Guidelines for mainstreaming biodiversity in economic sectors/programs/ projects in Ethiopia

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List of Abbreviations

CBD	Convention on Biological Diversity
DEA	Department of Environmental Affairs
EIA	Environmental Impact Assessment
GEF	Global Environmental Facility
IUCN	International Union for the Conservation of Nature
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organizations
OECD	Organization of Economic Cooperation and Development
PEI	Poverty-Environment Initiative
SDG	Sustainable Development Goals
STAR	Species Threat Abatement and Restoration
SEA	Strategic Environmental Assessment
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program

Acknowledgment

1. About the guidelines

1.1. Purpose

Biological diversity is the resource upon which families, communities, nations and future generations depend. Therefore, the integration of biodiversity conservation objectives in national development policy and planning, and routine natural resource use practices is highly required for sustaining life on Earth. This brings mainstreaming biodiversity in various sectors/programs/projects is a central agenda. However, for a considerable number of sectors/programs/projects how to mainstream biodiversity remained unresolved. This guideline is, therefore, designed to support local government practitioners/ policy-makers/sectors/programs/projects/initiatives in developing their context-specific biodiversity mainstreaming document which may serve as a tool for managing biodiversity mainstreaming. The guideline presents sequential steps in the development of a biodiversity mainstreaming document which perhaps assists sectors to prepare the document in a scientifically accepted manner.

1.2. Structure

The guideline provides an overview of biodiversity mainstreaming and its importance for the conservation and sustainable use of biological diversity in relevant sectoral or cross-sectoral plans, programs, and policies. The guideline gives practical guidance on how mainstreaming can be, and is being, achieved at different scales and within different levels of government including a wide range of actors. It is prepared for use by various sectors in Ethiopia wishing to amend their existing sectoral or cross-sectoral plans, programs, and policies, as they should integrate biodiversity conservation outcomes. Actionable steps to be followed during mainstreaming are suggested to guide and inspire users. This guideline is hence structured into thirteen sections in which the first three provide the overall background issues and sections 3 to 13 are the main body of the guidelines presenting the blueprints in the development of biodiversity mainstreaming document.

2. An Overview of the state of Ethiopia's biodiversity

Ethiopia, located in the Horn of Africa, showcases a rich diversity of physiographic and geographic features that enhance its cultural and ecological complexity. Its landscape includes highlands, plateaus, valleys, and lowlands, resulting in various microclimates. The temperate highlands, boosted by orographic lift, receive significant rainfall, leading to fertile soils that support diverse

agriculture and numerous endemic species, thereby increasing biodiversity. The highlands' intricate topography creates microclimates influenced by altitude, slope, and water proximity, resulting in variations in temperature and soil composition. In contrast, the lowland areas in eastern and southern Ethiopia are adapted to arid conditions with xerophytic vegetation. The East African Rift Valley contributes to diverse landforms and microclimates and these together make the country rich of biodiversity. Recently, the International Union for the Conservation of Nature (IUCN)Global Ecosystem Typology v2.0 identified 13 biomes, 17 major ecosystem types, and 49 Ecosystem Functional Groups in Ethiopia, including anthropogenic environments (Tesema, 2022).

The Montane Grassland Ecosystem features a single-layered canopy primarily composed of woody species like *Acacia abyssinica and Juniperus procera* (IBC, 2005) It supports a diverse avifauna, including half of Ethiopia's 18 endemic bird species and 56 from the Afrotropical Highlands Biome (IBC, 2005) (. The Dry Evergreen Montane Forest, found in highlands, includes threatened species such as *Olea europaea* and *Juniperus procera,* along with grassland patches (Friis *et al.*, 2011). In contrast, Moist Montane Forests in the southwestern highlands host endemic mammals like the Bale Monkey and Leopard (Williams *et al.*, 2004). The transitional rainforest on the western escarpment has 101 woody plant species, 47 of which are endemic(Friis *et al.*, 2011) The Acacia-Commiphora Woodland in the southeastern dry lowlands supports drought-resistant species vital for endangered mammals like the African Wild Ass. The Combretum-Terminalia Woodland consists of small to medium-sized deciduous trees, while the Lowland Tropical Forest in Western Gambella represents a semi-evergreen type dominated by Baphia abyssinica and Tapura fischeri (Tesema, 2022).

Ethiopia's biodiversity richness extends beyond ecosystem levels to encompass a wide array of biological resources, including plants, animals, and microorganisms. The region, which includes both Ethiopia and Eritrea, is home to approximately 6,027 documented vascular plant species, of which 600 are endemic (10%) and 1,024 (17%) are endemic to the Horn of Africa (Ensermu and Sebsebe, 2014). This endemic flora comprises 137 woody taxa (32 trees and 105 shrubs), 376 herbs, 57 succulents, and others, with 38.6% displaying local endemism (Vivero *et al.*, 2006). Species richness is highest in the southwestern and southeastern regions, highlighting two primary centers of endemism: the Somalia-Masai and the Afromontane highlands

The existence of diverse farming systems, cultures, and agroecologies has endowed Ethiopia with highly diverse plant genetic resources for food and agriculture. As a result, the country is regarded as a center of origin and/or diversity for many crop plants. Crops such as coffee (*Coffea arabica),* safflower (*Carthamus tinctorius*), tef (*Eragrostis tef*), noug or niger seed (*Guizotia abyssinica),* ANCHOTE (*Coccinia abyssinica),* Ethiopian potato (*Plectranthus edulis*), GESHO (*Rhamnus prinoides),* Ethiopian mustard or Gomenzer (*Brassica carinata*) and ENSET (*Ensete ventricosum*) have originated in Ethiopia. The country is also considered as a center of diversity for field crops such as barley (*Hordeum vulgare*), sorghum, tetraploid wheat (*Triticum* spp.) , finger millet (*Eleusine coracana*), faba bean (*Vicia faba*), tef (*Eragrostis tef*), linseed *(Linum usitatissimum*), niger seed (*Guizoptia abyssinica*), sesame (*Sesamum indicum*), safflower (*Carthamus tinctorius*), chickpea (*Cicer arietinum*), lentil (*Lens culinaris*), cowpea (Vigna unguiculata), grass pea (*Lathyrus sativus*) and fenugreek (*Trigonella fopenum-graceum*)

Ethiopia was factually used as a crucial transit point for domestic animals from Asia to Africa, leading to a rich diversity of livestock. It ranks first in Africa and tenth globally, with approximately 70.3 million cattle, 42.9 million sheep, 52.5 million goats, 2.2 million horses, 10.9 million donkeys, 8.2 million camels, and 57 million poultry (CSA, 2021). The majority of these livestock (excluding poultry) are indigenous breeds, including around 27 cattle, 154 sheep, 114 goats, 84 camels, and 17 chicken breeds. (DAD-IS, 2024). In terms of wildlife, Ethiopia is home to 320 mammal species, 55 endemics, 926 species of birds, 24 endemics, 242 species of reptiles, 19 endemics, 81 species of frogs and toads, 30 endemics, 201 species of fish, 40 endemics, 4693 species of arthropods /insects, 823 endemics, 71 species of scorpion, 50 species of snails, and 300 species of spider (EBI, 2023). Overall, Ethiopia's rich biodiversity faces significant threats, highlighting the need for further research and conservation efforts.

Research on the structural, phylogenetic, and functional diversity of microbial genetic resources is limited, but existing studies reveal significant microbial biodiversity (Lanzén *et al.*, 2013; Jeilu *et al.*, 2022). Environmental factors play a crucial role in shaping microbial community composition, with aquatic ecosystems like the Ethiopian Rift Valley Lakes offering unique habitats. Jeilu *et al.,* (2022) identified 3,603 prokaryotic and 898 eukaryotic operational taxonomic units in these lakes, highlighting their rich microbial genetic resources. Lanzen *et al.,* (2013) reported high microbial diversity in samples from five Central Rift Valley lakes, with operational taxonomic units ranging from 169 to 1,286 per sample. Additionally, diverse plant species in Ethiopia are linked to a variety of rhizosphere microorganisms (Beshah *et al.,* 2024). Traditional fermented foods such as Kocho and Injera also reflect the impact of regionally specific microbial communities, further enhancing Ethiopia's microbial diversity (Gänzle, 2015).

Furthermore, studies have shown that Ethiopian traditional fermented foods and beverages harbor a high diversity of industrially important microbial species (Andualem and Geremew, 2014; Wedajo Lemi, 2020)

Despite its rich biodiversity, Ethiopia's biological resources face significant threats at the ecosystem, species, and genetic levels, affecting both wild and domesticated organisms. Ecosystem degradation, driven by agricultural expansion, deforestation, and urbanization, fragments habitats and disrupts ecological processes (Tesema, 2022; Vergez, 2022) (. The conversion of natural landscapes into agricultural land has particularly impacted critical habitats in the Afromontane and Somali-Masai regions, where endemic species are vulnerable (Friis *et al.*, 2011). Climate change further exacerbates these issues by altering temperature and precipitation patterns, threatening ecosystem stability (Mastrorillo et al., 2016). At the species level, habitat loss, overexploitation, and invasive species have led to population declines, with approximately 20% of Ethiopia's mammals threatened, including the critically endangered Ethiopian wolf (*Canis simensis*) and Gelada baboon (*Theropithecus gelada*) (IUCN, 2020). The introduction of non-native species also poses risks to local biodiversity(Yonas, 2020) . Additionally, genetic diversity in domesticated species is threatened by the replacement of traditional varieties with improved cultivars, which diminishes essential genetic resources for food security. Traditional crops like tef (*Eragrostis tef*) are being replaced by monocultures, and unique livestock breeds such as Sheko cattle are at risk from interbreeding with zebu breeds (Melkam and Gezahegn, 2023; Admasu and Bayou, 2024) These trends underscore the urgent need for comprehensive conservation strategies to protect Ethiopia's biodiversity.

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3. Mainstreaming biodiversity

3.1. The concept of biodiversity mainstreaming

The International Union for the Conservation of Nature (IUCN, 2018), defines biodiversity mainstreaming as "the integration of the conservation and sustainable use of biodiversity in economic cross-sectoral plans such as those related to sustainable development, poverty reduction, climate change adaptation and/or mitigation, as well as trade, innovation and investment promotion, and international cooperation". The IUCN also specifies that "the concept of mainstreaming also applies to sector-specific plans such as agriculture, fisheries and aquaculture, forestry, tourism, mining, energy, infrastructure and construction, health, water, banking, telecommunications, information, and transport (among others). Ultimately, biodiversity mainstreaming implies transformational changes in development models, strategies, and paradigms". The Convention on Biological Diversity (CBD, 1992) states " The integration of the conservation and sustainable use of biodiversity in both cross-sectoral plans such as sustainable development, poverty reduction, climate change adaptation/mitigation, trade, and international cooperation, and in sector-specific plans such as agriculture, fisheries, forestry, mining, energy, tourism, transport, and others. It implies changes in development models ... and paradigms."

According to the Department of Environmental Affairs (DEA, 2016) "Mainstreaming relies on the principle that other sectors (eg mining, tourism and agriculture) will acknowledge their dependence on and

responsibility for biodiversity and incorporate biodiversity considerations in their normal business". The Food and Agriculture organization (FAO, 2018) on the other hand, regarded mainstreaming as "Biodiversity mainstreaming across the agricultural sectors is the process of embedding biodiversity considerations into all policies, strategies and practices that are adopted by public and private actors who either depend on biodiversity or whose actions have an impact on biodiversity. The purpose of mainstreaming biodiversity in the agriculture sectors is to ensure that biodiversity is conserved and used sustainably." In fisheries (Friedman *et al.*, 2018) it is " The progressive, interactive process of recognizing the values of biodiverse natural systems in the development and management of fisheries, accepting full accountability for, and effectively responding to, the broader impact of fishing and fishery-related activities on biodiversity and related structure and function of ecosystems".

Generally, biodiversity mainstreaming is more than applying 'safeguards' to ensure development processes do not harm biodiversity; it is principally about recognizing the potential of biodiversity to achieve desirable development outcomes. It is a complex, long-term, iterative process that entails integrating biodiversity concerns into national, local, and sector plans, policies, and budgets and then supporting their implementation. It involves working with a range of stakeholders – government, private sector, civil society organizations, non-governmental organizations, politicians, the general public, communities, media, and academia – to create changes in values, attitudes, knowledge, policy, procedures, and behaviors towards biodiversity. It is as much a political issue, requiring a process of institutional change, as it is a technical one.

