Mainstreaming Biodiversity for Sustainable Development

OECD

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Foreword

Biodiversity underpins all life and provides vital benefits to our societies and economies. Yet despite this, pressures from land-use change, over-exploitation of natural resources, pollution and climate change are contributing to an alarming loss of living diversity. Since 1970 one tenth of the world's terrestrial biodiversity and one third of freshwater biodiversity have been wiped out. We are on course to lose another 10% of terrestrial species by 2050.

We have to reverse these trends. Biodiversity and ecosystem services provide invaluable – but often invisible – benefits at global, regional and local scales. These include services such as nutrient cycling, habitat provisioning, pollination, erosion control and climate regulation. The need to mainstream biodiversity and ecosystem services more effectively into national and sectoral policies has recently gained renewed impetus on the global policy agenda. In line with the Convention on Biological Diversity and the 2011-2020 Aichi Biodiversity Targets, the 2030 Agenda for Sustainable Development places strong emphasis on biodiversity for achieving these objectives.

The purpose of *Mainstreaming Biodiversity for Sustainable Development* is to highlight examples of good practice and remaining challenges in four key areas. These areas are: mainstreaming biodiversity at the national level; mainstreaming biodiversity in the agriculture, forestry and fisheries sectors; biodiversity mainstreaming in development co-operation; and monitoring and evaluating biodiversity mainstreaming.

Insights are drawn from 16 predominantly megadiverse countries (or those with biodiversity hotspots) as these countries host some of the richest and often most threatened biodiversity in the world. The countries examined also span the full range of income groups, from high-income economies such as Australia and France to lower-income economies such as Ethiopia and Madagascar.

Effectively mainstreaming biodiversity into all levels of government and society can lead to long-term and sustainable development outcomes and enhance the resilience of the ecosystems upon which we depend. The sharing of good practice insights and the identification of remaining challenges can help catalyse learning and foster change.

The report is intended for biodiversity policymakers and practitioners in developed and developing countries, as well as for development co-operation agencies and other national ministries. We hope this study will be of use as together we strive to develop better, more mainstreamed, biodiversity policies for better lives.

Angel Gurría
Secretary-General, OECD

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The publication has been written by Katia Karousakis and Megha Sud (OECD Environment Directorate), and Galina Alova and Naeeda Crishna Morgado (OECD Development Co-operation Directorate). Bérénice Lasfargues (OECD) prepared an early draft of Chapter 5. The authors would also like to gratefully acknowledge comments received from the OECD Secretariat, namely Simon Buckle (ENV/CBW); Jan Corfee-Morlot (formerly DCD/GPP); Dimitris Diakosavvas, Julien Hardelin, Roger Martini, Claire Delpeuch, James Innes, Barbara Hutniczak (TAD/NRP); Myriam Linster, Ivan Hascic (ENV/EPI); Ziga Zarnic (ENV/GGGR); and Ronnie Downes (GOV/BUD); as well as comments received from Tim Scott (UNDP BIOFIN), and Juha Siikamäki and Tom Brooks (IUCN). Anna Rourke and Jane Kynaston (ENV/CBW) provided administrative support.

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Table of contents

Acronyms and abbreviations 11

Executive summary 17

Chapter 1. **Good practice insights for mainstreaming biodiversity and development** 21

1.1. Mainstreaming biodiversity to achieve sustainable development 22
1.2. What do mainstreaming biodiversity and development involve? 23
1.3 Good practice insights on biodiversity mainstreaming 27
1.4. Mainstreaming biodiversity for sustainable development – a blueprint for action 33
Notes 35
References 36

Chapter 2. **Mainstreaming biodiversity at the national level** 39

2.1. Introduction 40
2.2. Mainstreaming development and poverty objectives in national biodiversity strategies 41
2.3. Mainstreaming biodiversity into national development plans and other strategies 44
2.4. Institutional issues 49
2.5. Role of data and information in mainstreaming 55
2.6. Biodiversity in national budgets 59
Annex 2.A1. Mainstreaming development and poverty alleviation in NBSAPs 65
Annex 2.A2. Biodiversity mainstreaming in NDPs 70
Notes 72
References 74

Chapter 3. **Mainstreaming biodiversity in agriculture, forestry and fisheries** 79

3.1. Mainstreaming biodiversity in agriculture 81
3.2. Mainstreaming biodiversity in forestry 94
3.3. Mainstreaming biodiversity in fisheries 108
Annex 3.A1. Share of agriculture as % of GDP and in employment in the 16 countries, 2016 116
Annex 3.A2. Contribution of the forest sector to employment and GDP in focus countries, 2011 . . . 117
Notes 118
References 122

Chapter 4. **Mainstreaming biodiversity in development co-operation** 137

4.1. The role of development finance in funding for biodiversity in developing countries 138
4.2. Development co-operation support for mainstreaming in developing countries 139
4.3. Mainstreaming biodiversity within development co-operation 143
Notes 153
References 154

Chapter 5. **Monitoring and evaluating biodiversity mainstreaming** 161

5.1. Objectives of monitoring and evaluation of biodiversity mainstreaming 162
5.2. Conceptual measurement framework 163
5.3. Possible indicators for monitoring and evaluating biodiversity mainstreaming 169
Annex 5.A1. UNPEI steps in integration of mainstreaming into national monitoring processes 172
Notes 174
References 174

Figures

Figure 1.1 Entry points for mainstreaming biodiversity and development 25
Figure 2.1 Assessment framework for biodiversity management and mainstreaming 40
Figure 2.2 Existing strategies of relevance to NBSAPs 45
Figure 2.3 Proportion of union budget allocated to MOECAF, FD, NWCD and PAs, 2010-15 61
Figure 3.1 Visible and invisible flows from agriculture 82
Figure 3.2 OECD agricultural support to farmers by potential environmental impact 90
Figure 3.3 Forest area under forest management plans in selected countries 98
Figure 3.4 Forest area under certification schemes in selected countries 108
Figure 4.1 Bilateral biodiversity-related ODA, 2007-16 139
Figure 4.2 Providers of bilateral biodiversity-related ODA 139
Figure 4.3 Bilateral official development assistance activities with biodiversity as a secondary objective 2006-15, two-year averages 150
Figure 4.4 Top five sectors receiving bilateral biodiversity-related ODA: Total commitments and biodiversity as share of overall ODA to sector 150

Tables

Table 1.1 Focus countries examined and their characteristics 26
Table 2.1 Biodiversity-relevant policy areas covered by various ministries 50
Table 2.2 Indicative list of ministries/departments and NBTs of the NBAP in India 51
Table 2.3 Lead institutions in charge of the NBSAP implementation in Ethiopia 52
Table 2.4 Examples of biodiversity-relevant inter-ministerial committees 53
Table 3.1 Examples of policy instruments to mainstream biodiversity in agriculture 86
Table 3.2 Examples of policy instruments to mainstream biodiversity in forestry 97
Table 3.3 Examples of policy instruments to mainstream biodiversity in fisheries 111
Table 4.1 Examples of biodiversity-specific policies and strategies by DAC members 144
Table 4.2 Biodiversity and environmental safeguards in multilateral development banks 146
Table 5.1 Indicator classification relating to biodiversity mainstreaming 164
Table 5.2 Indicators for Aichi Biodiversity Target 2 under Strategic Goal A 166
Table 5.3 Examples of possible indicators to monitor progress towards biodiversity mainstreaming . . 169

Boxes

Box 1.1 SDGs in support of biodiversity conservation and sustainable use 22
Box 1.2 What is biodiversity mainstreaming? 24
Box 2.1 Examples of stakeholder participation in NBSAP development 43
Box 2.2 Bolsa Verde programme in Brazil 47
Box 2.3 Examples of data challenges highlighted in NBSAPs and Fifth National Reports 56
Box 2.4 A review of biodiversity expenditure data across four countries 59
Box 2.5 The BIOFIN Initiative 61
Box 2.6 Objectives and insights from BIOFIN in the Philippines 62
Box 3.1 Integrating biodiversity into land-use planning in South Africa 81
Box 3.2 Agroecology in France 84
Box 3.3 Policy instruments to promote sustainable agriculture 87
Box 3.4 Ban on diclofenac to prevent vulture extinction in South Asia 88
Box 3.5 Environmentally harmful farm input support in Brazil 89

Box 3.6 Landcare: A community approach to sustainable land management . . . 93
Box 3.7 Viet Nam's efforts to reverse deforestation: Five Million Hectare Reforestation Programme . . . 96
Box 3.8 Long history of forest management in France . . . 97
Box 3.9 Community forestry reform in Nepal . . . 99
Box 3.10 Indigenous peoples in the management of the Peruvian Amazon . . . 100
Box 3.11 Viet Nam's Payment for Forest Environmental Services . . . 102
Box 3.12 Biodiversity offset schemes in Mexico and Brazil . . . 104
Box 3.13 Direct and indirect subsidies for monoculture plantations in Indonesia . . . 106
Box 3.14 Forest Stewardship Council certification for sustainable use of forest resources . . . 107
Box 3.15 Examples of international goals, targets and initiatives relevant to sustainable oceans and fisheries . . . 110
Box 3.16 Progress in the implementation of the Code of Conduct for Fisheries . . . 112
Box 3.17 Fisheries management in Peru . . . 112
Box 3.18 Opportunities for further reform in France . . . 115
Box 4.1 Total official support for sustainable development: An emerging measure to track broader financial resources for sustainable development . . . 142
Box 4.2 Risk assessment approaches to support biodiversity mainstreaming . . . 147
Box 4.3 Capturing the mainstreaming component in ODA through the OECD DAC Rio marker methodology . . . 149
Box 4.4 Harnessing synergies between biodiversity and climate change mitigation in REDD+ projects . . . 151
Box 5.1 Barriers to learning from M&E . . . 163
Box 5.2 UN Poverty-Environment Initiative indicators for successful environmental mainstreaming . . . 165
Box 5.3 Examples of indicators proposed in NBSAPs to monitor biodiversity mainstreaming . . . 166
Box 5.4 Indicators for the mainstreaming of biodiversity in production landscapes/seascapes and sectors in the GEF biodiversity strategy . . . 167

Acronyms and abbreviations

5MHRP	Five Million Hectare Programme (Viet Nam)
AFB	French Biodiversity Authority, *Agence française pour la biodiversité*
AFD	French Development Agency, *Agence française de développement*
AIDESEP	Interethnic Association for the Development of the Peruvian Rainforest (Peru), *Asociación Interétnica de Desarrollo de la Selva Peruana*
ANSPE	Agency for Overcoming Extreme Poverty (Colombia), *Agencia Nacional para la Superación de la Pobreza Extrema*
BMZ	Federal Ministry for Economic Co-operation and Development (Germany), *Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung*
CBD	Convention on Biological Diversity
CBF	community-based forestry
CEDRIG	Climate Environment and Disaster Risk Reduction Integration Guidance
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNFL	National Company of Energy and Lighting (Costa Rica), *Compañía Nacional de Fuerza y Luz*
CONABIO	Commission for the Knowledge and Use of Biodiversity (Mexico), *Comisión nacional para el conocimiento y uso de la biodiversidad*; National Biodiversity Commission (Brazil), *Comissão Nacional de Biodiversidade*
CONAFOR	National Forestry Commission (Mexico), *Comisión Nacional Forestal*
CONAGUA	National Water Commission (Mexico), *Comisión Nacional del Agua*
CONAMA	National Council for the Environment (Brazil), *Consello Nacional de Meio Ambiente*
CONANP	National Commission of Natural Protected Areas (Mexico), *Comisión Nacional de Áreas Naturales Protegidas*; Environmental Reserve Quotas (Brazil), *Cotas de Reserva Ambiental*
CRGE	Climate Resilient Green Economy (Ethiopia)
CRS	Creditor Reporting System
CUSTF	Environmental Compensation for Land Use Changes in Forested Areas Programme (Mexico), *Cambio de Uso de Suelo en Terrenos Forestales*

DADF	Department of Animal Husbandry, Dairy and Fisheries (India)
DAWR	Department of Agriculture and Water Resources (Australia)
DAFF	Department of Agriculture, Forestry and Fisheries (South Africa)
DEA	Department of Environmental Affairs (South Africa)
DEE	Department of Environment and Energy (Australia)
EBI	Ethiopian Biodiversity Institute
EIA	environmental impact assessment
EMP	environmental management plan
ENBioMex	National Strategy on Biodiversity of (Mexico), *Estrategia Nacional Sobre Biodiversidad de México*
EU CAP	European Union Common Agricultural Policy
EUR	euro
FAD	fish aggregating device
FAO	Food and Agricultural Organization of the United Nations
FD	Forest Department (Myanmar)
FMO	Netherlands Finance Development Company, *Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden*
Finnfund	Finnish Fund for Industrial Cooperation
FLEGT	Forest Law Enforcement, Governance and Trade Action Plan
FMP	forest management plan
FSC	Forest Stewardship Council
GDP	gross domestic product
GEF	Global Environment Facility
GPP	green public procurement
HCFCs	hydrochlorofluorocarbons
IBAMA	Brazilian Institute for Environment and Renewable Natural Resources
ILO	International Labour Organization
INPE	National Institute for Space Research (Brazil), *Instituto Nacional Penitenciario*
ITQ	individual transferable quotas
IUCN	International Union for Conservation of Nature
IUU	illegal, unreported and unregulated
IVQ	individual vessel quota
JAXA	Japanese Aerospace Exploration Agency
JICA	Japan International Cooperation Agency

KfW	Reconstruction Credit Institute (Germany), *Kreditanstalt für Wiederaufbau*
MAA	Ministry of Agriculture and Food (France), *Ministère de l'agriculture et de l'alimentation*
MADS	Ministry of Environment and Sustainable Development (Colombia), *Ministerio de Ambiente y Desarrollo Sostenible*
MDB	multilateral development bank
MDG	Millennium Development Goal
M&E	Monitoring and Evaluation
MEEM	Ministry of Environment, Energy and Marine Affairs (France), *Ministère de l'Environnement, de l'Energie et de la Mer*
MoAI	Ministry of Agriculture and Irrigation (Myanmar)
MOECAF	Ministry of Environmental Conservation and Forestry (Myanmar)
MoEFCC	Ministry of Environment, Forests and Climate Change (India and Ethiopia)
MPA	marine protected area
MSC	Marine Stewardship Council
NBA	National Biodiversity Assesment (South Africa)
NBAP	National Biodiversity Action Plan (India)
NBDS	National Biodiversity Database System (Viet Nam)
NBCC	National Biodiversity Coordination Committee (Nepal)
NBS	National Biodiversity Strategy
NBSAP	National Biodiversity Strategy and Action Plan
NBT	National Biodiversity Target
NCBC	National Committee for Biodiversity Conservation (China)
NDP	National Development Plan
NEC	National Environmental Council (Columbia)
NEDA	National Economic Development Authority (Philippines)
NEMA	National Environnent Management Agency (Uganda)
NGO	non-governmental organisation
Norad	Norwegian Agency for Development Cooperation
NRM	natural resource management
NRMMC	Natural Resource Management Ministerial Council (Australia)
ODA	official development assistance
ONF	National Forestry Office (France), *Office national des forêts*
PA	protected area

PBSAP	Philippine Biodiversity Strategy and Action Plan
PDP	Philippine Development Plan
PES	payment for ecosystem services
PEFC	Programme for the Endorsement of Forest Certification
PFES	Payment for Forest Ecosystem Service (Viet Nam)
PINE	Net Internal Ecological Product (Mexico), *Producto Interno Neto Ecológico*
PIR	Policy and Institutional Review
PPA	Public Private Alliance
PRSPs	Poverty Reduction Strategy Papers
Proparco	Participation Company for Economic Co-operation (France), *Société de promotion et de participation pour la coopération économique*
PSE	Producer Support Estimate
PSG	simplified management plan (France), *plan simple de gestion*
REDD	reducing emissions from deforestation and forest degradation
RTG	forest management standard regulation (France), *règlement type de gestion*
SAGARPA	Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (Mexico), *Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*
SANBI	South Africa National Biodiversity Institute
SANParks	South Africa National Parks
SCBD	Secretariat of the Convention on Biological Diversity
SDC	Swiss Agency for Development Cooperation
SDG	Sustainable Development Goal
SECTUR	Secretariat of Tourism (Mexico), *Secretaría de Turismo*
SEA	strategic environmental assesment
SEDP	Socio-Economic Development Plan (Viet Nam)
SEEA	System of Environmental-Economic Accounting
SEMARNAT	Secretariat of Environment and Natural Resources (Mexico), *Secretaría de Medio Ambiente y Recursos Naturales*
SFM	sustainable forest management
SHCP	Secretariat of Finance and Public Credit (Mexico), *Secretaría de Hacienda y Crédito Público*
SMART	specific, measurable, attributable, relevant, time-bound
SNA	System of National Accounts
TAC	total allowable catch

TEEB	The Economics of Ecosystems and Biodiversity
TOSSD	total official support for sustainable development
UNDP BIOFIN	United Nations Development Programme Biodiversity Finance Initiative
USAID	United States Agency for International Development
USD	US dollar
VAT	value-added tax
VEA	Viet Nam Environment Administration
VNFOREST	Viet Nam Administration of Forestry
VPA	Voluntary Partnership Agreement
WAVES	Wealth Accounting and Valuation of Ecosystem Services

Executive summary

Achieving sustainable development for "our people, our planet, our prosperity" is one of the top policy priorities of our time. Mainstreaming biodiversity and the value of our natural ecosystems into economic growth and development objectives is a crucial element of this, as reflected by Sustainable Development Goals 14 and 15 on Life under Water and Life on Land, among others. Strategic Goal A of the 2011-2020 Aichi Biodiversity Targets under the Convention on Biological Diversity is to address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.

Mainstreaming biodiversity is a formidable task, as it implies taking a comprehensive and systematic approach across multiple dimensions (such as national and sectoral strategies, plans and policies; institutional settings; and national budgets), and across various stakeholders. Many countries have embarked on this path and aim to make progress in this regard. Drawing on experiences and insights from 16 of some of the most biodiversity-rich countries worldwide, this report highlights emerging good practice for mainstreaming biodiversity at national level; in the agriculture, forestry and fisheries sectors; across development co-operation; and in monitoring and evaluation. It also highlights areas where further progress is needed. The focus countries are: Australia, Brazil, the People's Republic of China, Colombia, Ethiopia, France, India, Madagascar, Mexico, Myanmar, Nepal, Peru, the Philippines, South Africa, Uganda and Viet Nam.

At the national level, most National Biodiversity Strategies and Action Plans (NBSAPs) recognise the linkages between biodiversity and development and include targets for mainstreaming. Similarly, National Development Plans (NDPs), National Sustainable Development Plans, and green growth strategies of some countries include consideration for biodiversity, though the extent varies greatly. Continuing challenges in the design and implementation of biodiversity mainstreaming measures include effective horizontal and vertical institutional co-ordination; adequate human resources and capacity, particularly within sector line ministries; collection and dissemination of policy-relevant data for mainstreaming; and tracking and mobilising financial resources for biodiversity in the context of national budgets and beyond.

Looking across the agriculture, forestry and fisheries sectors, there is increasing realisation of the pressures they exert on biodiversity and the important contributions of ecosystem services in the continued development of these sectors. This is due in part to National Ecosystem Assessments (NEAs) or similar studies being undertaken in some countries, including economic valuation studies. In many countries, however, the full suite of policy instruments available to conserve and sustainably use biodiversity are not being implemented at the scale that is needed. There is a need, for example, for better co-ordinated and enforced instruments for land-use and marine spatial planning; and for further consideration of the use of economic instruments that are also able to provide continuous incentives for more sustainable production and consumption patterns, and to mobilise revenue, so as to enhance mainstreaming outcomes. In several countries, a high degree of informality and illegal activities in these sectors continues to drive biodiversity loss.

Development co-operation, which plays an important role in supporting biodiversity mainstreaming in partner developing countries, acts as a source of finance and technical assistance, and biodiversity is considered among the ongoing priorities in the environmental programming of development partners. Challenges that remain include the need for further and more explicit prioritisation of biodiversity within development finance portfolios and programming, by better capturing the synergies with climate and other environmental and development objectives. The persistent limitations in individual expertise, human resources and organisational capacity and a lack of funding for biodiversity in partner countries also hinder the continuity of positive change initiated by development co-operation activities beyond project lifetimes.

While progress towards mainstreaming biodiversity is being made, a formidable challenge that remains is to better monitor and evaluate the outcomes and impacts of these efforts at the national level. Doing so in a more consistent manner would also facilitate comparison of experiences across countries and their effectiveness, and an exchange of lessons learned. This challenge is due in part to the lack of consistent data and indicators to develop baselines and to monitor and report on progress towards achieving mainstreaming goals and targets. In terms of responses, further consideration on how to monitor and evaluate mainstreaming efforts across the full range of responses, namely inputs, process, outputs, outcomes and impacts, would be useful.

Key steps for promoting biodiversity mainstreaming:

- Given the multiple drivers of biodiversity loss and degradation, establish a clear understanding of the key pressures at national level and effectively communicate these among various stakeholders including policy makers, the private sector and civil society. Prioritise responses to address these pressures, and consider the types of policy measures likely to be most effective in terms of environmental impact as well as cost.
- Conduct an NEA (or other similar assessment), incorporating where possible the economic benefits that ecosystems provide.
- Define indicators for environmental and socio-economic policy variables (via participatory approaches), establish baselines, and make the information publicly available.
- Review and evaluate institutional and legal frameworks, identify challenges and weaknesses, and strengthen these as appropriate to promote policy coherence and enhance horizontal and vertical co-ordination.
- Review and evaluate existing policy instruments (including positive and harmful incentives that may be in place) and identify what adjustments may be needed, as well as the need for additional policy instruments including those that are able to generate revenue.
- Monitor and evaluate progress on a regular basis and enable adaptive management over time.

Enabling conditions for effective biodiversity mainstreaming include:

- well-established and documented understanding of the value of biodiversity and ecosystem services and their role in economic growth and development, communicated and accepted across different stakeholder groups

- a strong commitment to biodiversity mainstreaming at national and sector levels, at political level, and reflected in NBSAPs, NDPs (among others) and sectoral strategies, and supported by policy coherence across legislative and policy frameworks
- adequate institutional capacity, including dedicated human resources at national and subnational levels to implement and monitor mainstreaming actions, so as to support iterative decision-making and inter-ministerial co-ordination mechanisms
- better understanding of biodiversity finance needs and gaps and accordingly, adequate financing and budgeting to support biodiversity mainstreaming at national and sector levels and vertically, including, where relevant, support for mainstreaming from development co-operation
- broad stakeholder engagement in decision making and implementation.

Chapter 1

Good practice insights for mainstreaming biodiversity and development

Mainstreaming biodiversity across government and society is crucial for meeting many of the Sustainable Development Goals. This chapter provides an overview of the interlinkages between biodiversity and sustainable development and highlights assessment frameworks and entry points for biodiversity mainstreaming. Drawing on experiences and lessons learned from 16 of some of the most biodiverse countries in the world, the chapter concludes with the key messages and good practice insights from across the report.

Biodiversity – the diversity within species, among species and of ecosystems – is fundamental to human well-being. Terrestrial and marine biodiversity provide a wide range of ecosystem services such as food provisioning, water purification, habitat provisioning, erosion control, nutrient cycling and climate regulation, all of which humans depend on to support life. Despite the fundamental importance of biodiversity to economic, social, health and cultural systems, biodiversity loss continues worldwide as the pursuit of economic growth and development leads to the conversion, and in many cases over-exploitation, of natural resources for inputs to production and consumption.

Given the multiple pressures on biodiversity, there is increasing recognition of the fact that greater efforts are needed to reflect the inherent – and often invisible – values of biodiversity and ecosystem services in all aspects of decision making. Biodiversity underpins many of the 17 Sustainable Development Goals (SDGs), and effective mainstreaming will be an essential step for countries – developed and developing alike – to deliver on Agenda 2030. In recognition of this, the Cancun Declaration on Mainstreaming the Conservation and Sustainable Use of Biodiversity for Well-being, adopted at the 13th Conference of the Parties (COP13) to the Convention on Biological Diversity (CBD) in December 2016, commits parties to undertake work at all levels of government and across all sectors to mainstream biodiversity. Achieving this will require strategic, coherent and well-coordinated policies and actions.

1.1. Mainstreaming biodiversity to achieve sustainable development

The linkages among biodiversity, economic growth and development are well recognised in the global sustainable development agenda. Agenda 2030 and the SDGs place a strong emphasis on biodiversity, recognising that it is central to achieving international goals on sustainable development and poverty reduction. 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) (Box 1.1), and biodiversity-related actions are integrated into the targets of eight additional SDGs.[1] This is in line with the CBD and the 2011-2020 Strategic Plan for Biodiversity. Article 6b of the CBD, for instance, directs parties to "Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies." Strategic Goal A of the Aichi Biodiversity Targets is "Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society". Under this goal, Target 2 for example is: "By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems."[2]

Box 1.1. **SDGs in support of biodiversity conservation and sustainable use**

- Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
- Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

The need to mainstream biodiversity more effectively into national and sectoral economic and development objectives is relevant to all countries, though specific issues and priorities differ. Globally, key pressures on biodiversity include land-use change and management, over-exploitation of natural resources, pollution, invasive alien species and climate change (OECD, 2012). Production and consumption patterns have imposed severe stress on the earth's natural resources and its resilience. The biodiversity and development linkages are particularly acute in developing countries, where the poorest populations rely disproportionately on ecosystems and natural resources for their livelihoods and well-being. The World Bank estimates that natural capital accounts for an estimated 36% of total wealth in developing countries (World Bank, 2016), compared with only 2% in OECD countries (World Bank, 2011).[3] Ecosystem services are estimated to account for 47% of gross domestic product (GDP) of the poor in India, 75% in Indonesia and 89% in Brazil (TEEB, 2010). Biodiversity also provides the poor with a form of cost-effective and readily accessible insurance against risk, particularly food security risks, health risks and environmental hazards (Vira and Kontoleon, 2013; Roe and Mapendembe, 2013). Conversely, the loss of biodiversity also imposes huge costs on the economies of developing countries – damages due to crime related to natural resources and the environment in developing countries are estimated to be more than 70 billion United States dollars (USD) a year (World Bank, 2014).

Biodiversity and ecosystem services underpin many key economic sectors which support growth, development and human well-being including agriculture, forestry, fisheries and tourism. Agriculture supports more than half of the world's population, including 1.5 billion people living on small-scale farming in developing countries. Over 3 billion people depend on freshwater, marine and coastal biodiversity for their livelihoods, including many people in developing countries for whom fishing is a main subsistence and commercial activity.[4] Overall, it is estimated that 60% of the world's ecosystems have been degraded over the past 50 years (Millennium Ecosystem Assessment, 2005). With climate change expected to exacerbate existing development pressures, especially in the most vulnerable communities, the impact of biodiversity loss will be even greater in the future. As the global population is projected to increase to 9.7 billion people by 2050 (UNDESA, 2015), with much of this increase expected in developing countries, these pressures are anticipated to rise under a business-as-usual scenario. The need for more sustainable development pathways is therefore crucial.

1.2. What do mainstreaming biodiversity and development involve?

Mainstreaming is intended to promote coherence between biodiversity and development objectives at all levels. While perhaps the most traditional approach to addressing biodiversity loss has been to establish protected areas, it is increasingly clear that there is a need to scale up other approaches that are able to mainstream biodiversity considerations across all sectors of the economy, so as to address the drivers of biodiversity loss and ensure sustainable use (OECD, 2012; 2013).

Mainstreaming has been described in various ways (Box 1.2). Some refer more explicitly to processes, whereas others refer to both processes and outcomes. Some tend to focus more on sectors, whereas others emphasise both national and sector mainstreaming. A more recently used term, "reciprocal mainstreaming" (IIED, 2015), emphasises that biodiversity considerations should be integrated into other development agendas, and that development considerations should be integrated into biodiversity objectives. In this report, the term "mainstreaming" is used to refer to reciprocal mainstreaming, covering both processes and outcomes, and focuses on both national and sector entry points.

Box 1.2. **What is biodiversity mainstreaming?**

"Integrating or including actions related to conservation and sustainable use of biodiversity in strategies relating to production sectors, such as agriculture, fisheries, forestry, tourism and mining. Mainstreaming might also refer to including biodiversity considerations in poverty reduction plans and national sustainable development plans" (CBD, 2014).

"The process of embedding biodiversity considerations into policies, strategies and practices of key public and private actors that impact or rely on biodiversity, so that it is conserved and sustainably used both locally and globally" (GEF Secretariat, 2016).

"The recognition and integration of biodiversity and ecosystem services and development considerations across different levels of governance and entry points (e.g. national, sectoral, local)" (IIED and UNEP-WCMC, 2013; OECD, 2013).

"The integration of biodiversity concerns into defined sectors and development goals, through a variety of approaches and mechanisms, so as to achieve sustainable biodiversity and development outcomes" (African Leadership Group, 2012).

