THE REPUBLIC OF GHANA

REPUBLIC OF GHANA

MINISTRY OF ENVIRONMENT, SCIENCE AND TECHNOLOGY

NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN (NBSAP)

2026–2030

Aligning Ghana's Biodiversity Priorities with the Kunming–Montreal Global Biodiversity Framework



Accra, Ghana

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LIST OF ACRONYMS

Acronym	Full Name
ABS	Access and Benefit-Sharing
APR	Annual Progress Report
BIOFIN	Biodiversity Finance Initiative
BER	Biodiversity Expenditure Review
CBD	Convention on Biological Diversity
CEPA	Communication, Education and Public Awareness
CHM	Clearing House Mechanism
COP	Conference of the Parties
CREMA	Community Resource Management Area
CSO	Civil Society Organization
DDDP	District Development Data Platform
DSI	Digital Sequence Information
EbA	Ecosystem-based Adaptation
EIA	Environmental Impact Assessment
EPA	Environmental Protection Authority
FC	Forestry Commission
FPIC	Free, Prior and Informed Consent
GBF	Global Biodiversity Framework
GCF	Green Climate Fund
GEF	Global Environment Facility
GES	Ghana Education Service
GIS	Geographic Information System
GLSS	Ghana Living Standards Survey

Acronym	Full Name
GSS	Ghana Statistical Service
IAS	Invasive Alien Species
IOM	Integrated Ocean Management
IUCN	International Union for the Conservation of Nature
IUU	Illegal, Unreported and Unregulated (Fishing)
KMGBF	Kunming–Montreal Global Biodiversity Framework
L.I.	Legislative Instrument
LUSPA	Land Use and Spatial Planning Authority
MDA	Ministry, Department or Agency
MDG	Millennium Development Goal
MEL	Monitoring, Evaluation and Learning
MERR	Monitoring, Evaluation, Reporting and Review
MEST	Ministry of Environment, Science and Technology
MLNR	Ministry of Lands and Natural Resources
MMDA	Metropolitan, Municipal and District Assembly
MoFA	Ministry of Food and Agriculture
MOFA	Ministry of Fisheries and Aquaculture
MoF	Ministry of Finance
MoGCSP	Ministry of Gender, Children and Social Protection
MSP	Marine Spatial Planning
MTDP	Medium-Term Development Plan
NAP	National Adaptation Plan
NBA	National Biosafety Authority
NBSAP	National Biodiversity Strategy and Action Plan
NBSC	National Biodiversity Steering Committee
NCCE	National Commission for Civic Education

Acronym	Full Name
NDC	Nationally Determined Contribution
NDPC	National Development Planning Commission
NTFP	Non-Timber Forest Product
OECM	Other Effective Area-Based Conservation Measure
PA	Protected Area
PES	Payment for Ecosystem Services
PSEA	Prevention of Sexual Exploitation and Abuse
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RMSC	Resource Management Support Centre
SEA	Strategic Environmental Assessment
SEEA	System of Environmental-Economic Accounting
SHS	Senior High School
SCP	Sustainable Consumption and Production
TNFD	Taskforce on Nature-related Financial Disclosures
TVET	Technical and Vocational Education and Training
TWG	Technical Working Group
UN	United Nations
USD	United States Dollar
WRC	Water Resources Commission

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The Ministry recognises the contributions of all individuals and organisations that supported the development of the NBSAP, which provides a common direction for conserving and restoring biodiversity, sustaining its use, and ensuring the equitable sharing of benefits.

The NBSAP's implementation depends on the participation and accountability of institutions and stakeholders whose decisions affect Ghana's biological resources.

FOREWORD

Biodiversity forms the foundation of Ghana's natural heritage and is essential to the country's sustainable development. Forests, wetlands, rivers, savannas, coastal, and marine ecosystems provide critical ecosystem services that support livelihoods, ensure food security, regulate climate and water systems, and sustain cultural traditions and values passed down through generations. Despite their importance, these natural assets are facing increasing pressures from population growth, land-use change, unsustainable resource exploitation, pollution, invasive alien species, and the impacts of climate change. Addressing these challenges is not only an environmental imperative but also a fundamental prerequisite for achieving inclusive economic growth, social well-being, and long-term national resilience.

The National Biodiversity Strategy and Action Plan (NBSAP) 2026–2030 represents Ghana's renewed commitment to halting and reversing biodiversity loss while advancing sustainable and inclusive national development. Aligned with the Kunming-Montreal Global Biodiversity Framework (KMGBF) adopted under the Convention on Biological Diversity (CBD), this Strategy reflects Ghana's national priorities, development aspirations, planning systems, and decentralized governance structure.

Building on the achievements, lessons, and challenges of previous biodiversity strategies, the NBSAP 2026-2030 adopts a more integrated, results-driven, and adaptive approach to biodiversity governance. It recognizes that conserving biodiversity is a shared responsibility that extends beyond environmental institutions and requires coordinated action across government, the private sector, traditional authorities, civil society organizations, academia, research institutions, local communities, women, youth and persons with disabilities.

Accordingly, the Strategy places strong emphasis on mainstreaming biodiversity considerations into national and sub-national development planning, reforming incentives that drive unsustainable practices, mobilizing innovative and sustainable financing and strengthening institutional accountability through robust monitoring, evaluation, reporting

and review systems. These measures aim to ensure that biodiversity considerations are systematically integrated into decision-making across all sectors of the economy.

Importantly, the NBSAP positions biodiversity as a strategic national asset that underpins climate resilience, economic transformation, human well-being, and sustainable livelihoods. Through its 23 National Biodiversity Targets, the Strategy provides a clear and actionable framework to conserve and restore ecosystems, protect species and genetic diversity, promote the sustainable use of biological resources, and ensure the fair and equitable sharing of benefits arising from the utilization of biodiversity and genetic resources.

The successful implementation of this Strategy will depend on collective ownership, strong partnerships, and sustained commitment from all stakeholders. The Government of Ghana will provide leadership, policy direction, coordination, and oversight, while Metropolitan, Municipal, and District Assemblies (MMDAs) will play a pivotal role in translating national priorities into effective local action. Equally, the private sector, civil society, traditional authorities, development partners, and individual citizens must contribute their knowledge, resources, and leadership to safeguard Ghana's biodiversity for present and future generations.

I therefore call upon all stakeholders to actively support and participate in the implementation of the National Biodiversity Strategy and Action Plan 2026–2030. Together, we can secure a resilient, prosperous, and nature-positive future in which biodiversity continues to sustain our economy, enrich our culture, and enhance the well-being of all Ghanaians.

Hon. Dr. Zanetor Agyeman-Rawlings (MP)
Minister for Environment, Science and Technology
Republic of Ghana

EXECUTIVE SUMMARY

Biodiversity is the foundation of Ghana's natural heritage and a critical pillar of national development, climate resilience, food security, cultural identity, and livelihoods. Forests regulate water cycles, sequester carbon, and support ecosystem stability; coastal and marine ecosystems sustain fisheries, tourism, and local economies; while genetic resources underpin agricultural productivity, public health, and innovation. However, biodiversity loss continues to accelerate because of population growth, land-use change, unsustainable exploitation of natural resources, pollution, invasive alien species, and the growing impacts of climate change. If left unaddressed, these pressures will undermine Ghana's development aspirations and compromise the well-being of both present and future generations.

The National Biodiversity Strategy and Action Plan (NBSAP) 2026-2030 represents Ghana's renewed commitment to halting and reversing biodiversity loss in line with the Kunming-Montreal Global Biodiversity Framework (KMGBF). The Strategy provides a comprehensive and actionable roadmap for conserving biodiversity, promoting its sustainable use, and ensuring the fair and equitable sharing of benefits arising from genetic resources and associated traditional knowledge. It further seeks to mainstream biodiversity considerations across national development planning, economic decision-making processes, and societal actions at all levels.

Strategic Direction and National Targets

The NBSAP is organized around 23 National Biodiversity Targets, fully aligned with the KMGBF. Collectively, these targets address the direct and indirect drivers of biodiversity loss while strengthening the policy, institutional, financial, and social conditions necessary for effective implementation. Recognizing the interdependence of biodiversity challenges and solutions, the targets are designed to be implemented as an integrated and mutually reinforcing package rather than as isolated interventions.

Targets 1-8 focus on reducing direct pressures on biodiversity through biodiversity-inclusive spatial planning, ecosystem restoration, the expansion and effective management of protected areas and Other Effective Area-Based Conservation Measures (OECMs),

species conservation, sustainable use of wild species, management of invasive alien species, pollution reduction, and the strengthening of climate-biodiversity synergies.

Targets 9-13 emphasize governance, equity, and knowledge systems. These targets focus on access and benefit-sharing for genetic resources and traditional knowledge, sustainable production and consumption systems, safeguarding ecosystem services, enhancing urban biodiversity, and ensuring the fair and equitable sharing of benefits derived from the use of digital sequence information.

Targets 14-18 seek to integrate biodiversity considerations into public and private sector decision-making. They promote the mainstreaming of biodiversity across national and sub-national development planning, public investment and budgeting processes, business and financial systems, sustainable consumption and lifestyles, biosafety governance, and the reform or elimination of incentives that are harmful to biodiversity.

Targets 19-23 provide the enabling conditions necessary for successful implementation. These targets focus on mobilizing biodiversity finance, strengthening capacity development and technology transfer, advancing education and public awareness, promoting inclusive participation and access to information and justice, and ensuring gender-responsive approaches to biodiversity conservation and sustainable use.

Together, these 23 targets provide a coherent framework for action that will guide Ghana's efforts to conserve biodiversity, enhance ecosystem resilience, support sustainable development, and contribute to the achievement of the global goals and targets of the Kunming-Montreal Global Biodiversity Framework by 2030.

Monitoring, Evaluation and Learning (MEL)

The NBSAP positions Monitoring, Evaluation and Learning (MEL) as a central governance and accountability function, integral to effective implementation rather than a stand-alone reporting requirement. The MEL framework is aligned with Ghana's national development planning and reporting architecture, as well as the monitoring framework of the Kunming-Montreal Global Biodiversity Framework (KMGBF), thereby facilitating coherent national and international reporting while minimizing duplication of effort.

Progress will be measured through a harmonized suite of indicators comprising KMGBF headline indicators, component indicators, and nationally relevant complementary indicators. These indicators are designed to assess not only biodiversity outcomes but also the extent and effectiveness of implementation efforts. Monitoring will therefore be undertaken across four interconnected dimensions: impact, implementation, resource mobilization, and effectiveness.

To support adaptive management, the MEL framework incorporates a structured feedback and learning mechanism that enables the continuous assessment of progress, identification of emerging challenges, and timely corrective action where necessary. By generating evidence for decision-making and informing policy and management responses, the framework ensures that implementation remains responsive to changing circumstances, emerging threats, and evolving national priorities. This adaptive approach strengthens accountability, promotes continuous learning, and enhances the likelihood of achieving the NBSAP's biodiversity goals and targets by 2030.

Communication, Education, and Public Awareness

The successful implementation of the NBSAP depends on informed and active participation by all sectors of society and the economy, as well as sustained changes in attitudes and behaviours towards biodiversity conservation and sustainable resource use. To achieve this, the Strategy recognizes Communication, Education and Public Awareness (CEPA) as a cross-cutting implementation mechanism that supports the achievement of all 23 National Biodiversity Targets.

Through formal and non-formal education, community engagement, strategic communication, media outreach, and culturally appropriate awareness programmes, CEPA seeks to strengthen public understanding of the value of biodiversity and the consequences of its loss. It serves as a critical bridge between policy and practice by translating technical and policy information into accessible knowledge that can inform decision-making and encourage positive behavioural change.

The CEPA programme will promote greater public participation in biodiversity conservation, strengthen compliance with environmental laws and regulations, foster stewardship among local communities, and build broad societal ownership of Ghana's biodiversity agenda. Special emphasis will be placed on engaging youth, women, indigenous peoples and local communities, the private sector, educational institutions, civil society organizations, and the media as key partners in biodiversity action.

The National Biodiversity Strategy and Action Plan (NBSAP) 2026-2030 provides Ghana with a clear, credible, and implementable framework for fulfilling its commitments under the Kunming-Montreal Global Biodiversity Framework (KMGBF). By aligning national priorities, policies, and actions with the goals and targets of the Framework, the NBSAP contributes to the realization of the Convention on Biological Diversity's 2050 Vision of "Living in Harmony with Nature."

The Strategy adopts an integrated whole-government and whole-of-society approach that recognizes biodiversity as a fundamental asset for sustainable development, climate resilience, human well-being, and economic prosperity. Through the mainstreaming of biodiversity considerations into national planning, public investment, sectoral policies, and private sector decision-making, the NBSAP seeks to ensure that conservation and sustainable use become integral components of Ghana's development pathway.

Successful implementation will require strong political commitment, adequate financing, effective institutions, robust monitoring and accountability mechanisms, and meaningful participation by all stakeholders. By empowering government institutions, local communities, women, youth, indigenous people, civil society organizations, research, academia, and the private sector to contribute to biodiversity action, the Strategy establishes the foundation for collective responsibility and long-term success.

In conclusion, the NBSAP 2026-2030 charts a pathway for halting and reversing biodiversity loss, restoring degraded ecosystems, enhancing ecosystem services, and securing the sustainable use of Ghana's biological resources. In doing so, it will contribute not only to national development priorities but also to global efforts to conserve biodiversity for present and future generations.

CHAPTER ONE

NATIONAL CONTEXT AND BIODIVERSITY OVERVIEW

1.1: COUNTRY PROFILE AND DEVELOPMENT CONTEXT

1.1.1 GEOGRAPHIC AND ENVIRONMENTAL CONTEXT

Ghana is located on the west coast of Africa, occupying a total land area of approximately 238,533 square kilometres. Côte d'Ivoire borders the country to the west, Burkina Faso to the north, Togo to the east, and the Gulf of Guinea to the south. Crucially, Ghana also holds jurisdiction over a maritime Exclusive Economic Zone (EEZ) of approximately 227,500 square kilometres, extending 200 nautical miles seaward. This vast maritime domain is a critical reservoir of marine biodiversity and a key pillar of the emerging blue economy.

The country comprises four biogeographic regions (Figure 1.1): the Guineo-Congolian in the south-west (1), the Guinea-Congolia/Sudania transitional zone in the middle and south-east (2), the Sudanian in the north (3), and the Volta Region, which is predominantly mountainous (4). While the first three are well-established biogeographic regions, the Volta Region has been recognised as a distinct biogeographic region based on the distribution of the country's butterfly fauna.

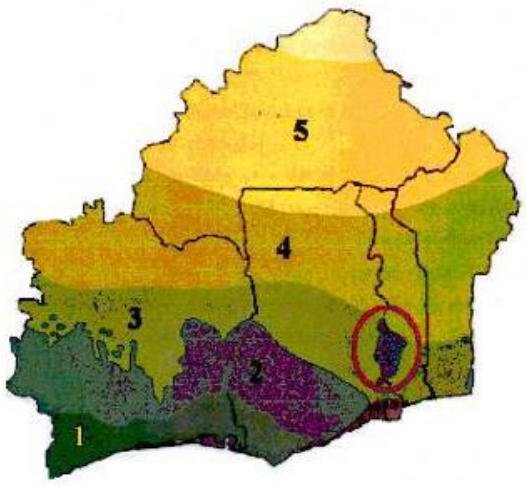

Figure 1.1 Biogeographic Zones

Ecologically, Ghana is divided into six distinct zones (Figure 1.2): Coastal Savanna, Evergreen Forest, Deciduous Forest, Transition Zone, Guinea Savanna and Sudan Savanna. These zones support a rich diversity of flora and fauna but are under varying degrees of pressure from anthropogenic factors.

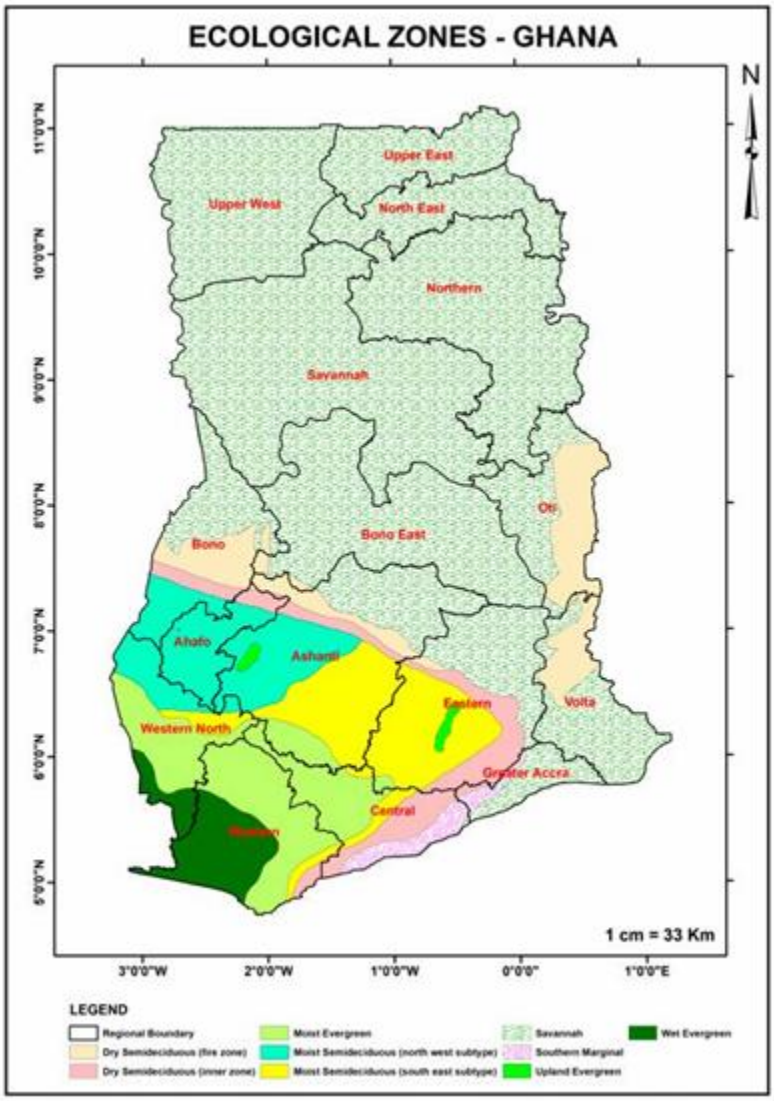

Figure 1.2 Ecological Zones of Ghana.

According to the Ghana Land and Ecosystem Extent Accounts (2015–2021), the country's closed forest cover declined by 23.4% (3,386 km²) over the six-year period, while settlement areas expanded by 49.9%, reflecting rapid urbanization and habitat conversion.

Current land-use data indicates that agricultural lands now occupy approximately 52% of the total land area, highlighting the intense competition between production and conservation landscapes (Figure 1.3).

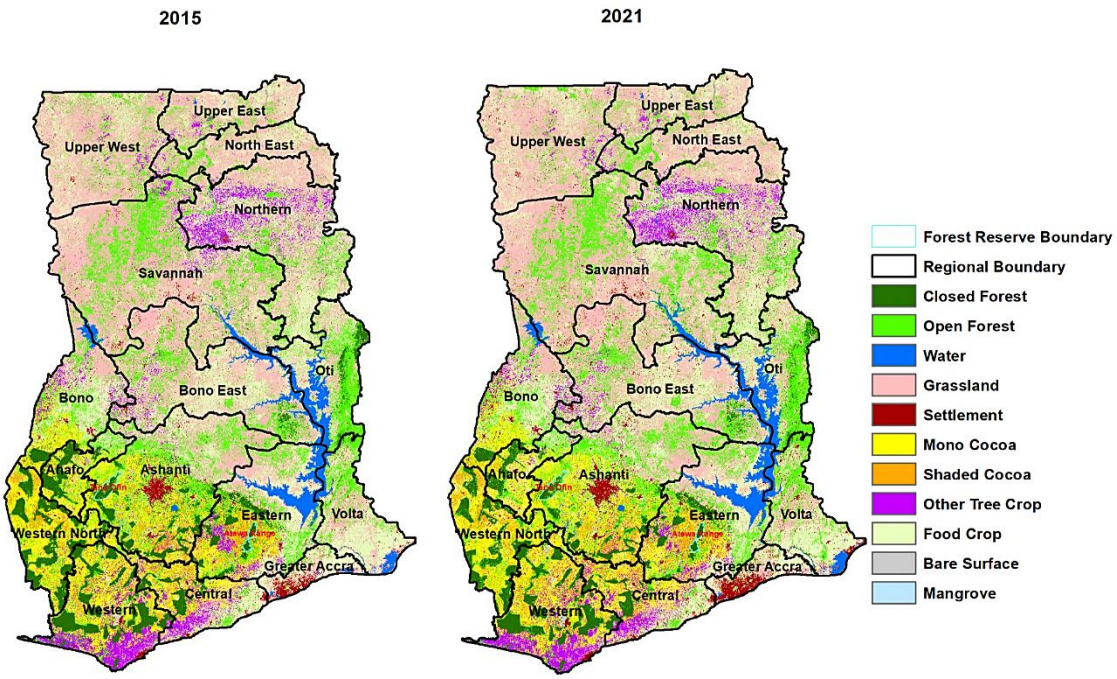

Figure 1.3: Land Cover Map of Ghana.

1.1.2 SOCIO-DEMOGRAPHIC PROFILE

Ghana's population was recorded at 30.8 million in the 2021 Population and Housing Census, with an intercensal growth rate of 2.1%. Currently, Ghana's population is estimated at approximately 35.7 million people with growth rate of 1.8% per year, and a median age of 21.6 years indicating a high incidence rate of youth in the populace. Ghana ranks 46th in the world by population. This reflects continued demographic growth and increasing demand for land, food, water, energy, and other natural resources. The population is increasingly urbanized, with approximately 59.2% of citizens living in urban areas, placing significant stress on peri-urban ecosystems and coastal zones. The population density has risen to 157 persons per square kilometre, intensifying the demand

for land, water, and biological resources. Administratively, the country is divided into 16 Regions and 261 Metropolitan, Municipal, and District Assemblies (MMDAs), creating a complex landscape for decentralised biodiversity governance.

1.1.3 ECONOMIC CONTEXT AND NATURAL CAPITAL

Ghana's economy remains fundamentally linked to its natural capital. In 2023/2024, the agriculture sector contributed approximately 19.0% to the Gross Domestic Product (GDP), with the crops sub-sector driving growth. However, the forestry and logging sub-sector contracted by 5.3% (Q4 2024), highlighting the critical challenge of balancing resource extraction with sustainability.

The coastal zone, although it constitutes only a 7% of the land area, supports 25% of the population and key industries (Figure 1.4). This zone faces severe erosion and sea-level rise, with the coastline retreating at an average rate of 2 meters per annum, and up to 17 meters in vulnerable areas like Keta. These dynamics underscore the urgent need for biodiversity-inclusive spatial planning, as mandated by this revised NBSAP.

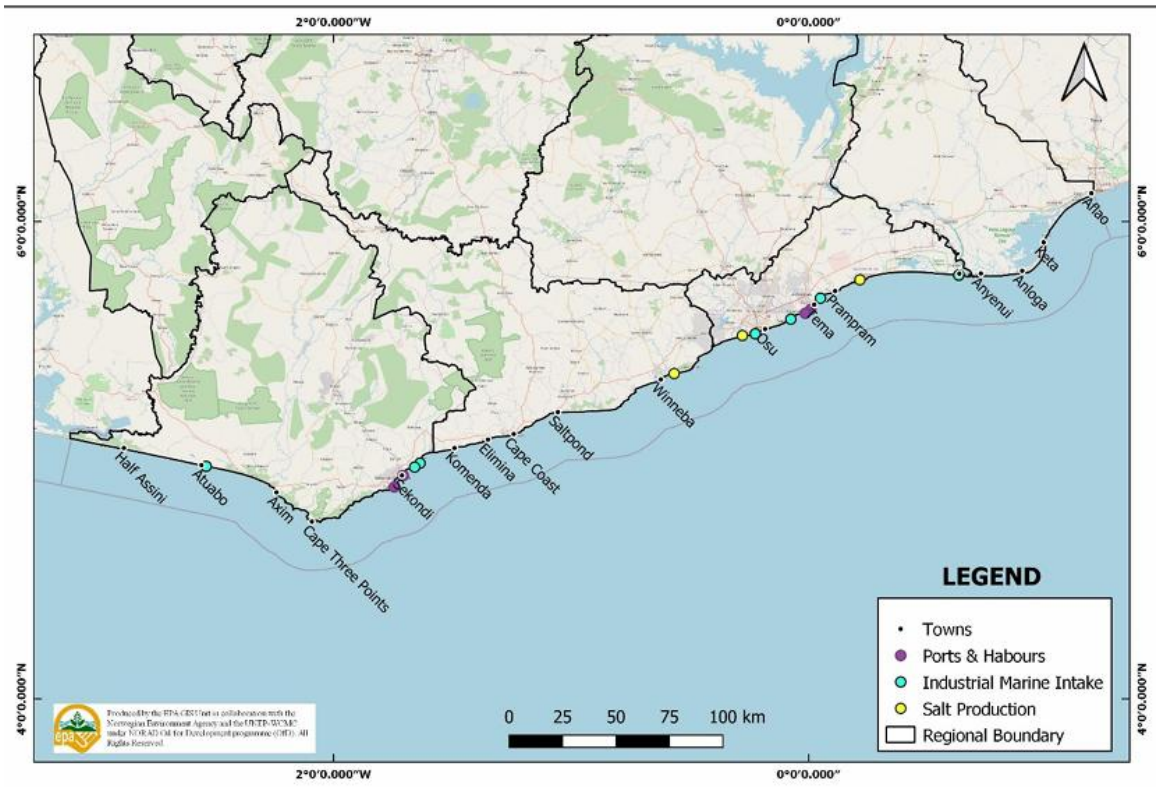

Figure 1.4: Industrial facilities along Ghana's Coast).

1.1.4 GOVERNANCE AND INSTITUTIONAL CONTEXT

Decentralised governance arrangements shape Ghana's development context. The 261 Metropolitan, Municipal and District Assemblies (MMDAs) are responsible for local-level planning and policy implementation, guided by the frameworks of the National Development Planning Commission (NDPC). This decentralised system provides opportunities for biodiversity considerations to be integrated into local development plans, spatial planning processes and land-use management frameworks. However, significant disparities in institutional capacity, technical expertise and financial resources across districts continue to constrain effective biodiversity mainstreaming. In addition to formal governance structures, traditional authorities play a critical role in biodiversity conservation through their custodianship of customary lands, protection of sacred groves, regulation of community resource use and promotion of indigenous conservation practices. Their influence and deep knowledge of local ecosystems provide valuable opportunities for strengthening community-based conservation and sustainable management of natural

resources, strengthening collaborations between MMDAs, traditional authorities, local communities and other stakeholders, it is therefore essential to ensure inclusive, effective and culturally appropriate biodiversity governance.

1.1.5 CLIMATE CHANGE AND RESILIENCE

Climate change adds a further layer of complexity to Ghana's biodiversity and development landscape. Rising temperatures, erratic rainfall patterns, prolonged droughts, coastal erosion, flooding, and other extreme weather events are already affecting ecosystem structure, function, and productivity. These climate-related impacts interact with existing pressures such as habitat loss, urbanization, pollution, and unsustainable resource use, often intensifying their effects and reducing the capacity of ecosystems to recover.

At the same time, healthy ecosystems play a critical role in strengthening resilience to climate change. Forests, wetlands, mangroves, savannas, and coastal ecosystems provide essential services such as carbon sequestration, flood regulation, shoreline protection, water security, and livelihood support for vulnerable communities. Recognising these benefits, national development planning increasingly emphasises Ecosystem-based Adaptation (EbA) as a cost-effective and sustainable approach to addressing climate risks. This growing policy focus creates a strategic opportunity to integrate biodiversity conservation and restoration actions into broader climate resilience and sustainable development efforts, positioning the measures proposed in this Strategy as key contributions to both environmental sustainability and climate adaptation objectives.

1.1.6 CONSTITUTIONAL MANDATE

The Revision of Ghana's NBSAP (2016-2021) is firmly rooted in the 1992 Constitution of the Republic of Ghana. Article 36(9) explicitly mandates that *"The State shall take appropriate measures needed to protect and safeguard the national environment for posterity; and shall seek co-operation with other states and bodies for purposes of protecting the wider international environment for mankind."* This provision serves as the supreme legal justification for Ghana's commitment to the Kunming-Montreal Global Biodiversity Framework (KMGBF).

1.2: GHANA'S ECOSYSTEMS, SPECIES AND GENETIC DIVERSITY

Ghana's biodiversity reflects the country's diverse ecological conditions, climatic gradients, and long history of interaction between people and nature. The nation has a variety of ecosystems, species, and genetic resources that provide essential ecological functions and support livelihoods, cultural heritage, economic development, and human well-being. Understanding the status, distribution, and significance of these biological resources is fundamental to setting priorities and guiding action under the National Biodiversity Strategy and Action Plan (NBSAP).

Ghana is broadly divided into three major ecological belts (coastal, forest, and savanna), which are further classified into six principal ecological/agro-ecological zones based on climate, vegetation, soils, and land-use characteristics. The ecological zones include the Coastal Savanna, Forest-Savanna Transition, Deciduous Forest, Evergreen Forest, Guinea Savanna, and Sudan Savanna zones.

The Ecological Zones of Ghana

1. **Coastal Savanna Zone**
    - Located along the coasts of the Greater Accra, Central, and Volta Regions.
    - Characterised by grasslands, shrubs, scattered trees, lagoons, wetlands, Coastal Strand and mangrove ecosystems.
    - Receives relatively low rainfall (about 800 mm annually).
    - Supports fisheries and marine livelihoods.
2. **Forest-Savanna Transition Zone (Dry and Wet)**
    - Forms a transitional belt between the forest and Savanna Regions.
    - Contains a mixture of forest and savanna vegetation.
    - Important for agriculture and livestock production.
3. **Semi-Deciduous Forest Zone**
    - Covers much of the middle forest belt.
    - Characterized by diverse tree species and high agricultural productivity.
    - Supports cocoa production and timber resources.
4. **Evergreen Forest (Moist and Wet Evergreen Forest) Zone**

- Found mainly in southwestern Ghana.
- Includes wet evergreen moist and upland evergreen forests with the highest biodiversity richness.
- Contains many protected areas and forest reserves.

5. **Guinea Savanna Zone**
    - The largest ecological zone, covering most of northern Ghana.
    - Dominated by grasslands with scattered drought-resistant trees.
    - Supports crop cultivation and livestock rearing.
6. **Sudan Savanna Zone**
    - Located in the extreme north-eastern part of Ghana.
    - Characterised by sparse vegetation, short grasses and drought-tolerant trees.
    - Receives the lowest rainfall among the savanna zones.

These ecological zones support a wide diversity of terrestrial, freshwater, coastal, and marine ecosystems, each characterized by distinct biological communities and ecosystem functions. Together, they contribute to the country's ecological resilience and provide critical ecosystem services such as water regulation, soil fertility maintenance, carbon sequestration, climate regulation, pollination, and coastal protection.

Ghana's terrestrial ecosystems comprise tropical forests, savanna woodlands, grasslands, wetlands, river systems, and agricultural landscapes (Figure 1.5). The country's forest ecosystems, particularly within the High Forest Zone, are among the most biologically diverse in West Africa and contain numerous endemics and globally threatened species. Savanna ecosystems occupy much of northern Ghana and provide important wildlife habitats while supporting agriculture and livestock production. Wetlands, including six internationally designated Ramsar sites, play vital roles in biodiversity conservation, flood regulation, fisheries production, and the conservation of migratory bird species. Coastal and marine ecosystems, including lagoons, estuaries, mangroves, seagrass habitats, and nearshore marine waters, support productive fisheries, tourism, and coastal livelihoods.

Ghana harbours a rich diversity of species across major taxonomic groups. The country is home to thousands of plant species, hundreds of bird species, numerous mammals, reptiles, amphibians, freshwater fish species, marine organisms, insects, and other invertebrates. Notable wildlife species include the forest elephant, duiker, leopard, manatee, chimpanzee, leatherback sea turtle, olive ridley turtle, arthropods, and several endemics and threatened bird species. Ghana's ecosystems also serve as important habitats for migratory species and contribute significantly to regional biodiversity conservation within the West African sub-region.

Genetic diversity underpins ecosystem resilience and food security. Ghana possesses a wide range of genetic resources found in crop varieties, livestock breeds, forest tree species, aquatic organisms, medicinal plants, and wild relatives of cultivated species. Indigenous crop varieties and livestock breeds have evolved over generations in response to local environmental conditions and continue to provide important genetic traits for adaptation to climate change, pests, diseases, and other emerging challenges. Traditional knowledge associated with the conservation and use of these genetic resources remains an important component of Ghana's biodiversity heritage and contributes to sustainable resource management and innovation.

Despite this rich biodiversity, many ecosystems and species are experiencing increasing pressure from habitat loss, deforestation, agricultural expansion, unsustainable harvesting of natural resources, pollution, invasive alien species, infrastructure development, illegal mining, and climate change. These pressures have contributed to ecosystem degradation, species population declines, and the erosion of genetic diversity. Addressing these challenges requires coordinated action to conserve ecosystems, protect threatened species, maintain genetic resources, and integrate biodiversity considerations into national development processes.

The conservation and sustainable use of Ghana's ecosystems, species, and genetic diversity are therefore central to achieving the NBSAP's objectives, enhancing ecosystem resilience, supporting sustainable livelihoods, and contributing to the Convention on Biological Diversity's vision of living in harmony with nature by 2050.

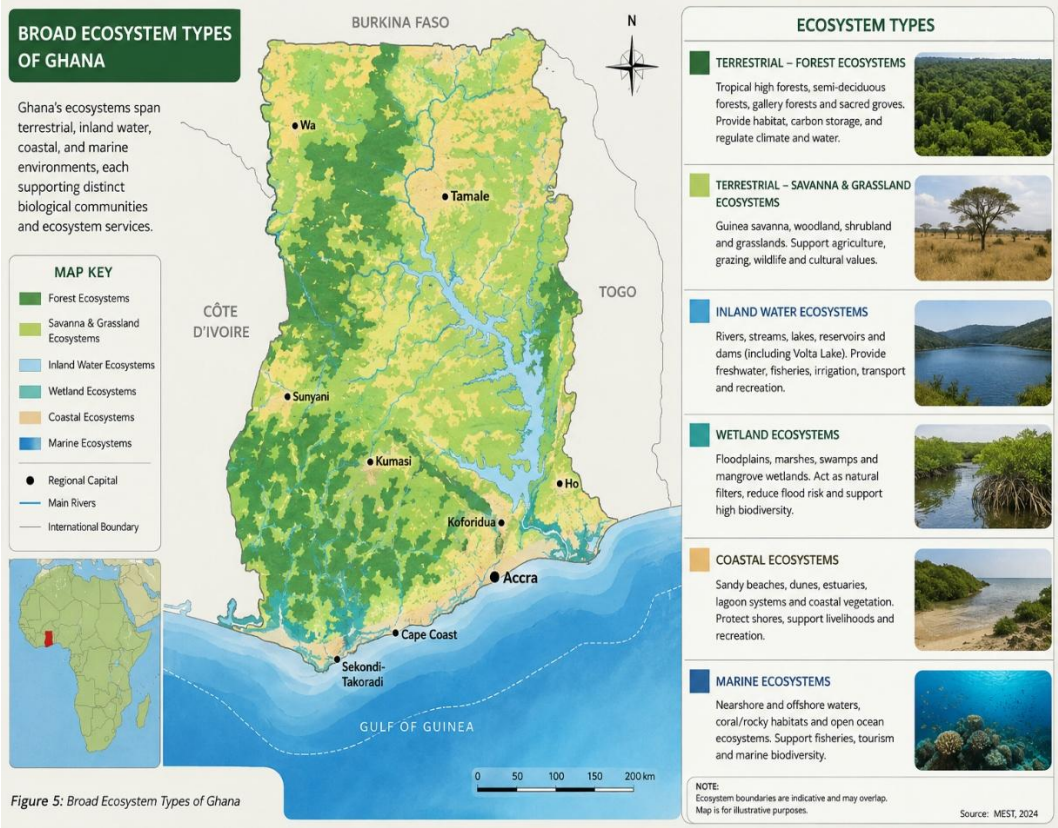

Figure 1.5 Broad Ecosystem Types of Ghana.

1.2.1 BIODIVERSITY OF TERRESTRIAL ECOSYSTEMS IN GHANA

Terrestrial ecosystems include the high forest zone, forest–savanna transition zone and savanna woodlands.

The high forest zone, located primarily in the southern part of the country, is part of the Upper Guinean Forest ecosystem and is recognised for its high species richness and endemism. These forests play a critical role in carbon storage, climate regulation, watershed protection, and provision of timber and non-timber forest products.

The forest–savanna transition zone and savanna ecosystems dominate central and northern Ghana. These ecosystems support a mix of woodlands, grasslands and agro-ecosystems, providing habitat for wildlife and supporting agriculture, grazing, and

fuelwood supply. Savanna ecosystems are particularly important for food security and livelihoods, but are vulnerable to land degradation, bushfires and climate variability.

1.2.1.1 THE FLORA OF TERRESTRIAL SYSTEMS

The most recent nationally consolidated botanical data are contained in the Plants of Ghana dataset published in 2021, while botanical conservation assessments have been periodically updated, with major reference assessments undertaken in 1996 and 2016. Ghana's floral diversity is a critical component of the Upper Guinea Forest Ecosystem, recognised globally as one of the 25 distinct biodiversity hotspots. Assessments of the country's flora have documented both indigenous and introduced species, indicating a rich natural heritage under significant stress.

Species Diversity and Composition

The country's botanical census records approximately 3,600 species representing the three major taxonomic groups. Floral diversity is most pronounced among the angiosperms, which accounts for most of the recorded plant life. Approximately 2,974 indigenous angiosperms and approximately 253 introduced or naturalised species have been documented.

Notably, only one indigenous gymnosperm is known: the West African Cycad (*Encephalartos barteri*). This species is of high conservation value (IUCN Status: Vulnerable) and is found primarily in rocky outcrops in the Volta Gorge. Other gymnosperms found in the country are introduced species used primarily for aesthetic and economic purposes.

High Forest Zone-Centres of Endemism and Hotspots

Species abundance and diversity are not evenly distributed. The wet evergreen forest type in the south-western corner of Ghana exhibits the highest levels of endemism and species richness. The Ankasa and Nini-Suhien Conservation Areas represent the most biologically diverse terrestrial zone in Ghana. Its unique climatic conditions and structural stratification support rare flora that are absent from other parts of the Upper Guinea range. While this

region is a global hotspot, it is severely fragmented. Historically, the region has lost over 80% of its original forest cover. Recent data from the *Ghana Land and Ecosystem Extent Accounts (2015–2021)* confirms that this trend continues, with a 23.4% decline in closed forest cover observed over a six-year period.

Savanna Ecosystems

Information on floral diversity in the northern savanna biomes remains sparse compared to the high forest zone. However, the gallery of forests (riparian vegetation) within the savanna landscape are critical micro-habitats that likely harbour greater species abundance and diversity than the surrounding dry savanna woodlands.

Table 1.1 Vascular Plant Census of Ghana

(a) Indigenous Species			
Taxonomic Group	**Family**	**Genus**	**Species**
Pteridophytes (Ferns & Allies)	**15**	**43**	**124**
Gymnosperms	**1**	**1**	**1**
Angiosperms:			
Monocotyledons	**30**	**227**	**780**
Dicotyledons	**127**	**806**	**2,069**
TOTAL INDIGENOUS	**173**	**1,077**	**2,974**
(b) Introduced (Naturalised) Species			
Taxonomic Group	**Families**	**Genus**	**Species**
Monocotyledons	**15**	**42**	**53**
Dicotyledons	**63**	**149**	**200**
TOTAL INTRODUCED	**78**	**191**	**253**

(Based on National Botanical Assessments from 1996-2016; Plants of Ghana, 2021)

1.2.1.2 THE FAUNA OF TERRESTRIAL SYSTEMS

Ghana's terrestrial fauna is diverse, reflecting the country's transition from the wet forests of the south to the dry savannas of the north. While populations have declined due to habitat

fragmentation, the country retains a distinct assemblage of species characteristic of the West African sub-region**.**

Zoogeographic Composition

Fauna is composed of four distinct biogeographical elements: Guinea-Congolian Forest Species, a Ubiquitous species found throughout the West and Central African rainforest belt, such as the Forest Elephant (*Loxodonta cyclotis*) and the West African Chimpanzee (*Pan troglodytes verus*). The Upper Guinea Endemics comprise species strictly limited to the Upper Guinea Forest block (West of the Dahomey Gap). Notable examples include the Zebra Duiker (*Cephalophus zebra*), Jentink's Duiker (*Cephalophus jentinki*), Western Red Colobus Monkey (*Procolobus badius*), Black-and-White Colobus Monkey (*Colobus vellerosus)* and the Diana Monkey (*Cercopithecus diana*). Transitional Zone Species occurring in the ecotone between forest and savanna, such as the Tawny Eagle (*Aquila rapax*). Sudan Savanna Species, restricted to the northern open woodlands, such as the Korrigum (*Damaliscus lunatus korrigum*).

Species Richness and Diversity Status

Although the terrestrial ecosystem is under pressure, it supports many species of conservation concern. Current records indicate the presence of 225 mammalian species, with approximately 93 species recorded specifically in the savanna ecological zone. Ghana is ornithologically rich, with 748 confirmed avian species. Of these, 494 are resident, while 176 are regular seasonal migrants, including 100 species from the Palearctic region. Ghana is strategically located on the East Atlantic Flyway and the Mediterranean Flyway, making it a vital corridor for waterbirds. Eleven (11) of the 15 terrestrial bird species endemics to the Upper Guinea Forest occur in Ghana, including the Wattled Cuckoo-shrike (*Campephaga lobata*) and the White-breasted Guineafowl (*Agelastes meleagrides*). Estimates suggest the presence of 221 species of amphibians and reptiles. Endemism is observed in three frog species (*Hyperolius baumanni*, *H. fusciventris*, and *H. sylvaticus*) and the false agama lizard *(Agama sylvanus)*. However, modern genetic research has reshaped its scientific classification. In 2012, a comprehensive molecular study published

by taxonomists officially determined that *Agama sylvanus* is a junior synonym of *Agama africana* (the West African Agama). High butterfly endemism is recorded, particularly in the high forest areas, where about 23 species are classified as endemic or near-endemic.

Conservation Status and Hotspots

Faunal diversity is concentrated in "biological hotspots" within the high forest zone, which accounts for 83% of all recorded species recorded. The Ankasa Conservation Area, Bia Forest Reserve, and Atewa Range Forest Reserve are critical refugia where canopy stratification and unique micro-climates support these endemic populations.

However, various threats are significantly modifying faunal abundance and diversity. Conservation concern is high for keystone species such as hornbills, parrots, and birds of prey. Additionally, while primarily marine, four out of the five species of marine turtles and three species of crocodiles are threatened by terrestrial disturbances (nesting beach destruction and habitat encroachment).

Table 1.2 Summary of Terrestrial Fauna Diversity in Ghana.

Taxonomic Group	Estimated Species Count	Key Conservation Notes
Mammals	225	Includes critically endangered primates e.g., Roland's Red Colobus (*Piliocolobus waldroni*).
Birds	748	Includes 12 Upper Guinea endemics and 176 migratory species.
Reptiles & Amphibians	~221	Includes endemic frogs (*Hyperolius* spp.) and threatened crocodiles.
Butterflies	~925	High endemism (23 spp.) in the Wet Evergreen forests.

1.2.2 BIODIVERSITY OF MARINE AND AQUATIC SYSTEMS

Ghana's aquatic biodiversity is shaped by two major hydrological domains: the marine and coastal ecosystems of the Gulf of Guinea and the inland freshwater systems of the Volta Basin and coastal river networks. Together, these ecosystems support a wide diversity of species, provide critical ecological functions, and sustain livelihoods through fisheries, agriculture, water supply, transportation, and cultural services.

The marine and coastal domains encompass sandy beaches, rocky shorelines, estuaries, lagoons, mudflats, mangroves, seagrass habitats, and nearshore marine waters. These ecosystems support diverse fish populations, marine mammals, sea turtles, crustaceans, molluscs, and numerous migratory bird species. Ghana's coastal wetlands, many of which are designated Ramsar Sites, provide important breeding, feeding, and nursery grounds for aquatic and terrestrial biodiversity. However, marine ecosystems face increasing pressure from overfishing, habitat degradation, coastal development, pollution, invasive species and the impacts of climate change, including sea-level rise and coastal erosion.

The inland freshwater domain is dominated by the Volta River system, Lake Volta, tributary rivers, floodplains, and numerous wetlands distributed across the country. These ecosystems support a wide range of freshwater fish, amphibians, reptiles, aquatic plants, and invertebrates, while also supplying water for domestic use, irrigation, hydropower generation, and fisheries. Freshwater habitats are increasingly threatened by water pollution, unsustainable land-use practices, illegal mining activities, sedimentation, water abstraction, and the fragmentation of river systems.

Although both marine and freshwater ecosystems continue to provide essential ecological and economic benefits, assessments indicate declining ecosystem integrity in many areas. Fish stocks are under pressure, wetland habitats are being degraded or converted, water quality is deteriorating in several river basins, and the resilience of aquatic ecosystems to environmental change is declining. Addressing these challenges will require integrated ecosystem-based management approaches that strengthen conservation, promote sustainable resource use, improve pollution control, and enhance the resilience of aquatic systems to climate change and other emerging threats.

1.2.2.1 MARINE AND COASTAL SYSTEMS

Ghana's coastline (Figure 1.6) extends approximately 550 kilometres from Aflao in the east to the border with Côte d'Ivoire in the west. The coastal zone includes a continental shelf area of about 24,300 km². This zone is characterized by three geomorphological sections: the sandy/shrub lands of the East (Volta Delta), the rocky shores of the Central Region, and the pristine wetlands of the West (Figure 1.6). In addition, the coastal zone is characterized by tidal mudflats, lagoons, mangroves, estuaries, some of which are Ramsar sites and offshore rocky reefs., while its Exclusive Economic Zone (EEZ) covers approximately 227,500 km² of the Atlantic Ocean.

These ecosystems provide nursery and feeding grounds for commercially important fish species, store carbon, protect coastal communities from erosion and storm surges, and support fisheries, tourism, oil and gas, other ocean-based economic activities and research. Marine fisheries alone support the livelihoods of an estimated 3.2 million people along the value chain and provide about 60% of animal protein. The artisanal sector, operating from 187 fishing villages, 279 fish landing sites, with more than 14,000 registered operational canoes, accounts for about 60 percent of national fish landings and is central to coastal livelihoods and food security.

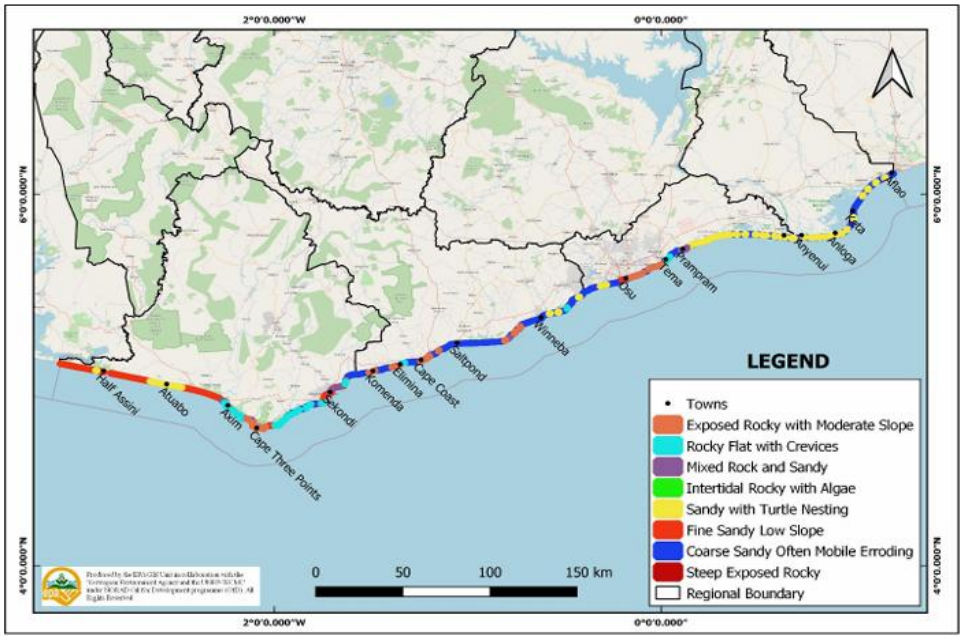

Figure 1.6 The Characterisation of Ghana's Coastline (Source: EPA)



Figure 1.7 Ghana's EEZ indicating the Inshore Exclusive Zone (IEZ) (Fisheries Commission, 2026)

Marine ecosystem, mangroves, coastal wetlands and Ramsar sites are particularly important for biodiversity conservation and climate resilience but are under increasing pressure from development and resource use. Mangrove forest (Figure 1.8) cover has reduced to 11,999 hectares that is, by approximately 19.6% between 2000 and 2022. This loss critically impacts all the coastal Ramsar sites in Ghana, which together with the marine environment and mangroves serve as vital spawning grounds for the about 513 recorded marine fish species and stopover havens for migratory birds.

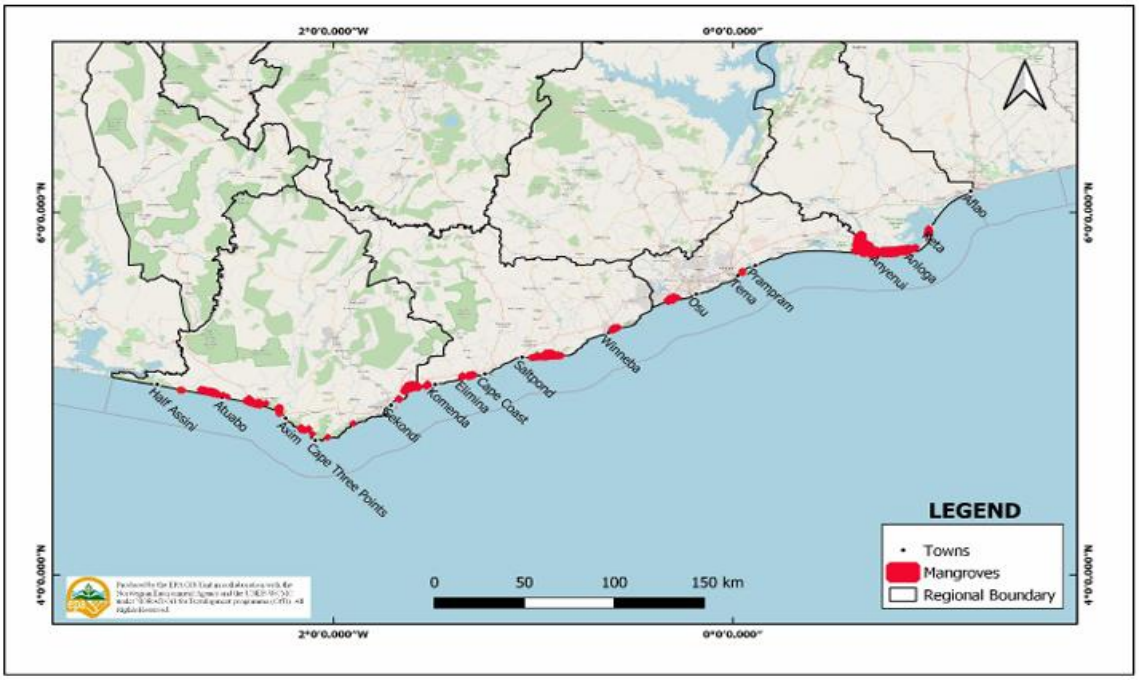

Figure 1.8 Mangrove Stands Along the Coast of Ghana.

Ghana boasts of over 90 coastal lagoons and estuaries including five coastal Ramsar sites (Keta, Songor, Sakumo II, Muni-Pomadze and Densu). These Ramsar sites are vital for migratory waterbirds but face severe siltation and pollution challenges (Figure 1.9).

On 14th April 2026, Ghana formally designated its first marine protected area, the Greater Cape Three Points Marine Protected Area, covering 703.86km2 and encompassing 21 coastal communities along the country's western coastline.

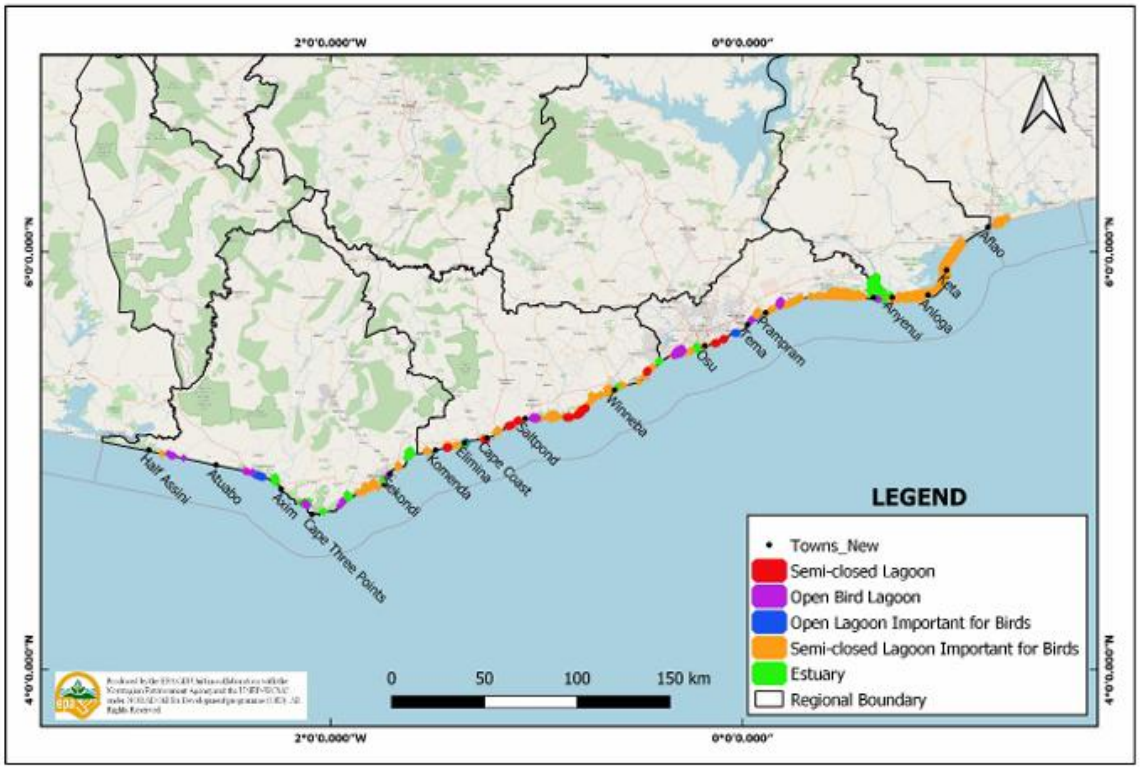

Figure 1.9 Important Lagoons and Estuaries Along the Coast of Ghana

Fisheries and fauna status

The marine ecosystem supports both demersal and pelagic fisheries, which are the livelihood backbone for over 3.2 million Ghanaians. Over the years, there has been a severe decline in landings of small pelagics (sardinellas, anchovies), dropping from a high of 277,000 Metric Tonnes (MT) in 1996 to approximately 28,688 MT in 2023. This represents a collapse of nearly 90**%**, signalling that these stocks are nearing ecological collapse. In terms of marine wildlife**,** the coast supports five species of marine turtles (including Leatherback and Olive Ridley), all of which are listed as vulnerable by the International Union for the Conservation of Nature (IUCN). There are about 18 Cetacean species (dolphins and whales) recorded in Ghana which are also facing increasing risks from fisheries bycatch.

Freshwater and Inland Aquatic Ecosystems

Ghana's inland water system is dominated by the Volta River Basin, which drains about 70% of the country, alongside the southwestern riverine systems (Pra, Ankobra, Tano). Unlike forests, the physical surface area of water bodies in Ghana has increased. According to the *Ecosystem Extent Accounts (2015–2021)*, open water bodies expanded by 6.5% (+476 km²), rising from 7,319 km² to 7,794 km². This increase is not necessarily a sign of health. It is largely attributed to the creation of artificial reservoirs and, critically, the proliferation of illegal mining ("galamsey") impoundments. These stagnant, often chemically contaminated pools inflate the "water" statistics while actively degrading biodiversity support functions.

Ghana also possesses the only protected inland freshwater wetland called Owabi Ramsar Site. The Owabi river and its surrounding forest form Ghana's only inland Ramsar site and the Owabi Wildlife Sanctuary, a protected area spanning about 13 square kilometres that hosts numerous bird species, monkeys, and local wildlife. Additionally, the Lake Bosumtwi, the only natural lake in Ghana, famously formed inside an ancient meteorite impact crater is a body of water spans that roughly 49 square kilometres with unique biophysical features enclosed by steep, lushly forested crater walls rising up to 1,400 feet above the water level, with no surface outlets or rivers flowing into it and also designated as a UNESCO Biosphere Reserve.

Fauna Species Diversity

A total of 219 freshwater fish species in Ghana, with 134 fish species (67%) occurring in the Volta Lake alone, and high endemism found in the swift-flowing rivers of the Western Region (www.fishbase.org). The *World Bank Country Environmental Analysis (2020)* indicates that heavy metal pollution (for instance, mercury, lead, arsenic and cyanide from gold mining) in basins like the Pra, Brim, Densu and Ankobra has rendered some aquatic habitats toxic, threatening endemic fish populations and human health. Invasive aquatic weeds typically the Water Hyacinth *(Pontederia crassipes)* further choke the Lower Volta, altering flow regimes and fish breeding grounds.

1.2.3 GENETIC DIVERSITY

Genetic diversity is a critical but often less visible component of Ghana's biodiversity. It underpins the resilience and productivity of agricultural systems, forestry resources, fisheries, and wildlife populations. Ghana possesses significant genetic diversity in crops, livestock, and wild relatives, shaped by diverse agro-ecological zones, traditional farming systems, and long-standing practices of selection and adaptation. Crop genetic diversity supports food security, nutrition, and adaptation to climate variability, pests, and diseases. The National Genebank at Bunso, managed by the CSIR-Plant Genetic Resources Research Institute (PGRRI), conserves more than 15,000 accessions of crop genetic resources, including landraces, crop wild relatives, improved varieties, and other plant genetic resources of national importance, thereby supporting agricultural resilience, food security, and biodiversity conservation, including cereals (maize, rice, sorghum), legumes (cowpea, groundnut), and root/tuber crops (cassava, yam). Recent characterisation efforts have identified salt-tolerant rice accessions (e.g., GH2153, GH9057) critical for climate change adaptation in coastal saline soils.