3.2. Importance of biodiversity mainstreaming

The survival of diverse genes, species, and ecosystems, and their continued provision of ecosystem services and human wellbeing depends on how biodiversity is managed and governed. The loss of biodiversity threatens our food supplies, opportunities for recreation and tourism, and sources of wood, medicines, and energy. However, most policy decisions do not fully recognize biodiversity's vital role in the economy. Biodiversity mainstreaming is an important part of conservation strategies going forward, as it informs policy decisions that tackle both the drivers and impacts of biodiversity loss and informs the appropriate responses (CBD,2011). Mainstreaming of biodiversity into sectors (and vice-versa) can include strategies to reduce the negative and enhance the positive impacts that the sector has on biodiversity and might involve minimizing the use, and optimizing the application of chemical fertilizers and pesticides so as to reduce negative impacts on groundwater, surrounding habitats and wildlife, and strengthening practices that integrate the natural processes into production systems or enhance agricultural biodiversity. Mainstreaming biodiversity across government and society is crucial for meeting many of the Sustainable Development

Goals. Mainstreaming biodiversity is indicated as central to achieving international goals on sustainable development and poverty reduction which is mentioned in the global sustainable development agenda: Agenda 2030 and the SDGs place a strong emphasis on biodiversity, and two of the 17 SDGs are dedicated to the conservation and sustainable use of biodiversity (i.e. 14 on Life under Water and 15 on Life on Land) (OECD, 2018). Mainstreaming ensures the integration of biodiversity values into development and poverty alleviation strategies and plans. Mainstreaming biodiversity concerns can be internalized into the way development efforts operate, shifting responsibility and ownership for conservation and sustainable use from solely the hands of the environment ministry/authority to those also of economic sectors (CBD, 2011). Biodiversity mainstreaming is generally understood as ensuring that biodiversity, and the services it provides, are appropriately and adequately factored into policies and practices that rely on and have an impact on it (GIZ, 2019). Biodiversity mainstreaming is a multilayered and dynamic concept with many definitions that have advanced over time. But the overall goal can be synthesized as better non-biodiversity-focused decision making which serves to improve outcomes for biodiversity itself. Mainstreaming of biodiversity secures and promotes local communities' access to and benefits from the use of biodiversity; and enables their participation in the design and implementation of biodiversity management policies and practices (Smith et al., 2020).

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4. Problem assessment by stakeholders

Problem assessment by stakeholders is the first and most critical step in biodiversity mainstreaming. This assessment involves conducting a thorough diagnosis of the current state of biodiversity integration across various scales, which may include national levels, specific sectors and subsectors, organizations, as well as individual programs and projects. The problem assessment process is multifaceted; it encompasses not only the identification of specific biodiversity-related challenges but also a detailed description of how these challenges intersect with development goals. This involves examining the underlying causes of biodiversity loss, understanding the socio-economic contexts that contribute to these issues, and recognizing the potential impacts on ecosystems and communities.

To undertake a thorough evaluation of biodiversity-development challenges, meticulous planning is essential. This involves establishing a steering committee, organizing a team of scientific and technical experts, and delineating a clear vision and objectives for the assessment. The steering committee is formed to enhance the assessment's relevance for policy formulation and decision-making by stakeholders, facilitating collaboration among involved parties, and guiding the preparation of the Terms of Reference (TOR). It typically comprises a small, executive group, including sector leaders and heads of sub-sectors. The scientific team is tasked with supporting the experts in developing and conceptualizing methodologies, frameworks, data analysis, and interpretation. Members may be drawn from universities, research institutions, and governmental or non-governmental organizations focused on conservation. The experts' team, who is responsible for conducting the assessment, should include professionals from both conservation and development sectors, possessing significant academic credentials and practical experience in relevant domains. The diverse expertise within the team is vital for addressing the intricate and interconnected nature of biodiversity issues; thus, affiliations and areas of specialization must be carefully considered. The team may encompass experts in ecology, plant and animal sciences, forestry, environmental economics, sociology, anthropology, and policy analysis. However, depending on the scale of the desired mainstreaming, the assessment may be conducted by a team with fewer professional qualifications, or it may necessitate the inclusion of additional experts from other disciplines. The following interconnected steps have to be duly considered to objectively identify problems associated with reciprocal biodiversity-development goals.

4.1. Diagnosis of the Current State of Mainstreaming

To execute a thorough, inclusive, and effective diagnostic assessment, meticulous management of the planning phase is essential. This preparatory phase includes critical steps such as stakeholder mapping to identify and engage relevant government agencies, NGOs, local communities, and the private sector for diverse perspectives. Clearly articulating the objectives of the diagnosis is vital to delineate which facets of biodiversity mainstreaming will be evaluated, including policy frameworks and stakeholder engagement. A robust data collection strategy must be formulated to acquire both qualitative and quantitative data, leveraging existing reports and databases. Selecting appropriate methodologies, such as surveys and interviews, is crucial for accurately capturing the current status. Establishing baseline conditions through the review of biodiversity indicators and practices, along with evaluating stakeholders' capacity to implement mainstreaming initiatives, are necessary. Additionally, a comprehensive communication plan ensures transparency in disseminating findings, while allocating requisite resources, devising a timeline with critical milestones, and identifying potential risks with mitigation strategies to further strengthen the foundation for a comprehensive diagnosis of biodiversity mainstreaming. Once the preparation phase is finalized, diagnosis of the current sates of biodiversity begins with a comprehensive assessment of existing policies, both long-term and short-term strategic frameworks, action plans, and other development-related initiatives that address biodiversity concerns. The team examines whether biodiversity considerations are incorporated into the vision of the target sector, subsector, or program. They further analyze whether both developmental and conservation outcomes are reflected in these plans and whether the implementation phase is adequately supported by budget allocations. Additionally, the team evaluates the presence of monitoring and evaluation mechanisms.

Depending on the scale of biodiversity integration, various documents can be utilized to assess the current state of biodiversity mainstreaming. At the national level, the team may refer to national policies and plans, overarching national visions, poverty reduction strategies, national budgets, multi-year development frameworks, land use plans, educational strategies, and other pertinent documents. At the sectoral level, sector development plans, sector strategies, and policies, sector investment programs, and related documentation can be scrutinized, and similar trends may be followed at the program/project level. At the local level, specific development plans, decentralized sector policies, and action plans from local governments and communities aimed at managing,

conserving, and sustainably utilizing biodiversity and ecosystems can serve as valuable sources of information.

For the sector-level diagnosis of the current state of biodiversity mainstreaming, the team may adopt the Assessment Framework derived from 'Rapid Diagnostic Tools' to assist policymakers and other stakeholders in understanding the degree to which biodiversity and development objectives are integrated at the sectoral level, as well as identifying the obstacles and constraints that must be addressed to facilitate further and more effective integration (mainstreaming diagnostic tool: www.iied.org/nbsaps). The diagnostic tools empower the team to evaluate various sector-specific issues and gather data essential for understanding the extent of biodiversity integration within the sector. This encompasses the overarching vision for biodiversity mainstreaming, the current state of knowledge regarding the linkages between development and biodiversity conservation, and the existing political and institutional frameworks that facilitate integration. Additionally, it includes an assessment of efforts undertaken thus far highlighting achievements, challenges encountered, and lessons learned as well as identifying existing opportunities to develop robust business cases.

While the identification and analysis of pertinent policy and planning documents serve as a valuable initial step, these documents alone are unlikely to furnish a comprehensive foundation for assessing the extent to which biodiversity issues are currently integrated into developmental decisions and vice versa. Therefore, the document review process must be augmented by engaging a diverse array of stakeholders, including government departments, non-governmental organizations (NGOs), community representatives, private sector entities, and other relevant organizations.

In this context, the diagnosis at the sector level could comprise:

- Understanding what progress has been made in mainstreaming biodiversity in the sector
- Map and analyze the mainstreaming approaches that have been adopted
- Assess how institutional structure and procedures support or inhibit biodiversity mainstreaming in the sector
- Examine performance within the institution and on the ground in terms of outcomes and impacts
- Identify areas of change and improvement

4.2. Identify and Define the Specific Biodiversity-Development Problems

The identification and characterization of biodiversity-development challenges represent a pivotal aspect of biodiversity mainstreaming. The main objective of this step is to understand which Biodiversity-Development problems should be integrated into national, sectoral, and sub-sectoral development plans and policies, and actions. This is done through the identification, measurement, and ranking of biodiversity-development problems. This process entails a rigorous scientific assessment that involves the systematic identification and prioritization of the principal threats to biodiversity. It also encompasses an analysis of the key economic sectors, development sectors, subsectors, initiatives, programs, and projects that are instrumental in driving these threats. Furthermore, this assessment not only identifies the immediate threats but also contextualizes them within broader socio-economic trends and policies. The assessment helps to recognize how specific initiatives and programs may exacerbate or mitigate these threats. For instance, agricultural expansion, urbanization, and industrial activities can significantly impact biodiversity, necessitating a nuanced understanding of their implications. The Biodiversity-development problems assessment team is advised to conduct such a comprehensive evaluation, which requires a multidisciplinary approach, integrating ecological, economic, and social dimensions, to fully understand the interplay between biodiversity and development.

Prior to initiating the biodiversity-development problem assessment, the technical and scientific teams must undertake several critical activities. First, stakeholder identification and engagement are essential for recognizing relevant entities such as government agencies, NGOs, local communities, and private sector representatives, facilitating early collaboration and insight gathering. Next, the objectives and scope of the assessment should be clearly defined, prioritizing specific biodiversity aspects and development goals. A comprehensive data collection plan must be developed to obtain necessary qualitative and quantitative data, identifying existing sources and any additional information needed. Capacity building is also crucial, equipping stakeholders with the training and resources needed for effective participation. A communication strategy should be devised to share information about the assessment process and findings with stakeholders and the broader community. Additionally, a timeline for assessment activities and resource allocation, including budget and personnel, should be established for efficient execution. Risk assessment involves identifying potential challenges and formulating mitigation strategies. Finally, the

preparation plan must be reviewed and finalized with stakeholders to ensure alignment before proceeding to the assessment phase, collectively ensuring a comprehensive and effective evaluation of biodiversity-development issues.

Based on previous assessments, biodiversity-development-related problem identification and description processes can be summarized into four fundamental steps. These steps are essential for understanding the complex interactions between biodiversity and development, ultimately guiding effective conservation and sustainable development strategies.

4.2.1. Setting methodology

During the assessment steps, the team should set methodologies that enable them to achieve the objectives of the assessment. While numerous methodologies have been established for analyzing the state and trends of biodiversity, it is crucial for the team to select appropriate techniques that align with their targeted spatial and temporal scales. The team is advised to use multifaceted methodologies that enable to assessment state of biodiversity at all its elements, identification of threats and driving factors; and ranking and linking the identified threats to the economic sector's and/or subsectors' activities. This enhances the richness and utility of the data to be generated. The methodologies implemented in initiatives such as the IUCN's BIODEV2030 program can serve as valuable frameworks. Specifically, the BIODEV2030 program has identified various methodologies tailored for nationwide biodiversity-development problem identification across eight pilot countries. The team may tailor this comprehensive approach encompassing four key methods: a thorough literature review, Species Threat Abatement and Restoration (STAR) metric analysis and mapping, expert-based threat elicitation, and non-expert-based threat assessments. Each of these methods contributes distinct insights, enabling a multifaceted understanding of biodiversity challenges and facilitating more effective conservation strategies (IUCN, 2020; Smith *et al.*, 2020).

In addition to the aforementioned methodologies, the integration of advanced ecological modeling techniques and remote sensing data can further enrich the analysis. Employing spatially explicit models allows for the exploration of biodiversity patterns in relation to anthropogenic pressures and ecological processes, providing a nuanced understanding of ecosystem dynamics. Moreover, leveraging citizen science and participatory approaches can augment data collection efforts,

particularly in regions where traditional survey methods may be logistically challenging. During the assessment, to consider a broader and inclusive range of biodiversity values the team should adopt conceptual frameworks. By synthesizing diverse data sources and methodologies, the team can achieve a more robust and holistic assessment of biodiversity status and trends, ultimately informing policy decisions and conservation actions that are grounded in empirical evidence and ecological theory (Bennett *et al.*, 2017; Pereira *et al.*, 2018).

4.2.2. Data collection

To generate informative results the team should collect all important data. The data could be both secondary and primary data. To collect secondary data:

- Review peer-reviewed scientific articles to explore scientific aspects
- Review existing national, sectoral, and subsectors official reports (such as reports to CBD, National Biodiversity Strategic Action Plans, Government Plans, Strategies, and road Maps as well as policies)
- Use existing global databases (such as the IUCN Red List of Threatened Species, the World Database on Protected Areas/WDPAs/, the World Database of Key Biodiversity Areas/WDKBAs/, the integrated Biodiversity Biodiversity Assessment Tool/IBAT/, FAO statistical data on deforestation)

For assessments focused on biodiversity and its threats, the team can adopt the DPSIR model—Drivers, Pressures, State, Impact, and Response—which systematically explores the interactions between human activities and environmental outcomes. In this framework, drivers are the forces causing changes in biodiversity, such as economic growth and population dynamics, while pressures refer to the resulting impacts, including habitat destruction and pollution. The State reflects the current condition of biodiversity, measured by metrics like species richness and ecosystem health. Impact evaluates how changes in biodiversity affect ecosystem services and human well-being, and Response addresses actions taken to mitigate threats, such as policy measures and restoration efforts. By employing the DPSIR framework, the team can analyze the relationships between human activities and biodiversity outcomes, enhancing understanding of challenges and informing targeted conservation strategies (Khan *et al.*, 2020). This structured approach aids in identifying key threats and improves communication among stakeholders, supporting evidence-based decision-making in biodiversity management.