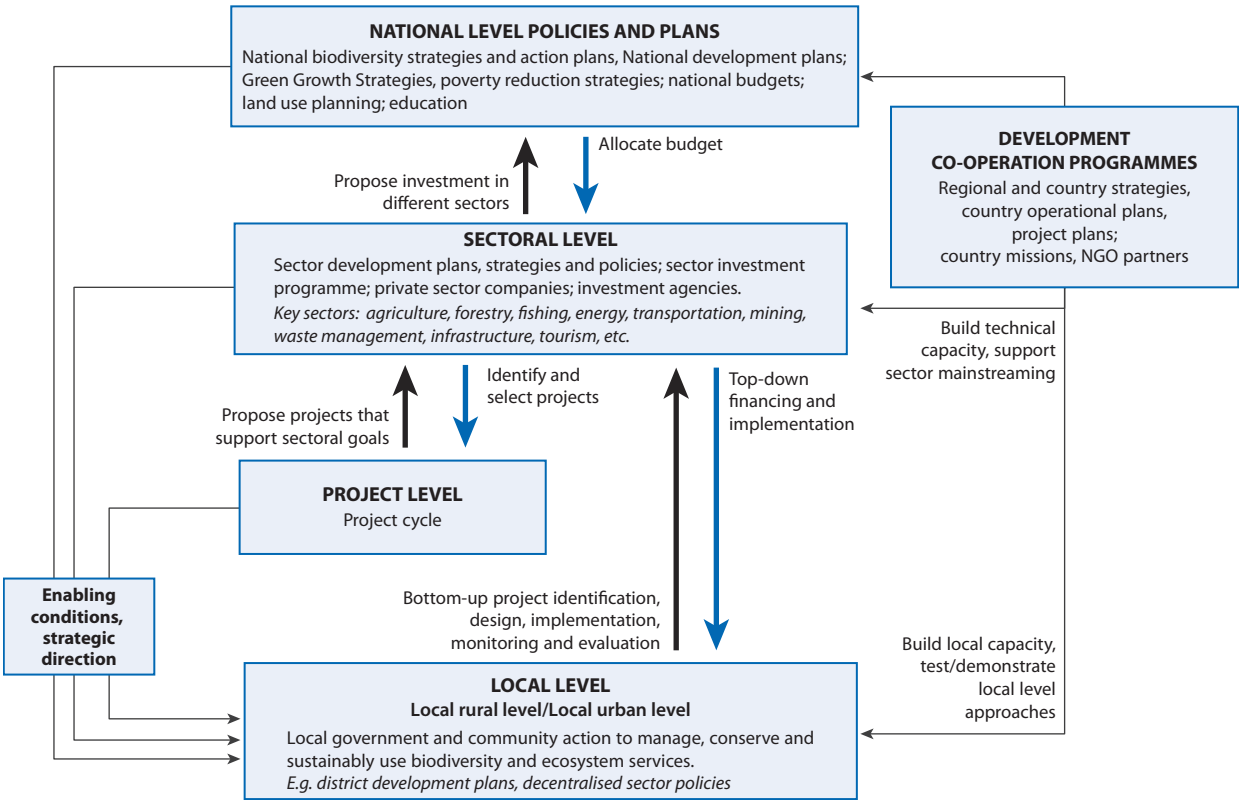
Sources: CBD (2014), *Global Biodiversity Outlook 4*, www.cbd.int/gbo4/; GEF Secretariat (2016), *Biodiversity Mainstreaming In Practice: A Review of GEF Experience*; IIED and UNEP-WCMC (2013), "Ten steps to biodiversity mainstreaming: Tips for NBSAPs 2.0 and beyond", http://pubs.iied.org/14625IIED; OECD (2013), *Scaling-up Finance Mechanisms for Biodiversity*, http://dx.doi.org/10.1787/9789264193833-en; African Leadership Group (2012), "Maun statement on biodiversity and development mainstreaming", http://povertyandconservation.info/sites/default/files/Maun%20Statement.pdf.

According to Huntley and Redford (2014), mainstreaming characteristics include: integration/internalisation/inclusion of biodiversity goals in development models, policies and programmes; simultaneously achieving positive biodiversity and development outcomes; and modifying human behaviour to increase sustainability. Biodiversity mainstreaming can focus on enabling environments at local, national or global levels. It can also focus on development policy, legislation, land-use planning, finance, taxation, economic incentives, international trade, capacity building, research and technology. In addition, it can focus on commodity chains and certification targeted at promoting conservation and sustainable use of major natural resources.

In a review of mainstreaming through the Global Environment Facility (GEF), Huntley and Redford (2014) state that though much has been written about how and why mainstreaming should be done, there is much less on what has been learned from mainstreaming practice – i.e. very limited information is available on what works and what doesn't.

For biodiversity mainstreaming to be effective, it should occur across all levels of government and include all relevant stakeholders (IIED and UNEP-WCMC, 2013). Entry points interact and are located at different levels of governance (Figure 1.1). For example, including attention to biodiversity and ecosystem services within a national or sector development plan is a key step in the mainstreaming process but will not result in changed outcomes on the ground if there is no budget allocated to implement the plan. Similarly, doing so will be insufficient if subnational and sector-level activities are not co-ordinated and aligned with the national vision and strategy (Drutschinin et al., 2015).

Figure 1.1. **Entry points for mainstreaming biodiversity and development**



Note: NGO = non-governmental organisation.

Source: Adapted from OECD (2009), *Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance*, http://dx.doi.org/10.1787/9789264054950-en.

The concept of mainstreaming is not new, nor is it one unique to biodiversity; it has been considered in areas such as climate change and disaster risk management, as well as the environment more broadly, notably in initiatives to pursue green growth or green economies. In the context of climate change, for instance, the impetus for low-emission development strategies was a perceived need to more cohesively pursue dual objectives of low emissions and development goals (see Clapp, Briner and Karousakis, 2010). Similarly, just as "aligning policies for a low-carbon economy" is directly associated with mainstreaming climate objectives into other sectors of the economy (OECD, 2015a), mainstreaming biodiversity and development could, for example, also be described as pursuing inclusive green growth for biodiversity and/or aligning policies for a resource-efficient economy. A number of the lessons and insights are relevant for how to mainstream biodiversity more effectively.

However, significant challenges remain in harnessing synergies and addressing trade-offs with regard to mainstreaming biodiversity in practice. Earlier work on biodiversity mainstreaming highlights the need to better assess mainstreaming efforts, to use these to inform policy making and to develop learning networks at regional and global scale (Huntley and Redford, 2014).

Table 1.1. **Focus countries examined and their characteristics**

Country	Biodiversity		Income group	Top 20 recipient of biodiversity-related ODA (or top 10 provider of biodiversity-related ODA)? 2014-16
	Mega-diverse	Biodiversity hotspots		
Australia	Yes	The Southwest Australia Ecoregion	HIC	No (Yes)
Brazil	Yes	Atlantic Forest	UMIC	Yes
People's Republic of China	Yes	Mountains of southwest China	UMIC	Yes
Colombia	Yes	Tropical Andes, Tumbes-Chocó-Magdalena	UMIC	Yes
Ethiopia	Yes	Eastern Afromontane	LIC	Yes
France	No	Mediterranean Basin and French overseas territories and departments in the Indian Ocean (Réunion, Mayotte and the Îles Éparses), South Pacific (New Caledonia) and Antilles	HIC	No (Yes)
India	Yes	Himalaya, Indo-Burma, Western Ghats	LMIC	Yes
Madagascar	Yes	Madagascar and the Indian Ocean Islands	LIC	No
Mexico	Yes	Madrean Pine-Oak Woodlands; Mesoamerican Forest	UMIC	No
Myanmar	No	Himalaya, Indo-Burma, mountains of southwest China	LMIC	No
Nepal	No	Himalaya, Indo-Burma	LIC	No
Peru	Yes	Tropical Andes, Tumbes-Chocó-Magdalena	UMIC	Yes
Philippines	Yes	Philippines	LMIC	Yes
South Africa	Yes	Cape Floristic, Succulent Karoo	UMIC	No
Uganda	No	Eastern Afromontane	LIC	Yes
Viet Nam	No	Indo-Burma	LMIC	Yes

Notes: **HIC** = high-income country; **UMIC** = upper-middle-income country; **LMIC** = lower-middle-income country; **LIC** = lower-income country.

Sources: Biodiversity hotspots from CEPF (2017), "Explore the biodiversity hotspots", www.cepf.net/resources/hotspots/; income classification from World Bank (2018), "World Bank Country and Lending Groups" (database), https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups; OECD (2017), *DAC Creditor Reporting System* (database).

This report draws on experiences from primarily 16 countries (Table 1.1), which are selected based on one or more of the following criteria:

- Countries that are "megadiverse" or host one or more biodiversity hotspots,[5] as these are countries which are rich in endemic species and which are under threat from human activities.
- Countries spanning different income groups. Mainstreaming biodiversity is crucial for all countries, as recognised by the parties to the CBD and the SDGs. Nations vary significantly in terms of their socio-economic characteristics and the institutional and technical capacities to make meaningful progress towards mainstreaming. A broad range of countries are therefore examined to ensure that various challenges are considered.
- The role of development co-operation in supporting biodiversity conservation and sustainable use. The OECD Development Assistance Committee (DAC) considers developing countries to be those eligible to receive official development assistance (ODA).[6] These are countries where major policy challenges include reducing poverty and improving human development, and where the trade-offs between biodiversity

conservation/sustainable use and poverty reduction are apparent. The size and extent of bilateral support for biodiversity in a country is an indication of the importance of biodiversity, as well as a reflection of the country's capacity to disburse and deploy biodiversity-related development finance.

In terms of sectors, the report focuses on approaches taken towards biodiversity mainstreaming in agriculture, forestry and fisheries. This is due to the importance of these sectors as they a) are a source of support for livelihoods and economic development; and b) exert pressure on biodiversity and also offer substantial opportunities to support biodiversity. While other sectors – such as tourism, energy, transport, infrastructure and extractives – are also critically important for biodiversity, analysis of these is outside the scope of this report.

1.3 Good practice insights on biodiversity mainstreaming

Biodiversity mainstreaming at the national level

The national-level entry point for reciprocal mainstreaming of biodiversity and development is key in terms of orienting the long-term strategic direction, enabling favourable financial decisions, and harnessing political will and opportunities for scalability. Important elements to help foster mainstreaming and enable its implementation in practice include: mainstreaming biodiversity across relevant national plans and strategies; ensuring co-ordination and coherence across institutions and clearly defining respective roles and responsibilities; generating the evidence base needed for informed decision making (e.g. with respect to legislative and policy frameworks); and mainstreaming biodiversity in national budgets.

Reciprocal mainstreaming through consistent and aligned objectives across various national strategies is a first step towards mainstreaming

A review of National Biodiversity Strategies and Action Plans (NBSAPs) of the focus countries suggests that most countries have recognised the need to mainstream biodiversity in their most recent NBSAPs, building on the Aichi Targets. A number of NBSAPs also define specific mainstreaming targets, as well as indicators to monitor progress. For example, the vision of South Africa's NBSAP links biodiversity conservation and sustainable use to the well-being of people in South Africa, includes a specific strategic objective to mainstream biodiversity into policies across sectors, and elaborates further actions and indicators on mainstreaming. These indicators include rate of loss of natural habitats and positive and harmful incentives. Outcomes of promoting mainstreaming in the NBSAPs are demonstrated, to some extent, through evidence of reciprocal mainstreaming, i.e. whereby the importance of biodiversity and/or ecosystems is being recognised in National Development Plans (NDPs).

Mainstreaming in other national-level plans and strategies is also occurring; however, there is large scope for greater coherence across different national policy areas. For example, the importance of biodiversity or ecosystems is recognised in several of the NDPs reviewed, though in some cases this is restricted to general strategic directions. A fewer number of NDPs incorporate specific biodiversity-relevant targets with associated indicators to monitor progress. Examples of biodiversity-relevant targets and indicators that are incorporated in NDPs include rates of deforestation, land use and degradation (Colombia); increase in forest cover (Nepal, Uganda); species in danger of extinction; and the number and size of protected areas. In addition, the extent to which the importance of

biodiversity (and/or ecosystems) is being recognised in other national strategies varies, and green growth strategies in particular tend to place a stronger emphasis on climate change issues than on biodiversity. Some positive examples of national strategies that integrate biodiversity alongside other policy objectives include the green growth strategy of Indonesia, the poverty reduction strategies of Brazil and Ethiopia, and the climate change strategies of France and Mexico.

Mainstreaming biodiversity in national strategies and policies can be facilitated by the NBSAP preparation process, especially when underpinned by strong stakeholder engagement. In preparing or updating the NBSAP, governments can facilitate engagement and discussion of the linkages and trade-offs between biodiversity and other national priorities (e.g. economic development, poverty reduction, food security, health), which in turn bolsters reciprocal mainstreaming. For example, Uganda set up a working group on "biodiversity for development, wealth creation and socio-economic transformation" to mainstream development issues in its NBSAP. Once this work was completed, the group's mandate was renewed to ensure that biodiversity was mainstreamed into the NDP.

Mainstreaming requires clear institutional mandates, and strong vertical and horizontal co-ordination mechanisms

Clearly identifying the roles and responsibilities of different institutions in the process towards biodiversity mainstreaming is important, as it helps to enhance transparency and accountability. A few NBSAPs reviewed, such as those of India and Ethiopia, clearly specify which institutions are involved for each of the biodiversity targets and actions. In some cases, more comprehensive institutional change has been undertaken to ensure effective implementation. Bringing together four existing institutions to establish the French Biodiversity Agency, for example, was aimed at rationalising biodiversity governance and creating a one-stop shop for action on biodiversity, which can also help promote synergies between action on biodiversity and other environmental agendas such as climate change and green growth.

Irrespective of whether the governance system in a country is centralised or decentralised, governments should aim for strong horizontal and vertical co-ordination and should institute mechanisms to help ensure policy coherence. Co-ordination mechanisms, through the establishment of inter-ministerial committees or working groups for instance, can facilitate a dialogue and working relationships that are necessary to formulate and implement wide-ranging policy reforms associated with reciprocal mainstreaming of biodiversity and development-related issues. At least nine of the countries reviewed have some form of biodiversity-relevant inter-ministerial committee already in place (including China and Nepal). However, challenges have arisen in many of these; for example, the institutions lack the authority or the resources to perform their functions, decisions taken are not binding, or they simply do not meet as frequently as they are supposed to. Such institutions will not be able to deliver on their intended objectives unless they are empowered to do so. It is perhaps timely for governments to review the existing mandates of such committees and to evaluate whether and how they can be improved so as to foster biodiversity mainstreaming.

Adequate human resources are needed among different sector ministries to ensure they are able to prioritise and implement mainstreaming, and governments can build on capacity already in place to tackle other environmental issues. For example, in Ethiopia, environmental units are embedded within various sector ministries with the intent to mainstream environmental issues across sectors. Targeted capacity building can support gaps in technical capacity, and should be focused at both national and subnational levels.

The Mainstreaming Biodiversity and Development Initiative, for example, is a joint effort between the International Institute for Environment and Development (IIED) and the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), funded by governments of the United Kingdom and Germany; it supports technical capacity building in eight African countries to promote mainstreaming. This includes developing tools and guidance to support mainstreaming at national and subnational levels, providing technical support to ministries in target countries, and promoting learning among different countries.

Robust, policy-relevant and readily available data and information are a prerequisite for mainstreaming efforts

The persistent lack of sufficient and/or publicly available data is an ongoing challenge for mainstreaming efforts. Biodiversity-related data are often unavailable, or are unreliable and/or of insufficient quality. Where data are available, usability and accessibility can be an issue with environment-related data fragmented across different institutions and not packaged in forms that can be utilised by various stakeholders. Australia's NBSAP, for example, identifies the need to better align research priorities and improve knowledge exchange among researchers, practitioners and policy makers so that biodiversity-related information is usable beyond the scientific community.

Data and information on biodiversity-related issues are critical for establishing baselines, quantifying benefits, targeting biodiversity expenditures to where they are most needed, and monitoring and evaluating change over time in order to track mainstreaming outcomes as well as impacts (OECD, 2013b). Data are useful not only to inform policy making but can also be instrumental for effective implementation, including enforcement of laws and regulations. In Brazil, for example, a state-of-the-art satellite-based deforestation monitoring system in the Amazon biome, run by the National Institute for Space Research, has enabled the government to monitor and enforce actions against deforestation. Mexico has recently launched a national automated mapping system that allows the evaluation of national subsidies/incentives through spatial analysis tools.[7]

National Ecosystem (or Biodiversity) Assessments can provide the comprehensive information base to facilitate mainstreaming efforts. They are useful in terms of establishing baselines and providing a comprehensive overview of the current state of and pressures on biodiversity. A notable assessment is that of South Africa, which also provides spatially explicit data on the basis of which priority areas and corresponding priority actions are identified. This has also been used to develop biodiversity sector plans at the local and district levels, and overall, the quantity and quality of data available in South Africa has been instrumental in mainstreaming biodiversity in a number of sectors including mining, water infrastructure and agriculture (Manuel et al., 2016).

In addition to data systems, assessments that demonstrate the economic contribution of biodiversity to society and the costs of ecosystem loss and degradation in monetary terms can help make the case for mainstreaming. Such valuation exercises have been undertaken in several countries, with support from multilateral international initiatives such as The Economics of Ecosystems and Biodiversity (TEEB) and the World Bank's Wealth Accounting and the Valuation of Ecosystem Services (WAVES). Other types of national assessments can also be instrumental in informing and prioritising mainstreaming efforts. In France, a national study was undertaken to evaluate the public subsidies that are harmful to biodiversity (Sainteny et al., 2011). Such a study is unique among the countries reviewed in this report.[8] Given the volume of finance being allocated to potentially environmentally

harmful activities worldwide (including in agriculture, forestry and fisheries), this represents an area for further work. The OECD database on Policy Instruments for the Environment (PINE) also provides information on countries with biodiversity-relevant taxes, charges and fees, tradable permits, and other instruments, all of which are positive incentives for conservation and sustainable use.[9]

Lack of information on biodiversity-related expenditures is a barrier to mobilising support for biodiversity in national budgets

Effective mainstreaming cannot realistically be achieved without sufficient allocation towards addressing biodiversity in national budgets. Assessing the "appropriate" amount of the national budget to be allocated is based on comparing what is required to achieve the objectives specified in the NBSAP and what can reasonably be mobilised from alternative sources (e.g. from the private sector, ODA). Very few countries have been able to make such comparisons, however, due to a lack of robust, comprehensive and comparable time series data on public biodiversity expenditure across national and subnational budgets. Of the countries examined, only a few – such as India, Mexico and South Africa – have information on public biodiversity expenditure. Initiatives such as the United Nations Development Programme's Biodiversity Finance Initiative (UNDP BIOFIN) are working with 30 predominantly developing countries to collect this information. In the Philippines, BIOFIN and the Department of Budget and Management are working together to "tag" biodiversity-related expenditures. Combined with NBSAP costing, this work has enabled an assessment of the funding gap, which is around 10 billion Philippine pisos (PHP) a year. The recently established Paris Collaborative on Green Budgeting, led by the OECD in collaboration with France and Mexico, is a further step in this regard.

Mainstreaming biodiversity in agriculture, forestry and fisheries sectors

The agriculture, forestry and fisheries sectors have major impacts on biodiversity and are priority sectors for mainstreaming in many countries

The agriculture, forestry and fisheries sectors are central to economic growth and development worldwide, and especially so in developing countries. These sectors supply essential commodities such as food, fibre, fuel and fodder which constitute basic needs of society as well as inputs for other economic sectors. The agriculture sector alone employs one in three people in the world's active labour force (FAO, 2012). While these sectors depend on healthy ecosystems for their productive capacity (see e.g. OECD, 2015c, on fisheries and aquaculture), the sectors also exert pressure on biodiversity and are essential to conservation and sustainable use efforts. Large-scale land conversion for agriculture and degradation of ecosystems due to unsuitable agricultural practices and input use is a major pressure on biodiversity loss. In OECD countries, the contribution of agriculture to total income and employment is relatively low;[10] however, the sector continues to have a significant environmental impact given the high levels of input use and large land area under cultivation (36%) (OECD, 2016a; 2013a). The forestry sector is also important: the formal forestry sector is estimated to contribute more than USD 600 billion, or 0.9% of the world's GDP, and provide employment to 13.2 million people (FAO, 2014). Concurrently, forests, particularly in the tropics, provide habitat to 80% of global terrestrial species and a variety of ecosystem services (UN SPF, 2017). Fisheries play an important role for food security and nutrition, and fishery trade is especially important for developing nations, in some cases accounting for more than half of the total value of traded commodities (FAO, 2014).

Clarifying land tenure and reforming environmentally harmful subsidies are prerequisites for effective mainstreaming in the agriculture sector

Pressures on biodiversity related to agriculture stem from land-use change, and unsustainable input use and agricultural practices. The need for sustainable agricultural to ensure the long-term provision of ecosystem services that underlie production are increasingly being recognised. Agriculture sector strategies, plans and policies in countries such as Uganda, Ethiopia and India include consideration of sustainable use and management of natural resources. Key prerequisites for mainstreaming in the sector include clear and secure tenure rights to encourage investment in sustainable agricultural practices and integration of biodiversity criteria in land-use planning. Economic instruments for mainstreaming biodiversity in agriculture are generally underutilised, though mechanisms such as payments for ecosystem services are being increasingly implemented in a range of countries. Additionally, significantly enhanced efforts to identify and reform environmentally harmful government support to agriculture would contribute to mainstreaming efforts. An increasing number of countries are reporting to the OECD Producer Support Estimate database on agricultural support, which is a step in this direction.[11] Large-scale community engagement in natural resource management in the agricultural sector has been undertaken in certain countries such as Ethiopia and Australia, which contributes to raising awareness and enables adoption of improved technologies and practices. In order to better track mainstreaming outcomes, it would be useful to have agri-environmental indicators that are common across countries including indicators that explicitly account for biodiversity.

Approaches to mainstream biodiversity in commercial forestry objectives are taking root, but further efforts to engage local communities and improve land-use planning are needed

While there is clear recognition of the importance of inclusive and sustainable forest management, in a co-ordinated manner with other economic and social policy priorities, as reflected in many NDPs, practical efforts and implementation in this regard vary greatly among countries. For example, the percentage of forest area under forest management plans varies considerably across the countries examined, ranging from about 10% in Brazil, to 40% in France and Peru, to 100% in India and Myanmar (FAO, 2015). Policy instruments that mainstream and internalise the external costs of biodiversity loss in forestry, so as to reconcile the objectives of forest biodiversity, and the development of forestry as a commercial productive sector are increasingly being adopted. These include community-based forestry, payments for ecosystem services and sustainable timber certification schemes. Available comparable data on forest area under sustainable certification schemes at the national level also show large variations across these countries, with most below 2%. Notable exceptions are France (47%), South Africa (16%) and Australia (9%). Subnational data on forest certification remain limited (Kraxner et al., 2017). Common mainstreaming challenges at the practical implementation level include the need for stronger engagement with stakeholders, including indigenous communities, and better co-ordinated land-use planning with a number of sectors including agriculture.

Efforts to mainstream biodiversity in the fisheries sector need to be strengthened

Many challenges remain in the fisheries sector, as reflected by the continuing increasing trends in the over-exploitation of marine fish stocks. The projected rise in aquaculture is also expected to exert increasing pressure on biodiversity. Evaluating compliance with the voluntary Food and Agriculture Organization (FAO) Code of Conduct

for Responsible Fisheries is perhaps the most comprehensive international approach for assessing progress towards mainstreaming biodiversity in the fisheries sector. A fundamental prerequisite for effective fisheries management is reliable comprehensive data on fish stocks, which are lacking in many countries. Australia is a notable exception, and its data collection, together with fisheries management plans, has achieved near 100% sustainable stocks at national level. A number of the review countries are also currently reporting to the OECD Fisheries Support Estimate database (e.g. Australia, Chinese Taipei, Colombia, France and Indonesia), enabling the tracking of government support to this sector over time. Marine spatial plans, which aim to take a systematic and comprehensive approach across sectors in the oceans space, are also beginning to proliferate and have been implemented in Australia, China, Colombia and Mexico; are under development in South Africa; and are being discussed in Brazil, Chile, Madagascar, Thailand and Viet Nam.

Development co-operation and biodiversity mainstreaming

Development co-operation continues to play an important role in supporting mainstreaming efforts in developing countries

Development partners are an important source of finance and technical capacity in support of biodiversity conservation and sustainable use in developing countries. Many developing countries, such as Madagascar and Ethiopia, have identified the availability of external funding as an important factor in successful implementation of their NBSAPs. Concurrently, a steady increase has been recorded in bilateral biodiversity-related ODA from members of the OECD DAC over the past decade, reaching USD 7.9 billion per year in 2015-16. Despite this, biodiversity-related ODA still makes up only a small share of overall portfolios, around 6% in 2015-16.

Besides financing biodiversity efforts, development co-operation supports biodiversity mainstreaming by strengthening frameworks for mainstreaming at the national level as well as directly supporting the mainstreaming of biodiversity into specific sector policies, plans and projects. Both of these include efforts to a) improve policies and institutions; b) improve data and information systems; and c) mobilise financing for biodiversity conservation and sustainable use. In Peru, development co-operation has been a key partner in creating the Ministry of Environment and developing a policy framework to promote public investment in biodiversity. A number of initiatives that have become important enablers of mainstreaming, such as the World Bank WAVES programme, the UNDP BIOFIN and financing from the Global Environment Facility (GEF), have been implemented through continued development co-operation support.

Efforts are under way to integrate biodiversity within development co-operation programming

At the same time, there is an indication that biodiversity is becoming an increasingly important theme in development co-operation programming, with several development partners prioritising biodiversity and ecosystem services within their overall development co-operation strategies. There are also examples of rigorous screening systems being implemented to realise biodiversity co-benefits, or at a minimum to identify and mitigate potential risks to biodiversity in development projects and programmes. Despite the progress achieved, considerable potential remains for further support to mainstreaming efforts of partner countries, and better biodiversity mainstreaming within development co-operation operations and portfolios.

Monitoring and evaluation of biodiversity mainstreaming

Efforts to monitor and evaluate biodiversity mainstreaming need to be scaled up

The need to monitor and evaluate mainstreaming efforts cannot be underestimated. It is not possible to identify how to allocate human, financial and technical resources more effectively, in order to achieve desired objectives, without assessing the impact of interventions over time. The use of indicators is a key component of this. Though indicators are emerging, monitoring and evaluation of biodiversity mainstreaming is in its infancy. The Aichi Biodiversity Targets and the proposed global indicators thereunder, as well as the indicator framework under the SDGs, offer a starting point from which further indicators could be considered. A few of the NBSAPs reviewed in this report also include indicators that are relevant to mainstreaming initiatives (e.g. rate of loss of natural forests, e.g. Viet Nam; number of positive and harmful incentives, e.g. Ethiopia), and some have also been transposed into NDPs (and other national strategies). International organisations that serve as platforms to collect comparable national data (e.g. OECD, FAO, World Bank) also have an important role to play in this context. Building on the indicator frameworks of the Aichi Biodiversity Targets, the SDGs and other multi-country data sources, this report presents a preliminary set of indicators that could be considered for further use to help monitor and evaluate biodiversity mainstreaming efforts in a more consistent manner. This includes indicators across the range of response indicators, namely inputs (e.g. finance), processes (e.g. establishment of inter-ministerial committees), outputs (e.g. national assessments and other studies), outcomes (e.g. new or more ambitious policies) and impacts (changes in the state of biodiversity and ecosystem services).

1.4. Mainstreaming biodiversity for sustainable development – a blueprint for action

Given the breadth of biodiversity mainstreaming, the overarching key messages from this report are the need to: be comprehensive and systematic in assessing mainstreaming needs, prioritise actions and interventions in the face of resource constraints, scale up and make more ambitious the full suite of biodiversity policy instruments that are able to impact on production and consumption patterns, and further develop and use indicators so as to be able to monitor and evaluate progress towards biodiversity mainstreaming over time. Based on this work, as well as previous OECD efforts to assess mainstreaming in the context of green growth, climate change and development co-operation, there are five main areas of action needed by policy makers and decision makers to promote effective mainstreaming of biodiversity and development.

Establish a strong social and business case for biodiversity

Given the multiple drivers of biodiversity loss and degradation, mainstreaming efforts depend on a clear and well-documented understanding of the value of biodiversity and ecosystem services for the economy and society at large, as well as the key pressures, communicated and accepted across sectors and different stakeholder groups. Governments can prioritise the following action to support the development of a strong business case for biodiversity:

- Conduct a national assessment of biodiversity and ecosystem services outlining the key pressures on biodiversity and incorporating, where possible, the full social benefits that ecosystems and ecosystem services provide, including monetary values where feasible.

- Integrate biodiversity-related considerations into sector-level resource assessments – e.g. agriculture, forestry, fisheries – and identify key pressures in each case.
- Invest in statistical/data systems to establish an evidence base on the drivers, pressures and state of biodiversity, including in improvements to the quality of existing data and efforts to enhance consolidation of and access to different data sources, and to enable evidence-based decision making.
- Develop targeted messages to the relevant stakeholders and work together to identify solutions.

Align policies on biodiversity for sustainable development

A strong commitment to biodiversity mainstreaming at national and sector levels is a prerequisite for successful mainstreaming. This commitment should also be reflected in NBSAPs and national/sector development policies, supported by policy coherence across legislative and policy frameworks. Integrating biodiversity and development policy and planning requires the following priority action:

- Develop a clear long-term vision for biodiversity and development through national biodiversity strategies, ensuring engagement of different stakeholders from economic sectors and development planning.
- Promote strategic leadership for biodiversity within the government, e.g. by embedding responsibility for mainstreaming under a cross-cutting, high-level inter-ministerial committee, working group or panel.
- Actively integrate and embed biodiversity into national development planning and policy making, through overarching entry points for environmental issues more broadly.
- Review and evaluate legal and policy frameworks to identify challenges and weaknesses, and strengthen these as appropriate so as to promote policy coherence between biodiversity and development objectives
- Define indicators for environmental and socio-economic policy variables, establish baselines, and make the information publicly available.
- Review and evaluate existing policy instruments (including positive and harmful incentives that may be in place), and identify what adjustments are needed, including the need for additional policy instruments and those that are able to generate revenue.