Livestock genetic resources contribute to resilience in pastoral and mixed farming systems, particularly in savanna and transition zones. Ghana's livestock genetic resources include indigenous breeds such as the West African Shorthorn cattle (*Bos taurus*) and Djallonké sheep *(Ovis aries)*, which are valued for their adaptability, resilience to local climatic conditions, and resistance to endemic diseases. Preserving these genetic resources is critical for maintaining agricultural biodiversity and strengthening climate-resilient food systems. The *Ghana Livestock Development Strategy* prioritises the characterisation and conservation of these hardy, disease-resistant local breeds to ensure future food security.

Genetic diversity in wild species supports ecosystem stability and adaptive capacity. However, changes in land-use, agricultural intensification, habitat degradation, and the replacement of traditional varieties with uniform breeds and crop types pose risks to genetic diversity. Strengthening conservation and sustainable use of genetic resources, including in-situ and ex-situ approaches, is therefore an important component of Ghana's biodiversity strategy.

1.2.4 BIODIVERSITY DATA, KNOWLEDGE AND GAPS

Ghana has made significant progress in generating and managing biodiversity information through national biodiversity assessments, environmental impact assessments, ecosystem accounting initiatives, species inventories, ecological research, and sector-specific monitoring programmes. These efforts have enhanced understanding of the country's ecosystems, species diversity, and natural resource trends, and have provided an important evidence base for biodiversity policy, planning, and management.

A range of institutions, including government agencies, research institutions, universities, civil society organisations, and local communities, contribute to biodiversity data generation and knowledge management. Increasing use of geospatial technologies, environmental information systems, ecosystem assessments, and citizen science initiatives has further strengthened the availability of biodiversity information and supported national reporting under the Convention on Biological Diversity (CBD) and other multilateral environmental agreements.

Despite these advances, significant knowledge and information gaps remain. Data availability, quality, and spatial coverage vary considerably across ecosystems, taxonomic groups, and geographical regions. While relatively substantial information exists for forests, protected areas, selected wildlife species, and certain agricultural genetic resources, important gaps persist in relation to freshwater and marine biodiversity, invertebrates, microorganisms, ecosystem condition and functionality, species population trends, and the status of genetic diversity within both wild and domesticated species.

Long-term ecological monitoring systems remain limited, making it difficult to assess changes in biodiversity over time and evaluate the effectiveness of conservation interventions. In addition, biodiversity datasets are often fragmented across institutions, reducing opportunities for integrated analysis, coordinated reporting, and evidence-based decision-making. There is also a need to strengthen national biodiversity information management systems to improve data accessibility, interoperability, quality assurance, and data-sharing among stakeholders.

Furthermore, traditional knowledge, indigenous knowledge systems, and community-based observations remain underrepresented in national biodiversity databases, despite their important contribution to the conservation and sustainable use of biological resources. Greater recognition and integration of these knowledge systems would enhance understanding of biodiversity trends, support locally appropriate management approaches, and strengthen stakeholder participation in conservation efforts.

Addressing these knowledge and data gaps is essential for effective implementation of the NBSAP, evidence-based policymaking, and adaptive management. Accordingly, the Strategy prioritizes actions to strengthen biodiversity monitoring, research, data management, knowledge generation, capacity development, and inclusive participation. These investments will improve the quality and availability of biodiversity information, support national and international reporting obligations, and provide a robust foundation for tracking progress towards the National Biodiversity Targets and the goals of the Kunming-Montreal Global Biodiversity Framework (KMGBF).

1.2.5 IMPLICATIONS FOR THE NBSAP

The diversity of Ghana's ecosystems, species, and genetic resources highlights the need for a comprehensive, integrated, and ecosystem-based approach to biodiversity conservation and sustainable use. The country's forests, savannas, wetlands, freshwater systems, and coastal and marine ecosystems each face unique ecological challenges and management requirements. At the same time, common pressures such as land-use change, habitat fragmentation, unsustainable resource exploitation, pollution, invasive alien species, and climate change affect biodiversity across ecosystems and sectors, necessitating coordinated and collaborative responses at all levels.

These realities underscore the importance of adopting a whole-of-government and whole-of-society approach to biodiversity management, in which conservation, sustainable use,

restoration, traditional knowledge and equitable benefit-sharing are integrated into national development planning, sectoral policies, investment decisions, and local resource management practices. Effective implementation will require strengthened institutional coordination, enhanced stakeholder participation, improved knowledge management, and the mobilization of adequate financial and technical resources.

This revised NBSAP builds upon Ghana's rich biodiversity heritage by explicitly linking ecosystem, species, and genetic diversity conservation to national development priorities, climate resilience, food security, sustainable livelihoods, and human well-being. The Strategy recognizes that biodiversity is both a development asset and a foundation for ecological resilience, and that its conservation is essential for achieving broader national and international commitments.

Accordingly, the 23 National Biodiversity Targets and associated actions are designed to address the drivers of biodiversity loss, strengthen ecosystem integrity, conserve threatened species and genetic resources, restore degraded ecosystems, and promote the sustainable use of biological resources. The NBSAP also seeks to strengthen biodiversity mainstreaming across sectors, improve governance and accountability, enhance knowledge and monitoring systems, and ensure the meaningful participation of local communities, women, youth, Indigenous Peoples, civil society organizations, academia, and the private sector.

Through the implementation of these strategic actions, Ghana aims to halt and reverse biodiversity loss, enhance ecosystem resilience, safeguard genetic resources, and ensure that biodiversity continues to provide critical ecosystem services and socio-economic benefits for present and future generations. In doing so, the NBSAP contributes to the achievement of the national development agenda, the goals and targets of the Kunming-Montreal Global Biodiversity Framework, and the Convention on Biological Diversity's 2050 Vision of "Living in Harmony with Nature."

1.3: IMPORTANCE OF BIODIVERSITY TO GHANA'S SUSTAINABLE DEVELOPMENT

Biodiversity forms the backbone of Ghana's environmental integrity, economic development, social well-being, and cultural identity. The country's diverse ecosystems, ranging from forests, savannas, and wetlands to rivers, lakes, coastal and marine systems, provide essential ecosystem services that support livelihoods, food security, energy production, climate resilience, and national development.

National biodiversity assessments have consistently recognised that a significant proportion of Ghana's population depends directly on biological resources for income, subsistence and socio-cultural practices. Biodiversity is foundational for agriculture, fisheries, forestry, medicine, tourism, and rural livelihoods, particularly in forest-dependent and coastal communities. These dependencies make biodiversity conservation not only an environmental priority but also a socio-economic imperative.

In Ghana, ecosystem services derived from biodiversity, such as soil fertility, pollination, water regulation, coastal protection, and carbon sequestration, are critical to sustaining productive sectors of the economy.

The recent national ecosystem accounting exercises conducted by the country reinforce the national importance of biodiversity by quantifying the extent and contribution of Ghana's ecosystems. The Ghana Land and Ecosystem Extent Accounts (2015–2021) demonstrate that natural ecosystems continue to occupy a substantial share of the national territory, forming the spatial basis for ecosystem service provision. Complementary Ecosystem Services Accounts show that provisioning, regulating, and cultural services generated by ecosystems contribute significantly to livelihoods, food systems, climate regulation, and human well-being. These accounts provide nationally endorsed evidence that biodiversity constitutes a core component of Ghana's natural capital.

From a development perspective, national environmental assessments have increasingly framed biodiversity as a driver of sustainable growth rather than a constraint. The Ghana Environment Report and the Country Environmental Analysis highlight strong linkages between biodiversity, poverty reduction, and economic resilience. They emphasize that unsustainable exploitation of biological resources imposes long-term economic costs

through land degradation, fisheries decline, loss of ecosystem services, and increased vulnerability to climate change.

Biodiversity also holds deep cultural and social significance in Ghana. Sacred groves, community forests, wetlands, and traditional conservation practices reflect long-standing relationships between communities and nature. Indigenous and local knowledge systems, recognised in national biodiversity reports, contribute to ecosystem stewardship, resource governance, and resilience at the local level.

At the national policy level, the importance of biodiversity is reflected in Ghana's continued commitment to integrating biodiversity considerations into development planning, sectoral strategies, and environmental governance frameworks. This approach aligns national priorities with global commitments under the CBD and the Kunming–Montreal Global Biodiversity Framework, while responding to Ghana's specific ecological, social, and economic contexts.

Biodiversity is fundamental to Ghana's sustainable development trajectory. It supports livelihoods, underpins key economic sectors, enhances climate resilience, sustains cultural heritage, and contributes to national well-being. Protecting and sustainably managing biodiversity is therefore central to achieving Ghana's development objectives and ensuring long-term prosperity for present and future generations.

1.4: KEY BIODIVERSITY VALUES AND PRIORITY AREAS

Ghana's biodiversity is embedded within a diverse mosaic of terrestrial, freshwater, coastal, and marine ecosystems that provide critical ecological, economic, cultural, and social benefits. These biodiversity values extend beyond formally designated Protected Areas (PAs) and are distributed across production landscapes, forest reserves, wetlands, rivers, agricultural systems, coastal and marine environments, and community-managed areas. Recognizing and safeguarding these values is essential for maintaining ecosystem integrity, supporting sustainable livelihoods, and advancing national development objectives.

The ecological value of Ghana's biodiversity lies in its role in sustaining ecosystem functions and processes that support life and human well-being. Forests, savannas, wetlands, freshwater systems, and marine ecosystems regulate water flows, maintain soil fertility, support pollination, sequester carbon, moderate climatic conditions, and provide habitats for a wide diversity of species. These ecosystems also enhance resilience to climate change and natural disasters, contributing to the stability and productivity of both natural and human systems.

Biodiversity also holds significant economic value. Agriculture, fisheries, forestry, tourism, and other nature-based sectors depend on healthy ecosystems and biological resources. Fisheries and coastal ecosystems support food security and employment for millions of Ghanaians, while forests provide timber, non-timber forest products, and ecosystem services that contribute to local and national economies. Genetic resources from crops, livestock, medicinal plants, and wild species provide opportunities for agricultural development, research, innovation, and climate adaptation.

Equally important are the social, cultural, and spiritual values associated with biodiversity. Many communities maintain strong cultural and traditional connections to sacred groves, wetlands, rivers, forests, and particular species. Traditional knowledge and customary resource management systems have historically contributed to the conservation and sustainable use of biodiversity and continue to play an important role in environmental stewardship and community resilience.

To ensure effective conservation and sustainable management, the NBSAP recognizes a range of priority biodiversity areas that are important for maintaining ecological processes, conserving threatened species, protecting ecosystem services, and supporting sustainable development. These include:

- Protected Areas and wildlife reserves;
- Forest reserves and high biodiversity forest landscapes;
- Key Biodiversity Areas (KBAs) and Important Bird Areas (IBAs);
- Ramsar Sites and other wetlands of national and international importance;
- River basins, lakes, and freshwater ecosystems;
- Coastal and marine ecosystems, including lagoons, estuaries, mangroves, coral communities, and turtle nesting beaches;
- Biodiversity-rich agricultural landscapes and agroforestry systems;
- Community-managed conservation areas and sacred natural sites;
- Ecologically important restoration landscapes;
- Areas of high genetic diversity and importance for crop wild relatives, indigenous livestock breeds, and other genetic resources.

The identification and management of these priority areas provide a strategic basis for directing conservation investments, restoration efforts, biodiversity mainstreaming initiatives, and sustainable resource management interventions. Accordingly, this NBSAP adopts a landscape and seascape approach that recognizes the interconnected nature of ecosystems and promotes the integration of biodiversity conservation into broader development planning and land and water use decisions.

By protecting and sustainably managing these key biodiversity values and priority areas, Ghana can strengthen ecosystem resilience, secure essential ecosystem services, safeguard biodiversity for future generations, and contribute to the achievement of national development goals and the objectives of the Kunming-Montreal Global Biodiversity Framework.

1.4.1 ECOLOGICAL AND CONSERVATION VALUES

Ghana is endowed with ecosystems and habitats of significant ecological importance at national, regional, and global levels. The High Forest Zone, which forms part of the Upper Guinean Forest Biodiversity Hotspot, is particularly important due to its high species richness, levels of endemism, and contribution to regional ecological processes. The remaining natural forest blocks, forest reserves, and wildlife protected areas provide critical habitat for threatened species while sustaining essential ecosystem functions, including watershed protection, climate regulation, and carbon sequestration.

The Savanna and Transitional Zones also possess substantial biodiversity value, supporting wildlife species adapted to open and seasonally variable environments. These ecosystems contribute to landscape connectivity, facilitate the movement of migratory species, and provide ecosystem services that are fundamental to agriculture, livestock production, and rural livelihoods.

Inland aquatic ecosystems, including rivers, streams, lakes, wetlands, floodplains, reservoirs, and dugouts, are biodiversity-rich environments that play a vital role in supporting aquatic flora and fauna, regulating hydrological processes, and sustaining fisheries and agricultural production. Wetlands are particularly valuable due to their high biological productivity and ecosystem service functions. They serve as natural flood buffers, improve water quality, and provide critical habitats and breeding grounds for fish, amphibians, reptiles, birds, and insects. Ghana's coastal and marine ecosystems, extending across its shoreline and territorial waters are recognised for their exceptional ecological productivity and biodiversity significance. Mangroves, lagoons, estuaries, seagrass habitats, and nearshore marine ecosystems function as important nursery grounds for fish and other marine species, support migratory birds, and enhance coastal resilience against erosion, storms, and sea-level rise. While these ecosystems deliver substantial ecological, economic, and social benefits, they remain highly vulnerable to degradation arising from unsustainable resource use, pollution, habitat conversion, and the impacts of climate change.

Collectively, these ecosystems underpin Ghana's natural heritage and contribute to the provision of essential ecosystem services, including food production, water security, climate regulation, disaster risk reduction, and cultural values. Their conservation and sustainable management are therefore fundamental to achieving national biodiversity, development, and climate objectives.

1.4.2 ECOSYSTEM SERVICES AND DEVELOPMENT VALUES

Ghana's priority biodiversity areas are closely linked to the provision of ecosystem services that underpin economic development, human well-being, and environmental sustainability. Forests, wetlands, rivers, lakes, coastal ecosystems, and other natural landscapes provide a wide range of benefits, including food production, water supply, energy generation, climate regulation, soil fertility maintenance, and disaster risk reduction. These ecosystem services contribute directly to national development objectives, poverty reduction, and the resilience of communities and productive sectors.

Forest ecosystems play a particularly important role in regulating climate, protecting watersheds, preventing soil erosion, and supporting agriculture through pollination and nutrient cycling. They also provide timber and non-timber forest products that contribute to livelihoods, local economies, and national revenue. Similarly, wetlands and inland water systems support fisheries, agriculture, livestock production, and domestic water supply while regulating water flows and reducing the impacts of floods and droughts.

Catchment areas associated with major river basins and reservoirs are of critical national importance. These landscapes sustain hydropower generation, irrigation schemes, industrial activities, and potable water supplies for urban and rural populations. Degradation of watersheds through deforestation, land conversion, pollution, and unsustainable resource use can reduce water quality and availability, increase sedimentation of reservoirs, and undermine economic productivity. Their protection and restoration are therefore essential for maintaining Ghana's water, energy, and food security.

Coastal and marine ecosystems also provide substantial development benefits. Fisheries resources support livelihoods, employment, food security, and foreign exchange earnings, while mangroves, dunes, lagoons, and estuaries contribute to shoreline stabilization, carbon storage, and protection against coastal erosion and storm surges. Healthy coastal ecosystems enhance the resilience of communities and infrastructure in areas increasingly exposed to climate-related risks.

Biodiversity-rich landscapes further support tourism and recreation, generating income and employment through nature-based tourism, wildlife viewing, cultural heritage activities, and ecotourism initiatives. Protected areas and other conservation sites contribute to local and national economies while promoting environmental education and scientific research.

Urban and peri-urban green spaces, although often undervalued, provide important ecosystem services in rapidly growing towns and cities. Parks, urban forests, wetlands, and green corridors contribute to temperature regulation, air quality improvement, stormwater management, recreation, public health, and overall quality of life. As urbanisation accelerates, the conservation and integration of green infrastructure within urban planning will become increasingly important for building sustainable, resilient, and liveable cities.

Taken together, these ecosystem services demonstrate that biodiversity conservation is not only an environmental imperative but also a strategic investment in Ghana's long-term economic growth, social development, climate resilience, and sustainable development pathway. Effective management of priority biodiversity areas is therefore essential for safeguarding the natural capital upon which current and future generations depend.

1.4.3 CULTURAL, SOCIAL AND HERITAGE VALUES

Biodiversity in Ghana possesses important cultural, social, spiritual, and heritage values that extend beyond its ecological and economic significance. Across the country, communities have long maintained strong relationships with nature through traditional knowledge systems, cultural practices, and customary institutions that shape the use and stewardship of natural resources. Sacred groves, community forests, culturally significant landscapes, wetlands, and species associated with traditional beliefs and practices constitute an important component of Ghana's natural and cultural heritage.

Many sacred groves and traditionally protected sites serve as de facto conservation areas, where cultural norms, taboos, and customary regulations restrict unsustainable resource use and contribute to the preservation of biodiversity. These areas often provide refuge for indigenous plant and animal species, protect important water sources, and maintain ecological functions within increasingly modified landscapes. In many parts of the country, traditional authorities and local communities continue to play a vital role in safeguarding these sites and the biodiversity they support.

Biodiversity also contributes to social cohesion, cultural identity, and the transmission of indigenous knowledge across generations. Traditional ecological knowledge informs farming systems, fisheries management, medicinal practices, and the sustainable use of wild species and genetic resources. Such knowledge systems often contain insights on ecosystem management, species conservation, climate adaptation, and resource governance that remain relevant for contemporary conservation and sustainable development efforts.

Many species and ecosystems hold spiritual and symbolic significance for local communities and are closely associated with cultural ceremonies, festivals, folklore, and customary practices. The protection of these resources contributes not only to biological conservation but also to the preservation of cultural heritage and community identity. Biodiversity-rich landscapes therefore represent both ecological assets and living cultural landscapes that embody historical relationships between people and nature.

Recognising and integrating cultural and social values into biodiversity conservation is essential for achieving equitable and inclusive outcomes. Conservation approaches that respect customary institutions, traditional knowledge, and community rights can strengthen local stewardship, enhance compliance with conservation measures, and foster broader public support for biodiversity management. Such approaches are also consistent with the principles of participatory governance and the need to ensure that conservation actions generate benefits for Indigenous Peoples and local communities.

The conservation of Ghana's biodiversity should therefore be viewed not only as an environmental and developmental priority but also as a means of safeguarding the nation's cultural heritage, traditional knowledge systems, and social values for present and future generations.

1.4.4 EXISTING PRIORITY AREA DESIGNATIONS AND APPROACHES

Ghana has developed a range of policy, legal, and management instruments to identify, designate, and manage areas of high biodiversity importance. These mechanisms provide the foundation for national conservation efforts and support the protection of ecosystems, species, and ecological processes across terrestrial, freshwater, coastal, and marine environments.

Key biodiversity conservation designations include Protected Areas (PAs), Forest Reserves, Wildlife Protected Areas, Fisheries Reserves, Wetlands of International Importance (Ramsar Sites), Important Bird Areas (IBAs), Key Biodiversity Areas (KBAs), and Community Resource Management Areas (CREMAs). Together, these areas contribute to the conservation of critical habitats, threatened species, ecosystem services, and important ecological corridors. In addition, sacred groves, community-managed forests, and locally conserved areas continue to play an important role in biodiversity conservation and natural resource stewardship.

Beyond formal conservation designations, biodiversity considerations are increasingly incorporated into sectoral planning and development processes. Environmental and Strategic Environmental Assessment procedures, land-use and spatial planning frameworks, integrated watershed management approaches, marine spatial planning initiatives, and ecosystem-based management programmes all contribute to the identification and management of areas with high biodiversity value.

These tools support decision-making by helping to balance conservation objectives with economic development, infrastructure expansion, agricultural production, and other land and resource uses. Despite these efforts, assessments indicate that a significant proportion of Ghana's biodiversity remains outside the existing protected area network. Many areas of high conservation importance occur within agricultural landscapes, production forests, rangelands, inland waters, coastal ecosystems, and marine environments that are not formally protected. In some cases, these areas support threatened species, ecological connectivity, critical ecosystem services, or unique genetic resources, yet remain vulnerable to habitat conversion, unsustainable resource use, pollution, and climate change.

This situation highlights the need to complement conventional protected-area approaches with broader landscape and seascape conservation strategies. Such approaches should promote ecological connectivity, recognize Other Effective Area-Based Conservation Measures (OECMs), strengthen community-based conservation initiatives, and integrate biodiversity considerations into wider land-use and development planning processes. Expanding conservation actions beyond formally protected areas will be essential for maintaining ecosystem integrity, safeguarding biodiversity values, and achieving Ghana's national biodiversity targets under the Kunming-Montreal Global Biodiversity Framework (KMGBF).

Accordingly, this NBSAP adopts an integrated landscape and seascape approach that recognizes the contribution of both protected and non-protected areas to biodiversity conservation. By improving spatial planning, strengthening cross-sectoral coordination, and promoting sustainable management across all ecosystems, Ghana can enhance the effectiveness, representativeness, and resilience of its biodiversity conservation efforts while supporting sustainable development and community well-being.

1.4.5 IMPLICATIONS FOR SPATIAL PLANNING AND BIODIVERSITY ACTION

Recognising key biodiversity values and priority areas provides a critical foundation for biodiversity-inclusive spatial planning under this NBSAP. Spatial planning tools can help direct development activities away from ecologically sensitive and high-value biodiversity areas, thereby reducing habitat loss, fragmentation, and degradation. At the same time, they enable the identification of areas where restoration investments are most needed and where conservation actions can deliver the greatest ecological, social, and economic benefits.

The identification and mapping of priority biodiversity areas support informed decision-making across sectors, including agriculture, infrastructure, mining, forestry, fisheries, energy, urban development, and tourism. By integrating biodiversity considerations into land-use and marine spatial planning processes, Ghana can better manage competing demands on natural resources while maintaining ecosystem integrity, ecological connectivity, and the continued provision of essential ecosystem services.

This NBSAP therefore promotes the application of integrated landscape and seascape planning approaches that balance conservation and development objectives. Such approaches seek to strengthen the protection and management of areas with high biodiversity value, restore degraded ecosystems, and promote the sustainable use of biological resources within production landscapes and seascapes. They also recognise the important role of local communities, customary institutions, and community-based conservation initiatives in maintaining biodiversity outside formally protected areas.

Through the integration of biodiversity priorities into spatial planning frameworks, Ghana can enhance climate resilience, reduce environmental risks, safeguard critical natural assets, and create greater certainty for sustainable investments and development. This will help ensure that economic growth and infrastructure development are compatible with long-term biodiversity conservation and the equitable sharing of benefits derived from natural resources.

Accordingly, this NBSAP adopts an integrated approach to priority areas that links protection, restoration, sustainable use, and community stewardship across terrestrial, freshwater, coastal, and marine ecosystems. By doing so, it seeks to conserve Ghana's most important biodiversity values while advancing sustainable development objectives, strengthening ecosystem resilience, and promoting inclusive and equitable benefit-sharing.

CHAPTER TWO

STATUS, TRENDS, AND DRIVERS OF BIODIVERSITY LOSS

2.1: STATUS AND TRENDS OF TERRESTRIAL ECOSYSTEMS

2.1.1 OVERVIEW OF TERRESTRIAL LAND COVER DYNAMICS

Ghana's terrestrial landscape has undergone profound and rapid transformations over the past three decades, marked by the systematic conversion of natural ecosystems into human-dominated land-uses. The analysis of land cover data, conducted within the System of Environmental-Economic Accounting (SEEA) framework, highlights a dynamic mosaic of forest, savanna, cropland, and expanding settlement areas.

According to the Ghana Land and Ecosystem Extent Accounts (2015-2021), the national territory in 2021 was predominantly composed of grasslands (34.6%), followed by food crops (20.3%), and open forests (18.4%).[2] This distribution underscores the dominance of agrarian expansion and savanna ecosystems, often at the expense of closed-canopy forests, and signals the need for targeted policy interventions to safeguard biodiversity and ecosystem resilience.

2.1.1.1 LANDSCAPE STABILITY AND TRANSITIONS (2015–2021):

During the 2015–2021 accounting period, Ghana's land cover remained largely stable, with approximately 91.2% of the national territory retaining its dominant land-use and land-cover characteristics. This stability reflects the continued persistence of major ecosystem types, including forests, savannas, agricultural landscapes, wetlands, and urban areas across much of the country.

Despite this overall stability, approximately 8.8% of Ghana's land area, equivalent to about 12,812 km², underwent conversion from one land-cover class to another. These transitions indicate significant changes in the spatial distribution and condition of ecosystems and highlight ongoing pressures on biodiversity and natural resources. Land-cover conversions were primarily associated with agricultural expansion, settlement growth, infrastructure

development, mining activities, and changes in vegetation cover resulting from deforestation, degradation, and natural regeneration processes.

While some transitions reflect positive trends, such as reforestation and ecosystem recovery, others result in habitat loss, fragmentation, and declining ecosystem integrity. The conversion of natural habitats to agricultural or built-up areas can reduce biodiversity, disrupt ecological connectivity, and diminish the capacity of ecosystems to provide essential services such as water regulation, carbon sequestration, soil protection, and climate resilience.

The observed level of land-cover change underscores the dynamic nature of Ghana's landscapes and the growing influence of human activities on ecosystem structure and function. In particular, areas undergoing rapid transformation may experience increased pressure on species populations, freshwater systems, and ecosystem services that support local livelihoods and economic development.

These findings highlight the importance of strengthening integrated land-use planning, sustainable landscape management, ecosystem restoration, and biodiversity-sensitive development approaches. Monitoring landscape transitions provides an important evidence base for identifying priority areas for conservation action, assessing emerging threats, and guiding interventions aimed at maintaining ecological integrity while supporting sustainable development.

Understanding where and how land-cover changes are occurring will be critical for achieving the objectives of this NBSAP, the Kunming-Montreal Global Biodiversity Framework, and Ghana's broader climate, land restoration, and sustainable development commitments.

2.1.1.2 Deforestation

Deforestation accounted for 4,921 km² of the degraded area, representing approximately 1.5-2% of the national territory over a six-year period. This indicates persistent pressure on forest cover despite ongoing conservation interventions, underscoring the need for strengthened enforcement and restoration measures.

2.1.1.3 Agricultural Expansion

Agricultural land, particularly food crop areas, expanded from 18.6% of the total land area in 2015 to 20.3% in 2021. This net increase remains a primary driver of natural habitat conversion, highlighting the importance of integrating sustainable agricultural practices into land-use planning.

2.1.1.4 Urbanisation

Settlement areas expanded significantly, increasing from 1.9% of the land area in 2015 to 2.8% in 2021. Concentrated in the Greater Accra and Ashanti regions, this expansion represents permanent soil sealing and habitat fragmentation, requiring targeted urban planning and ecosystem safeguards.

2.1.2 STATUS OF FOREST RESOURCES

The status of Ghana's forest resources remains a matter of national importance owing to the critical ecological, economic, and social functions that forests provide. Forest ecosystems play a vital role in carbon sequestration, climate regulation, water catchment protection, soil conservation, nutrient cycling, and the provision of habitats for a significant proportion of the country's biodiversity. They also support livelihoods, contribute to food security, and provide timber, non-timber forest products, and other ecosystem services essential to national development.

Ghana's forest resources are distributed across three broad ecological zones: the High Forest Zone (HFZ), the Transition Zone (TZ), and the Savanna Zone (SZ). The High Forest Zone, located predominantly in the southern part of the country, contains the greatest concentration of forest biodiversity and supports most of Ghana's closed forest ecosystems. The Transition Zone forms an ecological interface between the forest and savanna landscapes, while the Savanna Zone occupies the northern regions and is characterized by woodlands, savanna forests, and gallery forests.

Despite their importance, forest ecosystems across all ecological zones continue to experience significant pressures. Deforestation, forest degradation, agricultural expansion, unsustainable logging, wildfire, infrastructure development, urban growth, and illegal mining activities are contributing to habitat loss, ecosystem fragmentation, and declining ecosystem health. These pressures not only threaten biodiversity conservation but also undermine the forests' capacity to provide essential ecosystem services, including carbon storage, water regulation, and climate resilience.

In recent decades, Ghana has implemented several initiatives aimed at improving forest governance, promoting sustainable forest management, restoring degraded landscapes, and enhancing community participation in forest conservation. These efforts include reforestation and afforestation programmes, forest landscape restoration initiatives, protected area management, and the implementation of mechanisms to reduce emissions from deforestation and forest degradation. However, the scale and persistence of existing threats continue to pose significant challenges to the long-term sustainability of forest resources.

Maintaining and restoring forest ecosystems across the High Forest, Transition, and Savanna Zones will therefore be critical for achieving Ghana's biodiversity conservation objectives and climate commitments. Strengthened forest governance, enhanced enforcement of environmental regulations, sustainable land-use planning, ecosystem restoration, and greater participation of local communities and the private sector will be essential to safeguard forest biodiversity, maintain ecosystem services, and enhance ecological resilience for current and future generations.

2.1.2.1 DEFORESTATION RATES AND HISTORICAL CONTEXT

Ghana has experienced significant forest loss over the past two decades, with deforestation remaining one of the most pressing threats to biodiversity conservation, climate resilience, and sustainable land management. Between 2001 and 2015, the country recorded an average annual deforestation rate of approximately 3.51 percent, equivalent to the loss of more than 315,000 hectares of forest annually. Over this period, cumulative forest loss exceeded 4.7 million hectares, reflecting the scale and persistence of pressures on the country's forest resources.

The distribution of forest loss reveals important differences across forest types. Approximately 84 percent of the total loss, representing about 3.98 million hectares, occurred within open forest landscapes, while the remaining 16 percent, equivalent to approximately 745,000 hectares, occurred in closed forests. This distinction has important policy implications. Closed forests are generally located within state-managed forest reserves and protected areas, where regulatory frameworks provide a degree of protection. In contrast, open forests, many of which occur on customary lands and within agricultural landscapes, remain highly vulnerable to agricultural expansion, settlement development, fuelwood harvesting, and other competing land uses.

The spatial distribution of deforestation has also evolved over time. During the period 2001-2010, forest loss was concentrated primarily within the High Forest Zone and the Transition Zone, driven largely by cocoa expansion, timber harvesting, infrastructure development, and agricultural encroachment. These areas contain some of Ghana's most biologically diverse forest ecosystems and therefore represent critical conservation priorities.

Between 2013 and 2015, however, forest loss increasingly shifted towards the Savanna Zone, where fragile woodland and savanna ecosystems experienced accelerated degradation because of agricultural expansion, fuelwood collection, and charcoal production. During this period, annual forest losses exceeded 500,000 hectares, highlighting the growing pressure on northern landscapes and the need for strengthened sustainable land management approaches across the savanna ecological zone.

The historical pattern of deforestation demonstrates that forest loss is not confined to a single ecological zone or sector but is driven by a combination of land-use change, agricultural expansion, unsustainable resource extraction, population growth, infrastructure development, and weak enforcement of land-use regulations. More recently, illegal mining activities have emerged as a significant additional driver of forest degradation and biodiversity loss, particularly within forest reserves and critical watershed areas.

These trends underscore the need for integrated and landscape-scale interventions that combine forest conservation, restoration, sustainable production systems, community-based natural resource management, and stronger governance mechanisms. Addressing the underlying causes of deforestation will be essential for achieving Ghana's biodiversity, climate, and sustainable development objectives, while safeguarding the ecological functions and ecosystem services provided by the country's forest resources.

RECENT TRENDS (2015–2021)

Data from 2015–2021 confirm these trajectories. Closed forest extent declined by 25% in just six years, signalling a severe reduction in Ghana’s high-value biodiversity habitats and carbon sinks. Tropical rainforest ecosystems (wet and moist) and moist semi-deciduous forests decreased by approximately 11%, leaving only about **40%** of the original rainforest ecosystem intact.

2.1.3 REGIONAL FOREST DYNAMICS AND HOTSPOTS

Forest cover dynamics in Ghana exhibit significant regional variation, reflecting differences in ecological conditions, land-use patterns, population pressures, and economic activities. While the Ashanti, Western North, and Western Regions have historically contained some of the country's largest and most biologically important forest landscapes, they are increasingly experiencing high rates of forest degradation and habitat fragmentation. These trends highlight the need for region-specific interventions that address the underlying drivers of forest loss while promoting sustainable land management and ecosystem restoration.

The Ahafo Region recorded the highest rate of land degradation between 2015 and 2021, with approximately 16.93 percent of the landscape undergoing degradation. During the same period, an estimated 5.4 percent of closed forest areas were converted to open forest, indicating a decline in forest integrity and ecological quality. This trend reflects the combined effects of agricultural expansion, timber harvesting, infrastructure development, and other land-use pressures that continue to alter natural forest ecosystems.

In the Western North and Ashanti Regions, which remain the centre of Ghana's cocoa production landscape, forest ecosystems have experienced substantial canopy thinning and fragmentation. The expansion and intensification of cocoa cultivation, often accompanied by the removal of shade trees and natural vegetation, have contributed to the emergence of a "cocoa-forest mosaic" landscape. Although these landscapes continue to retain some tree cover and biodiversity value, the ecological integrity, connectivity, and resilience of the original forest ecosystems have been significantly reduced.

The Greater Accra Region presents a contrasting pattern of forest change. With only approximately 5,211 hectares of forest cover remaining in 2015, the region has one of the lowest levels of natural forest cover in the country. Rapid urbanization, infrastructure expansion, industrial development, and population growth have led to the widespread conversion of natural vegetation into built-up areas. As a result, remnant forest patches and urban green spaces are increasingly important for maintaining ecosystem services, enhancing climate resilience, and supporting biodiversity within the region.

These regional patterns demonstrate that forest degradation and loss are driven by diverse and context-specific factors. Consequently, effective forest conservation and restoration strategies will require differentiated approaches that respond to local ecological conditions and socio-economic realities. Strengthening sustainable cocoa production systems in forested regions, restoring degraded landscapes, promoting urban greening initiatives, enhancing community-based resource management, and improving land-use planning will be critical for reversing forest loss and maintaining ecosystem resilience across Ghana's ecological zones.

2.1.3.1 FOREST RESERVES AND PROTECTED AREA PERFORMANCE

Forest reserves within Ghana’s High Forest Zone (HFZ) cover approximately 1.7 million hectares and constitute a cornerstone of the country’s biodiversity conservation and sustainable forest management efforts. These reserves protect critical habitats, support ecological connectivity, conserve watersheds, and provide refugia for numerous threatened and endemic species. However, the designation of forest reserves alone has not been sufficient to prevent encroachment, habitat degradation, and the loss of forest integrity. Increasing pressures from agricultural expansion, illegal logging, mining activities, infrastructure development, and human settlement continue to undermine the ecological condition of many reserves.

The Atewa Forest Reserve, a globally significant upland evergreen forest and recognized Key Biodiversity Area (KBA), illustrates the challenges facing protected forest landscapes. Between 2015 and 2021, the reserve experienced a decline of approximately 2 percent in closed forest cover, accompanied by a 13 percent increase in open forest areas. This change was associated with the expansion of settlements and an increase in bare or exposed surfaces, indicating growing human pressure on the reserve and progressive degradation of forest quality. Given Atewa's importance for biodiversity conservation, water supply regulation, and ecosystem services, these trends raise concerns regarding its long-term ecological resilience.

Similarly, the Tano-Offin Forest Reserve experienced substantial degradation during the same period. An estimated 38 percent of its closed forest cover, equivalent to approximately 20,857 hectares, was lost between 2015 and 2021. This significant decline reflects intense pressure from illegal logging, unregulated mining activities, agricultural encroachment, and other unsustainable land-use practices occurring within and around the reserve. The scale of forest loss highlights persistent challenges relating to enforcement, monitoring, and the effective management of protected forest resources.

These examples demonstrate that protected area designation, while essential, does not automatically guarantee conservation outcomes. Effective protection requires adequate financing, strengthened law enforcement, improved monitoring systems, active stakeholder engagement, and sustained investment in restoration and sustainable livelihoods. They also underscore the need to complement protected area management with broader landscape approaches that address the drivers of forest loss beyond reserve boundaries.

Under this NBSAP, improving the effectiveness and resilience of forest reserves and other protected areas will remain a priority. This will involve strengthening governance and enforcement mechanisms, enhancing ecological monitoring, restoring degraded forest habitats, promoting community participation, and integrating protected area management into wider landscape-level planning processes. Such actions are essential to safeguard forest biodiversity, maintain ecosystem services, and contribute to Ghana's national biodiversity, climate, and sustainable development objectives.

2.1.4 STATUS OF SAVANNAH AND TRANSITION ZONES

The Savanna Zone, which occupies approximately the northern two-thirds of Ghana, is dominated by Guinea Savanna and Sudan Savanna woodlands and grassland ecosystems. These landscapes support a rich diversity of wildlife, provide grazing resources for livestock, sustain agricultural production, and supply a wide range of ecosystem services that are critical for local livelihoods and national development. The zone also contains important watersheds, gallery forests, and biodiversity-rich habitats that contribute to ecological stability and climate resilience.

However, savanna ecosystems are increasingly vulnerable to degradation arising from multiple pressures, including agricultural expansion, unsustainable harvesting of fuelwood and charcoal, recurrent wildfires, overgrazing, and the impacts of climate variability and climate change. These pressures are contributing to declining vegetation cover, soil degradation, reduced ecosystem productivity, and habitat loss across large areas of the landscape.

Of particular concern is the gradual process of “savannization,” whereby the degradation and loss of forests and woodland vegetation contribute to the southward expansion of drier ecological conditions. The weakening of vegetation cover in northern and transitional forest landscapes reduces ecosystem resilience, accelerates land degradation, and increases susceptibility to drought and desertification processes. As this trend continues, it poses significant threats to biodiversity conservation, agricultural productivity, water resources, and the livelihoods of communities that depend directly on natural resources.

The Transition Zone, which forms the ecological interface between the High Forest and Savanna Zones, is especially important because it supports a mixture of forest and savanna species and serves as a critical buffer between the two major ecological regions. However, this zone has experienced considerable land-use change due to agricultural expansion, settlement growth, timber harvesting, and recurrent bushfires. These pressures have contributed to the conversion of natural vegetation, increasing habitat fragmentation and reducing ecological connectivity.

The continued degradation of both the Savanna and Transition Zones has implications beyond the affected regions. Declining ecosystem health can reduce carbon storage, weaken watershed protection functions, increase vulnerability to climate change, and accelerate biodiversity loss. Furthermore, communities within these areas are particularly dependent on ecosystem services for food production, energy, income generation, and climate adaptation, making them especially vulnerable to environmental decline.

Addressing these challenges will require integrated landscape management approaches that combine ecosystem restoration, sustainable agriculture, wildfire management, sustainable fuelwood production, community-based natural resource management, and climate adaptation measures. Strengthening the resilience of savanna and transition ecosystems is therefore essential not only for biodiversity conservation but also for safeguarding livelihoods, enhancing food security, and supporting sustainable development across northern and central Ghana.

2.1.4.1 TRENDS IN SAVANNAH EXTENT:

The extent and condition of Ghana's savanna ecosystems have undergone notable changes in recent years, reflecting increasing pressure from human activities and environmental change. Between 2015 and 2021, the area covered by Guinea Savanna Woodland declined from approximately 59,342 km² to 57,906 km², indicating a continued reduction in one of the country's most extensive terrestrial ecosystems.

This decline is largely attributable to the expansion of agricultural land, increasing demand for fuelwood and charcoal, recurrent wildfires, unsustainable harvesting of woody vegetation, and other land-use changes. The conversion of woodland areas into cropland and settlements has resulted in habitat loss, fragmentation, and reduced ecosystem integrity, while the extraction of biomass for household energy continues to place significant pressure on remaining woodland resources.

The loss of savanna woodland has important ecological and socio-economic implications. These ecosystems provide critical habitat for wildlife, contribute to carbon storage and climate regulation, support soil conservation, and underpin the livelihoods of rural communities through the provision of fuelwood, fodder, non-timber forest products, and other ecosystem services. Continued degradation therefore threatens biodiversity conservation, ecosystem resilience, food security, and local livelihoods.

These trends underscore the urgent need for integrated land-use planning and sustainable landscape management approaches that balance conservation and development objectives. Priority actions include the promotion of sustainable agricultural practices, restoration of degraded woodlands, improved wildfire management, strengthened community-based natural resource management, and the adoption of alternative and renewable energy sources to reduce dependence on fuelwood and charcoal. Such measures will be essential for maintaining the ecological integrity of Ghana's savanna ecosystems and enhancing their resilience to future environmental and climatic pressures.

2.1.4.2 THE TRANSITIONAL ECOTONE

Situated between Ghana's High Forest Zone and the Savanna Zone, the Guinea-Congolia/Sudania Transitional Zone represents a dynamic mosaic of forest, woodland, and savanna ecosystems. This ecotonal landscape supports species from both biogeographic regions and serves as an important ecological corridor that facilitates species movement, genetic exchange, and ecosystem connectivity. Its unique ecological characteristics contribute significantly to biodiversity conservation, climate regulation, watershed protection, and the provision of ecosystem services that support local livelihoods.

The Transitional Zone also performs a critical environmental function as a buffer against desertification and land degradation. By maintaining vegetation cover and ecological connectivity between the forest and savannah biomes, it helps moderate the expansion of arid conditions and contributes to landscape resilience in the face of climate variability and change. Consequently, the effective management and restoration of this zone are essential for safeguarding ecological stability and supporting sustainable land use across both northern and southern Ghana.

However, changes observed in the Transitional Zone over recent decades raise important concerns. Although the geographical extent of the transition landscape has expanded since the 1980s, much of this expansion reflects the gradual degradation of formerly closed and semi-deciduous forests into more open woodland and savanna-like vegetation rather than a natural ecological succession process. Deforestation, recurrent wildfires, agricultural expansion, unsustainable timber harvesting, and other human-induced disturbances have contributed to the conversion of forest ecosystems into degraded transition woodlands, resulting in reduced forest integrity and biodiversity.

This trend has significant implications for biodiversity conservation and ecosystem resilience. The progressive transformation of forest ecosystems into transitional vegetation types can lead to habitat loss, reduced carbon storage capacity, declining ecosystem services, and increased vulnerability to drought and land degradation. It may also accelerate the process of "savannization", thereby weakening the ecological buffering function of the Transitional Zone.

Addressing these challenges will require integrated landscape management approaches that combine forest conservation, ecosystem restoration, sustainable agricultural practices, wildfire prevention and control, and community-based natural resource management. Strengthening the ecological integrity of the Transitional Zone will be critical for maintaining biodiversity, enhancing climate resilience, preventing further land degradation, and supporting the long-term sustainability of Ghana's forest and savanna ecosystems.

2.1.5 LAND DEGRADATION AND SOIL HEALTH

Land degradation remains one of the most significant environmental challenges facing Ghana, with far-reaching implications for biodiversity conservation, agricultural productivity, water resources, climate resilience, and human well-being. Degradation occurs in various forms, including soil erosion, nutrient depletion, declining organic matter, compaction, salinization, and the physical deterioration of soil structure. These processes reduce the productive capacity of land, diminish ecosystem functioning, and compromise the ability of natural systems to support sustainable livelihoods and economic development.

A substantial proportion of Ghana's land area is affected by erosion and other forms of land degradation. It is estimated that nearly 70 percent of the country's land experiences severe to very severe soil erosion, resulting in the loss of fertile topsoil and associated nutrients. This situation undermines critical ecosystem services provided by healthy soils, including nutrient cycling, water infiltration and storage, carbon sequestration, and support for vegetation growth. The cumulative effect is reduced land productivity, increased vulnerability to drought and flooding, and declining ecosystem resilience.

The drivers of land degradation are diverse and often interconnected. Unsustainable agricultural practices, deforestation, overgrazing, bushfires, mining activities, infrastructure development, and rapid urban expansion contribute significantly to soil degradation across the country. In many areas, the removal of natural vegetation exposes soils to wind and water erosion, while continuous cultivation without adequate soil conservation measures accelerates nutrient depletion and declines in soil fertility.

The impacts of land degradation extend beyond agricultural production. Degraded soils reduce the capacity of ecosystems to support biodiversity, regulate water flows, and buffer communities against climate-related shocks. Sedimentation resulting from erosion can also affect rivers, wetlands, reservoirs, and coastal ecosystems, further degrading habitats and reducing water quality. As a result, land degradation poses a significant threat to the achievement of national biodiversity, food security, climate adaptation, and sustainable development objectives.

Addressing these challenges will require integrated land management approaches that promote sustainable agricultural practices, soil and water conservation, ecosystem restoration, agroforestry, climate-smart agriculture, and sustainable forest and rangeland management. Strengthening landscape restoration initiatives, improving land-use planning, and enhancing community participation in natural resource management will be critical to restoring soil health, maintaining ecosystem functions, and enhancing the resilience of both natural and human systems.

Under this NBSAP, reversing land degradation and improving soil health are recognised as essential components of ecosystem restoration and sustainable biodiversity management. Healthy soils are fundamental to ecosystem integrity and productivity, and their conservation will be critical for safeguarding biodiversity, supporting livelihoods, and ensuring the long-term sustainability of Ghana's natural resources.

2.1.5.1 SOIL EROSION INDICATORS

Indicators derived from the Revised Universal Soil Loss Equation (RUSLE) model confirm that soil erosion is a widespread and persistent form of land degradation across Ghana. The analysis indicates that large portions of the country are affected by moderate to severe erosion, resulting in the loss of fertile topsoil, declining soil productivity, reduced water retention capacity, and increased sedimentation of rivers, wetlands, and reservoirs.

The most severe impacts are observed in the Northern, Upper East, and Upper West Regions, where land degradation interacts with climatic variability, vegetation loss, and unsustainable land management practices to accelerate desertification processes. In these regions, soil erosion contributes to declining agricultural productivity, reduced ecosystem resilience, and increased vulnerability of rural communities whose livelihoods depend heavily on natural resources.

Significant erosion hotspots are also evident in the Bono, Ahafo, and Oti Regions, where agricultural expansion, deforestation, bushfires, and inappropriate land-use practices have contributed to soil degradation and declining land quality. These pressures weaken ecosystem functions and reduce the long-term capacity of landscapes to support biodiversity conservation, food production, and economic development.

Urban areas are likewise experiencing increasing soil degradation challenges. In metropolitan areas such as Accra, rapid urbanisation, inadequate spatial planning, and the widespread sealing of soil surfaces through roads, buildings, and other infrastructure have altered natural drainage patterns and increased surface runoff. These changes contribute to severe localized erosion, flooding, sediment transport, and the deterioration of remaining urban soils, thereby compromising ecosystem integrity and reducing the capacity of urban landscapes to provide important environmental services.

These trends highlight the need for integrated watershed and landscape management approaches that combine soil and water conservation measures, sustainable agricultural practices, ecosystem restoration, climate-resilient land-use planning, and urban green infrastructure development. Strengthening soil health and reducing erosion will be critical to maintaining ecosystem productivity, supporting biodiversity conservation, enhancing climate resilience, and sustaining the flow of ecosystem services across Ghana's terrestrial landscapes.

2.1.5.2 ECONOMIC AND SOCIAL IMPLICATIONS

Land degradation imposes significant economic and social costs on Ghana, undermining agricultural productivity, rural livelihoods, food security, and long-term economic growth. The annual economic cost of agricultural land degradation is estimated at approximately US$540 million, equivalent to about 0.9% of national GDP. These losses arise from declining soil fertility, reduced crop yields, increased production costs, loss of ecosystem services, and the need for additional investments to maintain agricultural output.

The impacts of land degradation are closely linked to patterns of rural poverty. Areas experiencing severe land degradation often exhibit higher levels of socioeconomic vulnerability, with poverty incidence reaching up to 40% in districts characterized by declining Net Primary Productivity (NPP), compared with the national average of approximately 24%. This relationship reflects the strong dependence of rural households on land-based resources for income, food production, and employment.

A reinforcing cycle frequently emerges between poverty and environmental degradation. Declining land productivity reduces agricultural incomes and food availability, limiting the capacity of farmers to invest in sustainable land management practices. In response to diminishing yields, households may expand cultivation into marginal lands, forests, savanna woodlands, wetlands, and other ecologically sensitive areas in an effort to maintain production. Such expansion often accelerates soil erosion, nutrient depletion, habitat loss, and ecosystem degradation, further weakening the productive capacity of the land.

The consequences extend beyond the agricultural sector. Degraded landscapes often experience reduced water retention, greater vulnerability to droughts and floods, diminished biodiversity, and lower resilience to climate change. These effects can increase livelihood insecurity, contribute to rural-to-urban migration, and place additional pressure on public resources and social support systems.

Addressing land degradation is therefore not only an environmental priority but also a critical economic and social development imperative. Investments in sustainable land management, ecosystem restoration, climate-smart agriculture, agroforestry, soil conservation, and integrated landscape approaches can help restore productivity, improve rural incomes, strengthen food security, and enhance resilience to climate change. Such interventions offer significant opportunities to break the cycle of degradation and poverty while supporting Ghana's broader objectives for sustainable development, biodiversity conservation, and climate resilience.

Implications for the NBSAP: The strong linkage between land degradation, biodiversity loss, and rural poverty highlights the need for integrated actions that simultaneously promote ecosystem restoration, sustainable agricultural practices, and livelihood improvement. Prioritising degraded landscapes for restoration and strengthening community-based natural resource management will be essential for achieving both biodiversity and socioeconomic outcomes under this NBSAP.

2.1.6 TRENDS IN AGRICULTURAL LAND USE

Agriculture remains the dominant driver of terrestrial ecosystem change in Ghana and continues to shape the country's land-use dynamics. Between 1990 and 2021, the area under cropland expanded by approximately 303%, reflecting the extensive and sustained conversion of natural ecosystems, particularly forests, woodlands, and grasslands, into agricultural land. This expansion has been driven by population growth, increasing food demand, commercial agricultural development, and the growing importance of export crops such as cocoa, oil palm, rubber, and cashew.

While agricultural expansion has contributed significantly to food production, employment, and economic growth, it has also resulted in substantial environmental costs. The conversion of natural habitats to cropland has reduced ecosystem extent and integrity, fragmented wildlife habitats, and placed increasing pressure on biodiversity. In many areas, agricultural encroachment has occurred within forest landscapes, savanna woodlands, riparian zones, and other ecologically sensitive ecosystems, contributing to habitat loss and declining species populations.

The expansion of agriculture has frequently followed an extensive production model in which increases in output are achieved through the cultivation of additional land rather than through improvements in productivity. As a result, agricultural growth has often been associated with deforestation, vegetation clearance, soil degradation, and the loss of ecosystem services. These trends have been particularly evident in frontier agricultural zones where natural vegetation continues to be converted to meet growing production needs.

At the same time, agricultural landscapes remain important components of Ghana's biodiversity. Smallholder farming systems, agroforestry practices, traditional mixed-cropping systems, and mosaic landscapes can support a range of plant and animal species while providing ecological connectivity between natural habitats. However, the biodiversity value of these landscapes depends on management practices and the extent to which natural vegetation and ecological features are retained.

Climate change, declining soil fertility, and increasing competition for land are expected to intensify pressures on agricultural systems in the coming decades. Without improved land-use planning and more sustainable production practices, further agricultural expansion may increase risks to biodiversity, ecosystem services, and climate resilience.

Addressing these challenges will require a transition towards more sustainable and productive agricultural systems. This includes promoting climate-smart agriculture, agroecological approaches, sustainable intensification, agroforestry, integrated landscape management, and the restoration of degraded lands. Such approaches can enhance food security and rural livelihoods while reducing pressure on remaining natural ecosystems.

Implications for the NBSAP: Given that agriculture is the principal driver of land-use change and biodiversity loss in Ghana, achieving national biodiversity targets will require stronger integration of biodiversity considerations into agricultural policies, programmes, and investments. Enhancing sustainable production systems, protecting high-value ecosystems from agricultural conversion, and promoting biodiversity-friendly farming practices will be critical for reconciling agricultural development with conservation objectives.

2.1.6.1 COCOA LANDSCAPE DYNAMICS

Cocoa production remains the backbone of Ghana's agricultural economy and one of the most important land-use systems within the High Forest Zone. However, the expansion and intensification of cocoa cultivation have also made the sector a major driver of forest conversion and biodiversity loss. Over recent decades, cocoa farming has increasingly expanded into forested landscapes, contributing to the transformation of natural ecosystems and the fragmentation of critical habitats.

Traditionally, cocoa was cultivated under shaded agroforestry systems in which cocoa trees were integrated with native forest species. These systems maintained canopy cover, conserved biodiversity, supported soil fertility, and provided ecological connectivity across agricultural landscapes. However, changing production practices, the introduction of high-yielding cocoa varieties, pest and disease pressures, and the pursuit of increased short-term productivity have gradually pushed farmers toward full-sun cocoa monocultures.

This transition has accelerated canopy loss and reduced the ecological value of cocoa landscapes. Full-sun systems typically involve the removal of shade trees and natural vegetation, resulting in lower habitat diversity, reduced carbon storage, diminished ecosystem resilience, and increased vulnerability to climate variability. The loss of tree cover also affects hydrological regulation, soil conservation, and the provision of habitat for forest-dependent species.

The cocoa-growing regions of Western, Ashanti, Ahafo, Bono, Bono East, and parts of the Eastern and Central Regions form a "cocoa-forest mosaic" that has become a focal area of land-use change and deforestation. In many areas, declining productivity on aging cocoa farms, coupled with incentives for expanding production, has encouraged farmers to convert remaining forest patches and previously uncultivated lands into new plantations. Land-cover accounts indicate continued expansion of full-sun ("Mono Cocoa") cultivation, highlighting the ongoing replacement of mixed and forest-associated systems with more intensive production models.

The resulting landscape transformation has significant implications for biodiversity conservation. Forest conversion associated with cocoa expansion contributes to habitat loss, ecological fragmentation, and declining populations of forest-dependent flora and fauna. It also reduces the integrity of ecological corridors linking protected areas and forest reserves, thereby limiting species movement and ecosystem connectivity.

At the same time, cocoa landscapes present important opportunities for biodiversity conservation and restoration. The widespread adoption of climate-smart cocoa production, agroforestry systems, shade-tree restoration, and sustainable land management practices can help reconcile production objectives with biodiversity conservation. These approaches improve ecosystem services, enhance climate resilience, restore habitat connectivity, and contribute to carbon sequestration while sustaining farmer livelihoods.

Implications for the NBSAP: Given the strategic importance of cocoa to Ghana's economy and its significant influence on land-use change, transforming cocoa production systems will be critical to achieving biodiversity conservation goals. Priority actions should include promoting biodiversity-friendly cocoa agroforestry, strengthening deforestation-free supply chains, restoring degraded cocoa landscapes, protecting remaining natural forests, and supporting farmers through incentives that reward sustainable production and ecosystem stewardship. Such measures can help ensure that cocoa production contributes to both economic development and the conservation of Ghana's remaining forest biodiversity.

2.1.6.2 FOOD CROP EXPANSION

In the Savanna and Transition Zones, the expansion of food crop cultivation has emerged as a major driver of land-use change and ecosystem transformation. Growing demand for food, population growth, shifting cultivation practices, and the expansion of commercial agriculture have increased pressure on natural habitats, resulting in the conversion of woodlands, grasslands, and other natural ecosystems into agricultural land.

Between 2015 and 2021, the area under food crop cultivation increased from approximately 18.6 percent to 20.3 percent of total national land cover. This expansion occurred primarily at the expense of savanna woodlands, grasslands, and transitional ecosystems, leading to habitat fragmentation, reduced vegetation cover, and declining ecosystem integrity. The continued conversion of natural landscapes to cropland has contributed to the loss of biodiversity, reduced ecological connectivity, and increased pressure on ecosystem services.

The ecological consequences of food crop expansion extend beyond habitat loss. The removal of natural vegetation alters hydrological processes by reducing water infiltration, increasing surface runoff, and accelerating soil erosion. These changes can affect watershed function, reduce groundwater recharge, increase sedimentation in rivers and reservoirs, and heighten vulnerability to droughts and floods. In addition, the simplification of natural landscapes often results in declines in species richness and ecosystem resilience.

While agricultural development remains essential for food security, rural livelihoods, and economic growth, these trends highlight the importance of balancing production objectives with biodiversity conservation and sustainable land management. Strengthening land-use planning, promoting climate-smart and sustainable agricultural practices, enhancing agroforestry systems, and restoring degraded landscapes will be critical to reducing further habitat conversion while maintaining agricultural productivity and ecosystem health.

Under this NBSAP, sustainable agricultural intensification and integrated landscape management are prioritised as key approaches for reconciling food production needs with biodiversity conservation objectives. These measures will help safeguard ecosystem services, enhance resilience to climate change, and support the long-term sustainability of agricultural landscapes in Ghana.

2.1.6.3 SETTLEMENTS EXPANSION

Urbanization has emerged as a significant driver of terrestrial ecosystem transformation and biodiversity loss in Ghana. Rapid population growth, expanding infrastructure, industrial development, and increasing demand for housing have contributed to the accelerated conversion of natural and semi-natural landscapes into built-up areas. Between 1990 and 2021, the extent of settlement areas increased by approximately 673 percent, making urban expansion one of the most dramatic land-cover changes observed during the period.

The impacts of settlement growth are particularly evident in rapidly urbanizing regions. Between 2015 and 2021, substantial conversion of grassland ecosystems to settlements was recorded in the Greater Accra Region (10.1 percent) and the Volta Region (2.7 percent). Similar trends are emerging in other metropolitan and peri-urban areas as cities continue to expand beyond their traditional boundaries into surrounding agricultural lands, wetlands, forests, and other natural habitats.

The ecological consequences of settlement expansion are extensive. The conversion of natural ecosystems into built environments results in habitat loss and fragmentation, reducing the ability of species to move, disperse, and maintain viable populations. Urban development also contributes to the sealing of soils through roads, buildings, and other infrastructure, which diminishes water infiltration, increases surface runoff, and elevates the risk of flooding and erosion. Furthermore, the disruption of ecological connectivity weakens ecosystem resilience and reduces the capacity of landscapes to sustain biodiversity and deliver essential ecosystem services.

