, these have been translated as part of the planning guidelines for assisting all the district and all the sectors to capture biodiversity in their Medium Term Development Plans. Ghana is implementing a Connect Project Mainstreaming of biodiversity information into the heart of government decision-making. The objective is to address the barriers to the integration of biodiversity information into decision making. A national action plan on the concept of "Man and the Biosphere" launched in 2018 to be integrated into the development plans of 10 districts in collaboration with NDPC.

The integration of biodiversity programmes at the district and municipal level have contributed towards poverty reduction and biodiversity conservation. The youth in Agriculture and Afforestation programme a collaborating programme between the Forestry Commission and Youth Employment Agency provided employment to 15000 youths in tree planting.

Indicators used in this assessment

- Policies and programmes implemented at urban (population 5,000and above) and rural (below 5,000) districts and municipalities
- Level of voluntary acceptance and subscription.
- Developed tools and guidelines by December 2017

Please describe any other tools or means used for assessing progress
NDPC and Environmental Protection Agency have developed a guide book on integrating climate change and Disaster Risks into National Development, Policies and Planning. Other tools are being developed.

Relevant websites, web links and files

- https://core.ac.uk/download/pdf/132663003.pdf
- thbftonline.com/2018/business/agribusiness/gh¢144m-committed-to-greening-ghana-initiative/

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
Evidence available for efforts done for mainstreaming biodiversity into national accounting, policy and planning is minimal.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
There is comprehensive national monitoring and evaluation system in place to ensure annual progress report of Ministries, Department and Agencies. But because bodiveristy is not fully integrated into the monitoring systems, reports do not adequately capture biodiversity issues.

Relevant websites, web links and files

- www.ndpc.gov.gh

Progress Assessment Ghana Target 3
By 2020, Incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed.

Category of progress towards the implementation of the selected target:
☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:
December 2018

Additional information
Agencies have been established with the responsibility to manage the country's biodiversity resources and have signed on to all the major international treaties that seek to protect biodiversity. Despite all of Ghana's commendable efforts to conserve its biodiversity, data to inform management interventions and enable monitoring of the status of biodiversity in the country are inadequate. According to a 2015 World Bank Assessment, there has been a general increase in the number of threatened species in Ghana from 2008 to 2016.

The high poverty levels contribute to high dependence on and exploitation of natural resources, hence the need for economic incentives for biodiversity conservation. Towards the achievement of the Aichi Target 3, a strategy was put in place to accelerate the process of removal of harmful incentives to biodiversity. The National target was to first identify harmful incentives that drive biodiversity loss and degradation and then develop a mechanism for eliminating or phasing out those incentives.

Traditional laws and sanctions are currently in place promotes biodiversity conservation and should be accorded legal backing to ensure effective enforcement. Appropriate legislation, both at the national and district levels, should be developed to provide sanctions against individuals, corporate bodies and communities which engage in activities deemed not to be promoting the sustainable use and management of the country's biological resources.

Indicators used in this assessment
- Catalog of incentives harmful to biodiversity conservation.
- The number of harmful incentives to biodiversity expunged from national plans and policies.

Please describe any other tools or means used for assessing progress
Research and analysis

Relevant websites, web links, and files

- http://www.tradingeconomics.com/ghana/bird-species-threatened-wb-data.html
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3720029/
- http://gh.chm-cbd.net/convention/strategic-framework-biodiversity-management/incentive-measures-and-sanctions-conservation-and

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☐ Based on partial evidence
☒ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
Very little data was available for analysis of incentives (both harmful and progressive) of biodiversity

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
All Ministries, Departments and Agencies with bearing on biodiversity are required to monitor and submit periodical reports on progress towards the target to NDPC.

Progress Assessment Ghana Target 4
By 2020 Governments, business and stakeholders develop plans for sustainable production and consumption and keep the impacts on resource use within safe ecological limits.

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

Ghana runs periodic public awareness for the appreciation and conservation of its biodiversity. Also, the sector ministries partner with private organizations and businesses to develop programmes to sustainably utilize natural resources and prevent biodiversity loss. An example of such a partnership is the Newmont Ghana reforestation programme. In accordance with achieving the target, Ghana is also being joined by several NGOs and international organizations. The GEF Small Grants programme is such an institution and has undertaken about 270 projects nationwide of which 42.55% is on biodiversity. Other organizations include Friends of the Earth, HATOF Foundation, Nature and Development Foundation, Green Earth Organization, Nature Conservation Research Centre and Conservation Alliance. These organizations focus on:

- Improving environmental performance of forest products
- Building capacity of local communities on forest fringe and advise on land use
- Forming partnerships to promote responsible forest management
- Influence the development of plantation and wood fuel sectors
- Engaging government, communities, and companies to maximize benefits through REDD+
- Environmental education for indigenes
- Women empowerment and sustaining nature

The conservation of biodiversity is integrated at all levels into national, regional, district and sectoral planning efforts to implement goals and objectives of policies effectively. The role of local communities and the wealth of traditional knowledge in conservation and management of biodiversity is also recognized and promoted.

Indicators used in this assessment

A biodiversity communication and public awareness strategy on the preservation and conservation of Ghana's biological heritage developed and implemented in place.
Please describe any other tools or means used for assessing progress

Relevant websites, web links, and files

- Small Grants Programme-Ghana

- https://sgp.undp.org/component/countrypages/?view=stories&country=51&Itemid=271
- https://sgp.undp.org/index.php?country=51&option=com_countrypages&view=countrypage&Itemid=271
- WWF offices
- http://wwf.panda.org/wwf_offices/ghana/
- Conservation Alliance
- http://www.conservealliance.org/
- NGOs in ex-situ conservation in Ghana
- http://gh.chm-cbd.net/biodiversity/faunal-diversity-ghana/ex-situ-conservation/institutions-and-organizations-undertaking-ex-situ-conservation-activities/ngos-private-consultants-and-other-experts
- How Ghana fares in Biodiversity Conservation
- http://www.ghana.gov.gh/index.php/media-center/features/2405-how-ghana-fares-in-biodiversity-conservation

Level of confidence of the above assessment

☒ Based on comprehensive evidence
☐ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above

From the reports that have been presented above, the sources are relevant, credible and verifiable

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Ministry of Environment, Science, Technology and Innovation, Ministry of food and agriculture, Environmental Protection Agency, Private Sector businesses, NGOs, Research institutions and Universities are required to monitor and submit periodical reports on progress towards the target to NDPC

Progress Assessment Ghana Target 5
Reducing the rate of loss of all-natural habitats, including forests, to at least half and where feasible brought close to zero, and degradation and fragmentation significantly reduced.

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

The main agency responsible for the maintenance of forests in Ghana is the Forestry Commission which is under the Ministry of Lands and Natural Resources. This agency in collaboration with other relevant stakeholders has undertaken a number of projects towards the reduction of the rate of loss and degradation of forests in Ghana. In 2001, The National Forest Plantation Development Programme (NFPDP) was launched with the purpose of creating forest plantations. The programme was relaunched in 2010 to include private lands that are outside forest reserves. At the end of 2018, about 221,216 ha of forest plantations had been established under this project.

The Bamboo and Rattan Development Programme was launched as an extension of the NFPDP with the objective to promote bamboo and rattan production as a complement to the wood industry so as to reduce the pressures on natural forests. To sustainably manage a resource-endowed area, communities organize themselves and rely on traditional decision-making processes and a constitution to guide and regulate their activities under the programme Community Resource Management Areas (CREMA). This CREMA concept was used in designating Lake Bosumtwi as a biosphere reserve.

Other measures in place to mitigate the destruction of forest habitats include the creation of volunteer groups that are trained on basic firefighting techniques by the Ghana Fire Service to combat forest fires and stricter law enforcement through increased patrols. A number of policy measures under the Forestry Commission have also been put in place since 2014 to maintain and enhance forest areas. These include capacity building of staff, formation of Rapid Response Teams to fight illegal activities in forest areas and training of Officers of the Forestry Commission as Public Prosecutors to prosecute offenders. The second phase of the Forestry Commission-Newmont Reforestation Offset Programme is also set to get underway which is expected to cover an estimated 303 ha of land. New MOU was just signed to begin Phase II in Atiwa forest reserve (17300ha). The first offset has been completed. (Biodiversity Offset Programme). The Sustainable Land and Water Management Project which is sponsored by the World Bank is also being undertaken which aims at addressing environmental and land degradation through improved community-driven management of natural resources. There is a 5-

year World Bank programme (Forest Investment Program: Enhancing Natural Forest and Agroforestry Landscapes Project). The objective of the Ghana Forest Investment Program enhancing natural forest and Agroforestry Landscapes project is to improve forest and tree management practices by cocoa farmer, CREMA communities and forest reserve managers to reduce forest loss.

VPA, WTS, FLEGT sponsored by European Union- redefine business operating processes of FC so that only timber from sustainable sources are placed on the international and domestic markets. Forestry Commission host the National Red Plus Secretariat and all preparatory processes have been completed and at readiness stage for the implementation for the payment of carbon.

Forest Farm Facility II project sponsored by FAO- the objective is to introduce more trees on farms to enhance carbon stocks and also to prevent land conflict between forestry and agriculture. There is an MOU between Ghana, Ivory Coast and Burkina Faso to establish biological corridors to link national parks.

There are several policies in Ghana to improve the protection and regularisation of water resources in Ghana which include the National Water Vision Policy (2007) and National Policy (2012). The Water Resource Commission's Buffer Zone Policy was also created for the preservation and functioning of the country's water bodies and ecosystems. The Commission has also developed a Water Quality Index that is used to categorize the health of water bodies in a systematic manner. A national Wetlands Action Plan was developed for a 10-year period (2007-2016) in an effort to conserve the country's wetlands. Ghana has also signed to two international treaties, The Ramsar Convention and the Convention of Migratory Species which requires all Parties to provide annual report on the ecological integrity of specified sites of interests.

Indicators used in this assessment

- Legislations on Community Resource Management Areas (CREMA)
- Management plans for important wetlands
- Management plans for forests
- Availability of legal framework for management of natural habitats.

Please describe any other tools or means used for assessing progress

Ghana's Ramsar National Report to the 13th meeting of the Conference of the Contracting Parties to the Ramsar Convention on Wetlands (COP13) provides important information on the status and progress of managing wetlands. This provides a basis for assessing the progress made towards the achievements of this target. The relevant maps for this assessment can be found in following the section were produced by UN Biodiversity Lab.

Relevant websites, web links and files

- Ramsar National Report to COP13 https://www.ramsar.org/sites/default/files/documents/importftp/COP13NR_Ghana_e.pdf
- Water Resource Commission launches Buffer Zone Policy

http://www.ghana.gov.gh/index.php/media-center/news/695-water-resources-commission-launches-buffer-zone-policy

- Sustainable Land and Water Management http://projects.worldbank.org/P132100?lang=en
- National Forest Plantation Development Programme http://www.fcghana.org/page.php?page=291&section=28&typ=1
- Bamboo & Rattan Development Programme http://www.fcghana.org/baradep/page.php?page=134&section=28&typ=1

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
There are data gaps on the status of natural habitats which make it difficult to provide a comprehensive assessment of the progress made in reducing the rate of loss and degradation of habitats in the Country.

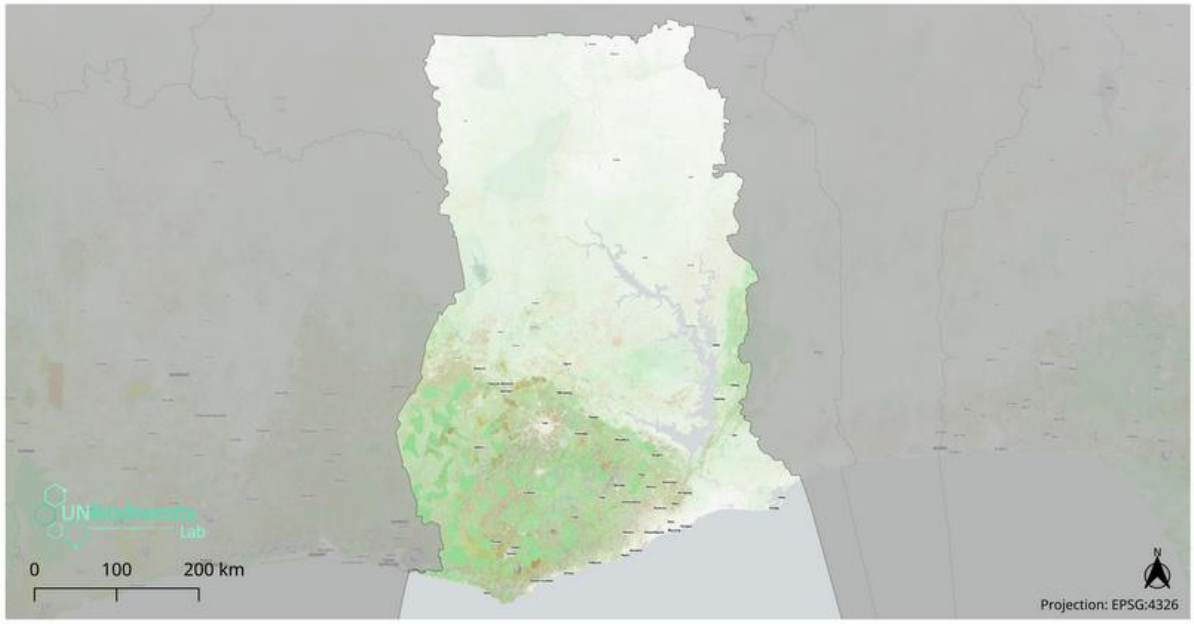
Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
The Ministry of Environment, Science, Technology and Innovation, Ministry of Land and Natural Resources, Forestry Commission, Wildlife Division, Environmental Protection and Civil Society Organisations monitors and submits reports on progress towards the target.

Relevant websites, web links and files

- Ramsar National Report to COP13 https://www.ramsar.org/sites/default/files/documents/importftp/COP13NR_Ghana_e.pdf
- Water Resource Commission launches Buffer Zone Policy http://www.ghana.gov.gh/index.php/media-center/news/695-water-resources-commission-launches-buffer-zone-policy
- Sustainable Land and Water Management http://projects.worldbank.org/P132100?lang=en
- National Forest Plantation Development Programme http://www.fcghana.org/page.php?page=291&section=28&typ=1
- Bamboo & Rattan Development Programme http://www.fcghana.org/baradep/page.php?page=134&section=28&typ=1
- https://www.dropbox.com/sh/llizprcu6sob9x8/AADK0ziXB9oTX1MtgvxdAvJBa/Ghana?dl=0&subfolder_nav_tracking=1



Forest Cover
(% Canopy Closure) 25% 100%

Year of Loss
2001 2017

Gain
(2000-2011)

Data: Forest Cover Loss (2000-2017)

Country: Ghana

Data Sources:
Hansen, M.C., et al., 2013. High-Resolution Global Maps of 21st-Century Forest Cover Change. Science 342, 850–853.
Global Administrative Unit Layers (GAUL). 2015. UN Cartographic Unit.

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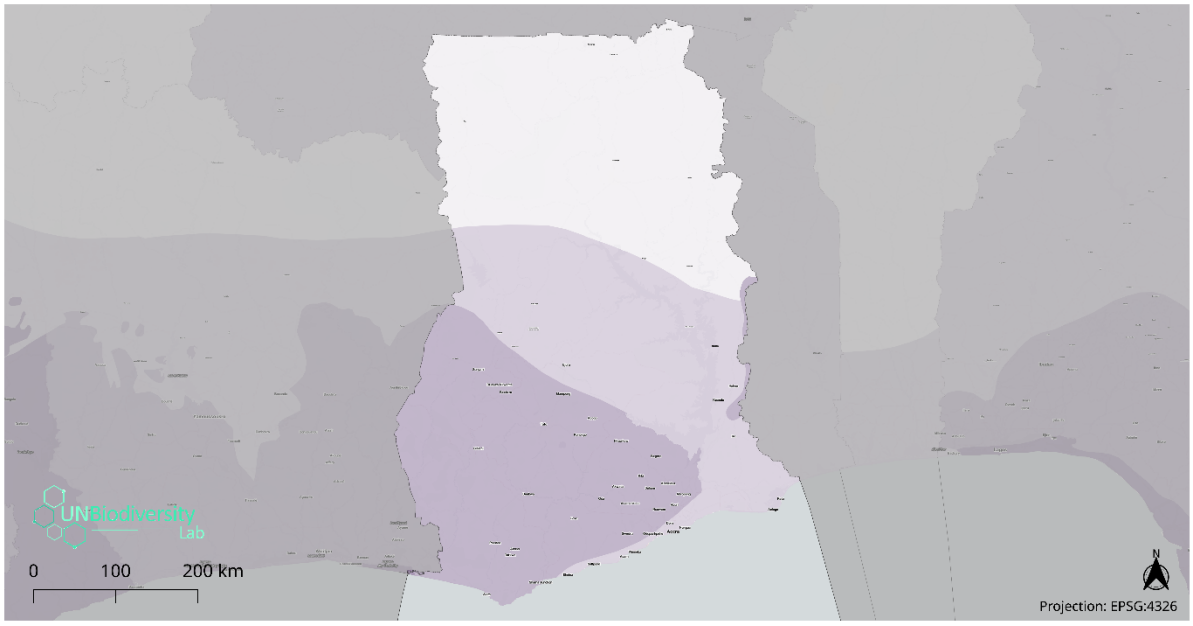

Biodiversity Intactness (%)
- <60%
- 60-70%
- 70-75%
- 75-80%
- 80-85%
- 85-90%
- 90-95%
- 95-97.5%
- 97.5-100%
- >100%

Data: Degradation within Ecoregions (2016)

Country: Ghana

Data Sources:
Dinerstein, E., et al., 2017. An Ecoregion-Based Approach to Protecting Half the Terrestrial Realm. BioScience 67, 534–545.
Newbold, T., et al., 2016. Has land use pushed terrestrial biodiversity beyond the planetary boundary? A global assessment. Science 353, 288–291.
Flanders Marine Institute (2018). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 10.
Global Administrative Unit Layers (GAUL). 2015. UN Cartographic Unit

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Progress Assessment Ghana Target 6
All stocks managed and harvested sustainably so that overfishing is avoided

Category of progress towards the implementation of the selected target:
☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:
December 2018

Additional information
The country has through several projects made progress towards the implementation of the target. The Ministry of Fisheries and Aquaculture Development (MoFAD) in collaboration with the Fisheries Commission (FC) developed and published in 2015 the Fisheries Management Plan (2015-2019) for Marine Sub-sector in 2015 (FMP). To reduce fishing efforts and overfishing among the Industrial fleet, two (2) Months Closed-Season was observed in 2016, 2017 and 2018. In 2019, the industrial vessels closed season will increase to three (3) months. Additional Licensing requirements and annual registration have been imposed on semi-industrial and industrial fishing vessels, requiring the conditions to be met quarterly, including sanitary conditions on the vessels. Those who fail are denied licenses for the quarter. To improve surveillance and monitoring the Ministry of Fisheries and Aquaculture Development through the Fisheries commission has installed Vessel Monitoring Systems (VMS) in all industrial vessels including Tuna Vessels. Through the Fisheries Enforcement Unit made up of personnel from the Fisheries Commission, Ghana Navy and Marine Police officers sea and land patrols were conducted. This led to the arrests and prosecution of and Respectively. In Addition, Observer Missions have been conducted on all Industrial Vessels including Tuna vessels.