Develop monitoring and evaluation systems for mainstreaming

- Build on relevant indicators under the Aichi Biodiversity Targets and the SDGs, and further examine what other indicators would be useful and feasible to monitor and evaluate mainstreaming at the national level and across sectors.
- Such indicators could better cover the full range of responses, including inputs (e.g. finance and staff), processes (e.g. existence of inter-ministerial commissions), outputs (e.g. new data and assessments), outcomes (e.g. new policies such as the introduction of pesticide taxes), and impacts (e.g. improved state of biodiversity).

Strengthen institutions and capacity

Adequate institutional capacity, including dedicated human resources at national and subnational levels to implement and monitor mainstreaming action, supports iterative decision-making and inter-ministerial co-ordination mechanisms.

- Establish horizontal and/or vertical co-ordination mechanisms.
- Clearly define mandates, roles and responsibilities of relevant institutions.
- Provide training, and enhance capacity to ensure implementation.
- Promote research on biodiversity mainstreaming and research collaborations in developed and developing countries (including South-South collaborations), and provide grants as well as support for mainstreaming environmental and biodiversity programmes in education at all levels (schools and at university level).

Mobilise adequate financing for biodiversity

Identifying biodiversity financing needs to ensure the conservation and sustainable use at the national level and by sector enables the policy actions identified above to be implemented. Finance for biodiversity can be mobilised through government budgets, through economic instruments (and in some cases voluntary approaches) that apply to the private sector, and through civil society via philanthropy for example. In developing countries, support for mainstreaming from development co-operation can play an important complementary role to the government and other stakeholders. It is important to also note that the biodiversity financing challenge is not only about mobilising additional resources, but also about a) avoiding future costs; b) spending existing resources more effectively and efficiently; and c) reallocating existing resources as appropriate.

- Develop and embed approaches to track biodiversity-related expenditure within the government system, and identify resource needs to effectively implement mainstreaming activities.
- Examine the potential use of economic instruments (such as taxes, charges and fees, and payments for ecosystem services, among others) that are able to generate revenue, while also providing continuous incentives for biodiversity mainstreaming.
- Promote efforts to further engage the private sector in biodiversity mainstreaming efforts.

Notes

1. Biodiversity is also relevant to other SDGs, including Goal 1 on poverty eradication, Goal 2 on food security and sustainable agriculture, Goal 6 on sustainable water management, Goal 8 on economic growth, Goal 9 on resilient infrastructure, Goal 11 on cities and human settlements, Goal 12 on sustainable consumption and production, and Goal 13 on combating climate change.
2. Many of the targets in the SDGs resonate strongly with the CBD Aichi Biodiversity Targets, including on mainstreaming. SDG Target 15.9 for example is: “By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes and poverty reduction strategies, and accounts”.

3. See Lange, Wodon and Carey (2018) for updated numbers.

4. www.un.org/sustainabledevelopment/oceans/.

5. Biodiversity hotspots originated from the concept of "megadiverse" countries or those rich in endemic species, which was proposed by Conservation International in 1998 (Mittermeier et al., 2004). There are currently 36 biodiversity hotspots worldwide which together hold the majority of the world's endemic species, and also hold exceptionally high numbers of threatened species, including 50% of threatened mammals, 73% of threatened birds and 79% of threatened amphibians (see Myers et al., 2000).

6. The DAC list of ODA-eligible countries includes all low- and middle-income countries, excluding those that are members of the Group of 8 or European Union, and includes the United Nations' list of Least Developed Countries separately.

7. http://ssig.conabio.gob.mx/appweb.

8. Similar efforts are being undertaken in other countries including Germany, Italy and the Kyrgyz Republic.

9. The OECD PINE database includes information on when the instrument was introduced, what it applies to, the geographical coverage, the environmental domains it aims to address (e.g. biodiversity, climate), the industries concerned, revenues, costs or rates, earmarking, and exemptions.

10. The share of agriculture in total GDP of OECD countries ranges from 0.3% to 9.2% (OECD, 2013a), and employment ranges from 1.1% to 21% (OECD, 2016d).

11. These include Australia, Brazil, China, Colombia, France, Mexico and South Africa.

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Chapter 2

Mainstreaming biodiversity at the national level

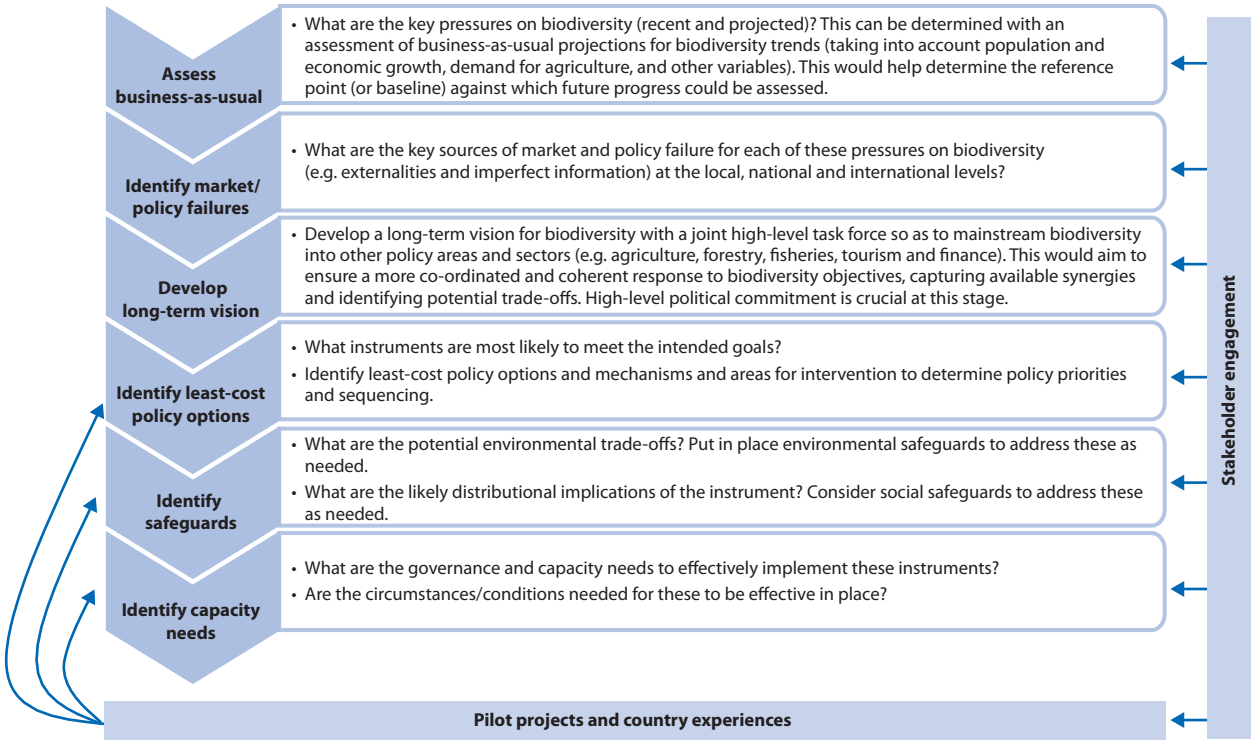
This chapter highlights some of the key features that need to be considered in mainstreaming biodiversity at the national level. This includes reciprocal mainstreaming of biodiversity and development across key strategies and plans including National Biodiversity Strategies and Action Plans, National Development Plans and green growth strategies, among others. Moreover, it examines institutional co-ordination and the establishment of clear roles and responsibilities for biodiversity mainstreaming, the role of data in fostering biodiversity mainstreaming, and how biodiversity is being mainstreaming in national budgets.

2.1. Introduction

The national-level entry point for reciprocal mainstreaming is an important one, as most often it is at this level that long-term strategies are developed, that financing decisions are made and where opportunities for scalability can be harnessed. It is also at this level that political will must be captured. This chapter examines key features that need to be considered for biodiversity mainstreaming at the national level. These are: the extent to which mainstreaming of economic development and where relevant, poverty alleviation objectives are reflected in National Biodiversity Strategies and Action Plans (NBSAPs); the extent to which biodiversity is reflected in National Development Plans (NDPs) and other relevant strategies; institutional arrangements in place to foster mainstreaming; the role of data and information in mainstreaming; and the extent to which biodiversity is reflected in national budgets. It is important to note that these issues should be considered in the broader context of assessment frameworks that have been developed for the conservation and sustainable use of biodiversity, which include the need for mainstreaming (Figure 2.1).

Moreover, while there is a need for mainstreaming biodiversity and development across all sectors and areas of the economy, some are likely to be more important than others. Prioritising and sequencing mainstreaming efforts to target areas that are likely to have a greater impact at lower cost can help to achieve more efficient results.[1]

Figure 2.1. **Assessment framework for biodiversity management and mainstreaming**



Source: Adapted from OECD (2013a), *Scaling-up Finance Mechanisms for Biodiversity*, http://dx.doi.org/10.1787/9789264193833-en.

2.2. Mainstreaming development and poverty objectives in national biodiversity strategies

NBSAPs have an important role to play in driving the process of mainstreaming at the national level. NBSAPs should clearly set out goals, objectives and priorities for action, including those for mainstreaming. They should also include clear timetables and targets for the specified objectives and actions, and define indicators that enable monitoring of progress towards achieving these.

The Convention on Biological Diversity (CBD) has recognised that NBSAPs should be used as "effective instruments for the integration of biodiversity targets into national development and poverty reduction policies and strategies, national accounting, as appropriate, economic sectors and spatial planning processes" (CBD, 2010). To be effective, therefore, NBSAPs should also reflect the links among biodiversity, economic development and where relevant, poverty alleviation priorities (including defining specific objectives, targets and indicators for reciprocal mainstreaming). Several efforts, adopting different approaches, have been undertaken to evaluate the extent to which biodiversity strategies recognise the links to sustainable development and poverty eradication (CBD, 2016; CBD, 2015; Pisupati and Prip, 2015; IIED, 2013; Prip et al., 2010). A review of first-generation NBSAPs revealed a large variation in the attention given to development issues, with only a few NBSAPs making explicit reference to poverty reduction[2] (Prip et al., 2010).

An overview of the extent to which development and poverty alleviation objectives have been mainstreamed in the most recent NBSAPs of 16 countries is provided in Annex 2.A1. This examines a) whether objectives for mainstreaming biodiversity into economic development and poverty alleviation have been clearly specified; b) the definition of clear, time-bound and measurable targets and priority actions to implement these objectives; and c) the extent to which indicators to monitor and assess implementation are defined. The analysis also draws on relevant insights from the Fifth National Reports.

The review finds that while the importance of mainstreaming biodiversity and development is well recognised, the extent to which this is translated into priority actions and indicators varies. Nearly all NBSAPs refer to development (and poverty alleviation) in one way or another, but few have established priority actions that specifically link socio-economic development and biodiversity objectives, and fewer have identified indicators against which to monitor progress. On the whole, more recent NBSAPs tend to fare better with regard to mainstreaming than those that are outdated. Nevertheless, while the acknowledgement of the importance of mainstreaming biodiversity and development is essential, specific objectives, actions, targets and indicators are required to provide clear strategic guidance to various stakeholders, and to enable monitoring of progress over time.

While all the countries reviewed recognise the need for mainstreaming in a general sense, some countries consider mainstreaming biodiversity and development as a central goal. In South Africa, for example, the overarching vision of the 2005 NBSAP is to conserve, manage and sustainably use biodiversity to ensure equitable benefits to the people of South Africa, now and in the future. The strategic objectives of the NBSAP are therefore clearly linked with the economic and human development objectives of the country.[3] In India, the NBSAP from 2014 includes a target on integrating biodiversity values into planning processes.[4] Moreover, the NBSAP reiterates that it is to be implemented in line with the overarching National Environmental Policy (NEP) (2006), which was developed to integrate environmental concerns including biodiversity into economic and social development.[5]

Other NBSAPs highlight that while mainstreaming is a priority, a number of challenges persist. Nepal's NBSAP (2014), for example, recognises that mainstreaming biodiversity into development plans and programmes had been inadequate, being the priority of only the line ministry (the Ministry of Forests and Soil Conservation). As a result, the NBSAP lists priority actions for mainstreaming and identifies supporting institutions to implement these.[6] In the Philippines, though there is a legal mandate to promote mainstreaming into development planning, the country's Fifth National Report acknowledges that many of the NBSAP priorities had been reflected mainly in environmental and natural resources programmes, and that some of these envisaged interventions had never been implemented. The upcoming NBSAP (2014-25) addresses this by identifying entry points for mainstreaming into planning and development processes, including in local governance and urban biodiversity. [7]

Regarding poverty alleviation in relation to biodiversity mainstreaming, while most of the NBSAPs describe the poverty eradication challenges, particularly in the sections focusing on Aichi Targets 2 and 14[8] or the Millennium Development Goals (MDGs), only a few NBSAPs go beyond a general discussion and translate these considerations into formal objectives and priority actions. This suggests a need for greater policy coherence between NBSAPs and poverty reduction policies. Colombia's NBSAP (2014), for instance, mentions poverty in general terms, despite the country's ambitious strategic direction for extreme poverty eradication, implemented by Colombia's National Agency for Overcoming Extreme Poverty (ANSPE), which was established in 2012.[9]

Examples of NBSAPs where the links between poverty and biodiversity have been explicitly described and priority actions have been outlined related to this include those of India, Nepal, Peru, South Africa and Uganda. Nepal includes two poverty-related priority actions in its NBSAP, namely, "effectively informing the decision-makers that achieving most of the MDGs depend directly on ecosystem services, including the targets on poverty" and "ensuring poor's access to environmental resources and decision making". Peru discusses poverty in the context of equity and productive conservation under the principles and management approaches that guide the implementation of the national biodiversity targets.[10]

Only a few NBSAPs include specific poverty-related indicators with time-bound measurable national targets. The People's Republic of China, for example, has defined two poverty-related indicators under Aichi Target 14 (i.e. net income per capita of rural households and the number of people in poverty). Nepal has incorporated an indicator into the implementation matrix (i.e. additional hectares of degraded forest rehabilitated through pro-poor leasehold forestry by 2020).

Stakeholder engagement in the NBSAP development process

Ensuring broad stakeholder consultation processes in the preparation of NBSAPs can also pave the way to fostering the mainstreaming of biodiversity through increasing ownership among various stakeholders and thereby facilitating implementation and providing avenues for discussion of the linkages and trade-offs between biodiversity and other national priorities (such as economic development, poverty reduction, food security, health). Previous analysis of experience with the formulation of national sustainable development strategies, for example, concluded that the involvement of finance ministries facilitates the integration of environmental development priorities with fiscal priority setting and national expenditure and revenue generation (IISD, 2004; OECD, 2006; cited in Clapp, Briner and Karousakis, 2010).

Most parties involved a range of stakeholders[11] in the NBSAP revision process, though there is little elaboration on the quality of engagement or implications for NBSAP implementation (SCBD, 2016). Many modes of stakeholder engagement have been reported. Among the 110 revised NBSAPs, the SCBD reports that 66 of them record a formal co-ordination structure such as a working group to bring together various stakeholders for NBSAP-related tasks (SCBD, 2016). In Uganda, for example, a thematic working group on biodiversity for development of wealth creation and socio-economic transformation was established, along with three others, to contribute to the NBSAP revision process. The working groups consist of government ministries, departments and agencies, including those related to agriculture, environment, forestry, wildlife, energy, finance, wetlands, trade, tourism and national planning; district representatives; research institutions; academia; the private sector; and non-governmental organisations (NGOs), among others (Sabino, 2013). Once the NBSAP was approved, their mandate was renewed to spearhead mainstreaming biodiversity into national development frameworks, including the monitoring and budget for Uganda's NDP, spanning the period from 2015/16 to 2019/20 (IIED, 2015). Given the stakeholder membership of the working group (including national planning, agriculture, etc.), this should help to ensure continuity and consistency in the messages conveyed in the NBSAP and the NDP. Further examples of stakeholder participation in the NBSAP process are highlighted in Box 2.1.

Box 2.1. **Examples of stakeholder participation in NBSAP development**

In **France**, the National Biodiversity Strategy (NBS) (2004-10) was formulated by the Department for Nature and Landscapes involving some technical contributors. One of the main criticisms was that local authorities and other stakeholders were not included in this process. Following the Grenelle Forum in 2007, a greater stress is laid on stakeholder involvement in the NBS (2011-20). There has been an effort to include stakeholders across various levels of government as well as civil society and the private sector, upstream in the formulation of the strategy and downstream through voluntary subscription and commitment to the NBS. All stakeholders (legal entities) are invited to subscribe to promote and publicise the NBS. Each subscriber is invited to make a commitment to action within 18 months and present an action plan which must involve significant, supplementary, measurable and scalable action.

In **Mexico**, the development of the National Strategy on Biodiversity of Mexico (Estrategia Nacional sobre Biodiversidad de México [ENBioMex]) and its Plan of Action 2016-2030 was carried out through a process that involved the broad direct participation of members from federal, state and municipal governments; academic institutions; civil society organisations; and the private sector. Indirectly around 1 800 people participated through involvement in the nine state strategies of biodiversity, which were a primary input for the ENBioMex. Numerous consultation workshops were held for the formulation of the strategy: a) six workshops in which 120 people from the different sectors participated to establish the main elements of the strategy (mission, vision, strategic axes, lines of action, actions, actors and deadlines for compliance); b) working meetings with key actors, to define a national Plan of Action for biodiversity including specific actions, actors responsible for implementation and the deadlines for compliance between 2016 and 2030; c) a national workshop for enrichment, with participation of around 150 people from 126 institutions and 15 national agencies, who contributed to enrich the content and approach of the Plan of Action; and d) finally, a workshop to include the gender perspective and highlight the participation of indigenous peoples and local communities through the ENBioMex.

Box 2.1. **Examples of stakeholder participation in NBSAP development**
(continued)

In **India**, a highly participatory, decentralised approach was conceived for the development of the National Biodiversity Action Plan (NBAP) (2008). The Union Ministry of Environment and Forests commissioned an NGO (Kalpavriksh) under a project funded by the Global Environment Facility to conceptualise and co-ordinate a country-wide consultation process for the preparation of the plan. Kalpavriksh convened a 15-member technical and policy core group consisting of experts from different sectors and various parts of the country to reach out to a large number of stakeholders. The consultation process covered over 50 000 people spanning across village organisations, popular movements, NGOs, academics and scientists, government officials from various agencies, the private sector, the armed forces, politicians, media persons, etc. This was done through various means including public hearings, local consultations, field research, cultural events, rallies, exercises in educational institutions and formal workshops. The results of the exercise included 71 Biodiversity Strategy and Action Plans at local, state, eco-regional and thematic levels along with a final technical report for the NBAP. The NBAP was updated with an addendum in 2014 containing 12 national biodiversity targets along with relevant indicators and monitoring frameworks based on stakeholder consultations and a review of the programmes and activities being undertaken by ministries/ departments of the Government of India and State Biodiversity Boards. The review process included inter-ministerial meetings and public stakeholder consultations.

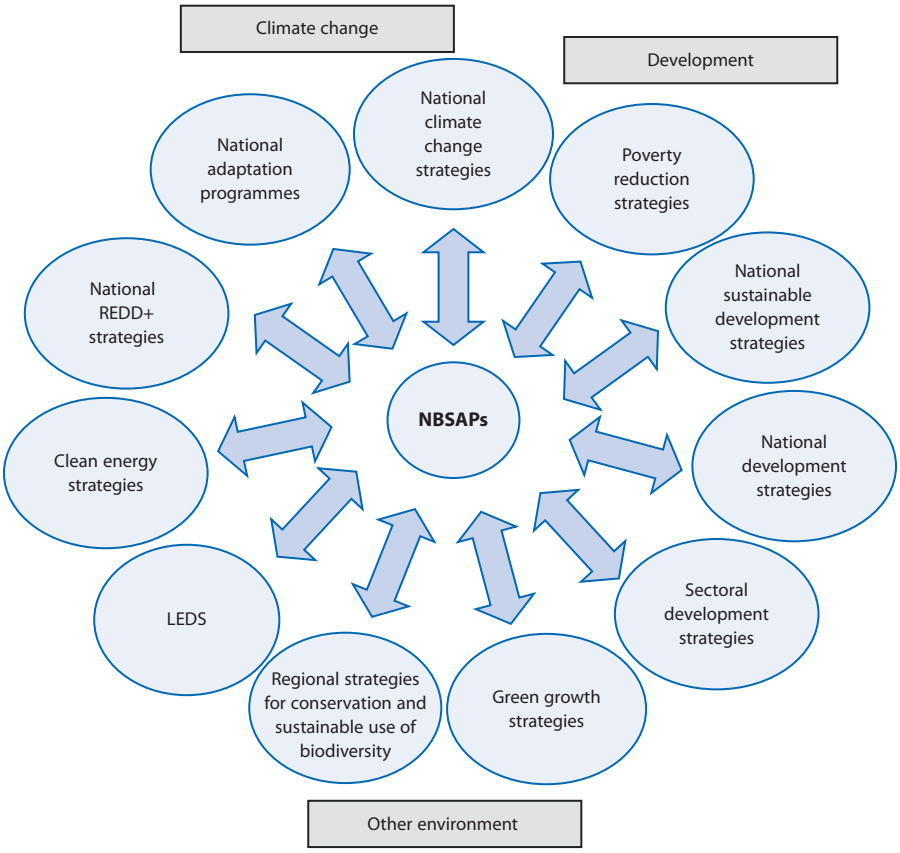
Nepal's NBSAP (2014) describes the plan's formulation process, which involved the collection of primary data through consultations with 1 664 stakeholders at the national, regional, district and community levels. The national-level consultations involved 41 government and non-government agencies, including meetings with the Ministry of Finance and the National Planning Commission. Among the main outputs of the consultations were critical reviews of biodiversity management mechanisms and an assessment of the progress made in implementation of the Nepal Biodiversity Strategy (2002) and Nepal Biodiversity Strategy Implementation Plan (2006). These reviews sought to identify major achievements, shortcomings and lessons learned to develop new biodiversity strategies, and action and implementation plans, as well as a framework for biodiversity management at the local level.

Sources: OECD (2016), *Environmental Performance Review of France;* MoEF (2008), *National Biodiversity Action Plan;* UNEP and CBD (2007) "Ensuring stakeholder engagement in the development, implementation and updating of NBSAPs"; TPCG and Kalpavriksh (2005) *Securing India's Future: Final Technical Report of the National Biodiversity Strategy and Action Plan;* MoEFCC (2014b), *India's Fifth National Report to the Convention on Biological Diversity 2014.*

2.3. Mainstreaming biodiversity into national development plans and other strategies

For mainstreaming to be effective at the national level, strategies, plans, and policies – especially those that are likely to have a strong impact on biodiversity – need to be aligned. This implies that the goals and objectives established in NBSAPs should also be reflected in other relevant national strategies, such as NDPs, Poverty Reduction Strategy Papers (PRSPs), National Sustainable Development Strategies (NSDSs) and/or green growth strategies (Figure 2.2).

Figure 2.2. **Existing strategies of relevance to NBSAPs**



Note: REDD+ = reducing emissions from deforestation and forest degradation in developing countries.

Source: Adapted from Clapp, Briner and Karousakis (2010), "Low-emission development strategies (LEDS): Technical, institutional and policy lessons", http://dx.doi.org/10.1787/5k451mzrnt37-en.

Mainstreaming of biodiversity in NDPs

Earlier studies examining the extent to which biodiversity is mainstreamed into other development strategies found that biodiversity mainstreaming was not widespread in NDPs, PRSPs or development co-operation agencies' policies (Prip et. al., 2010; Roe, 2010).[12]

More recent reporting to the CBD revealed that while 85% of parties to the convention (both developed and developing countries) have considered biodiversity in their national priorities or development plans, some of this integration appears to be incidental or random, often with no institutionalisation or planned process involved (CBD, 2014). Overall, only about 7% of the revised NBSAPs contain national targets which match the scope and level of ambition of Aichi Target 2[13] (CBD, 2016). This is reflected in the fact that the explicit integration of biodiversity into national budgetary processes is currently limited to a dozen countries (Burundi, Chile, Comoros, Ecuador, France, Kyrgyz Republic, Mexico, Mozambique, Netherlands, Norway, Tunisia, Viet Nam) (CBD, 2014).

An overview of the extent to which the focus countries have integrated biodiversity into their recent NDPs is provided in Annex 2.A2. It summarises whether biodiversity priorities are explicitly mentioned and integrated into the objectives and priority actions of the NDPs, and whether these are supported by targets and indicators.

Across most of the countries reviewed, biodiversity (or more generally ecological conservation) has been considered in the strategic objectives and priority actions in NDPs. A number of plans also include targets and indicators, such as those related to deforestation, land use and degradation (Colombia, Ethiopia), increase in forest cover (Nepal, Uganda), species in danger of extinction, and the number and size of protected areas. Most countries have devoted separate thematic sections to biodiversity, ecosystems or environmental protection more broadly. China's 12th Five-Year Plan (FYP) (2011-15) for example, addresses biodiversity under ecosystem protection and accelerated restoration, as part of the plan's overarching strategy to build "a resource-conserving and environment-friendly society through green development". The 13th FYP (2016-20) reiterates this commitment by including "improvement in ecological environment" as a central goal with dedicated targets and indicators. Brazil's federal development plan, Plano Plurianual (2016-2019), includes "conservation and sustainable use of biodiversity" as one of the core programmes, detailing a number of objectives, sub-goals and initiatives. In Mexico, since 2007, the government has included mainstreaming of environmental concerns as a necessary strategy for achieving sustainable development. Both the 2007-12 NDP and the 2013-18 NDP refer to biodiversity under various action items, most notably in the section on green and inclusive growth (OECD, 2013b). However, no targets and indicators are specified.

Myanmar is an example where biodiversity has not been clearly mainstreamed into the NDP. The current short-term plan, the Framework for Economic and Social Reforms (FESR) (2012-15), includes a short section on environmental protection more broadly, with a single reference to biodiversity. It does include a target to ensure sustainable development of forestry by 2015, though no indicators are specified against which progress can be assessed. The FESR sets policy priorities for the formulation of goals under the country's long-term vision, the National Comprehensive Development Plan (2011-31). It remains unclear whether the plan, once finalised, will include biodiversity in its objectives and targets.[14]

Mainstreaming of biodiversity into poverty reduction strategies

To ensure policy coherence, biodiversity considerations should also be mainstreamed into other national strategies. Across many countries examined here, poverty and inequality remain important developmental challenges, and addressing these issues can constitute the single most important national development priority. In several instances, PRSPs[15] are in fact the NDPs.[16] Given that many of the world's poor are directly dependent on natural resources for livelihood and well-being, while the sustainable management of natural capital can contribute to poverty alleviation, biodiversity-related priorities should be considered in a complementary manner with national poverty reduction strategies.

A review of nine poverty reduction strategies[17] suggests that biodiversity priorities have been incorporated, albeit to a varying extent, into the strategies of five countries (i.e. Brazil, Ethiopia, Nepal, Uganda and Viet Nam). For instance, the PRSP of Madagascar (2007) includes environment and biodiversity as a central theme.[18] Similarly, the importance of preserving biodiversity and ecology for the health and well-being of the poor has been recognised in the PRSP of Viet Nam (Viet Nam Government, 2004). Some of the poverty reduction strategies have also elaborated on specific ecosystem-related programmes, such as the Bolsa Verde green grant scheme introduced as part of the "Brazil without Poverty" (Brasil Sem Miséria) strategy (MDS, 2014) (Box 2.2.).

Overall, however, these poverty reduction strategies contain less detail on the specific biodiversity-related actions, targets and indicators when compared with NDPs,

and therefore, the extent to which the biodiversity-poverty inter-linkages are realised in practice would be difficult to assess. According to a government white paper, for example, the Development-oriented Poverty Reduction Program for Rural China, launched in the mid-1980s, made significant achievements in forest, wetland and biodiversity conservation (State Council of PRC, 2011). The information to verify these results through targets and specific indicators, however, does not seem to be readily available.

Box 2.2. **Bolsa Verde programme in Brazil**

Brazil's Bolsa Verde, a green grant scheme, is an example of a biodiversity-specific programme developed and implemented within a national poverty policy. The programme provides quarterly payments to families, including traditional peoples and indigenous communities, in extreme poverty living in federal protected and other rural priority areas in return for certain conservation and sustainable use activities. Although the grant scheme is considered a potentially effective payment for ecosystem services (PES) tool with more than 60 000 families enrolled as of June 2014, administrative complexities remain. There are challenges, among others, related to managing the beneficiaries' database, and monitoring and assessing the compliance with conservation commitments.

Sources: MMA (2015), *Fifth National Report to the Convention on Biological Diversity*; OECD (2015b), *OECD Environmental Performance Reviews: Brazil 2015*, https://doi.org/10.1787/9789264240094-en.

While the above-mentioned poverty reduction strategies tend to discuss the inter-linkages with biodiversity in general terms, there are others that make no explicit reference to biodiversity. For instance, ecosystems considerations do not feature in the current programmes implemented by Colombia's ANSPE,[19] while in the Philippines National Anti-Poverty Program 2011-2016 (NAPC, 2010), ecosystems are only briefly mentioned in relation to the reform and management of fisheries and aquatic resources. This is inconsistent with the government's overall orientation towards sustainable development, dating back to the Philippines Strategy for Sustainable Development (DENR, 1990) and the Philippine Agenda 21 (Philippine Government, 1996), in which ecosystems and biodiversity priorities play a central role.[20]

Mainstreaming of biodiversity into sustainable development, green growth and other relevant strategies

Among the 110 revised NBSAPs only 17 mention an integration of NBSAPs with sustainable development plans (CBD, 2016). Across a selection of countries reviewed, NSDSs and green growth strategies tend to mainstream biodiversity priorities in a relatively more formalised and advanced manner than PRSPs. For instance, South Africa's National Strategy for Sustainable Development and Action Plan (2011-14) highlights the importance of ecosystems and natural resources in sustainable development, setting out five strategic objectives, particular interventions and indicators with the aim of integrating socio-economic goals with ecological sustainability (DEA, 2011). Similarly, Viet Nam's strategy for the Implementation of Sustainable Development for 2011-20 (Viet Nam Government, 2012) provides a comprehensive account of biodiversity and its importance for development, detailing specific indicators and targets. The importance of biodiversity and ecosystems is also recognised in the sustainable development strategies of France and Australia.