Beyond biodiversity impacts, unmanaged urban growth can place additional pressure on water resources, increase pollution levels, exacerbate urban heat island effects, and reduce the availability of green spaces that contribute to human well-being and climate adaptation. These challenges highlight the growing importance of integrating biodiversity considerations into urban development and spatial planning processes.

Addressing these pressures will require the adoption of biodiversity-sensitive urban planning approaches, including the protection of ecologically important areas, the development of green and blue infrastructure networks, the conservation and restoration of urban wetlands and waterways, and the incorporation of ecological corridors into urban design. Strengthening land-use planning and environmental safeguards will be essential to balancing urban growth with biodiversity conservation and ecosystem resilience.

Under this NBSAP, sustainable urban development is recognized as an important component of biodiversity conservation. Integrating biodiversity into urban and peri-urban planning will help maintain ecological connectivity, enhance climate resilience, improve ecosystem service provision, and support healthier and more sustainable communities.

2.1.7 IMPLICATIONS FOR BIODIVERSITY PLANNING

The status and trends of Ghana's terrestrial ecosystems underscore the urgent need for integrated and landscape-scale approaches to biodiversity conservation and sustainable land management. Continued deforestation, land degradation, agricultural expansion, urban growth, and ecosystem fragmentation are placing increasing pressure on biodiversity and the ecosystem services upon which communities and economic sectors depend. Addressing these challenges will require coordinated actions that balance conservation objectives with the need for sustainable production, economic development, and livelihood improvement.

While Protected Areas, Forest Reserves, and other conservation designations remain central to Ghana's biodiversity conservation strategy, a significant proportion of the country's biodiversity occurs outside formally protected areas. Many important habitats, species populations, ecological corridors, and ecosystem services are embedded within agricultural landscapes, rangelands, production forests, freshwater systems, and other human-dominated environments. Consequently, achieving long-term biodiversity outcomes will require conservation measures that extend beyond protected area boundaries and incorporate broader landscape management approaches.

The observed patterns of forest degradation, savanna decline, land degradation, agricultural expansion, and settlement growth highlight the importance of integrating biodiversity considerations into land-use planning and development decision-making. Biodiversity-sensitive spatial planning can help direct development away from ecologically important areas, maintain ecosystem connectivity, reduce habitat fragmentation, and identify priority areas for restoration and conservation investment. Such approaches are essential for reconciling competing land-use demands while safeguarding critical biodiversity values.

In addition, sustainable land-use practices across agriculture, forestry, mining, infrastructure development, and urban planning will be critical for reducing pressures on terrestrial ecosystems. Promoting sustainable agricultural intensification, climate-smart production systems, agroforestry, integrated landscape management, and ecosystem restoration can enhance productivity while reducing biodiversity loss and ecosystem degradation. Strengthening community-based natural resource management and supporting local stewardship will also be essential, given the significant role that communities and customary landholders play in managing biodiversity-rich landscapes.

Restoration of degraded ecosystems represents another key priority. Rehabilitating forests, savanna woodlands, wetlands, riparian zones, and other degraded habitats can enhance ecological resilience, support species recovery, improve soil and water resources, increase carbon sequestration, and strengthen adaptation to climate change. Restoration efforts should be strategically targeted to areas where they can deliver the greatest ecological and socio-economic benefits.

These priorities are reflected throughout the targets and actions of this NBSAP, particularly those relating to biodiversity-inclusive spatial planning, ecosystem restoration, protected and conserved areas, sustainable use of biodiversity, climate resilience, and the mainstreaming of biodiversity across sectors. Collectively, these actions seek to halt and reverse biodiversity loss, strengthen ecosystem integrity, and ensure that terrestrial ecosystems continue to support livelihoods, economic development, and human well-being while contributing to the achievement of the Kunming-Montreal Global Biodiversity Framework and Ghana's broader sustainable development objectives.

2.2: STATUS AND TRENDS OF INLAND WATER ECOSYSTEMS

2.2.1 RIVER BASINS AND WATERSHEDS

Ghana's inland water ecosystems are organized around three major river systems: the Volta River System, which drains approximately 70 percent of the country's land area; the South-Western River System, which accounts for about 22 percent; and the Coastal River System, which covers the remaining 8 percent. Together, these river basins form the hydrological backbone of the country, supporting domestic water supply, agriculture, fisheries, hydropower generation, industry, transportation, and a wide range of ecosystem services essential for human well-being and economic development.

The Volta River System, by far the largest, includes the White Volta, Black Volta, Oti, Daka, and numerous tributary rivers, and encompasses the internationally significant Volta Lake. The South-Western River System comprises major rivers such as the Pra, Ankobra, Tano, and Bia, while the Coastal River System consists of shorter river catchments, including the Densu, Ayensu, Tordzie, and several smaller coastal rivers that drain directly into the Gulf of Guinea.

These river basins perform critical ecological functions. They sustain freshwater biodiversity, support wetlands and riparian ecosystems, facilitate groundwater recharge, regulate hydrological flows, maintain water quality, and provide habitat for numerous aquatic and semi-aquatic species. Inland water ecosystems also play a central role in supporting food security through fisheries, irrigation, livestock production, and floodplain agriculture, while contributing to climate resilience and disaster risk reduction.

Despite their importance, Ghana's river basins and watersheds are facing growing pressure from both natural and human-induced drivers. Land-use change, deforestation, agricultural expansion, urbanization, sand winning, infrastructure development, and unsustainable resource extraction have altered watershed conditions and accelerated ecosystem degradation. In particular, the loss of vegetation cover within catchment areas has increased soil erosion, sedimentation, and surface runoff reducing water quality and impairing aquatic habitats.

Pollution has emerged as one of the most significant threats to inland water ecosystems. Illegal and poorly regulated mining activities, agricultural runoff, untreated domestic wastewater, industrial effluents, and solid waste disposal have contributed to the deterioration of water quality in several river systems. These pressures have affected aquatic biodiversity, increased water treatment costs, reduced the availability of safe water for communities, and weakened the capacity of freshwater ecosystems to provide essential services.

The increasing vulnerability of watersheds to climate variability and climate change further compounds these challenges. Changes in rainfall patterns, prolonged droughts, flooding events, and rising temperatures are affecting river flows, wetland dynamics, and freshwater ecosystem health. Such impacts have important implications for water security, biodiversity conservation, and the livelihoods of communities that depend directly on freshwater resources.

The continued degradation of river basins and watersheds highlights the need for integrated water resources management approaches that combine watershed protection, ecosystem restoration, pollution control, sustainable land-use planning, and community participation. Strengthening the conservation and sustainable management of inland water ecosystems will be essential for maintaining ecological integrity, safeguarding freshwater biodiversity, enhancing climate resilience, and ensuring that Ghana's river systems continue to support sustainable development and human well-being.

2.2.1.1 THE VOLTA BASIN

The Volta River System is the largest drainage basin in Ghana and forms part of a major transboundary river basin shared by several West African countries. The system comprises the White Volta, Black Volta, Red Volta, and Oti Rivers, together with numerous tributaries that drain approximately 70 percent of Ghana's land area. Central to the basin is Lake Volta, one of the world's largest artificial reservoirs, with a surface area of approximately 8,500 km², a total water surface of about 11,000 km², and an extensive shoreline of roughly 5,200 km, occupying nearly 4 percent of Ghana's total land area.

The Volta Basin is of immense ecological, economic, and social importance. It supports freshwater biodiversity, fisheries, transportation, irrigation, domestic and industrial water supply, and hydropower generation, while providing critical ecosystem services that sustain livelihoods and national development. The basin also supports wetlands, riparian habitats, floodplain ecosystems, and important breeding and feeding grounds for aquatic species.

Ecosystem accounting analyses indicate that total water yield within the Volta Basin increased from approximately 49.37 billion cubic metres in 2015 to 78.27 billion cubic metres in 2021. While this increase may initially suggest an improvement in water availability, it largely reflects changes in land cover and watershed conditions rather than enhanced ecosystem health. The conversion of forests and woodlands to croplands and grasslands reduces evapotranspiration and increases surface runoff, resulting in higher short-term water yields.

This trend has important ecological and hydrological implications. Increased surface runoff can elevate the risk of flooding, accelerate soil erosion, and reduce groundwater recharge, leading to diminished dry-season river flows and reduced resilience during periods of drought. The loss of vegetation cover within catchment areas also contributes to increased sediment transport into rivers and reservoirs, degrading water quality, affecting aquatic habitats, and reducing the operational lifespan and efficiency of hydropower and water storage infrastructure.

In parts of Lake Volta, submerged and exposed tree stumps resulting from historical forest inundation and ongoing shoreline degradation continue to influence navigation, fisheries, and aquatic ecosystem dynamics. More broadly, the degradation of riparian vegetation, pollution from agricultural activities, settlements, and mining operations, and unsustainable land-use practices are placing increasing pressure on the ecological integrity of the basin.

These trends underscore the urgent need for integrated watershed management across the Volta Basin. Priority actions include the restoration of degraded catchments, reforestation and afforestation of critical watershed areas, protection of riparian buffers, sustainable agricultural practices, erosion control measures, and strengthened pollution prevention and monitoring. Such interventions will be essential for safeguarding water resources, maintaining ecosystem services, enhancing climate resilience, protecting freshwater biodiversity, and sustaining the long-term viability of Ghana's hydropower and water infrastructure.

2.2.1.2 SOUTH-WESTERN RIVER SYSTEM

The South-Western River System, comprising the Bia, Tano, Ankobra, and Pra Rivers, drains a significant portion of Ghana's biologically rich forest landscapes and mineral-bearing zones. These river basins provide critical ecosystem services, including freshwater supply, fisheries production, irrigation, transportation, biodiversity conservation, and support for domestic and industrial activities. The river systems also serve as important ecological corridors that connect forest, wetland, and coastal ecosystems, thereby sustaining a wide range of terrestrial and aquatic species.

Despite their ecological and economic importance, the South-Western river basins are among the most heavily degraded freshwater systems in the country. Their location within Ghana's principal mining and cocoa-producing landscapes has exposed them to intense pressures from land-use change, deforestation, agricultural expansion, and both industrial and artisanal mining activities. In particular, illegal small-scale mining operations have emerged as a major threat to the ecological integrity of these river systems.

Mining activities have resulted in widespread sedimentation, turbidity, and contamination of water bodies through the release of suspended solids and hazardous substances. These impacts have degraded aquatic habitats, reduced water quality, disrupted ecosystem functioning, and increased the cost of water treatment for downstream users. In several sections of the Pra, Ankobra, and Tano river basins, the loss of riparian vegetation and disturbance of riverbanks have accelerated erosion and altered natural hydrological processes. Deforestation within upper catchments has further exacerbated watershed degradation by increasing surface runoff and sediment transport into rivers and reservoirs. The resulting decline in water quality affects fisheries, reduces ecosystem resilience, and threatens communities and economic sectors that depend on these freshwater resources. In addition, habitat fragmentation and pollution are contributing to the decline of freshwater biodiversity, including fish species and other aquatic organisms that are sensitive to environmental change.

The continued degradation of the South-Western River System poses significant risks to biodiversity conservation, water security, public health, and sustainable economic development. Addressing these challenges will require strengthened enforcement of environmental regulations, improved control of illegal mining activities, restoration of degraded riparian zones and watersheds, promotion of sustainable land management practices, and enhanced monitoring of water quality and ecosystem health.

Under this NBSAP, the conservation and restoration of the South-Western river basins are recognized as priorities for integrated ecosystem management. Protecting these freshwater ecosystems will be essential for maintaining biodiversity, safeguarding ecosystem services, strengthening climate resilience, and ensuring the sustainable use of water resources for present and future generations.

The Pra Basin: The Pra River Basin is one of Ghana's most intensively utilized river basins, supporting a wide range of economic activities including agriculture, forestry, mining, and human settlements. As a result, the basin has experienced substantial land-use change and environmental degradation over time. Ecosystem accounting data indicate that total water yield in the basin increased from approximately 3.04 billion m^3 in 2015 to 6.45 billion m^3 in 2021. While this increase suggests greater surface water availability, it largely reflects changes in land cover, particularly the conversion of forests and other natural vegetation to agricultural land and disturbed landscapes.

The reduction in forest cover and riparian vegetation has altered the basin's hydrological functioning by increasing surface runoff and reducing water infiltration and groundwater recharge. This has resulted in greater variability in river flows, heightened flood risks during the rainy season, and reduced water retention during dry periods. Furthermore, intensive mining activities, including illegal small-scale mining, have contributed to widespread sedimentation, riverbank erosion, and declining water quality, placing additional stress on aquatic ecosystems and water-dependent communities.

The combined effects of land-use change, watershed degradation, and pollution threaten the ecological integrity of the Pra Basin and its capacity to provide essential ecosystem services. Strengthening integrated watershed management, restoring degraded riparian zones, controlling unsustainable mining activities, and promoting sustainable land-use practices will therefore be critical to maintaining water quality, freshwater biodiversity, and the long-term sustainability of the basin's natural resources.

Pollution and Illegal Mining ("Galamsey"): The Pra and Ankobra river systems have become among the most severely degraded freshwater ecosystems in Ghana, primarily due to the proliferation of illegal artisanal and small-scale gold mining activities, commonly referred to as "galamsey". These activities have resulted in extensive disturbance of river channels and riparian habitats, leading to increased sedimentation, extreme turbidity, and the deterioration of water quality.

Mining operations frequently mobilize large volumes of sediment into waterways and may introduce hazardous substances, including mercury, arsenic, cyanide, and lead, into aquatic environments. The accumulation of these pollutants poses significant risks to freshwater biodiversity, ecosystem functioning, and human health. Elevated sediment loads reduce light penetration, disrupt aquatic food webs, smother spawning and breeding habitats, and adversely affect fish and other aquatic organisms. Heavy metal contamination can also accumulate in sediments and aquatic species, creating long-term ecological and public health concerns.

The ecological consequences of galamsey extend beyond pollution. Riverbank destruction, loss of riparian vegetation, altered hydrological regimes, and habitat fragmentation have reduced the resilience of freshwater ecosystems and undermined their capacity to provide essential ecosystem services. These impacts threaten fisheries, agriculture, domestic water supply, and the livelihoods of communities that depend directly on river resources.

The degradation of the Pra and Ankobra rivers have also imposed substantial economic costs. In many instances, water quality deterioration has significantly increased the cost of potable water treatment and, in severely affected areas, has rendered treatment technically challenging or economically unsustainable. The continued decline of these river systems therefore represents a major threat to water security, biodiversity conservation, public health, and sustainable development.

Addressing these challenges will require strengthened enforcement against illegal mining, restoration of degraded riverine habitats, improved watershed management, pollution control measures, and the promotion of sustainable livelihood alternatives. These interventions are essential to restore the ecological integrity of the Pra and Ankobra river basins and ensure the long-term provision of freshwater ecosystem services.

2.2.1.3 COASTAL RIVER SYSTEM

The Coastal River System comprises a network of relatively short river basins that drain directly into the Gulf of Guinea, including major rivers such as the Densu, Ayensu, and Odaw. Although smaller in extent than the Volta and South-Western river systems, these basins are of considerable ecological, economic, and social importance. They support freshwater and wetland biodiversity, provide water for domestic and industrial use, sustain agriculture, and contribute to flood regulation and groundwater recharge.

Among these rivers, the Densu River Basin is strategically significant because it supplies water to a substantial portion of the Accra Metropolitan Area through the Weija Reservoir. The basin therefore plays a critical role in ensuring water security for one of Ghana's most densely populated and rapidly expanding urban regions.

Status and Trends: The Densu Basin faces intense and growing pressure from urbanization, industrial development, agricultural expansion, sand winning, and other human activities within its catchment. The basin has an estimated mean annual runoff of approximately 500 $\times$ 10^6 m^3, making it an important freshwater resource for domestic consumption, agriculture, and ecosystem functioning.

Despite its importance, the basin’s ecological condition has deteriorated significantly over time. Habitat modification, water pollution, encroachment on riparian areas, and changing hydrological conditions have contributed to declines in freshwater biodiversity. Populations of species once common in the basin, including crocodiles, various fish species, crustaceans, and bivalves, have declined substantially, reflecting increasing pressure on aquatic habitats and ecosystem processes.

Biodiversity loss in the Densu Basin affects ecosystem health, fisheries productivity, water quality, and the resilience of freshwater ecosystems. Furthermore, continued urban expansion within the catchment increases the risk of pollution, flooding, sedimentation, and the degradation of critical wetlands and riparian habitats that support ecological functioning.

The challenges facing the Densu and other coastal river basins underscore the need for strengthened integrated watershed management, improved land-use planning, protection of riparian buffers, pollution prevention and control, and restoration of degraded freshwater habitats. Safeguarding these river systems is essential not only for biodiversity conservation but also for maintaining water security, ecosystem services, and climate resilience in Ghana's rapidly urbanizing coastal landscapes.

2.2.2 FRESHWATER BIODIVERSITY AND FISHERIES

Ghana’s inland water ecosystems support a rich diversity of aquatic species and provide essential ecosystem services, including fisheries production, food security, livelihoods, transportation, and water supply. Freshwater habitats such as rivers, lakes, reservoirs, floodplains, and wetlands are particularly important for sustaining fish populations and other aquatic biodiversity. Among these, Lake Volta remains the most significant inland water body, supporting one of West Africa's largest inland fisheries and contributing substantially to national fish production.

Capture Fisheries

Inland capture fisheries, dominated by the Lake Volta fishery, continue to play a critical role in supporting livelihoods and household nutrition. Between 2015 and 2021, annual production from inland capture fisheries fluctuated between approximately 80,000 and 100,000 metric tonnes. Recent estimates indicate that production increased to approximately 155,000 metric tonnes by 2025, reflecting the continued importance of inland fisheries to national food systems.

Despite these production levels, there are increasing concerns regarding the sustainability of freshwater fish stocks. Evidence from fisheries monitoring indicates that the composition of catches has progressively shifted towards smaller-sized fish species and individuals. This trend is widely recognized as a biological indicator of overexploitation, whereby fish are harvested before reaching their first sexual maturity, reducing their capacity to reproduce and replenish stocks. Continued harvesting pressure, combined with

habitat degradation, the use of illegal fishing methods, and declining water quality, threatens the long-term productivity and resilience of freshwater fisheries.

Aquaculture Development

In contrast to the challenges facing capture fisheries, aquaculture production, particularly cage aquaculture in Lake Volta, has expanded significantly over the past decade. The growth of aquaculture has helped offset deficits in wild fish availability and has become an increasingly important source of fish protein, employment, and economic growth. The sector contributes to national food security while reducing reliance on capture fisheries and imported fish products. According to the Fisheries Commission, Ghana has approximately 2,000 small-scale fish farms as of 2025, with production increasing steadily following recovery from environmental and disease shocks.

However, the rapid expansion of aquaculture also presents environmental management challenges. High concentrations of fish cages in localized areas can contribute to nutrient enrichment through uneaten feed and fish waste, potentially affecting water quality and ecosystem health. In addition, intensive aquaculture systems may increase the risk of disease outbreaks, invasive species introductions, and localized ecological impacts if not properly managed and regulated.

Implications for Biodiversity Management

The observed trends highlight the need for an integrated approach to freshwater fisheries management that balances production objectives with biodiversity conservation and ecosystem sustainability. Key priorities include strengthening fisheries governance, improving compliance with fisheries regulations, protecting critical fish habitats and breeding grounds, reducing pollution, restoring degraded freshwater ecosystems, and promoting sustainable aquaculture practices. Maintaining healthy freshwater ecosystems will be essential to sustaining fish populations, preserving aquatic biodiversity, enhancing water quality, and supporting the livelihoods of millions of Ghanaians who depend directly or indirectly on inland fisheries. Accordingly, this NBSAP promotes ecosystem-based management approaches that integrate freshwater biodiversity conservation with sustainable fisheries development and water resource management.

2.2.2.1 THREATENED FAUNA

Freshwater biodiversity in Ghana is facing increasing pressure from habitat degradation, pollution, overexploitation of aquatic resources, invasive species, hydrological alterations, and the impacts of climate change. These pressures are contributing to declines in freshwater species populations and reducing the ecological integrity of rivers, wetlands, lakes, and associated habitats.

According to available conservation assessments, a significant number of Ghana's freshwater-dependent species are threatened with extinction. Current IUCN Red List assessments identify 56 freshwater fish species and 11 amphibian species as threatened, highlighting the growing vulnerability of the country's inland aquatic biodiversity. These trends reflect broader challenges affecting freshwater ecosystems, including declining water quality, habitat fragmentation, sedimentation, and unsustainable resource use.

Among the species of conservation concern is the West African manatee (Trichechus senegalensis), a largely aquatic mammal that depends on healthy riverine, estuarine, and wetland habitats. Populations of this species are threatened by habitat loss, accidental capture in fishing gear, hunting, and increasing human disturbance. Freshwater turtle species are also under pressure, including the African softshell turtle (*Trionyx triunguis*), which faces threats from habitat degradation, water pollution, fishing activities, and the destruction of nesting sites.

The decline of these and other freshwater species serves as an important indicator of the deteriorating condition of inland water ecosystems. The loss of freshwater biodiversity not only reduces ecosystem resilience and ecological functioning but can also undermine fisheries productivity, food security, cultural values, and the provision of vital ecosystem services. Conserving Ghana's threatened freshwater fauna will require strengthened protection of critical habitats, improved water quality management, restoration of degraded wetlands and river systems, effective regulation of resource use, and enhanced monitoring of species populations. These measures are reflected in this NBSAP through actions aimed at freshwater ecosystem conservation, pollution reduction, sustainable fisheries management, habitat restoration, and the protection of threatened species.

2.2.3 WATER QUALITY TRENDS

The quality of Ghana's surface water resources has shown a general decline over the past two decades, reflecting the cumulative effects of watershed degradation, pollution, rapid land-use change, urbanization, and unsustainable natural resource exploitation. Trends in the Water Quality Index (WQI) indicate a progressive deterioration in water quality across the Volta, South-Western, and Coastal River Systems, raising concerns about the long-term sustainability of freshwater ecosystems and the services they provide.

Declining water quality has important implications for biodiversity conservation, public health, fisheries production, agricultural activities, and domestic and industrial water supply. Freshwater ecosystems are particularly vulnerable because deteriorating water quality can alter ecological processes, reduce habitat suitability, and undermine the resilience of aquatic species and ecosystems.

Sediment Loading and Erosion

Excessive sedimentation has emerged as one of the most significant threats to freshwater ecosystems in Ghana. High sediment loads are primarily driven by deforestation, land degradation, agricultural expansion, infrastructure development, and both legal and illegal mining activities. The removal of vegetation cover and disturbance of soils within watersheds increase erosion rates and accelerate the transport of sediments into rivers, reservoirs, and wetlands.

Evidence from ecosystem accounting assessments highlights the growing scale of this challenge. In the Pra Basin, sediment retention services increased from approximately 113.41 million tonnes in 2015 to 192.66 million tonnes in 2021. While an increase in sediment retention may indicate enhanced ecosystem functioning, it also reflects substantially greater sediment mobilisation within the landscape because of land-cover change and watershed degradation. This suggests that ecosystems are under increasing pressure to prevent excessive volumes of sediment from entering waterways.

Elevated sediment loads reduce water clarity, alter aquatic habitats, smother spawning and feeding grounds, and decrease the storage capacity and lifespan of reservoirs and other water infrastructure. Sedimentation also increases water treatment costs and adversely affects fisheries and freshwater biodiversity.

Chemical Pollution

Chemical contamination represents a further and increasingly serious threat to Ghana's freshwater ecosystems. Rivers such as the Pra and Birim have experienced significant pollution arising from artisanal and small-scale gold mining activities, agricultural runoff, and other human activities. Mining operations introduce hazardous substances, including mercury, arsenic, cyanide, and lead, into aquatic environments, while agricultural activities contribute nutrients, pesticides, and other agrochemicals.

These contaminants pose significant risks to aquatic biodiversity through direct toxicity, habitat degradation, and disruption of ecological processes. Heavy metals and toxic chemicals can accumulate in sediments and aquatic organisms, leading to bioaccumulation and biomagnification within food chains. As a result, fish populations and other aquatic species may experience reduced survival, impaired reproduction, and long-term population declines.

The implications extend beyond ecosystem health. Communities that depend on freshwater systems for drinking water, fisheries, irrigation, and other livelihood activities are increasingly exposed to environmental and public health risks associated with water pollution. Contaminated water bodies can compromise food safety, increase water treatment costs, and threaten the long-term sustainability of freshwater resources.

Implications for Biodiversity Conservation

The continued deterioration of water quality underscores the urgent need for strengthened watershed protection and pollution control measures. Effective responses should include the restoration of degraded catchments and riparian zones, sustainable land management practices, improved regulation and monitoring of mining activities, reduction of agricultural pollution, and enhanced water quality monitoring systems.

Within the framework of this NBSAP, improving freshwater ecosystem health will require an integrated approach that addresses both the sources and impacts of water pollution. Protecting water quality is essential for conserving freshwater biodiversity, sustaining fisheries, maintaining ecosystem services, enhancing climate resilience, and safeguarding the well-being of communities that depend on Ghana's inland water resources.

2.2.4 INLAND FLOOD REGULATION

The degradation of Ghana's inland water ecosystems has significantly reduced their natural capacity to regulate floodwaters, increasing the exposure of communities, infrastructure, and productive landscapes to flood-related risks. Healthy watersheds, wetlands, floodplains, forests, and riparian vegetation play a critical role in moderating river flows, enhancing water infiltration, storing excess runoff, and reducing the frequency and severity of flooding events. However, the continued loss and degradation of these ecosystems have weakened their ability to provide these vital regulatory services.

Flood Incidence

Flooding has become an increasingly frequent and costly environmental hazard in Ghana. Between 2011 and 2015, the country recorded 508 flooding events, representing one of the highest frequencies of flood occurrences in recent history. These events affected both urban and rural areas, causing loss of life, displacement of communities, damage to infrastructure, disruption of economic activities, and degradation of natural ecosystems.

Economic Costs

The impacts of inland flooding extend beyond immediate physical damage, generating substantial economic losses each year. The annual economic cost of inland flooding is estimated at approximately US$120 million, equivalent to about 0.2 percent of national Gross Domestic Product (GDP). These costs arise from damage to homes, roads, bridges, agricultural lands, public utilities, and other critical infrastructure, as well as from disruptions to livelihoods and economic productivity.

Decline in Ecosystem Services

Assessments of ecosystem services indicate a measurable decline in the natural flood-regulation capacity of several river basins. In the Pra Basin, for example, flood-regulation services have deteriorated significantly due to land-use change, watershed degradation, and the loss of natural vegetation. In the Kumasi metropolitan area, the area protected from a 100-year flood event declined from approximately 13 km² in 2015 to only 4 km² in 2021, substantially increasing the exposure of people, infrastructure, and economic assets to flood hazards.

This decline is closely linked to the degradation of forests, wetlands, and riparian ecosystems that traditionally function as natural flood buffers. Removing vegetation cover reduces water infiltration and increases surface runoff, while losing wetlands and floodplains diminishes the landscape's ability to store and gradually release excess water. As a result, river systems respond more rapidly to intense rainfall events, increasing the frequency and severity of floods.

Implications for Biodiversity and Water Management

The reduction in flood regulation services highlights the importance of conserving and restoring inland water ecosystems as part of broader biodiversity and climate resilience strategies. Protecting watersheds, restoring wetlands and riparian buffers, improving catchment management, and integrating ecosystem-based approaches into flood risk management can significantly reduce flood vulnerability while generating additional benefits for biodiversity conservation, water quality, and climate adaptation.

Under this NBSAP, the restoration and protection of freshwater ecosystems are recognized as essential measures for enhancing ecosystem resilience and maintaining critical regulating services. Strengthening the ecological integrity of river basins and wetlands will not only support biodiversity conservation but also reduce disaster risks, protect livelihoods, and contribute to sustainable development.

2.3: STATUS AND TRENDS OF MARINE AND COASTAL ECOSYSTEMS

2.3.1 THE COASTAL ZONE CONTEXT

Ghana's coastal zone extends for approximately 550 km along the Gulf of Guinea and represents one of the country's most economically productive and ecologically significant regions. Although it occupies a relatively small proportion of the national land area, it supports approximately 25 percent of Ghana's population and serves as a focal point for economic activities, including fisheries, maritime transport, industrial development, tourism, oil and gas operations, salt production, and urban expansion. Coastal cities such as Accra, Tema, Cape Coast, Sekondi-Takoradi, and Keta play important roles in national economic growth and regional trade.

The coastal zone encompasses a diverse range of ecosystems, including mangrove forests, estuaries, lagoons, wetlands, sandy beaches, rocky shores, mudflats, and nearshore marine habitats. These ecosystems support high levels of biodiversity and provide essential ecosystem services that contribute significantly to national development and human well-being. They serve as breeding, nursery, feeding, and migratory habitats for fish, crustaceans, molluscs, marine mammals, sea turtles, waterbirds, and numerous other species. In addition, coastal ecosystems provide shoreline protection, carbon sequestration, nutrient cycling, flood regulation, and livelihood support for coastal communities.

The Environmental Sensitivity Atlas of the Coastal Areas of Ghana (2020) identifies mangroves, open lagoons, estuaries, and associated wetlands as among the country's most ecologically valuable and environmentally sensitive coastal habitats. These ecosystems perform critical functions such as fish breeding and nursery grounds, support important fisheries resources, and provide habitats for migratory birds and other species of conservation concern. Their ecological importance is further enhanced by their role in protecting coastlines from erosion, storm surges, and flooding.

Despite their importance, these coastal ecosystems are highly vulnerable to both natural and human-induced pressures. Rapid urbanization, industrial expansion, coastal erosion, pollution, unsustainable harvesting of natural resources, habitat conversion, and climate change are increasingly affecting the ecological integrity of the coastal zone. The Environmental Sensitivity Atlas further highlights the susceptibility of mangroves, estuaries, and lagoons to environmental contamination, particularly from oil spills and other forms of marine pollution, which can have long-lasting impacts on biodiversity, fisheries, local livelihoods, and ecosystem health.

The concentration of economic activities and population within the coastal zone therefore creates a complex management challenge that requires balancing development objectives with biodiversity conservation and ecosystem sustainability. Maintaining the ecological integrity of coastal ecosystems will be critical for supporting fisheries productivity, enhancing climate resilience, safeguarding coastal communities, and ensuring the continued provision of ecosystem services.

Accordingly, this NBSAP promotes integrated coastal and marine management approaches that strengthen ecosystem protection, support sustainable resource use, restore degraded habitats, and improve resilience to climate change and other emerging threats. Conserving Ghana’s coastal biodiversity is essential not only for achieving national biodiversity objectives but also for sustaining livelihoods, food security, and long-term economic development.

2.3.2 STATUS OF MANGROVES AND COASTAL WETLANDS

Mangroves and coastal wetlands are among Ghana's most valuable coastal ecosystems, providing a wide range of ecological, economic, and social benefits. These ecosystems serve as natural barriers against coastal erosion and storm surges, support fisheries production as nursery and breeding habitats, sequester and store significant amounts of carbon, and contribute to water purification and nutrient cycling. They also provide critical resources and livelihoods for many coastal communities. Despite their importance, mangroves and associated coastal wetlands are rapidly degrading due to increasing human pressures, including coastal development, land conversion, overharvesting of wood resources, pollution, and climate-related impacts.

Extent and Trends

Recent assessments indicate a substantial decline in Ghana's mangrove ecosystems. Between 2015 and 2021, national mangrove cover decreased by approximately 22.3 percent, declining from about 87 km² to 68 km². This reduction represents a significant loss of coastal habitat and has important implications for biodiversity conservation, fisheries productivity, shoreline stability, and climate resilience.

Continued degradation and loss of mangrove ecosystems weaken coastal environments' natural capacity to protect communities and infrastructure from erosion, flooding, and extreme weather events. It also reduces the availability of critical habitat for numerous fish, crustacean, mollusk, bird, and other wildlife species that depend on mangrove ecosystems for part or all of their life cycles.

Species Status

Ghana's mangrove ecosystems are dominated by a limited number of key species, including *Avicennia germinans* (black mangrove), *Rhizophora racemosa* (red mangrove), and *Laguncularia racemosa* (white mangrove), among others. These species play important ecological roles in maintaining coastal ecosystem structure, productivity, and resilience.

Evidence indicates that the principal mangrove species occurring in Ghana are experiencing varying degrees of decline. Of particular concern is *Laguncularia racemosa* (white mangrove), which is regarded as one of the most threatened mangrove species within the country's coastal ecosystems. Its decline is primarily linked to habitat conversion associated with coastal development, urban expansion, infrastructure projects, and unsustainable harvesting for fuelwood and fish-smoking activities. Similar pressures are affecting other mangrove species, contributing to reductions in ecosystem extent, quality, and regenerative capacity.

Implications for Biodiversity Conservation

The continued decline of mangroves and coastal wetlands has far-reaching implications for biodiversity and ecosystem services. The loss of mangrove habitat reduces nursery grounds for commercially important fish species, affects migratory and resident bird populations, weakens coastal protection functions, and diminishes the carbon storage potential of coastal ecosystems. These impacts are further compounded by pollution, sedimentation, invasive species, and the effects of climate change, including sea-level rise and increased coastal erosion.

Addressing these challenges will require strengthened protection of existing mangrove areas, restoration of degraded wetlands and estuaries, sustainable management of coastal resources, and improved enforcement of environmental regulations. Community participation and the promotion of alternative livelihoods will also be essential to reducing pressure on mangrove resources and enhancing local stewardship.

Under this NBSAP, mangrove and coastal wetland conservation are recognized as key priorities for achieving biodiversity conservation, climate adaptation, ecosystem restoration, and sustainable development objectives. Strengthening the resilience and integrity of these ecosystems will be critical for safeguarding coastal biodiversity and maintaining the ecosystem services upon which many communities and economic sectors depend.

2.3.2.1 WETLANDS DEGRADATION

Ghana's coastal wetlands, including internationally recognized Ramsar Sites such as Songor Lagoon, Densu and Sakumo II Lagoon, are facing increasing levels of degradation from human activities and land-use change. These wetlands provide critical ecosystem services, including flood regulation, water purification, shoreline protection, carbon sequestration, and habitat for migratory birds, fish, and other wildlife. However, growing pressure from urbanization, infrastructure development, resource extraction, and changing land-use patterns is diminishing their ecological condition and conservation value.

Remote sensing and satellite imagery analyses indicate substantial habitat modification within several coastal wetland systems. Songor and Sakumo II have experienced significant changes associated with settlement expansion, encroachment into wetland areas, and the conversion of natural habitats for salt production and related infrastructure. These activities have reduced wetland extent, altered hydrological regimes, fragmented habitats, and disrupted ecological processes essential to maintaining biodiversity and ecosystem functioning.

The expansion of settlements and saltpans has also increased pressure on surrounding mangrove areas, mudflats, lagoons, and marsh habitats, reducing breeding, feeding, and resting sites for waterbirds, fish, and other wetland-dependent species. As wetland ecosystems become increasingly fragmented and degraded, their ability to provide critical ecosystem services and support biodiversity declines.

The continued degradation of coastal wetlands has important implications for biodiversity conservation, climate resilience, and local livelihoods. Loss of wetland habitats reduces ecological connectivity, weakens natural flood protection functions, and increases the vulnerability of coastal communities to erosion, flooding, and climate-related impacts. It also undermines fisheries productivity and threatens species that depend on these ecosystems throughout their life cycles.

Addressing these challenges will require strengthened protection and management of Ramsar Sites and other coastal wetlands, improved land-use planning and enforcement, restoration of degraded habitats, and greater engagement of local communities in wetland stewardship. These actions are essential to maintain the ecological integrity of Ghana's coastal wetlands and to ensure that they continue to provide biodiversity, climate, and livelihood benefits for present and future generations.

2.3.3 MARINE FISHERIES RESOURCES

Ghana's marine fisheries sector is a vital component of the national economy, food security system, and coastal livelihoods, contributing approximately 0.7 percent of Gross Domestic Product (GDP) and providing employment and income for hundreds of thousands of people along the country's coastline. However, mounting evidence indicates that the sector is experiencing severe stress, with many commercially important fish stocks showing signs consistent with overexploitation and declining productivity.

Stock Decline

The most significant declines have been observed among the small pelagic fish species that constitute the backbone of artisanal fisheries and are commonly referred to as Ghana's "people's fish." These include sardinellas, anchovies, and chub mackerel, which serve as an important source of affordable animal protein for the population. Assessments indicate that landings of these species declined by approximately 86 percent, falling from about 138,955 metric tonnes in 1996 to 19,608 metric tonnes in 2016. This dramatic reduction reflects a substantial decline in stock biomass and signals a serious deterioration in the status of Ghana's marine fishery resources.

Catch per Unit Effort (CPUE)

Declining fish abundance is also reflected in trends in Catch per Unit Effort (CPUE), a key indicator of fisheries productivity. Within the artisanal fisheries sector, annual catches per canoe and per fisherman have declined steadily over the past decade despite increasing fishing effort. This pattern indicates that fishers are required to expend greater time, labour, and resources to harvest smaller quantities of fish, demonstrating a progressive reduction in stock availability and fishing efficiency.

The continued decline in CPUE has significant economic and social implications. Reduced catches undermine household incomes, threaten food security, and increase competition for increasingly scarce marine resources. For many coastal communities that depend heavily on fisheries for their livelihoods, declining productivity represents a growing challenge to economic resilience and well-being.

Overexploitation and Excess Fishing Capacity

A principal driver of fisheries decline is the excessive level of fishing effort exerted on marine resources. Bio-economic assessments indicate that the current level of exploitation significantly exceeds the Maximum Sustainable Yield (MSY) required to maintain healthy fish populations over the long term. The sector is characterized by substantial excess fishing capacity, with the number of vessels and fishing operations surpassing the level that marine ecosystems can sustainably support.

This overcapacity has contributed to stock depletion and reduced economic efficiency within the sector. Estimates suggest that unsustainable fishing practices result in annual losses of approximately US$200 million in potential economic benefits and resource rents that could otherwise be generated through sustainable fisheries management.

Illegal, Unreported and Unregulated (IUU) Fishing

The sustainability of Ghana's marine fisheries is further threatened by widespread Illegal, Unreported and Unregulated (IUU) fishing activities. Of particular concern is the practice known as "Saiko," involving the illegal transshipment of fish and bycatch from industrial trawlers to artisanal fishing canoes at sea. This practice undermines fisheries regulations, distorts fish markets, and contributes significantly to the depletion of fish stocks.

In addition, some industrial fishing vessels, including those operating under Ghanaian registration but with foreign ownership interests, have been implicated in targeting juvenile fish and fishing in areas reserved for artisanal fishers. The capture of immature fish before they reach reproductive age reduces stock replenishment capacity and accelerates population declines, further compromising the long-term sustainability of marine fisheries resources.

Implications for Biodiversity and Fisheries Management

The observed trends indicate that Ghana's marine fisheries have reached a critical stage requiring urgent and coordinated intervention. The continued decline of fish stocks threatens marine biodiversity, food security, employment, and the economic viability of the fisheries sector. Rebuilding fish populations will require strengthened fisheries governance, effective enforcement of regulations, reduction of excess fishing effort, elimination of IUU fishing practices, protection of critical breeding and nursery habitats, and greater adoption of ecosystem-based fisheries management approaches.

Under this NBSAP, the recovery and sustainable management of marine fisheries resources are recognized as priorities for conserving marine biodiversity and maintaining the ecosystem services upon which coastal communities depend. Achieving these objectives will require integrated action across fisheries management, marine spatial planning, habitat conservation, pollution control, and stakeholder engagement to ensure that Ghana's marine ecosystems remain productive, resilient, and capable of supporting future generations.

2.3.4 COASTAL EROSION AND FLOODING

Coastal erosion and flooding represent some of the most significant environmental threats facing Ghana's coastal zone. These challenges are being intensified by sea-level rise, climate variability, increasing human settlement along the coastline, and the degradation of natural coastal protection systems, including wetlands, mangrove forests, lagoons, beaches, dunes, and other intertidal ecosystems. The loss and deterioration of these natural defences have reduced the capacity of coastal landscapes to absorb wave energy, regulate flooding, and protect communities and infrastructure from coastal hazards.

Erosion Rates and Trends

Coastal erosion is widespread along Ghana's shoreline and continues to accelerate in several locations. It is estimated that Ghana loses approximately 2.7 million m² of shoreline annually, with nearly 80 percent of the coastline experiencing active erosion. Erosion rates vary across locations but typically range between 4 and 12 metres per year, depending on local geomorphological conditions, coastal processes, and human activities.

Particularly severe erosion hotspots occur along the Keta, Ada, and Tema coastlines, where the combined effects of wave action, shoreline modification, sediment imbalances, and sea-level rise have resulted in substantial land loss and increasing risks to coastal communities. In many areas, erosion has damaged homes, roads, public infrastructure, tourism facilities, and productive coastal lands, while also contributing to the loss of important habitats for fish, birds, sea turtles, and other coastal species.

Economic Impacts

The economic consequences of coastal degradation are substantial and are expected to increase significantly under future climate change scenarios. Estimates indicate that the annual economic cost of coastal erosion and flooding was approximately US$47 million in 2015, reflecting losses associated with damaged infrastructure, reduced economic activity, declining ecosystem services, and disaster response expenditures.

Climate change projections suggest that these costs could rise dramatically in the coming decades. By 2100, the annual economic impacts of coastal degradation could reach approximately US$1.6 billion if current trends continue and adequate adaptation measures are not implemented. Such increases would impose significant burdens on national development, public finances, and the livelihoods of coastal communities.

Vulnerability and Flood Risks

Ghana's coastal population is particularly vulnerable to flooding and other climate-related hazards. Approximately 1.8 million out of the over 3 million coastal settlers live in coastal areas situated below the 20-metre elevation contour, placing them at heightened risk from coastal flooding, storm surges, tidal inundation, and sea-level rise.

Urban centres face additional challenges arising from inadequate drainage infrastructure, rapid urbanization, and encroachment into natural drainage systems. In Accra, for example, recurrent flooding is exacerbated by blocked or restricted waterways and the degradation of natural flood-regulating ecosystems. The obstruction of lagoon outlets, particularly at the Korle Lagoon, limits the efficient discharge of stormwater and contributes to persistent flooding during the rainy season. Combined with extensive surface sealing and settlement expansion, these factors have increased both the frequency and severity of urban flood events.

Implications for Biodiversity and Coastal Management

The continued loss of coastal habitats and the increasing vulnerability of coastal communities highlight the importance of ecosystem-based approaches to coastal resilience. Mangroves, wetlands, lagoons, beaches, and other coastal ecosystems provide valuable natural protection against erosion and flooding while simultaneously supporting biodiversity, fisheries, tourism, and carbon sequestration.

Addressing coastal erosion and flooding will require integrated coastal zone management approaches that combine ecosystem restoration, protection of critical coastal habitats, climate adaptation planning, improved drainage and infrastructure development, shoreline management, and stricter control of settlement expansion into vulnerable areas. Restoration of mangroves, wetlands, and other nature-based coastal defences offers significant opportunities to enhance resilience while generating biodiversity and livelihood benefits.

Under this NBSAP, the conservation and restoration of coastal ecosystems are recognized as essential strategies for strengthening climate resilience, reducing disaster risk, maintaining ecosystem services, and safeguarding the biodiversity and livelihoods that depend on Ghana's coastal and marine environments.

2.3.5 MARINE POLLUTION

Pollution from land-based sources has emerged as a major threat to Ghana's coastal and marine ecosystems, undermining water quality, biodiversity, fisheries productivity, and human health. Rapid urbanization, inadequate waste management systems, industrial discharges, agricultural runoff, and the increasing generation of plastic waste have contributed to the degradation of coastal waters and associated habitats. These pressures affect estuaries, lagoons, wetlands, beaches, and nearshore marine ecosystems that are critical for biodiversity conservation and the provision of ecosystem services.

Solid Waste Pollution

Plastic and other forms of solid waste pollution are now widespread along Ghana's coastline and within coastal water bodies. Rivers, drains, and lagoons transport large quantities of waste from inland areas to the marine environment, while direct dumping in coastal communities further exacerbates the problem. Ghana is estimated to contribute between 1 and 3 percent of global marine debris inputs, largely through riverine discharge and unmanaged waste disposal practices.

Marine debris poses significant risks to biodiversity. Plastic waste can entangle marine mammals, sea turtles, birds, and fish, while smaller plastic particles may be ingested by marine organisms and enter food chains. The accumulation of waste along beaches, wetlands, estuaries, and lagoons also degrades habitats, affects tourism, and reduces the ecological quality of coastal ecosystems.

Chemical Pollution

Chemical contamination is an equally significant threat to Ghana's marine environment. One of the most notable examples is the Korle Lagoon, which has become a major source of pollution entering the Gulf of Guinea. The lagoon receives untreated domestic wastewater, industrial effluents, stormwater runoff, and other pollutants from the Accra metropolitan area, resulting in extremely poor water quality.

Biochemical Oxygen Demand (BOD) levels in the Korle Lagoon have been recorded at between 270 and 1,000 mg/l, indicating severe organic pollution and depleted oxygen conditions that are harmful to aquatic life. Such conditions significantly reduce the capacity of the lagoon to support biodiversity and maintain ecological functions.

Additional pollution pressures arise from informal electronic waste processing activities, particularly within the Agbogbloshie area. Heavy metals and other toxic substances released from e-waste processing can enter drainage systems and eventually reach coastal waters, where they accumulate in sediments and aquatic organisms. Contaminants such as lead and other heavy metals pose significant ecological and human health risks through bioaccumulation and biomagnification within aquatic food webs.

Chemical pollution is further compounded by discharges from health facilities, manufacturing industries, workshops, and agricultural activities. Nutrients, pharmaceuticals, hydrocarbons, detergents, pesticides, and other contaminants contribute to declining water quality and increasing stress on marine and coastal ecosystems.

Implications for Biodiversity Planning

The status and trends of Ghana's marine and coastal ecosystems highlight the urgent need for integrated and ecosystem-based management approaches. The combined impacts of overfishing, habitat degradation, pollution, coastal erosion, flooding, and climate change are placing increasing pressure on biodiversity and reducing the resilience of coastal and marine systems.

Effective biodiversity planning must therefore adopt a holistic approach that recognizes the interconnected nature of marine, coastal, and inland ecosystems. Conservation efforts need to be integrated with sustainable fisheries management, pollution prevention and control, ecosystem restoration, climate adaptation, and marine spatial planning. Strengthening governance, improving enforcement of environmental regulations, enhancing stakeholder participation, and promoting cross-sectoral collaboration will be essential for addressing these challenges.

This NBSAP recognizes that the long-term sustainability of Ghana's marine and coastal biodiversity depends on maintaining healthy ecosystems that can continue to provide food, livelihoods, climate regulation, shoreline protection, and other critical ecosystem services. Accordingly, the Strategy prioritizes actions aimed at restoring degraded habitats, reducing pollution, strengthening protected and conserved areas, promoting sustainable fisheries, enhancing climate resilience, and integrating biodiversity considerations into coastal and marine development planning.

Through these actions, Ghana seeks to halt the decline of marine and coastal biodiversity, improve ecosystem health and resilience, and ensure the sustainable use of marine resources for present and future generations.

2.4: STATUS AND TRENDS OF SPECIES AND GENETIC DIVERSITY

2.4.1 FLORA DIVERSITY AND STATUS

Ghana possesses a rich and diverse flora, with more than 3,600 documented vascular plant species occurring across its forest, savanna, freshwater, coastal, and marine ecosystems. Angiosperms constitute the dominant component of the national flora, comprising approximately 2,974 indigenous species, while gymnosperms are represented by a single native cycad species, Encephalartos barteri. This botanical diversity provides the foundation for ecosystem functioning, biodiversity conservation, food security, traditional medicine, and sustainable livelihoods.

The country's highest levels of plant species richness and endemism occur within the wet evergreen forests of southwestern Ghana, which form part of the globally significant Upper Guinea Forest biodiversity hotspot. These forests contain numerous rare, endemic, and economically important plant species, including valuable timber trees, medicinal plants, and species of high conservation concern. The ecological uniqueness of these forests makes them a priority for conservation and restoration efforts.

Despite this richness, plant diversity is increasingly threatened by habitat loss, forest degradation, agricultural expansion, mining, urbanization, and unsustainable harvesting. According to available conservation assessments, 119 plant species, representing approximately 3.3 percent of Ghana’s known flora, are currently classified as threatened. Species of particular concern include the white mangrove (Laguncularia racemosa) and the cycad Encephalartos barteri, both of which are affected by habitat fragmentation, degradation, and overexploitation.

Medicinal plants remain especially important within Ghana's healthcare system and cultural traditions. A significant proportion of the population continues to rely on herbal medicine for primary healthcare, creating sustained demand for medicinal plant resources. However, many wild medicinal plant populations are under increasing pressure from overharvesting and habitat degradation. Ecosystem accounting estimates indicate that the value of medicinal plant provisioning services increased from approximately USD 3 million in 2015 to USD 5 million in 2021. While this increase reflects the continuing importance of medicinal plants, it may also indicate growing scarcity and increasing extraction pressure on natural populations rather than an increase in resource abundance.

2.4.2 FAUNA DIVERSITY AND STATUS

Ghana supports a diverse assemblage of fauna distributed across its terrestrial, freshwater, and marine ecosystems (Table 2.3). The country is home to more than 748 bird species and approximately 275 mammal species, in addition to a wide range of reptiles, amphibians, fish, insects, and other invertebrates. These species contribute to ecological processes such as pollination, seed dispersal, pest regulation, nutrient cycling, and ecosystem resilience.

Despite this diversity, many wildlife populations have experienced significant declines due to habitat loss, fragmentation, overexploitation, pollution, invasive species, and climate-related pressures. National assessments indicate that a substantial number of vertebrate species are now threatened. The 2020 Environment Statistics Compendium identified 116 threatened vertebrate species, comprising 56 fish species, 11 amphibian species, 7 reptile species, 22 bird species, and 20 mammal species.

Mammals

Large mammal populations have been particularly affected by habitat loss and hunting pressure. Species such as elephants, bongos, and leopards are now largely restricted to protected areas and wildlife conservation landscapes, including Mole National Park and other protected sites. Population fragmentation and decreasing habitat availability remain major challenges to their long-term survival.

The decline of primate populations is especially concerning. The red colobus monkey has been declared locally extinct in Ghana, representing a significant loss of biodiversity and illustrating the severe consequences of habitat destruction and unsustainable hunting. This extinction highlights the urgent need for strengthened habitat protection and species recovery measures.

Avifauna

Although Ghana continues to support a high overall diversity of bird species, many forest-dependent birds are experiencing population declines. Habitat fragmentation, illegal logging, wildfires, agricultural expansion, and forest degradation have reduced the quality and connectivity of suitable habitats. Consequently, forest birds are increasingly used as indicators of ecosystem health and environmental change, with declines often reflecting broader deterioration of forest ecosystems.

Invertebrates

Invertebrates constitute an important but often underrepresented component of Ghana's biodiversity. Butterfly surveys, particularly within the Volta ecological zone, have revealed significant levels of localized endemism and ecological distinctiveness. These findings have contributed to the recognition of the area as a unique biogeographical region and highlight the importance of invertebrates as indicators of environmental health and conservation priorities.

The status of Ghana's fauna underscores the urgent need for targeted conservation interventions that combine species protection, habitat restoration, sustainable resource management, ecological monitoring, and community participation. Protecting species diversity is essential not only for maintaining ecosystem integrity but also for ensuring the continued provision of ecosystem services that support livelihoods, food security, and national development.

Table 2.3 Key Trends in Ghana's Biodiversity and Ecosystems (2015-2021)

Ecosystem Component	**Key Trend (2015–2021)**	**Primary Driver**
Closed Forest	**-25%** decrease in extent	Agricultural expansion (Cocoa), Logging
Open Forest	Dominant land cover (18.4% of total)	Degradation of closed forests
Mangroves	**-22.3%** decrease in extent	Fuelwood harvesting, Coastal development
Grassland	**-6%** decrease (approx.)	Conversion to settlement and cropland
Settlement	**Increased** (part of 673% long-term growth)	Urbanization, Population growth
Marine Fisheries	**- 90%** decline in small pelagic landings (1996-2025)	Overfishing, IUU fishing
Inland Water	**Declining** Water Quality Index	Illegal mining (Galamsey), Sedimentation

2.4.3 IMPLICATIONS FOR BIODIVERSITY CONSERVATION

The observed trends in species diversity indicate that while Ghana remains exceptionally rich in biological diversity, many species and populations are under increasing pressure. Continued loss of habitats, fragmentation of ecosystems, overexploitation, pollution, and climate change threaten both species survival and genetic diversity.

Accordingly, this NBSAP prioritizes actions to conserve threatened species, strengthen habitat protection, restore degraded ecosystems, enhance monitoring and research, and safeguard genetic resources. Attention is given to species and ecosystems of high conservation concern, including threatened mammals, freshwater fauna, forest-dependent birds, mangrove species, medicinal plants, and endemic taxa. Through these measures, Ghana seeks to halt biodiversity decline, maintain ecological resilience, and secure the benefits of its biological heritage for future generations.

2.5 GENETIC DIVERSITY

Genetic diversity is a fundamental component of biodiversity and provides the basis for adaptation, resilience, and long-term productivity in agricultural, forestry, fisheries, and natural ecosystems. It enables species and production systems to adapt to changing environmental conditions, emerging pests and diseases, and the impacts of climate change. However, evidence indicates that genetic diversity within both cultivated and domesticated species is progressively declining in Ghana.

Crop Genetic Diversity

The genetic diversity of many traditional crop species is under increasing pressure as indigenous landraces are replaced by a relatively narrow range of improved and high-yielding varieties. While improved varieties have contributed to agricultural productivity gains, their widespread adoption has reduced the diversity of genetic resources maintained within farming systems.

Significant declines have been observed in the diversity of traditional yam, banana, and local cocoa varieties. The gradual replacement of locally adapted varieties with genetically uniform cultivars increases the vulnerability of agricultural systems to pests, diseases, climatic extremes, and other environmental shocks. The erosion of crop genetic diversity also reduces future opportunities for crop improvement, breeding, and adaptation to changing conditions, thereby posing risks to long-term food security and agricultural sustainability.

Livestock Genetic Diversity

Similar trends are evident among Ghana's indigenous livestock resources. Traditional breeds that have evolved under local environmental conditions are increasingly being replaced through crossbreeding and the introduction of higher-yielding exotic breeds. While these introductions may improve short-term productivity, they can also lead to the loss of valuable adaptive traits that are critical for resilience.

A notable example is the West African Shorthorn cattle, an indigenous breed valued for its tolerance to trypanosomiasis and adaptation to local climatic and management conditions. This breed accounted for approximately 80 percent of the national cattle population during the 1990s but declined to below 50 percent by 2000. The reduction in indigenous livestock populations has implications for disease resistance, climate adaptation, and the conservation of locally important genetic traits. Similar concerns apply to other indigenous livestock breeds, including the Djallonké sheep and local goat breeds.

The conservation and sustainable use of genetic resources are therefore essential to strengthen food system resilience, support climate adaptation, and maintain options for future agricultural development. Continued investment in both in situ and ex situ conservation, including community-based conservation, field gene banks, and the National Gene bank, will be critical for safeguarding Ghana's genetic heritage.

2.6 WILDLIFE TRADE AND BUSHMEAT

Wildlife resources continue to play an important socio-economic role in Ghana, particularly in rural areas where bushmeat contributes to food security, nutrition, employment, and household income. For many communities, bushmeat serves as an important safety net during periods of food scarcity and agricultural hardship.

However, growing demand and unsustainable harvesting practices are placing increasing pressure on wildlife populations. Although bushmeat remains widely traded and consumed, there is mounting evidence of changes in species composition that indicate declining wildlife populations and increasing exploitation pressure.

2.6.1 TRENDS IN BUSHMEAT HARVESTING

Recent observations indicate that larger-bodied mammals, including many primates, antelopes, and other medium-to-large wildlife species, have become increasingly scarce in many landscapes. As a result, hunting activity has progressively shifted towards smaller and more resilient species such as grasscutters, rats, and other small mammals.

This transition from larger to smaller species is widely recognized as a sign of wildlife depletion and unsustainable harvesting. It reflects the reduced availability of preferred species and suggests that hunting pressure in many areas exceeds the capacity of wildlife populations to recover naturally. Habitat loss, forest fragmentation, agricultural expansion, and human settlement development further exacerbate these pressures by reducing suitable habitat and increasing access to previously remote areas.

Economic and Social Importance

Despite concerns regarding sustainability, bushmeat continues to provide significant economic and nutritional benefits. The true scale of the sector remains difficult to quantify because much of the trade occurs informally and outside official reporting systems. Nevertheless, bushmeat remains an important source of animal protein for many households and supports livelihoods for hunters, traders, processors, and associated value-chain actors.

Balancing biodiversity conservation with livelihood needs therefore represents a major policy challenge. Effective management will require a combination of strengthened enforcement, sustainable livelihood alternatives, community-based conservation approaches, awareness raising, and improved monitoring of wildlife populations and trade dynamics.

2.6.2 IMPLICATIONS FOR BIODIVERSITY PLANNING

The continuing decline of species and genetic diversity demonstrates that ecosystem conservation alone is insufficient to secure Ghana's biodiversity. Targeted measures are required to conserve threatened species, maintain population viability, preserve genetic resources, and ensure the sustainable use of wildlife and biological resources.

Protecting critical habitats, maintaining ecological connectivity, restoring degraded landscapes, controlling unsustainable exploitation, and strengthening species recovery programmes are essential for preventing further biodiversity loss. At the same time, conserving traditional crop varieties, indigenous livestock breeds, and other genetic resources will be critical for maintaining resilience in the face of climate change, emerging diseases, and evolving socio-economic conditions.

This NBSAP addresses these priorities through an integrated framework of targets and actions focused on:

- Species conservation and recovery;
- Sustainable use of biodiversity;
- Conservation of genetic resources;
- Invasive alien species management;
- Habitat restoration and ecological connectivity;
- Knowledge generation, monitoring, and research;
- Community participation and equitable benefit-sharing.