As part of efforts to implement the FMP and ensure sustainable fisheries resource utilization, the USAID/Sustainable Fisheries Management Project (SFMP) launched in 2015 sought to provide the status of small pelagic stocks in Ghana and to rebuild marine fish stocks that were at the brink of depletion in landings. A Scientific and Technical Working Group (STWP) was formed in the first year to prepare and deliberate on the stock status and to provide to the Fisheries Commission with management recommendations. The STWG members were selected from academia, government agencies and representatives of the fishing industry. A great deal of effort was made in obtaining biological and environmental data in the first year. This project for the purpose of monitoring the impacts established a biological and management indicator points/references. They were based on the idea of Maximum Sustainable Yield (MSY), measured with two indicators; fishing/removal rate expressed in fishing mortality (F) as F_{msy} and the level of the living population at sea or biomass which will assure a continuous production of the MSY represented by B_{msy}. The sustainability level of small pelagic fish appeared to have been exceeded by current fishing efforts from the reports of the USAID/Sustainable Fisheries Management Project.

Apart from the SFMP, the Fisheries Commission through its Fisheries Scientific Survey Division, captures fisheries catch data from industrial fleets as well as sampled fish landing sites in the country. Through the assistance of the EAF Nansen Programme conducted surveys in 2016 and 2017.

To further reduce fishing efforts to rebuild fish stock the Fisheries Commission with support from the World Bank has embarked on by-registration and embossment of artisanal canoes. As at May 2018 14,617 canoes had been registered and 10,307 embossed. The 2016 Canoe Frame Survey was published in August 2016. In addition, the registration and embossment of canoes, the number of fishing holidays currently at 52 days in a year is expected to increase to 104 days in 2019. Additionally, in 2019, in collaboration with the Fisheries Associations and other stakeholders, the artisanal subsectors will embark on a one-month Closed Season. The first phase of the West Africa Regional Fisheries Program (WARFP) which ended in 2018 was an intervention program supported by the World Bank which was aimed at the sustainable management of Ghana's fish and aquatic resources by strengthening the capacity of the country to govern and manage fisheries in a sustainable manner, reducing illegal fishing, increasing profits generated by the fish resources and the fraction of that profit which is captured by the country, and improving aquaculture.

MOFAD in February 2018 has inaugurated a national aquaculture committee which will provide relevant policy options to the Ministry to accelerate aquaculture development in Ghana while reducing its negative effects on the environment.

To improve and strengthen biosecurity, emergency response, surveillance and diagnostics, pharmaceutical use and education in the field of aquatic animal health management, the Ghana Aquatic Animal Health Policy was developed in 2017 by the Ministry of Fisheries and Aquaculture Development in collaboration with the Fisheries Commission and other stakeholders

Indicators used in this assessment

- Availability of fisheries management plan (2018).
- Improvement in the registration process and certificates issued or renewed (Canoe frame survey conducted).
- National Biosafety risk assessment guidelines.
- Improvement in registration and licensing

Please describe any other tools or means used for assessing progress

The status of the small pelagic stocks in Ghana in the Sustainable Fisheries Management Project reports was used as the primary source of evidence. The available report was published in June 2017

Relevant websites, web links and files

- Ministry of Fisheries and Aquaculture Development- Fisheries Management Plan https://www.mofad.gov.gh/fisheries-management-plan-of-ghana-2015-2019/

- Ghana-West Africa Regional Fisheries Program (GEF) http://www.projects.worldbank.org/P124812/ghana-west-africa-regional-fisheries-program-gef?lang=en
- USAID/Ghana Sustainable Fisheries Management Policy https://www.crc.uri.edu/download/GH2014_PGM198_CRC_FIN508.pdf
- Sustainable Fisheries Management Policy https://rmportal.net/biodiversityconservation-gateway/legality-sustainability/fisheries-development/project-search/add-a-project-activity/usaid-ghana-sustainable-fisheries-management-project-sfmp
- MOFAD Closed Season Fact Sheet https://www.mofad.gov.gh/wp-content/uploads/2018/09/MOFAD-Closed-Season-Factsheet_07112018.pdf

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
Although the information provided in the report is considered to be the best available scientific information available, the accuracy of consistency of data quality remains problematic. Also, Ghana does not have an annual comprehensive data on fish stocks and the sustainability of the harvests of the fish stocks.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
The Monitoring, Control and Surveillance Division under the Fisheries Commission are mandated to monitor, control and survey all fishing activities in the country. As part of their core functions, they manage and run a satellite base station which serves as a monitoring system on all Ghanaian registered fishing vessels. The Ministry of Fisheries and Aquaculture Department in collaboration with the Ghana Maritime Authority and other concerned agencies also monitor electronically the fishing vessels in Ghana. Adequacy of monitoring information to support assessment is considered partial owning to insufficient enforcements of regulations in fisheries and aquaculture, inappropriate and technological-limited fishing craft and gear, and inadequate fish processing and storage facilities.

Relevant websites, web links and files

- Fisheries and Aquaculture Profile of Ghana http://www.fao.org/fishery/facp/GHA/en#CountrySector-StatusTrends

- Monitoring, Control and Surveillance Division
  https://www.mofad.gov.gh/agencies/fisheries-commission/divisions-of-fisheries-commission/monitoring-control-and-surveillance-division/

Progress Assessment Ghana Target 7
By 2020, agricultural, aquaculture and forest ecosystems should have increased resilience and provide essential services in order to secure the country's variety of life, and contribute to human well-being, and poverty eradication.

Category of progress towards the implementation of the selected target:
☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:
December 2018

Additional information:
Measuring progress: Institutional arrangements have been put in place to track progress towards conservation of biodiversity in Ghana

Agriculture
The use of pesticides and fertilizers towards the battling of pests and the attainment of high crop yield are the major activities which negatively impact wildlife (plants and animals) in the field of agriculture. The government of Ghana is ensuring that agricultural activities sustain biodiversity through the implementation of Integrated Pest Management and the use of sustainable agricultural practices among farmers. The Ministry of Food and Agriculture (MOFA) is the body that oversees these implementations.

The Plant Protection and Regulatory Services Directorate (PPRSD) under the MOFA is the national institution which organizes, regulate, implement and coordinate the plant protection services which are crucial in the practice of sustainable agriculture and the conservation of biodiversity. To ensure its effectiveness, the PPRSD has regional offices and officers in the ten administrative regions of the country and at the main entry and exit points throughout the country. This is to control the influx of agricultural inputs such as seeds and seedlings to ensure healthy disease-free and accepted breeds of crops are imported into the country. Under the PPRSD are four divisions: Crop Pests and Disease Management Division, Pesticide and Fertilizer Regulatory Division and the Plant Quarantine Division.

The Crop Pest and Disease Management Division among its numerous functions is responsible for the development of Good Agricultural Practices (GAPs) and the provision of guidelines for Integrated Pest Management (IPM) of food crops. The PPRSD has contributed to the ban of certain inorganic fertilizers such as Dichlorodiphenyltrichloroethane (DDT) and Hexachlorobenzene (HCB) which have very high persistence in the environment. They then tend to affect non-target organisms as they stay in the environment for a long time even after fighting pests. This affects the highly bio-diverse soil ecosystems and in turn affect the plant biomass which the soil supports. The implementation of the use of Integrated Pest Management with the

ban of highly toxic pesticides has since been very effective in aiding in the increase in the cocoa yield of Ghana.

Aquaculture
The Ministry of Fisheries and Aquaculture Development, Fisheries Commission and other stakeholders such as the Fishery and Aquaculture Division of the Water Research Institute (WRI) ensures sustainable aquaculture practices. Effort has been made to increase fish yield and improve culture-based fisheries practices through rehabilitation of 3 public hatcheries in Ashaiman, Kona-Odumase and Vea, provision Extension services to fish farms as well as the development of guidelines for best aquaculture practices. This has led to an increase from 10,200 metric tonnes in 2010 to 62,718 metric tonnes in 2018.

Ecologically-unfriendly harvesting methods which included the use of filament nets which due to its small mesh size harvested immature fishes and other native aquatic organisms are drastically phased out as a result of education carried out by the division to fish farmers.

There has also been the Aquatic Animal Health and Post-Harvest initiatives in which twenty-five trained veterinary surgeons and two fisheries officers had been trained on aquatic animal health and sanitation.

The Aquaculture Research and Development Centre (ARDEC) under the Water Research Institute (WRI) of the Council for Scientific and Industrial Research (CSIR) at Akosombo has been committed to the breeding of *O. niloticus,* a breed of tilapia. This resilient and prolific breed has been supplied to more than 200 commercial producers and hatcheries all in an attempt to ensure conservation of tilapia.

Forestry: The government of Ghana with the relevant administrative bodies and the people of Ghana has put in place various mechanisms towards the conservation of biodiversity in Ghana. Methods used are grouped into in-situ; which employs the use of traditional and scientific methods in the sustainable management of biodiversity in order to ensure conservation, and ex-situ; which uses gene banks and recreational centers to ensure biodiversity conservation.

The in-situ method of conservation involves the use of areas which are protected legally, specifically forest reserves, wildlife conservation areas, and Ramsar sites. In Ghana, there are currently 280 forest reserves which are managed by the Forest Services Division under the Forestry Commission. These forest reserves cover a total area of about 23,792km² which makes up an equivalent of 11% of Ghana's total land area. Of these forest reserves, 75% have been used as production reserves for the exploitation of timber whiles the remaining 25% are protection reserves; there is currently no exploitation in these areas. The in-situ biodiversity method of conservation has proven to be a better option of conservation than other forms comprising twenty-one legally-constituted wildlife conservation areas, notably six national parks, six resource reserves, three wildlife sanctuaries, one strict nature reserve as well as six Ramsar Site. Aside from these, two wildlife conservation sites have been proposed under the management of the Wildlife Division of the Forestry Commission which comprises one national park and wildlife sanctuary.

The Forestry Commission has also set aside 29 Forest Reserves as Globally Significant Biodiversity Areas (GSBAs). This is to ensure that there is the conservation of wildlife (plants and animals) which are overexploited. This initiative has been kept effective with the inclusion and participation of the local communities. There is also the establishment of Important Bird Areas (IBA), still under the Forestry Commission, to conserve avian biodiversity which are of both local and global importance, and also because birds are good bio-indicators. Together with BirdLife International, the Ghana Wildlife Society (GWS), has been able to identify 36 IBAs-covering 11.494km², which is about 4.8% of the total land area of Ghana. Community Resource Management Area (CREMA), which is a geographically defined area outside a protected area which is endowed with sustainable resources and where communities have organized themselves for the purpose of sustainable resource management have been created under the Forestry Commission. The CREMA is based on indigenous community decision-making processes with an executive body and a constitution which supervises its activities.

The ex-situ method of biodiversity conservation involves the use of gene banks, botanical gardens, and zoological gardens to conserve biodiversity. In Ghana, the conservation facilities are located at the University of Cape Coast Museum (Botany Department Herbarium), University of Ghana (Zoology Department Entomology Museum, Botany Department Herbarium and Botanical Gardens and Noguchi Memorial Institute of Medical Research), Kwame Nkrumah University of Science and Technology Botanical Gardens and Forestry Herbarium, Accra Zoo, Kumasi Zoo, Aburi Botanical Gardens, Bunso Plant Genetics Research Centre and Arboretum, and Akropong Centre for Scientific Research into plant Medicine Herbarium and Arboretum.

Further, the Forestry Commission has commenced a number of initiatives which are tailored towards the protection of flora. The Bamboo and Rattan Development Programme (BARADEP) has successfully begun operations to ensure the sustainable use and conservation of bamboo and rattan resources in the country. The Newmont Reforestation Programme is also underway by Newmont Ghana in collaboration with the Forestry Commission. It is to ensure the reforestation of 317 hectares of forest lands in the eastern region by replanting three hectares for every one hectare impacted by the mine's footprint. The National Forest Plantation Development Programme (NFPDP) which was relaunched in 2010 following its establishment in 2001 has effectively conserved Ghana's forest resources through the restoration of forest cover of degraded forest lands, reducing wood supply deficit and the enhancement of food crop production among others.

There are however challenges with the implementation of these methods towards the attainment of sustainable biodiversity. There are administrative problems with the in-situ conservation sites such as low staffer numbers, the absence of infrastructure, low budgetary allocations and the lack of field equipment. When there is collaborative cooperation among the various stakeholders, both at the local and at the national level, these issues could be tackled.

Indicators used in this assessment:

- Standards and best practices guidelines in place.
- Enforce compliance to the guidelines on safe use of agrochemicals by 2018
- National Biosafety Risk Assessment guidelines in place by December 2019

Please describe any other tools or means used for assessing progress
Research and analysis

Relevant websites, web links, and files:

- The Bamboo and Rattan Development Programme (BARADEP): http://www.fcghana.org/baradep
- The Newmont Reforestation Programme: https://www.newmont.com/newsroom/newsroom-details/2015/reforestation-in-ghana/default.aspx
- The National Forestry Plantation Development Programme (NFPDP): (http://www.fcghana.org/page.php?page=291&section=28&typ=1
- Inauguration of task force on inspection of fishing vessels: http://www.ghana.gov.gh/index.php/media-center/news/3657-fisheries-minister-inaugurates-task-force-on-inspection-of-fishing-vessels

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above:
The flora and fauna indicators as used for the progress on this target indicate the ability of agriculture, aquaculture, and forestry biodiversity are sustainably managed and conserved. Initiatives taken by the relevant administrative bodies at different levels of governance are still in progress and are yet to fully ensure conservation of biodiversity as limitations such as low budgetary allocation, limited staffer members, and the lack of tools and equipment are factors which are impeding the progress of initiatives.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
Monitoring systems with respect to agriculture and forestry are inadequate as encroachment and unsustainable farming practices are still ongoing. However, there is a Vessel Monitoring System (VMS) which monitors fishing vessels in some part of the country and observer missions.

Relevant websites, web links, and files

- Monitoring of fishing vessels http://www.ghana.gov.gh/index.php/media-center/news/3657-fisheries-minister-inaugurates-task-force-on-inspection-of-fishing-vessels

Progress assessment: Ghana Target 8
Minimizing pollution, including excess nutrients, to levels that are not detrimental to ecosystem function and biodiversity (Aichi Target 8)

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

Waste generation is one of the most severe environmental problems in the country, with as much as 10-60% of solid waste not being properly disposed of. The Act 917 and the LI 917 has led to the process of establishment of a plant to treat electronic waste. Awareness on waste segregation has also been carried out within some public schools and civil and public organisations. To minimise all forms of pollution, numerous programmes and actions have been initiated, such as the promotion of more efficient cooking fuels, including Liquefied Petroleum Gas (LPG) and cleaner cook stoves, restrictions on open burning of municipal wastes through the introduction of stricter legislations, regulations on industrial emissions done under the National Point source emission guidelines with the Akoben Rating System and incentives to companies of good standing when checking compliance. In 2016, the country through the Ministry of Lands and Natural Resources started a national initiative against small scale illegal mining with the view to mitigating the negative impacts of this activity on land, particularly with respect to the pollution of water bodies.

The Ghana Environmental Protection Agency and many other related institutions have embarked on intensive awareness raising and behavioural change campaigns on waste management and sanitation, using catchy adverts and stories. The government in the last few years also instituted a mandatory National Sanitation Day, where citizens embark on cleaning exercises on the first Saturday of every month. This programme is considered to be minimally successful as there are impressions of it being politically motivated.

Indicators used in this assessment

- Community participating and adopting pollution reducing measures (segregation)
- Guidelines have been formulated effluent discharge. Standards are being developed
- Waste Management Regulations have been developed

Please describe any other tools or means used for assessing progress

- Coverage of waste collection services
- Number of interventions for behaviour change in waste disposal and sanitation

Relevant websites, web links and files

- https://www.cbd.int/doc/nr/assessment-table-2018-09-21-en.pdf

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
Work done reports are yet to go public.

Adequacy of monitoring information to support assessment

☒ Monitoring related to this target is adequate
☐ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
EPA relevant departments provide quarterly reports to the PPME Department. The details are in EPA annual report

Progress assessment: Ghana Target 9
Ensuring that invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment (Aichi Target 9)

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

Currently, there is no national systematic inventorying and regular monitoring regimes for establishing the status and trends of IAS in the country, however, selective monitoring of aquatic invasive species on fresh water systems. in some habitat. It is believed that the majority of IAS was introduced into the country in the recent past, with records showing one specie in 1930s, five in 1960s, six in the 1980s and five in the 1990s. However, more recent records in various sources have inconsistencies in the number of identified IAS. For example, in 2004 IUCN listed 26 invasive species, while another report by CAB International in the same year listed 30. In 2014, the draft IAS policy identified a total of 51 IAS and the 2016 State of Environment report listed 102 different taxa of which 88 were of known origin (84 were from other parts of Africa).

Pathways prioritised for intentional and unintentional introduction and spread of IAS in Ghana, mainly include travel and tourism, trade, agriculture, research, and the police and military on peace keeping duties. In agriculture, these are through movement of livestock and transportation of grains and seeds. Due to limited data on the year of entry of IAS into the country, pathways of entry, establishment and spread cannot be defined for properly formulating preventive strategies. In addition, comprehensive and credible data for establishing status and trends of alien species invasions are limited. The country has at least 48 official national entry points most of which are understaffed, under-resourced and inadequately equipped, relative to the enormous daily inflow of traffic and material. Similar to other international borders in Africa, unofficial entry points provide additional pathways for invasive species through smuggled goods and materials.

Some sectoral regulations and programmes across relevant sectors such as Forestry, Agriculture, Trade and Environment have however strengthened their regulatory tools to prevent and control invasive species. For example, the Fisheries Commission expects prospective aquaculture businesses to guarantee non-escape from the facility and will not allow introduction of exotic fish species without explicit permission from the Environmental Protection Agency and a health/sanitary certificate from the competent authority of the exporting country. The Ministry of Food and Agriculture (MOFA) have established the National Fruit Fly Committee and the National Fruit Fly Action Plan, with the aim of strengthening surveillance and control measures

and ensuring market access. The Volta River Authority (VRA) also spends an estimated US$327,038 annually in monitoring and managing the weeds in the Oti River. The Crop Research Institute of the Council for Scientific and Industrial Research have also implemented the biocontrol of *Chromolaena odorata* in Kumasi.

There are also numerous internationally funded initiatives that have supported national institutions in curtailing the spread and impacts of specific species. For example, in 2017, the process of natural enemy surveying was initiated in Ghana, in regard to fall armyworm. A comprehensive action plan comprising short-, medium- and long-term strategies has been drafted with concerned public and private sector stakeholders, as well as key donors. Open Data Kit (ODK) apps were developed for use, generating socioeconomic data on farmers' knowledge, access to information and perceptions of pest impacts. In 2017, a major outreach activity targeting a large number of rural farmers focused on simple messages developed from the fall armyworm evidence note. A video was produced in Ghana on fall armyworm in maize, linked with the Plant Protection and Regulatory Services Directorate and the Department of Extension Services. In total, five television shows were translated into Twi and transmitted on Adom TV and TV3 channels in December 2017. These television channels cover the central region of Ghana, and the cumulative viewership for both channels over the time period was over 3 million people. 40,000 posters were also printed and disseminated at key locations in Ghana

Other initiatives include projects targeting the control of the Paper Mulberry (*Broussonetia papyrifera*), introduced for the development of pulp for paper industry to Ghana in 1969 and eventually colonising forest ecosystems, farmlands and livestock pastures. In 2012, the Global Plantwise Initiative, led by CABI, provided farmers with assistance to manage invasive species. From 2005-2010, UNEP/GEF funded the Removing Barriers to Invasive Plant Management in Africa project which was executed by CAB International (CABI) together with national agencies including Council of Scientific and Industrial Research (CSIR). The project succeeded in raising levels of awareness of IAS, strengthen policy towards management, build relevant institutional capacity and develop effective and sustainable strategies for preventing the entry and limiting the spread of IAS. Lessons learnt were also applied to similar activities in other parts of sub-Saharan Africa.