The French National Strategy of Ecological Transition towards Sustainable Development 2015-2020 is a high-level document addressing various aspects including biodiversity and ecosystems. Priorities under this strategy include maintaining capacity of territories to provide and benefit from ecosystem services and developing a more resource-efficient new industrial and agricultural policy (MEDDE, 2015). Australia's National Strategy for Ecologically Sustainable Development (1992) contains strategic approaches, objectives and actions for various sectors as well as cross-sectoral issues including biodiversity. One of the core objectives of the strategy is to protect biological diversity and maintain essential ecological processes and life-support systems[21] (Australian Government, 1992).

In some cases countries have included biodiversity objectives in climate change strategies and action plans. For instance, India's National Action Plan on Climate Change (GoI, 2008) contains eight national missions, two of which specifically relate to biodiversity. The National Mission for Sustaining the Himalayan Ecosystem aims at community management of forests by village councils as well as scientific evaluation and monitoring of the glaciers and freshwater systems in the region. The National Mission for a Green India is aimed at the reforestation of 5 million hectares of degraded land through joint action by the local communities and the state forest departments. These missions have been included in the NDP as well. Among the objectives of Mexico's National Strategy for Climate Change (2013) is the conservation and sustainable use of ecosystems and maintenance of environmental services they provide. The strategy seeks to promote best agricultural and forestry practices to increase and preserve the natural carbon sinks.

In the green growth strategies examined,[22] biodiversity features more comprehensively in those of Viet Nam and Indonesia and less so in those of Ethiopia and Uganda, which are more climate-centric. Viet Nam's National Green Growth Strategy (Government of Viet Nam, 2012) is relatively broad and focuses on reducing the intensity of greenhouse gas emissions, greening production and promoting sustainable consumption. Several actions listed have direct or indirect consequences for biodiversity, including review of sectoral plans to ensure efficient use of natural resources in all sectors, restoration of conservation areas and degraded ecosystems, review of urban master plans with a focus on sustainable use and management of natural resources and increase in urban green cover, and promotion of eco-labelling and green products. Similarly in the case of Indonesia (Government of Indonesia and GGGI, 2015), the roadmap to green growth identifies renewable natural resources (e.g. forests, fisheries, agriculture, land management and marine activities) as one of four "clusters of opportunities". The strategy also refers to fostering new natural capital-based markets to mobilise resources from the non-consumptive use of natural capital and ecosystem services, e.g. via ecotourism, PES and mobilising forest carbon finance.

The main policy driver for green growth in Ethiopia is the Climate Resilient Green Economy Strategy (CRGE), which has two components: a Green Economy Strategy, which mainly addresses mitigation and was launched in 2011; and a Climate Resilience Strategy, which focuses on adaptation and is currently being developed with a focus on agriculture, forestry and land use (OECD, 2013a). One of the four pillars is "protecting and re-establishing forests for their economic and ecosystem services, including as carbon stocks" (FDRE, 2011). Several priority initiatives under the CRGE could contribute to lowering pressure on biodiversity. Under agriculture, for example, the priorities are to intensify agriculture with improved inputs to prevent expansion of agricultural land; to create new agricultural lands by rehabilitating degraded areas; and to promote low-emission techniques including use of organic fertilisers. Under the forestry sector, the priorities are to reduce demand for fuelwood by developing renewable sources of power and to increase afforestation, reforestation and forest management. An explicit inclusion of biodiversity considerations is not found in the

strategy; because of this, some of these priorities could negatively impact biodiversity and in turn, reduce the resilience of ecosystems to climate change. For example, focuses on expanding electric power generation from renewable sources, which is a pillar of the CRGE strategy, could have indirect benefits for biodiversity by reducing fuelwood dependence. On the other hand, without adequate safeguards, dependence on large hydropower could also have negative social and environmental impacts.

Uganda is currently developing a Green Growth Development Strategy to 2030 which has the following objectives: a) guide national policy and planning in an integrated way; b) mainstream climate change in key sectors of the economy; and c) position Uganda to access international funding to achieve low-carbon development and green growth. Based on existing information available to date, however, it seems that the strategy may not be sufficiently comprehensive, focusing narrowly on climate change issues without due attention being paid to biodiversity or sustainable natural resource use.

Overall, green growth strategies can be an important tool to integrate environmental goals, including biodiversity and climate change, with growth and development objectives, as has been done in the case of Viet Nam and Indonesia. Focusing too narrowly on climate change within these strategies can lead to a missed opportunity in setting out a comprehensive roadmap for environmentally sustainable economic growth.

Another example of a greening initiative is China's "ecological civilisation", a concept that first appeared in 2007 in a report to the 17th National People's Congress and that has recently gained stronger footing since the government released Central Document No. 12, "Opinions of the Central Committee of the Communist Party of China and the State Council on Further Promoting the Development of Ecological Civilisation" (CPCCC and State Council, 2015). The initiative seeks to make significant progress in addressing the obstacles to effective environmental policy implementation by setting out standards and assessment mechanisms. These include the shift away from using economic growth as the sole criterion to assess the performance of government officials, and creating a strict accountability and penalty system. Another important feature of the document is the collective responsibility for ecological advancement, in which all actors from the government, to the private sector, to individuals are expected to contribute their share. Slowing down biodiversity loss and enhancing the stability of ecosystems, as part of improving the overall quality of the ecological environment, are the biodiversity-specific elements of the document.

2.4. Institutional issues

Irrespective of whether the governance system in a country is centralised or decentralised, governments should aim for strong horizontal and vertical co-ordination and should institute mechanisms to help ensure policy coherence. Several countries have listed weak institutional collaboration as well as gaps and overlaps in mandates as a challenge in biodiversity mainstreaming (examples include Viet Nam[23] and Uganda [Matsiko, 2015]). The establishment of inter-ministerial committees and/or working groups is one way to help develop the institutional and governance capacity necessary to formulate and implement wide-ranging policy reforms associated with reciprocal mainstreaming of biodiversity and development.

While the biodiversity responsibilities are most commonly under the mandate of environment ministries, Table 2.1 summarises where other relevant policy areas are situated in the governance structures across a few of the countries. The table illustrates that governments have taken different approaches to assigning sector-level responsibilities to

Table 2.1. **Biodiversity-relevant policy areas covered by various ministries**

Country	Biodiversity	Forestry	Fisheries	Agriculture	Water	Tourism
Australia	Department of Environment and Energy (DEE)	DEE and Department of Agriculture and Water Resources (DAWR)*	DAWR	DAWR	DAWR	Department of Foreign Affairs and Trade
Colombia	Ministry of Environment and Sustainable Development (Ministerio de Ambiente y Desarrollo Sostenible) (MADS)	MADS	Ministry of Agriculture and Rural Development (Ministerio de Agricultura y Desarrollo Rural) (MADR)	MADR	Ministry of Housing, Cities and Territories	Ministry of Commerce, Industry and Tourism
Ethiopia	Ministry of Environment, Forest and Climate Change (MoEFCC)	MoEFCC	Ministry of Livestock and Fisheries	Ministry of Agriculture and Natural Resources	Ministry of Water, Irrigation and Energy	Ministry of Culture and Tourism
France	Ministry of Environment, Energy and Marine Affairs (Ministère de l'Environnement, de l'Energie et de la Mer) (MEEM)	Ministry of Agriculture, Agrifood and Forestry (Ministère de l'agriculture et de l'alimentation) (MAA)	MEEM	MAA	MEEM	Ministry of Foreign Affairs and International Development
India	MoEFCC	MoEFCC	Department of Animal Husbandry, Dairying and Fisheries (DADF)	DADF	Ministry of Water Resources	Ministry of Tourism
Mexico	Secretariat of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales) (SEMARNAT) National Commission of Natural Protected Areas (Comisión Nactional de Áreas Naturales Protegidas) (CONANP) (CONABIO**)	SEMARNAT National Forestry Commission (Comisión Nacional Forestal) (CONAFOR)	Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación) (SAGARPA)	SAGARPA	SEMARNAT National Water Commission (Comisión Nacional del Agua) (CONAGUA)	Secretariat of Tourism (Secretaría de Turismo) (SECTUR)
Myanmar	Ministry of Environmental Conservation and Forestry (MOECAF)	MOECAF	Ministry of Livestock, Fisheries and Rural Development	Ministry of Agriculture and Irrigation (MOAI)	MOAI	Ministry of Hotels and Tourism
South Africa	Department of Environmental Affairs (DEA); South Africa National Biodiversity Institute (SANBI); South Africa National Parks (SANParks)	Department of Agriculture, Forestry and Fisheries (DAFF)	DAFF	DAFF	Department of Water and Sanitation	Department of Tourism

* DEE for protected forests and DAWR for the rest.

** CONABIO, the Mexican Commission for the Knowledge and Use of Biodiversity (La Comisión Nacional para el Conocimiento y Uso de la Biodiversidad), is an inter-ministerial commission dedicated, among other activities, to the development, maintenance and update of the National Biodiversity Information System; to the support of projects and studies focused on the knowledge and use of biodiversity; to advising governmental institutions and other sectors; to undertaking special projects and programmes and sharing knowledge on biological diversity; and to following up on international agreements on topics related to biological diversity, and provide services to the public.

various institutions. While there may not necessarily be a right or wrong way to allocate these various responsibilities, effectively mainstreaming biodiversity across different policies and programmes requires strong collaboration across these. An exercise undertaken by India illustrates the number of different ministries that are, to some degree, involved in the implementation of the NBAP across each of the National Biodiversity Targets (NBTs) (Table 2.2) (MoEFCC, 2014a). Additionally, India's Addendum to the NBAP (2014) specifies indicators for the 12 NBTs and delineates the government agency responsible for monitoring each indicator. The agencies were identified on the basis of their mandate, expertise and geographical coverage and include national-, state- and local-level bodies.

Table 2.2. **Indicative list of ministries/departments and NBTs of the NBAP in India**

Ministries/departments of government of India and planning commission	NBTs											
Ministry of Agriculture	1	2	3	4	5	6	7	8	9	10	11	12
Ministry of Chemicals and Fertilisers	3	4	5	6	7	8	9	10	11	12		
Ministry of Coal	3	4	5	6	7	8	9	10	11	12		
Ministry of Commerce and Industry	2	3	5	7	8	9	10	12				
Ministry of Drinking Water and Sanitation	3	4	6	9	10	11	12					
Ministry of Earth Sciences	1	2	3	4	5	6	7	8	9	10	11	12
MoEFCC	1	2	3	4	5	6	7	8	9	10	11	12
Ministry of Health and Family Welfare	1	3	4	5	6	9	10	11	12			
Ministry of Human Resource Development	1	2	3	4	5	6	7	8	9	10	11	12
Ministry of New and Renewable Energy	1	2	3	4	5	6	7	8	9	10	11	12
Ministry of Panchayati Raj	1	3	4	5	6	7	8	9	10	11	12	
Ministry of Petroleum and Natural Gas	3	4	5	6	7	8	9	10	12			
Ministry of Power	2	3	4	5	6	7	8	9	10	12		
Ministry of Rural Development	1	2	3	4	5	6	7	8	9	10	11	12
Ministry of Science and Technology	1	2	3	4	5	6	7	8	9	10	11	12
Ministry of Shipping	3	4	6	7	8	9	10	12				
Ministry of Tourism	3	4	5	6	7	8	9	10	11	12		
Ministry of Tribal Affairs	1	2	3	4	5	6	7	8	9	10	11	12
Ministry of Urban Development	1	3	4	5	6	7	8	9	10	11	12	
Ministry of Water Resources	1	2	3	4	5	6	7	8	9	10	11	12
Department of Space	3	4	5	6	7	8	9	10	11	12		
Ministry of Youth and Space Affairs	1	2	3	9	10	11	12					
Ministry of Statistics and Programme Implementation	1	2	3	5	7	8	9	10	11	12		
Ministry of Communication and Information Technology	9	10	12									
Planning Commission of India	1	2	3	4	5	6	7	8	9	10	11	12

Source: MoEFCC (2014a), *National Biodiversity Action Plan (NBAP): Addendum 2014 to NBAP 2008*, www.cbd.int/doc/world/in/in-nbsap-v3-en.pdf.

A similar exercise with regard to specifying responsibilities has been undertaken in Ethiopia, which has identified the lead institutions for each of the biodiversity targets and actions (Table 2.3).

Table 2.3. **Lead institutions in charge of the NBSAP implementation in Ethiopia**

Lead institutions	Targets (no. of targets)	Actions (no. of actions)
Ethiopian Biodiversity Institute (EBI)	1, 2, 3, 6, 8, 9, 11, 12, 14, 15, 16, 17, 18 (13)	1.1, 1.2, 1.6, 2.1, 2.2, 2.3, 2.4, 3.1, 6.1, 6.2, 6.3, 8.1, 8.2, 8.3, 8.4, 8.5, 9.1, 9.2, 9.3, 11.1, 11.2, 11.3, 12.1, 12.2, 14.1, 14.2, 15.1, 15.2, 15.3, 16.1, 16.3, 17.1, 18.1, 18.2 (35)
Ministry of Agriculture and Natural Resources	1, 4, 10, 13 (4)	1.4, 4.3, 10.3, 13.1, 13.2 (5)
MoEFCC	5, 10 (2)	5.1, 5.4, 10.1, 10.2, 10.4 (5)
Ethiopian Wildlife Conservation Authority (Ministry of Tourism and Culture)	7 (1)	7.1, 7.2, 7.3, 7.4 (4)
National Planning Commission	3, 16, 17 (3)	3.2, 16.2, 17.2 (3)
Ministry of Livestock and Fisheries	5 (1)	5.2, 5.3 (2)
Ministry of Education	1 (1)	1.3, 1.4 (2)
Ministry of Industry	4 (1)	4.1 (1)
Ministry of Water Irrigation and Energy	4 (1)	4.2 (1)
Ministry of Women and Children Affairs	12 (1)	12.3 (1)

Source: Based on EBI (2015), *Ethiopia's National Biodiversity Strategy and Action Plan 2015-2020*.

Overall, the roles and responsibilities across institutions must be clearly and appropriately defined. Clearly setting out the ministries and agencies responsible for the relevant biodiversity targets and actions helps to enhance transparency and accountability in the mainstreaming process, and should be undertaken in all countries. In contrast in Uganda, a challenge has been raised regarding the lack of clearly defined roles between the National Environment Management Authority (NEMA) and the Ministry of Environment and Water; it is not clear who is responsible for implementation (Matsiko, 2015).

The establishment of inter-ministerial committees and working groups can also help to minimise silo approaches and thus foster policy coherence across the various ministries and the programmes they are responsible for. Several examples of such are summarised in Table 2.4, together with some of the challenges that have been identified.

While several countries have established inter-ministerial committees that are relevant to biodiversity, the mandates of these vary, and some have a narrower mandate than that of mainstreaming. It would be timely for governments to review the existing institutional structures in place and what they are intended to achieve, and consider updating these to reflect evolving policy needs and priorities. Moreover, once challenges or issues arise, these need to be addressed. It is also important to note, however, that these inter-ministerial committees do not need to be biodiversity-specific. If, for example, a government has established a green growth inter-ministerial committee, which adequately reflects biodiversity, then there is no need to convene a separate one. Embedding permanent environment or natural resource management units in various ministries, as is the case in Ethiopia and Madagascar,[24] could also contribute towards mainstreaming.

Table 2.4. **Examples of biodiversity-relevant inter-ministerial committees**

Country/Committee	Composition	Challenges
Brazil		
National Environmental Council (Conselho Nacional do Meio Ambiente) (CONAMA) – High-level advisory and deliberative committee	In 2010, CONAMA had 71 government representatives (41 federal, 27 state and 8 municipal); 22 representatives (11 permanent and 11 rotating) from civil society, academia and trade unions; 8 from the business sector; and 1 honorary member. It is supported by "technical chambers" (expert groups) on various policy issues.	Many members routinely miss its meetings. Municipalities complain they lack influence on its decision. As with other environmental policy areas in Brazil, responsibilities across institutions and levels of government often overlap, and effective co-ordination is challenging (OECD, 2015b).
National Biodiversity Commission (Comissão Nacional da Biodiversidade) (CONABIO) – co-ordinates, supervises and evaluates actions implemented under the Brazilian National Biodiversity Strategy. CONABIO is also responsible for elaborating the National Biodiversity Policy and promoting the implementation of Brazilian commitments under the CBD.	CONABIO includes representatives of nine ministries, civil society, the private sector and academia. Several other federal ministries and co-ordination bodies are involved in biodiversity policy.	
China		
National Committee for Biodiversity Conservation (NCBC)	NCBC consists of 25 departments, with the secretariat residing within the Ministry of Environmental Protection. NCBC co-ordinates biodiversity conservation actions at the national level.	
Inter-ministerial Joint Meeting for Protection of Biological Resources and the National Coordinating Group for Implementation of the Convention on Biological Diversity	Headed by the Ministry of Environmental Protection and composed of 17 ministries and commissions.	
Colombia		
National Environmental Council (NEC) – role is to ensure the inter-sectoral co-ordination between government environment and renewable energy policies and programmes.	The NEC comprises high officials, including ministers, as well as business, academia, NGOs and ethnic minorities, among others (OECD, 2012).	The NEC lacks the authority to perform its functions, while its decisions are not binding and rarely implemented. Moreover, although the council is supposed to meet every six months, in practice it does not (OECD, 2014).
Mexico		
CONABIO	10 Ministries: Foreign Affairs, Finance and Public Credit (Secretaría de Hacienda y Crédito Público) (SHCP), Energy, Economy, SAGARPA, Public Education, SSA, SECTUR, Social Development, SEMARNAT	Despite these various commissions, a much more comprehensive approach has been undertaken for climate change for example. OECD (2013b) has recommended that Mexico establish a high-level inter-ministerial task force (similar to the one for climate change) to promote economically and environmentally sustainable use of ecosystems and biodiversity.
CONAFOR	SEMARNAT, SHCP, SAGARPA, SECTUR and the National Defence Ministry, plus CONAGUA.	
Inter-secretarial Commission for the Sustainable Management of Seas and Coasts	Ministries of Interior; Foreign Affairs; Marine; Social Development; Energy; Economy, Agriculture, Livestock, Rural Development, Fisheries and Food; Communications and Transport; Tourism; and Environment and Natural Resources.	

Table 2.4. **Examples of biodiversity-relevant inter-ministerial committees** *(continued)*

Country/Committee	Composition	Challenges
Nepal		
The National Biodiversity Coordination Committee (NBCC) – role is to advise government on matters relating to biodiversity	NBCC is composed of 23 (to increase to 27) members and is led by the Minister of Forests and Soil Conservation. Members include representatives from other relevant government ministries (e.g. Agricultural Development, Energy, Finance), academia, the private sector and donors. NBCC is divided into thematic subcommittees: forests and protected areas, agro-biodiversity, biosecurity, genetic resources, and sustainable use of biodiversity.	NBCC has generally been viewed as ineffective in carrying out its mandate to guide, implement and monitor national biodiversity strategy. According to the NBSAP (2014), the committee is fraught with poor co-ordination, resulting from inadequate human and financial resources. Under its priority actions, the NBSAP has thus committed to strengthening the NBCC (by also providing legal recognition) and its secretariat (through provision of adequate human and financial resources), filling these gaps by 2016.
South Africa		
Ministers and Members of Executive Councils Meeting (MINMEC) and Ministerial Technical Committee (MINTEC) – facilitate co-ordination between DEA and the provincial environmental departments	MINTEC comprises the Director-General of DEA, representatives of public entities including SANBI and SANParks, and the heads of the provincial departments responsible for environmental management and biodiversity*.	Further efforts are needed to integrate biodiversity into other sectoral policies, notably mining, energy, transport and coastal zone management (OECD, 2013c).
Uganda		
Working group on biodiversity for development wealth creation and socio-economic transformation – to mainstream development in NBSAPs and biodiversity in NDPs	The working groups consist of government ministries, departments and agencies – Agriculture, Environment, Forestry, Wildlife, Energy, Finance, Wetlands, Trade, Tourism – National Planning Authority District representatives, and research institutions, academia, the private sector and NGOs, among others.	
Viet Nam		
Interdisciplinary Steering Committee to Formulate and Implement the NBSAP	The steering committee headed by the Minister of Natural Resources and Environment and representatives of the Office of the Government, National Assembly Office, 13 ministries, 2 academic and scientific bodies (Viet Nam Union of Science and Technology Associations, Viet Nam Academy of Science).	Different staff members were assigned to participate in different activities that did not capture the full information on progress of the implemented activities. Loose co-operation and inadequate communication among ministries led to achieving low outputs
Ministerial Joint Committee on Promotion of Biodiversity and Nature Conservation 2015-2020	Co-operation plan between the Viet Nam Administration of Forestry (VNFOREST) of the Ministry of Agriculture and Rural Development and the Viet Nam Environment Administration (VEA) of the Ministry of Natural Resources and Environment in biodiversity and nature conservation from 2015-20. The main co-operation areas are a) development and implementation of legal documents, policies on nature conservation and biodiversity; b) joint implementation of prioritised programmes approved in the NBSAP 2013; and c) development and management of database and sharing system on biodiversity observation between VNFOREST and VEA.	Just recently signed a memorandum of understanding, but has not implemented many joint activities due to lack of specific terms of references.

* MINTEC working groups include biodiversity conservation (Working Group 1), water (Working Group 5), environmental management including environmental impact assessments (EIAs) (Working Group 7), marine and coastal issues (Working Group 8), climate change (Working Group 10), and law reform (Working Group 11).

Co-ordination is also important between national and subnational agencies. Vertical institutional co-operation remains a challenge in a number of countries, including Madagascar, Peru, South Africa and Viet Nam. Some of the important reasons for lack of co-operative governance at different administrative levels are the lack of a comprehensive policy and legislative agenda (new initiatives are taken independently by different stakeholders); overlaps and contradictions among the mandates of different government departments and among the national, provincial and municipal levels of government; lack of capacity within many government authorities to implement the legislation and government policies (Du Plessis, 2008, cited in OECD, 2013c); and lack of sufficient financial resources. Australia is an example where the regional authorities have the primary mandate for biodiversity management. Regional government are responsible for creating natural resource management plans based on national frameworks. At the national level, the Natural Resource Management Ministerial Council (NRMMC)[25] prepared the NBSAP as well as the National Framework for Natural Resource Management Standards and Targets (NRMMC, 2002) to encourage integrated management of land, water and biodiversity on a landscape scale. Other countries, such as Myanmar, have set targets to enhance subnational planning and implementation for biodiversity management.[26]

More comprehensive institutional changes may be required to overcome silos and anchor biodiversity challenges in economic decisions so as to ensure effective implementation. In Ethiopia, this consisted of: re-establishment and restructuring of EBI; establishment of biodiversity centres in regional governments; establishment of regional biodiversity units of the EBI; and the establishment of new ministries (Tefera, 2016). New ministries and agencies were also created in Peru, subsequent to the 2005 General Environment Act. These include the Ministry of the Environment, the Peruvian National Protected Areas Service, and the Agency for Environmental Assessment and Enforcement in 2008. The National Service of Environmental Certification for Sustainable Investments was created in 2012 (OECD/UN ECLAC, 2017). In France there has been an attempt to align sector and environmental policies by extending the mandate of the Ministry of Ecology and Sustainable Development to cover transport, infrastructure, tourism and marine affairs, and more recently, energy, though some integration issues remain unresolved (OECD, 2016). Additionally, a key measure of the recently implemented law on biodiversity conservation (August 2016) was to rationalise biodiversity governance by setting up the French Biodiversity Authority (Agence Française pour la Biodiversité) (AFB), which has been operational since January 2017. Four institutions have been brought together under the AFB: the Agency for Protected Marine Areas, the National Office for Water and Aquatic Environments, the National Parks of France, and the Technical Workshop for Natural Areas. A joint research unit will be set up with the National Natural History Museum and the National Centre for Scientific Research. Moreover, resources for biodiversity management have been stepped up under the AFB.[27]

2.5. Role of data and information in mainstreaming

Robust, clear, policy-relevant and readily available data and information are required to enable policy decisions that are more effective in terms of both environmental impact and cost. Such information is critical for establishing baselines, quantifying benefits, targeting biodiversity expenditures to where they are most needed, and monitoring and evaluating change over time (Bass, 2013). The lack of sufficient data is a challenge that has often been raised in the context of mainstreaming. Examples of informational challenges noted in NBSAPs of India, Ethiopia and Uganda are highlighted in Box 2.3. Barriers to collecting comprehensive data include lack of technical and scientific capacity, lack of financial and institutional resources, and fragmentation of existing data. Another challenge often raised is the capacity needed to manage and report the existing data in an accessible and policy-relevant form.

Box 2.3. **Examples of data challenges highlighted in NBSAPs and Fifth National Reports**

In **Australia**, there remain significant gaps in knowledge on biodiversity and insufficient coverage for many parts of the country, according to the NBSAP (2010-30). For instance, there is relatively little information on marine biodiversity and on invertebrate species and micro-organisms, as well as how various plant, animal and micro-organism species contribute to ecological functions and health of the environment. There is need for greater communication among researchers, policy makers and on-ground biodiversity managers as well as improved alignment of research with priorities for biodiversity conservation in order to make data and information readily usable by stakeholders beyond the scientific community. Accordingly, Target 8 of the NBSAP is that by 2015, nationally agreed science and knowledge priorities for biodiversity conservation guide research activities.

Ethiopia's NBSAP (2015-20) identifies lack of information on components of biodiversity as a "key biodiversity conservation issue" and notes that there is no institution mandated with the maintenance, storage, analysis, organisation and dissemination of biodiversity-related information. Moreover, existing data are scattered among various institutions in and outside the country. Consequently, one of the strategic objectives of the NBSAP is the expansion and improvement of the information base on the biodiversity of Ethiopia. This is reiterated in the Fifth National Report, which sets a target that by 2017 the "national biodiversity database is strengthened, information dissemination strategy is devised and the Clearing House Mechanism is updated".

India's NBSAP (2008) reports that there is inadequate baseline data on species and genetic diversity, and their macro and micro habitats.* Existing biodiversity-related information is fragmented, and some databases are not of a high standard. The challenges to the collection and dissemination of national-level information include lack of infrastructure, lack of skilled manpower and a low level of co-ordination across different scientific fields. Consequently both the NBSAP (2008) and the NBSAP addendum (2014) list action points related to inventory building for setting baselines and building valuation models for biodiversity-related goods and services.

In **Peru**, environment-related data are fragmented and scattered among different authorities and levels of government. Despite considerable progress through the development of the National System of Environmental Information, challenges persist. Where the data are collected, they might not always be shared with the government or made publicly available. They are also not always sufficiently systematised and user-friendly. The current quality of biodiversity-related data has been considered insufficient to permit a comprehensive national evaluation of biodiversity, or to formulate concrete measures to promote conservation and sustainable use (CEPLAN, 2011).

In **Uganda**, one of the five strategic objectives of the NBSAP is "to facilitate research, information management and information exchange on biodiversity". Insufficient information is listed as a key issue for various biodiversity components including forests, wetlands, open waters and soil. The Fifth National Report points out that one of the challenges in the implementation of the NBSAP has been in carrying out a comprehensive inventory of biodiversity resources and that consequently there has been minimal progress towards the target to integrate biodiversity values in strategies and plans for development, economic growth and wealth creation and incorporating them in national accounts and reporting systems by 2020.

* Although 70% of the land area has been surveyed and 45 500 species of plants and 91 000 species of animals have been catalogued, there are large gaps in data and it is estimated that up to 400 000 species are yet to be recorded.

Information that can promote effective mainstreaming includes a clear understanding of the underlying and proximate drivers of biodiversity loss. In addition, given the often limited budget available for biodiversity, information that can help to target and prioritise biodiversity interventions to areas where they will have most impact is also important. Ideally, investments should be prioritised towards areas with highest biodiversity and ecosystem benefits and with highest risk of loss/degradation. Cost-effectiveness is also enhanced by prioritising areas with lower opportunity costs (Wunscher, Engel and Wunder, 2006; OECD, 2010).

Data on local socio-economic characteristics (e.g. income levels, employment) can enable consideration of impacts of biodiversity policies and mainstreaming interventions on poverty and income distribution. Understanding and addressing the potential distributional impacts of biodiversity policies and reforms are important to ensure their political acceptability and success (OECD, 2008). A study of Eastern Cape in South Africa, for example, showed that a change from livestock farming to eco-tourism resulted in the doubling of the number of jobs per hectare and a fourfold increase in income per hectare (OECD, 2013c). Finally, information on existing biodiversity finance, including needs and gaps, is also required to help plan and implement effective mainstreaming policies (discussed in Section 2.6).

National biodiversity (or ecosystem) assessments are useful for establishing baselines of information and provide a comprehensive understanding of current state and pressures on biodiversity. While a number of these have been undertaken, they vary greatly in terms of their objectives, scope and type.[28] An example of a high-quality National Biodiversity Assessment (NBA) is that of South Africa (DEA and SANBI, 2011) which is at the forefront of international practice in terms of methodology, quality of data and level of analysis (OECD, 2013c). It presents the state of biodiversity across terrestrial, freshwater, estuarine and marine environments. The assessment provides spatially explicit data on the basis of which priority areas and corresponding priority actions are identified. The NBA has also been used to develop biodiversity sector plans at the local and district levels. Overall, the quality and quantity of data available in South Africa has been instrumental in mainstreaming biodiversity in a number of key sectors, including agriculture, mining and water infrastructure, among others (Manuel et al., 2016). France initiated a national ecosystems and ecosystem services assessment in 2012. As part of this work, a conceptual framework was released in April 2017 and further work is under way.