Successful implementation will require strong cross-sectoral coordination, adequate financing, robust monitoring systems, strengthened institutional capacity, and the active participation of local communities, resource users, civil society organizations, academia, and the private sector. Through these actions, Ghana seeks to halt and reverse biodiversity loss while ensuring that biological resources continue to support livelihoods, resilience, food security, and sustainable development.

2.7 DRIVERS OF BIODIVERSITY LOSS

The decline of biodiversity in Ghana is driven by a complex interplay of direct human-induced pressures and underlying socio-economic factors. These drivers operate across terrestrial, freshwater, coastal, and marine ecosystems, often reinforcing one another and accelerating ecosystem degradation, species loss, and the erosion of genetic diversity. Understanding the nature and interaction of these drivers is essential for designing effective conservation responses and informing the implementation of this NBSAP.

2.7.1 DIRECT DRIVERS

2.7.1.1 LAND-USE CHANGE AND AGRICULTURAL EXPANSION

Land-use change remains the single most important driver of biodiversity loss in Ghana. The conversion of natural ecosystems into agricultural land, settlements, infrastructure, and other human-dominated landscapes has resulted in widespread habitat loss, fragmentation, and ecosystem degradation.

Cocoa Expansion

The expansion of cocoa cultivation into forested landscapes continues to be a major driver of deforestation within the High Forest Zone. High international cocoa prices, declining productivity on ageing farms, and increasing demand for agricultural land have incentivized the conversion of natural forests and, in some cases, encroachment into forest reserves. The resulting expansion of the cocoa-forest mosaic has contributed to habitat fragmentation, canopy loss, and declining forest integrity.

Food Crop Expansion

Food crop cultivation has expanded considerably across the Savannah and Transition Zones. Between 2015 and 2021, food crop area increased substantially, often at the expense of savannah woodlands, grasslands, and transitional ecosystems. This expansion has reduced natural habitats, altered ecosystem processes, and increased pressure on biodiversity-rich landscapes.

Urbanization

Rapid urban growth, estimated at more than 3 percent annually, has transformed extensive areas of natural and semi-natural habitats. Since 1990, settlement areas have expanded by approximately 673 percent, consuming peri-urban ecosystems, wetlands, agricultural lands, and coastal scrublands. These impacts are particularly evident within the Greater Accra Metropolitan Area and other rapidly growing urban centres, where habitat fragmentation and the loss of ecological connectivity continue to intensify.

2.7.1.2 ILLEGAL ARTISANAL AND SMALL-SCALE GOLD MINING ("GALAMSEY")

Illegal artisanal and small-scale gold mining, commonly known as *galamsey*, has emerged as one of the most severe threats to biodiversity and ecosystem integrity in Ghana.

Habitat Destruction

Mining operations typically involve clearing vegetation and removing topsoil, leaving behind heavily degraded landscapes marked by pits, spoil heaps, and exposed surfaces. These disturbances result in extensive habitat destruction and significantly reduce the potential for natural ecosystem recovery. In many areas, including forest reserves within the Western Region and other forested landscapes, mining has caused substantial ecological degradation.

Water Pollution

The widespread use of mercury and other chemicals in gold processing has contaminated major river systems, including the Pra, Ankobra, and Birim Rivers. Pollutants released into these waterways degrade aquatic habitats, alter food webs, reduce water quality, and pose significant risks to freshwater biodiversity and human health. The cumulative impacts of mining pollution threaten fisheries, water supply systems, and ecosystem functioning across entire watersheds.

2.7.1.3 OVEREXPLOITATION OF NATURAL RESOURCES

Unsustainable extraction and harvesting of biological resources continue to drive biodiversity loss across multiple sectors.

Fisheries

Marine fisheries are affected by excessive fishing effort, illegal fishing practices, and inadequate compliance with fisheries regulations. Activities such as light fishing, the use of undersized mesh nets, explosives, and illegal transshipment practices have depleted reproductive fish stocks and contributed to severe declines in commercially important species.

Logging

Timber extraction remains a major pressure on forest ecosystems. Available assessments suggest that harvesting rates significantly exceed sustainable production levels. Illegal logging and chainsaw milling, which supply a considerable proportion of the domestic timber market, frequently occur outside approved management frameworks, contributing to forest degradation and biodiversity loss.

Wildlife Hunting

Unsustainable bushmeat hunting continues to threaten wildlife populations throughout Ghana. Persistent hunting pressure has resulted in declining populations of large mammals and other wildlife species, contributing to local extinction and the disruption of ecological functions. The loss of key seed dispersers and other ecological specialists has important implications for forest regeneration and ecosystem resilience.

2.7.1.4 POLLUTION

Pollution from multiple sources is placing increasing pressure on terrestrial, freshwater, and marine ecosystems.

Solid Waste Pollution

Inadequate waste management has resulted in significant leakage of plastics and other solid waste into the environment. A substantial proportion of uncollected waste enters drains, rivers, lagoons, and coastal waters, contributing to habitat degradation and marine pollution.

Electronic Waste (E-Waste)

Informal processing of electronic waste releases heavy metals such as lead and cadmium, as well as persistent organic pollutants including dioxins. These pollutants contaminate soils, water bodies, and sediments, creating localized environmental hotspots and posing serious risks to biodiversity and human health.

Air Pollution

Increasing levels of particulate matter and emissions from household biomass burning, transportation, industrial activities, and open waste burning contribute to declining environmental quality. Air pollution affects ecosystem health and poses significant public health concerns.

2.7.1.5 CLIMATE CHANGE

Climate change is increasingly recognized as a threat multiplier that amplifies existing pressures on biodiversity and ecosystem services.

Climate Trends

Ghana has experienced an increase of approximately 1°C in mean temperatures since the 1980s, accompanied by increasing rainfall variability, changing seasonal patterns, and more frequent extreme weather events.

Impacts on Biodiversity

Rising sea levels contribute to coastal erosion, flooding, saline intrusion, and the degradation of mangroves and other coastal ecosystems. Changes in precipitation patterns affect freshwater availability, agricultural productivity, and ecosystem stability, often encouraging expansion into previously uncultivated areas. In marine environments, rising sea surface temperatures and altered oceanographic conditions, including changes in upwelling systems, are affecting fish productivity, recruitment, and species distribution.

The interaction of climate change with other drivers such as habitat loss, pollution, invasive species, and overexploitation further increases the vulnerability of biodiversity and ecosystem services. Building resilience to climate change will therefore be a critical component of biodiversity conservation and sustainable development efforts under this NBSAP.

2.7.2 INDIRECT DRIVERS

While direct pressures such as habitat conversion, pollution, overexploitation, and climate change have immediate impacts on biodiversity, these pressures are shaped and reinforced by a range of underlying socio-economic, institutional, and governance factors. Addressing these indirect drivers is essential for achieving long-term biodiversity conservation and sustainable development outcomes.

2.7.2.1 POPULATION GROWTH AND POVERTY

Population growth and poverty exert significant pressure on Ghana's natural resources and ecosystems. Ghana's population continues to grow rapidly and is projected to increase substantially over the coming decades, resulting in rising demand for food, energy, land, housing, water, and infrastructure. This growing demand intensifies competition for natural

resources and accelerates the conversion of forests, wetlands, savannas, and other natural habitats into agricultural and settlement areas.

In many rural communities, poverty remains an important driver of environmental degradation. Limited livelihood opportunities and inadequate access to alternative sources of income and energy often increase dependence on natural resource extraction, including fuelwood collection, charcoal production, bushmeat hunting, artisanal mining, and unsustainable harvesting of forest products. While these activities provide short-term livelihood benefits, they frequently occur at rates that exceed the regenerative capacity of ecosystems, contributing to biodiversity loss and environmental degradation.

2.7.2.2 ECONOMIC FACTORS

Ghana's economy continues to depend heavily on the extraction and utilization of natural resources, including gold, timber, cocoa, fisheries resources, oil, and agricultural commodities. These sectors contribute significantly to national income, employment, and foreign exchange earnings, but they also place considerable pressure on ecosystems when resource use is not managed sustainably.

Economic incentives often favour short-term production gains over the long-term maintenance of natural capital. As a result, environmental costs associated with deforestation, land degradation, pollution, biodiversity loss, and ecosystem degradation are frequently not fully reflected in market prices or development decisions. Estimates suggest that the economic cost of environmental degradation reached approximately US$6.3 billion, equivalent to 10.7 percent of GDP, in 2017. These losses represent forgone ecosystem services, reduced productivity, increased health costs, and declining natural resource availability (Table 2.4).

The failure to adequately value ecosystem services and biodiversity within economic planning can lead to development pathways that undermine the ecological foundations upon which long-term economic prosperity depends. Strengthening natural capital

accounting and integrating biodiversity values into economic decision-making are therefore critical for achieving sustainable development.

Table 2.4 Estimated Cost of Environmental Degradation in Ghana (2017)

Category	Estimated Cost (US$ billion)	% of GDP
Air Pollution	2.49	4.2%
Water Pollution	1.80	3.0%
Gold Mining (Galamsey)	0.68	1.2%
Agricultural Land Degradation	0.54	0.9%
Deforestation	0.40	0.7%
Coastal Erosion/Flooding	0.05	<0.1%
Total	**~6.3**	**~10.7%**

2.7.2.3 POLICY AND INSTITUTIONAL CHALLENGES

Although Ghana has established a relatively comprehensive legal and policy framework for environmental management and biodiversity conservation, implementation challenges continue to constrain its effectiveness.

Weak Enforcement

Inadequate financial, technical, and human resources often hinder enforcement of environmental laws and regulations. Key institutions responsible for biodiversity management, including the Forestry Commission, Environmental Protection Authority, Fisheries Commission, and other sectoral agencies, frequently face resource constraints that limit monitoring, compliance, and enforcement activities. This situation enables illegal activities such as logging, mining, wildlife trafficking, and unsustainable fishing to persist in many areas.

Coordination Gaps

Biodiversity management responsibilities are distributed across multiple institutions, sectors, and levels of government. While this reflects the cross-cutting nature of

biodiversity conservation, overlapping mandates and weak coordination mechanisms can result in fragmented decision-making and conflicting land-use outcomes. In some instances, competing development priorities and sectoral objectives have resulted in land-use authorizations that compromise conservation objectives.

Perverse Incentives

Certain policies, subsidies, and incentive structures may inadvertently encourage unsustainable resource use. Incentives that lower operational costs in sectors such as fisheries, agriculture, and natural resource extraction can contribute to increased harvesting pressure where appropriate safeguards are absent. Such incentives may unintentionally encourage overexploitation of resources that are already under stress, thereby accelerating biodiversity decline.

Synthesis of Biodiversity Loss Trends

The combined evidence from land accounts, ecosystem assessments, biodiversity monitoring, and environmental analyses reveals a consistent and concerning pattern: Ghana is converting natural capital into produced capital at a rate that is increasingly difficult to sustain. Forests, wetlands, rivers, coastal ecosystems, fisheries, and wildlife populations continue to support economic growth and human development, yet many of these natural assets are being degraded faster than they can recover.

While these transformations have contributed to economic expansion and improved livelihoods in many areas, the long-term consequences include declining ecosystem services, reduced climate resilience, growing environmental risks, and increasing costs associated with ecosystem degradation. Unless these trends are reversed, continued biodiversity loss will undermine the ecological foundations upon which sustainable development depends.

The drivers of biodiversity loss are deeply embedded within broader development pathways, production systems, governance arrangements, and consumption patterns.

Consequently, addressing them will require transformative changes in the way natural resources are valued, managed, and governed across society.

2.7.2.4 IMPLICATIONS FOR THE NBSAP

The drivers of biodiversity loss in Ghana are highly interconnected and cannot be addressed through isolated interventions. Effective action will require coordinated, multi-sectoral, and whole-of-society responses that tackle both the immediate pressures on biodiversity and the underlying socio-economic and institutional factors that sustain them. Addressing these drivers requires the following:

- Biodiversity-inclusive spatial planning and land-use management;
- Sustainable agriculture, forestry, fisheries, and mining practices;
- Ecosystem restoration and conservation;
- Pollution prevention and control;
- Sustainable management of wild species and genetic resources;
- Invasive alien species management;
- Climate-resilient biodiversity conservation approaches;
- Improved environmental governance and enforcement;
- Enhanced biodiversity financing and investment; and
- Greater stakeholder participation, awareness, and accountability.

This NBSAP responds to these challenges through a comprehensive and integrated set of national targets and actions aligned with the Kunming-Montreal Global Biodiversity Framework (KMGBF). By addressing both the direct and indirect drivers of biodiversity loss, Ghana seeks to halt and reverse biodiversity decline, restore ecosystem integrity, strengthen resilience to climate change, and ensure that biodiversity continues to support sustainable development, food security, livelihoods, and human well-being for present and future generations.

CHAPTER THREE

PROCESS OF NBSAP REVISION AND STAKEHOLDER ENGAGEMENT

3.1: INSTITUTIONAL AND GOVERNANCE ARRANGEMENTS FOR NBSAP REVISION

The revision of Ghana's National Biodiversity Strategy and Action Plan (2026-2030) was undertaken through an institutional and governance framework designed to ensure national ownership, inter-sectoral coordination, and alignment with national development planning processes. The approach recognised biodiversity as a cross-cutting issue requiring a whole-of-government and whole-of-society approach.

3.1.1 NATIONAL INSTITUTIONAL LEADERSHIP

The Ministry of Environment, Science, and Technology (MEST) provided overall leadership and coordination for the NBSAP revision process. As the national focal point for the Convention on Biological Diversity, MEST was responsible for ensuring that the revised NBSAP aligns with Ghana's international commitments, including the Kunming–Montreal Global Biodiversity Framework, while remaining consistent with national policies and development priorities.

MEST worked closely with key sector ministries, departments, and agencies (MDAs), research and academia whose mandates relate to biodiversity. This institutional leadership enabled the integration of biodiversity considerations across relevant sectors and policy domains.

3.1.2 INTER-SECTORAL COORDINATION MECHANISMS

Given the cross-sectoral nature of biodiversity, the NBSAP revision process emphasised inter-ministerial and inter-agency coordination. Technical inputs were drawn from institutions responsible for biodiversity conservation, natural resource management, environmental protection, trade and industry development, gender and social protection, spatial and development planning.

The National Development Planning Commission played a key role in aligning the NBSAP with Ghana's national development planning framework. This alignment ensures

coherence between biodiversity objectives and medium- to long-term national development policies, as well as integration into sectoral and district development plans.

Inter-sectoral coordination mechanisms facilitated information sharing, technical review, and consensus-building across institutions, reducing duplication and strengthening policy coherence. This was important to set the stage for implementation, monitoring, reporting, and verification of the revised NBSAP.

3.1.3 ROLE OF SUB-NATIONAL AUTHORITIES

Metropolitan, Municipal, and District Assemblies (MMDAs) play a critical role in land-use planning, natural resource management, and local development implementation in Ghana. The NBSAP revision process recognised the importance of sub-national authorities in translating national biodiversity priorities into local action in line with the whole-of-government principle.

Engagement with sub-national institutions provided opportunities to reflect local realities, capacities, and challenges in biodiversity management. This decentralised perspective is essential for effective implementation of the NBSAP, particularly for targets related to spatial planning, ecosystem restoration, sustainable use, and community-based management.

3.1.4 TECHNICAL SUPPORT AND KNOWLEDGE INPUTS

The revision process drew on technical studies, national assessments, ecosystem accounts, sector reports, and policy reviews. These inputs provided a robust evidence-base for assessing biodiversity status and trends, identifying drivers of biodiversity loss, and defining realistic, achievable targets and actions.

Technical experts from relevant institutions contributed to the synthesis of information and development of draft components of this NBSAP. This ensured that the revised strategy reflects current knowledge, national circumstances, and practical considerations for implementation.

3.1.5 ALIGNMENT WITH CBD GUIDANCE AND NATIONAL REPORTING PROCESSES

The governance arrangements for the NBSAP revision were designed to align with CBD guidance on planning, monitoring, reporting, and review. The structure and content of the revised NBSAP were informed by decisions of the Conference of Parties (COP) and related guidance on implementing the Kunming–Montreal Global Biodiversity Framework. Linkages with national reporting processes, including biodiversity-related reporting to the CBD, were considered to ensure consistency and efficiency. This alignment supports streamlined monitoring and reporting during the implementation phase.

3.1.6 ENSURING TRANSPARENCY AND ACCOUNTABILITY

Transparency and accountability were guiding principles throughout the NBSAP revision process. Institutional roles and responsibilities were identified to support implementation, monitoring, and reporting. Governance arrangements emphasised coordination, information sharing, and accountability across institutions and levels of governance. To address persistent challenges of duplication and inadequate coordination among state and non-state institutions, a Responsibility Assignment Matrix (RAM) was adopted. Specifically, a Responsible, Accountable, Consulted, and Informed (RACI) model was applied to ensure the integration of values, goals, and objectives at cognitive, organisational, and process levels.

The application of the RACI model within this NBSAP is grounded in Ghana's specific public administration structure. A critical distinction is drawn between the **"Accountable" (A)** entities (primarily, sector Ministries such as MEST, MLNR, MoF, and MLGDRD) which hold the constitutional and policy mandate to report to Cabinet and Parliament) and the **"Responsible" (R)** entities. The "Responsible" actors are the technical agencies, departments, and MMDAs charged with the practical execution of actions.

By mapping these roles explicitly, this NBSAP ensures that policy oversight does not conflict with technical implementation, thereby streamlining decision-making and resource allocation.

Beyond vertical reporting lines, the RACI framework institutionalizes horizontal integration through the **"Consulted" (C)** and **"Informed" (I)** designations. Biodiversity

loss cannot be curbed in silos. Accordingly, the matrix requires lead agencies to consult cross-cutting regulators such as the NDPC for planning alignment or the EPA for environmental safeguards, before, during and after implementation.

Furthermore, the "Informed" category formalizes the role of high-level oversight bodies, including Cabinet and the National Biodiversity Steering Committee, ensuring that biodiversity outcomes remain visible at the highest levels of political governance. This structured flow of information eliminates the "silo mentality" that has historically hampered cross-sectoral cooperation. Ultimately, this governance arrangement is designed to maximize efficiency and eliminate duplication of effort.

By pre-assigning roles for every National Target, the RACI matrix provides a clear roadmap for development partners, private sector investors, civil society organisations and all relevant stakeholders, thereby fostering a "Whole-of-Government" and "Whole-of-Society" approach.

These arrangements provide a foundation for effective implementation of the NBSAP, enabling Ghana to track progress, address challenges, and adapt actions as needed over the implementation period.

3.2 STAKEHOLDER ENGAGEMENT AND PARTICIPATION PROCESS

Stakeholder engagement and participation were central elements of the process for revising this NBSAP. Recognising that biodiversity conservation and sustainable use involve a wide range of actors with diverse interests, knowledge systems, and responsibilities, the revision process adopted an inclusive and participatory approach consistent with national governance principles and guidelines of the CBD.

3.2.1 RATIONALE FOR STAKEHOLDER ENGAGEMENT

Biodiversity-related decisions affect livelihoods, land use, access to resources, and development opportunities across society. Effective and durable biodiversity strategies, therefore, require the meaningful involvement of stakeholders at national, sub-national, and local levels. The NBSAP revision process sought to ensure that perspectives from government institutions, traditional authorities, communities, civil society organisations,

academia, and the private sector were reflected in the strategy. Particular attention was given to gender and vulnerable groups, including Persons Living with Disability.

Stakeholder engagement was also essential for identifying implementation challenges, practical opportunities, and capacity needs, thereby strengthening the feasibility and ownership of the revised NBSAP.

3.2.2 STAKEHOLDER GROUPS ENGAGED

The stakeholder engagement process was designed to involve a broad range of actors whose mandates, activities, or interests intersect with biodiversity. These included:

- MDAs responsible for environment, natural resources, agriculture, fisheries, forestry, water, land use, planning and finance;
- MMDAs involved in local planning and implementation; traditional authorities and community representatives with indigenous knowledge and customary roles in land and natural resource management;
- civil society organisations and non-governmental organisations working on biodiversity, conservation, livelihoods and development;
- academic and research institutions providing technical and scientific expertise; and private sector actors whose activities depend on or impact biodiversity.

Engagement across these groups supported cross-sectoral dialogue and contributed to a shared understanding of biodiversity priorities and responsibilities. The list of stakeholders engaged is attached as Annex 1 of this strategy.

3.2.3 ENGAGEMENT APPROACHES AND MODALITIES

A range of engagement approaches were used during the NBSAP revision process to facilitate participation and information exchange. These included consultations, technical discussions, reviews of draft materials, participatory resource mapping with communities, key informant interviews, transect walks, and feedback mechanisms. These were tailored to different stakeholder groups, levels of governance and involvement with biodiversity issues. the principle of Free, Prior and Informed Consent (FPIC) was a non-negotiable backbone of the entire process.

Engagement approaches were designed to be flexible and responsive to stakeholder contexts, capacities, and roles. At the national level, consultations focused on policy coherence, strategic alignment, and implementation feasibility. At sub-national and community levels, engagement focused on local realities, resource use practices, and implementation challenges.

3.2.4 INTEGRATION OF STAKEHOLDER INPUTS

Inputs from stakeholders informed multiple aspects of the revised NBSAP, including identification of priority issues, understanding of drivers of biodiversity loss, and consideration of implementation arrangements. Stakeholder perspectives contributed to refining targets, actions, and governance mechanisms to ensure they are realistic and context appropriate.

While not all stakeholder views could be reflected in full, the engagement process provided opportunities for dialogue, clarification, and iterative refinement of the strategy. This contributed to building shared ownership and understanding of the NBSAP's objectives and commitments.

3.2.4.1 INCLUSIVITY, EQUITY AND PARTICIPATION PRINCIPLES

The stakeholder engagement process was guided by principles of inclusivity, transparency, and equity in addition to FPIC. Efforts were made to ensure participation of diverse stakeholder groups, including those directly dependent on biodiversity and ecosystem services for their livelihoods.

Recognising differences in knowledge, influence, access to information, and capacity, the process sought to create space for meaningful participation and to value different knowledge systems, including local and traditional knowledge. These principles are reflected in the NBSAP's emphasis on participation, benefit-sharing, and inclusive governance.

3.2.4.2 LINKAGES TO IMPLEMENTATION AND MONITORING

Stakeholder engagement was not limited to the NBSAP revision phase but is integral to its implementation, monitoring, reporting and review. These lessons were picked up as part of the challenges faced during the implementation of the 2016 NBSAP. This revised

NBSAP emphasises continued engagement with stakeholders to support implementation, track progress, address challenges, and adapt actions over time. In the past, engagements have been treated as events rather than a continuous process that builds relationships, common understanding, common goals, and shared responsibility. New experiences in co-creation and shared responsibility in our collaborative resource management approaches have shown that gradual, sustained relationships work better, though they may be expensive. These mechanisms for ongoing participation and feedback are important for maintaining accountability, learning, and adaptive management.

3.3 METHODOLOGY AND APPROACH TO NBSAP REVISION

The revision of the NBSAP (2016-2021) followed a structured, evidence-based, and iterative methodology designed to ensure alignment with national priorities and international obligations under the Convention on Biological Diversity. The approach emphasised transparency, analytical rigour, and national ownership, while recognising practical implementation realities.

3.3.1 GUIDING PRINCIPLES

The methodology for revising the NBSAP was guided by a set of core principles. These included the reliance on sector mandates and laws that enjoined the national institutions to produce specific documents, including annual reports on the status of implementation of medium-term development frameworks. The process also focused on national priority actions, working closely with the National Development Planning Commission to align reporting templates in a manner that makes it flexible to extract appropriate data from annual reports from Government Agencies. Another key principle was the use of existing national data, assessments, and policy documents as the primary evidence-base for analysis and target-setting. Where information gaps were identified, these were explicitly acknowledged rather than filled through assumptions. The gaps identified became actions and activities to be implemented under the revised NBSAP to enhance data collection and curation, knowledge management, learning, and capacity development.

3.3.2 EVIDENCE-BASED ASSESSMENT AND BASELINE DEVELOPMENT

The revision process began with a comprehensive review of existing national reports, environmental assessments (e.g. Country Environmental Assessment, 2020), ecosystem

accounts (e.g. Ghana Land and Ecosystem Extent, 2025), sectoral strategies (e.g. Sustainable Oceans Plan, 2025), and biodiversity-related studies (Annual Progress Reports from the Forestry Commission, Land-Use and Spatial Planning Authority, Fisheries Commission, Environmental Protection Authority, amongst others). These documents provided the basis for assessing the status and trends of ecosystems, species, and genetic diversity, as well as drivers of biodiversity loss.

Baseline information was synthesised across terrestrial, inland water, and marine ecosystems to provide a coherent national picture. This synthesis informed the identification of priority issues, spatial considerations, and thematic focus areas under the revised NBSAP.

3.3.3 ALIGNMENT WITH THE KUNMING–MONTREAL GLOBAL BIODIVERSITY FRAMEWORK

A central element of the methodology was explicit alignment with the Kunming–Montreal Global Biodiversity Framework. Extensive consultations were undertaken at both national and sub-national levels, to ensure that the nationally adopted targets found expression in our current statutes and administrative procedures to ensure that commitments are met. The structure of the revised NBSAP, including its goals, targets, and action areas, was aligned with those of KMGBF, ensuring consistency and comparability.

3.3.4 ITERATIVE DEVELOPMENT AND REVIEW

The NBSAP revision process followed an iterative approach, allowing for successive refinement of content based on technical review and stakeholder input. Draft components were reviewed internally by relevant institutions and adjusted to improve coherence, clarity, and feasibility.

This iterative process enabled the identification of overlaps, gaps, and inconsistencies, which were addressed through further analysis and coordination. Iteration also supported integration across chapters, ensuring that diagnostic sections, targets, and implementation arrangements are logically connected.

3.3.5 INTEGRATION WITH NATIONAL PLANNING AND POLICY FRAMEWORKS

Ghana has, over the years, worked extensively and interfaced with many of the Multilateral Environmental Agreements (MEAs), hence the basic legislation and policy framework required to effectively anchor the KMGBF and support its implementation were already in place. This was critical because national plans and budgets are rooted in our legislation and development frameworks, which could facilitate the implementation of our commitment without necessarily relying on total external financial support as in the case of the past. By aligning biodiversity priorities with existing planning and policy frameworks, the revised NBSAP is positioned as an enabling instrument that supports broader development objectives rather than a stand-alone environmental document.

3.3.6 MONITORING, EVALUATION AND ADAPTIVE MANAGEMENT CONSIDERATIONS

Considerations for monitoring, evaluation, and review were incorporated into the NBSAP methodology from the onset. The selection of targets, actions, and indicators was informed by data availability, institutional responsibilities, and reporting requirements under the CBD.

The methodology recognises that implementation will occur in a dynamic context and therefore emphasises adaptive management. Periodic review, learning, and adjustment are integral to ensuring that the NBSAP remains relevant and effective over its implementation period.

3.3.7 LIMITATIONS AND KNOWLEDGE GAPS

The methodology acknowledged limitations related to data availability, coverage, and resolution in certain areas of biodiversity assessment. These limitations informed the prioritisation of capacity-building, data development, and knowledge management actions within this NBSAP. By explicitly recognising constraints and uncertainties, this revised NBSAP provides a transparent foundation for future improvement and learning, consistent with international best practice.

CHAPTER FOUR

NATIONAL BIODIVERSITY STRATEGY

This chapter presents the strategic framework (Figure 4.1) that will guide the implementation of Ghana's National Biodiversity Strategy and Action Plan (NBSAP). It sets out the national vision, mission, guiding principles, and strategic goals that will direct biodiversity conservation, sustainable use, equitable benefit-sharing, and effective implementation. Together, these provide the foundation for coordinated action towards achieving national biodiversity priorities and the targets of the Kunming-Montreal Global Biodiversity Framework.

VISION STATEMENT

"*By 2050, Ghana's biodiversity is valued, conserved, and restored, serving as the foundation of a resilient economy where ecosystem goods and services sustain a healthy planet and the benefits of nature are shared equitably for the prosperity and security of all Ghanaians."*

MISSION

"To take urgent, transformative action to halt and reverse biodiversity loss by 2030; ensuring that Ghana's ecosystems are resilient, managed sustainably, and mainstreamed into development planning to secure livelihoods, eradicate poverty, and contribute to global climate goals."

4.2 GUIDING PRINCIPLES OF THE NBSAP

This strategy and action plan is anchored on the following seven core principles:

i. Ecosystem Approach

This NBSAP adopts an Ecosystem Approach and promotes the integrated management of land, water, and biological resources. It recognises people as integral to ecosystems and supports sustainable biodiversity management.

ii. Sustainable Use and Equity

This NBSAP promotes the sustainable use of biodiversity to prevent its long-term decline and safeguard its benefits for present and future generations. In line with the Nagoya Protocol, it also ensures the fair and equitable sharing of benefits from genetic resources, enabling local communities that steward these resources to gain tangible economic and social benefits.

iii. Whole-of-Government and Whole-of-Society Approach

Biodiversity loss is not solely an environmental issue but a developmental, economic, and socio-cultural challenge. Whole-of-Government: Success requires breaking down silos. This principle mandates mainstreaming biodiversity targets into the policies, budgets, and development plans of all sectors, including agriculture, fisheries, finance, energy, tourism, trade and infrastructure, not just the environment. Whole-of-Society: Implementation requires the active and inclusive participation as well as mobilisation of all stakeholders, including government institutions, the private sector, civil society, academia, traditional authorities, women, youth, persons with disabilities and local communities. This approach ensures no one is left behind and affirms that biodiversity is a shared responsibility across the national landscape.

iv. Knowledge and Evidence-Based Decision-Making

Interventions within this NBSAP are grounded in the best available knowledge, data, and technical expertise. This principle recognises and values Traditional Ecological Knowledge (TEK) held by local communities. Decision-making will therefore rely on a robust evidence-base that combines modern scientific findings with TEK.

v. Precautionary Action

Where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty shall not be used as a reason for postponing measures to avoid or minimise such a threat. This Strategy prioritises "prevention" over "cure and aims to prevent biodiversity loss and degradation.

vi. Subsidiarity and Decentralization

In alignment with Ghana's decentralised governance structure, decisions and actions regarding biodiversity management should be taken at the lowest appropriate level. While the central government provides national oversight through the MDAs, the MMDAs and local communities manage resources in practice.

vii. Adaptive Management and Learning

The implementation of this NBSAP will follow an iterative process of learning-by-doing. Regular monitoring and evaluation will generate feedback, allowing managers to adjust strategies and actions based on what is working, what is not, and emerging threats.



Figure 4.1 The NBSAP framework for Ghana

4.3 Strategic Goals of the NBSAP

The strategic goals integrate biodiversity considerations across sectors, levels of governance, and development planning, while promoting coordinated action among all relevant stakeholders to achieve effective and sustainable biodiversity conservation and management. Figure 4.2 presents the alignment between the strategic goals, focus areas, objectives, and the corresponding national biodiversity targets. This alignment demonstrates how the strategic direction of the NBSAP translates into measurable national targets and provides a coherent framework for implementation.

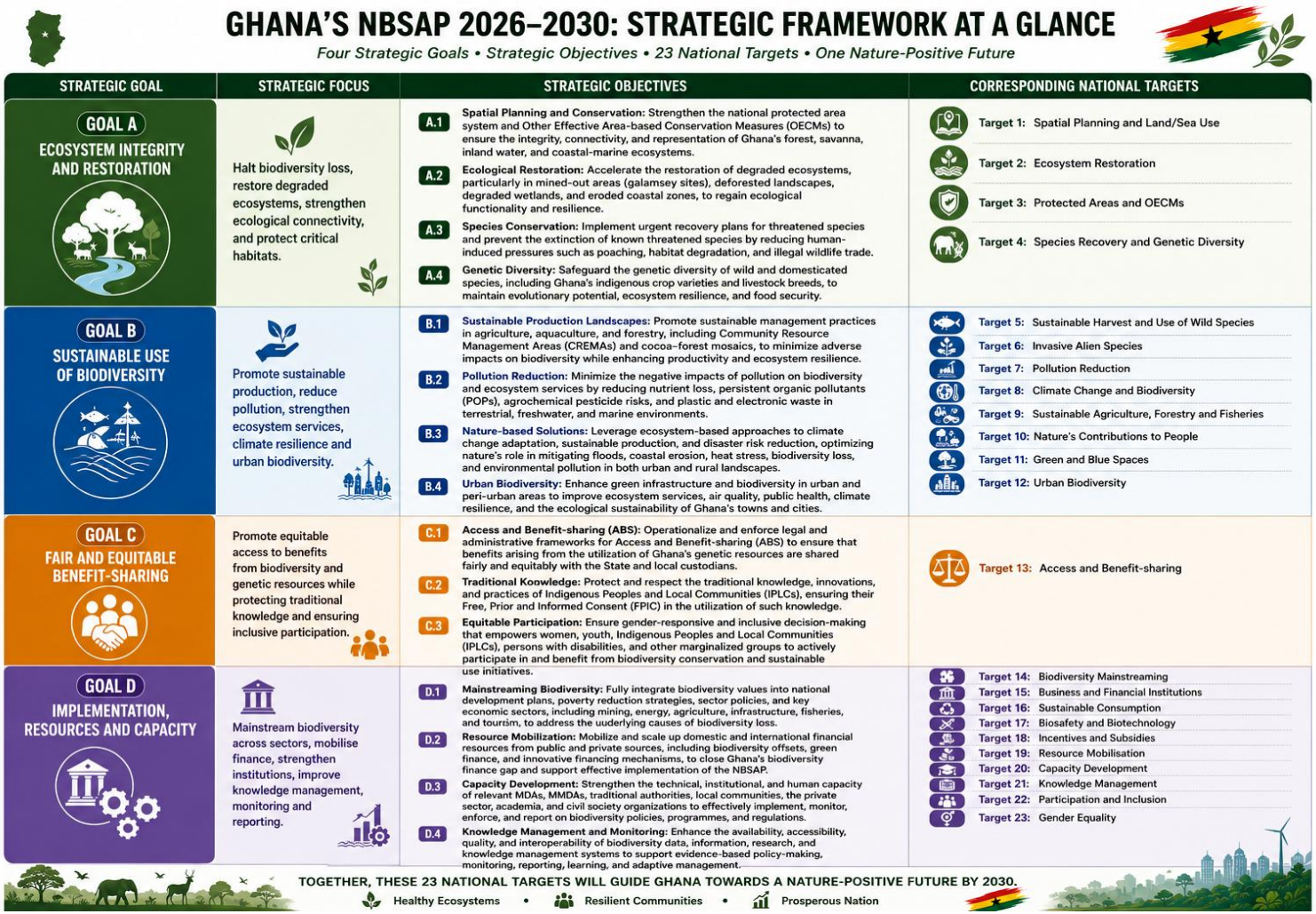

Figure 4.2 Ghana's NBSAP strategic framework from 2026-2030.

4.4 POLICY AND LEGAL FRAMEWORK COHERENCE

The successful implementation of this NBSAP (2026–2030) depends on a coherent policy and legal framework aligned with national biodiversity targets. While Ghana has several environmental laws and policies, implementation has been hampered by institutional fragmentation, overlapping mandates, and conflicting sectoral priorities. Biodiversity governance involves multiple MDAs which often lead to functional overlaps that impact accountability and resource efficiency. The mandates of key institutions are clarified in Table 4.1 to ensure streamlined implementation of the NBSAP.

Table 4.1: Institutional Mandate

Institution	Mandate in Biodiversity	Clarification of Boundary
Ministry of Environment, Science, and Technology (MEST)	Policy formulation, oversight, and international reporting (CBD Focal Point).	Focuses on high-level policy alignment and inter-ministerial advocacy.
Environmental Protection Authority (EPA)	Regulatory oversight, Environmental Impact Assessment (EIA), and enforcement.	Acts as the technical regulator for all activities impacting biodiversity outside protected areas.
Forestry Commission (FC)	Management of forest reserves and wildlife protected areas.	Leads on-the-ground conservation and sustainable timber management within gazetted areas.
Ministry of Food and Agriculture (MoFA)	Sustainable agricultural practices and agro biodiversity.	Responsible for mainstreaming biodiversity into farming systems to reduce land-use pressure.
Ministry of Fisheries and Aquaculture (MOFA)	Sustainable management of fisheries resources	Ensures responsible fishing practices and safe and sustainable use of fish resources

Water Resources Commission (WRC)	Management and regulation of water bodies and riparian ecosystems.	Leads the protection of inland aquatic biodiversity through Integrated Water Resources Management (IWRM).
Metropolitan, Municipal, and District Assemblies (MMDAs)	Localized land-use planning and community-level environmental management.	Implementation of biodiversity actions at the sub-national level under the guidance of national agencies.

4.5 COORDINATION MECHANISMS FOR IMPLEMENTATION

A multi-layered coordination framework will be essential for bridging the gap between national policy and localised actions by actively involving both state and non-state actors to ensure effective biodiversity conservation.

At the core of this framework is the National Biodiversity Steering Committee (NBSC), which serves as the primary inter-sectoral coordination body. Currently, the Committee's membership has been expanded to include the Ministry of Finance, the NDPC, and the private sector to ensure that biodiversity is seamlessly integrated into national budgeting and economic planning processes. Vertical and horizontal coordination will be further strengthened through strategic collaborations with the NDPC and the Ministry of Local Government, Chieftaincy and Religious Affairs to incorporate NBSAP targets into the Medium-Term Development Plans (MTDPs) of Metropolitan, Municipal, and District Assemblies (MMDAs).

Furthermore, a strong recognition of customary law through the establishment of a formal consultative platform with the National and Regional Houses of Chiefs to integrate community-managed lands and sacred groves into the national conservation landscape will be crucial. This inclusive approach will be complemented by a biennial "Biodiversity Stakeholder Forum" that will facilitate knowledge exchange among civil society, academia, the private sector and the government while aligning corporate social responsibility initiatives with national biodiversity priorities.

4.6 STRATEGIC GOALS OF THIS NBSAP

4.6.1 STRATEGIC GOAL A: ECOSYSTEM INTEGRITY AND RESTORATION

Aligned with KMGBF Goal A, it promotes the conservation, restoration, and sustainable management of terrestrial, freshwater, marine and coastal ecosystems through restoration, protected areas, spatial planning and sustainable land and water management.

Focus: Control loss, restore degraded areas and protect critical habitats. This Cover GBF Targets 1–4 (Spatial planning, Restoration, PA's, Species recovery).

Strategic Objective A. 1 (Spatial Planning and Conservation): Strengthen the national protected area system and Other Effective Area-based Conservation Measures (OECMs) to ensure the integrity, connectivity and representation of Ghana's forest, savanna and coastal-marine ecosystems.

Strategic Objective A. 2 (Ecological Restoration): Accelerate the restoration of degraded ecosystems, particularly in mined-out areas ("galamsey" sites), deforested landscapes and eroded coastal zones to regain ecological functionality and resilience.

Strategic Objective A. 3 (Species Conservation): Implement urgent recovery plans for threatened species and prevent the extinction of known threatened species by reducing human-induced pressures such as poaching and illegal wildlife trade.

Strategic Objective A. 4 (Genetic Diversity): Safeguard the genetic diversity of wild and domesticated species, including Ghana's indigenous crop varieties and livestock breeds, to maintain evolutionary potential and food security.

4.6.2 STRATEGIC GOAL B: SUSTAINABLE USE OF BIODIVERSITY

This goal promotes the sustainable use of biodiversity to support ecosystem services, livelihoods, food security, and economic development while balancing conservation and resource use.

Focus: Production landscapes, pollution control, and nature's contribution to people. This Covers KMGBF Targets 5–12 (Harvesting, Invasives, Pollution, Climate, Agriculture, Urban).

Strategic Objective B.1 (Sustainable Production Landscapes): Promote sustainable management practices in agriculture, aquaculture, and forestry (e.g., CREMAs, cocoa-forest mosaics) to minimize adverse impacts on biodiversity while enhancing productivity.

Strategic Objective B.2 (Pollution Reduction): Minimize the negative impact of pollution on biodiversity and ecosystem services by reducing persistent organic pollutants (POPs), agro-chemical risk, plastic and electronic waste in terrestrial and aquatic environments.

Strategic Objective B.3 (Nature-Based Solutions): Leverage ecosystem-based approaches to climate change adaptation, sustainable production and disaster risk reduction and optimize nature's role in mitigating floods, coastal erosion, and heat stress; biodiversity loss; environmental pollution in urban and rural areas.

Strategic Objective B.4 (Urban Biodiversity): Enhance green infrastructure and biodiversity in urban and peri-urban areas to improve air quality, mental health, and the ecological footprint of Ghana's cities.

4.6.3 STRATEGIC GOAL C: FAIR AND EQUITABLE BENEFIT-SHARING

Goal C promotes fair and equitable sharing of benefits from genetic resources and traditional knowledge, supporting community rights, inclusion, and incentives for conservation and sustainable use.

Focus: Genetic Resources, Traditional Knowledge, and Social Equity. This Covers KMGBF Target 13 (ABS)

Strategic Objective C.1 (ABS Frameworks): Operationalize and enforce legal and administrative frameworks for Access and Benefit-Sharing (ABS) to ensure that benefits from the utilization of Ghana's genetic resources are shared fairly with the state and local custodians.

Strategic Objective C.2 (Traditional Knowledge): Protect and respect the traditional knowledge, innovations, and practices of local communities, ensuring their free, prior, and informed consent (FPIC) in the utilization of such knowledge.

Strategic Objective C.3 (Equitable Participation): Ensure gender-responsive and inclusive decision-making that empowers women, youth, and local communities to actively participate in and benefit from biodiversity conservation initiatives.

4.6.4 STRATEGIC GOAL D: IMPLEMENTATION, RESOURCES, AND CAPACITY

This goal strengthens the enabling conditions for implementation through improved governance, capacity, financing, knowledge systems, and monitoring.

Focus: Mainstreaming, financing, and data systems. This Covers KMGBF Targets 14–23 (Mainstreaming, Finance, Capacity, Knowledge)

Strategic Objective D.1 (Mainstreaming Biodiversity): Integrate biodiversity values into national development plans, poverty reduction strategies, and key economic sectors (Fisheries, Mining, Energy, Infrastructure) to address the root causes of biodiversity loss.

Strategic Objective D.2 (Resource Mobilization): Mobilize and scale up domestic and international financial resources from public and private sources (including biodiversity offsets and green finance) to close the biodiversity finance gap.

Strategic Objective D.3 (Capacity Development): Strengthen the institutional and human capacity of relevant stakeholders to effectively implement, monitor, and enforce biodiversity regulations.

Strategic Objective D.4 (Knowledge Management and Monitoring): Enhance the availability and accessibility of biodiversity data and information systems to support science-based policy monitoring, reporting, and adaptive management.

4.7 POLICY AND LEGAL FRAMEWORK COHERENCE

The successful implementation of the NBSAP (2026–2030) depends on a coherent policy and legal framework aligned with national biodiversity targets. While Ghana has several environmental laws and policies, implementation has been hampered by institutional fragmentation, overlapping mandates, and conflicting sectoral priorities. Biodiversity governance involves multiple MDAs which often lead to functional overlaps that impact accountability and resource efficiency. The

mandates of key institutions have been clarified in Table 4.1 to ensure streamlined implementation of the NBSAP.

CHAPTER FIVE

NATIONAL BIODIVERSITY TARGETS AND ACTION PLANS

This chapter presents Ghana's 23 National Biodiversity Targets and Action Plans to halt and reverse biodiversity loss by 2030. It provides a clear roadmap to integrate biodiversity into national development by addressing its underlying drivers across key sectors, including land use, agriculture, mining, urban development, and finance. This chapter further establishes the implementation framework by defining priority actions, institutional roles and responsibilities, and coordination mechanisms using the RACI model to strengthen accountability and support effective implementation of the National Biodiversity Strategy and Action Plan (NBSAP).

5.1 NATIONAL BIODIVERSITY TARGETS

The 23 National Biodiversity Targets, presented under the four Strategic Goals in Chapter 4, provide the operational framework for implementing Ghana's National Biodiversity Strategy and Action Plan (NBSAP). Aligned with the Kunming–Montreal Global Biodiversity Framework (KMGBF), the targets translate the Strategy into measurable national outcomes and priority actions to halt and reverse biodiversity loss by 2030. Organized under the four Strategic Goals, the targets address ecosystem conservation and restoration, sustainable use of biodiversity, equitable benefit-sharing, and the enabling conditions required for effective implementation. Together, they provide a coherent framework for guiding national action, strengthening institutional coordination, mobilizing resources, and monitoring progress towards achieving Ghana's biodiversity vision. Figure 5.1 provides an overview of the 23 National Biodiversity Targets and their relationship to the four Strategic Goals of the NBSAP.



Figure 5.1 Overview of the 23 National Biodiversity Targets and their relationship to the four Strategic Goals of the NBSAP.

5.2 IMPLEMENTATION FRAMEWORK

The implementation of the National Biodiversity Strategy and Action Plan (NBSAP) is guided by a whole-of-government and whole-of-society approach that promotes coordinated action across sectors and levels of governance. Achieving the 23 National Biodiversity Targets relies on strong collaboration among government institutions, Metropolitan, Municipal and District Assemblies (MMDAs), traditional authorities, Local Communities (LCs), women, youth, persons with disabilities, civil society organizations, academia, research, the private sector, and development partners.

Implementation is coordinated through clearly defined institutional roles and responsibilities to strengthen accountability, improve policy coherence, and promote the efficient use of resources. Lead institutions provide strategic leadership and oversight, while implementing and supporting institutions work collaboratively to deliver the priority actions under each target. Cross-sectoral coordination, stakeholder participation, knowledge sharing, and adaptive management underpin implementation throughout the duration of this Strategy.

The implementation framework is supported by the Responsible, Accountable, Consulted and Informed (RACI) model, which provides a structured approach for assigning institutional roles and responsibilities, strengthening coordination, and enhancing accountability across all National Biodiversity Targets.

The implementation framework is operationalized through the institutional roles, coordination arrangements, and target-specific implementation matrices presented in the following sections. Figure 5.2 illustrates the institutional framework for delivering Ghana's National Biodiversity Targets.

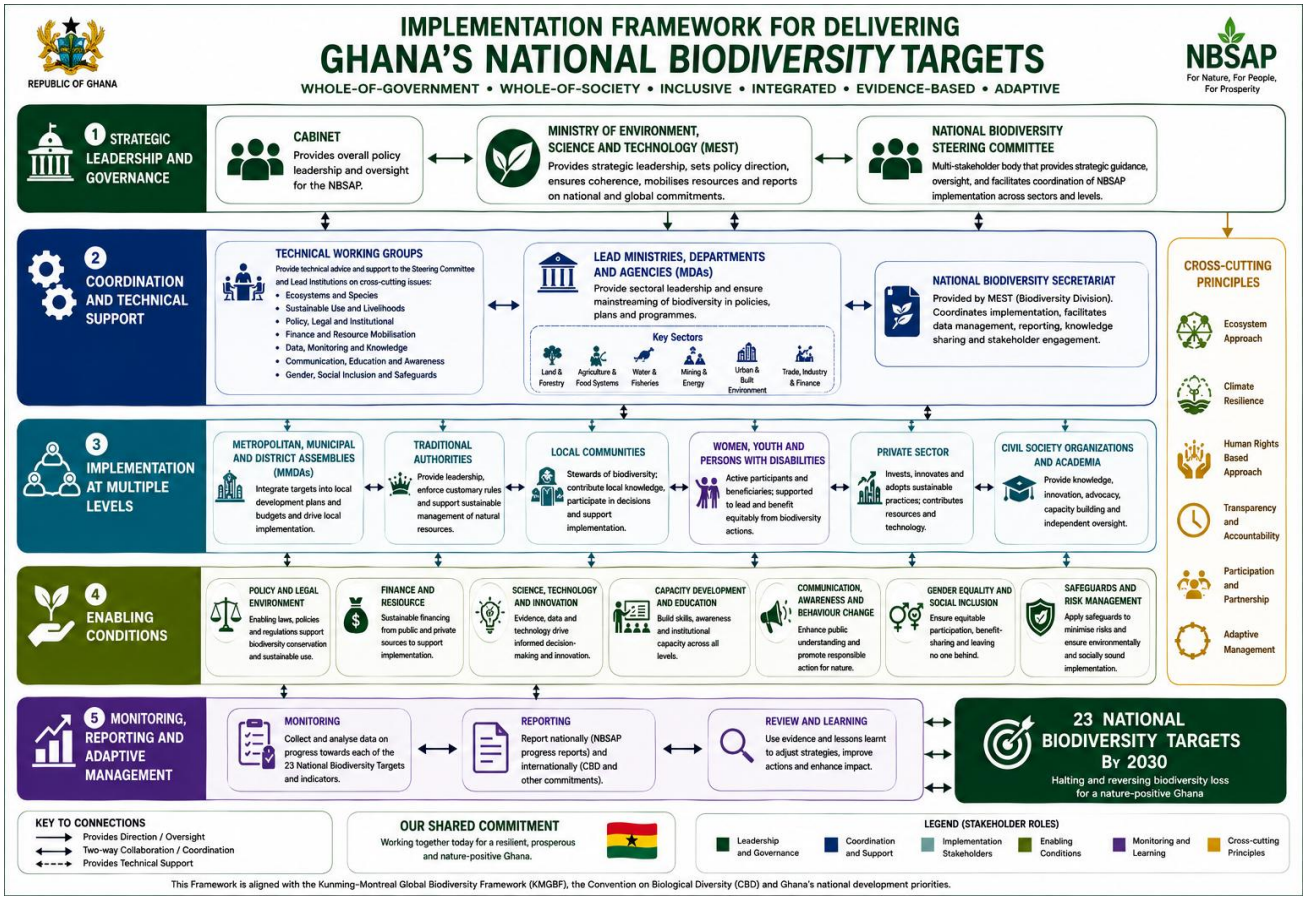

Figure 5.2 Institutional framework for delivering Ghana's National Biodiversity Targets.

5.3 INSTITUTIONAL ROLES AND RESPONSIBILITIES

To support effective implementation, the NBSAP adopts the **Responsible, Accountable, Consulted and Informed (RACI)** model as the framework for assigning institutional roles and responsibilities. The RACI model (Table 5.1) clarifies leadership, strengthens coordination, reduces duplication of effort, and promotes transparency in decision-making and reporting across all National Biodiversity Targets. The institutional roles and responsibilities for each National Biodiversity Target are presented in the target-specific implementation matrices in Tables 5.2 - 5.24.

Table 5.1 Description of Institutional Roles

Role	Description
Responsible (R)	Institutions responsible for implementing and delivering the activities under each National Biodiversity Target.
Accountable (A)	The institution with overall authority for ensuring that the target is achieved, providing strategic oversight and coordination. Only one institution is assigned overall accountability for each target.
Consulted (C)	Institutions and stakeholders that provide technical expertise, policy advice, or other inputs during planning and implementation.
Informed (I)	Institutions and stakeholders that are kept informed of progress, decisions, and implementation outcomes to promote transparency and coordination.

Table 5.2: Implementation Matrix for National Target 1 – By 2030, bring the loss of areas of high biodiversity importance under participatory, integrated biodiversity-inclusive spatial planning and effective management while respecting the rights of local communities.

Component	Description
National Target	Target 1: Spatial Planning and Land/Sea Use
Target Statement	By 2030, bring the loss of areas of high biodiversity importance under participatory, integrated biodiversity-inclusive spatial planning and effective management while respecting the rights of local communities.
Strategic Goal	Goal A: Ecosystem Integrity and Restoration
Strategic Objective	A.1 Spatial Planning and Conservation: Strengthen the national protected area system and Other Effective Area-based Conservation Measures (OECMs) to ensure the integrity, connectivity, and representation of Ghana's forest, savanna, inland water, coastal and marine ecosystems.
Key Planned Activities	Action 1.1: Operationalize biodiversity-inclusive spatial planning at district level through the preparation of Spatial Development Frameworks (SDFs) and Structure Plans that integrate biodiversity datasets and participatory planning processes. Action 1.2: Strengthen enforcement of ecological buffers through development control systems by applying zoning, setback and buffer standards, digitizing permitting systems, conducting inspections, and strengthening MMDA–EPA coordination. Action 1.3: Mainstream biodiversity into the national planning cycle by integrating biodiversity considerations into Medium-Term Development Plans (MTDPs). Action 1.4: Implement Marine Spatial Planning (MSP) through the Ghana Sustainable Ocean Plan by mapping critical marine habitats and allocating marine space for conservation and sustainable use.
Accountable (A)	Ministry of Local Government, Decentralisation and Rural Development (MLGDRD).
Responsible (R)	Land Use and Spatial Planning Authority (LUSPA); Metropolitan, Municipal and District Assemblies (MMDAs); Lands Commission; Forestry Commission; Environmental Protection Agency (EPA); National Development Planning Commission (NDPC); relevant sector institutions responsible for marine and coastal planning.
Consulted (C)	Traditional Authorities; Local Communities; Civil Society Organizations (CSOs); Research and Academia; Development Partners; relevant technical institutions. *(Derived from the participatory planning approach reflected in the target and action plan.)*
Informed (I)	Government institutions, private sector, local communities, development partners and the general public.

Expected Outputs	• Approved Spatial Development Frameworks (SDFs) and Structure Plans in priority MMDAs. • Biodiversity-sensitive areas incorporated into statutory spatial plans. • Ecological buffer standards systematically applied in development permitting. • Biodiversity integrated into national and district development planning. • Marine Spatial Planning operationalized to support integrated ocean governance.
Performance Indicators	• Trends in land-use change and spatial planning coverage. • Proportion of land and ocean area under biodiversity-inclusive spatial plans.

Table 5.3: Implementation Matrix for National Target 2 – By 2030, ensure that, at least 30 per cent of degraded areas are under effective restoration and management to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity and safeguarding the economic and social wellbeing of people, especially local communities.

Component	**Description**
National Target	**Target 2: Ecosystem Restoration**
Target Statement	By 2030, ensure that at least 30 per cent of degraded areas are under effective restoration and management to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity, and safeguard the economic and social well-being of people, especially local communities.
Strategic Goal	**Goal A: Ecosystem Integrity and Restoration**
Strategic Objective	**A.2 Ecological Restoration:** Accelerate the restoration of degraded ecosystems, particularly in mined-out areas (galamsey sites), deforested landscapes, degraded wetlands, and eroded coastal zones, to regain ecological functionality and resilience.
Key Planned Activities	**Action 2.1:** Scale up Forest Landscape Restoration (FLR) through implementation of the Ghana Forest Plantation Strategy and the Tree for Life Initiative. **Action 2.2:** Restore mining-degraded landscapes ('galamsey' sites) through ecological reclamation of mined-out areas. **Action 2.3:** Rehabilitate inland waters and riparian buffers through Basin IWRM Plans and restoration of degraded riverbanks and wetlands. **Action 2.4:** Restore degraded coastal ecosystems and mangrove landscapes through community-based restoration and climate adaptation initiatives. **Action 2.5:** Strengthen monitoring, evaluation and learning for ecosystem restoration through national restoration indicators, ecosystem accounting, adaptive management and knowledge sharing.
Accountable (A)	Ministry of Lands and Natural Resources (MLNR).

Responsible (R)	Forestry Commission; Environmental Protection Agency (EPA); Water Resources Commission (WRC); Fisheries Commission; Minerals Commission; Metropolitan, Municipal and District Assemblies (MMDAs); Ministry of Environment, Science, Technology and Innovation (MEST); National Development Planning Commission (NDPC).
Consulted (C)	Traditional Authorities; Local Communities; Civil Society Organizations (CSOs); Academia; Development Partners; relevant technical institutions.
Informed (I)	Government institutions; private sector; local communities; development partners; and the public.
Expected Outputs	• Degraded forest, savanna, inland water, coastal and marine ecosystems restored. • Mining-degraded landscapes rehabilitated. • Riparian buffers and wetlands restored. • Community-based mangrove restoration strengthened. • National ecosystem restoration monitoring system operational.
Performance Indicators	• Area under restoration. • Extent and condition of ecosystems.

Table 5.4: Implementation Matrix for National Target 3 – By 2030, ensure and enable, at least 30 percent of terrestrial, inland water, coastal and marine areas of importance for biodiversity and ecosystem functions and services, are effectively protected and managed while recognizing traditional authorities and the rights of local communities.

Component	Description
National Target	**Target 3: Protected Areas and Other Effective Area-based Conservation Measures (OECMs)**
Target Statement	By 2030, ensure and enable that at least 30 per cent of Ghana's terrestrial, inland water, coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and Other Effective Area-based Conservation Measures (OECMs), while recognizing and respecting the rights of local communities.
Strategic Goal	**Goal A: Ecosystem Integrity and Restoration**
Strategic Objective	**A.1 Spatial Planning and Conservation:** Strengthen the national protected area system and Other Effective Area-based Conservation Measures (OECMs) to ensure the integrity, connectivity, and representation of Ghana's forest, savanna, inland water, coastal and marine ecosystems.
Key Planned Activities	**Action 3.1:** Strengthen the management effectiveness of existing terrestrial, inland water, coastal and marine protected areas through improved governance, sustainable financing, monitoring and law enforcement.

	Action 3.2: Identify, recognize and support Other Effective Area-based Conservation Measures (OECMs), including community-conserved areas and privately managed conservation areas. **Action 3.3:** Improve ecological connectivity by establishing and maintaining ecological corridors between protected areas and key biodiversity areas. **Action 3.4:** Strengthen community participation, collaborative management and equitable benefit-sharing in protected area governance **Action 3.5:** Enhance biodiversity monitoring and management effectiveness assessments to support adaptive management of protected areas and OECMs.
Accountable (A)	Ministry of Lands and Natural Resources (MLNR).
Responsible (R)	Forestry Commission (Wildlife Division and Forest Services Division); Fisheries Commission; Environmental Protection Agency (EPA); Water Resources Commission (WRC); Metropolitan, Municipal and District Assemblies (MMDAs); relevant protected area management authorities.
Consulted (C)	Traditional Authorities; Local Communities; Civil Society Organizations (CSOs); Academia; Research Institutions; Development Partners; Private Protected Area Managers.
Informed (I)	Government institutions; private sector; local communities; development partners; and the public.
Expected Outputs	• Protected area network effectively managed and expanded. • OECMs identified, recognized and integrated into the national conservation system. • Ecological connectivity between critical habitats improved. • Community participation and collaborative management strengthened. • Protected area management effectiveness enhanced through regular monitoring and assessment.
Performance Indicators	• Percentage of terrestrial, inland water, coastal and marine areas effectively conserved. • Number and area of recognized OECMs. • Protected Area Management Effectiveness (PAME) assessment scores. • Connectivity between protected areas and key biodiversity areas.