Baseline studies have also been carried out by EPA with funds from the African Development Bank on Integrated management of Invasive Aquatic Weeds Project in 2006-2011) (River Tano and Kpong Headpond and Lower Volta River) and spent US$2.5 million dollars in controlling the weed in the critically infested Rivers over the period 2006-2011 during the implementation of the project. An Integrated Mycoherbicide Programme for Water Hyacinth Control in Africa (IMPECCA), has also been implemented by CAB International and funded by DANIDA.

Current efforts to manage introduced species though effective to some extent have still not been entirely successful. This is because intervention measures are *adhoc* instead of proactive and directed at specific invasive alien species menace. There is the need to set up a coordinating body to provide national leadership on invasive alien species management in a coordinated and effective manner.

Indicators used in this assessment

- Number of invasive alien species listed for Ghana
- Number of specific IAS interventions or management plans

Relevant websites, web links and files

- Invasive Alien Plants and their Management in Africa (2013) https://www.cabi.org/Uploads/CABI/publishing/promotional-materials/african-invasives-book.pdf
- Fisheries Regulation (LI 1968) http://extwprlegs1.fao.org/docs/pdf/gha151991.pdf
- https://www.cabi.org/Uploads/projectsdb/documents/62665/Action%20on%20Invasives%20Annual%20Report%202017.pdf

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
The analysis of priorities and interventions described is based on work carried out by various institutions.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
Currently, there are no national systematic inventorying and regular monitoring regimes for establishing the status and trends of IAS in the country. Data on the distribution of IAS are not complete for both terrestrial and aquatic habitats, and ecological zones. Information provided on the IAS distribution in ecological zones is therefore based on few cases and limited to the use of low-level scale of measurement of presence or absence.

Progress assessment: Ghana Target 10

Minimizing the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification, so as to maintain their integrity and functioning (Aichi Target 10).

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

The Ghana Forestry Development Master Plan (FDMP) (2016-2036) has integrated as one of its programmes, the mainstreaming of wetland management into the national land-use planning policy and promote the wise use of wetlands for farming, grazing, fishing, woodfuel production, and salt winning. The plan will promote sustainable management of mangroves to safeguard the wetlands and protect endangered species. Actions and strategies include revising, mapping, inventorying, and documenting potential wetlands of global significance by 2025; reviewing and updating/formulating for gazette, participatory wetland management plans for the RAMSAR site and other wetlands of national significance by 2025; and promoting community mangrove reservation and rehabilitation of all degraded wetlands for mangrove restoration and marine protection using CREMA governance system by 2025.

Regulations to protect coral reefs, mangroves and estuaries are being developed and at the drafting stage. Numerous mangrove planting exercises have been carried out by governmental and NGOs in attempts to restore the potential 22 km^2 of its mangrove areas, equivalent to 9.6% of the original mangrove areas. These include restoration activities from the early 1990's such as the ecological restoration programme of the Songor Ramsar site by the Wildlife Division (1993-1999), Regeneration, Sustainable Use and Management of Mangrove in the Keta Lagoon Complex Ramsar Site implemented in 1995, the Rehabilitation and Community Management of Mangroves and Coastal Wetlands project implemented in the Lower Volta by Green Earth Organisation (1996-1998), among others. These programmes have had significant representation of community members and local traditional authorities in addition to extensive awareness building to motivate behavioural change in local communities to sustainably harvest mangroves and associated resources. Despite continuous replanting, the relative size of mangrove forests along the entire extent of the country's coastline has not improved due to unsustainable harvesting.

Indicators used in this assessment

1. Regulations on protection of coral reefs, mangroves and estuaries in place.

2. Number of specific interventions or management plans for coastal ecosystems, especially mangroves

Relevant websites, web links and files

- https://www.cbd.int/doc/nr/assessment-table-2018-09-21-en.pdf
- https://www.iucn.org/sites/dev/files/content/documents/mangrove-tnc-report-final.31.10.lowspreads.pdf
- https://www.crc.uri.edu/download/GH2009COM004ib2_508.pdf

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☐ Based on partial evidence
☒ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
The country does not have a holistic policy or integrated plan for the management of coastal ecosystems and natural resources. As a result, there has been no systematic way to evaluate or monitor how individual programmes and projects have influenced overall improvement in the coastal ecosystems.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☐ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☒ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
There is no central national monitoring system in place as the target is not monitored nationally but on a case by case basis and largely by academic and research institutions.

Relevant websites, web links and files

- https://www.cbd.int/doc/nr/assessment-table-2018-09-21-en.pdf

Progress assessment: Ghana Target 11
Ensuring that at least 17 per cent of Terrestrial and Inland water, and 10 per cent of Coastal and Marine Areas are Conserved through Systems of Protected Areas (Aichi Target 11)

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

Traditionally, local communities have always had practices and regulations to sustainably manage and conserve the environment and its natural resources. These laws aimed to protect specific ecosystems, protect particular plant and animal species and regulate the exploitation of these resources.

In addition, legally protected areas, mainly forest reserves, wildlife protected areas and Ramsar sites have been established under the management of the Forestry Commission to provide relative better protection and conservation. There are about 280 forest reserves that cover 11% of the total land area of the country. There are 21 legally-constituted wildlife protected areas, notably six national parks, six resource reserves, three wildlife sanctuaries, and one strict nature reserve. There are also three proposed wildlife conservation areas (one national park and one wildlife sanctuary), as well as six RAMSAR sites under the management of the Wildlife Division. The Ramsar sites provide sanctuary to more than 80% of migratory water birds stopping in Ghana. The sites also regularly harbour more than 1% of the estimated Atlantic Flyway populations of several species of long-distance migrants.

The country has also recently established internationally recognised Protected Areas, such as the Bia Biosphere in the Western Region, the Songor Ramsar site in the Greater Accra Region and the Lake Bosomtwe Biosphere Reserve in the Ashanti Region, as UNESCO Biosphere Reserves.

The management of protected sites require adequate institutional and human capacity. The personnel are responsible for clearing and maintaining forest reserve boundaries, controlling of illegal offences such as poaching in the wildlife Protected Areas, promoting local involvement through community outreach programmes and the formation of CREMAs, and collaborating with other stakeholder institutions such as law enforcement agencies in managing the areas. Staff strength, considered as a proxy for effective management, has shown some increases.

Although the number of protected areas have not changed, a number of studies have shown that the sizes of some of these sites have reduced as a result border disputes with fringe communities that required the re-demarcation of the protected area. Other studies have also shown that closed

canopy of the forest have significantly reduced, for example, by about 54.37% in the Bui National Park between 1990 and 2007. This has implications for fragmenting habitats and compromising its ecological integrity. The relevant maps for this assessment can be found in following the section were produced by UN Biodiversity Lab.

Indicators used in this assessment

- Total percentage of land area demarcated as protected sites
- Number of staff managing protected areas
- Trends in forest cover in protected areas

Relevant websites, web links and files

https://www.cbd.int/doc/nr/assessment-table-2018-09-21-en.pdf
https://www.dropbox.com/sh/llizprcu6sob9x8/AADK0ziXB9oTX1MtgvxdAvJBa/Ghana?dl=0&subfolder_nav_tracking=1

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

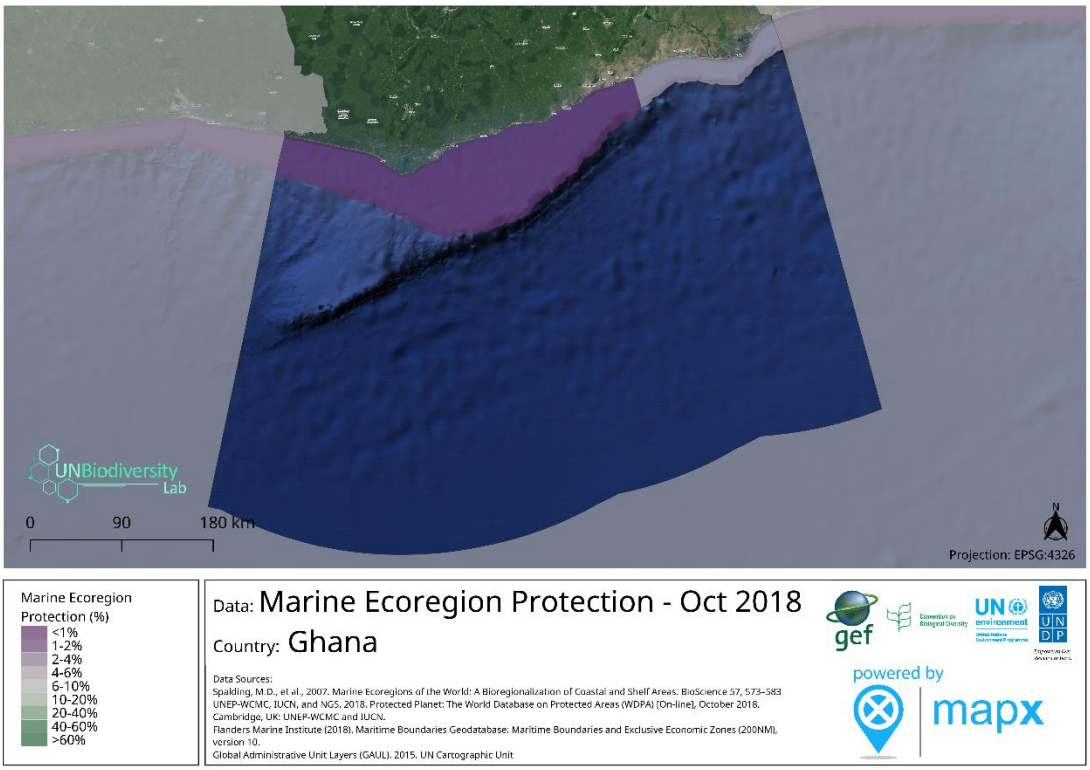
Please provide an explanation for the level of confidence indicated above.
Over the years, the country has developed comprehensive national measures, both by traditional and state institutions, to protect a significant proportion of its terrestrial and coastal/marine ecosystems. In addition, there is increasing international recognition for several its biodiversity hotspots. Due to weakening traditional values and increasing pressure on natural resources, as well as inadequate enforcement of legislatives to protect these ecosystems from encroachment and habitat loss, the ecological integrity of these protected areas are being compromised.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
The Forestry Commission is the statutory body responsible for managing forest and wildlife resources. Support comes from a number of government agencies and non-governmental organisations also contribute to the conservation of coastal ecosystems in the country, including the Ministry of Environment, Science, Technology and Innovation (MESTI), Ministry of Local Government (mainly the District Assemblies), Environmental Protection Agency (EPA), Water Resources Commission, Forest Services Division of the Forestry Commission, as well as NGOs such as the Ghana Wildlife Society, Friends of Ramsar Sites and Friends of the Earth.

Relevant websites, web links and files
https://www.cbd.int


UNBiodiversity Lab
0
90
180 km
N
Projection: EPSG:4326
Marine Ecoregion Protection (%)
<1%
1-2%
2-4%
4-6%
6-10%
10-20%
20-40%
40-60%
>60%
Data: Marine Ecoregion Protection - Oct 2018
Country: Ghana
Data Sources:
Spalding, M.D., et al., 2007. Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas. BioScience 57, 573-583
UNEP-WCMC, IUCN, and NGS. 2018. Protected Planet: The World Database on Protected Areas (WDPA) [On-line], October 2018. Cambridge, UK: UNEP-WCMC and IUCN.
Flanders Marine Institute (2018). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 10.
Global Administrative Unit Layers (GAUL). 2015. UN Cartographic Unit
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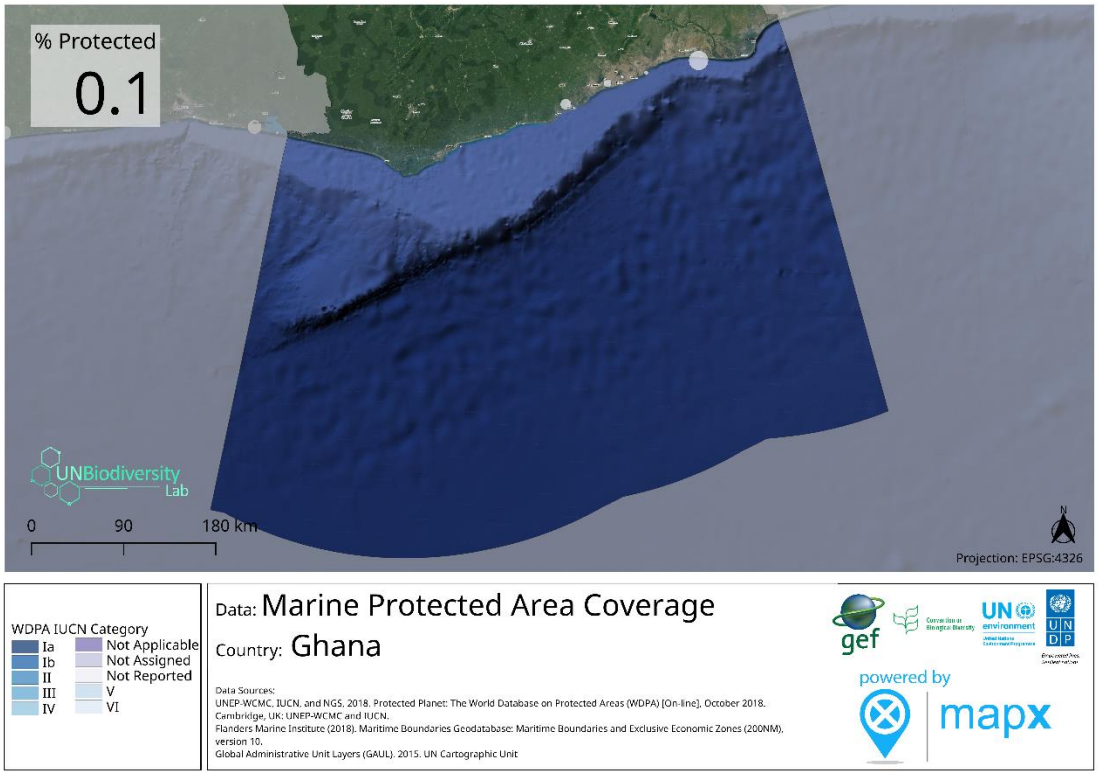
% Protected
0.1
UNBiodiversity Lab
0
90
180 km
N
Projection: EPSG:4326
WDPA IUCN Category
Ia
Ib
II
III
IV
Not Applicable
Not Assigned
Not Reported
V
VI
Data: Marine Protected Area Coverage
Country: Ghana
Data Sources:
UNEP-WCMC, IUCN, and NGS. 2018. Protected Planet: The World Database on Protected Areas (WDPA) [On-line], October 2018. Cambridge, UK: UNEP-WCMC and IUCN.
Flanders Marine Institute (2018). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 10.
Global Administrative Unit Layers (GAUL). 2015. UN Cartographic Unit
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Progress assessment: Ghana Target 12
Preventing the extinction of known threatened species and their conservation status, particularly of those most in decline, and improving and sustaining their status (Aichi Target 12)

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☐ Progress towards target but at an insufficient rate
☒ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

The country has made commendable effort to conserve its biodiversity and prevent the extinction of threatened species by demarcating about 16.3% of total land area as various categories of forest and wildlife protected areas. However, the IUCN Red List shows that the numbers of threatened species in the country and their extinction risk is rising. It includes a list of threatened flora in Ghana, as well as information on threat categories, which provides a useful indicator for monitoring the status of floral diversity in the country. In Ghana, 119 plant species occurring are listed on the IUCN Red List comprising three species that are critically endangered (CR), 20 that are endangered (EN) and 96 Vulnerable (VU). The addition to and/or deletion from the list, based on scientific data, would provide a measure of trends and some indication of the effectiveness of conservation measures put in place to protect the nation's flora. The threatened species of fauna recorded for Ghana includes 56 species of fish, 11 species of amphibians, 7 species of Reptiles, 22 species of birds and 20 species of mammals.

Data to inform management interventions and enable monitoring of the status of these species are also inadequate. There is insufficient data to determine population increases or decline, although there have been observations that some species may have gone extinct. The 2016 State of Environment Report indicates that the current status of threatened species of flora and fauna (including fish, amphibians, reptiles, birds and mammals) is unknown, as data requirements for determining trends are inadequate or incomplete. The relevant maps for this assessment can be found in following the section were produced by UN Biodiversity Lab.

Indicators used in this assessment

- Numbers of threatened species on IUCN Red List
- Trends in extinction risk of species

Please describe any other tools or means used for assessing progress

Based on global diversity indicators tracked by conservation organisations, including those by IUCN, and various compilations made of the numbers of species in different taxonomic groups.