Brazil has also taken steps towards building a biodiversity-related knowledge base, including releasing an updated list of threatened flora and fauna in 2014 and monitoring biodiversity conservation status in protected areas. Moreover, the National Institute for Space Research (Instituto Nacional de Pesquisas Espaciais) (INPE) runs a state-of-the-art satellite-based deforestation monitoring system for the Amazon biome which has enabled the government to enforce and monitor actions against deforestation. Additionally, the Brazilian Institute for Environment and Renewable Natural Resources (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis) (IBAMA) has initiated a satellite monitoring programme for the other terrestrial biomes in the country. Although the data on the other biomes are not yet as precise as the forest monitoring system for the Amazon biome, INPE and IBAMA are collaborating to develop monitoring systems across the country which can provide data on deforestation and land use that is comparable and continuous (OECD, 2015b). Such information on the status and trends in ecosystem change can enable prioritisation of policy action in sectors and activities which have the most impact on these resources.

Assessments that also include valuation of biodiversity (or ecosystems) – demonstrating their economic contribution to society, as well as the costs of their loss in monetary terms – can help make the case for mainstreaming by countering the "economic invisibility" of natural resources in decision-making processes. Recognising this, countries such as Brazil, India, Mexico and South Africa have initiated national-level valuation studies in partnership with The Economics of Ecosystems and Biodiversity (TEEB). Each of these countries has taken a different approach, depending on its national circumstances and priorities. For instance, India initiated a national-level TEEB project in 2011 to recognise, demonstrate and capture the value of ecosystem services in the context of wetlands, forests and marine ecosystems. In Brazil, the TEEB study initiated in 2013 under the Brazilian Natural Capital Initiative does not single out priority ecosystem types but focuses on various components (i.e. for national-level policy makers; for regional and local governments; for citizens; and for business).[29] South Africa has also initiated a TEEB assessment and released a report titled "State of play: Baseline valuation report on biodiversity and ecosystem services" (DEA, 2011), which gathers and synthesises available information on which the assessment can build. France is a currently developing a national assessment on ecosystems and ecosystem services, with an explicit target of restoration of at least 15% of degraded ecosystems (Fiorina et al., 2012). This assessment is expected to include a component valuating ecosystem services.

Another process that can enable mainstreaming is to include the values of biodiversity and ecosystem services in national accounting and reporting systems (as laid down in Aichi Target 2) so that these reflect the trends in environmental as well as economic resources. To facilitate internationally comparable integration of environment into national accounts, the System of Environmental-Economic Accounting (SEEA) was developed to supplement the System of National Accounts (SNA) by adding the dimension of stocks and flows of natural resources.[30] The SEEA contains internationally agreed upon standard concepts, definitions, classifications, accounting rules and tables for producing comparable statistics on the environment in order to integrate environmental and economic statistics and monitor interactions between the economy and the environment.[31]

In Mexico, the National Institute of Statistics and Geography calculates the net internal ecological product as part of its National System of Economic and Ecological Accounting, to demonstrate the negative effects and associated costs of ecological and environmental degradation for Mexico's gross domestic product (GDP) (OECD, 2013b). Brazil has begun to include the value of water resources in national accounts and is aiming to develop forest economic accounting as a next step (OECD, 2015b). Some countries, such as Peru, have set specific targets to make progress towards natural capital accounting. One of the targets featured in the Peru Bicentenary Plan 2021 under biodiversity objectives is the increase in the share of regional governments that have conducted an evaluation and valuation of their natural resources and to increase the number of environmental variables in the national accounts. However, so far only a few countries have taken steps towards natural capital accounting, and these generally focus on areas where demand for accounting is clear and linked to specific policy questions (OECD, 2012). The Wealth Accounting and the Valuation of Ecosystem Services (WAVES) initiative co-ordinated by the World Bank is supporting partner countries to recognise and reflect the importance of natural capital in national accounts.[32]

The information collected through biodiversity assessments including valuation studies should be made readily available and communicated in useful forms for policy makers at various levels and other stakeholders, in order for it to be integrated into economic and environmental decisions. In South Africa, for example, biodiversity-related information is easily obtainable and packaged in accessible forms for a variety of audiences. The Biodiversity

Advisor web portal[33] contains information for researchers, planners and policy makers such as detailed instructions on conducting EIAs, a Land Use Decision Support tool, links to useful institutions and biodiversity records, a wide variety of geographical information system maps, and biodiversity plans, among other information. Similarly, information on biodiversity and ecosystem services (including information on use of biodiversity and connections between biodiversity and human health) in Brazil is made available to policy makers, researchers and other stakeholders through the online Information System on Brazilian Biodiversity.[34] Challenges remain in maintaining updated and user-friendly data (MMA, 2015).

2.6. Biodiversity in national budgets

Effective management of biodiversity cannot realistically be achieved unless there is a sufficient budget in place to implement necessary conservation and sustainable use policies. This in turn requires that the budget process allows for visibility about biodiversity spending and facilitates informed debate about the adequacy of these allocations, at national and subnational levels, by reference to public commitments and in balance with other public goals.

The "appropriate" amount of national budget allocation would ideally reflect the gap between what is required to achieve the objectives specified in the NBSAP (and other biodiversity-relevant objectives more broadly) and what can reasonably be mobilised from alternative sources (e.g. from the private sector and official development assistance [ODA]). Accurate and up-to-date information on spending needs and available funding by relevant authorities is essential for estimating the financing gap and developing strategies to mobilise additional resources. Collecting robust, comprehensive and comparable time series data on public biodiversity expenditure across national and subnational budgets is an important starting point for informed debate. This would allow comparing biodiversity expenditure in relation to environmental and overall public expenditure. However, such data are not yet readily available for all countries. The type and detail of data available across four countries are summarised in Box 2.4 and illustrate that challenges still remain.

Box 2.4. **A review of biodiversity expenditure data across four countries**

India: India was among the first few countries to undertake a comprehensive assessment of funding for biodiversity conservation. Overall funding for biodiversity conservation amounted to 92 044.5 million rupees for 2013-14 from 77 schemes of 23 ministries/ departments. More generally, in India, overall funding for environment-related programmes is a very small proportion of the total annual budget. Between 2007-10 (under the 11th FYP), the annual budget for the Ministry of Environment and Forests (its name at that time) for various environmental programmes was around 0.012% of GDP and less than 0.25% of the annual national budget. The lack of funds for environmental programmes at the state and city level has been marked as a "cause for concern' in the current FYP.*

Mexico: Biodiversity expenditure was around 8.41 billion pesos (MXN) in 2009, an increase from MXN 2.56 billion in 2001, although the categorisation of data is not consistent over the years, making comparison difficult. More generally, data are available on the SEMARNAT budget (MXN 51.2 billion in 2011) and the relative shares of the commissions within this (CONANP's share in 2011 was MXN 0.99 billion [1.9%], an increase from MXN 0.35 billion in 2002, and CONAFOR's share was MXN 6.46 billion (i.e. 12.6%), a threefold increase in real terms since 2002). In comparison, the SAGARPA budget in 2011 was MXN 73.00 billion.**

Box 2.4. **A review of biodiversity expenditure data across four countries** *(continued)*

Nepal: There is to date no dedicated budget code and monitoring system in place, making it difficult to assess the exact funding trends for biodiversity management. More generally, data on the programme budget of the Ministry of Forests and Soil Conservation show that it continuously and substantially increased during the last decade.*** Similar increasing trends were found in allocation of budget for management of agro-biodiversity and climate change adaptation and management. Notably, Nepal has estimated the total cost of the NBSAP implementation over six years (almost 673 million United States dollars [USD] from 2014/15 to 2019/20), and has identified where the funding would come from (government covering 55%, donors 25%, private sector 2%).

South Africa: The government's biodiversity-related expenditure was around 1.9 billion rand (ZAR) in 2012-13, an increase from ZAR 1.3 billion in 2009-10. At the national level, the Department of Environmental Affairs spent 13% of its budget (around ZAR 576 million) in 2011-12 on biodiversity-related projects. The bulk of the expenditure for biodiversity comes from the provincial level, where all but two provinces (Gauteng and Northern Cape) allocate more than half their environmental expenditures to biodiversity. The provincial-level biodiversity-related expenditure amounted to ZAR 1.3 billion in 2012-13 (nearly double compared with the 2007-08 expenditure).

*The Fifth National Report states that despite expanded datasets in terms of number of ministries/departments and programmes considered as compared with the previous study undertaken for 2010-11, the amount arrived at for 2013-14 is lower. This is attributed to efforts made to reduce subjectivity in the earlier use of a multiplicative factor by directly consulting the concerned ministries/departments to confirm the contribution of schemes implemented by them towards biodiversity conservation, as well as to the significant difference in rupee-USD conversion rate in 2014.

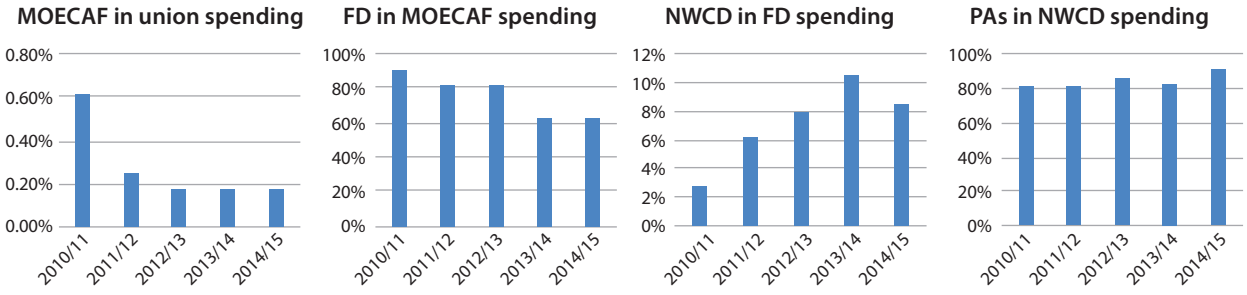
**In comparison, Mexico spent 1.7% of GDP on energy subsidies over 2005-09, including those for transport fuels and electricity use by households and farmers. Most of the subsidies benefit the rich more than the poor, however. For example, the poorest 20% reap only about a tenth of electricity subsidies and even less of transport fuel subsidies. Replacing indirect subsidies – artificially low prices for energy and water – with cash transfers would help the poor, encourage efficient use of energy and water, and help to promote more socially inclusive green growth.

***A bulk of the funds (i.e. 84.4%) came from the government or internal sources, and the remaining amount from foreign assistance in the form of grants (14.1%) and soft loans (1.5%).

Sources: MoEF (2012), *Report on Assessment of Funding Support for Biodiversity Conservation in India;* GoI (2013), *Twelfth Five Year Plan (2012-2017) – Faster, More Inclusive and Sustainable Growth;* OECD (2013b), *OECD Environmental Performance Review: Mexico 2013*, https://doi.org/10.1787/9789264180109-en; MFSC (2014), *Nepal Fifth National Report to Convention on Biological Diversity;* OECD (2013c), *OECD Environmental Performance Reviews: South Africa 2013*, https://doi.org/10.1787/9789264180109-en.

In Myanmar, comprehensive information on national biodiversity expenditure is not readily available at the present time. Time series data are available on the budget of the Nature and Wildlife Conservation Division (NWCD) (Emerton, Aung Kyin and Tizard, 2015), showing a nearly steady increase over the 2010/11-2014/15 period (Figure 2.3). It is interesting to note that the data are sufficiently granular to find that protected areas (PAs) were the main component of NWCD's budget, consuming just over 90% of funds. In the financial year 2014/15, union funds worth 1.06 billion kyats (MMK) (USD 1.03 million) were allocated to PAs.

Figure 2.3. **Proportion of union budget allocated to MOECAF, FD, NWCD and PAs, 2010-15**



Source: MOECAF data cited in Emerton, Aung Kyin and Tizard (2015), "Sustainable Financing of Protected Areas in Myanmar".

The NWCD sits under the Forest Department (FD), which is under the MOECAF. Time series data are also available for each of these. While the FD accounted for two-thirds of MOECAF spending (MMK 13.62 billion or USD 13.29 million), the share of FD funding going to NWCD was relatively low at 8.5% (MMK 1.15 billion or USD 1.12 million). Overall, the MOECAF budget (MMK 21.46 billion or USD 20.93 million) accounted for just 0.18% of total union expenditures on line ministries and departments (MMK 12.13 billion or USD 11.8 billion). This compares with around 5.7% for the health sector, 11% for education and 0.29% for social welfare (UNICEF, 2013).

Emerton, Aung Kyin and Tizard (2015) have undertaken a comprehensive analysis of financing of PAs in Myanmar that also clearly outlines the budget process in the context of PAs as well as funding sources, flow, gaps, constraints and opportunities. Ideally, such an analysis should also be undertaken for biodiversity conservation and sustainable use more generally, including mainstreaming.

The United Nations Development Programme (UNDP) Biodiversity Finance (BIOFIN) initiative is, in fact, currently working in 31 countries[35] to support governments in undertaking analysis such as the one for PAs in Myanmar but for biodiversity expenditure as a whole. BIOFIN has developed methodology with the aim of guiding countries to a) analyse the policy and institutional context for biodiversity finance; b) measure the current biodiversity expenditures; c) assess future financial needs; and d) identify the most suitable finance solutions to achieve national biodiversity plans and targets. The various components are highlighted in Box 2.5.

Box 2.5. **The BIOFIN Initiative**

1. Policy and Institutional Review (PIR)

Through the PIR process, the national BIOFIN Team maps the impact of economic sectors on biodiversity, identifies the main financing mechanisms being used and reviews which subsidies have an impact on biodiversity. The PIR also reviews the overall financing architecture for biodiversity in the country and generates specific recommendations for an improved institutional framework.

2. Biodiversity Expenditure Review

Through the Expenditure Review, BIOFIN collects detailed data on public, private and civil society budgets, allocations and expenditures to inform evidence-based biodiversity policies, financing and outcomes.

Box 2.5. **The BIOFIN Initiative** *(continued)*

3. Biodiversity Financial Needs Assessment

The Financial Needs Assessment produces a comprehensive estimate of the financial resources needed to achieve national and subnational biodiversity targets. It compares these financial needs with expected biodiversity expenditures over a medium- to long-term planning horizon. National biodiversity targets are typically articulated in NBSAPs and other key national strategies such as NDPs, sectoral development plans and climate change plans.

4. Biodiversity Finance Plan

The Biodiversity Finance Plan aims to present a coherent and comprehensive national approach to biodiversity finance that encompasses a full suite of finance solutions, going beyond the mobilisation of resources, and including strategies to reduce future costs and deliver more effectively scarce resources. The plan proposes steps to implement a balanced mix of prioritised finance solutions to sustainably manage biodiversity finance and achieve national biodiversity targets.

5. Implementing the Biodiversity Finance Plan

BIOFIN supports the design and implementation of some of the prioritised finance solutions.

Working with BIOFIN, for example, the Philippines has estimated that the total NBSAP financial requirements were USD 7.426 billion. Based on the findings from the Biodiversity Expenditure Review and the Financial Needs Assessment, the amount that is currently financed is 20% of the total annual requirement. It is currently working on developing a Biodiversity Finance Plan, including examining the potential to increase e.g. penalties and user fees, which were found to be low in the PIR (Box 2.6).

Box 2.6. **Objectives and insights from BIOFIN in the Philippines**

The Philippine Biodiversity Strategy and Action Plan (PBSAP) and BIOFIN are proposed to be mainstreamed in public- and private-sector decision-making processes, specifically planning, programming and budgeting.

Building on the results generated from the public and private expenditure review (PPER) and lessons learned from the processes of Climate Change Expenditure Tagging, BIOFIN Philippines will work with the Department of Budget and Management and bureaus under the Department of Environment and Natural Resources (DENR) to conduct biodiversity tagging workshops. The objective is to identify programmes, activities and projects of each bureau that are responsive to biodiversity. It is envisioned that this will provide finer resolution of biodiversity-related expenditures and at the same time provide a process that will raise awareness and inform the bureaus about biodiversity.

The National Economic Development Authority (NEDA) is the main government agency mandated to co-ordinate the formulation and implementation of development plans and investment programmes. For 2016, NEDA was tasked to start the pre-work of drafting the Philippine Development Plan (PDP) (up to 2022) for the next presidential term. This will serve as the basis of the Philippine Investment Plan and all other regional, provincial and local development plans and investment programmes. At time of writing, the five priority

Box 2.6. **Objectives and insights from BIOFIN in the Philippines** *(continued)*

programmes of the PBSAP have been fully integrated within the PDP Outcome 1 Strategies on "intensifying sustainable management of natural resources" and "expanding development of resource-based industries". In the section on priority legislation, BIOFIN lobbied for the inclusion of the Expanded NIPAS (National Integrated Protected Areas System) Act, Philippine Genetic Resources Access and Benefit Sharing, and proposed amendments to the use of the Malampaya Fund towards biodiversity conservation as priority environment and natural resources legislation supporting PDP. These policy measures are currently filed in the House of Representatives for the 17th Congress and are essential for biodiversity financing.

Part of the mainstreaming process is lobbying and advocacy work with the selected Regional Development Councils. The councils are the highest planning and policy-making body that serves as the counterpart of the NEDA board at the subnational level. They play a vital role in co-ordinating and setting direction of local initiatives that could accelerate socio-economic development in the region. BIOFIN's localisation initiative in Mindoro province shall apply this planning modality.

Based on the result of PPER, more than 10% of the available resources to finance biodiversity are attributed to the non-core biodiversity agencies. The amount is significant, and these agencies can also carry out activities that are beyond the mandate of DENR. Similar to the biodiversity tagging workshop, target agencies for this activity include: the Department of Agriculture and Bureau of Fisheries and Aquatic Resources, the Department of Science and Technology, the Commission on Higher Education and the Department of Education, the Department of Tourism, the National Research Council of the Philippines, the Department of Social Welfare and Development, the Department of the Interior and Local Government, and leagues.

The result of the gaps analysis show that even under the best scenario (i.e. the PBSAP is successfully mainstreamed, increases in ODA, projects), the Philippines still needs to raise at least 10 billion pisos a year. The bulk of this amount is expected to come from the private sector – including businesses, financial institutions, venture capital, foundations, philanthropies, privately run academic institutions, and for-profit and not-for-profit organisations. Thus, one of the core functions of the PBSAP secretariat will be to monitor financial flows related to PBSAP implementation.

Source: BIOFIN (2016), personal communication.

As a result of the BIOFIN Philippines process, a number of information gaps were addressed. Prior to BIOFIN, the expenditure towards biodiversity by government agencies (especially non-core) and other institutions was not known. There was also a knowledge gap on the cost of the PBSAP and the financing gap needed to implement it. Knowledge on potential investments that both the country and the private sector may look into was also lacking. Now, such possible investable projects can easily be pinpointed. Additional insights and lessons from the BIOFIN process in the Philippines include that: a) lobbying and advocacy work is an important element of mainstreaming; and b) it is important to plan ahead, so as to develop arguments, make contacts, and establish relationships and trust with key stakeholders and decision makers in order to effectively ensure mainstreaming.

BIOFIN could also be considered for use by all countries, as this would help to identify the appropriate allocation of national budget to biodiversity, as well as how to scale up finance from other sources, including private (see Bass, 2013, for further discussion). Another interesting example is from Uganda, where the Ministry of Finance, Planning

and Economic Development; the Office of the Prime Minister; the Ministry of Water and Environment; and NEMA developed a checklist for mainstreaming biodiversity in the budget framework paper. This is used for funding a project, as well as for monitoring and evaluation and appraisal (Matsiko, 2015). In the broader context of green budgeting, in December 2017 the OECD launched the Paris Collaborative on Green Budgeting, together with France and Mexico.[36]

Annex 2.A1

Mainstreaming development and poverty alleviation in NBSAPs

Country (Period of plan)	Mainstreaming of biodiversity and development in NBSAPs	Mainstreaming of poverty alleviation in NBSAPs
Australia (2010-30)	Australia's Biodiversity Conservation Strategy 2010-2030 identifies three national priorities for action (engaging all Australians, building ecosystem resilience and getting measurable results). Mainstreaming biodiversity is a sub-priority under the priority to engage all Australians. Priority actions under other sub-priorities also contribute to mainstreaming, such as "Develop innovative mechanisms to encourage private investment and interest in biodiversity conservation" (A8) and "Integrate biodiversity conservation into planning instruments" (A18). The target associated with mainstreaming is to achieve a 25% increase in the number of Australians and public and private organisations that participate in biodiversity conservation activities by 2015 (National Target 1). Targets are well defined; however, responsibility for priority actions is very broadly assigned. For example, "all governments, NGOs and businesses" are responsible for actions aiming at mainstreaming. Strategic direction ● Priority actions ● Indicators ◐	Increasing indigenous engagement is a sub-priority under the priority for "engaging all Australians". The associated priority actions are to increase the employment and participation of indigenous peoples in biodiversity conservation activities, increase the use of indigenous knowledge in biodiversity conservation decision making and increase the extent of land managed by indigenous peoples for biodiversity conservation. The associated target is that by 2015, a 25% increase in employment and participation of indigenous peoples in biodiversity conservation will be achieved. Strategic direction ● Priority actions ● Indicators ◐
Brazil (2008)	One of the national targets for 2011-20 is mainstreaming biodiversity values across national and local development and poverty reduction strategies, national accounting systems, and planning procedures. The Fifth National Report describes how Brazil's biodiversity programmes are contributing to the MDGs. Strategic direction ◐ Priority actions ● Indicators ○	Poverty eradication is mentioned several times, including in the context of payments for ecosystem services, compensation payments for poor families living in areas rich in natural resources, and programmes to support the harnessing of traditional knowledge. The Fifth National Report reiterates the commitment to poverty reduction, mainly in relation to payments for ecosystem services (e.g. Bolsa Verde), but also harnessing traditional knowledge and contributing to MDG 1. The progress towards Aichi Targets 2 and 14 is reported as occurring, but at an insufficient rate, unless efforts are increased. The indicators and monitoring strategy for the national biodiversity targets are being developed. Strategic direction ● Priority actions ◐ Indicators ○
China (2010)	The NBSAP (2011-30) states that biodiversity provides the foundation for human survival and sustainable social and economic development, and safeguards ecological safety and food security. Priority Area 2 is to incorporate biodiversity conservation into sectoral and regional planning and promote sustainable use. Under strategic tasks, "China will mainstream biodiversity conservation into national economic and social development planning as well as relevant sectoral planning processes". Thirty-nine projects have been listed (including project durations), a few of which relate to the mainstreaming of development. Strategic direction ● Priority actions ● Indicators ○	Poverty alleviation is only briefly mentioned in the NBSAP. The Fifth National Report gives wider consideration to poverty. The section on "poverty reduction and development" reinstates the importance China attributes to biodiversity conservation while aiming to reduce poverty, and details five focus areas. Net income per capita of rural households and the number of people in poverty are the two poverty-related indicators under Aichi Target 14. The reported outcomes under Target 2 relate to the efforts made to develop the methodology for economic evaluation of biodiversity, and for an assessment and reward-penalty system to enable the creation of an ecological civilisation. Strategic direction ◐ Priority actions ◐ Indicators ◐
Colombia (2012)	The need to mainstream development issues is recognised in the NBSAP, and a few key sectors are identified (e.g. agriculture/livestock, mining). Some challenges are highlighted but no specific timetables, targets or action plans on how to address these are included.	Poverty is mentioned a few times but in very general terms – no explicit poverty reduction benefits or examples included and no explicit priority actions or targets are referred to.

Country (Period of plan)	Mainstreaming of biodiversity and development in NBSAPs	Mainstreaming of poverty alleviation in NBSAPs
Colombia (2012) *(continued)*	In relation to wider development priorities, the NBSAP states that the NDP 2010-14 is aligned with Aichi Targets. There is also a reference to the need to integrate biodiversity with sectoral policies, as a lesson learned since launching the National Biodiversity Policy 1996. Strategic direction ◐ Priority actions ○ Indicators ○	On Aichi Target 2 and 14, the Fifth National Report assesses progress as medium and low respectively, with a risk of a negative trend, but does not elaborate how this was evaluated. Strategic direction ○ Priority actions ○ Indicators ○
Ethiopia (2016)	Mainstreaming is recognised as an important issue, with NBTs being aligned with government priorities, in order to facilitate their mainstreaming into five-year federal and regional plans. The NBSAP also emphasises improving agriculture productivity and preventing agricultural expansion, in order to ease the pressure on biodiversity. Ethiopia's commitment to a path of sustainable green development as part of its CRGE strategy is also reiterated. Each target has a set of indicators, specific actions as well as lead and co-ordinating agencies, and an implementation period which were developed in consultation with the stakeholders. The indicators are often but not always set against baselines Strategic direction ● Priority actions ● Indicators ●	The links between poverty and biodiversity are recognised in the NBSAP, in terms of both poverty contributing to the pressure on biodiversity and the sustainable use of biodiversity contributing to food security and poverty eradication. Poverty alleviation also features in NBTs (Targets 3 and 17) in relation to the need to integrate biodiversity objectives, community knowledge and the benefits from protected areas into poverty alleviation strategies. Strategic direction ● Priority actions ● Indicators ●
France (2011)	The 2011-2020 NBS was developed as a component under the NSDS. The ambition of the NBS is "to preserve, restore, strengthen and value biodiversity and ensure its fair and sustainable use and to involve everyone and every sector of activity, in order to succeed". Several targets aim at mainstreaming including through Including preservation of biodiversity in economic decisions (Target 7) and ensuring ecological efficiency of public and private policies and projects (Target 15). Based in the emphasis on "shared governance", the achievement of the broad targets set in the NBSAP is based on voluntary declarations of commitment by stakeholders. A set of proposed indicators for the NBS are set out in an accompanying document. They will be updated at an appropriate frequency for each indicator and the updated set of indicators will be published annually. Without quantified targets and deadlines for the targets included in the NBS, it will be difficult to assess progress. Strategic direction ● Priority actions ● Indicators ○	While there is no specific poverty-related target, Target 3 (turn biodiversity into a positive issue for decision makers) and Target 7 (include preservation of biodiversity in economic decisions) are relevant to poverty alleviation, especially in the overseas territories where the link between exceptionally rich biodiversity, and development and poverty alleviation is strong. Strategic direction N/A Priority actions N/A Indicators N/A
India (2008 and 2014)	The need for mainstreaming biodiversity across development sectors is recognised in the NBAP 2008. The plan mentions the need to integrate biodiversity concerns into development sectors (infrastructure, power, mining, etc.) and promote use of clean technologies. The 2014 addendum to the NBAP sets clear targets with explicit time frames, including that values of biodiversity be integrated in national and state planning processes, development programmes and poverty alleviation strategies by 2020 (Target 2). In addition, agriculture, fisheries and forestry have been set out as priority sectors for adopting sustainable development measures by 2020 (MoEFCC, 2014a). Strategic direction ● Priority actions ● Indicators ●	The link to poverty reduction is mentioned only in passing in the 2008 NBAP, in the context of wetlands (MoEF, 2008). Mainstreaming biodiversity into poverty alleviation programmes is part of National Target 2 in the NBAP addendum. Specifically, the Mahatma Gandhi National Rural Employment Guarantee Act programme and the Integrated Watershed Management Programme have been set aside as indicator projects for integrating livelihood and biodiversity goals (MoEFCC, 2014a). Strategic direction ● Priority actions ● Indicators ●
Madagascar (2015)	The NBSAP (2015-25) establishes the links between biodiversity conservation and sustainable economic development, and emphasises the role of biodiversity to improve the quality of life of the Malagasy people and the future of the next generation.	Poverty reduction is referred to in the NBSAP in numerous places, with poverty acknowledged as a main cause of biodiversity loss and the need for urgent action highlighted.