Table 5.5: Implementation Matrix for National Target 4 – By 2030, ensure urgent management actions to halt human-induced extinction of known threatened species and for the recovery and conservation of especially threatened species to significantly reduce extinction risk, as well as to maintain and restore the genetic diversity within and between populations of native, wild, and domesticated species and effectively manage human–wildlife interactions to minimize conflict for coexistence.

Component	Description
National Target	**Target 4: Species Conservation and Recovery**
Target Statement	By 2030, ensure urgent management actions to halt human-induced extinction of known threatened species and for the recovery and conservation of especially threatened species to significantly reduce extinction risk, as well as to maintain and restore the genetic diversity within and between populations of native, wild, and domesticated species, and effectively manage human–wildlife interactions to minimize conflict for coexistence.
Strategic Goal	**Goal A: Ecosystem Integrity and Restoration**

Strategic Objective	**A.3 Species Conservation:** Implement urgent recovery plans for threatened species and prevent the extinction of known threatened species by reducing human-induced pressures such as poaching, habitat degradation, and illegal wildlife trade. **A.4 Genetic Diversity:** Safeguard the genetic diversity of wild and domesticated species, including Ghana's indigenous crop varieties and livestock breeds, to maintain evolutionary potential, ecosystem resilience, and food security.
Key Planned Activities	**Action 4.1:** Enforce the Wildlife Resources Management Act, 2023 (Act 1115) and strengthen efforts to combat wildlife trafficking and illegal trade. **Action 4.2:** Develop and implement National Species Recovery Plans for priority threatened flora and fauna. **Action 4.3:** Institutionalize human–wildlife conflict mitigation measures, including rapid response systems and non-lethal deterrents to promote coexistence. **Action 4.4:** Strengthen ex-situ conservation facilities and gene banks to safeguard the genetic diversity of threatened wild and domesticated species.
Accountable (A)	Ministry of Lands and Natural Resources (MLNR).
Responsible (R)	Wildlife Division (Forestry Commission); Research Institutions (CSIR and Universities).
Consulted (C)	Environmental Protection Agency (EPA); Academia; Non-Governmental Organizations (NGOs).
Informed (I)	Cabinet.
Expected Outputs	• National Species Recovery Plans implemented for priority threatened species .• Wildlife crime and illegal trade reduced through strengthened law enforcement • Human–wildlife conflict mitigation systems established in priority landscapes. • Ex-situ conservation facilities and gene banks strengthened to conserve genetic diversity. • Populations of threatened species stabilized or increased.
Performance Indicators	• Red List Index for Ghana. • Number of threatened species with active, funded Species Recovery Plans. • Trends in human–wildlife conflict incidents and response times. • Proportion of local breeds and varieties conserved in gene banks or managed in situ.

Table 5.6: Implementation Matrix for National Target 5 –By 2030, ensure that the use, harvesting, and trade of wild species is sustainable, safe and legal, reducing the risk of pathogen spill-over and applying the ecosystem approach while respecting and protecting customary sustainable use by local communities.

Component	**Description**
National Target	**Target 5: Sustainable Use, Harvesting and Trade of Wild Species**
Target Statement	By 2030, ensure that the use, harvesting, and trade of wild species is sustainable, safe and legal, reducing the risk of pathogen spill-over and applying the ecosystem approach while respecting and protecting customary sustainable use by local communities.
Strategic Goal	**Goal B: Sustainable Use of Biodiversity**
Strategic Objective	**B.1 Sustainable Production Landscapes:** Promote sustainable management practices in agriculture, aquaculture, and forestry, including Community Resource Management Areas (CREMAs) and cocoa–forest mosaics, to minimize adverse impacts on biodiversity while enhancing productivity and ecosystem resilience.

Key Planned Activities	**Action 5.1:** Enforce legality in wildlife trade by operationalizing licensing and permit systems under the Wildlife Resources Management Act, digitizing permit issuance, strengthening market inspections and enforcing penalties against illegal wildlife trade. **Action 5.2:** Implement science-based fisheries management through enforcement of closed seasons, sustainable harvest measures, and elimination of Illegal, Unreported and Unregulated (IUU) fishing. **Action 5.3:** Formalize customary sustainable use by supporting CREMAs and Traditional Authorities to enforce local hunting regulations, closed seasons, and customary conservation practices consistent with national legislation. **Action 5.4:** Establish a One Health surveillance system at wildlife trade hubs and markets to monitor zoonotic disease risks associated with wildlife harvesting and trade.
Accountable (A)	Ministry of Lands and Natural Resources (MLNR); Ministry of Fisheries and Aquaculture (MoFA).
Responsible (R)	Wildlife Division (Forestry Commission); Fisheries Commission; Veterinary Services Directorate (Ministry of Food and Agriculture).
Consulted (C)	Ministry of Trade, Agribusiness and Industry; Customs Division (Ghana Revenue Authority); Environmental Protection Agency (EPA).
Informed (I)	Cabinet.
Expected Outputs	• Wildlife trade licensing and permit systems fully operational and digitized. • Sustainable fisheries management measures effectively implemented, including compliance with closed seasons and reduced IUU fishing. • Community-based sustainable harvesting systems strengthened through CREMAs and Traditional Authorities. • One Health surveillance system established for monitoring wildlife trade and zoonotic disease risks. • Sustainable, legal and traceable harvesting and trade of wild species promoted nationwide.
Performance Indicators	• Proportion of wild species harvested sustainably. • Number of illegal harvesting and wildlife trafficking incidents reported. • Compliance with fisheries closed seasons and harvest regulations. • Number of wildlife trade permits issued and monitored through traceable licensing systems.

Table 5.7: Implementation Matrix for National Target 6 – By 2030, eliminate, minimize, reduce and/or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by at least 50 per cent, through prevention, early detection, rapid response, eradication, control and management of priority invasive alien species.

Component	Description
National Target	**Target 6: Invasive Alien Species**
Target Statement	By 2030, eliminate, minimize, reduce and/or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by at least 50 per cent, through prevention, early detection, rapid response, eradication, control and management of priority invasive alien species.
Strategic Goal	**Goal B: Sustainable Use of Biodiversity**
Strategic Objective	**B.2 Pollution Reduction:** Minimize the negative impacts of pollution and other environmental pressures on biodiversity and ecosystem services by reducing risks from invasive alien species and strengthening ecosystem resilience. *(As aligned under Goal B in Chapter 4.)*
Key Planned Activities	**Action 6.1:** Strengthen national policy, legal and institutional frameworks for invasive alien species (IAS) management, including reviewing legislation and updating the National IAS Strategy and Action Plan. **Action 6.2:** Strengthen border biosecurity, quarantine systems, early detection and rapid response mechanisms to prevent the introduction and establishment of invasive alien species. **Action 6.3:** Implement national programmes for the prevention, eradication, containment and long-term management of priority invasive alien species in terrestrial, freshwater and marine ecosystems. **Action 6.4:** Strengthen national monitoring, surveillance, research and information management systems for invasive alien species to support evidence-based decision-making. **Action 6.5:** Raise public awareness and strengthen institutional and community capacity for the prevention and management of invasive alien species.
Accountable (A)	Ministry of Environment, Science and Technology (MEST).
Responsible (R)	Environmental Protection Agency (EPA); Ministry of Lands and Natural Resources (MLNR); Ministry of Food and Agriculture (MoFA); Plant Protection and Regulatory Services Directorate (PPRSD); Forestry Commission; Metropolitan, Municipal and District Assemblies (MMDAs).
Consulted (C)	Research Institutions; Universities; Civil Society Organizations (CSOs); Development Partners; Traditional Authorities; Local Communities; relevant technical institutions.
Informed (I)	Government institutions; private sector; local communities; development partners; and the general public.
Expected Outputs	• Updated national policy and legal framework for IAS management. • Functional national coordination mechanism for invasive alien species management. • Strengthened border biosecurity and early detection systems .• Priority invasive alien species effectively controlled or eradicated. • National monitoring and information management system for IAS operational .• Increased public awareness and institutional capacity for IAS prevention and management.

Performance Indicators	• Rate of invasive alien species introduction. • Area impacted by invasive alien species.

Table 5.8: Implementation Matrix for National Target 7 –By 2030, reduce pollution risks and the negative impact of pollution from all sources to levels that are not harmful to biodiversity, ecosystem functions and human health, including by reducing excess nutrients, pesticides, hazardous chemicals and plastic pollution.

Component	**Description**
National Target	**Target 7: Pollution Reduction**
Target Statement	By 2030, reduce pollution risks and the negative impact of pollution from all sources to levels that are not harmful to biodiversity, ecosystem functions and human health, including by reducing excess nutrients, pesticides, hazardous chemicals and plastic pollution.
Strategic Goal	**Goal B: Sustainable Use of Biodiversity**
Strategic Objective	**B.2 Pollution Reduction:** Minimize the negative impacts of pollution on biodiversity and ecosystem services by reducing nutrient loss, persistent organic pollutants (POPs), agrochemical pesticide risks, and plastic and electronic waste in terrestrial, freshwater and marine environments.
Key Planned Activities	**Action 7.1:** Strengthen policy, legal and regulatory frameworks for pollution control and biodiversity protection through review of legislation, environmental standards and enforcement mechanisms. **Action 7.2:** Reduce land-based sources of pollution affecting terrestrial, freshwater and coastal ecosystems by strengthening wastewater treatment, reducing agricultural runoff, addressing pollution from artisanal and small-scale mining, and promoting nature-based solutions. **Action 7.3:** Prevent and reduce plastic and solid waste pollution through improved waste management, recycling, circular economy approaches and measures to reduce plastic leakage into rivers, wetlands and marine environments. **Action 7.4:** Reduce pollution from hazardous chemicals, pesticides and waste through strengthened monitoring, safe handling, disposal systems and promotion of environmentally sound alternatives. **Action 7.5:** Strengthen pollution monitoring, research, awareness and institutional capacity for integrated pollution management and biodiversity protection.
Accountable (A)	Ministry of Environment, Science and Technology (MEST).
Responsible (R)	Environmental Protection Agency (EPA); Ministry of Sanitation and Water Resources; Ministry of Food and Agriculture (MoFA); Metropolitan, Municipal and District Assemblies (MMDAs); relevant Sector MDAs.

Consulted (C)	National Development Planning Commission (NDPC); Ministry of Lands and Natural Resources (MLNR); Traditional Authorities; Local Communities; Civil Society Organizations (CSOs); Academia; Development Partners; Private Sector.
Informed (I)	Government institutions; private sector; local communities; development partners; and the general public.
Expected Outputs	• Updated and harmonised pollution control policies, legislation and environmental standards. • Biodiversity safeguards integrated into environmental regulations and permitting systems. • Reduced nutrient, chemical, sediment and plastic pollution entering terrestrial, freshwater and marine ecosystems. • Improved wastewater treatment, waste management and recycling systems. • Enhanced monitoring, research and reporting on pollution and biodiversity impacts. • Increased public awareness and institutional capacity for pollution prevention and control.
Performance Indicators	• Levels of pollution (nutrients, pesticides and plastics). • Pollution impacts on biodiversity.

Table 5.9: Implementation Matrix for National Target 8 –Minimize on an annual basis the negative impact of climate change and ocean acidification on biodiversity, including through nature-based solutions and/or ecosystem-based approaches.

Component	Description
National Target	**Target 8: Climate Change and Biodiversity**
Target Statement	Minimize on an annual basis the negative impact of climate change and ocean acidification on biodiversity, including through nature-based solutions and/or ecosystem-based approaches.
Strategic Goal	**Goal B: Sustainable Use of Biodiversity**
Strategic Objective	**B.3 Nature-based Solutions:** Leverage ecosystem-based approaches to climate change adaptation, sustainable production and disaster risk reduction, optimizing nature's role in mitigating floods, coastal erosion, heat stress, biodiversity loss and environmental pollution in both urban and rural landscapes.
Key Planned Activities	**Action 8.1:** Scale up Nature-based Solutions (NbS) through implementation of the Updated Nationally Determined Contributions (NDC), with community-led restoration of degraded landscapes and conservation of standing forests using CBNRM approaches (e.g., CREMAs). 8.1.1: Promote and i integrate sustainable harvesting of wild species, customary practices and traditional knowledge, gender and social inclusion, alternative livelihoods, and equitable benefit-sharing into landscape plans.

	Action 8.2: Implement Ecosystem-based Adaptation (EbA B) interventions under the National Adaptation Plan (NAP), including restoration of mangroves, and wetlands scale up agroforestry systems climate-resilient landscape management and additional/alternative livelihood programmes. **Action 8.3:** Mainstream climate–biodiversity risk screening into infrastructure development and investment planning through the Ministry of Finance's climate prioritization tool and the EPA permitting system. **Action 8.4:** Enhance ocean resilience by protecting blue carbon ecosystems (mangroves and seagrasses) and reducing non-climatic stressors such as pollution and overfishing. Action 8.5: Strengthen wildlife governance compliance, and enforcement by operationalising relevant regulatory provisions on Wildlife conservation and management.
Accountable (A)	Ministry of Environment, Science and Technology (MEST).
Responsible (R)	Environmental Protection Agency (EPA – Climate Change Unit); Forestry Commission; Ministry of Finance.
Consulted (C)	Ministry of Lands and Natural Resources (MLNR); Ministry of Food and Agriculture (MoFA).
Informed (I)	Cabinet.
Expected Outputs	• Nature-based Solutions integrated into climate mitigation and adaptation programmes • Ecosystem-based Adaptation interventions implemented in priority landscapes. • Climate–biodiversity risk screening integrated into infrastructure planning and environmental permitting. • Blue carbon ecosystems protected and restored to enhance coastal resilience. • Climate resilience of terrestrial, freshwater and marine ecosystems strengthened.
Performance Indicators	• Ecosystem-based adaptation coverage. • Carbon stored in ecosystems.

Table 5.10: Implementation Matrix for National Target 9 –Ensure that the management and use of wild species are sustainable including customary use by local communities especially those in vulnerable situations and those most dependent on biodiversity, and for the benefit of present and future generations.

Component	**Description**
National Target	**Target 9: Sustainable Management of Wild Species for Livelihoods**
Target Statement	Ensure that the management and use of wild species are sustainable including customary use by local communities especially those in vulnerable situations and those most dependent on biodiversity, and for the benefit of present and future generations
Strategic Goal	**Goal B: Sustainable Use of Biodiversity**

Strategic Objective	**B.1 Sustainable Production Landscapes:** Promote sustainable management practices in agriculture, aquaculture, and forestry, including Community Resource Management Areas (CREMAs) and cocoa–forest mosaics, to minimize adverse impacts on biodiversity while enhancing productivity and ecosystem resilience.
Key Planned Activities	**Action 9.1: Scale up integrated land restoration and sustainable agriculture through CREMAs and farmer-based organizations** to restore degraded lands, promote organic inputs (compost, biochar), and expand conservation agriculture. **Action 9.2:** Implement co-management of inland fisheries research, monitoring, . empowering local fisheries committees to enforce sustainable harvesting measures, including net regulations **Action 9.3:** Support sustainable artisanal marine fisheries through livelihood diversification and enforcement of regulations against destructive fishing practices. **Action 9.4:** Promote sustainable bushmeat value chains by regulating bushmeat trade, enforcing closed seasons, licensing commercial hunters, and promoting farming of alternative game species such as grasscutter. **Promote a regulated, community-integrated bushmeat sustainability pathway** by enforcing hunter licensing and seasonal closures in collaboration with traditional authorities, piloting disease surveillance in wild game markets, and scaling alternative protein enterprises. **Action 9.5:** Provide inputs, training, and market linkages to enhance food security, income resilience, and equitable benefit-sharing arrangements, particularly ensuring gender and social inclusiveness. **Action 9.6**: Improve fish safety, sanitation and value addition and enforce artisanal fish-processing standards, strengthening public awareness of safe fish.
Accountable (A)	Ministry of Food and Agriculture (MoFA)., Ministry of Fisheries and Aquaculture
Responsible (R)	Fisheries Commission; Forestry Commission (Wildlife Division); Farmer and Fisher Groups .
Consulted (C)	Environmental Protection Agency (EPA). Ministry of Gender, Children, and Social Protection (MoGCSP), Water Resources Commission (WRC).
Informed (I)	Cabinet.
Expected Outputs	• Community-based natural resource management systems strengthened. • Sustainable inland and marine fisheries management implemented. • Livelihood diversification programmes supporting coastal and inland communities established. • Sustainable bushmeat value chains promoted through regulated harvesting and alternative livelihood options. • Improved livelihood benefits from sustainably managed wild species.
Performance Indicators	• Number of people (disaggregated by gender) using wild species for food, medicine or income under sustainable management frameworks. • Percentage of key wild species harvested at sustainable levels.

	• Number of operational CREMAs and Community Fisheries Management Committees with functioning benefit-sharing mechanisms.

Table 5.11: Implementation Matrix for National Target 10 –Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably including through a substantial increase of the application of biodiversity- friendly practices to safeguard food security, restoration of biodiversity maintenance of nature's contributions to people.

Component	Description
National Target	**Target 10: Sustainable Management of Agriculture, Aquaculture and Forestry**
Target Statement	Ensure that areas under agriculture, aquaculture, fisheries, and forestry are managed sustainably, including through a substantial increase in the application of biodiversity-friendly practices to safeguard food security, restoration of biodiversity, and maintenance of nature's contributions to people.
Strategic Goal	**Goal B: Sustainable Use of Biodiversity**
Strategic Objective	**B.1 Sustainable Production Landscapes:** Promote sustainable management practices in agriculture, aquaculture, and forestry, including Community Resource Management Areas (CREMAs) and cocoa–forest mosaics, to minimize adverse impacts on biodiversity while enhancing productivity and ecosystem resilience.
Key Planned Activities	**Action 10.1:** Promote sustainable agriculture and agroforestry by integrating biodiversity safeguards into agricultural extension services, promoting Climate-Smart Agriculture (CSA), Integrated Pest Management (IPM), and expanding cocoa–forest mosaic landscapes. **Action 10.2:** Implement sustainable aquaculture zoning through the Ghana National Aquaculture Development Plan (GNADP) to ensure environmentally sound siting and management of aquaculture facilities. **Action 10.3:** Enforce the Marine Fisheries Management Plan (2022–2026), including closed seasons, protection of spawning grounds, and measures to combat Illegal, Unreported and Unregulated (IUU) fishing. **Action 10.4:** Strengthen forest certification and timber legality assurance systems in line with the Forestry Development Master Plan to promote sustainable forest management and reduce illegal logging.
Accountable (A)	Ministry of Food and Agriculture (MoFA); Ministry of Fisheries and Aquaculture Development (MoFAD); Ministry of Lands and Natural Resources (MLNR).
Responsible (R)	Fisheries Commission; Forestry Commission; MoFA Directorates (Crops Directorate and Plant Protection and Regulatory Services Directorate – PPRSD).

Consulted (C)	Environmental Protection Agency (EPA).
Informed (I)	Cabinet.
Expected Outputs	• Biodiversity-friendly agricultural practices integrated into production systems. • Sustainable aquaculture zoning and environmental management operational. • Fisheries management measures effectively implemented, contributing to stock recovery. • Sustainable forest management, timber legality assurance and forest certification strengthened. • Increased resilience and sustainability of agriculture, aquaculture and forestry production systems.
Performance Indicators	• Proportion of agricultural area under productive and sustainable agriculture (SDG 2.4.1). • Area of forest under sustainable forest management certification or verified legal compliance. • Proportion of fish stocks within biologically sustainable levels (FAO Tier 1). • Number of aquaculture establishments complying with national environmental standards and biosafety guidelines.

Table 5.12: Implementation Matrix for National Target 11 – Restore, maintain and enhance nature's contributions to people, including reduction of disease risk, as well as protection from natural hazards and disasters through nature-based solutions and/or ecosystem-based approaches.

Component	Description
National Target	**Target 11: Ecosystem Services and Nature's Contributions to People**
Target Statement	Restore, maintain and enhance nature's contributions to people, including reduction of disease risk, as well as protection from natural hazards and disasters through nature-based solutions and/or ecosystem-based approaches.
Strategic Goal	**Goal B: Sustainable Use of Biodiversity**
Strategic Objective	**B.3 Nature-based Solutions:** Leverage ecosystem-based approaches to climate change adaptation, sustainable production, and disaster risk reduction, optimizing nature's role in mitigating floods, coastal erosion, heat stress, biodiversity loss, and environmental pollution in both urban and rural landscapes.
Key Planned Activities	**Action 11.1:** Strengthen integrated water resources management by implementing river basin management plans, protecting watersheds, and restoring degraded catchments. **Action 11.2:** Scale up ecosystem-based disaster risk reduction through the restoration of wetlands, floodplains, mangroves, and other natural ecosystems that reduce the impacts of floods, droughts, coastal erosion, and other natural hazards. **Action 11.3:** Integrate ecosystem services into national and local development planning by incorporating nature-based solutions into spatial planning, infrastructure development, and climate adaptation initiatives.

	Action 11.4: Strengthen national monitoring, valuation and awareness of ecosystem services to support evidence-based decision-making and public appreciation of nature's contributions to people.
Accountable (A)	Water Resources Commission (WRC).
Responsible (R)	Environmental Protection Agency (EPA); National Disaster Management Organisation (NADMO); Forestry Commission; Metropolitan, Municipal and District Assemblies (MMDAs).
Consulted (C)	Ministry of Environment, Science and Technology (MEST); Ministry of Local Government, Decentralisation and Rural Development (MLGDRD); Traditional Authorities; Local Communities; Civil Society Organizations (CSOs); Academia; Development Partners.
Informed (I)	Cabinet.
Expected Outputs	• Integrated river basin and watershed management strengthened. • Nature-based solutions applied for disaster risk reduction and climate resilience • Ecosystem services integrated into development planning and infrastructure investments. • Improved protection and restoration of ecosystems that provide essential services to people. • Enhanced national capacity for ecosystem service assessment, monitoring and valuation.
Performance Indicators	• Ecosystem services indices. • Water- and climate-regulation benefits.

Table 5.13: Implementation Matrix for National Target 12 – Sustainably increase the area, quality and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas to improve human health and well- being by mainstreaming the conservation and sustainable use of biodiversity in urban planning.

Component	Description
National Target	**Target 12: Urban Biodiversity and Green/Blue Spaces**
Target Statement	By 2030, significantly increase the area and quality of, and access to, green and blue spaces in urban and densely populated areas in ways that conserve biodiversity and provide sustainable environmental, social and economic benefits, particularly for women, children, older persons and persons with disabilities.
Strategic Goal	**Goal B: Sustainable Use of Biodiversity**
Strategic Objective	**B.4 Urban Biodiversity:** Enhance green infrastructure and biodiversity in urban and peri-urban areas to improve ecosystem services, air quality, public health, climate resilience, and the ecological sustainability of Ghana's towns and cities.
Key Planned Activities	**Action 12.1:** Integrate urban biodiversity, green–blue infrastructure, green belts, riparian corridors and coastal buffers into Spatial Development Frameworks, Structure Plans and Local Plans. **Action 12.2:** Mandate the designation and protection of green infrastructure networks within all new Structure and Local Plans prepared by MMDAs.

	Action 12.3: Rehabilitate degraded urban green spaces through restoration programmes, including planting indigenous tree species and creating accessible community parks and biodiversity hotspots. **Action 12.4:** Implement green building and development controls by enforcing minimum green coverage ratios and protecting permeable green spaces through the development permitting process.
Accountable (A)	Ministry of Local Government, Decentralisation and Rural Development (MLGDRD).
Responsible (R)	Metropolitan, Municipal and District Assemblies (MMDAs); Land Use and Spatial Planning Authority (LUSPA).
Consulted (C)	Lands Commission; Environmental Protection Agency (EPA); Forestry Commission.
Informed (I)	Cabinet.
Expected Outputs	• Urban Spatial Development Frameworks and Structure Plans incorporating green and blue infrastructure approved. • Green infrastructure networks legally designated and protected. • Degraded urban parks, wetlands and green spaces restored and expanded. • Green building standards and development controls applied across urban areas. • Increased public access to safe, inclusive and biodiversity-rich green and blue spaces.
Performance Indicators	• Access to green and blue spaces. • Urban green space coverage.

Table 5.14: Implementation Matrix for National Target 13 – Take effective legal, policy, administrative and capacity-building measures at all levels to ensure fair and equitable use and by 2030 facilitate the significant increase of the benefits shared from the utilization of genetic resources and from digital sequence information on genetic resources, as well as traditional knowledge, in accordance with applicable international access and benefit-sharing instruments.

Component	**Description**
National Target	**Target 13: Access and Benefit-sharing (ABS)**
Target Statement	Take effective legal, policy, administrative and capacity-building measures at all levels to ensure fair and equitable use and by 2030 facilitate the significant increase of the benefits shared from the utilization of genetic resources and from digital sequence information on genetic resources, as well as traditional knowledge, in accordance with applicable international access and benefit-sharing instruments
Strategic Goal	**Goal C: Fair and Equitable Benefit-sharing**
Strategic Objective	**C.1 Access and Benefit-sharing (ABS):** Operationalize and enforce legal and administrative frameworks for Access and Benefit-sharing (ABS) to ensure that benefits arising from the utilization of Ghana's genetic resources are shared fairly and equitably with the State and local custodians.

Key Planned Activities	**Action 13.1:** Operationalize Ghana's national Access and Benefit-sharing (ABS) framework in accordance with the Nagoya Protocol through the development and implementation of administrative procedures, permitting systems and institutional coordination mechanisms. **Action 13.2:** Strengthen institutional capacity for the regulation, monitoring and enforcement of access to genetic resources and associated traditional knowledge, including compliance monitoring and reporting. **Action 13.3:** Develop and implement equitable benefit-sharing mechanisms to ensure that monetary and non-monetary benefits arising from the utilization of genetic resources are fairly shared with the State and local communities. **Action 13.4:** Promote awareness, stakeholder engagement and capacity building on Access and Benefit-sharing among government institutions, research organizations, local communities and the private sector.
Accountable (A)	Ministry of Environment, Science and Technology (MEST).
Responsible (R)	Environmental Protection Agency (EPA); Forestry Commission; Council for Scientific and Industrial Research (CSIR); relevant research institutions and sector agencies responsible for genetic resources.
Consulted (C)	Ministry of Lands and Natural Resources (MLNR); Ministry of Food and Agriculture (MoFA); Traditional Authorities; Local Communities; Academia; Civil Society Organizations (CSOs); Development Partners; Private Sector.
Informed (I)	Cabinet.
Expected Outputs	• National Access and Benefit-sharing framework operationalized. • Access permits and compliance procedures established and effectively implemented. • Equitable benefit-sharing arrangements developed for the utilization of genetic resources and associated traditional knowledge. • Institutional capacity for ABS implementation, monitoring and enforcement strengthened. • Increased awareness and stakeholder participation in Access and Benefit-sharing processes.
Performance Indicators	• Benefits shared from genetic resources. • Number of Access and Benefit-sharing agreements in force.

Table 5.15: Implementation Matrix for National Target 14 –Ensure the full integration of biodiversity and its multiple values into policies, regulations, development planning processes and strategies, environmental assessments, and Natural Capital Accounting to progressively align all relevant public and private activities, fiscal and financial flows with the goals and targets of this framework.

Component	**Description**
National Target	**Target 14: Biodiversity Mainstreaming**

Target Statement	Ensure the full integration of biodiversity and its multiple values into policies, regulations, development planning processes and strategies, environmental assessments, and Natural Capital Accounting to progressively align all relevant public and private activities, fiscal and financial flows with the goals and targets of this framework.
Strategic Goal	**Goal D: Implementation, Resources and Capacity**
Strategic Objective	**D.1 Mainstreaming Biodiversity:** Fully integrate biodiversity values into national development plans, poverty reduction strategies, sector policies, and key economic sectors, including mining, energy, agriculture, infrastructure, fisheries, and tourism, to address the underlying causes of biodiversity loss.
Key Planned Activities	**Action 14.1:** Embed biodiversity into the National Development Planning Commission (NDPC) Medium-Term Planning Guidelines to ensure biodiversity safeguards and targets are integrated into sector and district development plans. **Action 14.2:** Implement biodiversity-inclusive Public Investment Management by integrating biodiversity risk screening into project appraisal under the Public Investment Management Regulations (L.I. 2411). **Action 14.3:** Advance Natural Capital Accounting by institutionalizing the System of Environmental-Economic Accounting (SEEA) to value Ghana's natural assets and support national decision-making. **Action 14.4:** Strengthen the application of Strategic Environmental Assessment (SEA) to major sector policies and programmes to identify and address biodiversity impacts early in the planning process.
Accountable (A)	National Development Planning Commission (NDPC).
Responsible (R)	Ministry of Environment, Science and Technology (MEST); Ministry of Finance (MoF); Sector Ministries (MDAs); Environmental Protection Agency (EPA); Ghana Statistical Service (GSS).
Consulted (C)	Environmental Protection Agency (EPA); Metropolitan, Municipal and District Assemblies (MMDAs); Academia; Civil Society Organizations (CSOs); Development Partners; Traditional Authorities; Local Communities.
Informed (I)	Cabinet.
Expected Outputs	• Biodiversity systematically integrated into national, sector and district development plans. • Biodiversity risk screening incorporated into public investment appraisal and budgeting. • Natural Capital Accounting (SEEA) operationalized to inform policy and investment decisions. • Strategic Environmental Assessment (SEA) strengthened across high-impact sectors. • Improved policy coherence between biodiversity, climate, economic development and public finance.
Performance Indicators	• Number of Sector and District Medium-Term Development Plans integrating biodiversity targets and indicators. • Integration of biodiversity into national accounting and reporting systems through SEEA.

	• Percentage of public investment projects screened for biodiversity risks prior to approval. • Integration of biodiversity into national planning and policies.

Table 5.16: Implementation Matrix for National Target 15 – Take legal, administrative and policy measures to encourage and enable businesses to regularly monitor, assess, and transparently disclose risks on biodiversity and information needed to promote sustainable consumption patterns and report on compliance with access and benefit-sharing regulations.

Component	Description
National Target	**Target 15: Business and Financial Institutions**
Target Statement	Take legal, administrative and policy measures to encourage and enable businesses to regularly monitor, assess, and transparently disclose risks on biodiversity and information needed to promote sustainable consumption patterns and report on compliance with access and benefit-sharing regulations.
Strategic Goal	**Goal D: Implementation, Resources and Capacity**
Strategic Objective	**D.1 Mainstreaming Biodiversity:** Fully integrate biodiversity values into national development plans, poverty reduction strategies, sector policies, and key economic sectors, including mining, energy, agriculture, infrastructure, fisheries, and tourism, to address the underlying causes of biodiversity loss. **D.2 Resource Mobilization:** Mobilize and scale up domestic and international financial resources from public and private sources, including biodiversity offsets, green finance, and innovative financing mechanisms, to close Ghana's biodiversity finance gap and support effective implementation of the NBSAP.
Key Planned Activities	**Action 15.1:** Develop and implement national guidelines for biodiversity risk assessment, disclosure and reporting by businesses and financial institutions, aligned with internationally recognized frameworks. **Action 15.2:** Integrate biodiversity risk screening into investment decisions, lending practices and environmental, social and governance (ESG) reporting across the financial sector. **Action 15.3:** Promote private sector investment in biodiversity conservation through green finance, biodiversity offsets, payment for ecosystem services and other innovative financing mechanisms. **Action 15.4:** Strengthen institutional capacity and partnerships to support biodiversity accountability, corporate reporting and sustainable business practices across key economic sectors. **Action 15.5**: Scale up the conversion of agricultural and organic waste into biofertilizers, biochar, biogas, animal and fish feed, and fuel briquettes.

	Action 15.6: Develop MMDA by-laws to enforce the promotion of segregation, market hygiene, and ban of illegal dumping in undesignated sites. **Action 15.7**: implement inter-ministerial coordination mechanisms to harmonize policy direction and clarify institutional roles across related sectors.
Accountable (A)	Ministry of Finance (MoF).
Responsible (R)	Ministry of Environment, Science and Technology (MEST); Environmental Protection Agency (EPA); Bank of Ghana; Securities and Exchange Commission (SEC); Ghana Stock Exchange (GSE); relevant sector Ministries, Departments and Agencies (MDAs).
Consulted (C)	Private Sector Associations; Financial Institutions; Civil Society Organizations (CSOs); Academia; Development Partners; Traditional Authorities; Local Communities.
Informed (I)	Cabinet.
Expected Outputs	• National biodiversity disclosure and reporting guidelines developed and implemented. • Biodiversity risks integrated into corporate governance, investment and lending decisions. • Increased private sector investment in biodiversity conservation and nature-positive enterprises. • Enhanced corporate transparency and accountability for biodiversity impacts and dependencies. • Strengthened partnerships between government, financial institutions and the private sector to support biodiversity mainstreaming.
Performance Indicators	• Number of companies disclosing biodiversity risks. • Financial flows aligned with biodiversity objectives.

Table 5.17: Implementation Matrix for National Target 16 – Strengthen supportive policy, legislative and regulatory frameworks to ensure that people are enabled to make sustainable consumption choices to reduce the national footprint of consumption on biodiversity including, halving national food waste, reducing over-consumption and waste generation by 2030.

Component	Description
National Target	**Target 16: Sustainable Consumption and Lifestyles**
Target Statement	Strengthen supportive policy, legislative and regulatory frameworks to ensure that people are enabled to make sustainable consumption choices to reduce the national footprint of consumption on biodiversity, including halving national food waste, reducing over-consumption, and waste generation by 2030.
Strategic Goal	**Goal D: Implementation, Resources and Capacity**

Strategic Objective	**D.1 Mainstreaming Biodiversity:** Fully integrate biodiversity values into national development plans, poverty reduction strategies, sector policies, and key economic sectors, including mining, energy, agriculture, infrastructure, fisheries, and tourism, to address the underlying causes of biodiversity loss.
Key Planned Activities	**Action 16.1:** Integrate sustainable consumption and lifestyle principles into national and sector policies, development plans, education and public awareness programmes. **Action 16.2:** Reduce food loss and waste by strengthening food value chains, improving post-harvest management, storage infrastructure and consumer awareness. **Action 16.3:** Promote sustainable public procurement by mainstreaming green procurement guidelines and encouraging the purchase of environmentally sustainable goods and services by public institutions. **Action 16.4:** Strengthen waste prevention, circular economy approaches, Extended Producer Responsibility (EPR) schemes, recycling systems and enforcement of hazardous waste management regulations. **Action 16.5:** Develop guidelines for the unintentional trace amounts of genetically modified material that may show up in conventional or organic products during shipping, handling or processing. **Action 16.6:** Conduct routine compliance inspections of contained-use facilities, confined field trial sites, and certified facilities. **Action 16.7:** Periodically review national guidelines on genome editing and stacked gene products. **Action 16.8:** Validate the judicial process on biosafety regulatory framework through a court ruling after nine years of litigation.
Accountable (A)	National Development Planning Commission (NDPC).
Responsible (R)	Ministry of Environment, Science and Technology (MEST); Environmental Protection Agency (EPA); Public Procurement Authority (PPA); Ministry responsible for Sanitation; Metropolitan, Municipal and District Assemblies (MMDAs).
Consulted (C)	Ministry of Finance; Consumer Protection Agency; Ministry of Trade and Industry; Civil Society Organizations (CSOs); Private Sector.
Informed (I)	Cabinet.
Expected Outputs	• National and sector policies integrating sustainable consumption and production principles. • Food loss and waste reduced through improved value chains and consumer behaviour. • Sustainable public procurement practices institutionalised across government. • Circular economy, recycling and Extended Producer Responsibility (EPR) systems strengthened. • Reduced environmental footprint from consumption and waste generation.
Performance Indicators	• National biodiversity footprint. • Resource use and waste indicators.

Table 5.18: Implementation Matrix for National Target 17 – Strengthen capacity and implement biosafety measures as set out in the Biosafety Act, 2011 (Act 831), and the Biosafety Regulations, 2019 (L.I. 2383), in reference to Article 8(g) and Article 19 of the CBD.

Component	Description
National Target	**Target 17: Biosafety and Biotechnology**
Target Statement	Strengthen capacity and implement biosafety measures as set out in the **Biosafety Act, 2011 (Act 831)** and the **Biosafety (Management of Biotechnology) Regulations, 2019 (L.I. 2383)**, in reference to Articles 8(g) and 19 of the Convention on Biological Diversity (CBD).
Strategic Goal	**Goal D: Implementation, Resources and Capacity**
Strategic Objective	**D.3 Capacity Development:** Strengthen the technical, institutional and human capacity of relevant Ministries, Departments and Agencies (MDAs), Metropolitan, Municipal and District Assemblies (MMDAs), academia, research institutions, the private sector and civil society organizations to effectively implement, regulate, monitor and report on biodiversity-related programmes, including biosafety and biotechnology.
Key Planned Activities	**Action 17.1:** Strengthen biosafety risk assessment capacity by enhancing the technical capabilities of the National Biosafety Authority (NBA) and the Technical Advisory Committee (TAC) to assess emerging biotechnologies and strengthen the biosafety policy and regulatory framework. **Action 17.2:** Operationalize regulatory monitoring and inspection by strengthening science-based risk assessment, regulatory decision-making, monitoring systems and laboratory infrastructure for Living Modified Organisms (LMOs) and biotechnology products. **Action 17.3:** Strengthen monitoring, compliance and enforcement by improving inspections, border controls, emergency response systems and coordination among regulatory agencies. **Action 17.4:** Enhance public awareness, participation and access to information through stakeholder engagement, transparent decision-making and public education on biosafety and biotechnology. **Action 17.5:** Strengthen inter-institutional collaboration with border control agencies for inspection, sampling, testing, and enforcement.
Accountable (A)	Ministry of Environment, Science and Technology (MEST).
Responsible (R)	National Biosafety Authority (NBA); Technical Advisory Committee (TAC); Research Institutions; Environmental Protection Agency (EPA); Food and Drugs Authority (FDA); Ministry of Food and Agriculture (MoFA); Customs Division of the Ghana Revenue Authority (GRA).
Consulted (C)	National Development Planning Commission (NDPC); Sector Ministries, Departments and Agencies (MDAs); Academia; Civil Society Organizations (CSOs); Media; relevant scientific and technical institutions.
Informed (I)	Cabinet.
Expected Outputs	• Updated and coherent national biosafety policy and regulatory framework.

	• Robust and transparent biosafety risk assessment and decision-making systems established. • Effective monitoring, inspection and enforcement of biosafety measures. • Strengthened laboratory infrastructure and technical capacity for biosafety assessment and detection. • Improved public awareness, participation and confidence in biosafety governance and biotechnology regulation.
Performance Indicators	• Biosafety regulatory systems in place. • Compliance with the Cartagena Protocol.

Table 5.19: Implementation Matrix for National Target 18 – By 2025, identify incentives, including subsidies, harmful for biodiversity and by 2030 progressively reduce harmful subsidies and scale up positive incentives for the conservation and sustainable use of biodiversity.

Component	**Description**
National Target	**Target 18: Harmful Incentives and Subsidies**
Target Statement	By 2025, identify incentives, including subsidies, harmful for biodiversity and by 2030 progressively reduce harmful subsidies and scale up positive incentives for the conservation and sustainable use of biodiversity.
Strategic Goal	**Goal D: Implementation, Resources and Capacity**
Strategic Objective	**D.2 Resource Mobilization:** Mobilize and scale up domestic and international financial resources from public and private sources, including biodiversity offsets, green finance and innovative financing mechanisms, to close Ghana's biodiversity finance gap and support effective implementation of the NBSAP.
Key Planned Activities	**Action 18.1:** Review and assess existing fiscal policies, subsidies and incentive schemes to identify those that directly or indirectly contribute to biodiversity loss and ecosystem degradation. **Action 18.2:** Develop and implement a national roadmap to eliminate, phase out or reform biodiversity-harmful incentives and subsidies in key sectors, including agriculture, fisheries, forestry, mining and energy. **Action 18.3:** Design and scale up positive incentives that promote biodiversity conservation and sustainable use, including Payments for Ecosystem Services (PES), biodiversity offsets, tax incentives, green investments and community-based conservation initiatives. **Action 18.4:** Strengthen policy coordination, monitoring and reporting systems to track subsidy reforms and the effectiveness of positive biodiversity incentives.
Accountable (A)	Ministry of Finance (MoF).
Responsible (R)	Ministry of Environment, Science and Technology (MEST); National Development Planning Commission (NDPC); Environmental Protection Agency (EPA); relevant sector Ministries, Departments and Agencies (MDAs).

Consulted (C)	Ministry of Food and Agriculture (MoFA); Ministry of Lands and Natural Resources (MLNR); Ministry of Energy; Private Sector; Civil Society Organizations (CSOs); Academia; Development Partners.
Informed (I)	Cabinet.
Expected Outputs	• National assessment of biodiversity-harmful incentives and subsidies completed. • Roadmap for subsidy reform developed and progressively implemented. • Positive biodiversity incentives and green financing mechanisms expanded. • Fiscal and policy instruments aligned with biodiversity conservation objectives. • Strengthened monitoring and reporting on biodiversity-related incentive reforms.
Performance Indicators	• Value of harmful subsidies removed or reformed. • Positive incentives scaled up.

Table 5.20: Implementation Matrix for National Target 19 – By 2030 increase the level of financial resources from all sources, by sustainably mobilizing financial resources in an effective, timely and easily accessible manner, including from domestic, international, public and private resources to implement the NBSAP.

Component	**Description**
National Target	**Target 19: Resource Mobilisation**
Target Statement	By 2030, increase the level of financial resources from all sources, by sustainably mobilizing financial resources in an effective, timely, and easily accessible manner, including from domestic, international, public, and private resources to implement the NBSAP.
Strategic Goal	**Goal D: Implementation, Resources and Capacity**
Strategic Objective	**D.2 Resource Mobilization:** Mobilize and scale up domestic and international financial resources from public and private sources, including biodiversity offsets, green finance, and innovative financing mechanisms, to close Ghana's biodiversity finance gap and support effective implementation of the NBSAP.
Key Planned Activities	**Action 19.1:** Operationalize the National Biodiversity Finance Plan by implementing the priority finance solutions identified through the BIOFIN process, including institutionalizing periodic Biodiversity Expenditure Reviews (BER). **Action 19.2:** Mainstream biodiversity into public budgeting through Biodiversity Budget Tagging under the Program-Based Budgeting (PBB) system to improve visibility and tracking of biodiversity expenditures across MDAs. **Action 19.3:** Mobilize green finance and private capital by leveraging the Securities and Exchange Commission's Green Bond Guidelines to support biodiversity conservation through corporate and sovereign green bonds. **Action 19.4:** Optimize international climate–nature synergies by aligning biodiversity financing with international climate finance mechanisms, including the Green Climate Fund (GCF), and packaging ecosystem restoration initiatives as climate adaptation and mitigation investments.

Accountable (A)	Ministry of Finance (MoF).
Responsible (R)	Ministry of Environment, Science and Technology (MEST); Development Partners. MEST serves as the technical lead for BIOFIN implementation and GEF/GCF project proposal development, while Development Partners provide official development assistance (ODA) and technical support for biodiversity finance solutions.
Consulted (C)	National Development Planning Commission (NDPC). Ensures that biodiversity financing aligns with national medium-term development priorities.
Informed (I)	Cabinet. Provides oversight of the national biodiversity financing gap and progress in resource mobilisation.
Expected Outputs	• National Biodiversity Finance Plan operationalized. • Biodiversity Budget Tagging integrated into the national budgeting system. • Green finance mechanisms and private sector investment in biodiversity expanded. • Increased access to international biodiversity and climate finance. • Predictable and diversified financing streams supporting implementation of the NBSAP.
Performance Indicators	• Biodiversity finance mobilised. • Domestic and international funding flows.

Table 5.21: Implementation Matrix for National Target 20 – Strengthen capacity-building and development, access to and transfer of technology, and promote development of and access to innovation and technical and scientific cooperation, including through South-South, North- South and triangular cooperation, to meet the needs for effective implementation and transfer of technology and programmes.

Component	Description
National Target	**Target 20: Capacity-building, Technology Transfer and Scientific Cooperation**
Target Statement	Strengthen capacity-building and development, access to and transfer of technology, and promote development of and access to innovation and technical and scientific cooperation, including through South-South, North- South and triangular cooperation, to meet the needs for effective implementation and transfer of technology and programmes.
Strategic Goal	**Goal D: Implementation, Resources and Capacity**
Strategic Objective	**D.3 Capacity Development:** Strengthen the technical, institutional and human capacity of relevant Ministries, Departments and Agencies (MDAs), Metropolitan, Municipal and District Assemblies (MMDAs), traditional authorities, local communities, the private sector, academia and civil society organizations to effectively implement, monitor, enforce and report on biodiversity policies, programmes and regulations.
Key Planned Activities	**Action 20.1:** Develop and implement a national biodiversity capacity development programme for government institutions, MMDAs, research institutions, traditional authorities, local communities and civil society organizations.

	Action 20.2: Strengthen scientific research, innovation, technology transfer and technical cooperation by promoting partnerships with universities, research institutions and international organizations, including through South–South, North–South and triangular cooperation. **Action 20.3:** Improve biodiversity monitoring, data management and reporting systems by investing in modern technologies, laboratory infrastructure, geospatial tools and digital platforms. **Action 20.4:** Strengthen institutional and community capacity for biodiversity governance, Community Resource Management Areas (CREMAs), community fisheries management, law enforcement and adaptive ecosystem management through continuous training and knowledge exchange.
Accountable (A)	Ministry of Environment, Science and Technology (MEST).
Responsible (R)	Environmental Protection Agency (EPA); Forestry Commission; Council for Scientific and Industrial Research (CSIR); Universities and Research Institutions; Metropolitan, Municipal and District Assemblies (MMDAs).
Consulted (C)	National Development Planning Commission (NDPC); Ministry of Education; Development Partners; Civil Society Organizations (CSOs); Traditional Authorities; Local Communities; Private Sector.
Informed (I)	Cabinet.
Expected Outputs	• National biodiversity capacity development programme implemented. • Scientific research, innovation and technology transfer strengthened through national and international partnerships. • Biodiversity monitoring, laboratory and geospatial infrastructure enhanced. • Government institutions, MMDAs, CREMAs and community resource management structures equipped with the skills and tools needed for effective biodiversity management. • Sustainable technical cooperation and knowledge exchange mechanisms established.
Performance Indicators	• Capacity-building activities implemented. • Technology transfer indicators.

Table 5.22: Implementation Matrix for National Target 21 – Enhance access to relevant and reliable data to policy makers, practitioners and the public to guide effective governance and participatory management of biodiversity and to strengthen communication, awareness-raising, education, monitoring, research and knowledge management including traditional knowledge and practices.

Component	Description
National Target	**Target 21: Knowledge Management, Education and Awareness**
Target Statement	Enhance access to relevant and reliable data to policy makers, practitioners and the public to guide effective governance and participatory management of biodiversity and to strengthen communication, awareness-raising, education, monitoring, research and knowledge management including traditional knowledge and practices
Strategic Goal	**Goal D: Implementation, Resources and Capacity**
Strategic Objective	**D.4 Knowledge Management and Monitoring:** Enhance the availability, accessibility, quality and interoperability of biodiversity data, information, research and knowledge management systems to support evidence-based policymaking, monitoring, reporting, learning and adaptive management.
Key Planned Activities	**Action 21.1:** Operationalize the National Biodiversity Clearing House Mechanism (CHM) by upgrading it into a dynamic national platform linked to the Ghana Statistical Service (GSS) StatsBank and the Ghana Carbon Registry to improve access to biodiversity information. **Action 21.2:** Enforce proactive environmental disclosure through publication of the Environmental Bulletin, Environmental Impact Statements (EIS), permit decisions and pollution monitoring information in accordance with the Environmental Protection Act. **Action 21.3:** Document and protect Traditional Ecological Knowledge (TEK) through collaboration with the Copyright Office and CSIR, including establishment of a Traditional Knowledge Digital Library with appropriate safeguards. **Action 21.4:** Strengthen citizen science and district biodiversity data collection by leveraging the District Development Data Platform (DDDP) and training MMDA officers and community volunteers to contribute biodiversity information to the national statistical system.
Accountable (A)	Ministry of Environment, Science and Technology (MEST).
Responsible (R)	Environmental Protection Agency (EPA); Ghana Statistical Service (GSS); Council for Scientific and Industrial Research (CSIR) and Universities; Right to Information Commission.
Consulted (C)	Traditional Authorities; Civil Society Organizations (CSOs).
Informed (I)	General Public.
Expected Outputs	• National Biodiversity Clearing House Mechanism fully operational and accessible. • Environmental information proactively disclosed through the Environmental Bulletin and related platforms. • Traditional Ecological Knowledge documented and safeguarded through appropriate knowledge management systems.

	• Citizen science and district biodiversity data integrated into the national statistical system. • Improved public awareness, transparency and access to biodiversity information for evidence-based decision-making.
Performance Indicators	• Public awareness of biodiversity values. • Access to biodiversity information.

Table 5.23: Implementation Matrix for National Target 22 – Ensure equitable, inclusive, effective and gender-responsive representation and participation in decision-making and access to justice and information related to biodiversity by local communities, as well as by women and girls, children and youth, and persons with disabilities and ensure the full protection of environmental human rights defenders.

Component	**Description**
National Target	**Target 22: Participation, Justice and Rights**
Target Statement	Ensure equitable, inclusive, effective and gender-responsive representation and participation in decision-making and access to justice and information related to biodiversity by local communities, as well as by women and girls, children and youth, and persons with disabilities and ensure the full protection of environmental human rights defenders.
Strategic Goal	**Goal D: Implementation, Resources and Capacity**
Strategic Objective	**D.3 Capacity Development:** Strengthen the technical, institutional and human capacity of relevant Ministries, Departments and Agencies (MDAs), Metropolitan, Municipal and District Assemblies (MMDAs), traditional authorities, local communities, the private sector, academia and civil society organizations to effectively implement, monitor, enforce and report on biodiversity policies, programmes and regulations.
Key Planned Activities	**Action 22.1:** Strengthen legal and policy frameworks to ensure participation, rights and access to justice in biodiversity governance by reviewing and updating laws, policies and institutional mandates in line with constitutional provisions and international commitments. **Action 22.2:** Promote inclusive and meaningful participation of women, youth and local communities by developing gender-responsive participation guidelines, strengthening representation in biodiversity governance structures and supporting participatory platforms at national and sub-national levels. **Action 22.3:** Strengthen access to information and transparency in biodiversity governance through improved public access to biodiversity information, stakeholder engagement and transparent decision-making processes. **Action 22.4:** Strengthen access to justice and grievance redress mechanisms by improving institutional capacity to receive, investigate and resolve biodiversity-related grievances and safeguard the rights of communities and environmental defenders.
Accountable (A)	Ministry of Environment, Science and Technology (MEST).
Responsible (R)	Attorney-General's Department; Environmental Protection Agency (EPA); Metropolitan, Municipal and District Assemblies (MMDAs); Sector Ministries, Departments and Agencies (MDAs). Supporting institutions include Traditional Authorities and Civil Society Organizations (CSOs).
Consulted (C)	National Development Planning Commission (NDPC); Civil Society Organizations (CSOs); Traditional Authorities; Local Communities.

Informed (I)	Cabinet.
Expected Outputs	• Strengthened legal and policy framework supporting rights-based biodiversity governance. • Increased participation of women, youth and local communities in biodiversity decision-making. • Improved transparency and public access to biodiversity information. • Effective grievance redress and access to justice mechanisms established for biodiversity governance. • Enhanced protection of community rights and strengthened accountability in biodiversity management.
Performance Indicators	• Participation of IPLCs and women. • Access to justice mechanisms.

Table 5.24: Implementation Matrix for National Target 23 – Ensure gender equality and empowerment in the implementation of the CBD framework where all women and girls have equal opportunities and capacity to contribute to the three objectives of the Convention.

Component	**Description**
National Target	**Target 23: Gender Equality**
Target Statement	Ensure gender equality and empowerment in the implementation of the CBD framework where all women and girls have equal opportunities and capacity to contribute to the three objectives of the Convention
Strategic Goal	**Goal D: Implementation, Resources and Capacity**
Strategic Objective	**D.3 Capacity Development:** Strengthen the technical, institutional and human capacity of relevant Ministries, Departments and Agencies (MDAs), Metropolitan, Municipal and District Assemblies (MMDAs), traditional authorities, local communities, the private sector, academia and civil society organizations to effectively implement, monitor, enforce and report on biodiversity policies, programmes and regulations through gender-responsive approaches.
Key Planned Activities	**Action 23.1:** Mainstream gender across biodiversity policies, programmes and projects by applying gender-responsive planning, budgeting, implementation and monitoring frameworks in all biodiversity-related sectors. **Action 23.2:** Strengthen women's leadership and participation in biodiversity governance by increasing representation in decision-making bodies, including CREMA Executive Committees and other natural resource management structures. **Action 23.3:** Improve women's equitable access to land, natural resources, finance, technologies, training and biodiversity-based livelihood opportunities through targeted capacity development and policy reforms. **Action 23.4:** Strengthen gender-responsive monitoring, reporting and knowledge management by collecting, analysing and reporting sex-disaggregated data and integrating gender indicators into the national biodiversity monitoring framework.

Accountable (A)	Ministry of Gender, Children and Social Protection (MoGCSP).
Responsible (R)	Ministry of Environment, Science and Technology (MEST); Environmental Protection Agency (EPA); Forestry Commission; Metropolitan, Municipal and District Assemblies (MMDAs); National Development Planning Commission (NDPC); relevant Sector Ministries, Departments and Agencies (MDAs).
Consulted (C)	Traditional Authorities; Local Communities; Civil Society Organizations (CSOs); Women's Groups; Academia; Development Partners; Private Sector.
Informed (I)	Cabinet.
Expected Outputs	• Gender-responsive biodiversity policies, plans and programmes implemented across sectors. • Increased representation and leadership of women in biodiversity governance and decision-making bodies. • Improved access by women to land, natural resources, biodiversity-based enterprises, finance and capacity-building opportunities. • Sex-disaggregated biodiversity data integrated into national monitoring and reporting systems. • Enhanced gender equality and social inclusion in biodiversity conservation, sustainable use and benefit-sharing.
Performance Indicators	• Gender equality in biodiversity decision-making. • Women's access to biodiversity benefits.

Figure 5.3 illustrates how Ghana's National Biodiversity Strategy and Action Plan translates the national vision into coordinated implementation through four strategic goals, twenty-three national biodiversity Targets, clearly defined institutional responsibilities, implementation actions, measurable outputs, performance indicators, and adaptive monitoring to achieve the 2050 Vision of living in harmony with nature. Together, the implementation matrices provide a practical roadmap for delivering the 23 National Biodiversity Targets and establish the institutional foundation for monitoring.

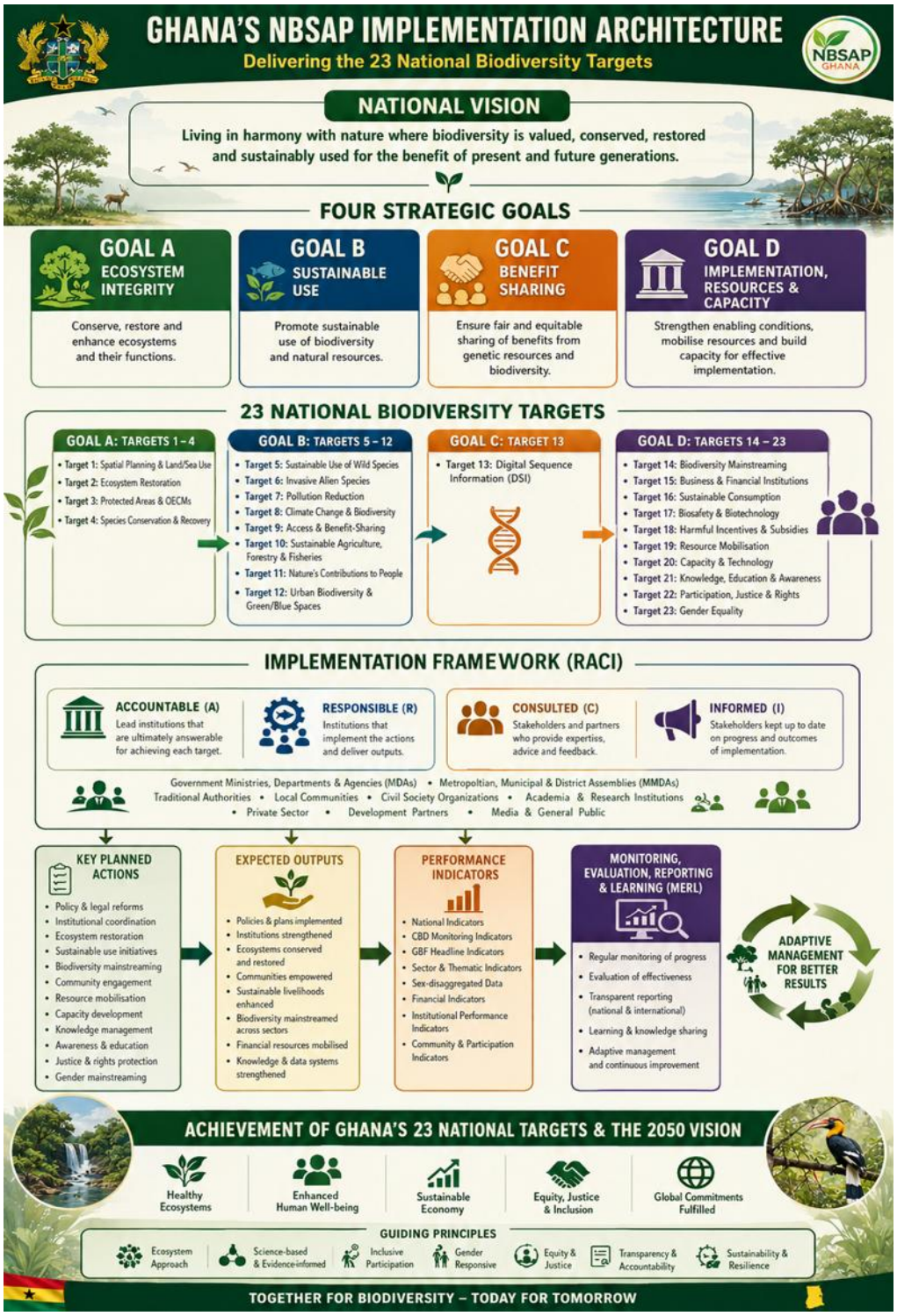

Figure 5.3 Integrated Implementation Architecture for Delivering Ghana's 23 National Biodiversity Targets.