Relevant websites, web links and files

- https://www.dropbox.com/sh/llizprcu6sob9x8/AADK0ziXB9oTX1MtgvxdAvJBa/Ghana?dl=0&subfolder_nav_tracking=1

Level of confidence of the above assessment

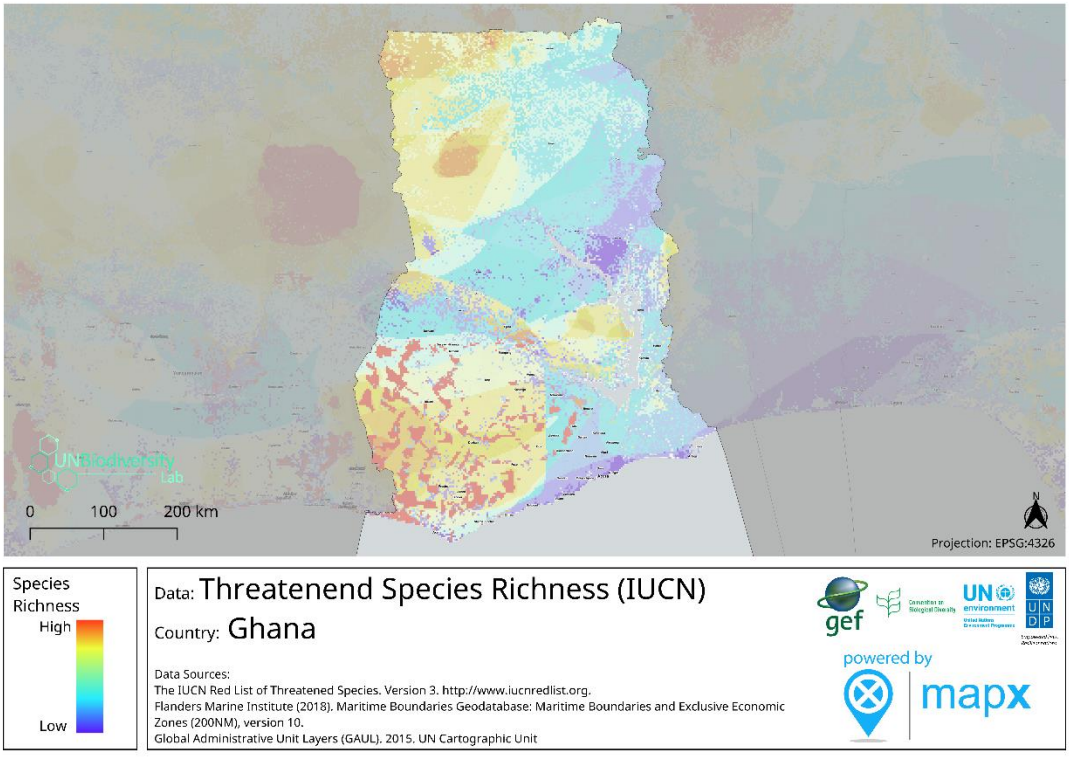
☐ Based on comprehensive evidence
☐ Based on partial evidence
☒ Based on limited evidence

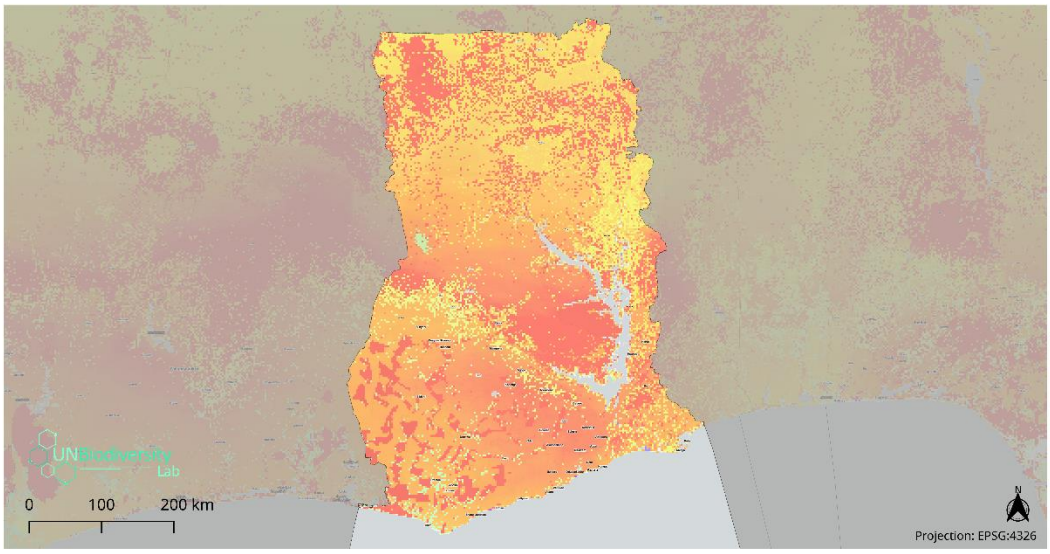
Please provide an explanation for the level of confidence indicated above.
The level of confidence is based on global diversity indicators tracked by conservation organisations, and various reports on observations of the numbers of species in different taxonomic groups, including those by IUCN.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☐ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☒ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
There are no national monitoring systems in place.





Species Richness
High
Low

Data: Species Richness (IUCN)
Country: Ghana

Data Sources:
The IUCN Red List of Threatened Species. Version 3. http://www.iucnredlist.org.
Flanders Marine Institute (2018). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 10.
Global Administrative Unit Layers (GAUL). 2015. UN Cartographic Unit

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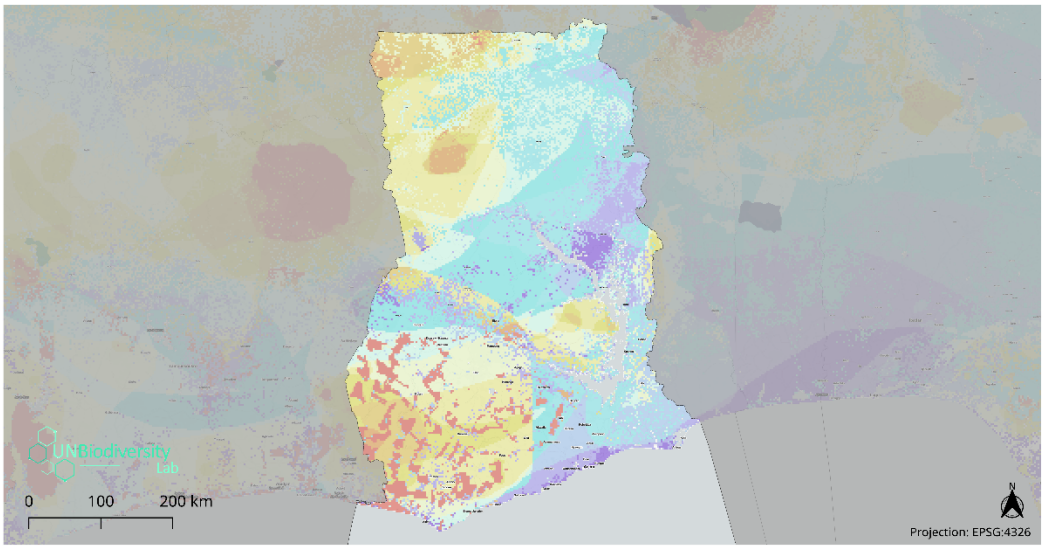

Percentage PA Converted
0-25%
25-50%

Threatened Species Richness
High
Low

Data: Threatenend Species Richness (IUCN) within Effective PA Network
Country: Ghana

Data Sources:
Jones, K.R., Venter, O., Fuller, R.A., Allan, J.R., Maxwell, S.L., Negret, P.J., Watson, J.E.M., 2018. One-third of global protected land is under intense human pressure. Science 360, 788–791; The IUCN Red List of Threatened Species. Version 3. http://www.iucnredlist.org; Flanders Marine Institute (2018). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 10; Global Administrative Unit Layers (GAUL). 2015. UN Cartographic Unit.

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Progress assessment: Ghana Target 13
Maintaining the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives (Aichi Target 13)

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

The national framework to ascertain biosafety, the Biosafety Act, 2011(Act 831) established a National Biosafety Authority (NBA) to lead the regulatory mechanisms of Genetically Modified Organisms (GMOs) in Ghana supported by a Technical Advisory Committee (TAC) that conducts scientific risk assessments on submitted applications. The NBA has the mandate to ensure an adequate level of protection in the field of safe development, transfer, handling and use of genetically modified organisms resulting from biotechnology that may have an adverse effect on health and the environment. The NBA collaborates with the Food and Drugs Authority, Environmental Protection Agency, Plant Protection and Regulatory Services Directorate, Ghana Revenue Authority and the Veterinary Services Directorate. Other institutions include Ghana Standards Authority, District Assemblies, Metropolitan Assemblies, Municipal Assemblies and any other Local Government Authorities.

There are also several published works on genetic biodiversity of Ghana, but many of these are scattered in various academic literature. There is no national monitoring system in place to assess the trends in genetic diversity of cultivated plants and farmed and domesticated animals and their wild relatives. The Ghana Biodiversity Information Facility (GhaBIF) is the Ghana national GBIF Node, linked to the University of Ghana Herbarium which is hosted by the Department of Botany (Department of Plant and Environmental Biology) and Insect collection at the Insect Museum in the Department of Animal Biology and Conservation Science.

Indicators used in this assessment

- Number of permits granted for research on GMOs per year
- Inventory of the gene bank developed for cultivated plants, farmed and domesticated animals and their wild relatives
- At least 50% of required staff and appropriate infrastructure developed by 2020

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
Indicators are based on the identified indicators for measuring the short term (2016-2020) objectives of national target action plan 13 which include (i) the number of permits granted for research on GMOs per year, (ii) an inventory of the gene bank developed for cultivated plants, farmed and domesticated animals and their wild relatives, (iii) and at least 50% of required staff and appropriate infrastructure developed by 2020. The establishment of the National Biosafety Authority and the Ghana Biodiversity Information Facility provide the structural requirements for measuring progress towards target, which is an achievement in itself.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
The National Biosafety Authority (NBA) is mandated to lead the regulatory mechanisms of Genetically Modified Organisms (GMOs) supported by a Technical Advisory Committee (TAC) that conducts scientific risk assessments on submitted applications.

Progress assessment: Ghana Target 14
Restoring and safeguarding ecosystems that provide essential services, including ecosystem services (Aichi Target 14)

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

- The National Forest Plantation Development Programme (NFPDP), launched in 2001, encourages the development of a sustainable forest resource base to meet the needs of industrial timber while enhancing environmental quality. Between 2002 and 2012, a total of 169,490 ha of plantations were established under the NFPDP, at an average of 16,949 ha each year. To control over exploitation of timber, a system of regional and district quotas for timber exploitation, known as the Annual Allowable Cut (AAC), have been introduced. In each district, the AAC indicates the maximum number of trees that can be felled in the off-reserve area annually. In addition, are schemes allocating land and revenue as incentives for afforestation and reforestation, such as the Modified Taungya System (MTS). SNV Mangrove Restoration Project across the entire coastland to Promoting Community Mangrove forest cultivation, conservation and rehabilitation
- Through the EPA MAB programme mangroves have been cultivated within the Songhor Biosphere Reserve
- IUCN – towards pro-poor REDD+ project II (2014-2017) aimed at promoting pro-poor REDD+ principles and rights based approaches to strengthen the conservation, governance and sustainable management of landscapes
- SLWMP being implemented by MESTI is piloting the PES system using tree planting (2016 to date)

In maintaining law and order and ensuring the intactness of the protected sites, protected area staff strength is considered a proxy for effective management. The total number of protected area staff increased from 2,542 in 2012 to 3,123 in 2013 but reduced to 3,029 in 2014. Some of the key activities of the protected area staff include: clearing and maintaining forest reserve boundaries; controlling of illegal offences such as poaching in the wildlife protected areas; promoting local involvement through community outreach programmes and the formation of CREMAs; and collaborating with other stakeholder institutions such as law enforcement agencies in managing the areas. Community Resource Management Areas (CREMA) are geographically defined outside protected areas where sustainable resource management is carried out by communities. The Traditional community decision making processes based on a

constitution and administered by an executive regulate and guide CREMAs activities. Since 2003 a total of 22 CREMAS have been created in different regions of the country.

Indicators used in this assessment

- Guidelines to mainstream watershed protection into district level planning
- Ecosystem health indices identified and published by Mid-2018
- Community-based watershed restoration plan developed by the end of 2018
- At least 15 % of degraded ecosystems restored by mid-2019

Please describe any other tools or means used for assessing progress
The 2016 State of Environment Report, Progress report for the implementation of the Ghana Forestry Development Master Plan (2016-2036) and the Ghana National Communication to the UNFCCC were used as the primary source of evidence. The relevant maps for this assessment can be found in following the section were produced by UN Biodiversity Lab.

Relevant websites, web links and files

- https://www.fcghana.org/userfiles/files/MLNR/FDMP_June%2015%20Final_draft.pdf
- https://www.dropbox.com/sh/llizprcu6sob9x8/AADK0ziXB9oTX1MtgvxdAvJBa/Ghana?dl=0&subfolder_nav_tracking=1

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
The documents indicated provide an extensive review of trends of related biodiversity indicators over substantial period of time.

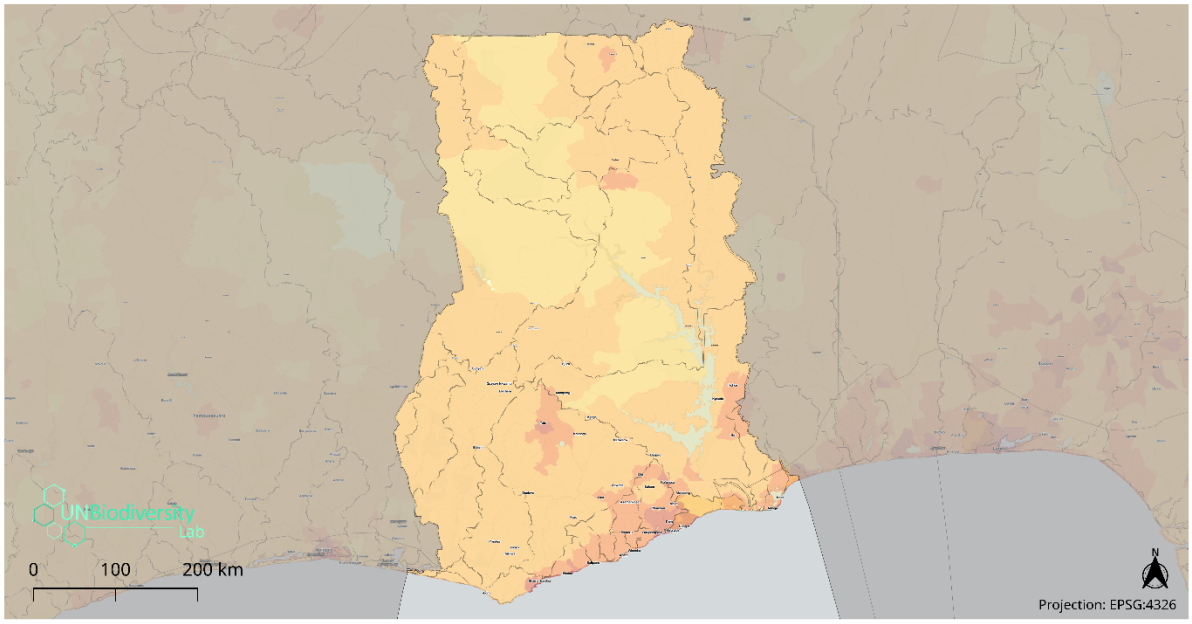
Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
The Forestry Commission regulates the use of forest and wildlife resources, conserves and manages biodiversity as well as coordinates all related policies. EPA (Natural Resource Department) and Fisheries Commission also regulate and monitors monitor biological resources. EPA submits an annual report to UNESCO which serves as a monitor for activities related to regulation and conservation of biodiversity within the various biosphere reserves in the country

Relevant websites, web links and files

- http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves



Withdrawal (% Annual Flow)
- Low (<10%)
- Low to medium (10-20%)
- Medium to high (20-40%)
- High (40-80%)
- Extremely high (>80%)
- Arid & low water use
- No data

Population Density (2015)
- No Data
- 1-5
- 2-25
- 25-250
- 250-1000
- 1000+

Data: Key Usage Areas for Water Security

Country: Ghana

Data Sources:
Gassert, F., M. Landis, M. Luck, P. Reig, and T. Shiao. 2014. "Aqueduct Global Maps 2.1." Working Paper. Washington, DC: World Resources Institute; Center for International Earth Science Information Network (CIESIN), Columbia University. 2016. Gridded Population of the World (GPW), v4: UN-Adjusted Population Density, v4 (2000, 2005, 2010, 2015, 2020). Palisades, NY: SEDAC; Flanders Marine Institute (2018). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 10.; Global Administrative Unit Layers (GAUL). 2015. UN Cartographic Unit.

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Convention on Biological Diversity
UN environment
United Nations Environment Programme
UNDP
United Nations Development Programme

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Progress Assessment Ghana Target 15

Enhancing ecosystem resilience and restoration to promote the contribution of biodiversity conservation to carbon stocks and ensure restoration of at least 15 per cent of degraded ecosystems

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

This target highlights the importance of mainstreaming the enhancement of ecosystems into policies and implementation plans to be able to build resilience and promote biodiversity and conservation and carbon stocks. This is done by restoring degraded ecosystems in the forests, wetlands and aquatic ecosystems as well as developing and implementing community-based incentive reward system for Ecosystem Services. There has been effort to protect and restore certain important ecosystems that are of great benefit to Ghana. This is mostly being achieved through the implementation of the Forestry Commissions REDD+ strategy. Ghana has several protected areas which is managed by government and other community resource management areas (CREMA) which are managed and protected by communities, NGO and CSOs are a strong accountability partner to the government and the people of Ghana to keep and protect the environment surrounding us. Even though all these efforts are being made there is still more to be done in terms of achieving this target.

Environmental and Social Management Framework (ESMF) provides support for reforms in forest policy and improve institutional practices, procedures and capacities. It provides a system to strengthen community based natural resource management institutions with improved practices and incentives for managing landscapes sustainably, enhanced reforms and practices. ESMF reinforces these through improved communication methods and materials, including platforms for information sharing, reduce tons of CO2 emissions from reduced deforestation and forest degradation.

The pilot *Enhancing Trees and Climate-Smart Practices in Agroforestry Corridors and Cocoa Landscapes on Farms with Communities* focuses on drivers of deforestation and land degradation on community managed agroforestry and cocoa cultivation landscapes in selected corridors in a target corridor linking several Forest Reserves of the HFZ. It aims to secure and enhance trees in corridors with community-based institutions, enhance trees and climate smart cocoa with farmers both in corridor landscapes and on admitted farms, and to deploy integrated landscape planning in support of community-based resource decisions. These activities will

enhance carbon stocks in the agroforestry and cocoa landscape by scaling up support (a combination of extension, inputs, certification, incentives) to smallholder farmers to increase protection of existing trees, planting of new trees, practicing agroforestry and shade grown climate smart cocoa production. It is to improve the care and maintenance of trees on private farmland, by devolving management responsibilities and improving incentives, coupled with extension and communication efforts. Pilot efforts have been developed in consultation with communities and land users in targeted zones.

Work within the savannah zone related to Shea Landscape is also ongoing with the aim of boosting shea nut production including adding value to the raw material to obtain maximum benefit. The transformative nature of this activity comes from giving community level institutions and cocoa farmers the incentives, knowledge, and tools to improve farm level outcomes and gain local benefits from managing trees and forest mosaics within the larger landscape, while also enhancing co-benefits associated with increased tree cover and carbon sequestration. This field demonstration builds on two key entry points:

- the current willingness of Government of Ghana to revise implementation practices and decentralize key management responsibilities to community level, particularly through Community Resource Management Areas (CREMA); and
- the alignment of interests among cocoa producers, buyers and regulators to ensure a more sustainable and climate-friendly supply/value chain. These efforts will be enhanced by innovative communication approaches to facilitate the delivery of practical, timely and useful information to farmers and community level institutions.

The aim of the pilot project *Pilot Investments on Forest Reserves for Reducing Degradation, Enrichment Planting, Nurseries, and Plantation Development for Restoring Degraded Forest Landscapes* is to reduce further degradation of permanent forest estates; enhance habitat and carbon stocks through enrichment planting and nursery development with ecologically and commercially important native species to restore degraded landscapes and facilitate the enabling conditions for plantation investment in severely degraded landscapes, with community involvement. This set of activities help to address the imbalance in timber supply and demand, improve the enabling environment and investment climate for sustainable forest management and plantation development, particularly on severely degraded forest reserves. This activity augments the supply of important native species within the high forest ecosystem, while also creating incentives and employment opportunities and markets for native seed stock, for communities and farmers to engage in the planting and preservation of native tree species, rather than encroachment into forests.