The team is advised to collect primary data through a multifaceted approach that includes stakeholder interviews, focus group discussions, and participatory assessments, engaging both experts and non-experts within the nation. This methodology facilitates a comprehensive understanding of biodiversity states and trends, as it harnesses diverse perspectives and local knowledge. Stakeholder interviews provide qualitative insights into ecological conditions and perceived threats, while focus group discussions foster collaborative dialogue, enabling the identification of key issues and priorities among various stakeholders. Participatory assessments further enhance this process by actively involving community members in data collection, thereby ensuring that indigenous knowledge and experiences are integrated into the analysis. This triangulation of data sources not only enriches the dataset but also enhances the validity and reliability of the findings, ultimately informing more effective biodiversity management and conservation strategies.

4.2.3. Data Analysis

Once the data are collected, they undergo various analytical methodologies to yield interpretable and informative results. The team can utilize a range of analytical tools tailored to the nature of the collected data and the specific information requirements. For example, the team may implement the standardized typological classification system outlined in the IUCN Global Ecosystem Typology v2, recently developed by (Keith *et al.*, 2020), facilitate a comprehensive ecosystem-based approach to biodiversity assessment. This framework enables nuanced categorization and evaluation of ecosystems, thereby enhancing the robustness of the analysis and supporting informed decision-making in biodiversity management.

In the context of a species-centric approach, the team can aggregate data on the total number of species, genera, and families, as well as the counts of endemic species and globally threatened species, alongside population trends categorized as Decreasing, Increasing, Stable, or Unknown. Calculate the STAR score for species per threat. Try to fully use the potential of STAR. Use STAR metric to (i) threat abetment ($STAR_T$) and STAR restoration ($STAR_R$), (ii) facilitate ranking through splitting STAR score by threat, (iii) to identify areas with opportunities to abate the threat and restore habitats by mapping STAR score to target area, (iv), infer STAR metric to other species not included in the methodology. For species-level analysis aimed at reassessing threat levels and quantitatively evaluating the potential benefits of interventions for threatened and near-threatened

species, the team may employ the STAR (Species Threat Abatement and Restoration) metric. STAR serves to elucidate which specific actions—whether threat mitigation or habitat restoration—could influence the Red List Index (Mair *et al.*, 2023) for comprehensive details on the STAR methodology. Reclassify the main identified and described threats from the review using the IUCN-CMP 3.2 typology threats (Level 2) to facilitate the comparison result with the IUCN Red List and STAR metric result.

The team may concurrently employ quantitative analyses, including spatial mapping and statistical modeling, to produce empirical evidence of biodiversity trends and their correlations with developmental activities. Spatial mapping, facilitated by Geographic Information Systems (GIS), visualizes species distributions, habitat types, and ecological features, while Species Distribution Modeling (SDM) forecasts potential species distributions based on environmental variables. Habitat mapping assesses habitat quality and connectivity, essential for understanding species needs. Threat assessment mapping integrates biodiversity data with human activity information to identify areas of significant biodiversity loss, and remote sensing tracks land use changes and ecosystem health over time. Biodiversity indices derived from spatial mapping provide quantitative metrics that inform conservation efforts and policy-making aimed at ecological preservation.

Statistical modeling quantitatively evaluates biodiversity states and trends, employing techniques such as regression analysis to identify relationships between biodiversity metrics and environmental factors, and time series analysis to forecast future trends. Multivariate analysis examines interactions among indicators, while species abundance models assess population distributions relative to environmental conditions. Risk assessment models quantify extinction probabilities based on threats, and ecological niche modeling predicts species distributions under changing conditions. Collectively, these methods yield insights into biodiversity dynamics and guide effective conservation strategies. Additionally, advanced data synthesis techniques, such as meta-analysis and integrative frameworks, enhance the extraction of actionable insights from findings. This rigorous approach aids in identifying priority issues and developing targeted strategies that align biodiversity conservation with developmental objectives. By systematically addressing these interconnected challenges, the assessment team can contribute to sustainable solutions that benefit both ecological systems and human communities.

4.2.4. Reporting findings

This section of the biodiversity-development problem assessment delineates the current state and trends of biodiversity across various components within the country, grounded in the available empirical data. It succinctly summarizes biodiversity metrics at multiple scales, including ecosystem, species, and genetic levels, encompassing all biodiversity types—namely, flora, fauna (both domesticated and wild), and microbial genetic resources. Furthermore, it identifies and elucidates biodiversity-development challenges, along with their direct and indirect driving factors, which may include socio-economic pressures, land-use changes, and climate impacts (Sala *et al.*, 2000; Tesema, 2022).

The team is tasked with presenting their findings in a comprehensive and informative manner, utilizing diverse data visualization techniques such as figures, charts, tables, and conceptual frameworks. It is essential that the biodiversity-development issues are explicitly articulated, with a thorough discussion of their interactions and potential trade-offs. This approach will facilitate a deeper understanding of the complex interdependencies between biodiversity and developmental processes, thereby informing more effective conservation strategies and policy decisions.

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5. Identify elements of biodiversity to be mainstreamed

The identification and characterization of biodiversity-development challenges necessitate a comprehensive analysis of biodiversity states and trends across all components. These components encompass ecosystems—ranging from biomes and bioregions to specific ecological communities—alongside species populations and genetic lineages (Gaston et al., 2000). A holistic assessment of biodiversity-development problems must integrate these multifaceted elements to ensure that interventions are appropriately targeted and effective.

In conducting this analysis, it is imperative for assessment teams to systematically evaluate each of the three biodiversity components: ecosystems, species, and genetic diversity. This approach will facilitate the identification of critical leverage points where interventions may yield the most significant positive impact. For instance, interventions aimed at enhancing habitat connectivity may be more effective at the ecosystem level, while species-specific conservation actions may be necessary to address population declines (Harrison & Bruna, 1999). By employing a multi-scale analysis, the teams can discern patterns and relationships that inform strategic decision-making, ultimately leading to more sustainable biodiversity outcomes that align with developmental goals (Millennium Ecosystem Assessment, 2005). This integrative framework can support the formulation of targeted strategies for mainstreaming biodiversity into broader development agendas.

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6. Identify sectors and development goals into which biodiversity concerns that are to be mainstreamed

For biodiversity mainstreaming to be effective, it should occur across all levels of government and include all relevant stakeholders (IIED, 2013). Identifying national, sectoral, or local level 'entry points'. is among the important steps in the process of biodiversity mainstreaming. Biodiversity concerns should be internalized and integrated into existing and/or new sectoral and cross-sectoral structures, processes, and systems as well as a broader economic development or poverty reduction strategy in a way development efforts operate for conservation and sustainable use of biological diversity. It is important to make an overall assessment of major existing national and sectoral (e.g. agriculture, mining, industrial development) development policies, programs and projects, and climate change-related initiatives that are relevant to biodiversity mainstreaming efforts, and to identify possible conflicting priorities. Such assessments enable working groups to identify the right entry points and possible champions for biodiversity mainstreaming (UNDP-UNEP, 2009) (GIZ, 2019). Integrating biodiversity considerations throughout government and society may start at different entry points including different scales and levels of government, and/or in specific sectors and geographic areas (CBD, 2011). The most likely entry points for such mainstreaming include:

6.1. National-level entry points for mainstreaming

The national-level entry point is an important level for biodiversity mainstreaming. Usually, it is at this level that long-term strategies are developed. At the national level, mainstreaming involves incorporating biodiversity concerns into policies and processes that affect a wide range of sectors and activities with national and societal implications. Mainstreaming at the national level is most effective in promoting the integration of biodiversity concerns into specific sectors and in different levels of government to comprise a two-way relationship with development/production sector objectives. Mainstreaming interventions should be informed by an intimate understanding of the policy environment, the political economy, and the dynamics of power and influence.

Understanding the national development background thus ensures that mainstreaming interventions build on existing planning processes and budgeting cycles rather than creating additional burdens on institutions, donors, and the national treasury. However, it is critical to consider that modifying development strategies

through mainstreaming needs to be understood as good for both development and biodiversity conservation. Identifying and analyzing relevant policy documents can be a useful starting point to provide the basis for reviewing how well biodiversity issues are being addressed in development decisions. National Biodiversity Strategies and Action Plans (NBSAPs, National Development Plans (NDPs) National Vision (long-term development plan), five-year national development plan, national sustainable development strategy, Sustainable Development (OECD, 2018), and other relevant strategies and policies provide important entry points for mainstreaming at the national level. The national level entry point can also serve a country to track mainstreaming biodiversity at the UN Development Assistance Framework; and Bilateral Country Assistance Strategies (IIED, 2013).

6.2. Sub-national level entry points for mainstreaming

Sub-national strategies, plans, and programs are a particularly important entry-point for mainstreaming as decisions at this level are likely to have more direct impacts on biodiversity than decisions at the national level. This level includes district development plans and decentralized sector policies. Sub-national strategies, plans, and programs also include arrangements whereby local communities and/or indigenous people are recognized as the custodians of certain territories and/or resources (IIED, 2013). The local authorities should be encouraged to demonstrate that they are integrating biodiversity conservation into their relevant service areas. It is also important to understand customary rules and engage with traditional authorities. This can help local communities and/or indigenous people to recognize the value of biodiversity and ecosystem services and act to maximize the positive and minimize the negative impacts of their activities on biodiversity.

6.3. Sectoral level entry points for mainstreaming

Sectoral activity should be dependent on the sustainable use of biodiversity. The incorporation or mainstreaming of biodiversity targets in sectoral policies and plans (BPI) is regarded as critical for reversing biodiversity loss (Runhaar *et al*., 2024). Biodiversity mainstreaming should result in situations where overall biodiversity gains exceed biodiversity losses. At the sectoral level entry points include Sectoral policies, strategies, plans, and programs e.g. national water master plan, forest strategy, etc. The main actors may include Sectoral ministries and institutions such as agriculture (, fisheries, livestock, horticulture), forestry, aquaculture, education, environment, trade, planning, poverty reduction, food security, rural development, economy, and finance.

Most nationally important sectors have their planning processes from which relevant plans, programs, and policies emerge for the sector's development (e.g. National Forestry Action Plans, National Water Plans. The issues addressed in these programs relate directly to the use of biodiversity and ecosystem services and

are used as entry points for mainstreaming. In addition, international cooperation agencies and environmental NGOs target their support to country-led sector reforms, investment programs, and technical assistance. This sector-wide approach provides an important entry point for mainstreaming biodiversity concerns into sector strategies, plans, and programs.

6.4. Area-Based Management Initiatives

Area-based conservation of biodiversity refers to the strategy of protecting species by protecting and managing the places where they live, including by accruing additional benefits by connecting places via corridors. These can be large or small, within one country or spanning several national territories and jurisdictions. Such initiatives, often grounded in a common vision negotiated between multiple stakeholders and having socio-economic and environmental components, encourage stakeholder, sectoral, intergovernmental, and public-private collaboration in order to realize that vision (CBD, 2011). Area-Based Management Initiatives are important entry points for mainstreaming biodiversity into the management of specific spatial areas.

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7. Identify desired biodiversity and development outcomes

Identifying the desired outcomes that better link improvements in both development needs and biodiversity conservation is the crucial step for mainstreaming biodiversity (IIED, 2013). Separately, development goals and /or biodiversity conservation concepts aim at different objectives and thus produce separate outcomes.

Considering development goals that aim at economic and social priorities alone will unavoidably place conservation limits (Koziell and Saunders, 2001; Drutschinin, et al. 2015). On the other hand, considering biodiversity objectives alone may also imply restrictions on development needs or may suffer higher costs at least in the short term, while in some cases, it reinforces existing economic and social priorities (OECD/DAC, 2002; Drutschinin, et al. 2015). Therefore, promoting win-win options that support both biodiversity and development objectives in development policy and planning is essential. Thus, any biodiversity mainstreaming attempt needs to identify the desired biodiversity-development outcomes.

Achievable biodiversity-development outcomes need to be identified prior to mainstreaming. These outcomes may vary from influencing plans and policies to decisions and budgets with the overall impact in behavioral change and delivering environmental improvements on the ground. Therefore, implementing sectors/programs/projects may identify or select achievable and best-suited outcomes from the list mentioned below but are not limited to (Dalal-Clayton and Bass 2009).