Country (Period of plan)	Mainstreaming of biodiversity and development in NBSAPs	Mainstreaming of poverty alleviation in NBSAPs
Madagascar (2015) *(continued)*	Strategic Objective 2 states that in 2025 at the latest, biodiversity values, opportunities and benefits of conservation and its sustainable use will be recognised and integrated into the country's socio-economic development activities. Strategic direction ● Priority actions ◐ Indicators ◐	Strategic Goals A to D of the NBSAP reflect how good management and governance of biodiversity can enhance development and reduce poverty. The Fifth National Report (2014) refers to the National Strategy for Sustainable Management of Biodiversity (2002-12), which has principles to help improve the living conditions of the population in the fight against poverty. Strategic direction ● Priority actions ◐ Indicators ◐
Mexico (2016)	The mission of the ENBioMex is "to establish the foundations to promote, guide, co-ordinate and harmonise the efforts of governments and society for the conservation, sustainable use, and fair and equitable sharing of benefit arising from the utilisation of the components of biological diversity and their integration into the country's sectoral priorities". The strategy is based on six strategic axes: knowledge; conservation and restoration; sustainable use and management; attention to pressure factors; education, communication and environmental culture; and mainstreaming and governance. Under these axes, there are 24 lines of action and 160 detailed priority actions. There are no indicators in the strategy; development of indicators by implementing agencies is a priority under several lines of action. Strategic direction ● Priority actions ● Indicators ○	Poverty alleviation is mentioned as a goal especially under the axis of sustainable use and management. Specific lines of action related to poverty in the document have been identified as generation, strengthening and diversification of productive and value chains in farming, forestry, fishing and aquaculture (3.2) and creation and strengthening of instruments for sustainable use and the fair and equitable sharing of benefits (3.3). Strategic direction ● Priority actions ● Indicators ○
Myanmar (2011 and 2015)	NBSAP (2011) sets ten strategic directions, one of which is mainstreaming biodiversity into other policy sectors; priority interventions under this include forging partnerships between biodiversity conservation and rural development. In the updated NBSAP (2015), national targets related to the Aichi targets have been defined, including incorporating biodiversity into state/region planning, developing a national legal framework on land tenure rights that encourages conservation and sustainable management, drawing up guidelines for mining and energy sectors, and placing over 130 000 hectares of forest under community management. Strategic direction ● Priority actions ● Indicators ○	The previous version of NBSAP (2011) mentions poverty in the context of biodiversity loss and land degradation, and refers to "the eight major tasks" undertaken by the government in an effort to address poverty, with a focus on rural areas. In the NBSAP (2015), which was revised to incorporate Aichi goals, poverty is mentioned in relation to harmful subsidies intended as poverty reduction policies; under Target 7 in relation to the importance of supporting smallholder farming for poverty reduction; and under Target 14 in relation to equity issues in accessing ecosystem services. Nevertheless, poverty does not feature among specific priority actions and indicators. Strategic direction ● Priority actions ● Indicators ○
Nepal (2014)	The NBSAP recognises that sustainable economic growth can be achieved only through responsible use of natural resources. It highlights that "conservation-friendly economic growth" has featured in NDPs since the 9th FYP (1997-2002). Nevertheless, it is noted that while Nepal made considerable progress in infrastructure development during the last decade, many projects do not take environmental safeguards into account. The NBSAP therefore lays the ground for practical implementation of the "conservation-friendly economic growth" strategy by identifying the main threats associated with economic development and relevant priority actions and indicators for their mitigation. For instance, one of the priority actions is to develop by 2015 an effective control mechanism for mining of gravel and sand, which poses a threat to forests and wetlands. It also aims to ensure effective implementation of environmental management plans by 2016, including in the EIA report of hydropower, industries, irrigation, mining, roads and other infrastructure projects. Strategic direction ● Priority actions ● Indicators ●	The NBSAP stresses a "strong poverty-environment-health and vulnerability nexus" in relation to the half of the population living in rural mountainous areas, where poverty, ethnic diversity and vulnerability are disproportionately higher than in lowlands. Linking biodiversity with poverty reduction is identified as a capacity need for successful implementation of the NBSAP. The pro-poor leasehold forestry programme is considered an important instrument to conserve biodiversity alongside poverty alleviation. Increasing the area of rehabilitated forest through the programme is the poverty-specific indicator in the target-indicator matrix. Strategic direction ● Priority actions ● Indicators ●

Country (Period of plan)	Mainstreaming of biodiversity and development in NBSAPs	Mainstreaming of poverty alleviation in NBSAPs
Peru (2014)	The NBSAP makes several references to the importance of sustainable use of biodiversity and other natural resources in the context of development. One of the six strategic objectives for 2021 is the increased contribution of biodiversity to national development, with an aim to promote bio-businesses and support them in marketing their bio-products nationally and internationally. The strategic objective details related priority actions and indicators. The recognition of the contribution of biodiversity to development and welfare features in the goal to increase the awareness of the value biodiversity brings to national development and welfare. A priority action in the target-indicator matrix is the development of a guide by 2015 on good corporate practices for biodiversity conservation for mining and hydrocarbons companies. Strategic direction ● Priority actions ◐ Indicators ◐	Poverty is integrated into the NBSAP under the "principle of equity" in the access to biodiversity and its benefits. Poverty also features in the discussion on the productive conservation and sustainable use of resources for the benefit of indigenous people and for local communities. Poverty reduction is not included in the NBSAP implementation target-indicator matrix. Strategic direction ● Priority actions ○ Indicators ○
Philippines (2002)	The crux of mainstreaming in the Philippine's NBSAP (1997) and Philippines Biodiversity Conservation Priorities (the second iteration of the NBSAP in 2002) is seen at the planning level. One of the six objectives in the NBSAP (1997) is that there be better integration of biodiversity in development planning. This is supported by broad action points in the 2002 NBSAP, such as: the Department of Agriculture, Department of Agrarian Reform, Department of Public Works and Highways, Department of Science and Technology, etc. incorporate the findings of the biodiversity priorities in their work plans, and local government units integrate these priorities into regional development. Strategic direction ● Priority actions ◐ Indicators ○	The NBSAP recognises that biodiversity loss exacerbates poverty. Local poverty status was used as one of the threat indicators to develop maps of areas of biodiversity priorities. The Fifth National Report refers to poverty reduction in relation to updating Philippines NBSAP and including an action plan to integrate the value of biodiversity into poverty reduction strategies. A link between PES and poverty alleviation is made under the progress report for Aichi Target 2. Land management and administration, listed under biodiversity-related programmes, refers to a connection between land tenure security and poverty alleviation. Strategic direction ◐ Priority actions ◐ Indicators ○
South Africa (2015)	The links between biodiversity and development are very well recognised and the need for mainstreaming permeates the NBSAP. The revised strategy has been aligned with the NDP 2010 and the Medium-Term Strategic Framework (2014-19). The overarching vision is to "conserve, manage and sustainably use biodiversity to ensure equitable benefits to the people of South Africa, now and in the future". This goal is to be achieved through six strategic objectives including enhancing "management of biodiversity assets and their contribution to the economy, rural development, job creation and social well-being" (Strategic Objective 1) and mainstreaming biodiversity considerations "into policies, strategies and practices of a range of sectors" (Strategic Objective 3). Each strategic objective is accompanied by actions ranked according to priority (high, medium and low), and targets, indicators, and lead and implementing agencies are listed for every action. Strategic direction ● Priority actions ● Indicators ●	The links to poverty feature strongly throughout the strategic objectives and associated activities; the key points that inform the strategy include the importance of livelihood concerns, the need for integration of biodiversity management with poverty alleviation and local development, and the importance of equitable sharing of benefits. Specific targets include that the biodiversity economy (economic opportunities linked to biodiversity assets) is expanded, strengthened and transformed to be more inclusive of the rural poor (Target 1.3). Strategic direction ● Priority actions ● Indicators ●

Country (Period of plan)	Mainstreaming of biodiversity and development in NBSAPs	Mainstreaming of poverty alleviation in NBSAPs
Uganda (2016)	Mainstreaming biodiversity into sectoral, cross-sectoral and district development plans is one of the priority areas of the second NBSAP of Uganda and is also included in the overarching principles and targets (Target 1.1). Linkages between the NBSAP and Uganda's Vision 2040, NDP and Sustainable Development Goals are sketched out in the strategy. Additionally there are targets to involve various stakeholders such as women, indigenous people and local communities as well as address impact on biodiversity from activities in various sectors. For instance, Target 3.6 is that by 2020, management plans are in place and implemented for areas under agriculture, aquaculture and forestry (Target 3.6). All targets are accompanied by priority actions, indicators and budget for implementation. Strategic direction ● Priority actions ● Indicators ●	Pressures on biodiversity due to poverty and the contribution of biodiversity to poverty reduction are key themes of the NBSAP. A three-phased approach to mainstreaming is proposed under which the first phase would be to make the case for mainstreaming regarding poverty-biodiversity linkages, followed by integrating biodiversity into national development processes and then building implementation capacity. Several targets and indicators aim at poverty alleviation indirectly through livelihood generation and stakeholder involvement. Strategic direction ● Priority actions ● Indicators ●
Viet Nam (2015)	The NBSAP to 2020 and Vision to 2030 clearly indicates that "biodiversity conservation must be integrated into national, sectoral and provincial development strategies, plans and policies" (Viewpoint 2.1.e.). The main vision of the NBSAP also recognises that biodiversity must contribute "significantly to the country's socio-economic development". In addition, the list of tasks for implementation includes "the development of legal documents" to guide "the mainstreaming of biodiversity conservation into land use planning, and the planning of a number of key sectors (agriculture, forestry and fisheries)". The strategy contains 5 strategic goals with 23 indicators assigned to different ministries for follow-up, monitoring and evaluation. These indicators are mainly focused on monitoring the state of and threats to biodiversity, and do not include a specific indicator to measure progress on mainstreaming. Strategic direction ● Priority actions ● Indicators ○	An explicit link is made between biodiversity and poverty by stating that conservation and sustainable use of biodiversity contribute to poverty reduction and improved living standards (Viewpoint 2.1.b.). The NBSAP also includes tasks and actions that could support poverty reduction efforts indirectly, such as implementing mechanisms to share benefits from conservation areas equitably with communities and replicating co-management models in protected areas. However, there are no specific projects, actions or indicators that link poverty and biodiversity conservation efforts explicitly. Strategic direction ● Priority actions ○ Indicators ○

Legend: ● = development and poverty priorities explicitly discussed and integrated into NBSAP as a strategic direction, priority action or indicator.

◐ = development and poverty priorities integrated into NBSAP, albeit to a limited extent, or feature in the progress analysis towards Aichi targets in a Fifth National Report, e.g. priority actions not formulated in NBSAP but reported on in the Fifth National Report.

○ = development and poverty priorities are not discussed.

Notes: "Strategic direction" refers to the existence of a substantial discussion on the linkages between biodiversity, and development and poverty reduction objectives.

"Priority actions" refers to the existence of specific development- and poverty-related actions, programmes and projects under national biodiversity targets.

"Indicators" refers to the existence of specific measurable indicators to monitor the performance towards development and poverty-related targets.

Sources: Review of NBSAPs across these countries.

Annex 2.A2
Biodiversity mainstreaming in NDPs

Country (Period of plan)	Mainstreaming of biodiversity into NDP
Australia	Australia does not have an NDP. Australia's National Strategy for Ecologically Sustainable Development, in place since 1992, aims to improve total quality of life now and in the future while maintaining ecological processes (see section on "mainstreaming of biodiversity into sustainable development, green growth and other relevant strategies").
Brazil (2016-19)	Biodiversity is integrated into the NDP. Under strategic dimensions, the importance of biodiversity in achieving sustainable development is explained, and links with tourism and exploration of resources are made. Under sector-level programmes, a separate programme with explicit budget is set out for biodiversity-related work. Biodiversity is also integrated into the agriculture sector programme, with links made to "socio-biodiversity" as a way of managing risks and strengthening agriculture policies. Strategic direction ● Actions/Targets ● Indicators ●
China (2016-20)	The 13th FYP for Social and Economic Development contains a section on resource conservation and environmental protection. Biodiversity is addressed through targets and indicators to increase forest coverage rate and stock as well as limitation of new construction land and increase in "ecological space". Targets to reduce pollution, energy and water use also have implications for biodiversity. Strategic direction ● Actions/Targets ● Indicators ●
Colombia (2014-18)	Biodiversity is mainstreamed into the 2014-18 NDP (Bases del Plan Nacional de Desarrollo) via sub-goals of one of its cross-cutting strategies – rural transformation and green growth. Targets and indicators related to deforestation, land use and degradation are included. Details on the aggregate budget and the funding sources to implement the cross-cutting strategy are also provided. Strategic direction ● Actions/Targets ● Indicators ●
Ethiopia (2010/11-2014/15)	The Growth and Transformation Plan II (2015-20) contains targets and indicators for natural resource management objectives under the agriculture and rural development sector (including areas of land rehabilitated, areas under community watershed development and areas under modern small-scale irrigation) and the targets on conserving agro-biodiversity in situ and ex situ. In addition, environment and climate change are incorporated into the plan as one of six cross-cutting issues. Targets under this section include developing the forest sector (including identification, demarcation and conservation of forest resources, increase in forest cover, and increase in socio-economic benefits of forests) and wildlife conservation and development with targets for PAs (including demarcation of new wildlife zones, monitoring illegal wildlife activities, development of benefits of wildlife zones, and participatory actions in demarcation, conservation, and benefit from PAs). Strategic direction ◐ Actions/Targets ● Indicators ●
France	France does not have an NDP. The National Strategy of Ecological Transition Towards Sustainable Development 2015-20 is a high-level plan defining the vision for green growth until 2020 (see section on "mainstreaming of biodiversity into sustainable development, green growth and in other relevant strategies").
India (2012-17)	The 12th FYP (2012-17), strategically titled Faster, More Inclusive and Sustainable Growth, has a section on sustainable development including programmes targeting sustainable management of the Himalayan ecosystem and the Western Ghats, coastal zone management, and public participation in sustainable development. Another section on environment, forests and wildlife lists schemes and programmes under three headings: forests, wildlife, and environment and ecosystems. Biodiversity is also mentioned under the key sectors of agriculture, animal husbandry and tourism. Broader environmental concerns and strategies for mitigating environmental Impact are a key objective in various sectors of industry such as energy, mining, steel, textile, petrochemicals and transport. Strategic direction ● Actions/Targets ● Indicators ○
Madagascar (2015-19)	The NDP acknowledges that natural capital, including biodiversity, is an important pillar to make Madagascar a modern and prosperous nation. The Fifth Strategic Direction of the NDP is "valuing natural capital and building resilience to disaster risks". While there are 11 sub-objectives under this Strategic Direction, these remain at a fairly general level and are not quantitative in nature (e.g. improve the legal and institutional framework; significantly reduce pollution). Biodiversity (included in "natural capital") is addressed in an isolated manner and not mainstreamed into the other four Strategic Directions. Strategic direction ● Actions/Targets ◐ Indicators ◐

Country (Period of plan)	Mainstreaming of biodiversity into NDP
Mexico (2013-18)	The NDP (2013-18) recognises the need to balance biodiversity conservation and the sustainable use of natural resources in development. Biodiversity is referred to under various action items, predominantly in Section 4.4 on green and inclusive growth. No targets and indicators have been specified. Strategic direction ● Actions/Targets ◐ Indicators ○
Myanmar (2011-30)	The short-term FESR (2012-15) includes a concise section on environmental protection with one reference to biodiversity and a few references to sustainable forestry. Strategic direction ◐ Actions/Targets ◐ Indicators ○
Nepal (2013/14-2015/16)	Biodiversity is integrated into some objectives and strategies under sectoral development policies of the 13th Three-Year Plan 2013/14-2015/16, namely in agriculture, food security and nutrition, forest and soil conservation, and tourism. Increased forest coverage area is included as a single biodiversity-related target and indicator. Strategic direction ● Actions/Targets ● Indicators ●
Peru (2011-21)	Biodiversity is mainstreamed into the Bicentenary Plan 2021 via the strategic objective of "natural resources and environment" (one of six), which elaborates on biodiversity-specific goals, priority actions, indicators and targets, and includes cost estimates to implement underlying programmes. Strategic direction ● Actions/Targets ● Indicators ●
Philippines (2011-16)	Biodiversity priorities feature prominently in the PDP 2011-2016 in the chapter on natural resource conservation, under a distinct sub-goal and subsequent priority actions. Biodiversity-related targets and indicators are elaborated in PDP 2011-2016 Mid-term Update (2014). Strategic direction ● Actions/Targets ● Indicators ●
South Africa (2011-30)	The NDP Vision 2030 refers to biodiversity numerous times, and in various contexts, from general to specific. Biodiversity is a core component of the "Environmental sustainability and resilience" section. Various other sections in the NDP including sections on tourism, agriculture, mining, land-use planning and climate change among others mention the need to keep biodiversity concerns in sight. While the plan contains no indicators, one of the key objectives under "environment" is to develop a set of indicators for natural resources accompanied by publication of annual reports to inform policy. Strategic direction ● Actions/Targets ● Indicators ○
Uganda (2015/16-2019/20)	Biodiversity considerations feature prominently in Uganda's NDP 2015/16-2019/20, which reports slow progress made in reducing biodiversity loss. The NDP has a dedicated section on "Environment and natural resources", which details biodiversity-specific objectives and interventions. Biodiversity is also incorporated in the plan's recommended post-2015 goals and targets (Annex 3) and "Public investment plan projects" (Annex 6). Regarding the indicators, the NDP notes that the National Planning Authority is charged with the task of developing NDP performance indicators and targets in liaison with sectors. Currently, the NDP includes as a biodiversity-specific indicator the increased forest coverage area. Biodiversity is also mainstreamed into tourism, through the recognised need to link the development of the sector to biodiversity conservation priorities by creating tourism and green zones, and into the oil and gas sector through a planned intervention to "strengthen institutional capacity to manage the impact of oil and gas activities on environment and biodiversity". Strategic direction ● Actions/Targets ● Indicators ◐
Viet Nam (2016-20)	The Socio-Economic Development Plan (SEDP) for the period of 2016-20 includes a stronger emphasis on environmental protection than previous years. The SEDP recognises that action on managing natural resources and protecting the environment has been limited in the past, and identifies effective management of natural resources and environmental protection as a key priority for the government for the next five years. The plan includes four environmental targets, including three related to waste management and the fourth being "forest coverage to reach 42% by 2025". This latter target is a revision of a target in the previous SEDP (2011-15), which was to increase forest cover to about "42%-43% by 2015". SEDP 2016-20 also includes an action to "Promote nature conservation and biodiversity" under activities related to climate change and environmental protection. Strategic direction ● Actions/Targets ● Indicators ○

Legend: ● = biodiversity priorities explicitly discussed and integrated.

◐ = biodiversity priorities integrated, albeit to a limited extent, or implicitly addressed through a broader encompassing element, e.g. aggregate budget for an overarching programme of which biodiversity constitutes a part.

○ = biodiversity priorities are not discussed.

Notes: "Strategic direction" refers to the existence of a substantial discussion on the linkages between biodiversity/ecosystems and development objectives.

"Actions/Targets" refers to the existence of specific biodiversity-related actions and goals.

"Indicators" refers to the existence of specific measurable indicators to monitor the performance towards biodiversity-related targets.

Notes

1. An understanding of what the key drivers of biodiversity loss are in a given country will help to do this (i.e. step 1 in Figure 2.1).

2. More specifically, their assessment of NBSAPs revealed that only a small majority consider biodiversity in a broader development policy context. Among these, the degree of elaboration varied considerably, from thorough analysis and actions linked to development policy papers (e.g. Namibia, Costa Rica) to general statements with no elaboration or proposed concrete actions.

3. These strategic objectives are that: 1. management of biodiversity assets and their contribution to the economy, rural development, job creation and social well-being is enhanced; 2. investments in ecological infrastructure enhance resilience and ensure benefits to society; 3. biodiversity considerations are mainstreamed into policies, strategies and practices of a range of sectors; 4. people are mobilised to adopt practices that sustain the long-term benefits of biodiversity; 5. conservation and management of biodiversity are improved through the development of an equitable and suitably skilled workforce; and 6. effective knowledge foundations, including indigenous knowledge and citizen science, support the management, conservation and sustainable use of biodiversity.

4. The addendum to India's NBSAP (2014) includes a national target (Target 2) to integrate values of biodiversity into national and state planning processes, development programmes and poverty alleviation strategies by 2020 along with indicators, responsible agencies and monitoring time frames.

5. The NEP lists key problems, strategies and priority actions for various environmental themes including regulatory reform, enhancing and conserving environmental resources, environmental standards and certifications, and stakeholder involvement.

6. Nepal's NBSAP (2014) sets a priority action (MB-A2) for mainstreaming that by 2019, biodiversity considerations will be incorporated in the policies, plans and programmes of all relevant line ministries and other government and non-government agencies.

7. https://www.cbd.int/doc/world/ph/ph-nbsap-v3-en.pdf.

8. Target 2 under Aichi Strategic Goal A: "By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems." Target 14 under Aichi Strategic Goal D: "By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable."

9. Colombia Government, Decree 4160 (2011).

10. Several NBSAPs highlight some important issues on the linkages between biodiversity and poverty. Myanmar discusses the potentially harmful environmental impacts of subsidies which support poverty alleviation. Nepal highlights the existence of a "strong poverty-environment-health and vulnerability nexus" in relation to the fact that half of its population lives in rural mountainous areas, where poverty, ethnic diversity and vulnerability are disproportionately higher than in the lowlands. Ethiopia highlights that the exploitation of natural resources brings only a short-term relief to poverty, while in the long term it is fraught with negative consequences for the environment, including biodiversity loss.

11. Most commonly engaged government ministries overall were those related to agriculture, development/planning, fisheries, forestry, tourism, education and finance. Non-governmental stakeholders included non-governmental organisations, the private sector, indigenous and local communities, and academia (SCBD, 2016).

12. Roe (2010) examined the degree to which biodiversity-poverty links have been recognised in NDPs (predominantly PRSPs but including other development plans listed by the World Bank as the equivalent of PRSPs) and found that just over 25% show a relatively high level of recognition of the importance of biodiversity; just under 25% have a low level of recognition and 50% fall in between). Just under half of the PRSPs reviewed have a relatively narrow interpretation of biodiversity – the focus being on wildlife, forests or protected areas – but some interpret biodiversity in a broader sense, noting the importance of genetic resources (e.g. Dominica) and agricultural biodiversity (e.g. Bangladesh, Nepal, Viet Nam) and others recognise the link between biodiversity and ecosystem services (e.g. Cambodia, Lao, Liberia, Uganda, Zambia).

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

14. This can be explained by a major transition the country is currently undergoing from a centralised top-down planning process to one that is bottom-up (Peninsula Press, 2013). Following liberalisation, Myanmar has faced the need to revisit its policy directions and formulate new short-term and long-term strategies (OECD, 2015a). Despite the challenges with the government's insipient transition, biodiversity mainstreaming has started to gain importance on the government's agenda. Mainstreaming biodiversity conservation into development planning has been identified as one of the priority actions by the 80 experts from the government and civil society gathered at a stakeholder consultation in 2012. The consultation produced the Myanmar Biodiversity Conservation Investment Vision (2013), with biodiversity mainstreaming identified as a strategic direction.

15. According to the World Bank's *PRSP Sourcebook*, a PRSP should contain a poverty analysis; a prioritisation of the programmes needed to achieve development objectives, targets and indicators; a plan for keeping track of progress towards goals and evaluating effectiveness of implementation of programmes; and a description of the participatory process in preparing the strategy (http://go.worldbank.org/3I8LYLXO80).

16. For instance, Ethiopia's PRSP (2010) constitutes its national Growth and Transformation Plan I 2010/11-2014/15, Nepal's PRSP (2003) coincides with Nepal's Tenth Plan 2002-2007, and Uganda's PRSP (2010) is the country's NDP 2010/11-2014/15 (www.imf.org/external/np/prsp/prsp.aspx).

17. Brazil (MDS, 2014), China (2011), Ethiopia (MOFED, 2010), Madagascar (2007), Nepal (NPC, 2004), Peru (MIDIS, 2014), Philippines (NAPC, 2010), Uganda (Republic of Uganda, 2010) and Viet Nam (Viet Nam Government, 2003).

18. Commitment 7: Cherishing the environment.

19. The closest link to biodiversity and ecosystems on the ANSPE's agenda is the first private social investment meeting held to discuss Ecosystem Services for Overcoming Extreme Poverty (ANSPE, 2014).

20. Moreover, ecological balance in ecosystems is also clearly included as one of the priorities in the country's Social Reform and Poverty Alleviation Act (Republic of Philippines, 1997), which in turn feeds into the National Anti-Poverty Action Agenda (Republic Act No. 8425 [www.lawphil.net/statutes/repacts/ra1997/ra_8425_1997.html]).

21. The other core objectives of the strategy are to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations and to provide for equity within and between generations.

22. Other countries that have prepared or are preparing green growth strategies include Cambodia, Chile, Ethiopia, Indonesia, Peru, Uganda and Viet Nam. France has developed an Energy Transition for Green Growth Act (2015).

23. www.oecd.org/env/resources/workshop-biodiversity-development-2015.htm.

24. Established by National Decree No. 2003-439 of 27 March 2003, requiring an environmental unit within each ministry.

25. The NRMMC has since been absorbed into the Standing Committee on Primary Industries.

26. Target 17.3 in the NBSAP of Myanmar is that "by 2020, BSAPs are under preparation in at least three states/regions."

27. AFB website: www.gouvernement.fr/en/a-biodiversity-agency-for-a-new-relationship-between-humankind-and-nature.

28. The Intergovernmental Platform on Biodiversity and Ecosystem Services provides a Catalogue of Assessments of Biodiversity and Ecosystem Services, a heterogeneous collection of assessments produced by a variety of actors (http://catalog.ipbes.net/).

29. TEEB for Business Brazil was released on 20 March 2014 (www.teebweb.org/countryprofile/brazil/).

30. https://seea.un.org

31. The SEEA is currently undergoing a multi-year revision process. The central framework devised as part of the revision was adopted by the UN Statistical Commission as the first international standard for environmental-economic accounting. The other two outputs of this process have been the Experimental Ecosystem Accounting and the Applications and Extensions of the SEEA, which contains subsystems of the SEEA framework for specific resources or sectors including: energy, water, fisheries, land and ecosystems, and agriculture.

32. WAVES is currently working with the following core implementing countries to develop natural capital accounting: Botswana, Colombia, Costa Rica, Guatemala, Indonesia, Madagascar, the Philippines and Rwanda (www.wavespartnership.org/en/partners).

33. http://biodiversityadvisor.sanbi.org.

34. www.sibbr.gov.br/.

35. www.biodiversityfinance.net/. These countries include Botswana, Brazil, Chile, Colombia, Costa Rica, Ecuador, Fiji, Guatemala, India, Indonesia, Kazakhstan, Malaysia, Mexico, Peru, the Philippines, Seychelles, South Africa, Thailand, Uganda and Zambia.

36. www.oecd.org/environment/green-budgeting.

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Chapter 3

Mainstreaming biodiversity in agriculture, forestry and fisheries

This chapter examines biodiversity mainstreaming in the agriculture, forestry and fisheries sectors. It highlights the inter-linkages between biodiversity and each of these sectors and then the types of policy instruments that can be used to mainstream biodiversity considerations within them. Drawing on experiences from the 16 focus countries, various examples illustrate opportunities and remaining challenges.

Mainstreaming biodiversity across sectors is important, as sectors have particular interactions with biodiversity. Synergies and trade-offs regarding sustainable use of biodiversity need to be addressed in the context of these interactions. Moreover, most nationally important sectors have their own planning and policy processes, thus providing an important entry point for biodiversity mainstreaming (CBD, 2011).

Priority sectors for biodiversity mainstreaming are likely to differ across countries, depending on the key drivers of economic development and/or pressure on biodiversity loss. This chapter examines the inter-linkages between biodiversity, and the agriculture, forestry and fisheries sectors. While other sectors are of course also relevant for biodiversity mainstreaming, such as tourism, energy, manufacturing, infrastructure and extractive industries, they are beyond the scope of this analysis.

Mainstreaming biodiversity in agriculture, forestry and fisheries can take place at multiple interacting scales including international, national and subnational levels.[1] As impacts on biodiversity can also be cross-sectoral, co-ordination and policy coherence among sectors is also required. These issues are also recognised in Sustainable Development Goal (SDG) 2 on food security and sustainable agriculture, SDG 14 on life under water (where several targets relate directly or indirectly to the fisheries sector), and SDG 17 on partnerships, which include systemic issues such as policy coherence.

Cross-sectoral policies and measures to mainstream biodiversity across sectors include clear and secure land tenure (including communal land tenure), spatial planning (e.g. land-use and marine spatial planning), environmental impact assessments (EIAs) and strategic environmental assessments (SEAs). Integrated land-use and marine spatial planning are instruments that can help prevent loss of biodiversity-rich lands or marine areas. Many countries (and subnational regions) formulate such land-use spatial plans. Including specific biodiversity criteria in these plans can help ameliorate some of the pressure by reducing land-use conversion of biodiversity-rich areas and minimising impacts of production activities upon them. In South Africa, easily available spatial information on biodiversity priorities has made it possible for policy makers to make decisions that take these into account (Box 3.1). In France, the inclusion of biodiversity criteria in land-use plans remains a challenge, though progress has been made in combining biodiversity and land-use planning within a single ministry (in 2007) and via the creation of the green- and blue-belt networks. Cross-sectoral technical committees to formulate comprehensive land-use plans (e.g. in Ethiopia) and plans based on ecological and economic zoning (e.g. in Peru) are examples of approaches that are being taken to develop national land-use plans.[2]

International organisations also have an important role to play in supporting biodiversity mainstreaming efforts across sectors and to help ensure that messages are relayed across constituencies (beyond biodiversity). The institutional structures of these organisations can also help. For example, at the OECD, several working parties bring together multiple constituencies, such as the Joint Working Party on Agriculture and Environment, the Joint Working Party on Trade and Environment, and the Network on Environment and Development Co-operation. Engaging in horizontal biodiversity work across international organisations is also an important enabler of biodiversity mainstreaming. For example, the OECD convened a workshop in October 2017, "Biodiversity, Climate Change and Agriculture: Towards Coherent Approaches", bringing together the biodiversity, climate and agriculture communities to exchange practical experiences and share lessons. Similarly, the recently established Food and Agricultural Organization (FAO) Platform on Biodiversity Mainstreaming across Agricultural Sectors (i.e. agriculture, forestry and fisheries) can play an important role in supporting implementation on the ground. Inter-organisational efforts

are also key to ensure co-ordinated and consistent messages. One example of this is the *OECD-FAO Guidance for Responsible Agricultural Supply Chains* (OECD-FAO, 2016).

Box 3.1. **Integrating biodiversity into land-use planning in South Africa**

An online mapping system identifying biodiversity priority areas and actions at various spatial scales in South Africa provides a means of integrating biodiversity concerns into social and economic development. The maps are available to various stakeholders including policy makers. This is coupled with a system of targets to conserve a representative sample of ecosystems and species (including ecological processes for long-term survival of these).