CHAPTER SIX

IMPLEMENTATION FRAMEWORK

This chapter presents the institutional arrangements and implementation mechanisms for delivering this NBSAP. It defines the roles of key stakeholders, coordination structures, and accountability processes required to achieve the national biodiversity targets.

6.1 INSTITUTIONAL ARRANGEMENTS FOR NBSAP IMPLEMENTATION

6.1.1 LEAD COORDINATING AUTHORITY

Overall coordination of the NBSAP is vested in the Ministry of Environment, Science and Technology (MEST), which serves as the National Focal Point for the Convention on Biological Diversity (CBD). MEST provides high-level policy leadership, ensuring that biodiversity targets are aligned with national development priorities and international commitments. Specifically, MEST is responsible for the following:

- Convening the National Biodiversity Steering Committee (NBSC) to oversee implementation progress and facilitate inter-ministerial dialogue.
- Coordinating the preparation of national biodiversity reports to the CBD and ensuring alignment with the Kunming-Montreal Global Biodiversity Framework (KMGBF).
- Harmonizing biodiversity policies with climate action and land-use planning to avoid policy conflicts.

6.1.2 ROLES OF SECTOR MINISTRIES

Biodiversity is a cross-cutting development issue. Therefore, sector ministries are Accountable (A) entities under this NBSAP's RACI framework, charged with integrating biodiversity targets into their respective sector policies and Medium-Term Development Plans (MTDPs).

- Ministry of Lands and Natural Resources (MLNR): Leads on forest and wildlife policy, overseeing the restoration of degraded landscapes and the management of protected areas through the Forestry Commission.

- Ministry of Food and Agriculture (MoFA): Responsible for mainstreaming agro-biodiversity conservation into agricultural extension services and promoting sustainable production landscapes.
- Ministry of Fisheries and Aquaculture (MOFA): Leads on the sustainable management of marine and inland fisheries resources, including aquaculture, enforcing regulations to rebuild fish stocks and protect aquatic biodiversity.
- Ministry of Finance (MoF): Critical for resource mobilisation, the MoF integrates biodiversity criteria into public investment guidelines and coordinates climate-nature financing.
- Ministry of Local Government, Chieftaincy and Religious Affairs (MLGCRA): Ensures that biodiversity priorities are cascaded down to the district level and integrated into the spatial planning and development processes of Assemblies.

6.1.3 ROLES OF STATUTORY AGENCIES AND REGULATORY BODIES

Statutory agencies act as the Responsible (R) technical arms for implementation and execution of specific actions defined in this NBSAP.

- Environmental Protection Authority (EPA): Regulates environmental impact assessments, monitors pollution levels, and enforces compliance with biodiversity safeguards in development projects.
- Forestry Commission (FC): Directly manages Ghana's forest reserves and protected areas, coordinates the REDD+ programme, and oversees the Community Resource Management Area (CREMA) mechanism.
- Land Use and Spatial Planning Authority (LUSPA): Provides the technical standards and zoning guidelines necessary to secure critical ecological areas within national and district spatial plans.
- Water Resources Commission (WRC): Manages river basins and enforces buffer zone policies to protect freshwater ecosystems.

6.1.4 ROLES OF METROPOLITAN, MUNICIPAL, AND DISTRICT ASSEMBLIES (MMDAS)

As the primary agents of local development, MMDAs are central to the "Whole-of-Government" approach. They are responsible for:

- Integrating biodiversity targets and green infrastructure into their Medium-Term Development Plans (MTDPs) and Spatial Development Frameworks (SDFs).
- Enforcing development controls to prevent encroachment on wetlands, waterways, and forest reserves within their jurisdictions.
- Mobilizing local resources and engaging communities for ecosystem restoration and sanitation initiatives.

6.1.5 ROLES OF TRADITIONAL AUTHORITIES AND COMMUNITY INSTITUTIONS

Recognizing that a significant portion of Ghana's biodiversity lies outside established protected areas, Traditional Authorities and local communities are essential partners.

- Traditional Authorities: As custodians of customary lands, they enforce traditional conservation practices (e.g., sacred groves, taboo days) and facilitate land access for restoration projects.
- Community Resource Management Areas (CREMAs): These community-based governance structures are empowered to manage wildlife and natural resources on off-reserve lands, ensuring that local people benefit directly from sustainable use.

6.1.6 ROLES OF CIVIL SOCIETY, PRIVATE SECTOR, AND RESEARCH INSTITUTIONS

- Civil Society Organisations (CSOs): Play a watchdog role, advocate for policy reforms, and often lead on-the-ground implementation of community livelihood and conservation projects.
- Private Sector: Encouraged to adopt sustainable production practices, invest in nature-based solutions, and disclose biodiversity risks and impacts in line with emerging national standards.

- Research and Academic Institutions: Provide the scientific data, baseline assessments, and innovations needed for evidence-based decision-making and monitoring of biodiversity trends.

6.2 INSTITUTIONAL COHERENCE AND ACCOUNTABILITY (THE RACI MODEL)

To address historical challenges of overlapping mandates and weak coordination, this NBSAP adopts a Responsible, Accountable, Consulted, and Informed (RACI) matrix for every national target.

6.3 INTER-MINISTERIAL COORDINATION MECHANISM

Biodiversity loss in Ghana is largely driven by activities in sectors outside the direct control of environmental regulators, specifically agriculture, fisheries, mining, infrastructure, and energy. Consequently, a siloed approach where the Ministry of Environment, Science, and Technology (MEST) acts alone is insufficient. Effective implementation of the 2026 NBSAP requires a robust inter-ministerial coordination mechanism to operationalize the "whole-of-government" approach. This mechanism is designed to ensure policy coherence, managing the inherent trade-offs between economic development targets and biodiversity conservation goals.

6.3.1 THE NATIONAL BIODIVERSITY STEERING COMMITTEE (NBSC)

The primary anchor for high-level coordination is the National Biodiversity Steering Committee (NBSC). Convened by MEST, this statutory body serves as the apex platform for cross-sectoral dialogue. NBSC is responsible for validating national reports, reviewing progress against the 23 National Targets, and serving as an advisory body to MEST.

Unlike previous iterations, the revitalized NBSC draws its membership from the "Accountable" institutions identified in the RACI matrix, specifically high-level representation (Directors, Chief Directors, Senior Researchers/Academics) from the following institutions:

i. Ministry of Environment, Science and Technology (MEST)
ii. Ministry of Finance (MoF)

iii. Ministry of Lands and Natural Resources (MLNR)
iv. Ministry of Food and Agriculture (MoFA)
v. Ministry of Fisheries and Aquaculture Development (MoFAD)
vi. Office of the Attorney-General and Ministry of Justice (OAGMoJ)
vii. Ministry of Gender, Children and Social Protection (MGCSP)
viii. Ministry of Trade and Agribusiness and Industry (MOTAI)
ix. Council for Scientific and Industrial Research (CSIR)
x. Ghana Atomic Energy Commission (GAEC)
xi. Environmental Protection Authority (EPA)
xii. National Biosafety Authority (NBA)
xiii. Land Use and Spatial Planning Authority (LUSPA)
xiv. Forestry Commission (FC)
xv. Fisheries Commission (FC)
xvi. Water Resources Commission (WRC)
xvii. National Development Planning Commission (NDPC)
xviii. Academia
xix. Civil Society Organisations (CSOs)
xx. CBD Focal Points

6.3.2 COORDINATION ACROSS THE PLANNING AND BUDGETING CYCLE

Coordination is not an ad-hoc event but is embedded in the national planning and budgeting calendar to ensure biodiversity is funded:

- Policy Formulation: The National Development Planning Commission (NDPC) utilizes Cross-Sectoral Planning Groups (CSPGs) during the preparation of the Medium-Term National Development Policy Framework. This ensures that NBSAP targets are integrated into the guidelines issued to all MDAs.
- Budgeting: During the annual budget hearings, the Ministry of Finance and the NBSC collaborate to screen sector budgets. This ensures that the "Responsible" agencies (e.g., Forestry Commission, Fisheries Commission) receive the necessary

budgetary allocation to execute their RACI functions, aligning fiscal flows with biodiversity priorities.

6.3.3 OPERATIONAL INFORMATION FLOW AND DECISION-MAKING

To support the NBSC, a Technical Working Group (TWG) comprising technical experts from the EPA, CSIR, and Universities provides the scientific evidence-base for decision-making. Information flows upward from the National Biodiversity Clearing House Mechanism (CHM) and the District Development Data Platform (DDDP) to the NBSC. This data-driven approach allows the coordination platform to move beyond administrative updates to making evidence-based decisions on critical issues, such as the approval of safeguards for large infrastructure projects or the declaration of closed fishing seasons in the fisheries sector.

6.3.4 MANAGING TRADE-OFFS AND CONFLICT RESOLUTION

A key function of the coordination mechanism is to serve as a forum for Trade-off Management. Where sectoral targets conflict, for example, between mining concessions and forest conservation, the NBSC provides a structured platform for dialogue, guided by the Environmental Protection Act, 2025 (Act 1124) and LUSPA's zoning guidelines. This mechanism ensures that disputes are resolved through technical assessment and policy alignment rather than fragmentation, ensuring that the "Accountable" lead ministries adhere to the "Do No Harm" principle.

6.3.5 VERTICAL LINKAGES: SUB-NATIONAL COORDINATION

Recognizing that implementation happens at the local level, national coordination is mirrored at the sub-national level through the Regional Coordinating Councils (RCCs). The RCCs act as the bridge between national policy and local action, monitoring the performance of Metropolitan, Municipal, and District Assemblies (MMDAs). Through the Regional Planning Coordinating Units (RPCUs), the RCCs ensure that the biodiversity targets integrated into District Medium-Term Development Plans are implemented and that feedback from local communities flows back up to the NBSC.

6.4 ROLE OF METROPOLITAN, MUNICIPAL, AND DISTRICT ASSEMBLIES (MMDAS)

Under the Local Governance Act, 2016 (Act 936), MMDAs constitute the highest political and administrative authority at the local level. Since biodiversity degradation, such as wetland encroachment, illegal mining (*galamsey*), and deforestation, occurs at specific local sites, MMDAs are the operational frontline of the NBSAP. They possess the statutory mandate to issue development permits, manage waste, and enforce bylaws, making them the primary agents for translating national biodiversity targets (e.g., Target 12 on Urban Green Spaces) into physical reality.

The primary vehicle for local biodiversity action is the Medium-Term Development Plan (MTDP). In accordance with the National Development Planning (System) Act, 1994 (Act 480), every MMDA is required to translate the NBSAP targets into their district-specific plans.

- Planning Guidelines: MMDAs utilize the guidelines issued by the NDPC to maintain biodiversity conservation into their social, economic, and spatial planning strategies.
- Budgeting: Biodiversity interventions are captured in the Composite Budget of the Assembly, ensuring that actions such as tree planting or sanitation management are not non-funded mandates but are allocated resources from the District Assemblies Common Fund (DACF) and Internally Generated Funds (IGF).

As designated "Responsible" entities in the RACI matrix, MMDAs execute the following statutory functions:

- Spatial Control: enforcing the Land Use and Spatial Planning Act, 2016 (Act 925) to zone and protect sensitive ecological areas (e.g., riparian buffers, steep slopes) from development.
- Waste Management: Implementing waste collection and recycling programmes to reduce pollution (Target 16) in collaboration with private service providers.

- By-Laws Enforcement: Gazetting and enforcing local bylaws that prohibit environmentally destructive practices, such as bush burning or farming on riverbanks.
- MMDAs serve as the statutory bridge between the modern state and traditional governance.
- CREMA Oversight: Under the Wildlife Resources Management Act, 2023 (Act 1115), MMDAs play a critical role in endorsing the formation of Community Resource Management Areas (CREMAs) and validating their constitutions.
- Customary Collaboration: MMDAs collaborate with Traditional Authorities to integrate customary conservation practices (such as *taboo days* or *sacred groves*) into formal district land-use plans, ensuring that traditional knowledge (Target 21) is legally recognised and protected.

To prevent fragmentation, MMDAs are linked to national policy through the Regional Coordinating Councils (RCCs). The RCCs monitor, coordinate, and evaluate the performance of the Assemblies within their region. This vertical structure ensures that national policies initiated by MEST or Ministry of Lands and Natural Resources are cascaded down to the District Planning Coordinating Units (DPCUs), and conversely, local challenges are reported upward to the National Biodiversity Steering Committee. Recognizing that many MMDAs face technical and financial constraints, the Local Government Service (LGS) provides the following framework for capacity building:

- Staffing: The LGS ensures the deployment of qualified Environmental Health Officers and Physical Planners to the districts.
- Green Revenue: MMDAs are encouraged to explore "green" revenue streams, such as eco-tourism levies or Payment for Ecosystem Services (PES) schemes within their jurisdictions, to supplement central government transfers.
- Accountability is enforced through the National Monitoring and Evaluation System.
- Annual Progress Reports (APRs): MMDAs must submit APRs to the NDPC, which now include specific indicators on environmental sustainability and biodiversity performance.

- Digital Reporting: MMDAs utilize the District Development Data Platform (DDDP) to upload local data on land use and ecosystem health, feeding directly into the national biodiversity monitoring framework (Target 23).

By integrating biodiversity into the DNA of local governance through spatial plans, composite budgets, and bylaws, MMDAs ensure that the NBSAP is not just a document at MEST, but a living practice in every district and community. They turn abstract national targets into tangible local benefits, such as cleaner water, reduced flood risk, and sustainable livelihoods.

6.5 RACI-BASED IMPLEMENTATION FRAMEWORK

In previous implementation cycles, a lack of precise role definition often led to institutional inertia, where cross-cutting targets fell through the cracks of ministerial silos. To address this, the 2026 NBSAP adopts a Responsibility Assignment Matrix (RAM) based on the RACI model. The primary purpose of this framework is to operationalize the "Whole-of-Government" approach by converting broad mandates into specific task assignments for each of the 23 National Targets. This structure eliminates ambiguity, ensuring that for every action, it is explicitly clear who is doing the work, who is making the decisions, who provides technical input, and who must be kept in the loop.

6.6 STAKEHOLDER ENGAGEMENT IN THE IMPLEMENTATION PROCESS

Biodiversity in Ghana is not solely a government asset; approximately 80% of land is held under customary tenure, and the private sector drives the agricultural and extractive activities that impact ecosystems. Consequently, a state-centric approach is insufficient. Effective implementation of the NBSAP requires a **"Whole-of-Society"** approach where stakeholders are not just beneficiaries but active partners. This section structures the engagement of non-state actors to ensure that the stewardship of Chiefs, the capital of the private sector, and the advocacy of Civil Society are harnessed towards the 23 National Targets. Engagement under this NBSAP is governed by the following core principles, aligned with the RACI framework:

- Inclusivity and Equity: Ensuring the voices of women, youth, and persons with disabilities are institutionalized in decision-making, particularly through the gender quotas mandated in the Affirmative Action (Gender Equity) Act, 2024 (Act 1121).

- Respect for Rights and Knowledge: Recognizing Free, Prior and Informed Consent (FPIC) as the standard for engagement, especially regarding the utilization of genetic resources (Target 13) and Traditional Ecological Knowledge.
- Transparency: Open access to biodiversity data for all stakeholders through the Right to Information Act, 2019 (Act 989).
- Partnership-based Co-delivery: Moving beyond consultation to shared responsibility, where non-state actors are designated as "Responsible" entities for specific actions in the RACI matrix.
- Traditional Authorities are the custodians of Ghana's customary lands and sacred groves. Their engagement is formalized through the National and Regional Houses of Chiefs.
- Role in RACI: Traditional Authorities are designated as "Consulted" (C) on policy matters but "Responsible" (R) for enforcing customary conservation laws (e.g., *taboo days*, sacred grove protection) at the local level.
- Service Delivery: They are often the "Responsible" partners for implementing livelihood projects, restoration activities, and capacity building in remote areas where government reach is limited.
- Accountability: They serve as independent "watchdogs," monitoring the government's progress against the NBSAP targets and holding the "Accountable" ministries to task through "shadow reporting" mechanisms.
- The private sector is engaged not only as a source of funding but as a driver of sustainable practices.
- Coordination: Engagement is anchored through the Private Enterprise Federation (PEF), the Ghana Chamber of Mines, and the Association of Ghana Industries (AGI).
- Actions: Companies are encouraged to adopt the Ghana Green Finance Taxonomy and disclose nature-related risks (Target 15). The Cocoa Board (COCOBOD) and major agribusinesses are critical partners in implementing agro-forestry and supply chain sustainability initiatives (Target 10).
- Evidence-based decision-making relies on the scientific community, led by the Council for Scientific and Industrial Research (CSIR) and public universities.

- Technical Support: These institutions populate the Technical Working Groups (TWGs) of the National Biodiversity Steering Committee.
- Innovation: They are "Responsible" for generating the baseline data for the National Biodiversity Clearing House Mechanism (CHM), developing stress-tolerant crop varieties, and validating traditional medicines, thereby underpinning Targets 20 (Capacity Building) and 21 (Knowledge Management).
- Development Partners (DPs) such as the World Bank, UNDP, UNEP, GEF, EU, AU, and bilateral donors provide the necessary financial and technical leverage.
- Alignment: Engagement is coordinated through the Environment and Natural Resources (ENR) Sector Working Group. This platform ensures that DP strategies (e.g., Country Partnership Frameworks) align with the NBSAP priorities, preventing fragmentation of aid and ensuring resources flow to the verified funding gaps identified in the Biodiversity Finance Plan (Target 19).
- To prevent "engagement fatigue" and duplication, oversight is centralized.
- Institutional Anchor: The National Biodiversity Steering Committee (NBSC) includes representatives from the House of Chiefs, PEF, and CSOs, ensuring these groups have a seat at the highest decision-making table.
- RACI Application: The RACI framework explicitly maps these stakeholders to specific targets. For instance, for Target 22 (Local Communities), the National House of Chiefs is a key "Consulted" partner, while CSOs are "Informed" to monitor progress. This structure ensures that engagement is systematic rather than ad-hoc.

By structuring stakeholder participation through the RACI framework, the NBSAP ensures legitimacy and sustainability. It transforms biodiversity conservation from a government mandate into a shared national enterprise towards the 2030 vision.

6.7: FINANCING LINKAGES AND IMPLEMENTATION SUPPORT

Implementation of the 2026 NBSAP cannot rely on ad-hoc project funding alone. It requires a structural shift from "funding projects" to "financing development." This section operationalizes National Target 19 (Resource Mobilisation) by detailing how financial resources flow through the public financial management system to the implementation

structures defined in the RACI framework. It establishes the mechanism for public financing from the Ministry of Finance and development partners to the "Responsible" entities (MDAs and MMDAs) executing the targets on the ground. Biodiversity financing is anchored in the Public Financial Management Act, 2016 (Act 921).

The National Development Planning Commission (NDPC) ensures the integration of NBSAP targets into the Medium-Term National Development Policy Framework and Medium-Term Plans of MDAs, RCCs and MMDAs. Consequently, these institutions are expected to incorporate biodiversity-related actions into their Plans and budget for them to ensure implementation.

Budgeting Mechanism: Ghana's Program-Based Budgeting (PBB) system allows the Ministry of Finance to track biodiversity expenditures. By introducing "Biodiversity Budget Tagging" codes, the government ensures that funds allocated to the Forestry Commission for "Reforestation" (Target 2) or to MOFA for "Fisheries Enforcement" (Target 10) are traceable and protected from reallocation. Financial resources follow a structured pathway defined by the RACI framework:

- Central Government Transfers: Funds flow from the Consolidated Fund to the "Accountable" Sector Ministries (e.g., MLNR, MoFA), who then disburse operational funds to "Responsible" agencies (e.g., Forestry Commission, EPA) for specific deliverables.
- Decentralized Transfers: For local implementation, biodiversity-related funds flow directly to MMDAs through the District Assemblies Common Fund (DACF). To access the "Responsiveness Factor" (RFG) grant element of the DACF, Assemblies must demonstrate compliance with environmental and climate change indicators in their plans.
- Ministry of Finance (MoF): As the lead for Target 19, MoF is responsible for issuing the Budget Guidelines that mandate biodiversity inclusion and for managing the Public Investment Management System (PIMS) under the Public Financial Management (Public Investment Management) Regulations, 2020 (L.I. 2411), to screen investments for biodiversity risks.

- MEST: Provide technical justification for budget requests, helping other environment ministries (like Roads or Energy) articulate the economic case for biodiversity safeguards.
- NDPC: Ensures coherence between the resource needs and the national development targets. Given the overlap between biodiversity and climate action, financing linkages prioritise synergies.
- Carbon Finance: The Ghana Carbon Registry (managed by the EPA) links NBSAP implementation to Article 6 of the Paris Agreement, allowing projects that restore forests (Target 2) to generate carbon credits for financing.
- International Funds: The Resource Mobilisation Strategy aligns NBSAP projects with the investment criteria of the Global Environment Facility (GEF) and the Green Climate Fund (GCF), ensuring that Ghana accesses grant financing for high-cost interventions like ecosystem restoration. To address the chronic underfunding of local authorities, MMDAs are supported to diversify revenue.
- IGF Mobilisation: MMDAs are encouraged to revise their fee-fixing resolutions to capture revenue from ecosystem services (e.g., eco-tourism levies, pollution charges) as Internally Generated Funds (IGF).
- Trust Funds: The establishment of dedicated funding windows, such as the Forest Landscape Restoration Fund, provides resources that communities and CREMAs can access for local stewardship activities. Transparency is enforced through the Biodiversity Expenditure Review (BER) process initiated under the BIOFIN project.
- Reporting: The Controller and Accountant General's Department (CAGD) provides data on actual versus budgeted expenditure.
- Review: The National Biodiversity Steering Committee (NBSC) reviews these financial reports annually to assess the "execution rate" of biodiversity budgets, ensuring that "Accountable" ministries are spending the allocated funds on conservation outcomes.

By formalising these linkages, this NBSAP ensures that "finance follows function." It reduces the uncertainty of reliance on donor project cycles and builds a predictable domestic financing pipeline essential for achieving the 2030 targets.

6.8: CAPACITY, TECHNOLOGY AND KNOWLEDGE SUPPORT FOR IMPLEMENTATION

A strategy is only as good as the people and tools available to execute it. This section details how National Target 20 (Capacity Building) and Target 21 (Knowledge Management) support the implementation framework. It addresses the critical gap between the *mandate* of institutions (what they are supposed to do) and their *capacity* (what they can do). Capacity support is targeted at the specific "Responsible" entities defined in the RACI matrix:

- Regulatory Capacity: Strengthening the EPA's ability to implement the new Environmental Protection Act, 2025 (Act 1124) and its related regulations.
- Local Government Capacity: Leveraging the Institute of Local Government Studies (ILGS) to train MMDA planning officers on the Land Use and Spatial Planning Act (Act 925), ensuring they can interpret ecological maps and enforce zoning laws.
- Judicial Capacity: Training prosecutors and Judges on all the biodiversity-related laws to ensure that environmental crimes are prosecuted effectively.

Implementation leverages the National Science, Technology, and Innovation (STI) Policy to deploy the following modern tools for biodiversity management:

- Monitoring Tech: For example, the Forestry Commission utilises the Resource Management Support Centre (RMSC) to deploy drone technology and satellite imagery for real-time deforestation alerts (Target 23).
- Data Systems: The District Development Data Platform (DDDP) provides the technological backbone for MMDAs to upload local biodiversity data, which is then aggregated by the Ghana Statistical Service (GSS).
- Biosafety: The National Biosafety Authority (NBA) is equipped with advanced detection laboratories to monitor Genetically Modified Organisms (Target 17).

- To bridge the science-policy interface, implementation relies on a continuous feedback loop:
- Research Institutions: The Council for Scientific and Industrial Research (CSIR) and the universities are designated as "Responsible" for generating baseline data (e.g., fish stock assessments).
- Clearing House Mechanism (CHM): The CHM is transformed from a static website into a dynamic knowledge hub where MMDAs and the private sector can access "best practice" guidelines for restoration and sustainable use.

Recognising that capacity is lowest where biodiversity is richest, support is decentralised through the following channels:

- MMDAs/CREMA Support: The Wildlife Division provides technical training to Community Resource Management Committees (CRMCs) on governance, financial management, and ecological monitoring, enabling them to manage CREMAs.
- Extension Services: The Ministry of Food and Agriculture (MoFA) integrates biodiversity modules into its extension officer training, ensuring farmers receive knowledge on agro-ecological practices (Target 10).
- MEST: To coordinate this support to prevent duplication (e.g., avoiding two different donors training the same rangers on the same topic).
- Needs Assessments: The National Biodiversity Steering Committee conducts periodic "Capacity Needs Assessments" to identify emerging gaps (e.g., ability to monitor marine plastics) and directs technical assistance partners to fill them.

By systematically upgrading human skills and technological infrastructure, this framework ensures that the RACI roles are performed competently. It moves the NBSAP from a document of "intent" to a mechanism of "action," powered by a capable workforce and evidence-based decision-making.

6.9 RISK MANAGEMENT AND ADAPTIVE IMPLEMENTATION

Implementation of the 2026 NBSAP will take place within a dynamic socio-economic and environmental context. However, fiscal constraints, institutional capacity, illegal mining (*galamsey*), competing land uses, climate change, and other external shocks may affect progress. To address these challenges, the NBSAP adopts a risk-aware, adaptive implementation approach that emphasizes early risk identification, coordinated responses, and continuous learning. The National Biodiversity Steering Committee (NBSC) will oversee risk management by monitoring key risks, including financial constraints, institutional coordination challenges, weak regulatory enforcement, socio-economic trade-offs, and climate-related or other external shocks. Mitigation measures include strengthened inter-sectoral coordination, diversified biodiversity financing, improved regulatory oversight, and active participation of civil society, traditional authorities, and local communities in monitoring implementation.

Adaptive management will be supported through regular monitoring, annual progress reviews, and the 2027 Mid-Term Review, enabling implementation strategies and priorities to be adjusted based on evidence, emerging challenges, and lessons learned. This NBSAP also promotes proactive planning by prioritising no-regret actions and strengthening horizon scanning to identify emerging biodiversity threats and opportunities.

Through this adaptive approach, the NBSAP will remain responsive, resilient, and effective in achieving Ghana's national biodiversity targets despite changing circumstances.

CHAPTER SEVEN

MONITORING, EVALUATION, AND LEARNING (MEL)

Monitoring, Evaluation, and Learning (MEL) are fundamental components of Ghana's NBSAP. In contrast to previous strategies where monitoring was frequently secondary, the current NBSAP explicitly establishes MEL as an essential governance function, as required by the National Development Planning (System) Regulations, 2016 (L.I. 2232). The framework has been developed to address three key areas specifically:

- **Evidence-Based Governance:** To provide policymakers in Cabinet and the National Biodiversity Steering Committee (NBSC) with data on the status of Ghana's biodiversity for evidence-based decision-making.
- **Compliance and Accountability:** To track the performance of institutions assigned responsibility in the RACI matrix in implementing their respective mandates.
- **Global Alignment:** To ensure that Ghana's implementation progress and outcomes are appropriately represented in the global stocktake under the Kunming-Montreal Global Biodiversity Framework.

The Monitoring, Evaluation and Learning (MEL) Framework serves as the primary mechanism for adaptive implementation of Ghana's revised Biodiversity Strategy and Action Plan. Given the dynamic nature of the operating environment, where challenges such as climate variability and illegal mining (*galamsey*) continue to evolve, conventional approaches based on fixed implementation plans may not adequately address emerging priorities and risks.

To enhance responsiveness and effectiveness, the framework incorporates a structured feedback mechanism that facilitates continuous learning and adaptive management. Through the regular assessment of implementation progress, outcomes, and emerging challenges, the framework enables timely adjustments to strategies, interventions, and resource allocation. This iterative process helps ensure that implementation remains

relevant, evidence-based, and responsive to changing environmental, social, and economic conditions, thereby improving the likelihood of achieving NBSAP's intended outcomes:

- **Trigger Mechanism**: Monitoring data serves as an early warning signal for adaptive management. For example, if quarterly monitoring of data from the Forestry Commission indicates a significant increase in wildfire incidents under Target 2, the MEL system identifies and flags the deviation from expected results.
- **Corrective Action**: The flagged deviation prompts a timely management response by the National Biodiversity Steering Committee (NBSC), enabling it to adjust implementation measures as needed. This may include reallocating resources from lower-priority activities to emergency wildfire prevention and response efforts, rather than waiting until the end of the strategy cycle to address the issue. This ensures that implementation remains responsive, effective, and aligned with emerging challenges and priorities.

The National Biodiversity Steering Committee (NBSC) serves as the principal decision-making body for adaptive management. Based on monitoring evidence, the NBSC is mandated to recommend corrective actions, including re-prioritisation of activities, reallocation of resources, and escalation of enforcement actions through responsible sector ministries. Where necessary, strategic decisions are elevated to Cabinet through MEST and NDPC.

7.1 SCOPE OF THE MEL FRAMEWORK

The scope of monitoring for Ghana extends beyond biological indicators to cover the entire implementation chain stated below:

- Impact Monitoring (State of Nature): Tracking changes in the status of biodiversity components (e.g., coral reef health, forest cover, species populations).
- Implementation Monitoring (Process): Assessing the execution rate of actions by MDAs and MMDAs.
- Resource Monitoring (Finance): Tracking financial flows under Target 19, utilizing the Biodiversity Expenditure Review (BER) methodology to ensure that budgeted funds are released and spent efficiently.

- Effectiveness Evaluation: Evaluating whether specific policy interventions (e.g., closed fishing seasons) are actually delivering the intended ecological outcomes.
- This framework harmonizes Ghana's domestic and international reporting obligations to prevent "reporting fatigue."
- National Reporting: The primary output is the inclusion of biodiversity indicators in the Annual Progress Reports (APRs) submitted by MDAs and MMDAs to the National Development Planning Commission.
- International Reporting: Data generated for national APRs forms the basis of Ghana's National Reports to the Convention on Biological Diversity (CBD), ensuring that Ghana's contribution to the global 30x30 target is validated.

Monitoring is continuous, but review is cyclical to align with the national planning calendar:

- Quarterly Reviews: Conducted by the Technical Working Groups (TWGs) of the NBSC.
- Annual Reviews: Aligned with the NDPC's Annual Progress Report cycle (February/March).

Strategic Stocktakes:

- 2026: Submission of the 7th National Report (Baseline validation).
- 2029: Global Stocktake Review.
- 2030: Mid-Term Evaluation (aligned with the 2030 Action Targets).
- 2035: End-Term Evaluation (Assessing the 2050 Vision trajectory).

Baselines for the national biodiversity indicators will be established and validated through Ghana's 7th National Report (2026), drawing on the most recent verified national datasets. Progress towards the 2030 targets will be measured against predefined trajectories and milestones rather than through single-point comparisons. This approach will enable Ghana to assess whether implementation remains on track, identify areas requiring additional intervention, and monitor progress towards achieving its national biodiversity commitments under the Kunming-Montreal Global Biodiversity Framework (KMGBF).

7.2 RESULTS-BASED MONITORING FRAMEWORK

Ghana's MEL framework follows a results-based monitoring logic that links implementation actions to measurable biodiversity outcomes and impacts. Monitoring is structured across four levels: (i) inputs and activities, (ii) outputs (e.g., spatial plans approved, protected areas gazetted), (iii) outcomes (e.g., reduced deforestation rates, improved fish biomass), and (iv) impacts reflected in national and global biodiversity indicators. This hierarchy ensures that implementation progress is assessed not only by activity completion, but by its contribution to ecological recovery and sustainability outcomes.

7.3 ALIGNMENT WITH THE KUNMING–MONTREAL GBF

7.3.1 MONITORING FRAMEWORK

Ghana's alignment with the global monitoring system is a strategic decision to ensure that national progress is recognised at the global level. In accordance with **CBD COP Decision 15/5**, Ghana adopts the unified monitoring framework to track its contribution toward the global "30x30" targets. This alignment allows MEST to seamlessly integrate national data into the global reporting platform. To balance global comparability with national flexibility, Ghana adopts the three-tiered structure of the KMGBF Monitoring Framework stated below:

- **Headline Indicators:** A high-level set of mandatory metrics (e.g., *Coverage of Protected Areas*) that capture the overall scope of the 23 Targets. These are used for high-level reporting to the CBD and the Presidency.
- **Component Indicators:** Detailed metrics covering specific aspects of a target (e.g., *Index of Coastal Eutrophication*), providing the granularity needed by technical agencies.
- **Complementary Indicators:** Nationally specific metrics (e.g., *Number of CREMAs established*) that reflect Ghana's decentralized governance approach.

Ghana's adoption of these indicators is governed by the principle of "National Relevance and Feasibility." MEST has prioritised indicators that serve dual purposes, satisfying international reporting requirements while simultaneously informing the Annual Progress Reports (APRs) required by the NDPC.

Through a rigorous technical review led by the Technical Working Group (TWG), each of Ghana's 23 National Targets has been explicitly mapped to the corresponding KMGBF Headline Indicators. For instance:

- National Target 2 (Restoration) is mapped to Headline Indicator 2.2: Area under restoration.
- National Target 3 (Conservation) is mapped to Headline Indicator 3.1: Coverage of Protected Areas and OECMs.

Annex 3 is the national targets mapped to their corresponding GBF headline indicators.

Recognizing that Ghana currently lacks data for some advanced indicators (e.g., *Genetic Diversity of Wild Species*), this NBSAP adopts a phased approach:

- Phase 1 (2026-2027): Focus on Headline Indicators where data exists (e.g., land cover, protected areas).
- Phase 2 (2028-2030): Leverage the Biodiversity Finance Initiative (BIOFIN) and academic partnerships to fill data gaps in marine biodiversity and soil health.

7.3.2 INSTITUTIONAL RESPONSIBILITIES FOR INDICATORS

Indicator management follows the established RACI framework below:

- Data Generators (Responsible): Technical agencies (e.g., Forestry Commission, Fisheries Commission, WRC) collect primary data during routine operations.
- Data Aggregators (Accountable): The Ghana Statistical Service (GSS) is accountable for quality assurance and aggregating this data into the National Statistical System.
- Data Users (Consulted/Informed): The NDPC utilizes these indicators for APRs, while MEST uses them for CBD reporting.

7.3.3 ROLE OF NATIONAL DATA SYSTEMS

The framework draws on existing robust systems:

- GSS StatsBank: The central repository for all Tier 1 (census/survey) data.
- District Development Data Platform (DDDP): The primary source for local-level administrative data (e.g., tree planting figures from District Assemblies).

- Sector Information Systems: Specialized databases from the key Institutions

7.3.4 INDICATOR SELECTION CRITERIA

Indicators were selected based on the following Specific-Measurable-Achievable-Realistic and Timebound (**SMART)** criteria tailored to Ghana's capacity:

- Relevance: Does it directly measure the target?
- Feasibility: Is data currently available or cost-effective to collect?
- Methodological Soundness: Is the methodology internationally recognised?
- Consistency: Can it be measured repeatedly over the 10-year period?

7.4 DATA SOURCES, COLLECTION, AND MANAGEMENT

7.4.1 PRIMARY DATA SOURCES

Monitoring draws on a diversified ecosystem of data providers such as:

- Administrative Data: Routine records from "Responsible" agencies (e.g., permit records from the Wildlife Division, EIA filings at the EPA).
- Geospatial Data: Remote sensing data provided by CERSGIS and RMSC, tracking land cover change and fire frequency.
- Statistical Surveys: Data from the Ghana Living Standards Survey (GLSS) managed by GSS.
- Citizen Science: Community-generated data from CREMAs and bird-watching groups.

7.4.2 DATA COLLECTION MECHANISMS

Data collection is integrated into statutory reporting cycles:

- The APR System: The primary mechanism is the Annual Progress Report process managed by the NDPC. MMDAs input biodiversity actions into the **DDDP**.
- Surveys: These are specific surveys conducted by the responsible institutions as part of their work or other programmes specifically triggered by interventions.
- EA Repository: The EPA uses biodiversity baseline data from Environmental Assessments submitted by proponents.

7.4.3 DATA MANAGEMENT AND COORDINATION

Data is managed through a "Hub-and-Spoke" model:

- The Hub: The National Biodiversity Clearing House Mechanism (CHM), hosted by EPA/MEST, serves as the central repository.
- The Spokes: Sector-specific databases remain with custodian agencies but share summary statistics with the CHM.

Coordination: The Technical Working Group (TWG) on Data meets semi-annually to resolve data friction between agencies.

7.4.4 DATA QUALITY ASSURANCE

- Quality assurance is enforced by the Ghana Statistical Service.
- Validation: All "Headline Indicators" undergo validation by the TWG before publication.
- Standardisation: Data must adhere to the National Quality Assurance Framework to prevent discrepancies.

7.4.5 ADDRESSING DATA GAPS

Ghana adopts a transparent approach to missing data through:

- Academic Partnerships: MoUs with the UG, KNUST and UCC to direct research toward data-poor areas (e.g., marine microplastics).
- Private Sector Disclosure: Leveraging the Ghana Green Finance Taxonomy to require corporate disclosure of nature-related data.

7.5 ROLES AND RESPONSIBILITIES FOR MONITORING AND REPORTING

7.5.1 OVERALL COORDINATION AND OVERSIGHT

MEST serves as the Lead Coordinator through the following functions:

- Convener: Convenes the NBSC to review monitoring data.
- CBD Focal Point: Sole authority responsible for submitting National Reports to the CBD Secretariat.

- Harmonisation: Works with NDPC to align CBD indicators with the National Development Plan.

7.5.2 ROLE OF NATIONAL STATISTICAL AND PLANNING INSTITUTIONS

- NDPC: Custodian of the M&E System; issues guidelines forcing MMDAs/MDAs to report on biodiversity.
- GSS: Quality Assurance body; ensures statistical soundness and consistency with international standards (UN SEEA).
- MMDAs: They are the Local Reporting Units.
- Data Collection: Planning Officers collect granular data (e.g., seedlings distributed, refuse dumps cleared).
- Platform Usage: Mandated to upload data directly onto the District Development Data Platform (DDDP).

7.5.3 ROLE OF NON-STATE ACTORS

- Civil Society (CSOs): Play a "Watchdog" role (Consulted), conducting independent verification/shadow reporting.
- Citizen Science: Local knowledge contribute data on human-wildlife conflict and species sightings.
- Private Sector: Reports on environmental footprints via EPA permit conditions.

7.5.4 REPORTING CYCLES AND TIMELINES

Reporting is synchronized with the global review process as follows:

- Seventh National Report (7NR): Due 28 February 2026 (Baseline).
- Global Stocktake (2029): Assessing global progress.
- Eighth National Report (2029): Comprehensive review.

7.6 TRANSPARENCY AND INTERNATIONAL ACCOUNTABILITY

Upon submission, all National Reports are published on the Biodiversity Clearing House Mechanism (CHM), accessible to all citizens in compliance with the Right to Information Act (Act 989). Monitoring outputs generated under this framework also serve as critical input to Communication, Education, and Public Awareness (CEPA) activities outlined in

Chapter 10. Evidence on biodiversity trends, compliance gaps, and success stories will be translated into public-facing communication products to strengthen transparency, public engagement, and voluntary compliance.

7.7 RISKS AND ASSUMPTIONS

The effectiveness of the MEL Framework depends on several critical assumptions, including the timely submission of data by Ministries, Departments and Agencies (MDAs) and Metropolitan, Municipal and District Assemblies (MMDAs), sustained financing for monitoring and reporting systems, and continued political commitment to the implementation and enforcement of biodiversity-related policies and regulations.

Key risks to effective implementation include data gaps for emerging indicators, limited technical and institutional capacity at the sub-national level, and external shocks such as climate-related disasters and other unforeseen environmental pressures. To address these challenges, the framework promotes a phased approach to indicator development and adoption, targeted capacity-building interventions under Target 20, and the integration of biodiversity monitoring and reporting requirements into statutory national reporting systems. These measures are intended to strengthen data reliability, enhance institutional capacity, and improve the resilience and sustainability of the MEL system over time.

CHAPTER EIGHT

RESOURCE MOBILISATION

8.1 RESOURCE MOBILISATION AS A DELIVERY ENABLER

Resource mobilisation is positioned as the primary "Delivery Enabler" for the 23 National Targets. Without it, the ambitious goals of restoring 30% of degraded ecosystems or reducing pollution risks remain theoretical. This strategy links the RACI implementation framework directly to financing pathways, ensuring that every "Responsible" entity has access to the necessary budget lines or investment vehicles to execute their mandate.

This NBSAP is fully aligned with Goal D and Target 19 of the Kunming-Montreal Global Biodiversity Framework (KMGBF). It provides a clear direction for Ghana's commitment to substantially increase the level of financial resources for biodiversity. The strategy aims at optimising the use of domestic capital while accessing new international funds dedicated to protecting and managing 30% of marine, coastal, and terrestrial ecosystems by the year 2030.

8.2 SCOPE OF RESOURCE MOBILISATION

The scope extends beyond the traditional definition of "fundraising." It encompasses a "blended finance" approach that integrates:

- Domestic Public Finance: Budgetary allocations through the Consolidated Fund and statutory funds (e.g., Mineral Development Fund).
- International Public Finance: ODA, climate finance (GCF/GEF), bilateral and multilateral cooperation.
- Private Sector Finance: Green bonds, biodiversity offsets, and corporate sustainability investments.
- Innovative Mechanisms: Carbon market revenues, Payments for Ecosystem Services (PES), and debt-for-nature swaps.

8.2.1 NATIONAL FINANCING CONTEXT FOR BIODIVERSITY

Resource mobilisation operates within the framework of the Public Financial Management Act, 2016 (Act 921), which governs the raising, allocation, management, and accountability of public resources. However, biodiversity expenditure has often remained "invisible" within this system, making it difficult to track, prioritise, and protect conservation investments.

To address this challenge, Ghana joined the global Biodiversity Finance Initiative (BIOFIN), supported by the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF), to develop a comprehensive National Biodiversity Finance Plan. The strategy uses the Government's Programme-Based Budgeting (PBB) system to make biodiversity-related expenditure explicit. This enables the Ministry of Finance to track conservation spending more effectively and safeguard it against fiscal shocks.

8.2.2 BIODIVERSITY WITHIN NATIONAL DEVELOPMENT PLANNING

Through the National Development Planning Commission, biodiversity has been elevated from a sectoral concern to a cross-cutting developmental priority. The integration of biodiversity targets into the Medium-Term National Development Policy Framework (MTNDPF) ensures that conservation actions are eligible for public funding, as MDAs and MMDAs can only budget for activities derived from approved development plans.

8.3 ESTIMATING RESOURCE NEEDS FOR NBSAP IMPLEMENTATION

To translate biodiversity commitments into actionable and costed interventions, Ghana has adopted the Biodiversity Finance Initiative (BIOFIN) methodology. This internationally recognised approach provides a robust and evidence-based framework for assessing the financial resources required to implement the revised National Biodiversity Strategy and Action Plan (NBSAP).

A key output of the BIOFIN process is the estimation of the biodiversity financing gap, defined as the difference between the financial resources needed to achieve the 23 national biodiversity targets, the level of current expenditure and available funding. By quantifying this gap, the methodology supports informed decision-making on resource mobilisation, budget allocation, and financing strategies, ensuring that biodiversity priorities are aligned with available resources and that funding needs are clearly identified and addressed.

8.4 LINKING COSTS TO TARGETS

Resource requirements have been estimated based on the specific actions and interventions identified under this NBSAP. This activity-based costing approach ensures that resource needs are directly linked to clearly defined outputs and outcomes, thereby strengthening the credibility of budget proposals submitted to the Ministry of Finance and enhancing accountability for implementation.

A summary of the estimated budget requirements for the key actions and measures under each of the 23 national biodiversity targets is presented in Table 8.1. The detailed National Action Plan, including the associated cost estimates for each action, is provided as an annex to support resource mobilisation efforts and inform discussions with government, development partners, the private sector, and other stakeholders on financing Ghana's ambitious biodiversity objectives.

Table 8.1 Consolidated Budget Summary for NBSAP 2026 (National Targets 1-23)

National Target	Thematic Focus	Indicative Budget (USD Million)
Target 1	Spatial Planning and Land/Sea Use	30
Target 2	Ecosystem Restoration	32
Target 3	Protected Areas and OECMs	34
Target 4	Species Conservation and Recovery	35
Target 5	Sustainable Use and Harvesting of Wild Species	32
Target 6	Invasive Alien Species	28

Target 7	Pollution Reduction	34
Target 8	Climate Change and Biodiversity	37
Target 9	Access and Benefit-Sharing of Genetic Resources	22
Target 10	Sustainable Agriculture, Forestry and Fisheries	51
Target 11	Nature's Contributions to People	40
Target 12	Urban Biodiversity and Green/Blue Spaces	35
Target 13	Digital Sequence Information (DSI)	20
Target 14	Biodiversity Mainstreaming Across Sectors	30
Target 15	Business and Financial Institutions	27
Target 16	Sustainable Consumption and Lifestyles	29
Target 17	Biosafety and Biotechnology	25
Target 18	Harmful Incentives and Subsidy Reform	30
Target 19	Resource Mobilisation and Biodiversity Finance	33
Target 20	Capacity-Building and Technology Transfer	37
Target 21	Knowledge, Education and Awareness	30
Target 22	Participation, Justice and Rights	26
Target 23	Gender Equality in Biodiversity Action	30
TOTAL (Targets 1–23)		**727**

8.5 INTERNATIONAL PUBLIC FINANCE AND DEVELOPMENT COOPERATION

8.5.1 ROLE OF INTERNATIONAL FINANCE

International finance acts as a catalyst for innovation and a bridge for large-scale capital needs. Ghana will leverage its status as a party to the CBD and Paris Agreement to access multilateral funds that target the climate-biodiversity nexus.

8.5.2 STRATEGIC ALIGNMENT WITH GEF AND GCF

The Ministry of Environment Science and Technology (MEST), as the operational focal point, aims to align Ghana's Global Environment Facility (GEF-8/9) portfolio directly with the NBSAP targets. Furthermore, by framing ecosystem restoration as an adaptation strategy, Ghana will access Green Climate Fund (GCF) resources, effectively "double-dipping" into climate finance to fund biodiversity outcomes.

8.5.3 BILATERAL PARTNERSHIPS

Bilateral cooperation will be reoriented from ad-hoc projects to Sector Budget Support or programmatic funding. This ensures that donor funds flow through national systems, reducing transaction costs and strengthening national institutions rather than creating parallel project implementation units.

8.6 PRIVATE SECTOR ENGAGEMENT AND INNOVATIVE FINANCING

The private sector, particularly in agriculture, mining and finance, controls the bulk of investment flows impacting nature. This strategy moves beyond voluntary Corporate Social Responsibility (CSR) to **market-based incentives**. By implementing the **Ghana Green Finance Taxonomy**, the strategy creates a regulatory environment where "nature-positive" businesses can access lower-cost capital.

8.6.1 GREEN BONDS AND CAPITAL MARKETS

Ghana will operationalise the Securities and Exchange Commission's (SEC) Green Bond Guidelines to issue sovereign or corporate green bonds dedicated to biodiversity. Proceeds from these bonds will finance bankable projects such as sustainable forestry plantations and eco-tourism infrastructure, attracting institutional investors seeking ESG-compliant assets.

8.6.2 BIODIVERSITY OFFSETS

To address residual impacts from development, the strategy explores a national Biodiversity Offset Framework. This mechanism would require developers (e.g., in mining or infrastructure) to finance conservation actions to achieve "No Net Loss," creating a new stream of private funding for protected areas.

8.7 ECONOMIC INSTRUMENTS, INCENTIVES AND SUBSIDY REFORM

8.7.1 REPURPOSING HARMFUL INCENTIVES

Consistent with Target 18, Ghana commits to a "Biodiversity Expenditure Review" to identify subsidies that drive biodiversity loss, such as blanket fuel subsidies that encourage overfishing. The strategy adopts a socially sensitive approach to subsidy reform, repurposing these funds into "smart subsidies" (e.g., providing subsidized sustainable fishing gear or cocoa agroforestry inputs) that incentivize conservation actions.

8.7.2 POSITIVE INCENTIVES

The government will introduce positive economic instruments, such as tax waivers for importation of clean technologies (e.g., invasive species control equipment) and Payments for Ecosystem Services (PES) schemes. Specifically, the strategy supports scaling up the cocoa-forest PES model, where farmers are paid directly for maintaining shade trees, aligning their economic interests with biodiversity retention.

8.8 INSTITUTIONAL ARRANGEMENTS FOR RESOURCE MOBILISATION

8.8.1 LEAD RESPONSIBILITIES

Effective mobilisation requires clear leadership. The Ministry of Finance acts as the Accountable lead for the Resource Mobilisation Strategy, responsible for fiscal policy and donor coordination. MEST acts as the Responsible Technical Lead, developing bankable proposals and managing the BIOFIN process.

8.9 MONITORING AND REPORTING ON BIODIVERSITY FINANCE

8.9.1 TRACKING AND ACCOUNTABILITY

This NBSAP establishes a Biodiversity Finance Tracking System integrated into the national budget codes. This allows the government to report accurately on domestic expenditures in the Annual Progress Reports and international reports to the CBD.

8.9.2 TRANSPARENCY

All receipts from biodiversity-related levies (e.g., tax on plastics, timber rights fees) and their utilisation will be published annually. This transparency is crucial for maintaining public trust and demonstrating to the private sector and donors that funds are being used efficiently for their intended conservation purposes.

8.10 RISKS, CONSTRAINTS, AND ENABLING CONDITIONS

8.10.1 MANAGING FISCAL RISKS

The strategy acknowledges the constraint of limited fiscal space due to debt servicing. To mitigate this, the focus is on efficiency and non-debt creating instruments like carbon markets, rather than solely relying on new borrowing.

8.10.2 ADDRESSING INSTITUTIONAL CAPACITY

A key constraint is the capacity to develop "bankable" projects that meet the rigorous standards of global funds like GCF. The strategy prioritises Project Preparation Facilities (PPF) to train staff in MDAs and MMDAs in green project design and financial engineering.

CHAPTER NINE

CAPACITY DEVELOPMENT, TECHNOLOGY TRANSFER AND KNOWLEDGE MANAGEMENT

9.1 INSTITUTIONAL CAPACITY FOR BIODIVERSITY IMPLEMENTATION

9.1.1 NATIONAL-LEVEL INSTITUTIONAL FRAMEWORK

The complexity of biodiversity degradation requires institutions that are agile and interconnected. The strategy focuses on strengthening the relevant MDAs not just as a ‘policy hub’, but as a "compliance engine" capable of coordinating cross-sectoral Inter-Ministerial actions.

Institutions with regulatory mandates, especially the EPA, Fisheries Commission, and Water Resources Commission, will undergo targeted capacity upgrades. This involves equipping them with the legal and technical tools to enforce the new Environmental Protection Act, 2025 (Act 1124) and Fisheries Act, 2025 (Act 1146), ensuring they can prosecute environmental crimes and illegal fishing operations, as well as manage complex EAs and FIAs for oil, gas, mining projects and other developmental activities.

9.2 SUB-NATIONAL INSTITUTIONAL CAPACITY

Recognising that implementation happens on the ground, the strategy targets the Metropolitan, Municipal, and District Assemblies (MMDAs). The Local Government Service will be supported to establish functional "Biodiversity Desks" or strengthen existing Environmental Health Units within the Assemblies, ensuring they have the logistical capacity to manage local forest and fisheries reserves, protect biodiversity, as well as sanitation infrastructure.

9.3 HUMAN CAPACITY AND SKILLS DEVELOPMENT

Ghana faces a critical skills gap in emerging biodiversity fields. The strategy prioritises the development of a new cadre of professionals skilled in Natural Capital Accounting, Biosafety Risk Assessment, Taxonomy, and Green Finance. Leveraging the professional certification mandates in the new Environmental Protection Act, the strategy supports the Continuous Professional Development (CPD) of environmental practitioners. This ensures

that consultants conducting Environmental Impact Assessments (EIAs) are abreast with the latest biodiversity safeguard standards. Partnerships with universities (e.g., UG, KNUST, UCC, UENR, amongst others), and the Institute of Local Government Studies (ILGS) will facilitate the integration of biodiversity modules into standard public service training. This ensures that MMDAs receive baseline training on how to integrate biodiversity into development planning.

9.4 SCIENTIFIC, TECHNICAL AND TRADITIONAL ECOLOGICAL KNOWLEDGE

The Council for Scientific and Industrial Research (CSIR) and its specialised institutes (e.g., Forestry Research Institute of Ghana, Water Research Institute) serve as the scientific backbone of the NBSAP. Capacity-building will focus on upgrading their laboratories and field stations to support long-term ecological monitoring and the preservation of genetic resources. This NBSAP explicitly recognises Traditional Ecological Knowledge (TEK) as a valid and vital source of information. This strategy creates mechanisms to document and integrate the knowledge of Traditional Authorities and local communities, such as the locations of sacred groves or the breeding cycles of fish, into formal management plans, ensuring that conservation is culturally grounded.

To ensure evidence-based policy, a formalized Science-Policy Platform will be established. This body will translate complex scientific data (e.g., on climate vulnerability or species extinction risks) into actionable policy briefs for Cabinet and Parliament, thereby bridging the gap between researchers and decision makers.

9.5 TECHNOLOGY TRANSFER AND INNOVATION

Technology is a multiplier force for conservation. The strategy facilitates the transfer and adoption of critical technologies, including Drone/UAV systems for forest monitoring, e-DNA kits for rapid biodiversity assessment, and Vessel Monitoring Systems (VMS) for fisheries enforcement.

Beyond importing technology, the strategy supports local innovation. This includes funding for Ghanaian start-ups and research hubs to develop locally appropriate solutions, such as mobile apps for citizen science reporting or low-cost sensors for water quality monitoring in remote illegally mined-impacted areas.

Ghana will leverage international partnerships (North-South and South-South) to access proprietary technologies and advanced training. This includes collaborating with global space agencies for satellite data access and working with the private sector to deploy blockchain for timber traceability.

9.6 KNOWLEDGE MANAGEMENT AND INFORMATION SYSTEMS

The CHM will be transformed from a static website into a dynamic National Biodiversity Information Hub. This centralised platform will aggregate data from all sectors, serving as the "single source of truth" for Ghana's biodiversity statistics. It will facilitate the open sharing of data between the Forestry Commission, Fisheries Commission, Water Resources Commission, GSS, and the public. To prevent data silos, the strategy mandates the adoption of common data standards (consistent with the Ghana Statistical Service protocols). This ensures that spatial data generated can be seamlessly overlaid with biological data, enabling integrated land-use planning.

9.7 CAPACITY DEVELOPMENT AT SUB-NATIONAL AND COMMUNITY LEVELS

The sustainability of the NBSAP rests on community ownership. Capacity building efforts will target Community Resource Management Areas (CREMAs) and Community-Based Fisheries Management Committees. Training will focus on governance, financial management, and conflict resolution, empowering these bodies to manage their resources autonomously and transparently.

Chiefs and Traditional Leaders are the custodians of customary law. The strategy supports the National and Regional Houses of Chiefs to codify customary conservation laws (e.g., taboo days) and integrate them with statutory bylaws, strengthening the enforcement of community-based conservation.

9.8 PARTNERSHIPS AND TECHNICAL COOPERATION

Ghana will actively pursue South-South cooperation, learning from other African nations facing similar challenges (e.g., managing cocoa-forest landscapes or combatting wildlife trafficking). This peer-to-peer learning fosters solutions that are contextually relevant and cost-effective.

Civil Society Organisations (CSOs) and the private sector are key partners in capacity delivery. The strategy encourages "train-the-trainer" models where NGOs with specialised expertise (e.g., in primate conservation or marine protection) build the capacity of government staff and community rangers.

9.9 FINANCING CAPACITY DEVELOPMENT AND TECHNOLOGY TRANSFER

Capacity development requires sustained investment, not just one-off workshops. The Resource Mobilisation Strategy explicitly includes budget lines for long-term training and institutional strengthening. This ensures that capacity building is treated as a recurrent capital investment.

Ghana will utilise the capacity-building windows of the GEF and GCF to finance the acquisition of expensive technologies (like satellite and other remote sensing infrastructure) and specialised technical assistance, ensuring that these investments leave behind a legacy of national competence.

9.10 RISKS, CONSTRAINTS, AND ENABLING CONDITIONS

A major risk is the loss of trained personnel to the private sector or international organisations ("brain drain"). The strategy addresses this by focusing on institutional retention strategies, improving working conditions for field staff, and bonding schemes for beneficiaries of specialised government training.

To prevent the "graveyard of equipment" syndrome, the strategy mandates that all technology transfers include long-term maintenance plans and budget allocations for repairs and upgrades. Technology will only be adopted if there is demonstrated domestic capacity to sustain it.

CHAPTER TEN

COMMUNICATION, EDUCATION AND PUBLIC AWARENESS (CEPA)

Biodiversity conservation is ultimately a human endeavour. The success of this National Biodiversity Strategy and Action Plan (NBSAP) will depend not only on policies, institutions, and financial investments, but also on the knowledge, attitudes, values, and actions of individuals, communities, businesses, and governments. The purpose of this Communication, Education and Public Awareness (CEPA) Strategy is therefore to bridge the gap between biodiversity policy and public action by making biodiversity relevant, understandable, and meaningful to all Ghanaians.

CEPA seeks to transform biodiversity from a technical and sector-specific issue into a national concern that is understood and supported across society. By increasing awareness of the importance of biodiversity and ecosystem services, strengthening environmental literacy, promoting participation, and encouraging behavioural change, CEPA helps build the social foundation necessary for effective conservation and sustainable use. It also supports transparency, accountability, and public engagement in biodiversity-related decision-making processes.

This Strategy is aligned with the Convention on Biological Diversity (CBD), the Kunming-Montreal Global Biodiversity Framework (KMGBF), and Ghana's national development priorities. It recognises that biodiversity conservation requires informed and empowered citizens who understand both the benefits derived from nature and the consequences of biodiversity loss. Through targeted communication, education, and engagement interventions, CEPA will support the implementation of all components of the NBSAP and contribute to a shared national vision of living sustainably within ecological limits.

10.1 ROLE OF CEPA IN ACHIEVING NATIONAL TARGETS

CEPA is not a standalone programme but a cross cutting enabling mechanism that supports the implementation of all 23 National Biodiversity Targets under this NBSAP. It provides the foundation for awareness, knowledge sharing, stakeholder engagement, social mobilisation, and behavioural change required to achieve biodiversity outcomes across sectors and levels of society.