7.1. Participation and democratic process outcomes

- Better communication of biodiversity and development stakeholders/shareholders
- Extended participation of stakeholders in making the case for the importance of biodiversity to development needs
- Enhanced participation of biodiversity-dependent/vulnerable stakeholders

7.2. Policy and political outcomes

- Advanced macro-economic, fiscal, development, and social policy, constitutions, and statements of national vision, that include biodiversity considerations
- Political leadership across all parties is broadly supportive of maintaining biodiversity in the development process

7.3. Plan outcomes

- Inclusion of biodiversity-development linkages in national development and poverty reduction strategies and sector plans and implementation strategies
- Biodiversity is reflected both as a sector or range of sectors (e.g. for biodiversity conservation and ecosystem service delivery) and as a cross-cutting issue for all other sectors in the plan (e.g. as safeguards and as potentials for co-benefits)

7.4. Budget and accounting outcomes

- Inclusion of biodiversity-development linkages in national and sector /program budgets

- Fiscal instruments informed by biodiversity-development linkages
- Evidence of public-private sector resource mobilization
- Inclusion of ecosystem services in national accounting systems

7.5. Institutional and capacity outcomes

- A range of appropriate tools/procedures to mainstream biodiversity on a continuing basis is available, recognized, and with adequate mandates, skills, and resources to employ them
- Strengthened capacity in key sub-sectors/programs to include biodiversity sustainability into their strategies
- Strengthened capacity within finance/planning sectors /programs to integrate biodiversity into budget decision-making
- Strengthened capacity within biodiversity institutions to understand development processes and interact in a constructive manner
- A range of systemic links between institutions are made, formal and informal, to ensure an improved flow of information and ideas
- Biodiversity is part of core educational and training curricula at all levels
- Biodiversity-development criteria are established as cross-cutting norms for planning and monitoring purposes

7.6. Investment and economic outcomes

- Improved domestic resource mobilization for biodiversity-poverty reduction investments
- Increased donor contributions to country-level biodiversity sustainable investment
- A coherent set of economic and regulatory tools and incentives promote and reward integration and added value while discouraging inappropriate behaviors

7.7. Behavioral outcomes

- Sustained behavioral change by individuals, institutions, and society, in both public and private domains – biodiversity is a normal, accepted, and expected part of doing business
- Key patterns and processes of production, consumption, and waste treatment in sectors and localities are informed by clear biodiversity considerations
- The media and public interest groups regularly address environment-development links

7.8. Pro-poor biodiversity management outcomes

- Pro-poor management of ecosystem services, such as medicinal, cosmetic, or edible plants; healthcare, wild foods, soil fertility; traditional breeds and crop varieties; water purification; cultural or religious benefits from biodiversity realized

7.9. Ultimate (biodiversity and developmental) impacts of outcomes

- Improved productivity and sustainability of use of biodiversity assets
- Risks from ecosystem hazards better managed through informed, targeted control mechanisms
- Improved and sustained income, safety nets, health, and livelihoods for individuals, companies, and the public from the use of biodiversity assets and economic growth
- Improved access to biodiversity and natural resources, especially for the poor

The biodiversity mainstreaming covers several possible outcomes, some of which will be a prerequisite to others. It is therefore important to know which levels are being aimed at. Some sectors/programs/projects may want to address all these outcomes, others may feel they have the appropriate policies and plans in place but this is not being translated into effective action on the ground, or vice versa.

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8. Shape communication strategy

A communication strategy for biodiversity mainstreaming is a targeted plan designed to integrate biodiversity considerations into various sectors of society by effectively conveying the importance and benefits of preserving biodiversity. It involves identifying key messages, audiences, and channels to raise awareness, influence behavior, and foster collaboration among stakeholders (Chirwa and Boikanyo, 2022). Communication is the key to gaining support for implementing activities toward the conservation and sustainable use of biodiversity. After all, no one wants to conserve something they do not know or care about. Biodiversity will need to become an urgent priority at national and local levels. This will require a robust communication strategy for Biodiversity mainstreaming (CBD Secretariat, 2007). Effective communication is essential to bring the changes in policy, norms, and behavior that are required for biodiversity mainstreaming. There must be strong communication throughout the mainstreaming stages; it is vital during problem articulation, stakeholder engagement, and business case development. Approach to shaping a communication strategy that effectively mainstreams biodiversity across various sectors and policies in Ethiopia, with illustrative examples to demonstrate the strategy in action are presented as follows.

8.1. Understanding the Context and Identifying Stakeholders

The first step in shaping a communication strategy is to thoroughly understand the national context, including the current state of biodiversity, existing policies, and the key sectors that interact with biodiversity (CBD Secretariat, 2007). In Ethiopia, agriculture, forestry, water management, and tourism are among the sectors most directly linked to biodiversity. Identifying and engaging stakeholders from these sectors is critical. Stakeholders include government ministries, local communities, the private sector, non-governmental organizations (NGOs), and international partners.

A communication strategy could involve collaborating with this ministry to promote sustainable farming techniques that enhance biodiversity, such as agroforestry, which combines crops with trees and supports ecosystem health. Workshops and training sessions could be organized to demonstrate the benefits of such practices, helping to build support for biodiversity-friendly policies within the agricultural sector.

8.2. Integrating Biodiversity into Policy Frameworks

To mainstream biodiversity, it is essential to embed it within the policy frameworks of key sectors. The communication strategy should focus on advocating for the inclusion of biodiversity considerations in sectoral policies, development plans, and national strategies. This can be achieved by providing evidence-based information that illustrates the economic, social, and environmental benefits of biodiversity. For example, a targeted communication effort could be directed at the tourism sector, which has the potential

to significantly impact biodiversity. The strategy could involve producing policy briefs that showcase the economic value of biodiversity-rich areas, such as national parks, as attractions for eco-tourism. These briefs could also suggest sustainable tourism practices that minimize environmental impact, such as community-based tourism initiatives that involve local populations in conservation efforts. By demonstrating the financial benefits of conserving biodiversity to the tourism industry, the strategy can encourage the integration of biodiversity considerations into tourism policies and practices.

8.3. Utilizing a Multi-Channel Approach

Effective communication begins with raising awareness about the importance of biodiversity and its benefits across different sectors. The strategy should aim to increase understanding among policymakers, industry leaders, and the general public about how biodiversity supports economic stability, food security, and climate resilience. This requires creating and disseminating clear, compelling messages that resonate with diverse audiences(CBD, 2016). To reach and engage different audiences, the communication strategy should employ a multi-channel approach. This involves using a combination of traditional media, such as newspapers and radio, along with digital platforms, including social media, websites, and online forums. Each channel should be selected based on its effectiveness in reaching the target audience.

For instance, in rural areas where internet access may be limited, community radio programs can be an effective way to reach farmers and local leaders. These programs could feature discussions on how traditional land management practices, such as rotational grazing, can support biodiversity and improve agricultural productivity. Likewise, social media campaigns can be used to engage urban audiences and younger generations, who are more likely to be active online. Through interactive content, such as videos, quizzes, and infographics, the strategy can educate and inspire these audiences to support biodiversity initiatives (CBD, 2016). Additionally, the strategy could involve producing documentary films that highlight successful biodiversity conservation projects across Ethiopia. These films could be screened on national television, at community events, and in schools, providing a powerful visual narrative that underscores the importance of biodiversity and the need to protect it. By using multiple communication channels, the strategy ensures that biodiversity messages are widely disseminated and resonate with different segments of the population (CBD, 2016).

8.4. Building Strategic Partnerships

Collaborating with a range of partners can significantly enhance the impact of the communication strategy. Partnerships with NGOs, research institutions, and international organizations can provide additional resources, expertise, and platforms for advocacy. These partnerships can help amplify the reach of biodiversity messages and support the integration of biodiversity into sectoral policies (CBD Secretariat, 2007). For example, a partnership with an international conservation organization could provide technical

assistance in developing communication materials and conducting research to support policy advocacy. This organization could also help facilitate dialogues between different sectors, bringing together stakeholders to discuss common goals and challenges related to biodiversity mainstreaming. By building strong partnerships, the communication strategy can leverage global best practices and resources while ensuring that the approach is tailored to Ethiopia's specific needs and context.

8.5. Media Monitoring and Evaluation

Media monitoring and evaluation are key in shaping a communication strategy for biodiversity mainstreaming. By tracking media coverage, teams can gauge public sentiment, identify trends, and assess the effectiveness of their messaging. This insight allows for timely adjustments to communication tactics, ensuring that messages resonate with target audiences and effectively promote biodiversity goals. Continuous evaluation helps refine strategies, improve outreach, and enhance the overall impact of the communication efforts in promoting biodiversity conservation.

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9. Identify and engage stakeholders who might support or undermine progress toward desired outcomes

Identifying and engaging stakeholders who might support or undermine progress towards desired outcomes involves mapping out all relevant parties, including community members, government agencies, NGOs, and private sector actors. Conducting stakeholder analysis helps assess their interests, influence, and potential impact on the programs. Engaging supportive stakeholders early fosters collaboration, while addressing concerns of those who might undermine progress through dialogue and negotiation can help mitigate conflicts. This proactive approach ensures a more cohesive effort toward achieving biodiversity goals.

9.1. What is a stakeholder?

A stakeholder is any individual, group, organization, or entity that has an interest in or is affected by biodiversity and its integration into various sectors of society. Stakeholders include those with vested interests in or influence over the natural resources of an area, those who have something to gain or lose

based on a program's intended outcomes, and/or those implementing or supporting conservation strategic approaches (Macey *et al.*, 2017). These stakeholders can include:

- **Government agencies**: Ministries and departments responsible for agriculture, forestry, fisheries, urban planning, and environment, which have a direct impact on biodiversity.
- **Local communities and Indigenous peoples**: Groups whose livelihoods, cultures, and traditions are closely tied to natural resources and biodiversity.
- **Private sector**: Businesses and industries, especially those involved in sectors like agriculture, forestry, fisheries, tourism, and construction, which can have significant impacts on biodiversity.
- **Non-governmental organizations (NGOs) and civil society**: Organizations advocating for environmental protection, conservation, and sustainable development, which play a role in influencing policy and practices.
- **Academia and research institutions**: Universities and research centers that provide scientific knowledge and research on biodiversity and its importance.
- **International organizations:** Multilateral bodies like the United Nations, World Bank, and other international entities that provide guidance, funding, and support for biodiversity conservation efforts.
- **General public:** Citizens and consumers whose awareness and behavior can influence biodiversity through their choices and actions.

9.2. What is stakeholder engagement?

Stakeholder engagement in biodiversity mainstreaming refers to the process of actively involving various interested parties including governments, businesses, communities, non-governmental organizations (NGOs), and indigenous peoples in integrating biodiversity considerations into policies, practices, and decision-making across different sectors of society (Erin *et al.*, 2018). Importance of stakeholder engagement in biodiversity mainstreaming.

Stakeholder engagement is vital in biodiversity mainstreaming because it brings together diverse groups: governments, businesses, communities, NGOs, and indigenous peoples to collaboratively address the challenges of preserving and sustainably managing ecosystems. This collective involvement ensures that various perspectives and knowledge systems are integrated, leading to more effective and inclusive policies and actions. By fostering collaboration, stakeholder engagement enhances the chances of achieving sustainable outcomes and builds shared responsibility for biodiversity conservation (CBD, 2007).

9.3. How can stakeholders be engaged in Biodiversity Mainstreaming?

Box 9.1 Key importance of stakeholder engagement in Biodiversity Mainstreaming

1. **Inclusive Decision-Making:** Ensures that diverse perspectives and knowledge systems are considered, leading to more effective and comprehensive policies.
2. **Collaboration and Partnerships:** Facilitates cooperation among different groups, enhancing the collective ability to address biodiversity challenges.
3. **Shared Responsibility:** Promotes collective ownership of biodiversity goals, increasing commitment and accountability among stakeholders.
4. **Awareness and Education:** Raises awareness of biodiversity's value, encouraging sustainable practices across various sectors.
5. **Conflict Resolution:** Helps identify and address potential conflicts between different interests, finding balanced solutions that benefit both people and nature.
6. **Policy Integration:** Ensures that biodiversity considerations are embedded in broader economic, social, and environmental policies, supporting sustainable development.

Stakeholders can be engaged in biodiversity mainstreaming by involving them in program design, early in the planning process, understanding their motivations, and aligning program goals with their interests. Regular communication, participatory decision-making, and incorporation of local knowledge ensure that stakeholders feel valued and invested. Additionally, fostering local leadership and designing culturally relevant engagement activities help build long-term commitment and support for biodiversity initiatives (Erin *et al*., 2018).

9.3.1. Analyze the programmatic, socioeconomic, political, and social contexts to inform program design.

Analyzing the programmatic, socioeconomic, political, and social contexts is vital for designing a program that is both effective and relevant. This process involves assessing the specific goals and existing

conservation efforts (programmatic context), understanding local economic conditions and livelihood needs (socioeconomic context), and navigating the regulatory environment and power dynamics (political context). Additionally, it requires considering cultural norms and community values (social context). By integrating these insights, the program can be tailored to address local realities, ensuring it is well-aligned, culturally sensitive, and sustainable(Gonzalez and Jentoft, 2011).

9.3.2. Plan for consistent and sustained support of engagement efforts

Planning for consistent and sustained support of engagement efforts in biodiversity mainstreaming is crucial for long-term success. This involves setting clear goals and timelines, ensuring regular communication with stakeholders through various channels, and building strong, trusting relationships. Allocating resources, including dedicated personnel and funding, is key to maintaining these efforts (Gray *et al.*, 2012). Additionally, continuous monitoring and adaptation based on feedback ensure that engagement remains effective and responsive.

Finally, it's important to monitor and evaluate the effectiveness of engagement activities regularly. By assessing what works well and where improvements can be made, teams can adapt their strategies to better meet stakeholder needs and sustain their involvement. This iterative process helps keep engagement efforts dynamic and responsive, ensuring that stakeholders remain committed and invested in the program's success.