At a more granular level, a series of projects in the Western Cape province provide an example of targeted inclusion of biodiversity in land-use plans. The provincial government and municipalities are jointly responsible for land-use planning in South Africa. The National Environmental Management Act (Act 107 of 1998) mandates inclusion of considerations for unique and threatened biodiversity of the region into these plans. The Putting Biodiversity Plans to Work project initiated by the Botanical Society of South Africa is aimed at supporting the municipal and provincial government planning departments in becoming conversant with existing scientific biodiversity plans. The South African National Biodiversity Institute (SANBI) worked with the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) to include biodiversity plans into the mandated provincial Spatial Development Framework. Lessons learned from these projects included that highly scientific plans developed by the academic community are often not easily integrated into municipal planning processes unless there is considerable "translation" into the language used by municipal planners. This was overcome by the provincial DEA&DP working together with SANBI (a SANBI biodiversity planning expert was seconded to the DEA&DP in 2008). The result was integration of biodiversity concerns into the department's own guidelines in order to standardise terminology and enable the department to take ownership of the plans for use and future revisions.

Sources: Manuel et al. (2016), "Key ingredients, challenges and lessons from biodiversity mainstreaming in South Africa: People, products, process", http://dx.doi.org/10.1787/5jlzgj1s4h5h-en; OECD (2013), *OECD Environmental Performance Reviews: South Africa 2013*, https://doi.org/10.1787/9789264180109-en.

3.1. Mainstreaming biodiversity in agriculture

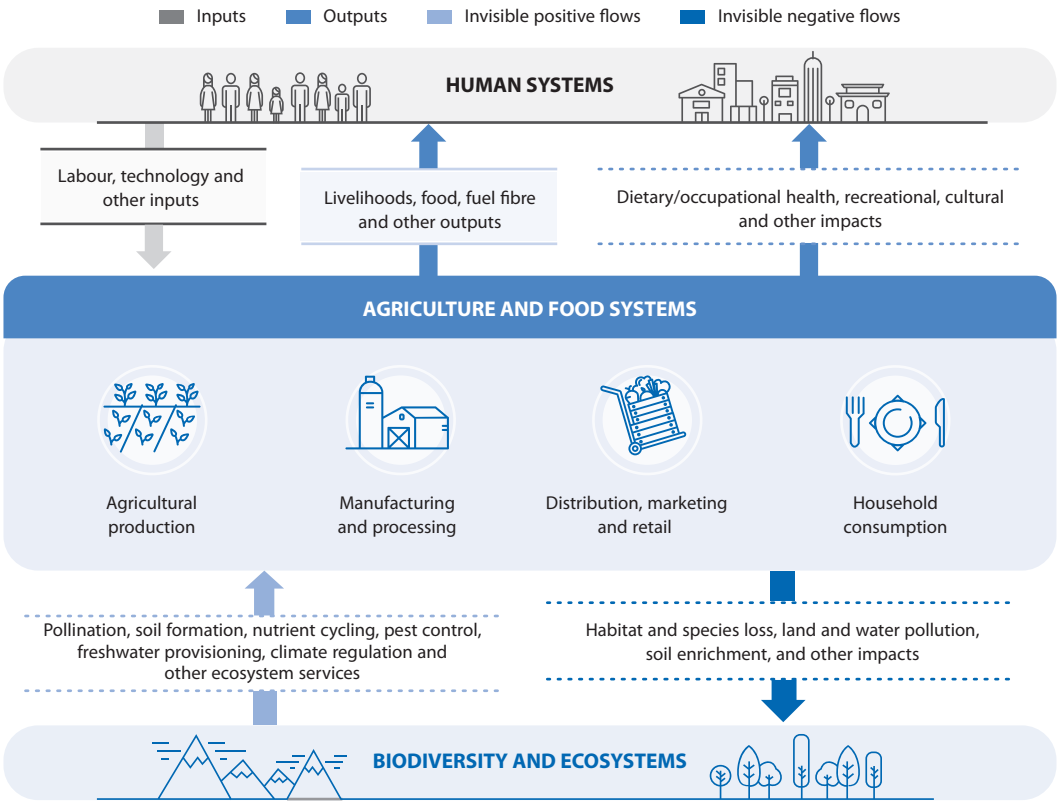
The biodiversity-agriculture nexus and its role in national and global economies

Agriculture is likely to be a priority sector for biodiversity mainstreaming in many countries around the world, as it is often a key pressure on biodiversity (OECD, 2012; IPBES, 2018).[3] Agriculture also provides a range of benefits including carbon storage, rural landscapes and resilience to natural disasters (such as flooding, landslides, fire and snow damage) (OECD, 2015d), as well as pollination and soil functionality. The agricultural sector is also central to economic growth and development in several countries and is key for food security – SDG 2 – especially in developing countries (Dethier and Effenberger, 2012; World Bank, 2008). Globally, over 37% of land area is under agricultural use (World Bank, 2015). The sector provides employment to 2.5 billion people (1 in 3 people in the world's active labour force) (FAO, 2012; WDR, 2008), with agriculture constituting the main source of employment in many developing and emerging economies (e.g. 47.2% in India; 46.7% in Viet Nam; and 31.5% in the People's Republic of China).[4] On average in low-income countries, agriculture employs 65% of the labour force and accounts for 29% of gross domestic product (GDP)[5] (Dethier and Effenberger, 2012). The contribution of

agriculture to total income and employment in OECD countries is relatively low; the share of agriculture in total GDP ranges from 0.3% to 9.2% (OECD, 2013a), and employment ranges from 1.1% to 21% (OECD, 2016f) (see Annex 3.A1). However, the sector continues to have a significant environmental impact given the high levels of input use and large land area under cultivation[6] (OECD, 2016a; OECD, 2013a).

Agricultural production both depends upon and impacts biodiversity (OECD, 2011). Figure 3.1 illustrates the interaction among agricultural production, human systems and biodiversity. Biodiversity provides essential services to agriculture including nutrient cycling, pollination, soil formation, genetic diversity, freshwater provisioning and climate regulation. The global economic value of pollinators to the agricultural sector, for example, has been estimated at between 235 billion United States dollars (USD) and USD 577 billion annually (IPBES, 2016). Similarly, the value of biological pest control and nitrogen mineralisation in 15 global cultivation regions is estimated to exceed USD 34 billion annually (Sandhu et al., 2015). In France, the value of ecosystem services provided by pastures has been estimated at 600 euros (EUR) per hectare per year (about USD 737) for permanent pastures and between EUR 1 100 and EUR 4 600 per hectare per year (about USD 1 353-5 653) for wet pastures (CGDD, 2013). Moreover, agricultural lands can provide habitats for species (e.g. birds, insects and rodents), especially low-intensity agro-systems[7] (OECD, 2008b).

Figure 3.1. **Visible and invisible flows from agriculture**



Source: Adapted from TEEB (2015), *TEEB for Agriculture and Food: An Interim Report*.

Agricultural expansion into natural and semi-natural lands (such as forests and grasslands) and unsustainable practices related to agricultural intensification (such as over-intensive use of agrochemicals, overgrazing and increased crop specialisation) are major causes of degradation worldwide (Maclaughlin and Mineau, 1995; OECD, 2013f). Around 70% of projected terrestrial biodiversity loss and 50% of freshwater biodiversity loss by 2050 are expected to take place due to drivers linked to agriculture (PBL, 2014).[8] The sector is estimated to have been the proximate driver for around 80% of global deforestation (Kissinger, Herold and Sy, 2012).

Certain agricultural practices can lead to degradation of soil and water resources, introduction of invasive species, and fragmentation of natural habitats (TEEB, 2015). Over half of the world's agricultural land (52%) is estimated to be moderately or severely degraded (ELD Initiative, 2015). Moreover, both land-use change and agricultural intensification focused on a few modern breeds are contributing to genetic erosion of crop and livestock varieties and their wild relatives (SCBD, 2016b; Flynn et al., 2009). In China, for example, the number of local rice varieties fell from 46 000 to around 1 000 between the 1950s and 2006, and wild rice varieties disappeared from 60-70% of their earlier spread (SCBD, 2010). The loss of genetic diversity, especially replacement of local, well-adapted crop breeds, increases the vulnerability to pests, diseases and environmental changes, including climate change (Ratnadass et al., 2012; Heal et al., 2004).

The sector also has a strong impact on water resources, accounting for an estimated 70% of global freshwater withdrawal and consumption (FAO, 2014a). Unsustainable agricultural practices are likely to lead to disruption of aquatic systems, siltation of water bodies and pollution of aquatic environments due to chemical fertilisers and pesticides. Around 60% of globally applied nitrogen fertilisers and 50% of phosphorus fertilisers are estimated to be in excess of the required amount (West et al., 2014). Nutrient run-off from fertilisers has led to 405 "dead zones" due to eutrophication around the world, covering 250 000 square kilometres of ocean area (UNDP, 2012). Agriculture also contributes to climate change, accounting for 22% of total greenhouse gas (GHG) emissions (14.5% of total global GHG emissions are from livestock farming) (Smith et al., 2014).

Ecosystem degradation caused by environmentally harmful agricultural practices can in turn have negative impacts on agricultural productivity (OECD, 2013f). For instance, the cost of soil erosion in a watershed of the Ethiopian highlands for 2013 and 2014 was estimated at around 19% of per capita income (Ayele et al., 2015). Similarly, poor soil quality due to overuse of chemical nitrogen fertiliser in China has contributed to declining or stagnant annual growth rates of rice and maize production in most provinces[9] (Fan et al., 2012; Peng, Tang and Zou, 2009). In contrast, practices aimed at improved natural resource management can have a significant positive contribution to agricultural productivity and income. Investment in the construction of soil bunds in Ethiopia, for example, is estimated to have an internal rate of return as high as 17% (Tadesse, Tesfay and Gebreslase, 2016). Sandhu et al. (2015) estimate that if 10% of global arable area is converted to methods of sustainable intensification[10] such as organic agriculture, the total value of biological pest control and nitrogen mineralisation would exceed the combined global cost of current pesticide and fertiliser use.

Mainstreaming in practice: Aligning objectives and strategies and addressing enabling conditions

As indicated in Figure 2.1 (Chapter 2), countries should ideally have a clear understanding of the key pressures on biodiversity at the domestic level, and prioritise their mainstreaming efforts accordingly. If the agricultural sector is indeed a key (current and/or projected)

pressure, then a first entry point is to ensure that objectives to sustainably use biodiversity are mainstreamed into national agricultural strategies, policies and plans. In Uganda, for example, the National Agriculture Policy (2013) includes "sustainable use and management of agricultural resources" as one of the six main objectives. Activities under this objective include promotion of and support for sustainable land management and conservation agriculture. In India, both the National Development Plan (NDP) (2010-17) and the National Policy for Farmers (2007) include aims to protect and improve land, water and biodiversity resources in agriculture, with the objective of promoting sustainable increase in productivity.

As policy coherence is needed across all sectors, these objectives should also be mainstreamed in all other relevant strategies (see e.g. Figure 2.2). The National Mission on Sustainable Agriculture, a component of India's Climate Action Plan (2008), has been integrated into the NDP (2012-2017). Similarly the Growth and Transformation Plan II (2015-20) in Ethiopia, which integrates sectoral plans, aims to promote sustainable farming practices, enhanced conservation of indigenous biodiversity resources, and livelihood development related to natural resources (such as forestry, rehabilitated lands and water resources) in the context of agriculture. The National Climate Change Strategy (2013) in Mexico includes as a line of action the implementation of agricultural policies aimed at rationalised use of fertilisers, producing and applying bio-fertilisers and efficiently using nitrogenates. However, the objective in the NDP (2013-18) related to agriculture is limited to building productivity and competitiveness in the agriculture and fisheries sectors to ensure food security.[11]

To achieve the objectives set out in sector-related plans and policies, it is important that these be reflected in legislation and be backed by clear targets. Nepal's Agricultural Development Strategy (2014), for example, provides targets and indicators for the short, medium and long term (i.e. 5, 10 and 20 years, respectively) for various objectives, including "sustainability of agriculture".[12] The targets are to be achieved through measures such as maintaining forest cover, improved input use and agricultural practices, and land conservation and rehabilitation.[13] In France, the Law on the Future of Agriculture, Food and Forestry[14] provides support measures (information, training, research and funding) to facilitate the transition to sustainable methods of production.[15] The recently adopted Biodiversity Law[16] in France also includes elements relevant to agriculture such as the ban on the use of pesticides containing neonicotinoids, prohibition of patenting of products derived essentially from biological processes, and authorisation of free exchange of vegetable seeds belonging to the public domain between farmers to preserve agricultural biodiversity. Moreover, the Law on the Future for Agriculture, Food and Forestry aims to promote sustainable agriculture through promoting agroecology in France (Box 3.2).

Box 3.2. **Agroecology in France**

Launched in 2012 as part of the Produce Differently (Produisons Autrement) initiative, the aspiration to move towards agroecology has been included in the French Law of the Future for Agriculture, Food and Forestry with the aim of having a majority of the French farmers engaged in agroecology by 2025. The term is not closely defined in the law, though promoting crop diversity and biodiversity are included as guiding principles. In general the aim of agroecology in this context is to meet the combined production, environmental and social challenges of food security, conserving natural resources, responding to climate change issues, and combating poverty and rural exodus. The principles of agroecology include fostering positive biological interactions in the agricultural ecosystem (such as functional biodiversity in the form of hedges and grass strips and appropriate crop rotation to combat pests and infections) and completing

Box 3.2. **Agroecology in France** *(continued)*

bio and geochemical cycles such as water and nitrogen cycles (for example through developing synergies between livestock farming and crops to reduce dependence on chemical fertilisers while managing organic effluents) in order to increase farmers' resilience through increasing sustainability of production and diversifying sources of income. Initiatives under the banner include promotion of measures such as reduction in use of pesticide for crops and antibiotics for livestock, promoting agroforestry and organic farming, and promoting crop rotation and natural methods of crop protection. An action plan developed by a steering committee that brings together various stakeholders emphasises (among other things):

- agricultural training to more effectively include agroecology in teacher training and educational programmes for students
- mobilisation of research and development in order to develop and disseminate agroecological innovations
- involving stakeholders by recognising groups of farmers and other interested stakeholders under the 2014 law by setting up economic and environmental interest groups at the regional and local levels
- review of public support available for agriculture in order to incentivise commitment to agroecology
- development of a self-assessment tool to enable farmers to track and compare results in order to assess their practises.

Sources: MAAF (2016), *The Agroecology Project in France*; MAAF (2013), *Agroecology: Different Definitions, Common Principles*; MAAF (n.d.), "Agroecology In France", http://agriculture.gouv.fr/telecharger/58144?token=84c0ffff0caf34ea89f434e9745865a2.

Institutional arrangements can also help foster biodiversity mainstreaming. Examples include the integration of natural resource management (NRM) into agricultural institutions at various levels. In Ethiopia, for instance, the newly reorganised Ministry of Agriculture and Natural Resources has a specific division for NRM and NRM staff in all other divisions.[17] The aim is to work with communities to ensure that soil, water and biodiversity are sustainably managed in agricultural areas so as to maintain agricultural productivity. Similarly in Madagascar, each ministry (including the ministries for agriculture and livestock) contains an environment unit. Such institutional arrangements, including staff with the necessary technical expertise, can help to ensure that ecosystem service considerations are reflected in agricultural policies, programmes and activities. Experience from Ethiopia, Madagascar and Viet Nam shows that awareness and capacity for mainstreaming are needed at both the policy and the local implementation levels for mainstreaming to be successful. Capacity building for local governing and implementing bodies can aid successful uptake of mainstreaming measures and, in the case of agriculture, is required to engage farmers at the local level.

An important prerequisite for effective mainstreaming is to ensure clearly defined and secure tenure rights, in particular for agricultural land and forests. Unclear or insecure tenure remains a major barrier to long-term investment and encourages unsustainable practices in favour of higher production in the short term (SCBD, 2016; FAO, 2002). Tenure arrangements differ significantly across contexts. In Peru, for example, only 28.8% of farmers possess land titles while the remaining farmers rent or squat on communal lands, whereas in Viet Nam,

all land is owned by the state but land-use rights can be granted to farmers and corporations. There has been a continued effort to improve tenure security of agricultural land in Viet Nam over the years through a series of legislation, though certain institutional and legal issues remain to be resolved (Nguyen, 2012). The Sustainable Land Management Programme in Ethiopia targets tenure insecurity along with promoting better land management practices through community engagement. Over 100 000 landholding certificates (which give farmers user rights to land) have been distributed under the programme to enhance a sense of ownership and enable adoption of measures that reduce soil and water degradation. There has been a reported 10% increase in production of major crops and a 16% increase in household income in areas covered by the programme (World Bank, 2016). A study in northern Ethiopia estimates that land certification increased investment in land and productivity by 40% while also increasing incomes, especially of female-led households, and improved child nutrition (Holden and Otsuka, 2014). Tenure rights are therefore important for both investment in sustainable agriculture and promoting growth and equity.

Mainstreaming in practice: Making the most of the policy toolkit

Looking beyond sectoral strategies and institutional issues, a number of policy instruments are available to governments to mainstream biodiversity in agriculture and thus internalise the external costs of agriculture on the environment (Table 3.1 and Box 3.3). As the key pressures on biodiversity from agriculture vary across countries by both type and magnitude, different instruments are likely to be needed depending on the context, including socio-economic circumstances. In Viet Nam, for instance, the major driver of forest conversion to agriculture is the production of export-oriented products such as coffee and rubber (OECD, 2015a; To and Tran, 2014). In Ethiopia, conversion takes place largely at the level of the individual farmer for subsistence cultivation[18] (EBI, 2014). Similarly, input use and efficiency also differ greatly with serious implications for biodiversity. For example, fertiliser use in China amounts to 565.3 kilogrammes per hectare (kg/ha) of arable land and in France, 151 kg/ha of arable land, whereas in countries such as South Africa it is 60.6 kg/ha and in Madagascar it is 5.5 kg/ha of arable land[19] (World Bank, 2016). There will therefore be different priorities across countries regarding where mainstreaming efforts should be more urgently focused. Countries also vary in terms of their technical and institutional capacities to effectively implement different types of policy instruments (see OECD, 2013g, for a discussion of this).

Table 3.1. **Examples of policy instruments to mainstream biodiversity in agriculture**

Regulatory (command-and-control) approaches	Economic instruments	Information and other voluntary instruments	Other measures
Land-use/spatial planning tools and requirements (e.g. EIAs and SEAs)	Price-based instruments • Taxes (e.g. on groundwater extraction, pesticide and fertiliser use) • Charges/fees • Subsidies to promote biodiversity (e.g. target public investments in green technology)	Eco-labelling and certification (e.g. organic agriculture labelling schemes)	Trade measures (e.g. lower tariff and non-tariff barriers on food and agricultural products bearing in mind the potential environmental impact on biodiversity and sustainable resource use)
Strengthen rules and standards for water, soil quality and land management	Reform of environmentally harmful subsidies (decouple farm support from commodity production levels and prices)	Green public procurement	Research and development (e.g. increase public research on sustainable food and agricultural systems)

Table 3.1. **Policy instruments to mainstream biodiversity in agriculture** *(continued)*

Regulatory (command-and-control) approaches	Economic instruments	Information and other voluntary instruments	Other measures
Enact controls on excessive use of agrochemicals and fertilisers in production	Payments for ecosystem services (PES), payments for agri-environment and climate schemes	Voluntary approaches (e.g. negotiated agreements between businesses and government for nature protection or voluntary offset schemes)	Environmental education, training and advice (e.g. incorporate sustainable approaches in training, education and advice programmes throughout the entire food chain, including farmers)
Nature, biodiversity and environmental legislations (e.g. Natura 2000 areas in the European Union)	Biodiversity offsets/biobanking		Development assistance (e.g. increase official development assistance for environmentally sustainable initiatives in food and agriculture)
	Tradable permits (e.g. water rights and carbon emissions)		
	• Liability instruments • Non-compliance fines • Performance bonds		

Sources: Adapted from OECD (2013e), *Scaling-up Finance Mechanisms for Biodiversity*, http://dx.doi.org/10.1787/9789264193833-en; OECD (2011), *Food and Agriculture*, http://dx.doi.org/10.1787/9789264107250-en.

Box 3.3. **Policy instruments to promote sustainable agriculture**

Environmental policy should promote efficiency in the use of resources to increase production relative to inputs used and ensure that prices reflect the scarcity value of natural resources and the cost of environmental impacts. This means in particular: reducing environmentally harmful subsidies; enshrining the "polluter pays" principle within the legal and regulatory framework; obliging investors to internalise the costs of environmental degradation by making EIAs compulsory, issuing environmental permits and sanctioning environmentally damaging activities; providing incentives for the supply of environmental goods and services and encouraging participatory management of natural resources; and reducing pre- and post-harvest food loss and waste.

Source: OECD (2011), *Food and Agriculture*, http://dx.doi.org/10.1787/9789264107250-en.

A common regulatory measure implemented in the case of large-scale agricultural projects in many countries is mandatory EIAs (such as in France, Peru and the Philippines). The purpose of EIAs is to ensure that decision makers consider the environmental impacts when deciding whether or not to proceed with a planned project. Small-scale agriculture remains outside the ambit of EIA regulation in most cases. The EIAs of individual projects should be supplemented with legislation mandating SEAs of sectoral policies, plans and programmes in order to factor in landscape-level impacts.

Regulatory approaches can also be used to control input, sale and use. The Law on Environmental Protection (2014) in Viet Nam, for example, decrees that producers, distributors and users of pesticides, especially those that are "likely to spread or agglomerate in the environment" must be registered and assessed for meeting legal standards. Absolute

bans on certain agrochemicals (or other inputs) may be required in cases where drastic, irreversible impacts are evident, such as the ban on the veterinary drug diclofenac to prevent the extinction of vultures in South Asia (Cuthbert et al., 2015; BirdLife, 2013) (Box 3.4).

Box 3.4. **Ban on diclofenac to prevent vulture extinction in South Asia**

Until 1990, three species of Gyps vultures in South Asia were some of the most abundant large raptors globally. Vultures provide a vital ecosystem service by aiding disposal of livestock carcasses, the lack of which poses serious risks to human and livestock health. Between the early 1990s and 2007, the population of all three species of Gyps vultures fell by a drastic 97%, placing them on the Critically Endangered category on the Red List of the International Union for Conservation of Nature (IUCN). The subspecies of white-rumped vultures dropped by 99.9% (compared with 1992 populations), placing them on the brink of extinction.

The cause of decline was established to be an anti-inflammatory veterinary drug, diclofenac. The drug, toxic for vultures, was transferred to the birds while feeding on carrion from medicated animals. Veterinary use of diclofenac was banned in India, Nepal and Pakistan in 2007 and in Bangladesh in 2010 along with promotion of the alternative drug, meloxicam. As a result, the rate of decline in Gyps vulture populations slowed down in the region, and the proportion of vulture carcasses with fatal levels of diclofenac in India fell by about half within four years of the ban.

Continued diclofenac-related mortality in vultures in India is attributed to illegal use of diclofenac sold in pharmacies for human use. Consequently, based on the recommendation of the Ministry of Environment, Forest and Climate Change, the Ministry of Health and Family Welfare banned the sale of multi-dose vials of diclofenac for human use in 2015.

Despite the catastrophic experience in South Asia, the use of products for veterinary use containing diclofenac was approved in Spain (which is home to more than 95% of Europe's vulture population) in 2013, followed by Italy, Estonia, Latvia and the Czech Republic, leading to concerns about a similar collapse of scavenger bird populations in Europe.

Sources: Cuthbert et al. (2015), "Continuing mortality of vultures in India associated with illegal veterinary use of diclofenac and a potential threat from nimesulide"; BirdLife (2013), "Vultures are under threat from the veterinary drug diclofenac", www.birdlife.org/datazone/sowb/casestudy/156; Green et al. (2016), "Potential threat to Eurasian griffon vultures in Spain from veterinary use of the drug diclofenac"; MoEFCC (2015), "Environment Ministry recommends ban on multidose vial of diclofenac to save vultures", http://pib.nic.in/newsite/PrintRelease.aspx?relid=127003.

Economic instruments to help reflect costs of environmental and human impacts and thus mainstream biodiversity in agriculture include taxes (e.g. on groundwater extraction and on fertiliser and pesticide use), charges and fees. These instruments, based on the "polluter pays" approach, have not been widely adopted, however, despite their ability to provide correct signals to producers and consumers, as well as to raise revenue. Notable examples in the context of pesticide taxes include Viet Nam and France (OECD, 2016c). In Viet Nam, certain pesticides and herbicides are covered under the environmental protection tax, introduced in 2012. Fees are levied on water pollution from pesticides in Australia (under the load-based licensing scheme) and in France (under water effluent charges from non-point sources of emission). Revenue generated from these taxes and fees could be reinvested to promote and enable sustainable agricultural practices (Jakobsson, 2014).[20]

Effective mainstreaming of biodiversity in agriculture will also require significantly enhanced efforts to identify and reform environmentally harmful government support to agriculture. In most countries around the world, governments provide substantial support to farmers via a variety of payments. These can be potentially environmentally harmful, neutral or beneficial.[21] Few countries have undertaken national studies to assess the impacts of support payments on the environment and biodiversity more specifically. Notable exceptions include France and Germany (Sainteny et al., 2012; German Environment Agency, 2014).[22] In France, the Grenelle I Act mandated that a report on environmental impact of public budgetary or fiscal assistance be compiled in order to provide the basis for reviewing harmful subsidies (OECD, 2016d). In most countries, however, measures are yet to be taken to identify and reform environmentally harmful incentives in agriculture. The Fifth National Reports of Nepal and the Philippines (both released in 2014), for example, highlighted that no progress had been made on the review of incentives harmful to biodiversity. The Secretariat of the Convention on Biological Diversity (SCBD) reported no significant overall progress on the removal of harmful subsidies globally, despite increasing recognition of the need to do so (SCBD, 2014). All countries should ideally conduct a national assessment of the types of agricultural support in place to identify incentives to be removed or reformed.

Examples of support measures potentially harmful for biodiversity include value-added tax (VAT) exemption on agrochemicals and electricity subsidies in Mexico (OECD, 2013c) and the waiver of irrigation service fees and the reduced costs for the domestic fertiliser industry due to subsidies for coal, natural gas and electricity in Viet Nam (OECD, 2015a). Such measures undermine rationalised use of input by farmers; for example, fertiliser use in Viet Nam has gone up by 517% in the last 25 years to almost twice the average levels for Southeast Asia, and it is estimated that two-thirds of this enters the freshwater system (MONRE, 2014). In France, support measures encourage the use of diesel (especially for road freight and farming), contributing to reduced air quality (OECD, 2016d).[23] Box 3.5 provides examples of environmentally harmful subsidies in the case of Brazil.

Box 3.5. **Environmentally harmful farm input support in Brazil**

In Brazil (as in many other countries), key agricultural inputs such as water, pesticides and fertilisers are implicitly subsidised. Water abstraction is not charged for in many regions. Fertilisers and pesticides are exempt from some federal and state taxes, which has increased their use and related impact on human health, ecosystems, and water and soil quality. Brazil is one of the world's largest consumers of fertilisers (after China, India and the United States), and fertiliser use is particularly high in the south and southeast regions where large-scale farming prevails, especially for certain crops such as soya. Several widely used pesticides are considered dangerous or highly dangerous for the environment and detrimental to pollinators, and the use of non-authorised pesticides is high.

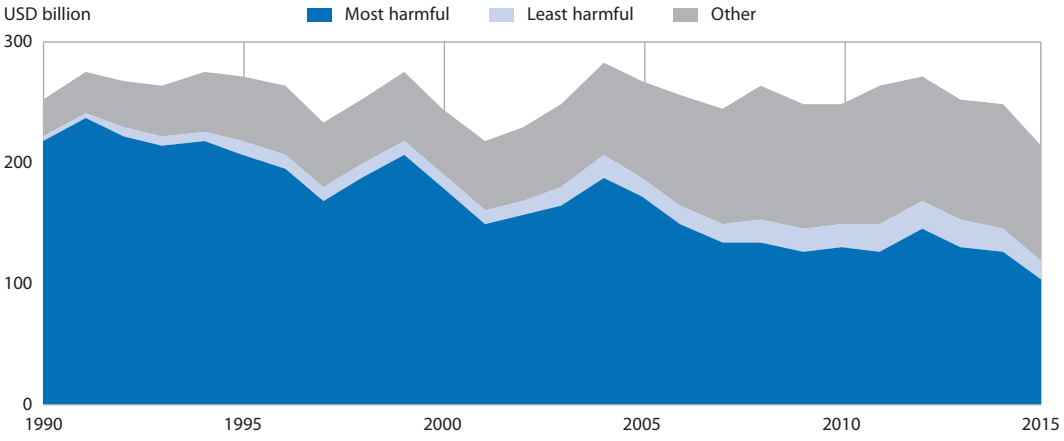
Sources: OECD (2015b), *OECD Environmental Performance Reviews: Brazil 2015*, http://dx.doi.org/10.1787/9789264240094-en; MMA (2015), *Fifth National Report to the Convention on Biological Diversity*, www.cbd.int/doc/world/br/br-nr-05-en.pdf; Jardim and Caldas (2012), "Brazilian monitoring programs for pesticide residues in food – Results from 2001 to 2010", http://dx.doi.org/10.1016/j.foodcont.2011.11.001.

Agricultural support, once in place, often proves difficult to remove given the backing it enjoys from beneficiaries who are a part of rural vote banks and political pressure groups (Bruvoll, Skjelvik and Vennemo, 2011; Wiggins and Brooks, 2010; OECD, 2007).