The Government of Ghana completed and adopted a National Wetlands Conservation Strategy as one of the outputs of the GEF/World Bank funded Coastal Wetlands Management Project. The Strategy was developed to provide opportunity for a more detailed expression of relevant actions for wetlands conservation. The strategy has been revised in the light of new and emerging challenges, new government policy directions, lessons learnt, and experiences gained over the period. The Action Plan sort to address nine inter-related priority issues, including: Participation in Wetlands Management; Legal Framework; Wetlands Inventory, Research and Monitoring; Wetlands Rehabilitation and Restoration; Long-term Sustainability; Contribution to Poverty Reduction; Communication, Education and Public Awareness; Networking and International

Cooperation. The relevant maps for this assessment can be found in following the section were produced by UN Biodiversity Lab.

Indicators used in this assessment

In order to achieve this target and assess effectiveness the following indicators were used

- At least 15% of degraded ecosystem restored by December 2019
- Guidelines for community-based incentive system for ecosystem services developed by mid-2018

Please describe any other tools or means used for assessing progress

Annual Reports from the EPA, MESTI and other governmental institutions were used to monitor progress

Relevant websites, web links and files

- https://www.ramsar.org/news/ghanas-national-wetlands-conservation-strategy-revised
- Environmental and Social Management Framework (ESMF) Draft Final Report
- https://www.dropbox.com/sh/llizprcu6sob9x8/AADK0ziXB9oTX1MtgvxdAvJBa/Ghana?dl=0&subfolder_nav_tracking=1

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

There are some limitations in the method of assessment in that reports from the said institutions may be delayed and might not specifically mention the indicator progress in detail as should be to the survey method. Further, most of these responses will come from municipal assemblies whose survey responses were based upon the knowledge of the individuals in communities and therefore may be limited to their scope of awareness and knowledge. As well, since municipalities are very diverse in Ghana there may be inconsistencies in the interpretation, and the application, of biodiversity practices and considerations in the context of municipal operations.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

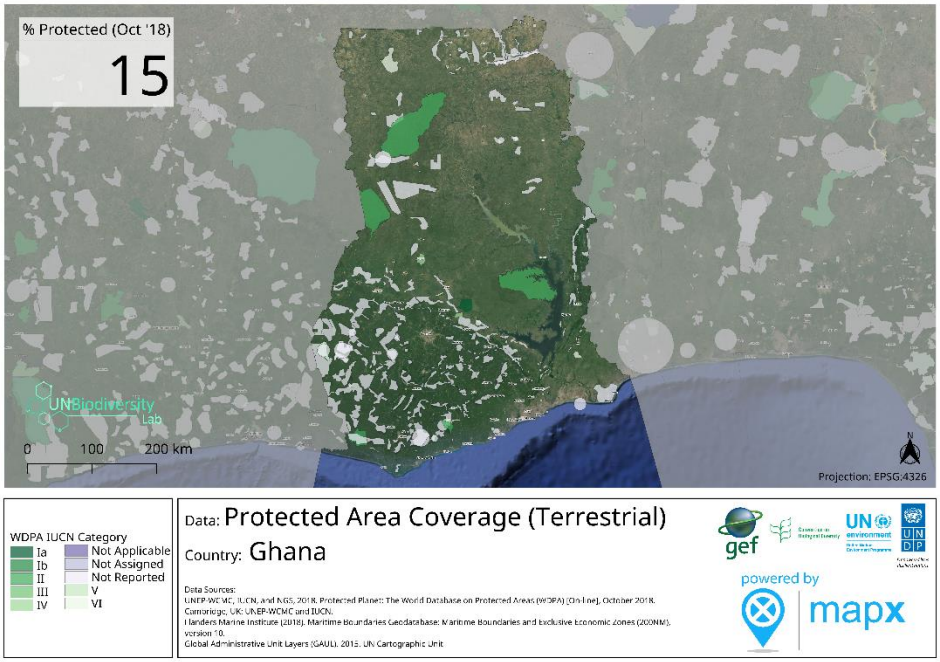
Please describe how the target is monitored and indicate whether there is a monitoring system in place

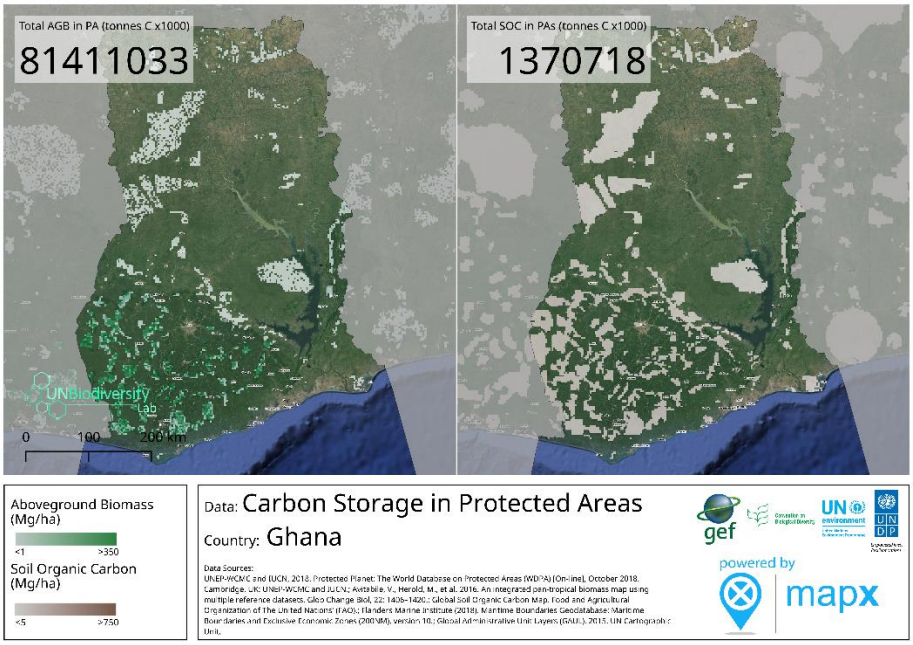
The conservation of biodiversity in Ghana depends on ministries, departments and agencies outside the Ministry of Environment Science, Technology and Innovation. Therefore, the successful implementation requires a concerted action on all levels of governance including the traditional authorities, the private sector, civil society organizations and the Government of

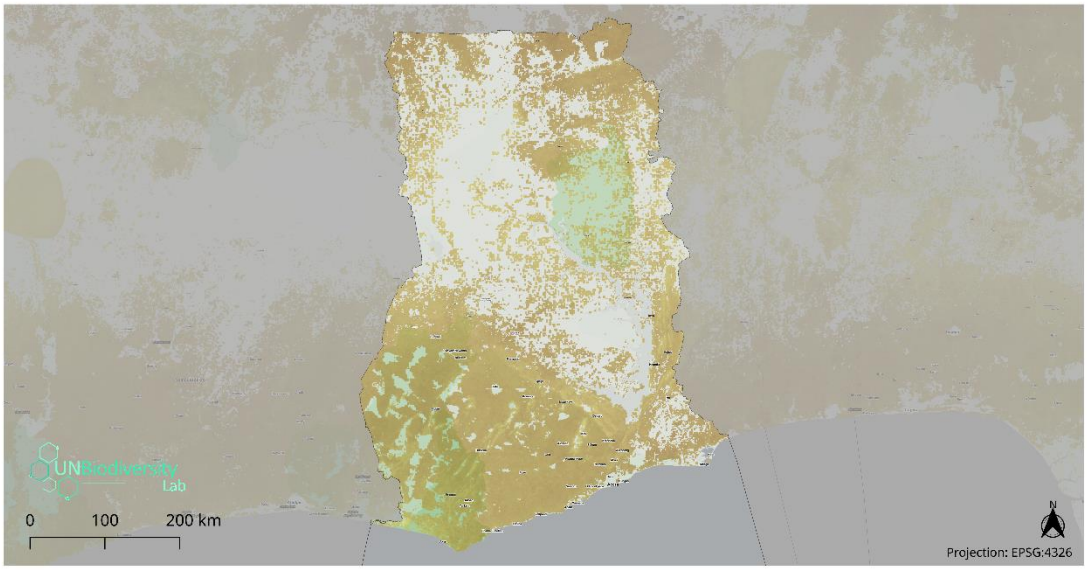
Ghana as a whole. In general, there is a lack of compliance with and monitoring of the policies of fisheries and agriculture, amongst others. The current number of forest reserves (291) and wildlife protected areas (15) constitute the permanent forest estate of Ghana which is under the control and monitoring of the Forestry Commission.

Relevant websites, web links and files

- https://www.cbd.int/countries/profile/default.shtml?country=gh







SOC Increase After 20 Yr (Croplands)

low high

Sequestration Potential in Catchment (mean C eqv./km2)

0 - 65
65 - 185
185 - 356
356 - 600
600 - 947
947 - 1415
1415 - 2095
2095 - 3233

Data: Carbon Sequestration Potential

Country: Ghana

Data Sources:
Potential for Tropical Forest Carbon Sequestration. NatureServe Dashboard. www.natureserve.org.; Zomer, R.J., Bossio, D.A., Sommer, R., Verchot, L.V., 2017. Global Sequestration Potential of Increased Organic Carbon in Cropland Soils. Scientific Reports 7, 15554.; Flanders Marine Institute (2018). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 10.; Global Administrative Unit Layers (GAUL). 2015. UN Cartographic Unit.

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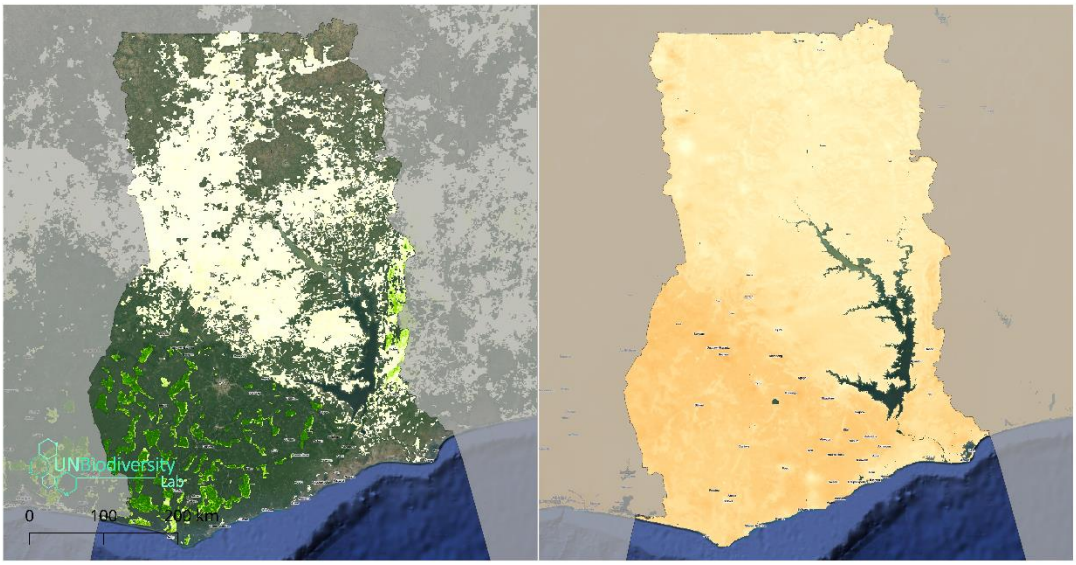

Aboveground Biomass (Mg/ha)

0 >350

Soil Organic Carbon (Mg/ha)

<1 >750

Data: Carbon Storage in the Environment

Country: Ghana

Data Sources:
Avitabile, V., Herold, M., et al. 2016. An integrated pan-tropical biomass map using multiple reference datasets. Glob Change Biol, 22: 1406-1420.
Global Soil Organic Carbon Map. Food and Agricultural Organization of The United Nations' (FAO).
Flanders Marine Institute (2018). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 10.
Global Administrative Unit Layers (GAUL). 2015. UN Cartographic Unit.

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Progress Assessment Ghana Target 16
Operationalising the Nagoya protocol on access and benefits sharing

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

Ghana has not been able to fully implement Article 15 of the CBD. This is due partly to inadequate government policies, legislation and resources. Additional problems relate to relevant personnel and logistics required to formulate and effectively implement the legislation on "access to genetic resources and benefit sharing" after adoption.

There are some sector specific policies that touch briefly on the topic in some respects. For example, the Ghana Wildlife and Forestry Policy has recognized access to natural resources by interested parties and the perpetual flow of optimum benefits to all segments of society. The District Assemblies Law prescribes an eventual take-over of or participation by District Assemblies in the management and development of natural and environmental resources under their respective jurisdictions. It is expected that the delegation of management authority to the custodians of the resources and local level administration, would ensure rational use of these biological resources and the associated conservation of biological diversity and benefit sharing with the custodians. District Assemblies are empowered to enact Bye-Laws on natural resources management and conservation.

The National Biodiversity Strategy and Action Plan hopes to formulate effective agreement for formulating bioprospecting and evaluating all benefit sharing mechanisms in the country. In addition, it plans to review and redefine tenurial rights that guarantee fair and equitable sharing of benefits from access and rights to use of biological resources. It gives the assurance that appropriate measures and structures for fair and equitable sharing of benefits derived from the use and conservation of biological resources will be developed. Innovative financing and commercialization instrument for genetic resources must be identified and utilized for biodiversity conservation.

Ghana has a national programme on Plant Genetic Resource for Food and Agriculture (PGRFA) with the Plant Genetic Resources Research Institute (PGRRI) as the focal institution. Utilization of PGRFA stored in ex-situ collections is high. Plant breeding is one of the most important ways of PGRFA utilization. The West Africa Centre for Crop Improvement (WACCI) of the University of Ghana has been set-up to bring improvement in crops in the context of changing

climate and food insecurity. All these are measures currently in Ghana to conserve biodiversity. There are several national institutions and other stakeholder organizations which contribute to the national PGR programme. Through the PGRRI, this programme feeds into other networks including the 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

Indicators used in this assessment

- Relevant legislations enacted by ending 2017
- Nagoya Protocol ratified by December 2017.
- Guidelines for Nagoya Kuala Lumpur Supplementary Protocol in place by mid-2019.

Please describe any other tools or means used for assessing progress
Annual Reports from the EPA, MESTI, FC, MLNR and other governmental institutions were used to monitor progress

Relevant websites, web links and files

- http://www.fao.org/docrep/013/i1500e/Ghana.pdf
- http://bch-cbd.naturalsciences.be/ghana/biodiversity/abs.htm

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☐ Based on partial evidence
☒ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
Though no national regime has been put in place on Access and Benefit Sharing in Ghana yet, there is a great potential for it to be successful when it is initiated in the country. It is clear from the foregoing policies that government has a vision to implement the concept of benefit sharing. What is needed now is to consolidate the vision that is scattered within various policy documents and begin the process of consultation and public participation in fashioning appropriate legislative and regulatory tools for implementation.

Ghana's expectation is that appropriate support is made available in terms of financial and related support to enable Ghana to implement the concept of access to and sharing of benefits arising out of the use of its vast genetic resources,

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The proposed National Biodiversity Commission (NBC) secretariat will be responsible for the coordination of all projects and activities under the NBSAP and monitors the implementation process through regular reporting by sector agencies, field visits, and peer review workshops. Each sector agency supervises its own work plan, monitor performance, whether by project inputs and outputs or policy measures and will report on progress and problems at quarterly bases during project coordination meetings either on-line or during project visits. A reporting format will be developed by NBC for the sector agencies to be used. The commission analyses and consolidate the reports as a routine function and feedback to the sector agencies and partners annually

Relevant websites, web links and files

- http://www.fao.org/docrep/013/i1500e/Ghana.pdf
- http://bch-cbd.naturalsciences.be/ghana/biodiversity/abs.htm
- National Biodiversity Strategy and Action Plan https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Progress Assessment Ghana Target 17
Developing and adopting a policy instrument, for the implementation of an effective, participatory and updated NBSAP

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

The updating and reformulation of the 2016 National Biodiversity Strategy and Action Plan for Ghana was mainly participatory involving all the stakeholders in the environment sector. The revision was led by the National Biodiversity Committee with the strategic guidance of the Ministry of Environment Science, Technology and Innovation (MESTI). Series of workshops and task force meeting were held to collate national views. The inputs came from diverse sources including the Ministry of Lands and Natural Resources and its Agencies (Forestry Commission), Ministry of Food and Agriculture and its Agencies, Ministry of Fisheries and Aquaculture Development, Fisheries Commission, the Council for Scientific Industrial Research (CSIR), the Universities as well as the Civil Society Organizations (NGOs Traditional Authorities and Faith based groups)

Ghana has trained and built the capacity in the natural resource accounting in the view on ensuring issues of natural resources and its accounting at national and regional levels are captured in the National budgets. A draft Wildlife Bill is currently before Parliament for enactment to institutionalize community participation in natural resource conservation and management. Ghana has also developed the framework on tree tenure and benefit sharing. Ghana has drafted a buffer zone currently undergoing consultations

Indicators used in this assessment

The tool used was the NBSAP M&E Plan in place by end of 2017. The other tools were:

- National Development Planning Commission development framework and M&E guidelines and the Ministry of Finance M&E guidelines.
- Capacity building for a number of participants in a training exercise in Anglophone West Africa

Please describe any other tools or means used for assessing progress

The draft document was discussed extensively at both regional and national stakeholder consultative workshops in 2012 and further interrogated and validated in 2016. A national Task Force was constituted to finalize the document by aligning the targets and the action plans to the national priorities and stakeholder's expectations.

Relevant websites, web links and files

- National Biodiversity Strategy and Action Plan, November 2017
  https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf
  Ministry of Finance Website

Level of confidence of the above assessment

☒ Based on comprehensive evidence
☐ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
There are strategies to enhance the implementation of the NBSAP through participatory planning, knowledge management and capacity building. There is a recall on the roles of the institutions that constitute the political economic stakeholders in the country, and the need for a strengthened coordinating national biodiversity planning entity, i.e. the National Biodiversity Committee promotes leadership. In this way, the roles of stakeholders are identified and streamlined.

The report from the field also gives indication that the sectoral level agencies and relevant stakeholders including the CSO's, local communities and the private sector undertook related projects in line with the NBSAP.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place
The NBSAP has the overall result framework which serves as monitoring tools to coordinate the implementation of the actions proposed.

Relevant websites, web links and file

- National Biodiversity Strategy and Action Plan
  https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Progress Assessment Ghana Target 18
Ensuring that the traditional knowledge, innovations and practices of indigenous and local communities and their customary use, are respected

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

There various awareness-creation exercises on community-based management systems by the Forestry Commission and Environmental Protection Agency of Ghana, appear to appreciate the role of indigenous knowledge in the process. Specifically, in the case of the management of the forest reserves, no effective formal strategies exist as yet for working with rural communities to accomplish the goals of nature conservation using local experiences and knowledge. Yet, for the many communities involved in the management of forests and other nature reserves, their local knowledge and experiences have been instrumental in the management of their environments and their resources.

There is limited up-to-date governmental data available to assess clear progress on this target. However, information from other informal sources currently do make use of biological resources as a means of artistic and cultural expression, and that they hunt, fish and gather in order to avail themselves of important sources of traditional foods and medicine. Indigenous peoples value these activities, and accordingly, undertake initiatives which promote and facilitate the use of traditional practices and stewardship of the land. This includes a range of activities, from taboos, rest days, sacred groves, and many others are used in ecosystem management.