9.3.3. Gauge their level of interest and influence

To gauge their level of interest, teams can conduct surveys, interviews, or focus group discussions to understand stakeholders' perspectives, priorities, and concerns regarding biodiversity issues. This engagement helps clarify how stakeholders perceive the program and what aspects they consider most important. Additionally, assessing the influence of each stakeholder involves examining their ability to impact decision-making processes, resource allocation, and overall program success. Stakeholders with high influence and interest should be prioritized in engagement efforts, as they can significantly affect the program's trajectory.

By thoroughly identifying and analyzing stakeholders' interests and influence, teams can develop targeted engagement strategies that address specific concerns, foster collaboration, and ultimately enhance the effectiveness of biodiversity mainstreaming initiatives. This systematic approach ensures that stakeholders are not only recognized but also actively involved in shaping the outcomes of the program (Macey *et al.*, 2017).

9.3.4. Assess different stakeholder perspectives and values

This process involves actively listening to and understanding the diverse viewpoints held by various stakeholders, recognizing that each group may prioritize different aspects of biodiversity based on their unique experiences, cultural backgrounds, and interests. To begin this assessment, teams should conduct stakeholder interviews, surveys, or workshops that encourage open dialogue. This allows stakeholders to express their concerns, values, and aspirations regarding biodiversity and the program's objectives. By facilitating these conversations, teams can gain insights into the environmental, economic, and social values that different stakeholders associated with biodiversity, such as conservation, sustainable livelihoods, or cultural heritage (Gore and Kahler, 2012). Additionally, it is important to identify potential conflicts or synergies between stakeholder perspectives. Understanding where values align or diverge can help teams navigate complex relationships and address potential disagreements proactively. This awareness enables the development of strategies that integrate diverse values into the program, promoting a sense of ownership and collaboration among stakeholders.

Box 9.2 Follow the Evidence

For instance, women and men in villages within two communal conservancies in Namibia had different human-wildlife conflict risk perceptions, as women had greater "worry" for conflict's effects on local livelihoods. One implication of this finding was that if strategic approaches to reduce human-wildlife conflicts were framed solely in terms of male-oriented viewpoints they might discourage participation by women, for whom these issues were just as relevant. This could be overcome by designing interventions that targeted the perceptions and needs of both women and men.

Source: (Gore and Kahler, 2012).

9.3.5. Understand stakeholder motivations

Understanding stakeholder motivations is essential for effective engagement. By identifying what drives stakeholders whether it's economic benefits, environmental concerns, or cultural values teams can tailor their strategies to align with these interests. This insight helps in building trust, fostering collaboration, and addressing potential conflicts early on. Knowing stakeholders' motivations ensures that the program resonates with their priorities, increasing their commitment and support for biodiversity initiatives. For instance, local communities might prioritize sustainable livelihoods, while government agencies may focus on regulatory compliance or economic development. By understanding these diverse motivations, teams can identify potential areas of synergy as well as conflicts, allowing for more effective negotiation and collaboration (Sterling *et al.*, 2017).

9.3.6. Design engagement efforts to reflect local values and culture

Designing engagement efforts to reflect local values and culture is central for ensuring community buy-in and program success. This involves understanding local traditions, beliefs, and practices, and incorporating them into the engagement strategy. Tailoring communication methods and activities to align with these cultural norms fosters trust, respect, and relevance. By doing so, the program becomes more inclusive and resonates better with the community, leading to stronger support and more sustainable outcomes. It is also crucial to foster inclusive participation, ensuring that diverse voices, including marginalized groups, are heard and valued.

Box 9.3 Follow the Evidence

For example, A program in Ghana unsuccessfully attempted to introduce and train local communities living around a protected area in alternative livelihood strategies. The attempts failed because the strategies promoted livelihood activities with no tradition or history in the region and did not address human-wildlife conflicts. The sole exception was an eco-tourism plan that was co-developed with the community and highlighted existing cultural attractions in the village, as well as ecological sites of interest in the nearby park. In this case, the enterprise rooted in community tradition helped the village to generate employment and sustain its culture despite restrictions on access to the protected area.

Source : (Appiah-Opoku, 2011)

9.3.7. Involve stakeholders early in the process.

By engaging stakeholders from the outset, teams can gain valuable insights into their needs, concerns, and expectations, which helps to shape the program's objectives and strategies. Early involvement fosters a sense of ownership among stakeholders, making them feel valued and respected as key contributors to the initiative. This proactive approach can also identify potential challenges and areas of conflict before they escalate, allowing teams to address issues collaboratively and develop solutions that reflect the interests of all parties involved. Early engagement facilitates open communication, enabling stakeholders to provide feedback and share their knowledge, which can enhance the program's design and implementation. Additionally, involving stakeholders from the beginning helps build trust and strengthen relationships, which are essential for long-term collaboration. By demonstrating a commitment to inclusivity and transparency, teams can encourage ongoing participation and support throughout the project lifecycle (Gaymer *et al.*, 2014).

9.3.8. Build continued stakeholder involvement in program or activity design.

This approach begins by incorporating mechanisms for ongoing communication and feedback throughout the program's lifecycle. Teams should establish regular check-ins, updates, and opportunities for stakeholders to provide input on program progress, challenges, and adaptations.

Creating advisory committees or working groups that include diverse stakeholder representatives can facilitate collaboration and ensure that multiple perspectives are considered in decision-making processes. These groups can help identify emerging issues and co-develop solutions, reinforcing stakeholders' sense of ownership and commitment to the program. Additionally, it is important to design activities that encourage active participation from stakeholders. This can include workshops, training sessions, and community events that not only inform but also empower stakeholders to contribute their knowledge and skills to the initiative. Providing incentives for participation, such as recognition, capacity-building opportunities, or tangible benefits, can further motivate ongoing involvement (Sterling *et al.*, 2017).

9.3.9. Include multiple sources of knowledge in decision-making.

Including multiple sources of knowledge in decision-making is essential for developing well-rounded and effective biodiversity initiatives. This approach recognizes that diverse perspectives contribute to a richer understanding of complex ecological, social, and economic issues. By integrating scientific research, traditional ecological knowledge, and local community insights, teams can create more robust and informed strategies that address the multifaceted nature of biodiversity conservation (Tengö *et al.*, 2014). Engaging with academic institutions, research organizations, and environmental experts provides access to the latest scientific findings and best practices. This scientific knowledge can inform evidence-based decision-making and help identify effective conservation methods. At the same time, incorporating traditional ecological knowledge from local communities enriches the understanding of local ecosystems, cultural practices, and sustainable resource management techniques that have been passed down through generations.

Facilitating dialogue between different knowledge holders such as scientists, local practitioners, indigenous groups, and stakeholders creates opportunities for collaborative learning and mutual respect. This dialogue can take place through workshops, forums, or community meetings, where participants can share their experiences, insights, and solutions to common challenges. Moreover, employing participatory research methods can empower stakeholders to contribute actively to data collection and analysis, ensuring that their voices and knowledge are recognized in the decision-making process. By valuing and incorporating multiple sources of knowledge, teams can enhance the relevance and effectiveness of their initiatives, leading to more sustainable and adaptive outcomes in biodiversity conservation. This inclusive approach

not only strengthens community engagement but also fosters resilience in the face of environmental changes and uncertainties (Tengö *et al.*, 2014).

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10. Identify enabling factors for mainstreaming

The process of putting biodiversity on the agenda of another ministry to find common grounds to work together and to identify common objectives needs relationship building. Mainstreaming biodiversity needs enabling environments that can help in influencing a policy, plan, or budget of a sector which in turn needs changing particular behaviors, attitudes, and positions. This can be achieved through the cooperation of stakeholders in government (e.g. other ministries and departments) and other segments of society associations, communities, NGOs, media, etc.). For biodiversity mainstreaming to be effective, understanding the political context and development objectives are also very important.

Working groups should identify key enabling factors that might need to be addressed in the mainstreaming process: The existence or absence of these factors in your context will help you to shape the specific approaches to take in your mainstreaming process and the tools to use. Existing enabling factors that need to be worked with might include:

10.1. Political will and leadership

Biodiversity mainstreaming is significantly dependent on the political economy and institutional issues. It is a political process; politicians need to be better engaged and understand the political risk of not addressing biodiversity. Political support and buy-in are essential as successful mainstreaming requires leadership, political wisdom, and good information. Though, it requires an understanding of the political economy surrounding biodiversity and development, and the dynamics of power and influence that will affect the decisions made: whether they work for biodiversity, for development, for both – or neither (Mainstreaming Biodiversity Development, 2012). Those processes need awareness and political will from the highest levels to provide support for implementation (Huntley and Redford 2014).

Demonstrating long-term impacts associated with the improved status of biodiversity and human well-being can help to enhance the political interest in biodiversity conservation. Encouraging political will, engaging with champions for biodiversity, development, finance, and civil society can be considered as guiding principles for effective mainstreaming. In general concept of working to receive political, social, and

financial support and to modify development policy towards biodiversity mainstreaming is good to take advantage of rapid socio-political change, social and political interventions implemented by the government such as poverty reduction strategies, National Development Plan, and Green economy initiatives. “Hot moments for biodiversity conservation” occur through unexpected political change, law and institutional reforms, new technologies, or macro-economic dynamics that offer special opportunities for inserting mainstreaming processes (Huntley and Redford, 2014).

10.2. Media and public perception and awareness of values

Biodiversity conservation planners need to think differently about using communication, education, and public awareness rather than just making scientific information available to the public. Communication and public awareness activities should be targeted to different stakeholders in order to gain support for mainstreaming. Using a wide range of means to make voices heard and learn others’ perspectives on shared problems and increasing the information base can create ownership and leadership amongst key players in public and private governance for biodiversity conservation. Mass media - print, broadcast and digital can be used as an important means of informing large portions of the public and of stimulating dialogue on biodiversity conservation issue in society. Mass media can be used to exert some influence on decision-making. It also plays an important role in promoting conservation and encouraging governments to do so. The mass media can appeal still to national pride by publishing or airing information about nature and natural treasures, with a positive perspective that can to exert some influence on decision-making.

Public opinion can become so strong as it pressurizes government decision-makers and the private sector to change policies and practices. Providing information about mainstreaming strategies, and future activities can help to engage interest groups in its process. Lobbying inputs through public meetings, workshops, and the media, and capacity building to facilitate participation, are key steps in the guidelines for plan and preparation during biodiversity mainstreaming. Lobbying biodiversity mainstreaming issues through public meetings, workshops, and the media should be practiced. The media drew attention to the potential environmental impacts of significant projects, stressing the implications for people’s livelihoods and encouraging increased public involvement. It is also important to take a long-term perspective to develop relationships with the press and to inspire journalists to better appreciate biodiversity issues.

10.3. Cross-sector coordination

Since biodiversity mainstreaming can focus at local, national, or global levels, it might entail working with government agencies, civil society, and private sector organizations. For biodiversity mainstreaming to be effective, it should occur across all levels of government and include all relevant stakeholders (IIED, 2013). Mainstreaming requires clear institutional mandates and strong vertical and horizontal coordination

mechanisms. Identifying the roles and responsibilities of different institutions in the process of biodiversity mainstreaming is important, as it helps to enhance transparency and accountability. Therefore, it requires cross-sector coordination to strengthen links and actions between sectors and associated public and private sector institutions that affect and/or benefit from biodiversity.

Sectoral plans and programs are ideally developed with the participation of a wide range of civil society actors. To mainstream biodiversity into these plans and programs biodiversity experts need to participate actively in these processes at as early a stage as possible. Such participation can be very helpful in the biodiversity mainstreaming processes. Mainstreaming in single sectors needs to be complemented by mainstreaming work in cross-sectoral dimensions.

10.4. Stakeholder participation

Mainstreaming can be initiated and supported by different stakeholders, including the government, civil society, local and indigenous communities, and the private sectors. Stakeholders can be ministries, government agencies, private sector associations, local governments, landholders, women's groups or community associations. Successful mainstreaming starts with identifying the major institutions with a mandate for biodiversity, those for development, and those for integration, as well as particular players who present strong potentials or threats to mainstreaming (IIED and UNEP-WCMC, 2017). Mainstreaming proponents should consider all views of biodiversity and ensure that information delivered on biodiversity is relevant to different actors. For each biodiversity issue decide in advance to what extent or for what purpose, you are going to engage with each stakeholder group. Such actions can create great opportunities for identifying co-benefits, underlying causes of biodiversity problems, and promoting reciprocal mainstreaming (Smith *et al*., 2020). Stakeholder participation is used to promote synergies for the benefit of multiple stakeholders. Such engagements can create great opportunities for identifying co-benefits, and underlying causes of biodiversity problems. Stakeholder participation enhances win-win' biodiversity and development goal achievements. Working groups should ensure transparency and multi-stakeholder involvement in the mainstreaming process by promoting open, multi-stakeholder dialogues.

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11. Identify approaches and tools to achieve dual biodiversity and development outcomes

Achieving both the biodiversity and development outcomes needs the identification and use of suitable approaches and tools (IIED, 2013). Several approaches and tools may be needed. Some of them are needed to make a business case (for example, valuation and strategic environmental assessments) while others to enable the necessary policy and legal reforms. Moreover, certain approaches and tools can help to bring about the required reforms, such as education, partnerships, spatial planning land use planning and economic incentives. The latter may include payment for ecosystem services schemes and revenue-sharing mechanisms (CBD, 2011).