Effective communication and public engagement can significantly improve understanding of biodiversity values, strengthen compliance with environmental regulations, and promote voluntary adoption of sustainable practices. For example, awareness campaigns can increase public understanding of seasonal fisheries closures, protected area regulations, restoration initiatives, invasive species management measures, and restrictions on environmentally harmful activities. Greater public understanding of these interventions can reduce conflicts, improve compliance, and lower enforcement costs.

CEPA also supports biodiversity mainstreaming by helping policymakers, businesses, communities, and resource users understand the relevance of biodiversity to their respective mandates, livelihoods, and development aspirations. Through targeted communication, stakeholders can better appreciate the links between biodiversity, climate resilience, food security, water security, public health, economic development, and cultural heritage.

The Strategy further contributes to achieving biodiversity targets by:

- Increasing public awareness and understanding of biodiversity and ecosystem services;
- Strengthening support for biodiversity-friendly policies and practices;
- Promoting sustainable consumption and production patterns;
- Encouraging responsible natural resource use and stewardship;
- Enhancing participation in conservation and restoration initiatives;
- Supporting environmental compliance and law enforcement efforts;
- Improving access to biodiversity information and knowledge;

- Building constituencies for conservation among youth, women, local communities, and the private sector; and
- Facilitating knowledge exchange and learning across sectors and stakeholders.

Without effective communication, education, and public participation, biodiversity conservation efforts are more likely to face resistance, misunderstanding, and limited long-term impact. With effective CEPA, however, compliance with environmental measures increasingly becomes a shared social norm and biodiversity conservation becomes a collective national responsibility.

Accordingly, CEPA serves as an essential catalyst for implementing this NBSAP and ensuring that its targets, actions, and outcomes are understood, supported, and sustained by the people of Ghana. Through informed and active participation, CEPA will help create the societal conditions necessary to halt and reverse biodiversity loss while advancing sustainable development and human well-being.

10.1.1 SCOPE AND ALIGNMENT

The Communication, Education and Public Awareness (CEPA) Strategy provides a comprehensive framework for building biodiversity awareness, strengthening environmental literacy, promoting participation, and encouraging behavioural change across all sectors of society. Recognising that biodiversity conservation requires action at multiple levels, the Strategy encompasses a broad range of communication and learning approaches, including formal education, non-formal adult learning, public awareness campaigns, strategic media engagement, community outreach, digital communication, and participatory knowledge-sharing initiatives. The Strategy is designed to reach diverse stakeholder groups whose decisions and actions influence biodiversity outcomes. These include policymakers, parliamentarians, government officials, traditional authorities, local government institutions, private sector leaders, educators, researchers, civil society organisations, youth, women, farmers, fishers, resource users, faith-based organisations, media practitioners, and the general public. By tailoring communication approaches and messages to the specific needs, interests, and responsibilities of each audience, the CEPA programme seeks to maximise relevance, effectiveness, and impact.

At the formal education level, CEPA supports the integration of biodiversity and sustainability concepts into curricula, teaching materials, and experiential learning activities. Non-formal education initiatives will focus on adults and community groups, providing practical knowledge and skills that support sustainable livelihoods and environmental stewardship. Public awareness campaigns and media engagement activities will further extend the reach of biodiversity information, helping to foster a wider culture of conservation and sustainable resource use.

The Strategy is fully aligned with Target 21 of the Kunming-Montreal Global Biodiversity Framework (KMGBF), which calls for ensuring that relevant knowledge and information are accessible to decision makers, Indigenous People and local communities, women, youth, the private sector, and the public to enable effective and inclusive participation in biodiversity governance and decision-making. In this regard, CEPA serves as an essential mechanism for democratizing access to biodiversity information and strengthening public engagement in environmental management processes.

The Strategy also supports broader national objectives relating to environmental governance, sustainable development, climate resilience, and social inclusion. By improving access to information, strengthening environmental literacy, and promoting meaningful participation, CEPA contributes to greater transparency, accountability, and environmental justice. It empowers citizens and stakeholders to understand their rights and responsibilities, engage constructively in biodiversity-related decisions, and contribute actively to the conservation and sustainable use of Ghana's biological resources.

Through this broad and inclusive scope, the CEPA Strategy seeks to create an informed and engaged society that is equipped to support the implementation of the NBSAP and contribute to the achievement of Ghana's biodiversity vision and national development aspirations.

10.1.2 NATIONAL CONTEXT FOR BIODIVERSITY COMMUNICATION AND EDUCATION

In Ghana, biodiversity is integral to cultural identity and daily survival, from clan totems to medicinal plants. Yet public awareness of biodiversity decline varies rural communities witness it directly, while urban populations are increasingly disconnected from the ecosystems that support them.

Radio remains the dominant medium for rural communication, while digital platforms are expanding among youth despite the persistent digital divide. Effective communication must therefore adopt a hybrid approach: digital for urban youth, community radio and durbars for rural audiences. Messages must be multilingual and culturally sensitive, integrating local languages, proverbs and traditional governance systems.

10.1.3 INSTITUTIONAL FRAMEWORK FOR CEPA

MEST provides overall policy leadership, Environmental Protection Authority (EPA) and Forestry Commission lead technical campaigns, while the National Commission for Civic Education (NCCE) drive grassroots engagement.

The Ministry of Education and Ghana Education Service (GES) oversee curriculum integration. At the local level, Metropolitan, Municipal, and District Assemblies (MMDAs) facilitate community engagement through Information Services Departments.

Traditional Authorities act as the trusted messengers via community durbars, while Civil Society Organisations (CSOs) complement government efforts through advocacy, education programmes, and accountability.

10.1.4 FORMAL EDUCATION AND CURRICULUM INTEGRATION

To build a future generation of stewards, biodiversity must be integrated into the core curriculum. This involves moving beyond "Nature Study" to embed concepts of ecosystem services, climate resilience, and sustainability into Science and Social Studies curricula at the Basic and Senior High School levels. The goal is to nurture environmental literacy from an early age.

Curriculum change is ineffective without capable teachers. The strategy supports pre-service and in-service training for teachers to deliver biodiversity education effectively. This includes the development of locally relevant teaching materials, such as field guides to local flora and fauna, that replace generic, foreign examples in textbooks.

Learning by doing is prioritised. The strategy encourages the establishment of "School Nature Clubs" and field trips to National Parks and CREMAs, connecting classroom theory with the physical reality of Ghana’s environment. Tertiary institutions will be supported to

develop specialised courses in conservation biology and natural resource management to supply the technical workforce.

10.1.5 NON-FORMAL EDUCATION AND PUBLIC AWARENESS

Non-formal education and public awareness programmes are essential for influencing behaviour, strengthening community stewardship, and promoting the sustainable use of biodiversity among key resource users. These programmes are particularly important for reaching populations that operate outside formal education systems, including farmers, fishers, hunters, traders, traditional authorities, women's groups, and local community organisations whose day-to-day decisions directly affect biodiversity outcomes.

Adult education and community outreach initiatives will focus on building practical knowledge and skills for sustainable natural resource management. Community-based platforms, including Community Resource Management Areas (CREMAs), will be used to promote sustainable agricultural practices, responsible fisheries management, wildlife conservation, ecosystem restoration, and climate-resilient livelihood options. Through participatory learning approaches and peer-to-peer knowledge exchange, these programmes will strengthen local ownership of biodiversity conservation and encourage the adoption of environmentally sustainable practices.

National awareness campaigns will be implemented using a range of communication channels, including radio, television, newspapers, social media platforms, community information centres, cultural events, and local language communication tools. Campaigns will be aligned with national and international environmental observances such as World Environment Day, World Biodiversity Day, World Wetlands Day, and annual fisheries management initiatives such as the Closed Fishing Season. Messages will be designed to encourage specific actions and behavioural changes through clear and targeted calls to action, including themes such as "Stop *Galamsey*," "Protect Our Mangroves," "Restore Our Forests," "Protect Ghana's Wildlife," and "Reduce Plastic Pollution."

Agricultural extension services, adult literacy programmes, farmer field schools, and community development initiatives will incorporate biodiversity awareness and education into their regular activities. These platforms will provide opportunities to improve understanding of the links between biodiversity, food security, livelihoods, climate resilience, and human well-being. Emphasis will be placed on empowering women, youth, traditional leaders, and community-based organisations to participate meaningfully in natural resource governance and biodiversity-related decision-making processes.

By strengthening awareness, knowledge, and community engagement, non-formal education and public awareness programmes will help foster a culture of environmental responsibility and collective stewardship. This approach will support the effective implementation of the NBSAP by ensuring that biodiversity conservation is understood not only as a government responsibility but as a shared societal effort essential for sustaining Ghana's natural heritage and securing benefits for present and future generations.

10.1.6 STRATEGIC COMMUNICATION AND MEDIA ENGAGEMENT

Effective communication is critical to the successful implementation of this NBSAP. Strategic communication will serve as a key mechanism for increasing awareness, influencing behaviour, mobilising stakeholders, strengthening accountability, and building long-term public support for biodiversity conservation and sustainable use. Recognising the diversity of audiences and communication needs across Ghana, the NBSAP adopts a multi-channel and audience-centred communication approach designed to maximise both reach and impact.

The communication strategy will utilise a combination of traditional and digital media platforms. Radio will remain a primary medium for reaching rural populations and resource-dependent communities due to its wide accessibility and use of local languages. Television will support visual storytelling through documentaries, feature programmes, and educational content highlighting Ghana's ecosystems, wildlife, conservation successes, and biodiversity challenges. Print media, online news platforms, social media, podcasts, websites, and digital campaigns will be used to engage urban audiences, policymakers, educators, youth, and the private sector.

Communication messages will be tailored to the priorities and interests of specific stakeholder groups. For example, engagement with economic and planning institutions will emphasise the contribution of biodiversity and ecosystem services to economic growth, natural capital, climate resilience, and national development. Communication with local communities and resource users will focus on livelihoods, food security, ecosystem services, and sustainable resource management practices. Youth-focused messaging will highlight environmental stewardship, innovation, future generations, and intergenerational equity, while communication with the private sector will emphasise business risks, sustainability, natural capital dependencies, and biodiversity-related opportunities.

The media will be recognised as a key partner in biodiversity conservation. To strengthen the quality and accuracy of environmental reporting, this NBSAP will support the establishment and capacity development of a “Green Press Corps” comprising journalists, editors, broadcasters, and digital media practitioners with specialised knowledge of biodiversity, climate change, ecosystem services, and environmental governance. Training programmes, field visits, access to technical experts, and regular information briefings will be provided to improve reporting quality and encourage evidence-based journalism. This approach seeks to strengthen public understanding of biodiversity issues while reducing misinformation and promoting informed public discourse.

Regular media engagements, including press conferences, policy dialogues, media roundtables, and dissemination of biodiversity reports and monitoring results, will help maintain public awareness and transparency throughout the implementation period of the NBSAP. Open access to relevant biodiversity data, knowledge products, and communication materials will further strengthen public trust and stakeholder engagement.

To ensure inclusivity and equitable participation, communication materials will be developed in major Ghanaian languages, including Akan, Ewe, Ga, Dagbani, and other widely spoken local languages where appropriate. Information will also be produced in accessible formats to accommodate women, youth, persons with disabilities, Indigenous People, local communities, and other marginalised groups. This approach will help ensure that biodiversity information is understandable, accessible, and relevant to all sections of society.

Through these strategic communication and media engagement efforts, this NBSAP seeks to foster a well-informed and environmentally conscious society that actively supports biodiversity conservation, sustainable resource management, ecosystem restoration, and the achievement of Ghana's biodiversity goals. A strong communication framework will help transform awareness into action and ensure that biodiversity becomes a shared national responsibility across all sectors and stakeholder groups.

10.1.7 YOUTH, GENDER, AND INCLUSION IN CEPA

The effective implementation of this NBSAP requires the active participation of all segments of society. Recognizing Ghana’s youthful population, diverse cultural contexts, and varying levels of access to information and decision-making processes, the Communication, Education, and Public Awareness (CEPA) programme will adopt an inclusive approach that promotes meaningful engagement of youth, women, persons with disabilities, indigenous people, local communities, and other marginalised groups.

Youth Engagement

The youth represent a powerful force for innovation, advocacy, and long-term environmental stewardship. As future custodians of Ghana's natural heritage, youth will be engaged not merely as recipients of biodiversity information but as active partners in the design and implementation of conservation solutions. The CEPA programme will support youth participation through biodiversity innovation challenges, environmental leadership initiatives, digital campaigns, citizen science programmes, volunteer opportunities in protected and conserved areas, biodiversity clubs, and youth-led advocacy networks.

Emphasis will be placed on harnessing digital technologies and social media platforms to engage young people in biodiversity monitoring, environmental education, awareness raising, and policy dialogue. Partnerships with schools, universities, youth organisations, and community groups will help foster environmental leadership and strengthen youth ownership of biodiversity conservation initiatives at local and national levels.

Gender-Responsive Communication and Participation

Women play a central role in natural resource management, agriculture, fisheries, forest product harvesting, household food security, and community resilience. However, they often face barriers to accessing information, financial resources, decision-making processes, and opportunities for participation in environmental governance. To address these challenges, CEPA activities will adopt a gender-responsive approach that recognises the different knowledge needs, priorities, and experiences of women and men. Communication and outreach efforts will utilise platforms that are accessible and relevant to women, including market associations, cooperatives, savings groups, faith-based organisations, community gatherings, and women's networks. Information products and capacity-building initiatives will place particular emphasis on sustainable livelihoods, resource rights, climate resilience, biodiversity-based enterprises, and benefit-sharing opportunities.

The active involvement of women in biodiversity planning, decision-making, and community stewardship initiatives will be promoted as a means of improving conservation outcomes while advancing gender equality and social inclusion.

Inclusion of Persons with Disabilities and Marginalised Groups

The CEPA programme will ensure that biodiversity information and participation opportunities are accessible to all members of society, including persons with disabilities and socially marginalised groups. Communication materials will be developed in accessible formats where appropriate, and outreach approaches will be adapted to accommodate diverse needs and abilities.

Special efforts will be made to reach communities that may have limited access to information, resources, or decision-making processes. This includes ensuring access to information on biodiversity conservation, ecosystem restoration opportunities, climate adaptation measures, natural resource governance, and rights related to access and benefit-sharing.

By promoting equitable access to knowledge and participation, the NBSAP seeks to ensure that no individual or community is excluded from the benefits of biodiversity conservation or from opportunities to contribute to environmental stewardship.

Building an Inclusive Conservation Movement

Through targeted engagement of youth, women, persons with disabilities, Indigenous People, local communities, and other stakeholders, the CEPA programme aims to foster a broad-based and inclusive national movement for biodiversity conservation. Empowering diverse actors to participate in decision-making, knowledge generation, and conservation action will strengthen social ownership of the NBSAP and enhance the sustainability of its outcomes. An inclusive CEPA approach will not only improve biodiversity conservation outcomes but also contribute to social equity, resilience, and sustainable development by ensuring that the benefits of biodiversity are shared fairly across all segments of society.

10.1.8 BEHAVIOUR CHANGE AND SUSTAINABLE LIFESTYLES

Raising awareness is a necessary but insufficient condition for biodiversity conservation. Long-term conservation outcomes require changes in individual behaviours, social norms, production systems, and consumption patterns that influence how natural resources are used and managed. Accordingly, this NBSAP recognises behaviour change as a central component of the Communication, Education and Public Awareness (CEPA) programme and promotes practical actions that enable individuals, households, communities, institutions, and businesses to adopt more sustainable lifestyles and practices.

The CEPA programme will move beyond information dissemination to actively encourage positive behavioural change by linking awareness campaigns with accessible and affordable alternatives. Conservation messaging will therefore be accompanied by practical solutions that allow people to reduce their environmental footprint while maintaining or improving their quality of life. Examples include promoting the adoption of fuel-efficient cookstoves and alternative energy sources to reduce dependence on fuelwood and charcoal, encouraging the use of reusable bags and sustainable packaging to reduce plastic pollution, and supporting sustainable agricultural practices that enhance productivity while conserving biodiversity.

Behaviour change interventions will be informed by social and behavioural research and will seek to address the motivations, incentives, and barriers that influence decision-making. Campaigns will focus on demonstrating the social, economic, and environmental benefits of biodiversity-friendly choices and strengthening positive social norms that support conservation and sustainable resource use.

Targeted communication strategies will be developed for different stakeholder groups. For urban households and the growing middle class, awareness campaigns will promote sustainable consumption patterns, including responsible purchasing decisions, reduction of food waste, energy conservation, water efficiency, and support for biodiversity-friendly products and services. For farmers, fishers, and other natural resource users, communication will emphasise sustainable production practices, ecosystem stewardship, and long-term resource sustainability.

The private sector and industry will also be important audiences for behaviour change programmes. Engagement efforts will encourage compliance with environmental regulations, integration of biodiversity considerations into business operations, responsible sourcing, sustainable supply chains, resource efficiency, and corporate environmental stewardship. Industry associations and business networks will be encouraged to champion best practices and demonstrate leadership in biodiversity conservation.

Educational institutions, religious organisations, traditional authorities, civil society organisations, and community leaders will be engaged as trusted agents of change capable of influencing attitudes and behaviours within their constituencies. Their involvement will help reinforce conservation messages and encourage the widespread adoption of sustainable practices across society.

Ultimately, the goal of this component of the CEPA programme is to create a culture in which biodiversity-positive choices become the easiest, most attractive, and most socially desirable options. By fostering sustainable lifestyles and responsible consumption and production patterns, Ghana can reduce pressure on ecosystems, promote environmental stewardship, and contribute to the achievement of both national biodiversity targets and broader sustainable development objectives.

10.1.9 PARTNERSHIPS, INNOVATION AND LEARNING

The successful implementation of this NBSAP requires a whole-of-society approach that mobilises the knowledge, resources, networks, and influence of a diverse range of stakeholders. Government institutions alone cannot generate the scale of behavioural change and societal transformation required to halt and reverse biodiversity loss. Accordingly, the Communication, Education and Public Awareness (CEPA) programme places strong emphasis on partnerships, innovation, and continuous learning as key enablers of effective biodiversity conservation.

Strategic partnerships will be developed with civil society organisations, academic and research institutions, traditional authorities, community-based organisations, development partners, and the private sector. Attention will be given to collaboration with faith-based organisations, which possess extensive community networks and hold significant influence over social norms and values. Through sermons, religious gatherings, educational programmes, and community outreach activities, churches, mosques, and other faith institutions can play an important role in promoting environmental stewardship, ethical resource use, and collective responsibility for the conservation of creation and natural heritage.

Private sector engagement will be equally important. Partnerships with telecommunications companies, media organisations, advertising agencies, technology firms, and other businesses will help expand the reach, innovation, and effectiveness of public awareness campaigns. Such collaborations can support the development of creative communication products, digital platforms, mobile applications, social media campaigns, and other tools that enhance public engagement with biodiversity issues. Private sector actors can also contribute financial resources, technical expertise, and innovation to support biodiversity education and outreach efforts.

The CEPA programme will promote the use of innovative and participatory approaches that encourage learning through direct engagement and experience. Emerging technologies and citizen-centred methods provide new opportunities to connect people with biodiversity and strengthen environmental stewardship. Tools such as citizen science applications, digital biodiversity monitoring platforms, geospatial technologies, participatory mapping, community photography, and interactive online learning platforms will be used to facilitate knowledge sharing and public participation in biodiversity monitoring and conservation.

Participatory communication approaches, including community storytelling, eco-theatre, environmental festivals, biodiversity champions programmes, and participatory video production, will also be employed to encourage dialogue and local ownership of conservation initiatives. These approaches enable communities to document and communicate their experiences, values, and conservation priorities in culturally appropriate ways while fostering stronger connections between local knowledge and formal conservation planning.

Learning and adaptive management will form an integral component of the CEPA programme. Mechanisms will be established to regularly assess the effectiveness of awareness campaigns, education initiatives, and communication strategies. Lessons learned and best practices will be documented and disseminated to inform future interventions and encourage continuous improvement. Knowledge exchange platforms, peer-learning networks, and stakeholder forums will facilitate the sharing of experiences across sectors, regions, and communities.

By fostering partnerships, encouraging innovation, and promoting continuous learning, the NBSAP seeks to create a dynamic and collaborative environment in which biodiversity knowledge is generated, shared, and applied widely. These efforts will strengthen public participation, enhance ownership of conservation actions, and build a nationwide constituency capable of supporting the long-term conservation and sustainable use of Ghana's biodiversity.

10.1.10 MONITORING, EVALUATION, AND LEARNING (MEL) FOR CEPA

The effectiveness of Communication, Education and Public Awareness (CEPA) initiatives will depend not only on the extent of outreach activities undertaken, but also on their ability to influence knowledge, attitudes, behaviours, and decision-making processes that contribute to biodiversity conservation and sustainable use. Accordingly, the CEPA programme under this NBSAP adopts results-based monitoring, evaluation, and learning framework designed to assess both outputs and outcomes and to support continuous improvement throughout implementation.

Monitoring will move beyond traditional activity-based indicators, such as the number of workshops conducted, participants reached, media products produced, or educational materials distributed. Instead, greater emphasis will be placed on measuring substantive changes in awareness, understanding, attitudes, behaviours, and participation among target audiences. This approach will provide a clearer assessment of whether communication and education interventions contribute to achieving biodiversity conservation objectives.

Key indicators will track changes in public awareness and behavioural outcomes, including:

- Percentage of the population with awareness of biodiversity values and ecosystem services;
- Levels of public understanding of major biodiversity threats and conservation responsibilities;
- Adoption rates of sustainable agricultural, fisheries, forestry, and consumption practices;
- Participation in community-based conservation and restoration initiatives;
- Engagement of youth, women, and marginalised groups in biodiversity-related decision-making;
- Public support for biodiversity conservation policies and actions; and
- Changes in attitudes towards sustainable resource use and environmental stewardship.

To assess these outcomes, a range of monitoring tools and feedback mechanisms will be employed. These may include perception surveys, knowledge-attitude-practice (KAP) assessments, stakeholder consultations, focus group discussions, community dialogues, social media analytics, citizen feedback platforms, and independent evaluations. Such mechanisms will provide valuable insights into how different audiences receive, interpret, and respond to biodiversity-related messages.

Learning and adaptive management will be integral components of the CEPA programme. Information generated through monitoring and evaluation processes will be used to identify successful approaches, address implementation challenges, and improve communication effectiveness over time. Where evidence indicates that messages, communication channels, or outreach methods are not achieving the desired results, strategies will be revised and adapted accordingly. Conversely, innovative approaches and successful pilot initiatives will be documented, shared, and scaled up where appropriate.

The National Biodiversity Steering Committee (NBSC), in collaboration with relevant institutions and partners, will oversee the periodic review of CEPA implementation and ensure that lessons learned inform future planning and resource allocation. Knowledge-sharing platforms and regular learning exchanges will be established to facilitate the dissemination of good practices across sectors, organisations, and communities.

Ultimately, effective CEPA serves as the critical bridge between the ambitions of this NBSAP and the actions of the people and institutions responsible for its implementation. By fostering a well-informed, engaged, and empowered society, CEPA helps transform biodiversity conservation from a sectoral concern into a shared national responsibility. Through continuous learning, evidence-based communication, and inclusive participation, this NBSAP seeks to cultivate a culture of environmental stewardship that supports the achievement of national biodiversity targets and secures Ghana's natural heritage for present and future generations.

10.1.11 IMPLEMENTATION ARRANGEMENTS FOR CEPA

A dedicated CEPA Implementation Plan will guide the implementation of this Communication, Education and Public Awareness (CEPA) Strategy by establishing clear priorities, institutional responsibilities, delivery mechanisms, resource requirements, and monitoring arrangements. The Plan operationalises CEPA as a cross cutting enabling mechanism supporting the implementation of all 23 National Biodiversity Targets and contributing directly to the achievement of Target 21 of the Kunming-Montreal Global

Biodiversity Framework (KMGBF), which calls for improved access to biodiversity information, awareness, participation, and knowledge.

The CEPA Implementation Plan will provide a coordinated framework for biodiversity communication and learning across national, sectoral, regional, district, and community levels. The Environmental Protection Authority (EPA), as the national focal institution for NBSAP implementation, will provide overall coordination and oversight, working closely with relevant ministries, departments, agencies, research institutions, local governments, civil society organisations, traditional authorities, community-based organisations, academic institutions, development partners, and the private sector.

Implementation will be undertaken through a multi-stakeholder partnership approach that recognises biodiversity conservation as a shared responsibility. Sector institutions will integrate biodiversity awareness and communication activities into their respective programmes and outreach mechanisms, while local authorities and community structures will play critical roles in promoting locally relevant communication and engagement processes. Traditional authorities, faith-based organisations, youth groups, women's organisations, media institutions, and private sector actors will serve as strategic partners in extending the reach and effectiveness of CEPA interventions.

The implementation framework will support the delivery of a wide range of interventions, including public awareness campaigns, environmental education programmes, community engagement initiatives, digital communication platforms, citizen science activities, biodiversity information products, media partnerships, and capacity-building programmes. Emphasis will be placed on fostering behaviour change, strengthening biodiversity literacy, promoting inclusive participation, and supporting compliance with environmental laws and sustainable resource management practices. To ensure effective coordination, the CEPA Implementation Plan will establish mechanisms for information sharing, joint planning, knowledge exchange, and reporting among implementing institutions. These mechanisms

will help reduce duplication of effort, promote synergy among initiatives, and strengthen the consistency of biodiversity messages delivered across sectors and stakeholder groups.

Monitoring, evaluation, and adaptive learning will form an integral component of implementation. Progress will be assessed through a combination of output, outcome, and impact indicators, with lessons learned routinely incorporated into programme design and delivery. This will help ensure that communication approaches remain relevant, evidence-based, and responsive to changing contexts and stakeholder needs.

The CEPA Implementation Plan provides the practical pathway for translating the communication objectives of the NBSAP into measurable actions that strengthen biodiversity knowledge, encourage sustainable behaviours, improve stakeholder participation, and build long-term public support for biodiversity conservation. By supporting implementation across all biodiversity targets, CEPA serves as a foundational mechanism for achieving the overall vision of the NBSAP.

The detailed CEPA Implementation Plan, including implementation timelines, institutional responsibilities, performance indicators, and indicative budgets for the period 2026-2030, is presented in Annex 4 of this NBSAP.

CHAPTER ELEVEN

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ANNEXES

Annex 1: List of stakeholders engaged.

Ministry of Finance	Environmental Protection Authority
Ministry of Lands and Natural Resources	National Biosafety Authority
Office of the Attorney General and Ministry of Justice	Land Use and Spatial Planning Authority
Ministry of Energy and Green Transition	Water Resources Commission
Ministry of Fisheries and Aquaculture	Fisheries Commission
Ministry of Tourism, Culture and Creative Arts	Forestry Commission-WD
Ministry of Works, Housing and Water Resources	Nature and Development Foundation
Ministry of Gender, Children and Social Protection	Ghana Statistical Service
Ministry of Local Government, Chieftaincy and Religious Affairs	GRA, Customs Division
Department of Parks and Gardens	Association of Ghana Industries
Department of Community Development	Institute of Environmental and Sanitation Studies, UG
Ministry of Food and Agriculture	Department of Marine and Fisheries Sciences, UG
Ministry of Trade, Agribusiness and Industry	Department of Plant and Environmental Biology, UG
National Development Planning Commission	Conservation Alliance International
Council for Scientific and Industrial Research-PGRRI	Hen Mpoano
Council for Scientific and Industrial Research-FORIG	Kasa Initiative
Council for Scientific and Industrial Research, STEPRI	IUCN, Ghana
Council for Scientific and Industrial Research-WRI	UNDP
Ghana Atomic Energy Commission-BNARI	Ghana Youth in Biodiversity
	Centre for Biodiversity Conservation Research, UG
	National Council for Persons with Disability

Annex 2.1: Action Plan for National Target 1 – Spatial Planning and Land/Sea Use to Reduce Biodiversity Loss

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 1.1: Operationalise biodiversity-inclusive spatial planning at district level	• Identify priority MMDAs covering areas of high biodiversity importance • Compile, harmonise and validate national biodiversity spatial datasets (e.g. KBAs, forest reserves, wetlands, riparian buffers) • Prepare and approve Spatial	**Accountable:** Ministry of Local Government, Chieftaincy and Religious Affairs (MLGCRA) **Responsible:** Land Use and Spatial Planning Authority (LUSPA); Metropolitan, Municipal and District Assemblies (MMDAs) **Supporting:** Forestry	2026–2030	• Approved SDFs and Structure Plans in priority MMDAs • Biodiversity-sensitive areas zoned as conservation or protection areas within statutory spatial plans	• Technical capacity in GIS, spatial analysis and data management at MMDA level • Institutional access to harmonised, up-to-date biodiversity spatial datasets • Human capacity for participatory planning and FPIC processes • Operational	12,000,000

	Development Frameworks (SDFs) and Structure Plans in accordance with Act 925 and LUSPA planning models • Conduct inclusive, FPIC-compliant stakeholder consultations	Commission; Lands Commission			capacity including planning software, hardware and data systems	
Action 1.2: Strengthen enforcement of ecological buffers through development control systems	• Apply national zoning, setback and buffer standards in development permit assessment and approval	**Accountable:** MLGDRD **Responsible:** MMDAs **Consulted:** Environmental	2026–2030	• Ecological buffer and setback standards systematically applied in development permitting	• Technical capacity in development control and zoning enforcement • Institutional capacity for digital	6,000,000

	processes • Digitise development permit screening, tracking and compliance monitoring systems • Conduct routine inspections and enforcement actions in buffer zones • Strengthen coordination between MMDAs and EPA in development control	Protection Agency (EPA)		• Reduced incidence of illegal development in wetlands, riparian zones and coastal areas	permit management and compliance monitoring • Human capacity for inspections and enforcement • Operational resources for field monitoring and legal enforcement	

Action 1.3: Mainstream biodiversity considerations into national and district development planning cycles	• Update NDPC planning guidelines and templates to incorporate spatial biodiversity constraints • Enforce spatial consistency checks for all Medium-Term Development Plans (MTDPs) • Conduct annual MTDP compliance reviews and provide feedback	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** Ministries, Departments and Agencies (MDAs); MMDAs **Consulted:** Ministry of Environment, Science and Technology (MEST)	2026–2030	• National and district MTDPs aligned with biodiversity-inclusive spatial plans • Annual reports on spatial and biodiversity compliance within development planning	• Technical capacity for spatial screening and review of MTDPs • Human capacity in biodiversity–development policy integration • Institutional systems for monitoring, reporting and feedback aligned with Act 925	3,000,000

	to MDAs and MMDAs					
Action 1.4: Implement Marine Spatial Planning under the Ghana Sustainable Ocean Plan	• Compile and map critical marine and coastal habitats (e.g. mangroves, estuaries, spawning grounds) • Designate exclusion, limited-use and multi-use marine zones through participatory processes • Establish and operationalise an inter-sectoral	**Accountable:** Ministry of Environment, Science and Technology (MEST) **Responsible:** Ministry of Lands and Natural Resources (MLNR); Fisheries Commission **Consulted:** EPA; NDPC	2026–2030	• National marine spatial plan formally adopted and operationalised • Marine and coastal biodiversity areas secured through spatial zoning	• Technical capacity in marine GIS and habitat mapping • Institutional capacity for integrated ocean governance and MSP coordination • Human capacity for cross-sector negotiation and facilitation • Operational marine data platforms and decision-support tools	9,000,000

	MSP coordination mechanism • Adopt and pilot the national marine spatial plan					

Annex 2.2: Action Plan for National Target 2 – Ecosystem Restoration to Enhance Biodiversity and Ecosystem Services

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 2.1: Restore degraded terrestrial ecosystems in priority landscapes	• Identify and prioritise degraded forest, savanna and transition zone landscapes using ecosystem extent and condition data • Implement	**Accountable:** Ministry of Lands and Natural Resources **Responsible:** Forestry Commission; MMDAs	2026–2030	• Degraded forest and savanna landscapes under active restoration • Improved vegetation	• Technical capacity in landscape restoration and agroforestry • Access to ecosystem condition and degradation data • Human capacity for	14,000,000

	restoration interventions including assisted natural regeneration, enrichment planting, and agroforestry systems • Integrate restoration into district spatial plans and development programmes • Engage communities and traditional authorities through participatory restoration planning	**Supporting:** CSOs; Traditional Authorities		cover and ecosystem condition in priority areas	community mobilisation and facilitation • Operational resources for nursery development and field implementation	
Action 2.2: Restore degraded inland	• Identify degraded rivers, wetlands, floodplains and	**Accountable:** Ministry of Sanitation and	2026–2030	• Restored riparian buffers and wetlands	• Technical capacity in wetland and riparian restoration	8,000,000

water ecosystems and riparian zones	catchments (e.g. Pra, Ankobra, Volta sub-basins) • Rehabilitate riparian buffers and wetlands through revegetation and protection measures • Integrate restoration with pollution control and catchment management initiatives • Promote community stewardship of restored inland water ecosystems	Water Resources **Responsible:** Water Resources Commission; MMDAs **Consulted:** EPA		• Improved water quality and aquatic habitat condition	• Water quality monitoring and hydrological assessment skills • Institutional coordination for catchment-level management • Field equipment and restoration materials	
Action 2.3: Restore degraded coastal	• Map degraded mangrove forests, lagoons and coastal	**Accountable:** Ministry of Environment,	2026–2030	• Degraded mangrove and coastal wetland	• Technical capacity in mangrove ecology and restoration	7,000,000

and mangrove ecosystems	wetlands • Implement mangrove restoration and coastal wetland rehabilitation programmes • Strengthen community-based mangrove management and co-management arrangements • Integrate restoration with coastal protection and climate adaptation initiatives	Science and Technology **Responsible:** Forestry Commission; MMDAs **Supporting:** Traditional Authorities; CSOs		areas restored • Enhanced coastal resilience and fisheries nursery functions	• Community facilitation and co-management skills • Coastal GIS and habitat monitoring tools • Sustainable financing mechanisms for community stewardship	
Action 2.4: Strengthen monitoring and	• Develop national indicators for ecosystem condition	**Accountable:** National Development	2026–2030			

learning for ecosystem restoration	and restoration progress • Integrate restoration monitoring into ecosystem accounting and APR systems • Document and disseminate restoration lessons and best practices • Support adaptive management based on monitoring results	Planning Commission **Responsible:** MEST; Forestry Commission; WRC **Consulted:** EPA				

Annex 2.3: Action Plan for National Target 3 – Protected Areas and Other Effective Area-Based Conservation Measures (OECMs)

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 3.1: Expand and consolidate the national protected area network in priority ecosystems	• Identify priority terrestrial, inland water, coastal and marine areas for protection based on biodiversity values and ecosystem services • Expand protected area coverage through gazettement of new forest reserves, wildlife protected areas, and marine protected areas	**Accountable:** Ministry of Lands and Natural Resources **Responsible:** Forestry Commission; Wildlife Division **Consulted:** NDPC; MMDAs	2026–2030	• Expanded and legally secured protected area network • Improved ecological representation across ecosystems	• Technical capacity in conservation planning and gap analysis • Legal and institutional capacity for gazettement and boundary demarcation • GIS and spatial analysis tools for PA planning • Operational resources for field	12,000,000

	• Strengthen legal status and boundary demarcation of existing protected areas • Integrate protected areas into national and district spatial plans				surveys and demarcation	
Action 3.2: Recognise, strengthen and scale up OECMs, including CREMAs and community-managed areas	• Identify and assess potential OECMs in production landscapes, inland waters and coastal zones • Formalise CREMAs, sacred groves, community forests and wetlands as OECMs	**Accountable:** Ministry of Environment, Science and Technology (MEST) **Responsible:** Forestry Commission; MMDAs **Supporting:**	2026–2030	• Recognised and documented OECMs contributing to conservation targets • Enhanced community-led conservation outside formal protected areas	• Capacity to apply OECM criteria and assessment tools • Community facilitation and governance strengthening skills • Institutional systems for OECM registration and reporting	8,000,000

	• Develop governance and management arrangements consistent with OECM criteria • Support community stewardship and benefit-sharing mechanisms	Traditional Authorities; CSOs			• Sustainable financing mechanisms for community conservation	
Action 3.3: Strengthen management effectiveness of protected areas and OECMs	• Update and implement management plans for protected areas and OECMs • Strengthen law enforcement, patrols, and compliance	**Accountable:** MLNR **Responsible:** Forestry Commission; Wildlife Division **Consulted:** EPA; MMDAs	2026–2030	• Improved management effectiveness of protected areas and OECMs • Reduced illegal activities and habitat degradation	• Human capacity for protected area management and enforcement • Technical skills in monitoring, patrol planning and compliance • Operational	10,000,000

	mechanisms • Improve infrastructure, equipment and staffing for site-level management • Promote co-management approaches with local communities				resources (equipment, transport, ranger facilities) • Conflict resolution and co-management skills	
Action 3.4: Strengthen monitoring, reporting and integration of protected areas and OECMs into national frameworks	• Establish a national system for tracking PA and OECM coverage and effectiveness • Integrate PA and OECM data into national biodiversity monitoring and	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** MEST; Forestry Commission **Consulted:** EPA				

	reporting systems • Report progress towards national and global conservation targets (e.g. 30×30) • Promote learning and adaptive management					

Annex 2.4: Action Plan for National Target 4 – Species Conservation and Recovery

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 4.1: Identify, assess and prioritise threatened species	• Update national Red List assessments for priority taxa (flora, mammals, birds, reptiles,	**Accountable:** Ministry of Environment, Science and Technology	2026–2030	• Updated national Red List assessments • Priority	• Taxonomic and ecological expertise for species assessments • Data collection,	5,000,000

for conservation action	amphibians, fish and invertebrates) • Identify species of national conservation concern and extinction risk drivers • Prioritise species for targeted recovery and management interventions • Integrate species priorities into national and sectoral planning frameworks	**Responsible:** Forestry Commission; Wildlife Division; Research Institutions **Consulted:** EPA; Universities		species lists guiding conservation investments	analysis and species monitoring capacity • Institutional systems for Red List updating and reporting	
Action 4.2: Implement targeted species recovery and	• Develop and implement species recovery plans for priority threatened species	**Accountable:** Ministry of Lands and Natural Resources **Responsible:**	2026–2030	• Species recovery plans implemented • Stabilised or increasing	• Technical capacity in species recovery planning and implementation • Habitat	12,000,000

management programmes	• Restore and manage critical habitats for focal species • Establish ex situ conservation, breeding and reintroduction programmes where necessary • Promote community-based stewardship for species conservation	Forestry Commission; Wildlife Division; MMDAs **Supporting:** CSOs; Traditional Authorities		populations of priority species	management and restoration skills • Ex situ conservation and reintroduction expertise • Community engagement and stewardship capacity	
Action 4.3: Reduce pressures on species from illegal exploitation and trade	• Strengthen enforcement of wildlife laws and regulations • Enhance detection, surveillance and	**Accountable:** MLNR **Responsible:** Wildlife Division; Law Enforcement	2026–2030	• Reduced illegal harvesting and trade in wildlife and plant species	• Enforcement and investigation capacity for wildlife crime • Training in CITES implementation and	8,000,000

	intelligence on illegal wildlife trade • Strengthen inter-agency coordination at national and border levels • Raise awareness on the impacts of illegal wildlife trade	Agencies **Consulted:** EPA; Customs; Judiciary		• Improved compliance with wildlife laws	compliance • Operational logistics for patrols and border control • Legal and prosecutorial capacity	
Action 4.4: Manage human–wildlife conflict and promote coexistence	• Identify and map human–wildlife conflict hotspots • Implement conflict mitigation measures (barriers, early warning systems, deterrents) • Develop compensation, insurance or benefit-	**Accountable:** MEST **Responsible:** Forestry Commission; Wildlife Division; MMDAs **Supporting:** Traditional	2026–2030	• Reduced incidence of human–wildlife conflict • Improved tolerance and coexistence with wildlife	• Technical capacity in conflict assessment and mitigation • Community engagement and facilitation skills • Institutional frameworks for compensation and grievance handling	6,000,000

	sharing mechanisms where appropriate • Promote awareness and coexistence strategies	Authorities; CSOs			• Monitoring systems for conflict incidents	
Action 4.5: Strengthen monitoring, research and reporting on species status and trends	• Establish national species monitoring protocols and databases • Support long-term ecological research and citizen science initiatives • Integrate species data into national biodiversity monitoring and reporting systems • Report progress	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** MEST; Forestry Commission; Research Institutions **Consulted:** EPA				

	against national and global species targets					

Annex 2.5: Action Plan for National Target 5 – Sustainable Use and Harvesting of Wild Species

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 5.1: Strengthen policy, legal and regulatory frameworks for sustainable use of wild species	• Review and update policies, laws and regulations governing the use of wild species (forestry, wildlife, fisheries and NTFPs) • Harmonise sectoral regulations to address overharvesting and	**Accountable:** Ministry of Lands and Natural Resources **Responsible:** Forestry Commission; Fisheries Commission **Consulted:** Ministry of Environment,	2026–2030	• Updated and harmonised regulatory frameworks for sustainable use • Sustainability safeguards embedded in sectoral policies	• Legal and policy analysis capacity • Institutional coordination across forestry, fisheries and wildlife sectors • Technical expertise on sustainable harvest thresholds and safeguards	4,000,000

	illegal use • Integrate sustainability thresholds, quotas and safeguards into regulatory instruments • Strengthen compliance with international agreements (e.g. CITES)	Science and Technology; EPA				
Action 5.2: Promote sustainable harvesting practices and community-based management of wild species	• Develop and disseminate sustainable harvesting guidelines for key wild species (timber, bushmeat, medicinal plants,	**Accountable:** MEST **Responsible:** Forestry Commission; Fisheries Commission; MMDAs	2026–2030	• Sustainable harvesting practices adopted in priority landscapes and seascapes • Enhanced	• Technical capacity in sustainable harvest methods • Community facilitation and co-management skills • Socio-economic	10,000,000

	fisheries) • Support community-based natural resource management systems (e.g. CREMAs, co-management arrangements) • Promote alternative livelihoods to reduce pressure on wild species • Strengthen benefit-sharing mechanisms	**Supporting:** Traditional Authorities; CSOs		community stewardship and livelihoods	and livelihood development expertise • Extension and outreach systems	
Action 5.3: Strengthen monitoring, control and	• Strengthen monitoring of harvest levels and compliance with	**Accountable:** MLNR **Responsible:** Forestry	2026–2030	• Reduced illegal and unsustainable harvesting of	• Enforcement and investigation capacity • Data systems for	9,000,000

enforcement of wild species harvesting and trade	quotas and regulations • Enhance surveillance, inspections and enforcement along value chains • Improve traceability systems for timber, wildlife and fisheries products • Strengthen inter-agency collaboration to address illegal, unreported and unregulated (IUU) activities	Commission; Fisheries Commission; Law Enforcement Agencies **Consulted:** EPA; Customs; Judiciary		wild species • Improved compliance with harvesting and trade regulations	monitoring harvest and trade • Operational logistics for inspections and patrols • Legal and prosecutorial capacity	

Action 5.4: Strengthen research, data and knowledge systems on sustainable use of wild species	• Conduct stock assessments and sustainability studies for priority wild species • Establish national databases on harvest levels, trade and use of wild species • Support applied research on sustainable use and value chains • Integrate sustainable use data into national biodiversity monitoring and reporting systems	**Accountable:** National Development Planning Commission **Responsible:** MEST; Research Institutions; Forestry Commission; Fisheries Commission **Consulted:** EPA	2026–2030	• Improved evidence base for sustainable use decision-making • Regular reporting on status and trends of harvested species	• Technical capacity in stock assessment and sustainability analysis • Data management and analytical skills • Research infrastructure and partnerships • Knowledge-sharing platforms	5,000,000

Action 5.5: Raise awareness and promote responsible consumption of wild species	• Implement public awareness campaigns on sustainable use and legal sourcing of wild species • Engage private sector actors and value chain actors on sustainability standards • Promote behaviour change to reduce demand for illegally harvested species • Integrate sustainable use messaging into education and	**Accountable:** MEST **Responsible:** EPA; CSOs; MMDAs **Supporting:** Media; Private Sector	2026–2030	• Increased awareness and adoption of responsible consumption practices • Reduced demand for illegally harvested wild species	• Communication and behaviour-change expertise • Outreach and education capacity • Partnerships with media and private sector actors	4,000,000

	extension programmes					

Annex 2.6: Action Plan for National Target 6 – Prevention, Control and Management of Invasive Alien Species

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 6.1: Strengthen national policy, legal and institutional frameworks for invasive alien species management	• Review and update national policies, legislation and regulations relevant to invasive alien species (IAS) • Develop or update a national IAS strategy and action plan aligned with KMGBF Target 6 • Clarify	**Accountable:** Ministry of Environment, Science and Technology **Responsible:** EPA; MLNR; Ministry of Food and Agriculture (MoFA)	2026–2030	• Updated national policy and legal framework for IAS management • Functional inter-sectoral coordination mechanism	• Legal and policy analysis capacity • Institutional coordination and governance mechanisms • Technical expertise on IAS pathways and impacts	3,000,000

	institutional mandates and coordination mechanisms across sectors • Integrate IAS considerations into sectoral and district development plans	**Consulted:** NDPC; MMDAs				
Action 6.2: Prevent introduction and spread of invasive alien species through strengthened biosecurity	• Strengthen border controls and quarantine measures at points of entry (ports, airports, land borders) • Implement risk assessment and pathway management for	**Accountable:** MEST **Responsible:** EPA; MoFA; Customs; Ports Authorities **Consulted:** MLNR	2026–2030	• Reduced introduction of new invasive alien species • Functional EDRR system established	• Technical capacity in biosecurity risk assessment • Surveillance and diagnostic skills • Operational logistics for border inspection and quarantine	8,000,000

	priority IAS • Develop and apply early detection and rapid response (EDRR) protocols • Strengthen regional and cross-border cooperation on IAS				• Information-sharing systems	
Action 6.3: Control, contain and manage priority invasive alien species in key ecosystems	• Identify and prioritise high-risk IAS affecting terrestrial, freshwater and marine ecosystems • Implement mechanical, biological and chemical control	**Accountable:** MLNR **Responsible:** Forestry Commission; MoFA; MMDAs **Supporting:** CSOs; Traditional Authorities	2026–2030	• Reduced impacts of priority IAS in affected ecosystems • Improved condition of ecosystems following IAS management	• Technical expertise in IAS control and restoration techniques • Field implementation and monitoring capacity • Community	10,000,000

	measures where appropriate • Restore ecosystems degraded by invasive alien species • Engage communities in IAS management and reporting				engagement and awareness skills • Equipment and operational resources	
Action 6.4: Strengthen monitoring, research and information systems on invasive alien species	• Establish a national IAS database and reporting system • Conduct research on IAS distribution, impacts and management effectiveness	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions **Consulted:** Forestry Commission	2026–2030	• National IAS monitoring and reporting system operational • Evidence-based IAS management decisions	• Data management and analytical capacity • Research and monitoring expertise • Digital platforms for data sharing and reporting	4,000,000

	• Integrate IAS indicators into national biodiversity monitoring frameworks • Support knowledge sharing and learning on IAS management					
Action 6.5: Raise awareness and build capacity on invasive alien species prevention and management	• Implement public awareness campaigns on IAS risks and prevention • Train government staff, private sector actors and communities on IAS identification	**Accountable:** MEST **Responsible:** EPA; MoFA; MMDAs **Supporting:** CSOs; Media	2026–2030	• Increased awareness and capacity to prevent and manage IAS • Reduced human-mediated spread of IAS	• Communication and behaviour-change expertise • Training and extension capacity • Educational materials and outreach tools	3,000,000

	and management • Integrate IAS awareness into education, extension and outreach programmes • Promote behaviour change to reduce accidental introductions					

Annex 2.7: Action Plan for National Target 7 – Reduce Pollution to Levels That Are Not Harmful to Biodiversity

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 7.1: Strengthen policy, legal and	• Review and update national policies, legislation and	**Accountable:** Ministry of Environment,	2026–2030	• Updated and harmonised pollution control	• Legal and policy analysis capacity • Technical	4,000,000

regulatory frameworks for pollution control and biodiversity protection	standards on pollution control (chemicals, plastics, wastewater, air and soil pollution) • Integrate biodiversity safeguards into environmental quality standards and permitting systems • Strengthen enforcement provisions and penalties for pollution-related offences • Harmonise pollution control	Science and Technology **Responsible:** Environmental Protection Agency; Sector MDAs **Consulted:** NDPC; MMDAs		frameworks • Biodiversity safeguards embedded in environmental regulations	expertise in pollution standards and biodiversity risk assessment • Institutional coordination across pollution-related sectors	

	regulations across sectors					
Action 7.2: Reduce land-based sources of pollution affecting terrestrial, freshwater and coastal ecosystems	• Strengthen regulation and treatment of municipal and industrial wastewater • Reduce agricultural runoff through promotion of good agricultural practices • Address pollution from artisanal and small-scale mining (including mercury use) • Promote nature-based solutions for pollution mitigation	**Accountable:** MEST **Responsible:** EPA; Ministry of Sanitation and Water Resources; MoFA; MMDAs **Consulted:** MLNR	2026–2030	• Reduced nutrient, chemical and sediment pollution entering ecosystems • Improved water and soil quality in priority areas	• Technical capacity in wastewater treatment and pollution abatement • Agricultural extension capacity for pollution-reducing practices • Monitoring and enforcement capacity at district level • Infrastructure and operational resources	12,000,000

	(e.g. constructed wetlands)					
Action 7.3: Prevent and reduce plastic and solid waste pollution	• Strengthen implementation of solid waste management policies and plans • Promote waste reduction, reuse and recycling initiatives • Implement measures to reduce plastic leakage into rivers, wetlands and marine environments • Engage private sector and informal waste actors	**Accountable:** Ministry of Sanitation and Water Resources **Responsible:** MMDAs; EPA **Supporting:** Private Sector; CSOs	2026–2030	• Reduced plastic and solid waste pollution in ecosystems • Improved waste management systems	• Technical capacity in integrated waste management • Public–private partnership development skills • Behaviour-change communication expertise • Waste collection and recycling infrastructure	9,000,000
Action 7.4: Strengthen	• Improve monitoring of	**Accountable:** EPA	2026–2030	• Improved national systems	• Laboratory and analytical capacity	6,000,000

monitoring, reporting and management of chemicals and hazardous substances	chemicals and hazardous substances in air, water and soil • Strengthen implementation of chemicals management conventions (e.g. Basel, Rotterdam, Stockholm) • Establish pollutant inventories and release registers • Strengthen emergency response and incident management systems	**Responsible:** MEST; Health Sector Agencies; Customs **Consulted:** NDPC		for chemicals and hazardous waste management • Reduced biodiversity and health risks from toxic substances	• Technical expertise in chemicals risk assessment • Data management and reporting systems • Emergency response capacity	
Action 7.5: Raise awareness and	• Implement national awareness	**Accountable:** MEST				

promote behavioural change to reduce pollution impacts on biodiversity	campaigns on pollution and biodiversity impacts • Promote responsible consumption and production practices • Integrate pollution and biodiversity topics into education and extension programmes • Engage communities in pollution prevention and reporting	**Responsible:** EPA; MMDAs; CSOs **Supporting:** Media; Educational Institutions				

Annex 2.8: Action Plan for National Target 8 – Enhance Climate Change Mitigation, Adaptation and Resilience through Biodiversity

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 8.1: Integrate biodiversity into national climate change policies, strategies and planning frameworks	• Review and update climate change policies and strategies to integrate biodiversity considerations (e.g. NDCs, NAPs) • Align biodiversity objectives with climate mitigation and adaptation priorities • Strengthen coherence between climate, biodiversity	**Accountable:** Ministry of Environment, Science and Technology **Responsible:** EPA; NDPC; Sector MDAs **Consulted:** MMDAs	2026–2030	• Climate policies and plans reflecting biodiversity-based solutions • Improved coherence between climate and biodiversity frameworks	• Policy analysis and integration capacity • Technical expertise in climate–biodiversity linkages • Institutional coordination mechanisms across sectors	4,000,000

	and development planning frameworks • Integrate ecosystem-based approaches into national and sectoral climate planning					
Action 8.2: Scale up ecosystem-based adaptation (EbA) and nature-based solutions (NbS)	• Identify priority landscapes and seascapes for EbA and NbS interventions • Implement NbS for climate adaptation (e.g. mangrove restoration, watershed protection, urban	**Accountable:** MEST **Responsible:** Forestry Commission; MMDAs; MLNR **Supporting:** CSOs; Traditional Authorities	2026–2030	• EbA and NbS interventions implemented in priority areas • Enhanced ecosystem resilience and community adaptive capacity	• Technical capacity in EbA and NbS design and implementation • Ecosystem and climate risk assessment skills • Community facilitation and participatory planning capacity • Operational	14,000,000

	green infrastructure) • Integrate EbA/NbS into district development and spatial plans • Promote community participation and co-benefits for livelihoods				resources for field implementation	
Action 8.3: Enhance the role of ecosystems in climate change mitigation	• Protect and restore high-carbon ecosystems (forests, mangroves, wetlands) • Integrate biodiversity safeguards into REDD+ and other mitigation	**Accountable:** Ministry of Lands and Natural Resources **Responsible:** Forestry Commission; EPA	2026–2030	• Reduced emissions from land use and ecosystem degradation • Enhanced carbon sequestration through	• Technical capacity in carbon accounting and MRV systems • Integration of biodiversity safeguards into mitigation programmes	10,000,000

	initiatives • Strengthen carbon stock assessment and monitoring systems • Promote sustainable land-use practices that reduce emissions	**Consulted:** NDPC		biodiversity conservation	• Monitoring and reporting capacity	
Action 8.4: Strengthen climate risk assessment, monitoring and early warning systems using biodiversity data	• Integrate biodiversity indicators into climate risk and vulnerability assessments • Strengthen ecosystem-based early warning systems (e.g. floods, droughts, coastal	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions **Consulted:** MMDAs	2026–2030	• Climate risk assessments incorporating ecosystem considerations • Improved early warning and preparedness	• Technical capacity in climate and ecosystem modelling • Data integration and analytical skills • Institutional coordination for risk monitoring and response	5,000,000

	erosion) • Improve data sharing between climate and biodiversity monitoring systems • Support adaptive management based on risk and monitoring results					
Action 8.5: Build awareness and capacity on climate–biodiversity linkages and resilience	• Implement awareness campaigns on climate change impacts on biodiversity and ecosystem services • Train government staff, communities and private sector	**Accountable:** MEST **Responsible:** EPA; MMDAs; CSOs **Supporting:** Educational Institutions; Media				

	actors on climate-resilient, biodiversity-based solutions • Integrate climate–biodiversity topics into education, extension and training programmes • Promote knowledge sharing and learning					

Annex 2.9: Action Plan for National Target 9 – Ensure Fair and Equitable Access to and Benefit-Sharing from Genetic Resources and Associated Traditional Knowledge

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 9.1: Strengthen the national legal, policy and institutional framework for Access and Benefit-Sharing (ABS)	• Review and update national ABS policies, legislation and regulations in line with the Nagoya Protocol • Clarify institutional mandates and coordination mechanisms for ABS implementation • Develop or update	**Accountable:** Ministry of Environment, Science and Technology **Responsible:** EPA; Attorney-General's Department **Consulted:** NDPC; Sector MDAs	2026–2030	• Updated and coherent national ABS legal and policy framework • Clear procedures for access permits and benefit-sharing agreements	• Legal and policy analysis capacity on ABS and Nagoya Protocol • Institutional coordination mechanisms across sectors • Technical expertise in ABS governance and compliance	3,000,000

	national ABS guidelines and procedures for access permits and benefit-sharing agreements • Integrate ABS provisions into sectoral policies and research regulations					
Action 9.2: Establish and operationalise national ABS administrative and permitting systems	• Strengthen national ABS focal point and competent national authorities • Establish transparent procedures for prior informed consent (PIC) and mutually agreed terms	**Accountable:** MEST **Responsible:** EPA; Relevant Sector Agencies **Consulted:** Customs; Research Institutions	2026–2030	• Functional national ABS permitting and tracking system • Improved compliance with ABS requirements	• Administrative and technical capacity for permit processing • Digital systems for tracking access and use of genetic resources • Inter-agency coordination and	5,000,000

	(MAT) • Develop and operationalise an ABS permit and tracking system • Link ABS permitting with research, export and customs controls				information-sharing capacity	
Action 9.3: Protect traditional knowledge associated with genetic resources and ensure equitable benefit-sharing	• Document and safeguard traditional knowledge associated with genetic resources, with community consent • Develop community protocols and	**Accountable:** MEST **Responsible:** EPA; MMDAs **Supporting:** Traditional Authorities; CSOs	2026–2030	• Traditional knowledge protected and recognised within ABS systems • Communities receiving fair and equitable benefits	• Community facilitation and FPIC expertise • Legal literacy on community rights and ABS • Institutional mechanisms for benefit-sharing and grievance handling	6,000,000

	guidelines for access to traditional knowledge • Support fair and equitable benefit-sharing arrangements with local and indigenous communities • Strengthen community rights and participation in ABS processes					
Action 9.4: Promote compliance by users of genetic resources, including research and private sector actors	• Raise awareness among researchers, private sector and academia on ABS obligations • Integrate ABS	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions	2026–2030	• Increased compliance with ABS requirements by users of genetic resources	• Compliance monitoring and enforcement capacity • Training for researchers and	4,000,000

	compliance into research funding, permitting and ethics approval processes • Strengthen monitoring and enforcement of ABS compliance along value chains • Promote responsible research and innovation practices	**Consulted:** Private Sector		• Reduced cases of unauthorised access and use	private sector actors • Coordination between regulatory and research institutions	
Action 9.5: Strengthen awareness, capacity and knowledge systems for ABS	• Build capacity of government institutions on ABS implementation and reporting • Establish national	**Accountable:** NDPC **Responsible:** MEST; EPA **Consulted:**	2026–2030	• Improved national capacity for ABS monitoring and reporting • Transparent	• Technical capacity in ABS data management and reporting • Monitoring and evaluation skills	4,000,000

implementation and reporting	databases for ABS agreements and benefit-sharing outcomes • Integrate ABS indicators into national biodiversity monitoring and reporting systems • Report on ABS implementation to national and international frameworks	Research Institutions		reporting on benefit-sharing outcomes	• Digital platforms for information management and reporting	