There are various awareness creation exercises by CSO's and EPA through GEF small grants program. The CSO's have compiled a list of community protected areas and sacrad groves for Central, Volta and Brong Ahafo Regions. Through this, conservation practices within these areas are embedded in cultural values and practices. Wildlife protected through the use of totems as bio cultural heritage including traditional laws and norms, spiritual beliefs and values and ancestral knowledge and practices.

Indicators used in this assessment

- Traditional knowledge on sacred landscape compiled and processed by mid-2018
- Public engagements on traditional knowledge initiated by mid- 2017
- Traditional knowledge awareness programme initiated by ending 2017
- Legislation on community rights on genetic resource in place by December 2018

- Indigenous knowledge systems are gradually being transitioned into science for purposes of research, e.g. CSIR, Millar Institute of indigenous knowledge, University for Development Studies, etc.
- Guidelines for the enactment of community level Legislation on Traditional Knowledge fully operational by mid-2020
- A document on existing biodiversity related traditional knowledge systems developed by December 2019
- Productivity of pilot schemes integrating traditional knowledge and basic science initiated by Mid-2017

Please describe any other tools or means used for assessing progress

Annual Reports from the EPA, MESTI and other governmental institutions and NGOs/CSOs were used to monitor progress

Relevant websites, web links and files

- National Biodiversity Strategy and Action Plan https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

There is limited up-to-date governmental data available to assess clear progress on this target. However, information from other informal sources currently do make use of biological resources as a means of artistic and cultural expression, and that they hunt, fish and gather in order to avail themselves of important sources of traditional foods and medicine. Indigenous peoples value these activities, and accordingly, undertake initiatives which promote and facilitate the use of traditional practices and stewardship of the land. This includes a range of activities, from taboos, rest days, sacred groves, and many others are used in ecosystem management.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

Monitoring is the responsibility of MESTI, however, most of these will come from municipal assemblies who work within the communities and have information that is based upon the knowledge of the individuals in communities.

Relevant websites, web links and files

- National Biodiversity Strategy and Action Plan https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Progress Assessment Ghana Target 19
Knowledge, on the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☒ On track to achieve target
☐ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

The key strategies to develop knowledge management for biodiversity conservation activities in the country include:

- Developing a web platform that allows better knowledge capture and information dissemination, monitoring and evaluating the use of news media;
- Systematize processes and create templates that facilitate data collection from all relevant sectors for publication;
- Building capacity for knowledge management at the national and local levels through training and learning;
- Contributing to relevant knowledge bases and fora by increasingly forming a constituency of CSOs with capacity, motivation and systematic information flow;
- Establishing information exchange links with the national policy making bodies.;
- Establishing partnerships to upscale and replicate successful biodiversity conservation projects and best practices;
- Capturing and disseminating the results, lessons learned and best practice from the SGP portfolio via different media by streamlining and strengthening the database, intranet and website to allow for knowledge exchange and sharing;
- Providing guidance and collaborating with sector agencies/CSOs on how to capture and disseminate knowledge and conduct knowledge exchange at the local level to be aggregated at global level.

Indicators used in this assessment

- Biodiversity publications, websites, social media presence initiated by ending 2017
- Biodiversity information dissemination begins by mid- 2017
- Research gaps identified and published by mid-2018
- Personnel trained or engaged in programs in biodiversity and agriculture by December 2018

Please describe any other tools or means used for assessing progress
The knowledge management tools applied are:

- Knowledge need assessment, mapping and audits: MESTI conducts a needs assessment to understand what information is the most valuable, how to capture it and how to disseminate it.
- Best Practices- the NBC captures best practices at the local and national levels, conduct case studies, and undertake publications and share with the media key achievements.
- Peer-to-peer learning-the NBC facilitates peer-to-peer learning between programmes/projects and local communities as an effective method to share knowledge, help communities learn from each other and as a tool for replication and up scaling of best practices.
- Centres of knowledge- MESTI supports the setting up technology and systems demonstration sites or centres of knowledge for biodiversity conservation knowledge systems and demonstrated technologies. These centres of knowledge will become places where other communities, government officials, and development practitioners can learn in the biodiversity conservation practices.
- Communities of Practice (CoPs) - Communities of practice allows the organization to pool the collective ideas and knowledge of its staff to help build and institutionalize corporate memory. MESTI encourages successful community-based biodiversity conservation to practice CoPs.
- Strategic Environmental Assessment and Environmental Impact Assessments by the Environmental Protection Agency of Ghana
- Community development and knowledge management for Satoyama initiative

Relevant websites, web links and files

- National Biodiversity Strategy and Action Plan
- https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf
- http://www.fcghana.org/library_info.php?doc=43&publication:Forest%20&%20Wildlife%20Policy&id=15
- https://www.fcghana.org/userfiles/files/MLNR/FDMP_June%2015%20Final_draft.pdf

Level of confidence of the above assessment

☒ Based on comprehensive evidence
☐ Based on partial evidence
☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.
The government wishes to increase public awareness and people's involvement in conservation of forest and wildlife resources, particularly where they directly affect the livelihood of communities and the stability of the environment. Emphasis of this is being laid in in most of the Policies and their implementation plans in the country, for instance in the Ghana Forestry Development Master Plan (2016-2036) as one of its major component Research and training and within this is to increase public education and create awareness on the value and multiple uses and benefits of forests. This appears in several more of the nation’s policies.

These initiatives contribute widely in indicating how information from this target is assessed. Mostly through the reports of government and non-governmental organisation who contribute to achieve this target.

The Strategic Environmental Assessment carried out on the potential opening of the Voltaian Basin for petroleum exploration which has a potential of going through a National forest park and other biodiversity hotspots.

Adequacy of monitoring information to support assessment

☒ Monitoring related to this target is adequate
☐ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The Biodiversity unit is responsible for the development and formulation of policies, coordination of all projects and activities monitoring the implementation of the target through regular reporting by sector agencies, field visits, and peer review workshops. Each sector agency supervises its own work plan, monitor performance, whether by project inputs and outputs or policy measures, and reports on progress and problems at quarterly bases during project coordination meetings either on-line or during project visits. The biodiversity unit will analyse and consolidate the reports as a routine function and feedback to the sector agencies and partners annually.

Relevant websites, web links and files

- National Biodiversity Strategy and Action Plan https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Progress Assessment Ghana Target 20
Mobilizing increased financial resources for effectively implementing the strategic plan for biodiversity 2016- 2020 from all sources

Category of progress towards the implementation of the selected target:

☐ On track to exceed target
☐ On track to achieve target
☒ Progress towards target but at an insufficient rate
☐ No significant change
☐ Moving away from target
☐ Unknown

Date the assessment was done:

December 2018

Additional information

Existing funding sources, on-going development activities are used and also making existing government programmes become more sensitive to biodiversity concerns. The plan develops innovative funding mechanisms to implement most of the programme outlined in the programme. The plan sort for bilateral/multilateral aid for stand-alone, biodiversity projects an undertake debt-for-nature swaps and develop partnerships with the private sector, NGOs and other civil society institutions. There is the need to build the capacity of the staff of the Ministry of Environment to development and write bankable projects for the country.

Indicators used in this assessment

- An inventory of potential donors completed by mid-2017
- At least training of 20 public servants on resource December 2017
- NBSAP formulation completed by December 2016.
- The creation of the Biodiversity unit within the Ministry of Environment
- To ensure an effective collaboration between the Ministry of finance and the Ministry of Environment and relevant MDAs

Please describe any other tools or means used for assessing progress

- List of donors and their conditions for accessing available funds
- A standing team capable to help the public sector formulate projects to attract funding
- Number of biodiversity related funded projects.

Relevant websites, web links and files

- National Biodiversity Strategy and Action Plan https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Level of confidence of the above assessment

☐ Based on comprehensive evidence
☒ Based on partial evidence
☐ Based on limited evidence

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate
☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)
☐ No monitoring system in place
☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place

The National Biodiversity Commission (NBC) secretariat is responsible for the coordination of all projects and activities and monitors the implementation of the target through regular reporting by sector agencies, field visits, and peer review workshops. Each sector agency supervises its own work plan, monitor performance, whether by project inputs and outputs or policy measures, and reports on progress and problems at quarterly bases during project coordination meetings either on-line or during project visits. The NBC will analyse and consolidate the reports as a routine function and feedback to the sector agencies and partners annually.

Relevant websites, web links and files

- National Biodiversity Strategy and Action Plan
  https://www.cbd.int/doc/world/gh/gh-nbsap-v2-en.pdf

Section IV. Description of the National Contribution to the Achievement of each Global Aichi Biodiversity Target

Aichi Biodiversity Target 1

By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:

There are several initiatives ongoing in Ghana to ensure that awareness creation on biodiversity sustainability is effective and successful. Advertisements are ran in both print and electronic media on regular basis to sensitize people to abstain from degrading biodiversity. Community education (especially in communities with conserved areas) is held on regular basis to educate communities about the importance of the reserve area to their environment, health and economic improvement.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)

Ghana's contribution in awareness creation on biodiversity is in line with the achievement of the global biodiversity. Ghana observes the International Day for Biological Diversity every 22 May to announce the importance of conserving biodiversity. Ghana also observes other related biodiversity days including the World Wetland Day. The day was used to create awareness on the importance protecting wetland with it diverse biodiversity for sustainable development.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals

Awareness creation about biodiversity is very important to achieving inclusive and equitable quality education and promotes lifelong learning opportunities for all (SDG 4) and ensures sustainable consumption and production patterns (SDG 12) of biodiversity. Community education given through electronic media, documentaries and print media all aimed at changing attitudes towards biodiversity conservation.

Programmes and projects such as the Forestry Commission's tree planting programme help in sustaining life on land (SDG 15) and contribute to climate change mitigation (SDG 13). The programme has 5 Strategic Objectives (SOs) and Action Plans to achieve SDGs. SO1 is to establishment and management of planted forests, SO2 to forest plantation investment promotion (establishment and management), SO3 to employment creation and sustainable livelihoods, SO4 looks at the investments in research and development, extension, training and capacity building for forest plantation development and SO5 is about governance.

The Fishers Act 2002, Act 625 of the Ministry of Fisheries and Aquaculture Development implements three months closed season on industrial fishing to improve fish stock in the country. The ministry further intends to introduce same on artisanal fishing to augment the quest to improve stock as well as prevent some species from going extinct. This policy directly aligns

with SDG14 (conserve and sustainably use the oceans, seas and marine resources for sustainable development).

Aichi Biodiversity Target 2
By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:
The integration of biodiversity into mainstream national and local development and poverty reduction strategies and planning has seen many forms of achievement in Ghana. The various national programmes and projects are integrated into and implemented at district and municipal level for the development and improvement of the wellbeing of the people. Different biodiversity programmes with financial benefits to the parties that accept to conserve biodiversity were implemented at the local level with support from the nation level. Training, supervisory roles and equipment needed to the achieve targets were provided by the state.

Green Ghana Programme and Trees-on Farm Programme
A Government of Ghana (GoG) programme of planting trees in schools, along major roads, hospitals, and around waterbodies in the country led by the Forestry Commission has played a major role in planting trees in many part of the country. This programme has also provided employment to 15000 graduates at its initial stage of implementation.
Farmers from different parts of the country have subscribed to the tree-on farm programme and have incorporated tree planting into their farms. The tree-on farm programme gives participating farmers training on alternative livelihood activities and financial supports.

Aquaculture Development
Ghana through the Ministry of Fisheries and Aquaculture Development (MFAD) is committed to development and improving aquatic species. The yearly ban on fishing introduced by MFAD which was postponed to August 2019 is a programme aimed at improving stock of fish species in the waters of Ghana.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals

Tree-on Farm Programme
Integrating biodiversity into farms will help protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss (SDG 15)

Man and the Biosphere
This programme encourages mankind to integrate sustainable use of biodiversity in all their actions. This promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all (SDG 8) and make cities and human settlements inclusive, safe, resilient and sustainable (SDG 11).

Green Ghana Programme

The GoG green Ghana programme and the Forestry Commission tree planting programme all provide employment, training on alternative livelihood and financial incentives to people who take part in achieving their set targets. The employment, training and financial incentives help in achieving SDG 1 (end poverty in all forms everywhere).

Aichi Biodiversity Target 3
By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
The 2014 National Biodiversity Strategy was formulated by MESTI to meet the demands of the Aichi Targets. Agencies have been established with the responsibility to manage the country's biodiversity resources and have signed on to all the major international treaties that seek to protect biodiversity. Towards the achievement of the Aichi Target 3, a strategy was put in place to accelerate the process of removal of harmful incentives to biodiversity. The National target was to first identify harmful incentives that drive biodiversity loss and degradation and then develop a mechanism for eliminating or phasing out those incentives.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:
Upon achieving Aichi target 3, Ghana is set to achieve SDG 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development) and SDG 15 (Life on Land)

Aichi Biodiversity Target 4
By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of the use of natural resources well within safe ecological limits.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
Sector ministries and bodies charged with the task of ensuring the implementation and legislation of policies work hand in hand with local bodies and private organizations to reduce biodiversity loss. Nationwide sensitization is organized using media houses to disseminate information to people. Also, institutions like the National Commission for Civic Education and the Ministry of Education in collaboration with NGOs run educational programmes in various educational institutions to sensitize the youth on the effects on biodiversity loss and how to conserve biodiversity. There is also an ongoing project on sustainable production and consumption by the Environmental Protection Agency which will strictly contribute to the achievement of the target.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
Ghana is party to a number of conventions and international agreements relating to biodiversity conservation on a global level. This has led to the ratification of their policies and the initiation on a national level. These conventions are, the African Convention on the Conservation of Nature and Natural Resources, Convention on Wetlands of International Importance, Convention on the International Trade in Endangered Species of Wild Fauna and Flora, Convention on the Conservation of Migratory Species and Convention on Biological Diversity.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
In achieving Aichi target 4, Ghana is set to achieve SDG 2 (End hunger, achieve food security and improve nutrition and promote sustainable agriculture), SDG 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all), SDG 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation), SDG 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development), SDG 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss)

Aichi Biodiversity Target 5
By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
As detailed in section III, the country has contributed to the achievements of this target through projects such as the National Forest Plantation Programme, The Bamboo and Rattan Development Programme, Community Resource Management Areas and the Buffer Zone Policy. Forest Investment Programme, Forest Farm Facility II, Forest Law Enforcement, Governance and Trade Program.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
Ghana was the first country to sign the Voluntary Partnership Agreements under the Forest Law Enforcement, Government and Trade Action Plan (FLEGTAP) which provides a monitoring system and a legal framework to ensure that all timbers imported into the European Union (EU) were in accordance with the law of the exporting country. It was observed that the high demand for timber in the EU have led to illegal logging and thus the destruction of forest habitats. Other countries like Congo, Cameroon, and Indonesia have also signed to this agreement.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
In achieving the Aichi target 5, Ghana is contributing to the achievements of Sustainable Development Goals 7 (Ensure access to affordable, reliable, sustainable and modern energy for all), 13 (Take urgent action to combat climate change and its impacts), 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development) and15(Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss)

Aichi Biodiversity Target 6
By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
As detailed in section III, Ghana has through a number of projects contributed to the achievement of this Aichi Biodiversity Target. Ghana in 2015 started the Sustainable Fishing Management Project to provide an assessment on the state of fishes in Ghana with a focus on small pelagic fishes. The project revealed the trend of overfishing which encouraged the ministry to start registering small artisanal canoes. This will ensure that fishing is monitored and harvesting is done sustainably as in line with Aichi Biodiversity Target. In an effort to restore depleted fisheries, Ghana has introduced a closed season program to reduce pressure on overexploitation. A two month closed season was implemented for industrial vessels in 2016, 2017 and 2018. In monitoring and halting overfishing, Ghana is undertaking a licensing and registration program for all canoes and vessels. The West Africa Regional Fisheries Program (WARFP) is also aimed at attaining sustainable fishing in line with the Aichi Biodiversity Target.
(http://www.ghana.gov.gh/index.php/media-center/news/4728-fisheries-ministry-inaugurates-closed-season-committee).

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
Ghana serves as the host of the Fisheries Committee for West Central African Gulf of Guinea and is also a member. The committee which is aimed at eliminating illegal fishing in the west central region of the Gulf of Guinea has a number of Ghanaians in high ranking positions making contributions which will lead to the achievement of the Aichi Biodiversity Target.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
In achieving the Aichi target 6, Ghana is contributing to the achievements of Sustainable Development Goals 1 (End poverty in all of its forms everywhere), 2 (End hunger, achieve food security and improve nutrition and promote sustainable agriculture), 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all), 12 (Ensure sustainable consumption and production patterns), 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development) and 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss).

Aichi Biodiversity Target 7
By 2020, agricultural, aquaculture and forest ecosystems should have increased resilience and provide essential services in order to secure the country's variety of life, and contribute to human well-being, and poverty eradication.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
Agriculture
Ghana's contributions to the Aichi Target 7 in the field of Agriculture are discussed in the actions which are put in place towards the achievement of the Ghana National Target 7 as highlighted in section III of the report. The Plant Protection and Regulatory Services Directorate (PPRSD) under the Ministry of Food and Agriculture (MOFA) has over the years been ensuring the practice of Integrated Pest Management and sustainable agricultural practices. A sub-division of the PPRSD, the Crop Pest and Disease Management Division ensures that farmers practice Good Agricultural Practices (GAPs) which is to ensure the conservation of Biodiversity.

Aquaculture
As highlighted and described in detail in section III of the report, Ghana is ensuring the sustainable management and conservation of aquatic lifeforms through the establishment of bodies and initiatives such as the Fishery and Aquaculture Division of the Water Resource Institute (WRI), an eight-member Task Force, Fisheries Enforcement Unit, the Aquatic Research and Development Centre (ARDEC) and the Aquatic Animal Health and Post-Harvest initiative.

Forestry
With respect to forestry sector towards the achievement of the Aichi Target, the Forestry Commission in collaboration with other relevant bodies like BirdLife International and the Wildlife society of Ghana has put in place in-situ and ex-situ methods of biodiversity conservation. In-situ methods involve the use of forest reserves, wildlife conservation areas, and Ramsar sites through the creation of Globally Significant Biodiversity Areas (GSBAs), Important Bird Areas (IBA), and Community Resource Management Areas (CREMA). The ex-situ methods, on the other hand, employ the establishments of gene banks, Botanical and Zoological gardens to conserve biodiversity in the country. The Forestry Commission has also initiated programmes such as the Bamboo and Rattan Development Programme (BARADEP), the Newmont Reforestation Programme, and the National Forest Plantation Development Programme (NFPDP). These are explained in Section III of the report.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
Currently, Ghana is a signatory to 35 international conventions and agreements related to the conservation of biodiversity. Joining these conventions, Ghana has over the years implemented activities mostly at the national level as contributions towards the conservation of biodiversity at the global level. Some of the conventions which have been instrumental towards the achievement of the Aichi Target 7 are:

African Convention on the Conservation of Nature and Natural Resources

Ghana signed on to the African Convention on the Conservation of Nature and Natural Resources in 1968 when as a country, developed different areas of conservation on definitions as provided by the Convention. Ghana has benefited from this initiative by

(i) adopting required methods towards the conservation, utilization, and development of soil, water, flora and fauna through the use of scientific methods, and with due regard to the best interest of the Ghanaian people;
(ii) providing special protection to threatened animal and plant species which are likely to go extinct, and habitats necessary for their survival;
(iii) establishment of conservation areas.

Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention)

Ghana became a member of the Ramsar Convention in 1988 after which as a country has been guided by the Convention's framework for international cooperation towards the protection and judicious use of wetlands as they are ecosystems with very diverse fauna and flora species. This includes the setting aside of wetlands (Marine/coastal, inland and man-made) of International Importance (Ramsar Sites) in Ghana. The marine/coastal Ramsar Sites in Ghana include Senya Bereku, Cape Three Points, Mouths of Volta, Pra and Butre rivers, Kakum and Ankobra; Inland Ramsar Sites include Densu, Afram, Oti, Bosomtwi, Black, Red and White Volta Ramsar Sites whiles the Man-made wetlands include Tono, Vea, Annum Valley, Elmina Salt Pans, Densu Delta and Brimsu reservoir Ramsar sites. The Convention also has aided in the legislation and implementation of plans towards the conservation of the available Ramsar Sites in the country such as the establishment of nature reserves on wetlands. Example of such reserves is the Digya National Park which is found on the shores of the Volta Lake

Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Ghana has been a signatory of this convention since 1975. The main objective of the Convention is to protect threatened species of plants and animals which are affected by international trade through regulation in specific plants and animal species so they are not overly exploited. Ghana has played a very key role in biodiversity conservation through CITES as among the Convention's three species Appendices I, II, and III, Ghana is one of the 21 out of 154 countries to have listed Appendix III species (species that are nationally threatened, and are protected within the borders of the individual countries with international support)

Convention on Biological Diversity (CBD)

The Convention on Biological Diversity (CBD) in pursuit of a global biodiversity mission has provided guidance and targets (Aichi Targets) with which Ghana as a country has been obliged to adhere to protect plant and animal species. Ghana updated her first National Biodiversity Strategy which was developed in 2002, later in 2016 to conform to the demand updates of the Convention.

Convention on the Conservation of Migratory Species (Bonn Convention)

The Convention on the Conservation of Migratory Species has since 1988 when Ghana became a member country aided in Ghana placing terns (Sturnidae) on Ghana's list of wholly-protected species.

(http://www.ghana.travel/nature-and-wildlife).
(trade.cites.org).

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals

As Ghana puts in place policies and implementations towards the achievement of the Aichi Biodiversity Target 7, the following Sustainable Development Goals will be achieved alongside:

- SDG 1: End poverty in all of its forms everywhere
- SDG 2: End hunger, achieve food security and improve nutrition and promote sustainable agriculture
- SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all
- SDG8: Promote sustained, inclusive and sustainable
- SDG 12: Ensure sustainable consumption and production patterns
- SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss.

Aichi Biodiversity Target 8
Minimizing pollution, including excess nutrients, to levels that are not detrimental to ecosystem function and biodiversity (Aichi Target 8)

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:
The government has made commendable progress towards minimising pollution from various sources, especially through improving its policy frameworks and legislatives as well as innovative national programmes which contributes to the achievement of Aichi Target 8.
The government has significantly reduced point sources pollution through the enforcement of the provisions of the Environmental Impact Assessment Regulations LI 1652 through the sector Specific effluent discharge guidelines. Implementation of the buffer zone policy has reduced nutrient loading from diffuse sources of pollution in agricultural fields.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
Ghana has rectified the Minamata Convention and enacted the Hazardous Electronic, and other waste (classification) Control and Management Act 2016 (Act 917) and the Hazardous, Electronic, and other Waste (Classification) Control and Management Regulations 2016 (LI 2250)

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:
Strategies by the country to effectively implement all pollution related policies and actions are key to achieving sustainable development and improving the overall wellbeing of its population. Specifically, these actions contribute to SDG 3.9 (Substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination), SDG 6.3 (improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally), SDG 14.1 (prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution), and SDG 6.3 (improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally).

Aichi Biodiversity Target 9
By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:
Integrated management measures are ongoing to control invasive aquatic weeds in specific water bodies in Ghana. The Government is controlling Fall Army worm in Ghana. To date, GH₵9,998,896 has been spent on chemicals to control the infestation. Farmers are being educated on ways to control the infestation. The country has initiated several internationally recommended legislatives and institutional structures for monitoring alien species invasion and managing existing ones which contributes directly to the achievement Aichi Target 9.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals:
The nation's activities also contribute to supporting the implementation of SDG 15.8 which recommends that by 2020, measures should be introduced to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.

Aichi Biodiversity Target 10
Minimizing the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification, so as to maintain their integrity and functioning. (Aichi Target 10)

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description:
There is no holistic or comprehensive national management strategy for coastal ecosystems in Ghana, however, many related policies and research programmes have provided guidelines for the sustainable use of mangrove ecosystems, which contributes to achieving the Aichi target 10.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
Initiatives to sustainably manage the country's coastal ecosystems, especially mangroves, contributes to SDG 14 to conserve and sustainably use the oceans, seas and marine resources for sustainable development. It specifically relates to Target 14.2 which focuses on sustainably managing and protecting marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience and take action for their restoration in order to achieve healthy and productive oceans.

Aichi Biodiversity Target 11
Ensuring that at least 17 per cent of Terrestrial and Inland water and 10 per cent of Coastal and Marine Areas are Conserved through Systems of Protected Areas (Aichi Target 11)

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
The country has made commendable progress in delineating a significant proportion of its terrestrial and aquatic ecosystem for legal protection, whilst also encouraging community participation in its management. The number of biodiversity hotspots that are of international value are also increasing. This contributes directly to the Aichi target 11.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
The country's actions to delineate significant proportion of its terrestrial and aquatic ecosystems for conservation supports the implementation of SDG 14.5 which is directly relevant to the marine component of Aichi Biodiversity Target 11 and with identical percentage elements.

Aichi Biodiversity Target 12
Preventing the extinction of known threatened species and their conservation status, particularly of those most in decline, and improving and sustaining their status (Aichi Target 12).

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
Although the country lacks a monitoring system to adequately inform on the changes in trends of identified species under threat and their conservation status, progress is being made towards achieving Aichi Target 12. This is mainly through meeting its reporting commitments to international agreements such as Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES), to regional conventions such as the African Convention on the Conservation of Nature and Natural Resources, as well as improving national policy frameworks that have strengthened the capacity of mandated institutions such as the Wildlife Division and community participation to enforce conservation regulations.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
National processes to update lists of nationally threatened and endangered species as well as improve enforcement of conservation strategies for protected areas, contribute to the objectives of SDG15 to halt biodiversity loss. Specifically, the national target 12 contributes to global indicators to protect and prevent the extinction of threatened species (SDG15.5) and to take urgent action to end poaching and trafficking of protected species of flora and fauna (SDG15.7).

Aichi Biodiversity Target 13
Maintaining the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives (Aichi Target 13)

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
The country has made commendable effort towards the Aichi target of maintaining genetic diversity through the establishment of regulatory and monitoring systems such as the National Biosafety Authority to lead regulatory mechanisms of GMOs, and the Ghana Biodiversity Information Facility, an open data infrastructure that allows the sharing of biodiversity information globally.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
National initiatives to coordinate GMOs, develop an inventory of a gene bank and develop capacity of staff and institutions, contribute to the objectives of SDG 2 for zero hunger. Specifically, it supports the achievement of SDG 2.5 that aims to maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.

Aichi Biodiversity Target 14
Restoring and safeguarding ecosystems that provide essential services, including ecosystem services (Aichi Target 14)

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
The implementation of numerous national programmes to increase forest cover through afforestation and reforestation programmes, whilst improving management of protected areas through enhanced legislatives and formalised community participation, contributes directly to the Aichi Target 14 to restore and safeguard ecosystems that provide essential services including ecosystem services.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
National actions to improve the management of protected areas and strengthen conservation efforts contributes to global indicators (i) to protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes by 2020 (SDG 6.6), and (ii) protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss (SDG 15)

Aichi Biodiversity Target 15
By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification**.**

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
Ghana's contribution to this target is partially reflected in the actions which contribute to Ghana Target 15 described in sections II and III of this report.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
The Bia-Diambarakro area, at the frontier between Ghana and Ivory Coast, is a complex mosaic of forests, forest fragments and agricultural land (especially cocoa farms), with each of these areas managed for different purposes and subject to different tenure and ownership arrangements. The GEF recently endorsed the project "Development of a trans-frontier conservation area linking forest reserves and protected areas in Ghana and Ivory Coast" ($859,000 GEF, and $1.59 million in co-finance), implemented by FAO, that is supporting the governments of Ghana and Ivory Coast to put in place the pillars of a trans-boundary management agreement for the long term sustainable management of the area.
https://www.thegef.org/news/support-aichi-targets-5-and-12-trans-frontier-conservation-area-ghana-and-ivory-coast

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
In achieving this Aichi Target 15, this will support directly and indirectly the implementation of the following Goals for the 2030 Agenda for sustainable development

- SDG 6.6
- SDG 13: Climate Action
- SDG 14: life below water
- SDG 15: Life on land.

Aichi Biodiversity Target 16
By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
Ghana upon ratifying the Nagoya Protocol, the country continues to develop a domestic access and benefit sharing policy and to work towards benefit sharing in communities. There have been meetings with communities and stakeholders to provide them with an opportunity to consider possible elements of a domestic access and benefit sharing policy and contribute to an increased understanding of the Nagoya Protocol. Ghana will continue to implement its commitments under the Convention by continuing to develop domestic policy on access and benefit sharing and observing the progress made on the implementation of the Nagoya Protocol.

The protocol enables Ghana to protect communities from exploitation, channel benefits to the local level to incentivise conservation, and enhance legal certainty and clarity for both users and providers of genetic resources. However, it can also help create equitable partnerships between communities and other groups, such as scientific organisations or companies that seek to develop new products based on natural resources.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
In northern Ghana, a community protocol resulted in mining being postponed to protect religiously significant areas of forest and streams, known as sacred groves**.**

https://www.iied.org/making-nagoya-protocol-work-community-level

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
The Nagoya Protocol is a mechanism that rests on fostering fair international partnerships and explicitly encompasses not only ecological, but also social and economic aspects. This underlines the relevance for achieving the SDGs, on matters as wide ranging as poverty alleviation, food security, health, economic growth, innovation, oceans and governance. It also explains the many direct and indirect references made to access and benefit sharing in several SDG targets. The Nagoya Protocol also, directly and indirectly, supports SDGs 1, 3, 4, 6, 8, 9, 13, 14, 15, 16 and 17. As Ghana puts in place policies and implementations towards the achievement of the Aichi Biodiversity Target 16, the Sustainable Development Goals will be achieved alongside.

Aichi Biodiversity Target 17
By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated
national biodiversity strategy and action plan.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
Ghana has developed the National Biodiversity Policy and updated the NBSAP. The Policy seeks to promote and contribute to conservation and sustainable use of biodiversity.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
The conservation of biodiversity in Ghana depends on ministries, departments and agencies outside the Ministry of Environment Science, Technology and Innovation. Therefore, the successful implementation of the NBSAP requires a concerted action on all levels of governance including the traditional authorities, the private sector, civil society organizations and the Government of Ghana as a whole.

The key considerations in the implementation of NBSAP is efficient allocation of resources, strengthening linkages between different stakeholders and coordinating their activities. MESTI is the lead ministry in the implementation and, in most cases, lead in the coordination of the sector activities.

At the policy implementation level, MESTI in collaboration with the Ministries of Lands and Natural Resources, Food and Agriculture (MoFA), Finance and Economic Planning and the Local Government and Rural Development (District Assemblies) are to ensure the enactment of the relevant legislation to support biodiversity coordination.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
In achieving Aichi target 17, Ghana is set to achieve most of the seventeen (17) set goal of the 2030 Agenda for Sustainable Development. These goals are SDGs 1, 2, 3, 6, 8, 9, 10, 13, 14, 15, 16 and 17,

Aichi Biodiversity Target 18
By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of local communities, at all relevant levels.

Promote conservation of community protected landscapes, incorporation of indigenous landscapes into biodiversity lands and the prosecution of offenders of the bye laws and integrating into scientific methods and usage. Traditional health practitioners are gradually being integrated into the formalized orthodox medical system in Ghana.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
Ghana's contribution to this target is partially reflected in the actions which contribute to Ghana Target 18 described in sections II and III of this report.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
Traditional Knowledge contributions to biodiversity and the environment have been mainstream by the government of Ghana into several policy and implementation documents to ensure effective implementation. Policies such as the National Climate Change Policy, NSABP, Environmental and Social Management Framework (ESMF) etc.

Inclusion of traditional knowledge is mainly by stakeholder consultations with communities and their leaders. Especially in the Agricultural sector, several traditional measures coupled with scientific knowledge have been adopted to improve on crop yield. In the Mining sector, the government of Ghana gave traditional leaders the mandate to help fight the menace of illegal mining activities (*galamsey*) in their communities.

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
Upon achieving Aichi target 18, Ghana is set to indirectly achieve SDGs 13(take urgent action to combat climate change and its impacts), 14 (conserve and sustainably use the oceans, seas and marine resources) and 15 (sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss)

Aichi Biodiversity Target 19
By 2020, knowledge, the science base and technologies relating to biodiversity, its values functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
To facilitate increased knowledge of biodiversity in the country, there is a need for increased and continuous research and development and the need for continuous learning from future occurrences. At present, biodiversity and environmental related research activities are dispersed within a number of Council for Scientific and Industrial Research (CSIR) institutions, universities and other research institutions. There is a National Biodiversity Commission (NBC) that has been established to support and create a platform for biodiversity-related research institutions to coordinate their activities to achieve synergies and avoid duplication as much as possible. The Commission seeks to enhance the capacity of research institutions to increase their research and development activities aimed at addressing current and future effects and impact biodiversity**.**

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals
Upon achieving Aichi target 19, Ghana is set to achieve SDGs 13(take urgent action to combat climate change and its impacts), 14 (conserve and sustainably use the oceans, seas and marine resources) and 15 (sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss)

Aichi Biodiversity Target 20
By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.

Please describe how and to what extent your country has contributed to the achievement of this Aichi Biodiversity Target and summarize the evidence used to support this description
Ghana's contribution to this target is partially reflected in the actions which contribute to Ghana Target 20 described in sections II and III of this report.

Please describe other activities contributing to the achievement of the Aichi Biodiversity Target at the global level (optional)
Natural Resources and Environmental Governance Programme (NREG) is designed to provide annual Sector Budget Support and to sustain the implementation of broad programme of Natural Resources Governance and Environmental reforms and innovation for the government**.** The NREG draws on the Framework Memorandum of Understanding that has been developed under the leadership of Government of Ghana (GoG) with five participating Development Partners (DPs) including: Agence Francois de Development (AFD), Department for International Development (DfID) of the United Kingdom, the European Commission (EC), the Royal Netherland Government (RNG) and the International Development Association (IDA - WB). Also, the

- Forest Investment Programme (FIP)
- Ghana Cocoa Forest REDD+ Programme (GCFRP)
- Cocoa Forest Initiative (CFI)

Ghana Resource joint solution project funded by the Dutch government in 2016-2020 focusing on biodiversity management implemented by Development Institute and Arocha Ghana

Funding needs assessment of Ghana's biodiversity conservation has been submitted in 2017

IUCN protected area category V &VI project funded by BMU initiative. The focus is on enhancing biodiversity conservation and sustainable management of category V&VI landscape (Mole and Wassa Amenfi).

Microsfere and Wildlife Division Programme
In the context of its efforts for the improvement of the livelihoods of inhabitants around protected areas, the Wildlife Division has set up a partnership since 2008 in Kakum National Park and Assin Attandanso Reserve with Microsfere, an NGO aiming at combining rural development and biodiversity conservation, through the use of microfinance and other accompanying measures. This common project is currently being implemented in 6 communities in the north and the west of the park.
http://www.fcghana.org/page.php?page

Based on the description of your country's contributions to the achievement of the Aichi Biodiversity Targets, please describe how and to what extent these contributions support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals

Upon achieving Aichi target 20, Ghana is set to achieve SDG 8 (promote inclusive and sustainable economic growth, employment and decent work for all) and 17 (revitalize the global partnership for sustainable development)

Section VI. Additional Information on The Contribution of Indigenous Peoples and Local Communities

Biodiversity conservation is currently focused on fusing modern and traditional methods of conservation. Traditional conservation methods are still very useful in most developing countries. In Ghana, indigenous methods of conservation are still relevant because some rural and even urban communities still observe conservation-related taboos and myths. Before the CBD, traditional methods of conservation had a history of being effective in biodiversity conservation. Unfortunately, they are underutilised. In some communities, biodiversity is conserved and protected because of their cultural and spiritual values. For example, there are about 2,000-3,200 sacred sites in Ghana and these cover about 1.5% of the country.

Although sacred sites are protected by local people for religious and cultural purposes, they perform ecological functions as well, because they are the natural habitats of rare and useful biodiversity. The Buabeng-Fiema Monkey Sanctuary, for example, has two species of monkeys one of which is listed as endangered in the IUCN red list. These monkeys are being conserved by the local people because of the belief that monkeys are sacred. The Jaagbo sacred grove in the Tolon-Kumbungu district in Northern Ghana has 220 plant species, in comparison to 60 in outlying areas. About 60 percent of plants found in the Jaagbo sacred grove can be used for medicine by the local people. Similarly, the Tanoboase and Buoyem sacred groves in the Brong Ahafo Region have been conserved since the 14th century. The sacred groves are being threatened by increasing populations, the need for more farmland, bat hunting, fuel wood collection and forest fires.

Indigenous people have been excluded from Ghana's attempt to conserve biodiversity in the past. Their exclusion from the 1948 Forestry policy, the 1994 Forest and wildlife policy, and the 2002 Forest and wildlife policy led to failures in their implementation. The cultural and artistic elements of the local people such as taboos, festivals, cosmological beliefs, totemic systems, and folklores were left out. To achieve the Ghana National Target 18 towards the achievement of the Aichi Target 18, it is crucial that the traditional knowledge, innovations and practices of the local people are considered.

Cultural practices

Ghana is made up of several ethnic groups which are spread across the ten administrative regions. These ethnic groups are distinguished from one another by the distinct cultural practices, which have been passed on to them by their ancestors. Among these cultural practices are those that have been very effective in conserving biodiversity in the past. The largest of the ethnic groups, the Asante people, have cosmological beliefs and taboos which recognize the presence of spirits throughout the universe. They provide sanctions to people who "disrespect" the forests, which are believed to be their place of abode. These beliefs have over the centuries provided security for forest resources by controlling anthropogenic activities such as farming, indiscriminate felling of trees and bush burning as these are highly forbidden.

Some ethnic groups have set aside days on which people cannot enter forests, farms and water bodies. These are believed to be sacred days for the gods. It is thus considered a taboo, and highly offensive and disrespectful for anyone to see the gods as they come to these areas during the sacred days.

Many ethnic groups and their sub-clans are also represented by totems which are mostly special animals or plants. These animals and plants are considered sacred as a result of their historical affiliation with these ethnic groups. Totemism has led to the protection of some animal and plant species such as crested porcupines, elephants, mudfishes, hyrax, and bats among many others. However, in recent times, the use of scientific methods as the only means of ensuring conservation of biodiversity has led to the discarding of these effective cultural practices. Also, some animals, trees and water bodies are regarded as totems and deities. They are protected by taboos and traditional laws which prevent people from hunting, cutting them down or fishing in them.