According to CBD (2011), numerous approaches and tools exist for mainstreaming biodiversity into the economic sectors /programs /development goals. This section will provide a brief overview of some of the most commonly used approaches and tools. Although some of these approaches and tools are more commonly used at one entry point or another, they are not specific to any given sector or level of government. Some of the most commonly used approaches and tools are listed and discussed below.

11.1. Approaches

11.1.1. The ecosystem services approach

This approach uses the Millennium Assessment's ecosystem services framework to help policymakers identify how their decisions depend on, and impact biodiversity, and to understand, analyze, and maximize both biodiversity and human-wellbeing benefits in their decisions (Ranganathan, 2008; CBD, 2011). The approach recommends the following five-step process for assessing the risks and opportunities inherent in decisions regarding activities that depend on and affect ecosystem services. These steps indicate where the technical team goes to work.

- Identify the ecosystem services in play
- Screen the ecosystem services for relevance
- Assess the condition and trends of the relevant ecosystem services
- Assess the need for an economic valuation of services
- Identify ecosystem service risks and opportunities

This approach also proposes scenario planning as a way to systematically explore possible alternative futures stemming from different decisions and how they may affect direct and indirect drivers of ecosystem change. The scenario approach is one tool for looking into the future, especially useful when considering the links between ecosystem services and development (Ranganathan, 2008). Finally, the approach guides on choosing and implementing policies to sustain the ecosystem services that underlie development. The Ecosystem services approach is designed to be incorporated into existing decision-making processes and to be used by decision-makers at all levels of governance and in different sectors (Ranganathan, 2008). For more information about the ecosystem services approach, its steps and guidance please follow the following link http://pdf.wri.org/ecosystem_services_guide_for_decisionmakers.pdf.

11.1.2. Environmental Impact Assessment (EIA) / Strategic Environmental Assessment (SEA)

Integrating EIA requirements into development planning can be a powerful approach to mainstreaming (CBD, 2011). This can be done by incorporating the findings of EIAs into planning and/or by using SEA to guide planning processes. SEA identifies and evaluates the possible consequences of policies, plans or programs, before they are implemented, to ensure that they balance economic, social, and environmental objectives. It is particularly useful in drawing attention to interrelated ecosystem services and in addressing trade-offs between them. Many countries have passed laws requiring EIAs and/or SEAs for new developments. Likewise, many donors have incorporated SEA requirements into their development assistance procedures and/or into specific Country Assistance Strategies/Plans (CBD, 2011).

The CBD Open-ended working group prepared the Akwé: Kon Voluntary Guidelines in order to ensure that projects and programs with a potential impact on indigenous and local communities undergo an appropriate impact assessment process (CBD, 2004a). It is expected that the procedures and methodologies embodied in the Voluntary Guidelines will play a key role in providing information on the potential cultural, environmental, and social impacts of proposed developments, thereby helping to prevent adverse impacts. For more information about the Akwé: Kon voluntary guidelines, please follow the following link https://www.cbd.int/doc/publications/akwe-brochure-en.pdf.

11.1.3. The CBD Ecosystem Approach

The ecosystem approach is a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way (CBD, 2004b; CBD, 2011). Thus, the application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: (1) conservation, (2) sustainable use, and (3) the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems. The ecosystem approach requires adaptive management to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning.

According to CBD (2004b), the ecosystem approach provides a framework of 12 principles that can be used to guide planning processes at national and sub-national levels in order to ensure that policies, plans, and programs consider biodiversity alongside economic and social objectives. With its provisions for the accommodation of different uses and interests in biodiversity, for the recognition of the interconnectedness of ecosystems, and for stakeholder participation and adaptive management, the ecosystem approach is an effective guide for mainstreaming. By its very nature, it also provides for integration between various sectoral interests. Rather than providing a fixed method, the ecosystem approach's 12 principles are to be used flexibly and with varying weights assigned to them, according to the context. For more information about the principles of the CBD ecosystem approach, its steps and guidance please follow the following link https://www.cbd.int/doc/publications/ea-text-en.pdf (CBD, 2004b).

In applying the 12 principles of the ecosystem approach, the following five points are proposed as operational guidance.

- Focus on the functional relationships and processes within ecosystems
- Enhance benefit-sharing
- Use Adaptive Management Practices
- Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to the lowest level, as appropriate
- Ensure inter-sectoral cooperation

11.1.4. Spatial Planning

Spatial plans provide an important opportunity for mainstreaming biodiversity into sectoral and cross-sectoral plans as they determine where economic activities and infrastructure developments are established. Dealing with specific spatial areas and the activities undertaken within them, spatial planning also provides for the coordination of different sectors /sub-sectors and tiers of government. Many countries have begun to integrate environmental and sustainability objectives into spatial plans opening a door for biodiversity. While spatial plans were once the exclusive domain of national governments, they are now also used in sub-national planning. Many spatial planning processes are becoming more democratic than before inviting the input and expertise of a range of stakeholders.

11.2. Tools

11.2.1. Ecosystem Service Indicators

Indicators, used to assess progress, can be valuable in mainstreaming because they facilitate the understanding and appreciation of the complex relationships between biodiversity and human well-being. They can be used to raise awareness of key actors, to motivate action, and to monitor progress toward sustainability. Of particular interest to the mainstreaming effort are Ecosystem service indicators, whereby ecosystems' capacities to render ecosystem services are measured (CBD, 2011). Some Examples of Ecosystem Service Indicators include

- Provisioning of Food
    - Crop production from sustainable [organic] sources in tons and/or hectares
    - Livestock from sustainable [organic] sources in tons and/or hectares
- Provisioning of Raw Materials
    - Industrial round wood in million m^3 from natural and/or sustainable managed forests
    - Cotton production from sustainable [organic] resources in tons and/or hectares
- Regulation of Air Quality
    - Atmospheric cleansing capacity in tons of pollutants removed per hectare
- Recreation and Eco-tourism
    - Number of visitors to protected sites per year
    - Amount of nature tourism

11.2.2. Legal Instruments

Biodiversity considerations may be integrated into a country's legal framework. This can be done at national or sub-national levels. Laws can also be designed specifically for a sector or an economic activity.

Laws governing the ownership, access, and use of natural resources are particularly important for the protection and sustainable use of biodiversity. They can be instituted to encourage, control, or prohibit particular uses. When instituting such laws, it is crucial that pre-existing customary laws, governance, and management structures be understood and considered, allowing new legal instruments to complement those that promote sustainable and equitable use.

As with other tools, strategies, and approaches (particularly economic instruments), legal instruments designed for specific sectors should take into account their effects on other sectors. Likewise, they should consider the full range of stakeholders and other civil society groups likely to be affected.

Examples of Legal Instruments Used to Mainstream Biodiversity

- **Algeria – Coastal Law, 2002:** Prohibits construction within 300 meters of the coast, and prohibits the building of roads within an 800-meter band parallel to the coast, on coastal dunes, dune ridges, and upper parts of beaches. Institutes a Coastal land use plan.
- **Algeria – Law on the Protection of the Environment in the Context of Sustainable Development, 2003:** Permits national biodiversity strategies and action plans to be better integrated into economic sectors. Conservation and sustainable use of biodiversity are integrated into sectoral and inter-sectoral plans.
- **Cambodia- Fishery Law, 2006:** Requires fishery management to be based on the ecosystem approach and emphasizes fish habitat conservation.
- **Spain –Law on Environmental Responsibility, 2007:** Requires operators of economic or professional activities that will, or might have environmental impact to adopt measures to prevent, avoid, or repair damages, and to pay the costs of doing so. Also requires the operators to communicate environmental damages. This law complements laws on EIA and SEA.
- **Lebanon- Hunting Law, 2004:** Aims to make hunting sustainable; refers explicitly to CBD; establishes hunting season, bans hunting for certain species, prohibits nest snatching, taking, destroying, selling, etc. establishes breed centers for selected game species.

11.2.3. Economic and Financial Tools

Economic and financial tools can be particularly useful in mainstreaming because economic forces underlie and explain biodiversity degradation and loss. These tools aim to "correct" or modify these economic forces and/or to put other economic forces into play, which favor the conservation and sustainable use of biodiversity. Economic and financial tools that can be useful in mainstreaming efforts include:

- ***Economic valuation***

- ***Removal, phasing out, or reform of harmful subsidies and other incentives that are harmful to biodiversity***
- ***Positive incentive measures such as for instance, payments for ecosystem services***
- ***Taxes, user fees, and other disincentives that apply the polluter-pays principle***

These economic and financial tools are best implemented in combination and embedded in a sound regulatory framework, as part of a broader policy mix aiming to create economic conditions and structures that are favorable to biodiversity conservation, sustainable use, and fair and equitable benefit sharing.

Economic Valuation

Economic and non-economic valuation methods are used to quantify the value of biodiversity. They can provide useful and reliable information for decision-making when applied carefully according to best practices. Application of these methods can be useful in distinguishing between short-term and long-term economic costs and benefits (immediate costs of conservation vs. long-term gains) and may assist in answering who should pay the costs of conservation (developers vs. local communities).

The choice of valuation tools depends on which biodiversity values are thought to be most relevant in a particular context. Different valuation tools may be combined or used in parallel to assess different biodiversity values, and the use of non-economic valuation tools can be helpful, particularly when certain biodiversity values are difficult to measure accurately using economic tools.

Removal, phasing out, or reform of incentives, including subsidies, that are harmful to biodiversity

Incentives that are harmful to biodiversity emanate from policies or programs that induce unsustainable behavior harmful to biodiversity, often as unanticipated (and unintended) side effects of policies or programs designed to attain other objectives. Subsidies to sectoral production, including energy, fisheries, agriculture, and others, are estimated at hundreds of billions of dollars annually. Among those, subsidies that support environmentally harmful practices, thus putting them at an advantage over more sustainable processes, are a significant concern and experience shows that their removal or reform can reduce environmental pressures, increase economic efficiency, and reduce fiscal burden. The removal of harmful subsidies can be done in isolation but undertaking it in a broader process of fiscal reform would enable not just addressing environmentally harmful effects, but rather taking a multi-criteria, holistic approach, which would also include the cost-effectiveness and the social effects of subsidies.

Positive Incentive Measures

Setting in place incentive measures provides an important source of support and encouragement for biodiversity conservation. Positive incentives for the conservation and sustainable use of biodiversity encourage the achievement of biodiversity-friendly outcomes or support activities that promote the conservation and sustainable use of biodiversity. They include:

- **Direct approaches:** which involve 'paying' (by monetary or non-monetary means) relevant actors to achieve biodiversity-friendly outcomes or, conversely, to not achieve biodiversity-harmful outcomes, for instance:
    - Conservation leases, covenants, or easements, or long-term retirement schemes;
    - Tax breaks for environmental donations or expenditures;
    - Payments for ecosystem services
- **Indirect approaches:** which seek to support activities or projects that are not designed exclusively to conserve or promote the sustainable use of biodiversity, but have the effect of contributing to these objectives.
    - Development or commercialization of biodiversity-based products or services, such as sustainable or eco-tourism, commercialization of non-timber forest resources ('biotrade'), possibly combined with consumer information schemes, for instance, certification or eco-labeling, where appropriate;
    - Community-based natural resource management (CBNRM)

Taxes, user fees, and other disincentives

Taxes, charges, fees, fines, compensation mechanisms, and/or tradable permits are tools that reflect the 'Polluter Pays' and 'Full Cost Recovery' principles and hence Instruments such as taxes, charges, fees, fines, compensation mechanisms and/or tradable permits are tools that reflect the cost of biodiversity and ecosystem services loss, with the and aim at having those (potentially) causing the loss to pay for it. Such tools can encourage polluters and those who overexploit biodiversity to take preventative action and to put aside funds for remedial action if such loss were to occur. They also ensure that those who reap certain ecosystem services pay for them rather than having society at large pay.

11.2.4. Standards, Codes of conduct, Guidelines, Good practices, and Certification

Production sectors use a number of tools for achieving environmentally and socially sustainable resource management practices. Many such tools including biodiversity concerns are established at the international level with country abidance determined on a voluntary basis. Standards can also be regulated at the national or sub-national level. In many cases, sectoral abidance to standards, codes, guidelines etc. will be

recognized and will favor the country's products through higher prices and access to niche markets reserved for suppliers who abide by the given standards.

Standards

Standards are policies that regulate the effect that human activity may have on the environment. They may specify a desired state (e.g. Lake pH should be between 6.5 and 7.5) or limit alterations (e.g. no more than 50% of natural forest may be damaged).

Codes of Conduct

Codes of Conduct can be very detailed and set out standards of behavior for responsible practices with a view to ensuring sustainable resource use.

Guidelines

Guidelines provide voluntary and practical advice on how to undertake particular processes. They are usually relatively general and can be applied to a number of circumstances

Good practices

Good practices or best practices are informal examples of actions that can be undertaken to achieve certain sustainability goals or points that need to be kept in mind towards this end.