Annex 2.10: Action Plan for National Target 10 – Ensure Sustainable Management of Agriculture, Forestry and Fisheries

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 10.1: Mainstream biodiversity into agricultural, forestry and fisheries policies, standards and investment plans	• Review and update sector policies/strategies to integrate biodiversity safeguards and sustainability standards • Integrate biodiversity and ecosystem service considerations into sector investment planning and budgeting	**Accountable:** National Development Planning Commission **Responsible:** Ministry of Food and Agriculture (MoFA); Ministry of Lands and Natural Resources; Fisheries Commission	2026–2030	• Sector policies and investment plans reflecting biodiversity safeguards • Sustainability standards integrated into planning and implementation frameworks	• Policy integration and planning capacity • Technical expertise on biodiversity-friendly standards and safeguards • Institutional coordination mechanisms across sectors	4,000,000

	• Promote adoption of sustainability standards and certification where applicable • Strengthen cross-sector coordination to address land-use and resource-use trade-offs	**Consulted:** Ministry of Environment, Science and Technology; EPA				
Action 10.2: Scale up biodiversity-friendly and climate-resilient agricultural practices	• Promote agroecology, conservation agriculture, integrated pest management (IPM) and soil health restoration	**Accountable:** MoFA **Responsible:** MoFA Agencies; MMDAs **Supporting:**	2026–2030	• Increased adoption of biodiversity-friendly agricultural practices • Reduced agricultural	• Extension capacity for agroecology/IPM/agroforestry • Access to climate and soil information services • Demonstration sites and farmer training systems • Inputs and incentives aligned with sustainability	12,000,000

	practices • Scale up agroforestry and shade-grown systems (including cocoa and tree crop landscapes) • Improve sustainable water use and irrigation management to reduce ecosystem pressures • Strengthen extension services and farmer-based organisations to support adoption	CSOs; Private Sector		pressure on natural habitats and improved on-farm biodiversity		

Action 10.3: Strengthen sustainable forest management and reduce deforestation and forest degradation	• Strengthen sustainable forest management planning and implementation in forest reserves and off-reserve landscapes • Promote legal, sustainable timber supply chains and reduce illegal logging • Support community forestry and benefit-sharing arrangements (including CREMAs where	**Accountable:** Ministry of Lands and Natural Resources **Responsible:** Forestry Commission; MMDAs **Consulted:** EPA	2026–2030	• Improved sustainable forest management practices • Reduced deforestation and forest degradation pressures	• Technical capacity in SFM, compliance and chain-of-custody systems • Enforcement capacity for forest offences • Community engagement and co-management skills • Fire management capacity and equipment	14,000,000

	relevant) • Strengthen fire management and restoration in degraded forest landscapes					
Action 10.4: Strengthen sustainable fisheries management and reduce overfishing and IUU fishing	• Strengthen implementation of fisheries management measures (effort controls, closed seasons, gear restrictions) • Strengthen surveillance, monitoring and enforcement against IUU fishing (including	**Accountable:** Ministry responsible for Fisheries (sector lead) **Responsible:** Fisheries Commission; Marine Police/Navy; Community fisheries institutions	2026–2030	• Reduced overfishing and improved compliance • Improved stock status and fisheries sustainability	• Technical capacity in stock assessment and fisheries science • MCS (monitoring, control and surveillance) capacity and logistics • Community co-management facilitation skills • Data systems for catch/effort reporting	15,000,000

	transshipment and illegal gear) • Promote co-management and community-based fisheries management approaches • Improve data systems for stock assessment and adaptive fisheries management	**Consulted:** MEST; EPA				
Action 10.5: Strengthen monitoring, reporting and incentives for sustainable	• Develop indicators for biodiversity-friendly production in agriculture, forestry and	**Accountable:** NDPC **Responsible:** MoFA; Forestry Commission; Fisheries	2026–2030	• National system for tracking sustainable production outcomes • Increased	• M&E capacity and data management systems • Technical expertise in incentive design and green finance • Institutional capacity for verification and reporting	6,000,000

production systems	fisheries • Integrate sustainability indicators into national reporting systems and sector APRs • Promote incentives and financing mechanisms for sustainable production (e.g. PES, green finance, certification support) • Support learning and adaptive management	Commission **Consulted:** Ministry of Finance; EPA		uptake of incentives supporting sustainable practices		

	across production landscapes and seascapes					

Annex 2.11: Action Plan for National Target 11 – Enhance Nature's Contributions to People and Ecosystem Services

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 11.1: Integrate ecosystem services and natural capital into national and district planning and decision-making	• Identify priority ecosystem services (water regulation, flood control, soil fertility, pollination, coastal protection, carbon storage) • Integrate ecosystem services considerations into NDPC planning guidelines, sector plans,	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** Ministry of Environment, Science and Technology	2026–2030	• Ecosystem services reflected in development planning frameworks • Improved investment decisions informed by	• Technical capacity in ecosystem service assessment and valuation • Planning capacity to integrate ecosystem service information • Data systems and tools for mapping	6,000,000

	and district MTDPs • Apply natural capital and ecosystem service valuation to inform investment decisions • Promote spatial prioritisation of ecosystem service "hotspots" in plans	(MEST); EPA; MMDAs **Consulted:** Ministry of Finance; MLNR		natural capital evidence	ecosystem service hotspots	
Action 11.2: Strengthen protection and restoration of ecosystems that provide critical services	• Prioritise protection/restoration of watersheds, wetlands, riparian buffers, mangroves and urban green areas • Implement nature-based solutions (NbS) to support flood control, erosion reduction and water security	**Accountable:** MEST **Responsible:** Forestry Commission; Water Resources Commission; MMDAs **Supporting:** Traditional	2026–2030	• Priority ecosystem service areas protected or restored • Improved service delivery for water security, flood regulation and	• Technical capacity in NbS/EbA design and implementation • Catchment and coastal management skills • Community facilitation and governance strengthening capacity • Operational	14,000,000

	• Strengthen catchment and coastal zone management actions linked to service delivery • Promote community-based stewardship and benefit-sharing mechanisms	Authorities; CSOs		coastal protection	resources for restoration and protection measures	
Action 11.3: Reduce risks and impacts from ecosystem degradation on human well-being	• Identify communities and sectors most vulnerable to ecosystem service loss (floodplains, drought-prone zones, coastal communities) • Implement risk reduction measures linked to ecosystem management (e.g.	**Accountable:** National Disaster Management Organisation (NADMO) / relevant sector lead **Responsible:** MMDAs; MEST; EPA	2026–2030	• Ecosystem-based risk reduction measures implemented • Reduced vulnerability to floods, erosion and drought impacts	• Technical capacity in ecosystem-based risk assessment • Institutional coordination between DRM and environment/planning systems • Operational capacity for local	8,000,000

	floodplain restoration, buffer protection) • Integrate ecosystem-based risk reduction into disaster risk management systems • Strengthen safeguards in infrastructure development affecting ecosystem services	**Consulted:** NDPC; Sector MDAs			implementation and monitoring	
Action 11.4: Strengthen sustainable financing mechanisms for maintaining ecosystem services	• Design and implement financing mechanisms such as Payments for Ecosystem Services (PES), watershed financing, biodiversity offsets (where appropriate), and green finance instruments • Mobilise private sector	**Accountable:** Ministry of Finance **Responsible:** MEST; NDPC; EPA **Consulted:** Private Sector; MMDAs	2026–2030	• Ecosystem service financing mechanisms operationalised • Increased funding flows to priority ecosystems	• Technical capacity in PES and environmental finance design • Institutional capacity for fund administration and accountability • Private sector	7,000,000

	participation in ecosystem service protection (water utilities, insurers, agribusiness, tourism) • Strengthen community benefit-sharing models linked to ecosystem service conservation • Build capacity for financial governance and transparent fund management				partnership and deal-structuring skills	
Action 11.5: Strengthen monitoring, knowledge and public awareness on	• Develop indicators for ecosystem service delivery and trends (water quality, flood regulation, pollination, coastal protection) • Integrate ecosystem	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions	2026–2030	• National monitoring system for ecosystem services established • Increased	• Technical capacity in ecosystem service monitoring and data management • Research and analytical capacity • Communication and	5,000,000

ecosystem services	service indicators into national biodiversity monitoring and NDPC reporting systems • Promote knowledge sharing and awareness campaigns on nature's contributions to well-being • Strengthen community participation in monitoring (citizen science)	**Supporting:** CSOs; Media		public understanding and participation in ecosystem stewardship	outreach expertise • Digital platforms for data sharing	

Annex 2.12: Action Plan for National Target 12 – Enhance Urban Biodiversity and Access to Green and Blue Spaces

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 12.1: Integrate urban biodiversity and green–blue infrastructure into urban planning and development frameworks	• Integrate urban biodiversity, green belts, riparian corridors and coastal buffers into urban spatial plans and structure plans • Update planning guidelines to require minimum green space standards in new developments • Promote biodiversity-sensitive urban	**Accountable:** Ministry of Local Government, Decentralisation and Rural Development (MLGDRD) **Responsible:** Land Use and Spatial Planning Authority (LUSPA); Metropolitan, Municipal and District Assemblies (MMDAs)	2026–2030	• Urban plans incorporating green and blue infrastructure • Minimum green space standards applied in urban development	• Urban ecology and green infrastructure planning expertise • GIS and spatial analysis capacity for urban planning • Institutional coordination between planning, environment and works departments	6,000,000

	design (parks, street trees, wetlands, green roofs) • Align urban planning with climate adaptation and flood risk reduction objectives	**Consulted:** NDPC; MEST				
Action 12.2: Protect, restore and expand urban green and blue spaces	• Identify and prioritise degraded or underutilised urban green and blue spaces for restoration • Restore urban wetlands, river corridors, lagoons, parks and coastal green spaces	**Accountable:** Ministry of Environment, Science and Technology (MEST) **Responsible:** MMDAs; Forestry Commission; Water Resources Commission	2026–2030	• Expanded and restored urban green and blue spaces • Improved ecosystem services in urban areas	• Technical capacity in urban restoration and NbS implementation • Community mobilisation and stewardship skills • Operational resources for park	14,000,000

	• Establish and manage urban parks, community green spaces and urban forests • Integrate nature-based solutions for urban cooling, flood control and recreation	**Supporting:** CSOs; Traditional Authorities; Community Groups			and wetland management	
Action 12.3: Improve equitable access to urban green and blue spaces and associated benefits	• Assess access to green and blue spaces across different urban communities • Prioritise investments in underserved and vulnerable neighbourhoods	**Accountable:** MLGDRD **Responsible:** MMDAs **Consulted:** MEST; CSOs	2026–2030	• Improved and more equitable access to urban green and blue spaces • Increased community use and stewardship	• Social inclusion and participatory planning capacity • Community engagement and facilitation skills • Monitoring systems for access and equity outcomes	6,000,000

	• Promote inclusive design to ensure safety, accessibility and cultural relevance • Support community-led management and use of urban green spaces					
Action 12.4: Strengthen urban biodiversity monitoring, awareness and knowledge systems	• Develop indicators for urban biodiversity and green space coverage • Integrate urban biodiversity indicators into national and district reporting systems	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** MEST; EPA; Research Institutions;	2026–2030	• Urban biodiversity monitoring system operational • Increased public awareness and participation	• Technical capacity in urban biodiversity assessment and data management • Digital platforms for citizen science and reporting • Communication	4,000,000

	• Promote citizen science and community monitoring of urban biodiversity • Implement awareness campaigns on the benefits of urban nature	MMDAs **Supporting:** Media; CSOs			and outreach expertise	
Action 12.5: Strengthen financing and partnerships for urban biodiversity and green infrastructure	• Mobilise public and private financing for urban green infrastructure (PPP, green bonds, municipal finance) • Engage private developers in delivering biodiversity-	**Accountable:** Ministry of Finance **Responsible:** MLGDRD; MEST; MMDAs **Consulted:** Private Sector; Development Partners	2026–2030	• Sustainable financing mechanisms supporting urban biodiversity • Long-term maintenance of urban green	• Environmental finance and PPP development skills • Institutional capacity for asset management and maintenance • Partnership development and	5,000,000

	friendly urban spaces • Strengthen partnerships with civil society and academia for implementation and innovation • Build capacity for sustainable financing and maintenance of urban green assets			and blue spaces	coordination capacity	

Annex 2.13: Action Plan for National Target 13 – Ensure Fair and Equitable Sharing of Benefits from the Use of Digital Sequence Information (DSI) on Genetic Resources

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 13.1: Establish national policy and institutional arrangements for benefit-sharing from DSI	• Interpret global decisions under the CBD on DSI and translate them into national policy guidance • Establish national institutional roles for coordination on DSI-related benefit-sharing • Integrate DSI considerations into existing ABS and biodiversity policy	**Accountable:** Ministry of Environment, Science and Technology (MEST) **Responsible:** EPA; Attorney-General's Department **Consulted:** NDPC; Research Institutions	2026–2030	• National policy guidance on DSI benefit-sharing developed • Clear institutional roles for DSI governance	• Legal and policy analysis capacity on DSI and CBD decisions • Institutional coordination mechanisms across environment, science and innovation sectors	2,000,000

	frameworks • Ensure policy coherence with research, innovation and data governance frameworks					
Action 13.2: Strengthen national systems for tracking and reporting use of DSI	• Establish mechanisms to track use of DSI originating from Ghana's genetic resources • Strengthen national reporting systems to interface with global DSI benefit-sharing mechanisms • Integrate DSI-	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions **Consulted:** ICT Agencies	2026–2030	• Functional national system for tracking and reporting DSI use • Improved transparency on utilisation of genetic information	• Technical capacity in data governance and information systems • Digital infrastructure and interoperability skills • Institutional capacity for reporting and compliance	4,000,000

	related data into national biodiversity information systems • Promote transparency and accountability in data use					
Action 13.3: Enhance national research, innovation and data governance capacity related to DSI	• Strengthen national research infrastructure for genomics, bioinformatics and biodiversity informatics • Develop guidelines for responsible generation, storage	**Accountable:** Ministry responsible for Science and Innovation (sector lead) **Responsible:** Research Institutions; Universities	2026–2030	• Improved national capacity to generate and use DSI responsibly • Increased participation of Ghanaian institutions in global research	• Technical capacity in genomics, bioinformatics and data management • Research infrastructure and equipment • Human capacity development for scientists and data managers	8,000,000

	and use of DSI • Promote equitable research partnerships and capacity sharing with international collaborators • Support local scientists' participation in global DSI initiatives	**Consulted:** MEST; EPA				
Action 13.4: Operationalise fair and equitable benefit-sharing from DSI	• Define national modalities for receiving and utilising benefits arising from DSI (financial and non-financial) • Establish	**Accountable:** Ministry of Finance **Responsible:** MEST; NDPC; EPA **Consulted:** Research	2026–2030	• National mechanism for receiving and allocating DSI-related benefits • Benefits channelled to biodiversity	• Financial governance and fund management capacity • Institutional mechanisms for benefit allocation and oversight	3,000,000

	transparent mechanisms for channelling benefits to biodiversity conservation and capacity development • Ensure benefits contribute to national biodiversity priorities and local capacity building • Strengthen governance and accountability for benefit utilisation	Institutions; CSOs		conservation and capacity development	• Monitoring and accountability systems	
Action 13.5: Raise awareness and	• Conduct awareness	**Accountable:** MEST	2026–2030	• Increased understanding of	• Communication and training	3,000,000

build capacity on DSI and benefit-sharing among stakeholders	programmes for policymakers, researchers, private sector and civil society on DSI and benefit-sharing • Develop guidance materials and training modules on DSI governance • Promote dialogue among stakeholders on equity, innovation and biodiversity outcomes • Strengthen national learning and knowledge-sharing platforms	**Responsible:** EPA; Research Institutions; CSOs **Supporting:** Media; Academic Networks		DSI and benefit-sharing obligations • Improved stakeholder engagement and compliance	capacity • Stakeholder engagement and facilitation skills • Knowledge management platforms	

Annex 2.14: Action Plan for National Target 14 – Mainstream Biodiversity into Policies, Planning and Decision-Making Across All Sectors

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 14.1: Integrate biodiversity considerations into national macroeconomic, development and sector policies	• Review national development frameworks, macroeconomic policies and sector strategies to identify biodiversity risks and dependencies • Integrate	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** Ministry of Environment, Science and	2026–2030	• Biodiversity systematically reflected in national and sector policies • Improved policy coherence across	• Policy analysis and mainstreaming expertise • Capacity to assess biodiversity risks and dependencies • Institutional coordination	5,000,000

	biodiversity objectives and safeguards into national development, infrastructure and investment policies • Strengthen policy coherence between biodiversity, climate, economic growth and poverty reduction agendas • Promote use of biodiversity evidence in Cabinet and parliamentary decision-making	Technology (MEST); Ministry of Finance; Sector MDAs **Consulted:** EPA		development sectors	mechanisms across sectors	
Action 14.2: Strengthen	• Integrate biodiversity	**Accountable:** Ministry of	2026–2030	• Biodiversity-inclusive public	• Technical capacity in	8,000,000

integration of biodiversity into public investment planning and budgeting	screening into public investment appraisal and budgeting processes • Apply biodiversity safeguards in infrastructure and major development projects • Strengthen strategic environmental assessment (SEA) and environmental impact assessment (EIA) systems • Build capacity of planning and	Finance **Responsible:** NDPC; EPA; Sector MDAs **Consulted:** MMDAs		investment decisions • Strengthened SEA and EIA systems	biodiversity risk screening and safeguards • Institutional capacity for SEA/EIA review and enforcement • Training for finance and planning officers	

	finance officers on biodiversity-inclusive investment decisions					
Action 14.3: Mainstream biodiversity into sub-national planning and decision-making	• Strengthen integration of biodiversity considerations into district development planning and spatial planning processes • Support MMDAs to apply biodiversity safeguards in local development decisions • Promote cross-	**Accountable:** Ministry of Local Government, Decentralisation and Rural Development (MLGDRD) **Responsible:** MMDAs; LUSPA **Consulted:** NDPC; MEST	2026–2030	• Biodiversity mainstreamed into district-level plans and decisions • Improved coherence between national and local biodiversity actions	• Technical capacity in biodiversity-inclusive planning at local level • Institutional coordination and guidance for decentralised implementation • Data and tools for local decision-making	7,000,000

	district and landscape-level coordination on biodiversity management • Strengthen role of decentralised institutions in biodiversity governance					
Action 14.4: Strengthen private sector engagement and accountability for biodiversity impacts	• Promote disclosure of biodiversity-related risks and impacts by businesses • Encourage adoption of biodiversity safeguards, standards and	**Accountable:** Ministry of Trade and Industry (sector lead) **Responsible:** Ministry of Finance; EPA; Private Sector Associations **Consulted:** MEST	2026–2030	• Increased private sector uptake of biodiversity safeguards • Improved transparency on biodiversity impacts	• Capacity in biodiversity risk assessment and reporting • Engagement and partnership-building skills • Monitoring and compliance systems	6,000,000

	reporting frameworks by the private sector • Integrate biodiversity considerations into public–private partnerships and value chains • Support capacity building for businesses on biodiversity risk management					
Action 14.5: Strengthen monitoring, reporting and learning on biodiversity	• Develop indicators to track biodiversity mainstreaming across sectors • Integrate	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions				

mainstreaming outcomes	mainstreaming indicators into national monitoring and reporting systems • Document lessons learned and best practices on biodiversity integration • Promote adaptive management and continuous improvement	**Consulted:** Sector MDAs				

Annex 2.15: Action Plan for National Target 15 – Ensure Businesses and Financial Institutions Assess, Disclose and Reduce Biodiversity-Related Risks and Impacts

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 15.1: Establish policy and regulatory frameworks for biodiversity risk assessment and disclosure by businesses and financial institutions	• Review and update policies and regulations to require assessment and disclosure of biodiversity-related risks and impacts by large businesses and financial institutions • Align national disclosure requirements with emerging global frameworks and standards (e.g.	**Accountable:** Ministry of Finance **Responsible:** Ministry of Environment, Science and Technology (MEST); EPA; Financial Sector Regulators **Consulted:** NDPC; Private	2026–2030	• National policy and regulatory framework for biodiversity risk disclosure established • Clear reporting requirements for businesses and financial institutions	• Legal and policy analysis capacity on biodiversity disclosure • Institutional coordination between environment, finance and regulatory agencies • Technical expertise on biodiversity risk	4,000,000

	TNFD, sustainability reporting standards) • Define scope, thresholds and reporting timelines for biodiversity disclosures • Integrate biodiversity risk considerations into corporate governance and regulatory oversight frameworks	Sector Associations			and impact assessment	
Action 15.2: Build capacity of businesses and financial institutions to	• Develop guidance, tools and sector-specific methodologies for biodiversity risk	**Accountable:** MEST **Responsible:** EPA; Financial Sector	2026–2030	• Improved capacity of businesses and financial institutions to	• Technical capacity in biodiversity risk assessment methodologies	8,000,000

assess and manage biodiversity-related risks and impacts	assessment and management • Train businesses, banks and investors on biodiversity risk screening, mitigation and reporting • Promote integration of biodiversity considerations into enterprise risk management and investment decision-making • Support pilot applications of biodiversity risk assessment in	Regulators; Private Sector Associations **Supporting:** CSOs; Technical Partners		manage biodiversity risks • Biodiversity risk considerations integrated into corporate and investment decisions	• Training and advisory capacity for private sector actors • Data and analytical tools for risk screening	

	priority sectors (e.g. mining, agriculture, infrastructure, finance)					
Action 15.3: Promote adoption of biodiversity-positive business practices and sustainable finance instruments	• Promote adoption of biodiversity safeguards, mitigation hierarchies and nature-positive practices across value chains • Encourage development and use of sustainable finance instruments (green bonds, biodiversity-linked finance, sustainability loans)	**Accountable:** Ministry of Finance **Responsible:** Financial Institutions; Private Sector Associations; MEST **Consulted:** NDPC; Development Partners	2026–2030	• Increased uptake of biodiversity-positive business practices • Growth in sustainable finance supporting biodiversity outcomes	• Capacity in sustainable finance design and structuring • Private sector engagement and partnership development skills • Monitoring systems for biodiversity finance outcomes	7,000,000

	• Support voluntary commitments and industry-led initiatives for biodiversity conservation • Incentivise investment in biodiversity-positive and nature-based solutions					
Action 15.4: Strengthen monitoring, compliance and accountability for biodiversity-related disclosures and actions	• Establish systems to monitor compliance with biodiversity disclosure and risk management requirements • Strengthen regulatory oversight	**Accountable:** Financial Sector Regulators (sector lead) **Responsible:** EPA; Ministry of Finance **Consulted:** MEST; NDPC	2026–2030	• Improved compliance and accountability for biodiversity-related disclosures • Increased transparency of private sector	• Monitoring, reporting and compliance capacity • Data management and analytical systems • Institutional capacity for	5,000,000

	and enforcement mechanisms • Publish aggregated reports on biodiversity-related business and financial sector impacts • Promote transparency and public access to biodiversity-related disclosure information			biodiversity impacts	enforcement and oversight	
Action 15.5: Strengthen awareness, dialogue and learning on business, finance and biodiversity	• Conduct awareness and dialogue platforms for policymakers, businesses and financial institutions	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions	2026–2030	• Increased awareness and knowledge on biodiversity-related business risks and	• Communication and facilitation skills • Knowledge management and learning systems	3,000,000

	on biodiversity risks and opportunities • Promote exchange of best practices and lessons learned on biodiversity integration in business and finance • Support research and knowledge generation on biodiversity–economy linkages • Strengthen national learning platforms on sustainable finance and biodiversity	**Supporting:** Private Sector Associations; Media		opportunities • Improved collaboration between public and private sectors	• Research and analytical capacity	

Annex 2.16: Action Plan for National Target 16 – Promote Sustainable Consumption and Lifestyles to Reduce Biodiversity Impacts

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 16.1: Integrate sustainable consumption and lifestyle principles into national policies and strategies	• Review and update national policies and strategies to integrate sustainable consumption and production (SCP) principles with biodiversity considerations • Align SCP initiatives with biodiversity, climate and circular economy objectives • Integrate	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** Ministry of Environment, Science and Technology (MEST); Ministry of Trade and Industry; Ministry of Energy	2026–2030	• National and sector policies reflecting biodiversity-sensitive SCP principles • Improved coherence between consumption, production and biodiversity goals	• Policy analysis and SCP integration capacity • Institutional coordination across consumption-related sectors • Technical expertise on biodiversity footprints of consumption	4,000,000

	sustainable consumption targets into sectoral and district development plans • Strengthen policy coherence across environment, trade, industry and consumer protection sectors	**Consulted:** EPA; MMDAs				
Action 16.2: Reduce biodiversity impacts along key consumption and production value chains	• Identify priority value chains with high biodiversity impacts (e.g. food, timber, fisheries, plastics, energy) • Promote resource-efficient, low-impact production	**Accountable:** Ministry of Trade and Industry **Responsible:** Sector MDAs; Private Sector Associations **Consulted:** MEST; EPA	2026–2030	• Reduced biodiversity impacts along priority value chains • Increased uptake of sustainability	• Technical capacity in value chain assessment and footprint analysis • Private sector engagement and advisory capacity • Systems for	10,000,000

	practices and technologies • Support adoption of sustainability standards, eco-labelling and certification schemes • Engage producers, retailers and consumers in reducing biodiversity footprints			standards and practices	certification and standards implementation	
Action 16.3: Promote sustainable public procurement and government leadership on	• Integrate biodiversity and sustainability criteria into public procurement policies and	**Accountable:** Ministry of Finance **Responsible:** Public Procurement	2026–2030	• Sustainable public procurement practices operationalised • Reduced	• Technical capacity in sustainable procurement and lifecycle costing • Training for	6,000,000

sustainable consumption	guidelines • Build capacity of procurement officers on sustainable and biodiversity-friendly purchasing • Pilot sustainable procurement in key public institutions and sectors • Monitor and report on biodiversity outcomes of public procurement	Authority; Sector MDAs **Consulted:** NDPC; MEST		biodiversity impacts from public sector consumption	procurement officers • Monitoring and reporting systems	
Action 16.4: Influence consumer behaviour and	• Implement national awareness and behaviour-change campaigns	**Accountable:** MEST **Responsible:** EPA; MMDAs;	2026–2030	• Increased adoption of sustainable consumption	• Communication and social behaviour change expertise	5,000,000

lifestyles towards biodiversity-friendly choices	on sustainable consumption and biodiversity impacts • Promote reduction of food waste, plastic use and unsustainable resource consumption • Engage youth, communities and civil society in promoting sustainable lifestyles • Integrate sustainable consumption concepts into education and	CSOs **Supporting:** Media; Educational Institutions		behaviours • Reduced demand for biodiversity-harmful products	• Outreach and education capacity • Partnerships with media and civil society	

	extension programmes					
Action 16.5: Strengthen monitoring, data and reporting on sustainable consumption impacts on biodiversity	• Develop indicators to track biodiversity impacts of consumption and production patterns • Integrate SCP–biodiversity indicators into national monitoring and reporting systems • Conduct periodic assessments of national biodiversity footprints • Support learning and adaptive	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions **Consulted:** Sector MDAs				

	management of SCP interventions					

Annex 2.17: Action Plan for National Target 17 – Strengthen Biosafety and Biotechnology Governance to Safeguard Biodiversity

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 17.1: Strengthen national biosafety policy, legal and regulatory frameworks	• Review and update biosafety laws, regulations and guidelines in line with international obligations and emerging technologies • Clarify institutional mandates and coordination	**Accountable:** Ministry of Environment, Science and Technology (MEST) **Responsible:** National Biosafety Authority (NBA); Attorney-	2026–2030	• Updated and coherent national biosafety policy and legal framework • Clear institutional roles for biosafety governance	• Legal and policy analysis capacity on biosafety and biotechnology • Institutional coordination mechanisms across environment, science and agriculture sectors • Technical expertise on	4,000,000

	mechanisms for biosafety governance • Integrate biodiversity safeguards into biotechnology research, development and deployment policies • Strengthen compliance and enforcement provisions	General's Department **Consulted:** NDPC; Sector MDAs			biosafety risk management	
Action 17.2: Strengthen risk assessment, risk management and decision-making for LMOs and	• Develop and apply science-based risk assessment and risk management procedures for LMOs and related	**Accountable:** MEST **Responsible:** National Biosafety Authority;	2026–2030	• Robust and transparent biosafety risk assessment and decision-making systems	• Technical capacity in biosafety risk assessment and molecular analysis • Laboratory infrastructure and	8,000,000

biotechnology products	products • Strengthen decision-making processes for approvals, monitoring and post-release management • Establish or upgrade laboratories and testing facilities for biosafety assessment • Strengthen coordination among regulatory and scientific institutions	Research Institutions; Sector Regulators **Consulted:** EPA; MoFA		• Improved management of potential biodiversity risks	equipment • Skilled human resources for regulatory review	
Action 17.3: Strengthen monitoring, compliance and	• Establish systems for monitoring approved LMOs and biotechnology	**Accountable:** National Biosafety Authority	2026–2030	• Effective monitoring and enforcement of biosafety	• Monitoring and surveillance capacity • Enforcement	6,000,000

enforcement of biosafety measures	applications • Strengthen inspection, compliance and enforcement mechanisms • Improve coordination with customs and border agencies to control transboundary movements • Develop emergency response and contingency plans for biosafety incidents	**Responsible:** EPA; Customs; Law Enforcement Agencies **Consulted:** MEST		measures • Reduced risks of unintended impacts on biodiversity	logistics and field inspection capacity • Emergency response and incident management expertise	
Action 17.4: Strengthen public awareness,	• Promote public awareness on biosafety issues,	**Accountable:** MEST **Responsible:**	2026–2030	• Increased public awareness and	• Communication and risk communication	4,000,000

participation and access to information on biosafety and biotechnology	rights and responsibilities • Ensure public access to information and participation in biosafety decision-making processes • Engage stakeholders including farmers, consumers, researchers and civil society • Develop communication strategies to address misinformation	National Biosafety Authority; EPA; CSOs **Supporting:** Media; Educational Institutions		trust in biosafety governance • Improved stakeholder participation in decision-making	expertise • Stakeholder engagement and facilitation skills • Information management systems	
Action 17.5: Strengthen capacity	• Build capacity for national reporting	**Accountable:** NDPC	2026–2030	• Improved national	• Technical capacity in monitoring and	3,000,000

for biosafety monitoring, reporting and international cooperation	under the Cartagena Protocol and related frameworks • Strengthen participation in regional and international biosafety cooperation mechanisms • Integrate biosafety indicators into national biodiversity monitoring systems • Promote learning and adaptive management	**Responsible:** MEST; National Biosafety Authority **Consulted:** EPA; Research Institutions		capacity for biosafety reporting and cooperation • Enhanced alignment with international biosafety obligations	reporting • Data management and information-sharing systems • Institutional coordination for international engagement	

Annex 2.18: Action Plan for National Target 18 – Eliminate, Phase Out or Reform Incentives Harmful to Biodiversity and Scale Up Positive Incentives

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 18.1: Identify and assess incentives and subsidies harmful to biodiversity across key sectors	• Conduct a national review of subsidies, fiscal incentives and public support measures affecting biodiversity (e.g. agriculture, fisheries, energy, mining, transport) • Assess biodiversity, social and economic impacts of identified incentives • Prioritise harmful	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** Ministry of Finance; Ministry of Environment, Science and Technology (MEST) **Consulted:**	2026–2030	• National inventory and assessment of biodiversity-harmful incentives • Priority list of incentives for reform or phase-out	• Economic and policy analysis capacity • Technical expertise in subsidy impact assessment • Institutional coordination across fiscal and sector agencies	4,000,000

	incentives for reform, phase-out or redirection • Establish a transparent inventory of biodiversity-relevant incentives	Sector MDAs; EPA				
Action 18.2: Reform, phase out or redirect incentives harmful to biodiversity	• Develop and implement reform plans for priority harmful incentives, ensuring social safeguards • Redirect reformed incentives towards biodiversity-positive and sustainable practices • Integrate	**Accountable:** Ministry of Finance **Responsible:** Sector MDAs; NDPC **Consulted:** MEST; EPA; CSOs	2026–2030	• Harmful incentives reformed or phased out • Public expenditure redirected towards biodiversity-positive outcomes	• Fiscal policy reform and public finance management capacity • Social impact assessment and mitigation skills • Stakeholder engagement and change	6,000,000

	biodiversity criteria into fiscal policy and subsidy design • Engage stakeholders to manage transition impacts				management capacity	
Action 18.3: Scale up positive incentives for biodiversity conservation and sustainable use	• Design and implement positive incentive schemes (e.g. PES, sustainable agriculture incentives, fisheries co-management incentives) • Promote incentives for private sector investment in biodiversity-positive	**Accountable:** MEST **Responsible:** Ministry of Finance; Sector MDAs; MMDAs **Supporting:** Private Sector; CSOs	2026–2030	• Expanded positive incentive schemes supporting biodiversity • Increased uptake of sustainable practices by communities and businesses	• Technical capacity in incentive design and implementation • Financial management and disbursement systems • Monitoring capacity to track biodiversity outcomes	12,000,000

	activities • Strengthen community-level incentives linked to conservation outcomes • Align incentives with national biodiversity and climate priorities					
Action 18.4: Integrate biodiversity considerations into national budgeting, fiscal planning and public expenditure reviews	• Integrate biodiversity tagging and tracking into national budget systems • Strengthen biodiversity-related public expenditure reviews • Build capacity of	**Accountable:** Ministry of Finance **Responsible:** NDPC; MEST **Consulted:** Sector MDAs	2026–2030	• Biodiversity-responsive budgeting systems operational • Improved tracking of biodiversity-related public expenditure	• Capacity in biodiversity finance and budget tagging • Data systems for expenditure tracking • Training for finance and planning officers	5,000,000

	finance and planning officers on biodiversity-responsive budgeting • Improve transparency and reporting on biodiversity-related expenditures					
Action 18.5: Strengthen monitoring, reporting and public awareness on incentives and biodiversity outcomes	• Develop indicators to track impacts of incentive reforms on biodiversity • Integrate incentive-related indicators into national biodiversity monitoring and reporting systems	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions **Consulted:** Ministry of Finance	2026–2030	• Regular reporting on biodiversity impacts of incentives • Increased transparency and accountability	• Monitoring and evaluation capacity • Data analysis and reporting skills • Communication and knowledge-sharing platforms	3,000,000

	• Communicate progress and outcomes of incentive reforms to the public • Promote learning and adaptive management					

Annex 2.19: Action Plan for National Target 19 – Mobilise Adequate, Predictable and Accessible Financial Resources for Biodiversity

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 19.1: Develop and implement a national biodiversity finance plan	• Conduct a comprehensive biodiversity finance needs assessment aligned with NBSAP priorities • Identify and map existing biodiversity financing flows (public, private, international) • Develop a national	**Accountable:** Ministry of Finance **Responsible:** Ministry of Environment, Science and Technology (MEST); NDPC **Consulted:** EPA; Development Partners	2026-2030	• National biodiversity finance plan developed and approved • Clear roadmap for financing NBSAP implementation	• Technical capacity in biodiversity finance assessment and planning • Institutional coordination between finance, environment and planning agencies • Analytical tools for finance gap analysis	4,000,000

	biodiversity finance plan, including financing gaps and strategies • Secure Cabinet approval and integrate the finance plan into national budgeting processes					
Action 19.2: Increase domestic public financing for biodiversity	• Integrate biodiversity priorities into national and sector budget ceilings • Strengthen biodiversity budget tagging and tracking systems • Advocate for	**Accountable:** Ministry of Finance **Responsible:** NDPC; Sector MDAs; MMDAs **Consulted:** MEST	2026–2030	• Increased domestic budget allocations for biodiversity • Improved tracking of biodiversity-related public expenditure	• Capacity in biodiversity-responsive budgeting • Public financial management and expenditure tracking skills • Data systems for	8,000,000

	increased allocations to biodiversity-relevant MDAs and MMDAs • Improve efficiency and effectiveness of public biodiversity expenditures				budget tagging and reporting	
Action 19.3: Mobilise private sector and innovative financing for biodiversity	• Promote private sector investment in biodiversity-positive activities and nature-based solutions • Develop and pilot innovative financing instruments (green	**Accountable:** Ministry of Finance **Responsible:** MEST; Financial Institutions; Private Sector Associations **Consulted:** NDPC	2026–2030	• Increased private and innovative financing for biodiversity • Operational biodiversity finance instruments	• Capacity in sustainable finance design and structuring • Private sector engagement and partnership development skills • Risk mitigation	10,000,000

	bonds, biodiversity credits, blended finance) • Engage financial institutions to integrate biodiversity considerations into investment decisions • Strengthen enabling environment for impact investment				and deal-structuring expertise	
Action 19.4: Enhance access to international biodiversity and climate finance	• Strengthen capacity to access multilateral and bilateral finance (GEF, GCF, AfDB, EU, etc.)	**Accountable:** MEST **Responsible:** Ministry of Finance; NDPC; EPA	2026–2030	• Increased mobilisation of international biodiversity finance • Improved	• Project development and proposal-writing capacity • Fiduciary management and	7,000,000

	• Develop high-quality, bankable biodiversity project proposals • Improve coordination with development partners and climate finance mechanisms • Strengthen fiduciary, safeguards and reporting systems	**Consulted:** Development Partners		quality and success rate of funding proposals	safeguards compliance skills • Monitoring and reporting capacity for donor-funded projects	
Action 19.5: Strengthen monitoring, reporting and transparency of	• Establish national systems for tracking biodiversity finance flows and outcomes	**Accountable:** NDPC **Responsible:** MEST; Ministry of Finance; EPA **Consulted:**	2026–2030	• National biodiversity finance tracking and reporting system operational	• Technical capacity in finance tracking and data management • Analytical and reporting skills	4,000,000

biodiversity financing	• Integrate biodiversity finance indicators into national reporting systems • Report progress towards national and global biodiversity finance targets • Promote transparency and public accountability in biodiversity financing	Research Institutions; CSOs		• Transparent reporting on biodiversity finance mobilisation and use	• Digital platforms for finance transparency	

Annex 2.20: Action Plan for National Target 20 – Strengthen Capacity Building, Technology Transfer and Scientific Cooperation for Biodiversity

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 20.1: Assess and prioritise national capacity needs for biodiversity implementation	• Conduct a national biodiversity capacity needs assessment covering institutions, human resources, infrastructure and technology • Identify priority capacity gaps across sectors and levels (national, sub-national, community) • Align capacity priorities with NBSAP targets and	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** Ministry of Environment, Science and Technology (MEST); EPA **Consulted:** Sector MDAs; MMDAs;	2026–2030	• National biodiversity capacity needs assessment completed • Capacity development roadmap guiding investments	• Technical capacity in capacity needs assessment and planning • Institutional coordination across sectors and levels • Analytical and facilitation skills	3,000,000

	implementation plans • Develop a national biodiversity capacity development roadmap	Research Institutions				
Action 20.2: Strengthen human and institutional capacity for biodiversity governance and implementation	• Implement targeted training programmes for policymakers, planners, regulators and practitioners • Strengthen institutional systems, mandates and coordination mechanisms for biodiversity management • Support recruitment,	**Accountable:** MEST **Responsible:** EPA; Sector MDAs; MMDAs **Supporting:** Civil Service Training Institutions; CSOs	2026–2030	• Enhanced skills and competencies across biodiversity institutions • Improved institutional effectiveness and coordination	• Training and curriculum development capacity • Human resource development and retention systems • Institutional strengthening and change management expertise	12,000,000

	retention and professional development of biodiversity-related staff • Promote gender-responsive and inclusive capacity development					
Action 20.3: Promote technology transfer and access to appropriate tools for biodiversity management	• Identify priority technologies and tools for biodiversity conservation, monitoring and enforcement (e.g. GIS, remote sensing, eDNA, digital permitting) • Facilitate access to and transfer of	**Accountable:** Ministry responsible for Science and Innovation (sector lead) **Responsible:** Research Institutions; MEST; EPA **Consulted:**	2026–2030	• Improved access to modern technologies for biodiversity management • Enhanced efficiency and effectiveness of implementation	• Technical capacity in technology assessment and deployment • Infrastructure and equipment for monitoring and analysis • Partnership development and	10,000,000

	environmentally sound technologies • Strengthen national infrastructure for data, laboratories and equipment • Promote partnerships with technology providers and research institutions	Private Sector; Development Partners			technology transfer skills	
Action 20.4: Strengthen scientific research, data generation and knowledge sharing on biodiversity	• Support long-term biodiversity research and monitoring programmes • Strengthen national biodiversity information systems and data interoperability	**Accountable:** NDPC **Responsible:** MEST; Research Institutions; Universities **Consulted:** EPA	2026–2030	• Improved national biodiversity knowledge base • Increased use of scientific evidence in decision-making	• Research funding and infrastructure • Data management and analytical capacity • Knowledge management and	8,000,000

	• Promote open access to biodiversity data while respecting ABS and TK considerations • Facilitate knowledge exchange among scientists, practitioners and policymakers				dissemination platforms	
Action 20.5: Strengthen regional and international scientific and technical cooperation	• Promote participation in regional and international biodiversity research networks and programmes • Strengthen South–South and triangular cooperation on	**Accountable:** Ministry of Foreign Affairs (sector lead) **Responsible:** MEST; NDPC; Research Institutions **Consulted:**	2026–2030	• Enhanced international cooperation and knowledge exchange • Increased access to expertise and technology	• Coordination and diplomatic engagement capacity • Technical expertise for international cooperation • Reporting and	4,000,000

	biodiversity • Facilitate exchange of expertise, technology and best practices • Strengthen reporting and engagement with global biodiversity processes	Development Partners			communication skills	

Annex 2.21: Action Plan for National Target 21 – Strengthen Knowledge, Education and Public Awareness for Biodiversity

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 21.1: Integrate biodiversity into formal education	• Review and update national curricula at basic, secondary and tertiary levels to	**Accountable:** Ministry of Education **Responsible:**	2026–2030	• Biodiversity integrated into formal education curricula	• Curriculum development expertise • Teacher training	8,000,000

curricula and training programmes	integrate biodiversity concepts and values • Develop teaching and learning materials on biodiversity and ecosystem stewardship • Strengthen teacher training and professional development on biodiversity education • Promote experiential learning (school gardens, field visits, nature clubs)	Ghana Education Service; Curriculum Authorities; MEST **Consulted:** EPA; Universities		• Improved quality and reach of biodiversity education	and capacity-building systems • Educational materials and learning resources	

Action 21.2: Strengthen public awareness and communication on biodiversity values and actions	• Develop and implement a national biodiversity communication and outreach strategy • Conduct nationwide awareness campaigns using mass media, digital platforms and community outreach • Promote national biodiversity events and observances • Tailor messages to different audiences (youth, women, private sector, local authorities)	**Accountable:** Ministry of Environment, Science and Technology (MEST) **Responsible:** EPA; Information Services Department; CSOs **Supporting:** Media; Community Leaders	2026–2030	• Increased public awareness and understanding of biodiversity • Greater public engagement in biodiversity conservation	• Communication and social behaviour change expertise • Media engagement and content development capacity • Community outreach and facilitation skills	7,000,000

Action 21.3: Promote community-based knowledge sharing and indigenous knowledge systems	• Document and promote indigenous and local knowledge relevant to biodiversity conservation, with FPIC • Support community learning platforms and peer-to-peer knowledge exchange • Integrate indigenous knowledge into local conservation and development initiatives • Strengthen recognition of	**Accountable:** MEST **Responsible:** MMDAs; Traditional Authorities; CSOs **Consulted:** Research Institutions	2026–2030	• Indigenous and local knowledge documented and applied • Enhanced community ownership of biodiversity actions	• Community facilitation and participatory methods capacity • Documentation and knowledge management skills • Institutional mechanisms to safeguard traditional knowledge	6,000,000

	cultural values associated with biodiversity					
Action 21.4: Strengthen access to biodiversity information and knowledge platforms	• Enhance national biodiversity information systems and data portals • Improve access to biodiversity data for policymakers, researchers and the public • Promote open data and citizen science initiatives where appropriate • Strengthen linkages between research outputs and decision-making	**Accountable:** National Development Planning Commission (NDPC) **Responsible:** MEST; EPA; Research Institutions **Consulted:** ICT Agencies	2026–2030	• Improved accessibility and use of biodiversity information • Increased evidence-based decision-making	• Data management and ICT capacity • Platform development and maintenance skills • Analytical capacity to translate data into policy-relevant knowledge	5,000,000

Action 21.5: Monitor and evaluate impacts of education and awareness programmes	• Develop indicators to track changes in knowledge, attitudes and practices related to biodiversity • Integrate awareness and education indicators into national monitoring frameworks • Conduct periodic evaluations of education and awareness interventions • Use lessons learned to improve programme effectiveness	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions **Consulted:** Ministry of Education	2026–2030	• Improved monitoring of biodiversity education and awareness outcomes • Adaptive improvement of programmes	• Monitoring and evaluation capacity • Survey design and data analysis skills • Reporting and learning systems	4,000,000

Annex 2.22: Action Plan for National Target 22 – Ensure Inclusive Participation, Access to Justice and Respect for Rights in Biodiversity Governance

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 22.1: Strengthen legal and policy frameworks to ensure participation, rights and access to justice in biodiversity governance	• Review and update laws, policies and guidelines to strengthen provisions on participation, access to information, justice and rights in biodiversity decision-making • Align national frameworks with constitutional provisions and international commitments on	**Accountable:** Ministry of Environment, Science and Technology (MEST) **Responsible:** Attorney-General's Department; EPA **Consulted:** NDPC; CSOs	2026–2030	• Strengthened legal and policy framework supporting rights-based biodiversity governance • Clear institutional mandates for participation and justice	• Legal and policy analysis capacity • Expertise in rights-based and inclusive governance approaches • Institutional coordination mechanisms	4,000,000

	rights and inclusion • Clarify roles and responsibilities of institutions in safeguarding rights in biodiversity governance • Integrate rights-based approaches into biodiversity policies and programmes					
Action 22.2: Promote inclusive and meaningful participation of women, youth, indigenous People and local communities	• Develop and apply guidelines for inclusive and gender-responsive participation in biodiversity planning and implementation • Support	**Accountable:** MEST **Responsible:** MMDAs; Sector MDAs **Supporting:** Traditional	2026–2030	• Increased participation of women, youth and local communities in biodiversity decision-making • Improved	• Facilitation and participatory planning skills • Gender and social inclusion expertise • Community	7,000,000

	participatory platforms at national and sub-national levels • Strengthen representation of women, youth and local communities in biodiversity governance structures • Promote culturally appropriate engagement processes	Authorities; CSOs		inclusiveness of governance processes	engagement mechanisms	
Action 22.3: Strengthen access to information and transparency in biodiversity governance	• Improve public access to biodiversity-related information, plans and decisions • Strengthen	**Accountable:** NDPC **Responsible:** MEST; EPA; MMDAs **Consulted:**	2026–2030	• Improved transparency and access to biodiversity information • Increased	• Information management and ICT capacity • Communication and outreach expertise	5,000,000

	transparency of decision-making processes (permits, EIAs, spatial plans, benefit-sharing) • Enhance national biodiversity information portals and disclosure systems • Promote use of local languages and accessible formats	Information Services Department; CSOs		public trust and accountability	• Systems for disclosure and transparency	
Action 22.4: Strengthen access to justice and grievance redress mechanisms related to biodiversity	• Strengthen legal aid and grievance redress mechanisms for biodiversity-related disputes • Build capacity of judicial and quasi-	**Accountable:** Judicial Service / relevant justice sector lead **Responsible:** Attorney-General's	2026–2030	• Improved access to justice for biodiversity-related grievances • Reduced conflicts and	• Legal capacity and training on biodiversity law • Institutional capacity for grievance handling and dispute	6,000,000

	judicial institutions on biodiversity and environmental law • Promote alternative dispute resolution mechanisms at community and local levels • Raise awareness of rights and remedies available to affected stakeholders	Department; EPA; Legal Aid Commission **Consulted:** MEST; CSOs		enhanced compliance	resolution • Community mediation skills	
Action 22.5: Strengthen monitoring, reporting and learning on participation, rights and justice outcomes	• Develop indicators to track participation, inclusion and justice outcomes in biodiversity governance • Integrate rights-related indicators into	**Accountable:** NDPC **Responsible:** MEST; EPA; Research Institutions **Consulted:** CSOs	2026–2030	• National system for tracking participation and rights outcomes • Evidence-based improvements in governance	• Monitoring and evaluation capacity • Data collection and analysis skills • Knowledge management and learning platforms	4,000,000

	national biodiversity monitoring and reporting systems • Document lessons learned and best practices on inclusive governance • Promote adaptive management and continuous improvement					

Annex 2.23: Action Plan for National Target 23 – Ensure Gender Equality and Empower Women and Girls in Biodiversity Action

Action	Key Activities	Lead / Responsible Institutions	Timeframe	Expected Outputs	Capacity Needs for Implementation	Indicative Budget (USD)
Action 23.1: Integrate gender equality and women's empowerment into biodiversity policies, plans and implementation systems	• Mainstream gender considerations into NBSAP implementation plans, sector policies and district development plans • Develop or update gender guidelines for biodiversity programming and project design • Require gender analysis and gender-responsive budgeting in	**Accountable:** Ministry of Gender, Children and Social Protection (MoGCSP) **Responsible:** Ministry of Environment, Science and Technology (MEST); NDPC; EPA **Consulted:**	2026–2030	• Gender-responsive biodiversity policies and plans operationalised • Gender guidelines applied across biodiversity programmes	• Gender mainstreaming and analysis expertise • Institutional coordination mechanisms across gender, environment and planning systems • Capacity for gender-responsive budgeting and safeguards	5,000,000

	biodiversity-related programmes • Strengthen institutional mandates and coordination for gender mainstreaming in biodiversity governance	MMDAs; Sector MDAs				
Action 23.2: Strengthen women's participation and leadership in biodiversity governance and decision-making	• Promote women's representation and leadership in biodiversity governance structures (national, district and community levels) • Establish and support inclusive	**Accountable:** MoGCSP **Responsible:** MMDAs; MEST; CSOs **Supporting:** Traditional Authorities; Community Leaders	2026–2030	• Increased women's participation and leadership in biodiversity governance • Stronger women's networks contributing to	• Facilitation and leadership development capacity • Gender and social inclusion expertise • Community engagement	7,000,000

	participation platforms for women and girls in biodiversity planning and implementation • Strengthen women's organisations and networks involved in natural resource governance • Promote safe, enabling environments for women's participation			biodiversity outcomes	mechanisms and safeguards	
Action 23.3: Enhance women's access to resources,	• Strengthen women's access to land, resources and	**Accountable:** Ministry of Finance	2026–2030	• Increased women's access to biodiversity-	• Livelihood development and value chain	10,000,000

benefits and livelihoods linked to biodiversity conservation and sustainable use	benefit-sharing opportunities in biodiversity programmes (e.g. restoration, agroforestry, NTFPs, fisheries co-management) • Support women-led and women-benefiting green livelihood initiatives and value chains • Promote equitable benefit-sharing arrangements in protected areas, OECMs and community conservation	**Responsible:** MoFA; MLNR; MEST; MMDAs **Consulted:** MoGCSP; Private Sector		linked livelihood opportunities • More equitable sharing of benefits from biodiversity conservation and use	support capacity • Expertise in gender-responsive benefit-sharing models • Financial inclusion and green finance facilitation capacity	

	systems • Strengthen financial inclusion and access to green finance for women					
Action 23.4: Strengthen safeguards, protection and response systems for gender-based risks in biodiversity programmes	• Integrate gender-responsive safeguards into biodiversity projects and field implementation • Strengthen grievance redress and response mechanisms for gender-based risks in programme areas • Train implementing partners on	**Accountable:** MoGCSP **Responsible:** MEST; EPA; Implementing Partners **Consulted:** CSOs; Justice Sector Institutions	2026–2030	• Gender safeguards operational across biodiversity programmes • Improved prevention and response systems for gender-based risks	• Safeguards and PSEA capacity • Institutional systems for grievance redress and response • Training and awareness tools	4,000,000

	prevention of sexual exploitation and abuse (PSEA) and gender safeguarding • Promote safe reporting pathways and community awareness					
Action 23.5: Strengthen gender-responsive monitoring, reporting and learning for biodiversity action	• Develop gender-responsive indicators aligned with KMGBF Target 23 • Integrate gender indicators into national biodiversity monitoring and NDPC reporting systems • Conduct periodic	**Accountable:** NDPC **Responsible:** MoGCSP; MEST; EPA; Research Institutions **Consulted:** CSOs	2026–2030	• National system for tracking gender outcomes in biodiversity action • Evidence-based improvements in gender mainstreaming	• Monitoring and evaluation capacity • Gender data collection and analysis skills • Knowledge management and learning platforms	4,000,000

	gender audits and evaluations of biodiversity programmes • Document and disseminate lessons and best practices on gender and biodiversity					

Annex 3: Mapping of National Targets to KMGBF Headline Indicators

National Target	National Focus	Corresponding KMGBF Target(s)	Headline Indicator(s)
Target 1	Spatial planning and land/sea use	GBF Target 1	• Trends in land-use change and spatial planning coverage • Proportion of land/sea area under biodiversity-inclusive spatial plans
Target 2	Ecosystem restoration	GBF Target 2	• Area under restoration • Extent and condition of ecosystems
Target 3	Protected Areas & OECMs	GBF Target 3	• Coverage of protected areas and OECMs • Connectivity of protected area networks
Target 4	Species conservation	GBF Target 4	• Red List Index • Population trends of selected species
Target 5	Sustainable use of wild species	GBF Target 5	• Proportion of wild species harvested sustainably • Illegal harvesting incidents

Target 6	Invasive alien species	GBF Target 6	• Rate of invasive alien species introduction • Area impacted by invasive alien species
Target 7	Pollution reduction	GBF Target 7	• Levels of pollution (nutrients, pesticides, plastics) • Pollution impacts on biodiversity
Target 8	Climate change & biodiversity	GBF Target 8	• Ecosystem-based adaptation coverage • Carbon stored in ecosystems
Target 9	Access & Benefit-Sharing	GBF Target 9	• Benefits shared from genetic resources • ABS agreements in force
Target 10	Sustainable agriculture, forestry & fisheries	GBF Target 10	• Area under sustainable management • Biodiversity-friendly production systems
Target 11	Nature's contributions to people	GBF Target 11	• Ecosystem services indices • Water- and climate-regulation benefits
Target 12	Urban biodiversity	GBF Target 12	• Access to green and blue spaces • Urban green space coverage
Target 13	Digital sequence information (DSI)	GBF Target 13	• Benefit-sharing mechanisms from DSI

Target 14	Biodiversity mainstreaming	GBF Target 14	• Integration of biodiversity into national planning and policies
Target 15	Business & finance	GBF Target 15	• Number of companies disclosing biodiversity risks • Financial flows aligned with biodiversity
Target 16	Sustainable consumption	GBF Target 16	• National biodiversity footprint • Resource use and waste indicators
Target 17	Biosafety & biotechnology	GBF Target 17	• Biosafety regulatory systems in place • Compliance with Cartagena Protocol
Target 18	Harmful incentives & subsidies	GBF Target 18	• Value of harmful subsidies removed or reformed • Positive incentives scaled up
Target 19	Resource mobilisation	GBF Target 19	• Biodiversity finance mobilised • Domestic and international funding flows
Target 20	Capacity & technology	GBF Target 20	• Capacity-building activities implemented • Technology transfer indicators

Target 21	Knowledge, education & awareness	GBF Target 21	• Public awareness of biodiversity values • Access to biodiversity information
Target 22	Participation, justice & rights	GBF Target 22	• Participation of IPLCs and women • Access to justice mechanisms
Target 23	Gender equality	GBF Target 23	• Gender equality in biodiversity decision-making • Women's access to benefits

Annex 4: Implementation Plan for Communication, Education, And Public Awareness (CEPA)

Strategic CEPA Area	Key Activities	Lead Institutions	Supporting Institutions	Timeframe	Expected Outputs	Indicative Budget (USD)
1. Policy Coordination and Strategic Messaging	• Develop a national CEPA Action Plan aligned with NBSAP targets • Establish consistent national biodiversity messaging and branding • Coordinate annual national biodiversity campaigns	MEST	EPA; Forestry Commission; NCCE	2026–2030	• Coherent national CEPA framework • Consistent biodiversity messaging nationwide	3,000,000
2. Formal Education and Curriculum Integration	• Integrate biodiversity into Basic, SHS and TVET curricula	Ministry of Education / GES	MEST; EPA; Forestry Commission	2026–2030	• Biodiversity embedded in national curricula • Teachers	8,000,000

	• Develop locally relevant teaching materials • Train teachers (pre- and in-service) • Support School Nature Clubs and field learning				equipped to deliver content	
3. Community-Based and Non-Formal Education	• CEPA through CREMAs and community platforms • Adult education via extension and functional literacy programs • Targeted outreach to farmers, fishers, women's groups	MMDAs	NCCE; MoFA; Fisheries Commission; CSOs	2026–2030	• Improved community knowledge and compliance • Peer-to-peer learning systems operational	6,000,000
4. Strategic Media and Public	• National radio and TV campaigns (local	EPA	Information Services Dept.;	2026–2030	• Increased public awareness and	7,000,000

Awareness Campaigns	languages) • Closed season, pollution and restoration campaigns • Journalist training ("Green Press Corps") • Digital youth engagement		Media Houses; CSOs		visibility of biodiversity issues • Improved quality of biodiversity reporting	
5. Youth, Gender and Inclusion-Focused CEPA	• Youth innovation challenges and volunteer programmes • Gender-responsive CEPA via women's platforms • Inclusive communication formats for PWDs	MoGCSP	MEST; Youth Agencies; CSOs	2026–2030	• Increased youth and women participation • Inclusive access to biodiversity information	4,000,000

6. Behaviour Change and Sustainable Lifestyles	• Behaviour-change campaigns linked to Target 16 • Promotion of sustainable alternatives (energy, plastics, food) • Social norm and lifestyle messaging	MEST	EPA; Private Sector; CSOs	2026–2030	• Adoption of biodiversity-friendly behaviours • Reduced pressure on ecosystems	5,000,000
7. Monitoring, Evaluation and Learning (MEL)	• CEPA perception and behaviour surveys • Tracking awareness and behaviour change indicators • Feedback loops and adaptive management	NDPC	MEST; EPA; Research Institutions	2026–2030	• Evidence-based CEPA programming • Adaptive improvement of messaging	3,000,000