Some communities forbid hunting or fishing on certain days. Communities in the Central and Western regions consider the sea as a goddess and as such do no fish on Tuesday because they believe she has time with her children (the fish). In some areas in the forest zone, it is a taboo to fell trees without the knowledge of the chief or priest. An example of such prohibitions is a river in Wansamire which can be fished for only domestic purposes thus preventing overconsumption.

The government of Ghana in its effort to revive the aforementioned cultural practices initiated the Traditional Knowledge Awareness Programme in the last quarter of 2017. The programme is aimed at educating the public on the traditional knowledge issues relating to biodiversity through the involvement of research institutions, NGOs, and most importantly, the local people and their traditional leaders.

Role of traditional leaders

The chieftaincy institutions of Ghana are recognized by the Ghanaian constitution; Article 270 of the 1992 Constitution. It states that the chieftaincy institution together with its traditional councils as established by law is guaranteed. The activities of illegal gold miners in Ghana has been detrimental and threatening to aquatic biodiversity as the use of heavy metals such as Mercury has been used in the alluvial gold mining process. Humans and wildlife which depend on these water bodies are also threatened with infections, cancers and death. Over the years, traditional leaders have been used to supervise the legislation for local communities on the rights on genetic resources. Community Resource Management Areas (CREMA), which is based on indigenous community decision-making processes are mostly overseen by the traditional leaders.

The Kumasi Declarations on SDGs(2018) urges local authorities to

- Ensure that all local government authorities have an adequate understanding of the Goals including their specific roles and responsibilities.
- Require local government authorities to undertake an analysis of their areas to identify possible Goal impact opportunities and key Goal risk areas.
- Require all local government authorities to report at least twice a year on the progress towards the Goals of the 2030 Agenda for Sustainable Development in their areas.

The role of traditional leaders in this declaration is;

- Ensure that traditional leadership is actively engaged with the 2030 Agenda and the AU Agenda 2063.

- Develop and deploy work on SDGs awareness, engagement and impact program to reach all traditional leaders starting with the National House of Chiefs.
- Identify traditional practices, under the remit of traditional leaders that can be used to support the attainment of the Goals.

The government of Ghana in recent times has launched a campaign against the activities of illegal miners in its quest to protect the water bodies and its associated biodiversity. The recognition of traditional leaders in this initiative has been very significant as they are regarded as the managers of the land and leaders with considerable authority. As a motivation for the traditional leaders, royalties paid to paramount chiefs have been increased from GH¢500 to GH¢1000. The number of traditional leaders who used to engage in the illegal mining activities has since declined as chiefs are setting good examples on protecting water bodies, fisheries, and aquaculture in the country.

Role of NGOs

The Ghana Association for the Conservation of Nature (GACON) worked with local communities to conserve what remains of sacred groves. According to reports by GACON, the customs and traditional rites of people often takes precedence over conservation and this contributed to the conservation of sacred areas. Conservation of these areas contribute to the reduction in the loss of natural resources (Target 5), prevention of extinction of threatened species (Target 12), ecosystem resilience and restoration for biodiversity conservation to carbon stocks (Target 15) and safeguarding traditional knowledge and practices of indigenous and local people and their customary use (Target 18).

In addition to the traditional laws and taboos, the local people with the help of NGO's and government agencies engage in alternative livelihood activities to reduce their dependence on forest resources. Examples of such activities are beekeeping, mushroom farming, woodlots and snail breeding. Although these activities are to alleviate poverty and conserve biodiversity, they sometimes help to replenish some resources. For instance, in Sankor and Nsuekyir, community members planted mangroves under the REDO project for firewood. However, the project report shows that the rehabilitation of mangroves led to an increase in crab, tilapia and shell and finfish. About 112 programmes have been undertaken in Ghana to provide alternative livelihoods for conservation as well as poverty alleviation. This integrates biodiversity into local development and poverty reduction strategies, hence it is geared towards the achievement of Aichi Target 2.

NGOs play a vital role in the use of traditional knowledge towards the conservation of biodiversity in Ghana. They act by directly reaching out to the local people at their doorsteps, addressing environmental issues and promoting public awareness on environmental problems in the immediate environment. Because of their practical involvement in solving environmental issues at the local level, their targets are most often achieved, making them a very important body in the conservation of biodiversity. NGOs dedicated to the conservation of the environment comprise members who include the local people, researchers, local community groups and learning institutions, farmers' groups and academicians. Some NGOs in Ghana dedicated to the conservation of biodiversity are Friends of the Nation, and Friends of the Earth.

Relevant Websites, web links and files:

- Adu-Gyamfi, Y. (2011). Indigenous beliefs and practices in ecosystem conservation: response of the church. *Scriptura*, 107 (2011), 145-135.
- Attuquayefio, D. K., & Fobil, J. N. (2005). An overview of biodiversity conservation in Ghana: Challenges and prospects. West African Journal of Applied Ecology, 7, 1-18.
- Boafo, Y. A., Saito, O., Kato, S., Kamiyama, C., Takeuchi, K., & Nakahara, M. (2016). The role of traditional ecological knowledge in ecosystem services management: the case of four rural communities in Northern Ghana. *International Journal of Biodiversity Science, Ecosystem Services & Management*, *12*(1-2), 24-38.
- Ekpe, E. K., Hinkle, C. R., Quigley, M. F., & Owusu, E. H. (2014). Natural resource and biodiversity conservation in Ghana: the use of livelihoods support activities to achieve conservation objectives. *International Journal of Biodiversity Science, Ecosystem Services & Management*, 10 (4), 253-261. DOI: 10.1080/21513732.2014.971056
- Osei-Owusu, Y (2016) Upgrade to a National Park; The case of Atewa Range Forest Reserve. A Rocha, Forestry Commission, Accra
- Government motivation to traditional leaders: (https://www.modernghana.com/news/800279/govt-to-reward-chiefs-who-are-helping-in-the-fight-against.html
- Role of NGOs and local people in the conservation of biodiversity: https://www.foei.org, http://fonghana.org
- ir.knust.edu.gh/bitstream/123456789/.../Investigation%20of%20the%20Cultural.pdf
- Sacred groves of Ghana: https://sacredland.org/sacred-groves-of-ghana-ghana/
- The Kumasi Declaration on the Sustainable Development Goals (SDGs) (2018)

Section VII Updated Biodiversity Country Profiles

Biodiversity facts

Status and trends of biodiversity, including benefits from biodiversity and ecosystem services and functions:

Forest Biodiversity

There is pressure on Ghana's forests, stemming from various aspects of land use. Many forest reserves are degraded due to wildfires, excessive extraction of timber and non-timber resources and human encroachment for agricultural purposes. Within the high forest zone (HFZ), cocoa farms, subsistence crops and fallow lands are dominant land use types.

The recent forest assessment of the high forest zone estimated the total forest land in Ghana at 9.337 million ha in 2015. This is made up of 1.556 million ha closed forest and 7.781 million ha open forest. The forest degradation rate in Ghana is estimated at 45,931.03 ha per annum since 1990 (Forest Preservation Programme report, FPP, 2013). The size of the closed forest has decreased from 2.704 million ha in 1990 to 1.556 million in 2015 indicating a depreciating rate of 192,648.25 ha per 5 years. The assessment further revealed that less than 20% of forest reserve areas have acceptable levels of integrity. Only 2% are in "Excellent" condition and another 14% in "Good" condition.

Currently, the remaining forest reserves is at risk of depletion from continued illegal-logging and agricultural clearing (NREG, 2014). However, there are increases in populations of some forest species, and generally, there has been an increase in forest cover, but the forest quality has declined (Forestry Development Master Plan (FDMP), 2016).

Off-reserve forests have roughly 6.5 million ha distributed as trees and forest patches in agricultural lands, forest fallows, riparian forests, sacred groves etc. Hansen, et al. (2009) provided the following estimates for land use classification of the HFZ: Natural forest (664,000 ha); Secondary forests (184,000 ha); Fallow (1,441,000 ha); Cleared (recently) farms (439,000 ha); Cocoa farms (1,001,000 ha); Food crops (1,236,000 ha); Grasslands (439,000 ha); and other land (102,000 ha) (FIP, 2012).

Agricultural Biodiversity

There has been a decline in the biodiversity of crops. Examples of this decline are seen in numbers of the local banana, cocoa and some yam species. Some yam species have completely disappeared from the farm produce. Generally, there is decline in crop biodiversity, but there are some crops that have had their diversities enhanced as a result of introduction of other varieties from outside the country. For livestock, some cattle breeds are on the decline. The West African short horn cattle which used to constitute about 80% of the national cattle population in the 1990s now constitutes about 47% of the national cattle herd.

Dry and Sub-Humid Lands Biodiversity

Coastal Savanna

There is severe reduction in the production of ecosystems goods and services through loss of fishing grounds, housing materials, grazing lands, farmlands and productivity, wildlife habitats,

energy sources, local displacement of species and scarcity of water sources. Consequently, there is loss of livelihood options and a decline in living standards of the people leading to worsening poverty.

Transition Zone
The transitional zone is rapidly turning into Savanna characterised by high deforestation and loss of watersheds. There is decline in soil fertility.

Northern Savanna
The northern savanna is characterised by rapid deforestation caused by high intensity of wild fires, wood fuel production, excessive tree felling and illegal surface mining. There are also the increasing incidents of floods and droughts. This situation has exacerbated food insecurity, water scarcity, disruption of social structure (emigration), loss of cultural heritage, loss of energy sources, loss of lives and property. The trend has also led to loss of habitats, decline in species populations, local species extinctions, increasing vulnerability to climate change impact, increasing incidence of alien invasive species, increasing transhumance leading to local and national insecurity, increasing poverty incidence as a result of loss of livelihood options, declining living standards, declining soil fertility and productivity, and increasing urbanization.

Inland Water Biodiversity

Rivers/Streams
Some data exist on fish, molluscs, insects, crustaceans, zoo-plankton, phyto-plankton and macrophytes. Generally, the trend is declining. However, some invasive aquatic macrophytes are increasing. Information on the other groups including insects such as arachnids, zoo- and phytoplankton is scanty.

Lakes/Reservoirs
Information on species in these water bodies is scanty. However, work on West African Manatee is on-going to establish species diversity.

Lagoons/Estuaries
Apart from fish species and waterfowls, information on species in these water bodies is scanty.

Marine and Coastal Biodiversity

Marine Mammals
All marine mammal species are threatened.

Water Birds
Fifteen (15) species are of international importance occur. There is a mixed trend with some species are increasing, a few stable, others decreasing.

Marine Turtles
Three species confirmed (Leatherback, Olive Ridley and Green; nesting on beaches and feeding offshore) threatened. Some monitoring and some detailed studies carried out at various points in time over the last 35 years. One species (Hawksbill) locally extinct; possible to make deductions

on trends from nesting monitoring data (with Sources from Centre for African Wetlands, Ghana Wildlife Society, Wildlife Division, Department of Oceanography & Fisheries - UG).

Fish
Three main marine groups (small pelagic, large pelagic and demersal species) and various brackish water species are present. Generally, fish stocks are declining (data sources: Fisheries Research Division, Guinea Current Large Marine Ecosystem; O&F-UG; Fisheries & Aquatic Sciences of University of Cape Coast). The decline in small pelagic species has been too sharp raising international concerns.

Plants of the mangrove forests
Three species of mangroves are prominent, namely *Avicenia* sp., *Rhizophora* sp. and *Laguncularia* sp. There is rapid decline in the status of all three species. However, *Laguncularia* is the most threatened.

Main pressures on and drivers of change to biodiversity (direct and indirect)

Biodiversity in Ghana is under severe pressure. While forest and dry and sub-humid (Savanna) biodiversity in protected areas are in very good condition, those in some reserves and off-reserve areas are not in good conditions. This is as a result of the intense pressure these ecosystems experience regularly.

There is evidence of declining trends in most of these ecosystems in which some components have declined in their composition, numbers, density, dispersion and distribution.

The major threats to biodiversity come largely from land-use conversions, habitat degradation, over exploitation, pollution, invasive alien species, climate change effects, predation, misapplication of chemicals into the environment, wild fires etc.

The land use conversions involve large scale farming, mono-cultural plantations, settlement siting, traditional farming practices for food and cash crops with the use of fire. Habitat degradation comes from such activities as misuse of fire, over harvesting of genetic resources, pollution and misapplication of chemicals. Over exploitation involves excessive cutting of trees in stressed habitats for fire wood as energy source, by-catch and use of inappropriate harvesting techniques such as pair trawling and beach seine. Climate change effects include sea level rise leading to sea water intrusion into fresh water habitats, intense drought and flooding.

Measures to enhance implementation of the Convention

Implementation of the NBSAP:

The effective management and coordination and implementation of biological diversity activities to achieve the objectives of the NBSAP require the MESTI to undertake the following activities:

- Support CSIR, EPA, Fisheries Commission and Forestry Commission, Universities, etc. to improve the scientific knowledge base of biodiversity in Ghana. This will require completing the survey and documentation of the biological diversity in Ghana and undertake studies to assess its direct and indirect values, and identify the potential threats to biological diversity loss, and how they may be countered.

- Enhance sustainable utilisation of the components of biodiversity by identifying and encouraging the optimum use of the components of biological diversity and by ensuring fair distribution of benefits to the local communities and nation.
- Support CSIR to develop to a centre of excellence in industrial research in tropical biological diversity in Ghana.
- Strengthen the institutional framework for biological diversity management in Ghana.
- Strengthen and integrate conservation programmes
- Integrate biological diversity considerations into sectoral planning and policy strategies
- Enhance the skill, capabilities and competences of relevant staff to ensure a cadre of trained, informed and committed manpower in the field of biological diversity.
- Encourage private sector participation in biological diversity conservation, exploration and sustainable utilisation.
- Review and update existing legislation to reflect biological diversity concerns and introduce new legislation where appropriate.
- Take mitigating measures to reduce the adverse effects of human activities on biological diversity.
- Support environmental impact assessment (EIA) monitoring to ensure sustainable sectoral activities
- Promote international cooperation and collaboration enhancement of biological diversity conservation and management in Ghana.
- Encourage and promote the exchange of biological diversity information through the clearing house mechanism
- Identify and establish appropriate funding mechanisms for biological diversity conservation and management.

Overall actions taken to contribute to the implementation of the Strategic Plan for Biodiversity 2011-2020:

The rate of degradation and loss of habitat are not decreasing due to increasing social and economic pressures. Approximately 16% (more than 38,000 km2) of the total land area of Ghana is under some form of protection; another 20-30% or more is under plantation of predominantly cash and food crops. The protected areas in the forests, dry and sub-humid lands (Savanna), as well as inland water and marine and coastal areas, have been the most effective areas for national implementation of the Convention. Protected areas have been expanded and the status of reserves has been upgraded.

Developmental projects can only take place in Ghana with an environmental impact assessment (EIA) and strategic environmental assessment (SEA). Offset programs can be introduced to support these assessments.

A national strategy is being developed for the management of invasive alien species to ensure a holistic approach to control invasions

Support mechanisms for national implementation (legislation, funding, capacity-building, coordination, mainstreaming)

Ghana has developed a long-term National Development Plan, which has strategies for the promotion of science, technology, maintenance of the quality of the environment and integration of environmental concerns into development policies. There has been amendment to many legislative instruments to reflect current issues on biodiversity identifying new and additional funding sources, new capacity development processes, national coordination and programmes to mainstreaming biodiversity into national sectoral policies.

Challenges

The challenges faced in biodiversity conservation in Ghana include the following:

- Low level of awareness and relevant of biodiversity to human
- Weak integration of biodiversity issues especially at the local level, including the implementation of activities established for in-situ, invasive alien species, agricultural biodiversity and traditional knowledge.
- Lack of a complete biodiversity assessment of Ghana.
- Encroachment of biodiversity hot spots in the country.
- Lack of financial resources for all biodiversity-related activities including climate-related Conventions.

A major area of concern is the lack of integration of biodiversity issues into development planning. The document mentions that a Steering Committee will be established to mainstream biodiversity issues into sectoral programmes to facilitate the development of relevant sector biodiversity policies. Again, the document identifies the lack of research, public education and awareness on biodiversity and ecosystem services. The development agenda states that the Ministry of Environment, Science, Technology and Innovation will facilitate the collaboration and harmonization of the biodiversity-related agreements. The Ministry will also establish monitoring mechanisms for biodiversity activities.

Various strategic actions have been identified to reverse natural resource degradation. Appropriate sustainable agriculture practices including biotechnology that promote correct soil conservation techniques will be applied, while forestation of degraded forests and off-reserve areas would be encouraged, including the adoption of a medium- to long-term plan for public and private programmes. Investments would be encouraged in industrial scale tree farming in specific depleted Forest Reserves and on degraded land and in commercial forestry outside forest reserves and along dried up and flowing streams and rivers. Other strategies include the promotion of plantation/woodlot development to meet the needs of society; human-centred biodiversity conservation initiatives; the use of Lesser Used Species (LUS), particularly for the construction industry on the domestic market; and the utilization of non-traditional tree species, such as rubber-wood, coconut and bamboo to supplement raw material supply from natural forests.

The possible strategies to solve biodiversity problems include the following:

• Facilitate the development of relevant sector biodiversity policies.
• Promote research, public education and awareness on biodiversity and ecosystem services.
• Facilitate the collaboration and harmonization of the biodiversity-related agreements.
• Establish monitoring mechanism for biodiversity activities.

About 80% of funds to undertake comprehensive management of protected areas have been provided from international sources and these funds have been applied accordingly. External sources of funding continue to pour into the country to support different implementation schedules of sectoral activities, some of which have a bearing on biodiversity but are not deemed sufficient.

Mechanisms for monitoring and reviewing implementation:
The monitoring of the NBSAP will be the responsibility of MESTI. In order for progress to be monitored and for easier means to aggregate and compare outcomes from individual Ministries and projects, the following attributes will be measured at least three times during the lifespan such project:

- changes in land use and forest cover, which can be measured on two key attributes greenness (use of NDVI for land cover changes) as a proxy indicator of biodiversity richness; improved livelihoods of the forest fringe communities, measured through child nutrition surveys (QBS) as proxy indicator for better livelihoods at household levels that can be attributable to improved land productivity; and
- investments in the forestry and fishery sectors as indicated by amounts of co-financing that come into the sectors through other sources.

Broadly, the socio-ecological productive landscapes (agricultural, rangelands and forests) with a vegetative cover greater than 10 per cent of the land area is considered acceptable. This would be supported by increasing/expanding vegetation under effective landscape management practices, which can be measured through the number of natural regeneration areas, established, hectares under CREMA that aim at improved forest cover and biodiversity conservation.

Relevant Websites, web links and files:

- fcghana.org/userfiles/files/NREG/NREG%20Report_251115.pdf
- https://www.fcghana.org/userfiles/files/MLNR/FDMP%20Final%20(2).pdf
- https://theredddesk.org/countries/initiatives/forest-preservation-programme-ghana
- https://www.fcghana.org/userfiles/files/redd/ESMF%20Ghana%20FIP_Final_13%20October%20%202014%20(2).pdf
- Ecological Footprint
- Marine Trophic Index
- Ocean Health Index
- Protected area coverage
- Protected Area Coverage of Key Biodiversity Areas
- Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
- Proportion of local breeds classified as being at risk, not-at-risk or at unknown level of risk of extinction
- Red List Index