Certification schemes

Certification schemes go a step further than voluntary codes of conduct in demanding adherence to a set of criteria that a given operation must meet before it can use the logo or name of the certification scheme. Certification schemes that include biodiversity in their criteria can be an extremely powerful tool for mainstreaming because they present the consumer with a choice to buy a more sustainable product

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12. Developing a 'business case' that persuades the stakeholders who need convincing

Biodiversity is an inimitable asset and hence, the government and the non-governmental sectors contribute to developing and improving its value. However, the value of biodiversity is often less recognized, and perceived as less important in economic and development decision-making. Investment decisions in different sectors and ensuing activities fail to take their potential impacts on biodiversity into account or to recognize the contribution that biodiversity can make to their desired goals(IIED; WCMC, 2014). Consequently, the potential for biodiversity to affect and be affected by economic development and poverty reduction strategies and processes is, therefore, underrated. The standpoints of biodiversity that are of particular significance to conservationists, a case in point, levels of endemism or species richness may be perceived as less relevant to development planners, investment bankers, or economists, who are oriented to jobs, food security, and export earnings. Therefore, it is imperative to develop and present a compelling credible biodiversity business case to bring the issue of biodiversity to the forefront in sectors other than the environment (IIED; WCMC, 2014).

A biodiversity 'business case' demonstrates the rationale for placing biodiversity at the center of policy, legislation, plans, and projects in a language that the proponents of those activities can understand. It should convince them to take action. It highlights the benefits of taking biodiversity into account and the associated costs and risks of business as usual. It is typically crucial for influencing powerful but hard-to-convince stakeholders, who often have an agenda geared towards monetary values exclusively to some extent (IIED and UNEP-WCMC, 2015). Characteristically, it is most advisable to make a 'business case' as specific as possible and present it in a language that may facilitate the conveyance of the message to those stakeholders to be convinced (IIED, 2013). It can be based on a narrative that explains the significance of biodiversity to society, and carries a central message that captures tangible benefits, along with the associated costs and the risks of 'business as usual'. Tangible benefits could include revenue, jobs, or products real-life issues with political and electoral resonance as well as financial. It can draw upon the pieces of evidence gathered and presented as a well-structured written document or it can be in a short verbal argument or presentation otherwise (IIED; WCMC, 2014). It has to be recognized that some stakeholders may have counter-arguments to the proposed initiatives or solutions. In this case, it is good to predict what these might be, to

be ready to be challenged, and appropriate responses lined up (IIED and UNEP-WCMC, 2015). Generally, in the preparation of a convincing biodiversity business case, the below-mentioned critical steps should be taken into consideration (IIED; WCMC, 2014).

12.1. Define your audiences/stakeholders

Identification of the relevant stakeholders/audiences to be convinced is the first step and is assumed to contribute to the focus of the business case. These will be sectors, organizations, or people that are affected by or affect biodiversity. In the case of a business case aimed to compel the federal government to take biodiversity seriously for example, the focus of the biodiversity business case will be permanent secretaries, policymakers, parliamentarians (respective standing committees), and the Ministry of Finance. In order to build strategic alliances, address potential partners such as private investors, the private sector, and non-government organizations. In general, it is good to have a checklist of audiences/stakeholders for the business case and this checklist may have the following key audiences/stakeholders:

- Ministries and government agencies (could be federal/regional agencies) relating to finance, planning and production
- Financial institutions including development banks/investment banks/micro finances
- The private sector/mining, water, tourism and construction companies
- Civil society organizations and those representing or influencing civil society (parliamentarians/regional councils).

Once you know who you want to address, contemplate what they may want to know and what message you want to convey to them. Each audience may have specific prejudices and biases and hence, tailor the case for each audience as one size may not fit all.

12.2. Frame persuasive arguments

For a possible course of action to be believed feasible by a decision maker, it has to be associated with their strategic interests (how can the planned course of action assist the target audience/stakeholder to achieve their own goals). The business arguments should be aligned with the key policy priorities of the government (could be federal of regional government) development agenda inclusive of job creation, health, food and water security, growth and equity, and rural development (Box 12.1).

Box 12.1: Biodiversity messaging that speaks to key policy priorities of most governments

Biodiversity provides myriad unique benefits that are critical to socio-economic development, including:

- Service delivery — providing basic ecosystem services via a green, cheaper, and energy-saving infrastructure,

  e.g provisioning of water and pollination
- Risk reduction — productions sectors climate hazard minimization eg broadening resource base that renders options if one food crop fails
- Direct financial value — some agricultural products or other species have high market potential, eg medicinal plants; animals and other species with tourists' attraction
- National economic diversification — through diversification of elements of biodiversity (habitat, species, and genetic diversity) that provides options, eg in tourism and forestry.
- Intrinsic and cultural value-related to identity, tradition, social cohesion, recreation, and spirituality.

Source: (WBCSD, 2013)

There are three areas of interest that the target audience/stakeholders may seek evidence for and may ask

- Why should they invest in biodiversity?
- What is the importance of biodiversity to their respective sectors/program/project?

- Will biodiversity investments generate benefits? In other words, will it create jobs, diversify rural livelihood options, augment, enhance, and protect built infrastructure, contribute to water and food security, and strengthen adaptation to climate change? Box 12.2 represents five broad business case arguments based on water valuation

Box 12.2. A business case based on water valuation

A business case analysis conducted by the World Business Council for Sustainable Development (WBCSD) for water valuation, detected five main business case arguments

1. Enhance decision-making: Enhanced decision-making can be possible by conducting water-related valuation studies. This is probably due to improvement in the sustainability of decisions, and along the road such valuation studies improves mindsets, behavior, and actions, awareness, and encourages collaboration.
2. Maintain and enhance revenues: Revenues are at least maintained or enhanced with water-related valuation studies.
3. Reduce costs: Reduction on company costs may be achieved through water-related valuation. There are clear linkage with arguments for minimizing risks, which perhaps result in reduced costs.
4. Manage risks: In the assessment of the nature and extent of potential risks related for instance with environmental changes as a consequence of depletion and climate change; changing stakeholder opinions, and implications of new regulations and environmental markets, water valuation studies play pivotal role.
5. Enhance reputation: Water-related valuation may assist in improving brand value and reputation in myriad ways which may further result to boost revenues, minimize costs, and potentially an increased share price. These arguments are aimed at the priorities of private, profit-making companies, but a similar approach could be adopted in thinking about how biodiversity might address the priorities of the finance or planning ministries, the agricultural sector and so on. In this case highlighting biodiversity's contribution to food security, health improvements, income generation, reduced vulnerability and ecosystem services can be taken as an example.

Source:(World Business Council For Sustainable Development, 2012)

In addition to economic benefits, other biodiversity-derived social, cultural, and political benefits should be given due consideration. In South Africa, eight 'value propositions' based on the market research process for biodiversity were tested with senior government decision-makers to see which ones had more traction (Table 12.1) (Maze *et al.*, 2016). The clear winner was framing biodiversity as a national asset of significant economic value, followed by a "proposition around the legacy the current generation will leave

our children: nature has given us a world full of wealth", but the more we take from it, the less there is to nourish the next generation. The South African experience also demonstrated the importance of messages highlighting achievable actions. Thus, the second runner-up was a message around practical actions that the government can take to secure biodiversity. Overall, it was concluded that an effective business case should position biodiversity as responding to things that society:

- Has to do, because they are national priorities
- Wants to do, because they draw on an emotional component, and
- Can do, because the way forward is practical and implementable.

Table 12.1 Eight 'value propositions' for biodiversity tested with senior government decision-makers in South Africa

Message 1: National asset	Biodiversity is a natural capital with immense economic significance for South Africa. Investing in natural capital, by giving a superior return on the investment, is investing in our country
Message 2: Children's legacy	Every decision the government makes affects the future of biodiversity a rich or impoverished natural world that we leave for our children and children's children. By investing in nature, we take care of our families.
Message 3: Practical solutions	There are practical, realizable things that the government can do to protect and enhance our 'natural infrastructure'
Message 4: A wealth of the rural economy	Biodiversity is the natural capital of the rural poor. We need to unleash the potential of biodiversity to develop rural economies.
Message 5: Climate change	Good biodiversity management can slow down climate change and its impacts. Our natural wealth can help to save us from natural disasters.
Message 6: Global leadership	South Africa is a world leader in biodiversity. As the world faces a global biodiversity crisis, South Africa can spearhead innovative solutions.
Message 7: Health	Healthy, thriving biodiversity is vital for a healthy population. Our rich variety of flora and fauna provides natural medicines used by over 80 percent of our population.
Message 8: Humanity	As humans, we are part of the web of life. Nature's *ubuntu* is all around us and is part of us.

Source: (Maze *et al.*, 2016)

Therefore, it is justified to consider other biodiversity-derived cultural, social, and political benefits than economic benefits exclusively. Generally, in the preparation of the biodiversity mainstreaming document sectors/programs/projects in question should present multifaceted and persuasive arguments in justifying the biodiversity-related benefits thereof.

12.3. Compile the evidence

Once the sector/program/project outlines convincing arguments, then they should assemble captivating evidence that underpins the case, including facts, figures, and real-life stories. In this regard, the assembled evidence could be qualitative or quantitative, general or specific, from the sector/program/project under consideration. Such experiences from other countries/regions/sectors that may permit to be able to draw motivation from, and compare with, are important. Box 9.3 presents the kind of analysis that might be useful to make an economic case however, it is good to remember, there are several other non-economic values of biodiversity that can be brought into the argument under consideration depending on the targeted audience/stakeholder.

Box 12.3. Analysis of sector-specific economic evidence on the importance of biodiversity

- Consider the portfolio of the available data and literature to detect information gaps and gather missing information if needed which could be made by conducting field surveys, interviews, or case studies
- Uncover value or benefits of biodiversity as compared to national/regional/sectoral/program/project priorities, e.g. economic growth, GDP, employment, exports, household income, poverty reduction
- Analyze the overall social, cultural, and political benefits of biodiversity in relation to national/regional/sectoral/program/project priorities
- Evaluate the changes over time to biodiversity over time under different use situations for specific sectors, such as agriculture, forestry, or water; or respective of the program/ project
- Estimate the costs of biodiversity loss under these different situations
- Analyze the costs of the policy measures required to conserve biodiversity and the benefits they entail.
- Analyze benefits and costs for different sectors, scenarios, policy measures, and biodiversity, expressed in relation to national priorities.

Source: (UNDP-UNEP, 2009)

The development of an evidence base for the significance of biodiversity can be brought about either by deciphering the already available data in new ways (for example, why wetlands matter for water supply) or collecting and interpreting new data (the dependence of poor households on biodiversity for income, subsistence, and health, for instance). Important sources of data may include:

- National biodiversity and environmental assessments (state of the environment, for example)
- Integrated environmental assessment and reporting
- Environmental impact assessment
- Strategic environmental assessment
- Natural capital accounts. Whenever possible, sectors/programs/projects should analyze the costs and benefits associated with investing in biodiversity or not investing in biodiversity. If there is no change in the status quo, what could happen to the target audiences' interests or bottom line? Could some future problems or costs be avoided if the change in action is made today? What are the risks and likely consequences of inaction?

Therefore, here sectors/programs/projects under consideration should gather a reliable set of data from the different sources mentioned above, and analyze and interpret them so that they can build a rich evidence base.

12.4. Identify the counter-arguments

In the process of making the biodiversity business case, it is essential to comprehend that some stakeholders may have counter-arguments to the proposed initiatives or solutions. Proactiveness to what these might be gives a chance to get ready and to be challenged and paves the way for a swift response. Therefore, sectors, programs or projects may need to identify what the points for negotiation might be, where will stakeholders be prepared to compromise, and what will constitute the 'red line' beyond which they will not go. Prepare a table of 'tr ade-offs', working out where you are prepared to compromise (or not) to achieve the ultimate goal of biodiversity integrated into business and government strategies (Table9.2).

Table 12.2 The tradeoffs between integrating biodiversity into business and government strategies.

Biodiversity	Tradeoffs			
		Industry	Government	Finance
	Species	• Acceptable demands …		

		• Unacceptable demands + 'red-line' argument why no compromise allowable
	Habitat Ecosystem	

12.5. Test and present your case

Having completed the above four interrelated steps successfully, the sectors/programs/projects should prepare how best to present their business case which can be done either as booklets, fact sheets, posters, briefing papers, a quick chat with a targeted stakeholder or decision maker, a formal presentation to the target audience, or through short films. The evidence can also be presented as a section in National Biodiversity Strategy and Action Plans (NBSAPs) or in National Development Plans. Irrespective of the platform (medium) effective communication is fundamental. This means targeting your message to the audience (for example, economists like numbers while journalists like a public interest angle). Plain rather than technical language and good graphics can make the difference between a case that succeeds and a case that fails. Therefore, even though sectors/programs/projects prepare the most compelling and convincing evidence to mainstream biodiversity, if these are not effectively communicated it going to be a futile exercise. Regardless of the quality or the strength of findings evidence rarely speaks for itself. Analytical, rational evidence has to be coupled with all the other things that influence how we make decisions which include emotions, instinct, intuition, values, ideology, culture, peer pressure, and politics. Sectors/programs/projects should consider themselves as the person listening to their case what will it be that tip you over into the 'convinced' camp? Could your case be made more compelling by telling it as a story with the climax or conclusion at the beginning rather than at the end? Would this draw the audience in? Likewise, don't focus on loss, but rather on what we 'love' about biodiversity, emphasizing how much we value what we have (other than monetary terms). Alternatively, consider whether it would work to tell their 'big story' (their business case) through several smaller stories that they know will resonate with the audience/stakeholders.

Eventually, having followed the aforementioned interrelated steps in the development of the biodiversity business case, sectors/programs/projects will be in a good position to persuade difficult-to-convince stakeholders, and hence, strict follow-up of the steps is vital.

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13. Develop a monitoring and evaluation (M&E) system for biodiversity mainstreaming

Monitoring and evaluation (M&E) is an organized collection and unbiased assessment of data on predetermined indicators to deliver information on the magnitude of progress and achievement of objectives of an ongoing project, program, policy, or intervention (OECD/DAC, 2002). Guidance and assessment of the effectiveness of the mainstreaming process rely on the placement of the right M&E system (IIED, 2013). Vigorous M&E of biodiversity mainstreaming is crucial for various reasons. First and foremost, it underpins the establishment of baselines (the current understanding of the state of play from which mainstreaming effectiveness can eventually be evaluated). It also helps to narrow the knowledge gap and build the evidence base on the success of mainstreaming, and when combined with case studies from practitioners, may provide intuitions on mainstreaming best practices and possible amendments. Eventually, it strengthens transparency rendering information on the accounting of resources used in response to declared objectives and results achieved (FAO, 2009). Thus, it injects sufficient information on the allocation and prioritization of resources and allows adaptive management over time. This is more important for domestic policymakers, to help identify what has worked and what can be made both more environmentally effective and cost-effective. The Global Environment Facility (GEF), has noted that

though billions of dollars have been spent on biodiversity mainstreaming outcomes, there is very little robust, credible evidence on the efficacy of these actions (Redford, 2014). This could be taken as an entry point for the relevance of the inclusion of monitoring and evaluation systems in Biodiversity Mainstreaming activities.

In an attempt to guide the biodiversity mainstreaming process and examine its success, a comprehensive monitoring system has to be put in place. Developing indicators to assess progress against mainstreaming objectives and targets is an essential part of the M&E process. In this regard, M&E of biodiversity mainstreaming gives due emphasis on

- **The effectiveness of the process:** Assessing progress with the steps along the way and the quality of the process against set criteria (participation, political will, leadership, reciprocal mainstreaming)
- **The mainstreaming context**: Ideally this should consider how this is changing in relation to enabling, disabling, driving, antagonizing biodiversity-development integration
- **Outcomes and impacts**: Mainstreaming can result in a spectrum of outcomes that bridge social, economic, and biodiversity spheres and can be at the policy level (upstream) or implementation level (downstream) (IIED and UNEP-WCMC, 2015).

Central to the development of the mainstreaming document by the respective sectors/programs/projects is setting SMART indicators for the above three areas of monitoring. Provided that it takes several years to demonstrate the tangible impacts of mainstreaming, it is commanding to set milestones along the way. Alternative tools can be employed to monitor progress against selected outcomes of the sector/program/ project and this may include:

- Public budget coding for biodiversity and associated environmental expenditure reviews can help track trends in budget allocations to biodiversity activities
- Natural capital assessment and accounting that monitors changes in biodiversity stocks, the benefits these provide, and associated trade-offs between competing sectors
- Strategic environmental assessment can examine the impact of policies and plans on biodiversity.

In spite of the challenges in determining whether the current biodiversity mainstreaming efforts have been successful, indicators to monitor could help substantially in assessing the effectiveness of the mainstreaming activities. The most commonly used conceptual framework in the development of indicators is the pressure-state-response model (OECD, 2017). In this model responses cover a wide spectrum of various actions where the actions by the government, the private sector, and civil society are included. According to this model response indicators used in the monitoring of biodiversity mainstreaming can be broadly grouped into five categories: inputs, processes, outputs, outcomes, and impacts (OECD, 2018). For

each category of response indicators to monitor and evaluate biodiversity, respective indicators can be derived. Hence it is good to notice once again in the preparation of the mainstreaming document of sectors/programs/projects identifying relevant indicators is a crucial step in monitoring and evaluating biodiversity mainstreaming. The table below exemplifies the response indicator category, its definition, and the possible indicators (Table 13.1).

Table 13.1 Indicator classification relating to biodiversity mainstreaming

Indicator type	Definition	Indicators
Input	Measure the material and immaterial pre-conditions and resources – both human and financial – provided for an activity,	• Finance allocated for biodiversity • Staff allocated to
Process	Measure the progress of processes or actions that use inputs and ways in which program services and goods are provided	• Establish an inter-ministerial committee for biodiversity
Output	Measure the quantity, quality, and efficiency of the production of goods or services as a result of an activity, project, program, or intervention	• Studies such as national ecosystem assessments or to identify and assess subsidies harmful to biodiversity
Outcome	Measure the intermediate broader results achieved through the provision of outputs	• Reduced pesticide use • Increase in protected area coverage
Impact	Measure the quality and quantity of long-term results generated as a result of achieving specific outcomes	• Improved condition of biodiversity and sustainability of ecosystem services, such as the number of
Context	Measure how the context (demographic, social, economic, etc.) informs and	• Measures of stakeholder participation during the

In the development of the M&E indicators care should be taken not to exclusively focus on output indicators of such type as the number of training sessions or workshops with little attention to input, process, outcomes, and impacts that show substantial change. This exclusivity is considered one of the pitfalls of the available biodiversity mainstreaming M&E indicators (USAID, 2015). It is also quite imperative to combine results indicators with early indicators to test the validity of causal logic and comprehend earlier in the implementation whether there exists causal logic. Early behavior change identified in monitoring and other early shifts can indicate where adapting can enhance the effectiveness of the overall strategic approach. Therefore, based on what was explained above in the development of biodiversity mainstreaming

documents, the respective sector/program/project should identify the relevant indicators that permit the measurement of the process and success of their biodiversity mainstreaming activity. UNPEI (2015) defined the key interrelated steps in the integration of biodiversity-development indicators showcasing the integration of poverty reduction-environment indicators and these steps involve:

13.1. Review literature and experience in other countries/sectors/programs/projects.

In order to detect issues that should be taken into consideration for biodiversity mainstreaming (poverty-environment) into a monitoring system, a thorough literature review is central. Experiences defining the process they have undertaken in the adoption of poverty-environment indicators are available from different countries,

13.2. Analyze national priorities and identify entry points.

Cyclic review and data collection are integral part of the National monitoring systems (e.g. five-year household surveys) that are closely linked with the review and elaboration of five-year National Development Plans and sector strategies. Sectors/programs/projects should map timelines and targets in order to inform and influence national monitoring systems at a strategic point in the review and planning cycle.

13.3. Identify key institutions and establish cross-sectoral working groups.

Map the national, subnational, and sector monitoring systems in place and the institutions mandated to coordinating their application, and those responsible for data collection. Monitoring systems are typically mandated of the national statistics office (authority), working in close collaboration with the Ministry of Planning and Development; time series data collection is a responsibility of sector ministries for a cluster of thematic indicators. Therefore, sectors/programs/projects need to establish working relationships with these institutions and make the case to them on the benefits of revisiting and/or adding dual biodiversity-development indicators into existing systems.

13.4. Analyze existing monitoring and reporting systems.

National monitoring systems mostly overlook associations with the environment and environmental monitoring systems on the other hand tend to fail to consider the poverty impacts of environmental changes. Analysis of the available national monitoring systems and the respective associated data collection and reporting components helps to identify essential information that can inform and influence changes to better reflect biodiversity-development linkages (poverty-environment). In addition, the availability, quality, and relevance of existing datasets and indicators (including gender disaggregation) should be analyzed, along with the institutional roles and responsibilities for collecting, analyzing, and reporting on data.

13.5. Identify possible biodiversity-development linkages through a consultative process.

The formulation of possible indicators should be made in a participatory fashion with the involvement of sector/program/project experts and statisticians from national/regional statistics office. The process should be embedded in the elaboration and monitoring of national/subnational development policy and planning and/or sectoral strategy processes. It should be informed by quality criteria and respond to the need to capture progress and change resulting from the implementation of priority initiatives contained in national plans and sector strategies, as funded by public- and private-sector funds. Indicator formulation could be preceded and informed by a commissioned study that offers a range of biodiversity-development indicators (poverty-environment) complete with definitions, purpose, institutional roles and responsibilities, and data collection protocols. Another useful input is sector or thematic indicators proposed under other national and/or global initiatives. For instance, national climate change adaptation and mitigation strategies, NBSAPs and green economy strategies have formulated specific indicators that could be considered.

13.6. Select a core set of indicators.

Through a consultative process with policy-makers from the ministries of planning and key sectors practitioners should facilitate a process in which a core set of indicators is selected from among the possible biodiversity-development (poverty-environment) indicators identified in the preceding step. Keep the number of proposed new indicators realistic, as not to raise concerns related to the costs of data collection, the feasibility of regular data collection, and how the data will be used for reporting.

13.7. Continuous review and refinement.

The adoption and application of poverty-environment indicators can take five to ten years, owing to the cyclic planning and monitoring process. National development policies and plans and sector strategies are normally subject to five-year review and formulation cycles, and national monitoring systems are linked to these. Experience shows that an indicator can be adopted in the national monitoring system but no data be collected on it over time, either because of a lack of institutional ownership to put data collection systems in place or because it has been determined that data collection is not technically or economically feasible. Consequently, the effectiveness of proposed indicators should be reviewed periodically and indicators dropped or refined accordingly.

Within the framework of the mentioned interrelated steps, it is critical to consider the inclusion of indicators that monitor dual biodiversity-development outcomes in the national monitoring systems by the respective sectors/programs/projects. This inclusion allows the sectors/programs/projects to make sure that

- their targets are being implemented

- the evidence of impact and benefits is being implemented
- such evidences are communicated to the national higher government officials in a manner that improves their understanding of the contribution of biodiversity to the national development goals (IIED and UNEP-WCMC, 2015).

Such an approach is being implemented by different countries in Africa, and the experience of how some of these countries included dual biodiversity-development indicators in the national monitoring systems is presented as a benchmark below (Table 10.3).

Table 13.2 The experience of inclusion of dual indicators (poverty-environment) in the national monitoring system

Sector	Dual biodiversity-development indicators	Country
Natural resources	The proportion of households whose main source of cash income is derived from natural resources	Tanzania
	Number of women that benefit from natural resource concessions	
	Female ownership or co-ownership of equipment and tools for production, processing, commercialization, and other services associated with natural resources	
	Perception of women and men who consider that the operating plan of co-management responds to their needs and interests	
	Number of forest management plans with gender-sensitive activities (eg non-timber forest products, medicinal plants, wildcrafting)	
Agriculture	Amount of agricultural land (ha) under Sustainable Land Management (SML). SLM includes soil and water conservation (eg contour ridging), soil fertility improvement (organic manure, agro-forestry), rainwater harvesting, and conservation agriculture	Malawi
	Estimated total soil loss in cropped areas (tons/ha/year)	Malawi
Energy	Percentage of households in rural and urban areas using alternative sources of energy to wood fuel (including charcoal) as their main source of energy for cook	Tanzania
	The amount of time or money spent by women and men to obtain energy supplies (fuelwood, charcoal)	
	Number/percentage of women and men adopting energy-saving technologies	
	Number/percentage of women and men involved in energy-related employment and training	
Fisheries and	Access to and control over key resources by women (eg fuelwood, craft supplies, shellfish)	

aquaculture in coastal zones	Percentage of women obtaining fisheries-related business credit
	Number/percentage of women who own aquaculture ponds
	Number of women managing successful productive projects (ie marine farms, ponds, zoo farms, eco-shelters)
	Participation of women in wetlands planning, professions, and research, at all levels

Source: (PEI, 2015)

The aforementioned examples can be taken as models by different economic sectors in Ethiopia to make the appearance of dual biodiversity-development indicators in the national monitoring system of the country. Therefore, it is quite sensational to align reciprocal biodiversity-development indicators in the national monitoring systems.

The other critical entry point the various sectors in Ethiopia should pay attention to is the alignment of the respective indicators they propose in relation to those proposed in the NBSAPs of the country. To this end, the NBSAP of Ethiopia proposed putative indicators to monitor biodiversity mainstreaming which perhaps include:

Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.

Target 2. By 2020, the existing biodiversity-related laws, regulations, and strategies, including those associated with incentives, are reviewed and gaps are addressed.

Indicator: Number of identified incentives that reward positive contributions and address perverse incentives.

Target 3. By 2020, biodiversity values and ecosystem services are communicated and integrated into national and local development and poverty reduction strategies and plans.

Indicator: Strategies integrating values of biodiversity and ecosystem services.

Target 4: By 2020, habitat conversion due to the expansion of agricultural land is halved from the existing rate of about 10% per year (EBI, 2020).

Indicator: Rate of annual conversion of habitats into agricultural land.

Hence in the preparation of the mainstreaming document, sectors are expected to duly consider these proposed indicators by Ethiopia's NBSAP.

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