However, there are examples of successful reform such as in China, where the government reintroduced a 13% VAT in 2015 on all imported and domestic fertilisers in order to curb excessive use and promote sustainable agricultural development (Hersey and Kovacs, 2015). Organic fertilisers remain exempt from the VAT. The objective of the Chinese government is to reduce the annual growth of chemical fertiliser use to below 1% for the 2015-19 period and to achieve zero growth by 2020 for major agricultural crops under the zero-growth action plan for chemical fertilisers and pesticides. For pesticides, the plan envisages a reduction in average use per unit of land to achieve zero growth in their total use by 2020 (OECD, 2016a). In Australia, the potentially most distorting forms of agricultural support[24] were removed in the early 2000s; the remaining support programmes in the country are targeted to risk management, environmental conservation and provision of general services (OECD, 2016a).

Government support to farmers in terms of the OECD Producer Support Estimate (PSE)[25] can be classified according to its potential impact on the environment. While measures such as market price support, payments based on commodity output (without imposing environmental constraints on farming practices) and payments based on variable input use (without imposing environmental constraints) are potentially most harmful for the environment, support considered potentially the most beneficial includes measures that impose environmental constraints and decoupled support payments based on non-commodity criteria, such as support for farming practices beneficial to biodiversity[26] (OECD, 2013f). On average, the potentially most environmentally harmful government supports to farmers have declined in OECD countries since 1990 and accounted for USD 130 billion per year, or 52% of total support, in 2012-14. Notwithstanding concerted efforts to decouple support from commodity output and prices, the potentially most environmentally beneficial support accounts for only 8% in the OECD area (Figure 3.2.).

Figure 3.2. **OECD agricultural support to farmers by potential environmental impact**



Note: It should be emphasised that neither the total PSE nor its composition in terms of different categories of policies can be interpreted as indicating the actual impact of policy on production and markets. The actual impacts (ex post) will depend on many factors that determine the aggregate degree of responsiveness of farmers to policy changes, including any constraint of production. For example, while it is true that market price support mechanisms and payments based on output are potentially the most harmful for the environment, whether they actually are harmful depends on a host of other factors, including whether production quotas are attached to them and whether they incorporate strong cross-compliance requirements, or are constrained by agri-environmental regulations independent of the support payments (OECD, 2013).

Source: OECD Secretariat calculations based on OECD (2016f), producer and consumer support database.

Environmentally motivated subsidies and PES can be used to encourage more sustainable agricultural practices. In eight provinces in China, for example, a subsidy is provided for grassland ecology conservation. A higher subsidy is paid for banning of grazing and a lower amount for maintaining a balance between herd and grass supply. This is coupled with training of herdsmen to allow a shift to other jobs (MEP, 2014). In France, subsidies are provided under the agri-environmental measures (AEMs) under the EU CAP for environmentally sound practices including those focused on biodiversity. Additionally, since 2015, over 30% of the direct subsidies available to farmers under the EU CAP are subject to conditionality of fulfilling environmental criteria.[27] Direct or contractual aid is provided for the voluntary implementations of AEMs, whereby farmers receive subsidies in exchange for adhering to one or more environmentally friendly agricultural practices for at least five years. In its rural development programming process for 2007-13, France introduced "regionalised" AEMs to focus resources on areas with priority challenges, including biodiversity (OECD, 2016d).[28] It must be noted that EU CAP 2014-20 measures are regarded as insufficient in terms of providing any major improvements in biodiversity, and member states will need to design national and regional plans to ensure long-term provisions of ecosystems related to agriculture (Pe'er et al., 2014; Poux, 2013). Moreover, support measures under the EU CAP (Pillar I) also continue to provide incentives for production which may increase pressure on natural resources. Policy coherence would require a review of all measures affecting the performance of the agricultural sector together with an assessment of local environmental conditions (OECD, 2017b).

PES schemes have been adopted in a number of countries worldwide to incentivise sustainable agricultural practices. In China, for instance, PES has been used to target soil erosion through increasing forest cover in erosion-prone agricultural areas through the Sloping Land Conversion Program. Initiated in the late 1990s, the programme is the world's largest PES programme under which payments are provided to farmers in two watershed areas for converting erosion-prone farmland to forests. By the end of 2012, 9.26 million hectares (ha) of sloping agricultural land had been reforested by 32 million households in 25 provinces under the programme (Liu and Henningsen, 2016). PES can be used to encourage biodiversity-friendly practices on land owned by a variety of stakeholders. The Land Stewardship Programme in South Africa is a PES programme aimed at landowners in biodiversity-rich areas. This programme makes it possible to expand protected areas at one-tenth the cost that would be needed to purchase the land and also protects the rights and interests of landowners, as compared with the protected areas model (OECD, 2013d). Private-sector actors have also used PES schemes to preserve ecosystem services necessary for production. An example of a PES scheme set up by a private company is that of the Vittel valley in northern France, where a bottled water company (Nestle Waters) set up a PES scheme to encourage farmers to shift to practices that would check the increasing nitrate rates in the water. This entailed signing long-term contracts with producers (18-30 years) to reduce fertiliser use, animal waste and manure and adapting improved technologies in order to reduce the risk to the company's production. In countries where PES schemes are not common, initiating pilots can provide an opportunity to understand specific challenges and contextualise PES programmes. One finding of pilot PES programmes initiated by the Peruvian government was that the lack of legislation recognising PES schemes discouraged local governments from allocating funds to such schemes (FAO, 2013a). Consequently, after six years of discussion, a broad legal framework regarding PES was passed in Peru in 2015.[29]

Apart from reducing pressure on biodiversity by reducing land under agriculture and changing input use practices, agri-environmental payments including PES can also be used for conservation of agro-biodiversity. Many countries have ex-situ conservation programmes for crops (mostly through gene banks) such as in Ethiopia, China, India and Nepal (EBI, 2014;

MEP, 2014; MoEFCC, 2014; MFSC, 2014).[30] In-situ conservation of local varieties, including on-farm conservation or protected areas for native plants, is less widespread. On-farm conservation has the added benefit of allowing the plant to continue to evolve through both natural and human selection in the production system at all levels (landscape, ecosystems and inter-species). Moreover, this method allows farmers better control over plant genetic resources than gene banks and provides opportunities for promoting an appreciation for crop/livestock diversity among farmers, preserving traditional knowledge and implementing benefit sharing (Sthapit, Padulosi and Mal, 2009). However, in most cases the yield and income from conserved varieties is lower than from improved varieties. Therefore incentives need to be developed to encourage farmers to cultivate them in identified areas. PES schemes can be used to promote varieties with low market potential and compensate for lower yield. Such schemes would need few partners and would be easy to monitor, as the service provided (crop variety) is not difficult to measure. Moreover, the schemes can be targeted to genetic hotspots and regional agroecosystems (GIZ, 2014; Narloch, Drucker and Pascual, 2011). A PES scheme aiming at conservation of quinoa varieties by smallholding farmers in Peru showed that such support could provide the missing incentive for conserving on-farm biodiversity and can be both pro-poor and low-cost (FAO, 2013a). PES schemes for agro-biodiversity would need to be supplemented by value chain development for traditional varieties.

Information and other voluntary instruments also have a role to play in mainstreaming biodiversity in agriculture. Certification for sustainable agriculture, for example, has grown rapidly, especially for tropical agroforestry crops, accounting for 38% of global coffee production, 22% for cocoa, 15% for palm oil and 12% for tea (Potts et al., 2014). While it still makes up a small proportion of total production for most agricultural produce (SCBD, 2014), environmental labelling and information schemes for food and agricultural products have grown more rapidly than for other product types (OECD, 2016g). There is some evidence that certain agricultural certification schemes can contribute to the protection and enhancement of biodiversity compared with conventional agriculture. For instance, in the case of the Rainforest Alliance (SAN Standards), it was found that certified shade forest coffee in Ethiopia was less likely to be deforested than uncertified shade forest coffee (which are as likely to be deforested as forests without coffee) (Takahashi and Todo, 2013). Similarly in Brazil, certified coffee farms provided greater deforestation control and habitat connectivity (Hardt et al., 2015). In Colombia, certified coffee farms were found to increase tree cover along with increasing habitat connectivity (Rueda, Thomas and Lambin, 2015).

However, challenges regarding the effectiveness of standards and certification schemes remain. Most agricultural standards focus on farm operations, not biodiversity outcomes. Monitoring regarding the impact of certified farms on biodiversity is also rare, and collection of impact data remains a challenge (Potts et al., 2014). As the implementation of standards varies across certified farms, certification does not automatically imply high standards of conservation and sustainable use of biodiversity. For instance, agrochemical management in coffee and cocoa farms certified by the Rainforest Alliance shows high levels of non-conformity with the standard (Milder and Newsom, 2015). Moreover, the global demand for certified products has not kept pace with the production, leading to oversupply; only about one-third to half of the standard compliant production is sold as standard compliant (Potts et al., 2014). One of the reasons for this lack of demand has been low awareness of certification and its implications among consumers.[31] Thus, support for awareness-raising (for producers and consumers) and monitoring and training (for producers and auditors) is required to improve the effectiveness of certification schemes (Global Nature Fund and Bodensee-Stiftung, 2014; Potts et al., 2014; UNEP-WCMC, 2011). Governments also have a role to play through financial assistance for smallholding farmers who may find it difficult to bear

the costs of certification,[32] green procurement programmes, tax incentives for purchasing certified products and mixed regulatory regimes (for instance, making certification mandatory for cultivation in high-value biodiversity areas) (OECD, 2013g).

Many governments are providing technical, financial and capacity-building support to promote organic agriculture.[33] Over half the parties to the Convention on Biological Diversity (CBD) have reported the development of an organic farming sector (SCBD, 2016b). Despite the steady growth in land area under organic farms globally,[34] it remains small in terms of share of total production (SCBD, 2014). Moreover, few parties have assessed the contribution of organic farming to production efficiency so far, especially in terms of land requirement (SCBD, 2016b). In India the government is attempting to foster the development of organic farming through the National Project on Organic Farming under the Ministry of Agriculture. The project aims to enable the spread of organic farming, including through low-cost certification systems, support for research and market development, technical capacity building for stakeholders, awareness building, and publicity.[35] Though it remains a niche market, the area under organic agriculture in India rose from 42 000 ha in 2003-04 to 1 050 000 ha in 2009-10 (MoEFCC, 2014). Similarly, the French government is supporting the growth of organic farming in the country through the Ambition Bio 2017 programme, which aims to double the areas under organic farming by providing financial aid for converting to organic farming, marketing, and research and development (Minagri, 2015, cited in OECD, 2016d). Currently, the demand for organic produce in the country is higher than supply (30% of organic produce consumed in France is imported), representing an opportunity for more producers to shift to organic production.

Green public procurement (GPP) can help promote markets for sustainably produced agricultural products; however, its implementation in the sector remains limited. Governments purchase food and other agricultural products for public distribution systems, schools, hospitals, prisons and the military, among other uses. Many countries have national legal frameworks on GPP in place (such as Brazil, China and Viet Nam, and most OECD countries). Applying GPP criteria especially for commodities which contribute to large-scale deforestation (such as palm oil, coffee and tea) and where certification is reliable and widespread would be one way to contribute to the demand for sustainably produced agricultural goods[36] (Brack, 2015).

Community engagement, training and capacity building for farmers are required to create awareness and enable adoption of improved technologies and practices. This is especially the case for smallholder farmers accounting for a majority of global production (TEEB, 2015). In Ethiopia, large-scale soil and water management through community watershed development has shown positive results and is being scaled up as a priority in the current plan period (GIZ, 2015). An example of a community-government-private sector partnership in Australia is provided in Box 3.6.

Box 3.6. **Landcare: A community approach to sustainable land management**

In Australia, government and communities have worked in partnership under the Landcare approach since 1989 to promote sustainable farming and land management. Community members come together to define and manage local environmental issues specific to their context. A number of activities are undertaken under this approach, including information collection and dissemination, trainings, workshops, demonstrations and trials. The communities and government work together to plan, promote and undertake sustainable land, water and vegetation management practices suitable to regional contexts. Currently 93% of farmers in the country are covered by Landcare.

Box 3.6. **Landcare: A community approach to sustainable land management**
(continued)

The programme receives grants from the Australian government (between 2008 and 2013, 2 billion Australian dollars was invested in the programme). Moreover, farmers receive tax deductions for undertaking Landcare. Landcare Australia Limited* is a non-profit organisation that promotes Landcare and helps raise funds by working with business partners to improve their own economic, environmental and social outcomes. The business sponsors in turn provide funding, research and development, and expertise for Landcare.

* https://landcareaustralia.org.au/.

Source: OECD (2013f), *Policy Instruments to Support Green Growth in Agriculture*, http://dx.doi.org/10.1787/9789264203525-en.

3.2. Mainstreaming biodiversity in forestry

The biodiversity-forestry nexus and its role in economic development

Mainstreaming biodiversity objectives into the sustainable management of forests that are designated for different purposes[37] is critical to reducing global pressures on valuable forest biodiversity exerted by land-use change, over-exploitation and degradation. The need to sustainably manage forests is well recognised and explicitly reflected in SDG 15 and its Target 15.2, to halt deforestation by 2020, and Target 15.b, to mobilise resources for sustainable forest management (UNGA, 2015).

Importance of forests for the environment, economy and livelihoods

Forests, particularly in the tropics, provide habitats to more than 75% of global terrestrial species. They also offer a variety of ecosystem services vital for human well-being and livelihoods, such as soil erosion prevention, pollination, water cycling and resilience to changing environmental conditions (FAO, 2016c). Forests are important carbon sinks that absorb nearly a third of the global annual anthropogenic carbon dioxide emissions and are essential to global climate change mitigation efforts (Bellassen and Luyssaert, 2014).

As a productive sector, forestry[38] can make a considerable contribution to the economy. The formal forestry sector is estimated to contribute more than USD 600 billion or 0.9% of the world's GDP and to provide employment to 13.2 million people (FAO, 2014b). Furthermore, the informal sector that includes forestry-related activities not reflected in the official statistics, e.g. wood fuel and charcoal production, employs an additional 41 million people,[39] and raises the total income generated from the sector to nearly USD 730 billion (1.1% of global GDP). It is notable that in low-income economies, the forestry sector constitutes a significantly higher average of 1.4% of GDP, compared with 0.1% in high-income countries (FAO, 2014b). The contribution of the informal forestry sector to GDP and employment also varies significantly across countries, representing in some of the countries reviewed more than a half of the overall income generated from forest activities (Annex 3.A2).

Forests are also essential for sustaining wider human development and livelihoods, meeting daily food, energy, shelter and health needs of millions of people worldwide. Overall, 1.6 billion people worldwide depend on forest resources to some extent, while

1 billion out of 1.2 billion of the extremely poor rely on forests for most of their livelihoods. This includes, among others, food, shelter, fuel and medicine (Chao, 2012). Based on FAO (2014b) estimates, 2.4 billion people cook with wood fuel, and 1.3 billion people use forest products for shelter. For instance, in Madagascar, the population dependent on wood fuel for cooking is as high as 98.5%, and in Myanmar, it is 88.4%, while in Uganda half of the population relies on forests for shelter (FAO, 2014b).

Changes in forest cover and impacts of planted forests on biodiversity

Despite the benefits provided by forests, global forest cover continues to decline, albeit at a slowing rate (FAO, 2016b). Global net loss in forest cover was 9.9 million ha per year in 1980-90, declining to 7 million ha per year in 1990-2000,[40] to 4 million ha in 2000-10, and finally reaching an annual rate of 3.3 million ha between 2010 and 2015 (FAO, 1995; 2016b).

When it comes to assessing the state of natural habitats, the dynamics in biodiversity-rich natural forest should be explored (FAO, 2016b). Net annual loss in natural forest constituted 10.6 million ha per year between 1990 and 2000, and 6.5 million ha per year between 2010 and 2015 (FAO, 2016a). While the loss of natural forest has slowed down, the decline is projected to continue, driven among others by further expansion of agricultural frontier,[41] particularly in the tropics (FAO, 2016b). Given the important role of natural forests in providing ecosystem services, evidence suggests that a significant economic cost may be incurred in case of policy inaction over the continued forest loss. In an estimation of stock values of different forest ecosystem services, Chiabai et al. (2011) conclude that carbon stocks are on average of the highest value, followed by provisioning services (food, fuel, wood and non-wood products), and passive and recreational use. In terms of the carbon stocks, Mirzabaev et al. (2015) estimate the global cost of the loss of tropical and rainforests in the range of USD 43 billion to USD 63 billion.

At the same time, area under planted forest is set to increase, in an effort to reverse the deforestation trend and meet the increasing demand for forest products and services (FAO, 2016a; 2016b). Planted forest area increased by more than 105 million ha[42] between 1990 and 2015, accounting for around 7% of global forest cover (FAO, 2016a). Forests may be planted for a number of purposes, including wood production,[43] water and soil protection, and carbon sequestration. An example of a large national afforestation programme is Viet Nam's Five Million Hectare Reforestation Programme (5MHRP), which aimed to increase the country's forest cover from 28% to 43% by 2010, by planting new forests and protecting existing ones (Huong, Zeller and Hoanh, 2014). While the programme is considered successful overall in terms of reversing forest loss, concerns have been raised about the impact of the large-scale afforestation on biodiversity (McElwee, 2009) (Box 3.7).

A number of key factors may determine the effectiveness of planted forests to minimise the impact on biodiversity (Bremer and Farley, 2010; Hartley, 2002). These include the integration of mixed and indigenous tree species; afforestation of previously degraded land, as opposed to replacing natural ecosystems; and ability to serve as wildlife corridors. Approaches to managing forests, both natural and planted, in a sustainable manner are discussed below.

Box 3.7. **Viet Nam's efforts to reverse deforestation: Five Million Hectare Reforestation Programme**

Viet Nam's 5MHRP is considered a successful government intervention to address deforestation. The objective of the programme, approved in 1998 and set to run until 2010, was to increase the country's overall forest cover to 43% by planting 5 million ha of new forest and protecting 9.3 million ha of existing forest. Based on the evaluation, during programme implementation the forest cover increased from 32% in 1998 to 39.5% in 2010. The target for total area of planted and regenerated forest was achieved by 93.5%. The programme was successful also in mobilising a budget totalling USD 1.4 billion (31.9 billion dong) from a combination of sources, including central and local government budgets, credit loans, and international donors and investors.

However, criticism of the programme points to the prioritisation of forest plantations over natural regeneration, which may in some cases have resulted in a replacement of native biodiverse, albeit degraded, forests by exotic monoculture plantations. Among other challenges faced by the programme are the limited state funding and the high interest rate on loans for investment in forest restoration. Moreover, land allocation and land-use planning have not met the envisaged requirements.

Sources: Huong, Zeller and Hoanh (2014), "The 'Five Million Hectare Reforestation Program' in Vietnam: An Analysis of its Implementation and Transaction Costs"; MARD (2011), "The 5MHRP Assessment Report"; McElwee, P. (2009), Reforesting "bare hills" in Vietnam: Social and environmental consequences of the 5 million hectare reforestation program".

Mainstreaming biodiversity in forestry in practice

Policy instruments to mainstream biodiversity in the forestry sector include instruments that integrate biodiversity considerations into the management practices of production forests and those that promote forest conservation and restoration. An overview of policy instruments to support biodiversity mainstreaming into the forestry sector is presented in Table 3.2.

Brazil, for example, saw a reduction of more than 70% in the deforestation rate in the Amazon between 2005 and 2013 (Nepstad et al., 2014). Central to the efforts to reduce deforestation have been the measures to address the underlying factors, such as the lack of clear land rights, resulting in rural conflicts and forest clearing as a way to define ownership, and enforceability of legal instruments to protect forests (OECD, 2015b) (Box 3.12). More generally, at the national level, forest policies are increasingly integrating the concept of sustainable forest management (SFM),[44] which promotes a balance between environmental, social and economic values and uses of forest resources (FAO, 2016b). The FAO has developed a number of indicators to measure countries' progress towards SFM, one of which is the creation of an enabling policy and legal framework (FAO, 2016a).[45]

Another indicator under SFM is the adoption of forest management plans (FMP) and related criteria. The vast majority of countries in the last decade have developed FMPs, accounting for a total of 2.1 billion ha of the world's forests, or roughly half of the total forest area. Of the overall area under FMPs, half is dedicated to production, and the other half to conservation (FAO, 2016a). Among the focus countries of this study, FMPs have been adopted by most countries,[46] all of which have included SFM indicators such as soil and water management, community engagement, and delineation of forests with high conservation value. France, for instance, has a long history of managing both public

and private forests through a variety of mandatory and voluntary instruments (Box 3.8). Several FMPs have also incorporated information on the subdivision by conservation and production uses of the forests under management (FAO, 2015) (Figure 3.3).

Table 3.2. **Examples of policy instruments to mainstream biodiversity in forestry**

Regulatory instruments	Economic instruments	Information/Voluntary instruments
Restrictions on use and access (e.g. protected areas, set-aside of native vegetation areas)	Taxes, charges and fees	Eco-labelling and certification (e.g. sustainable forest/timber certification)
Permits and quotas (e.g. concessions for SFM and timber logging)	PES and subsidies for reforestation	Green public procurement for timber
FMPs	Reform of environmentally harmful subsidies (e.g. subsidies for commodities driving forest loss such as timber, agricultural products)	
	Biodiversity offsets	
	Tradable development rights	

Sources: Adapted from OECD (2013g), *Scaling-up Finance Mechanisms for Biodiversity*, http://dx.doi.org/10.1787/9789264193833-en; OECD (2013c), *OECD Environmental Performance Reviews: Mexico 2013*, http://dx.doi.org/10.1787/9789264180109-en.

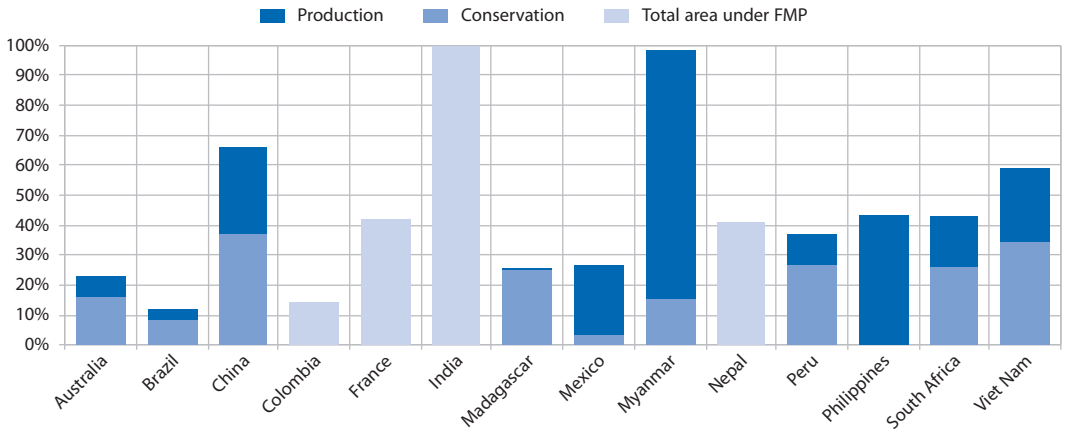
Box 3.8. **Long history of forest management in France**

The history of forest management in France dates back to the creation of the first forestry code in 1669 – *l'aménagement forestier* (forestry management). In 1827, forestry regime (*régime forestier*) was introduced, and it has largely pre-determined the management of public forests up until the present time. All public forests are subject to strict management rules and are governed by FMPs, developed through detailed studies, and approved by the forest owner and the National Forestry Office. FMPs are considered an important instrument to promote sustainable management of public forests and include, among others, considerations related to biodiversity and habitat conservation.

Three-quarters of the forests in France, however, are privately owned. Depending on their size, private forests are governed by either a mandatory or a voluntary arrangement. Owners of private forests that exceed 25 ha have a legal obligation to develop a simplified management plan (*plan simple de gestion*) (PSG). The PSG, which is valid for 10 to 20 years, provides an overview of the current state of the forest; its past management; and environmental, economic and social challenges. The PSG also determines the objectives for future management of the forest, including an annual plan for timber logging. Private owners of forests that are between 10 ha and 25 ha can develop the PSG on a voluntary basis. Small-scale forest owners can also subscribe to a code of good forestry practices, which grants access to government subsidies, or to a forest management standard regulation (*règlement type de gestion*) (RTG). The document formulated under the RTG provides recommendations on the management of the forest concerned, including species composition and solutions to major environmental challenges.

Sources: Deuffic et al. (2015), *Forest Land Ownership Change in France*; ONF (2017), *Gérer les forêts*; Tissot and Kohler (2013), *Integration of Nature Protection in Forest Policy in France*.

Figure 3.3. **Forest area under forest management plans in selected countries**



Note: Data for Ethiopia and Uganda were not available in FAO (2015).

Source: Authors, based on data retrieved from FAO (2015), *Global Forest Resources Assessment 2015*, www.fao.org/3/a-i4808e.pdf.

Protected areas

Protected areas[47] (PAs) are the cornerstone of conservation, including forest biodiversity. Over the past 25 years, there has been a significant expansion of forest protected areas,[48] from 7.7% in 1990 (12% of tropical forests) to 16.3% in 2015 (26.3% of tropical forests) (FAO, 2016a). Regarding the actual effectiveness of PAs as a forest conservation tool, existing empirical evaluations point to their positive, albeit modest, impact on reducing deforestation (Miteva et al., 2012). The successful management of PAs faces several challenges, particularly in countries with significant development pressures and increasing competition for land resources. Critical factors determining the effectiveness of PAs include, among others, effective administration, adequate human capacity and financial resources, and law enforcement (Leverington et al., 2010). In Madagascar, for instance, the World Bank's two-decade-long, three-phase loan programme has yielded a positive impact in terms of slowing deforestation to 0.6% within protected areas, as opposed to 1.6% outside the protected areas. This difference is particularly evident in the highland forests, where forest loss in protected areas is one-third to one-half the rate recorded in unprotected zones (IEG, 2013). Over the past decade, Madagascar has more than tripled its PA network, which now represents around 11.9% of the national territory (Government of Madagascar, 2015).[49] While a big achievement on its own, effectively sustaining the expanded PA network in the future is contingent on the availability of sufficient financial and human resources and capacity (Rakotomanana, Jenkins and Ratsimbazafy, 2013).

The long-term sustainability of PAs is also dependent on the approach used in engaging with local forest users and with indigenous communities. While there is still a significant debate related to the relative effectiveness of different PA types,[50] there has been a gradual realisation that conservation success often depends on connecting the priorities of biodiversity and forest conservation with socio-economic interests of local communities. According to the existing evidence, engaging local and indigenous communities in forest management may be equally effective – or more effective – in reducing deforestation and maintaining forest cover than strict forest conservation (Porter-Bolland et al., 2012; Nelson and Chomitz, 2009).

Aligning PA management with the interests of local communities is especially important in areas which have been traditionally managed by local people. In South America, for example, nearly 30% of national protected areas coincide, to a certain extent, with areas where indigenous people have historically lived (Cisneros and McBreen, 2010). Limiting the access to natural resources and prohibiting human activities may come at the cost of local livelihoods and well-being, and often trigger discontent and conflict, which undermine the effectiveness of PAs (Andrade and Rhodes, 2012). Involving indigenous peoples in managing their ancestral lands and assigning them land rights may result in a more cost-effective and less conflictual implementation of conservation projects (Sobrevila, 2008).

Community forest management

The recognition of the need to better engage communities in PA management has led to formalised participatory approaches to forestry. Community forest management[51] or community-based forestry (CBF) has become a widespread policy tool. Participatory models vary by the degree of empowerment based on the tenure rights involved, ranging from participatory conservation and joint forest management to community forestry with limited or full devolution, and finally to private ownership (Gilmour, 2016).

CBF usually aims to contribute to a variety of policy objectives, including improved forest condition, by way of better forest management and reduced deforestation, and improved local livelihoods of those dependent on forestry. The evidence on the effectiveness of community forestry models in achieving these objectives points to considerable potential to improve the state of forests, and reduce risks of wildfire and illegal logging. A meta-analysis of 40 PAs and 33 community forests across different tropical forests found that overall, community forests presented lower and less variable deforestation rates than PAs

Box 3.9. **Community forestry reform in Nepal**

Nepal's CBF policy reform dates back to 1987, when the First National Community Forestry Workshop was organised. The workshop led to a formulation of the Master Plan for the Forestry Sector 1988, and the initiation of a gradual handover of public forest to community groups. The reform sought to encourage restoration and conservation of degraded forests. The community groups holding ten-year extendable concessions are free to use and sell all forest products for their own benefit. The policy uptake has been impressive, reaching a national scale, with around 23% of forests in Nepal being managed by 18 000 registered Forest User Groups, involving 1.6 million households.

An example of the effectiveness of CBF in Nepal is the Dolakha District where despite a high average annual population growth rate of 2.3% between 1990 and 2010, forests managed by communities were restored at an annual rate of 2%. Moreover, during this twenty-year period, sparse forest was converted into dense forest between 1.1% and 3.4% per year, and non-forest areas saw a conversion into forest at a rate between 1.1% and 2%. CBF was also linked to a decline in slash-and-burn agriculture practices and wildfires. Evidence of considerable improvements in forest condition is available also for other regions of Nepal.

Sources: Gilmour (2016), *Forty Years of Community-Based Forestry: A Review of Its Extent and Effectiveness,* www.fao.org/3/a-i5415e.pdf; Kanel, Poudyal and Baral (2005), "Nepal community forestry 2005"; Niraula et al. (2013), "Measuring impacts of community forestry program through repeat photography and satellite remote sensing in the Dolakha district of Nepal"; Pandey and Paudyall (2015), *Protecting Forests, Improving Livelihoods – Community Forestry in Nepal*, Fern, September.

(Porter-Bolland et al., 2012). The tenure reforms in Viet Nam and China that saw a large-scale transfer of public land from state collectives to households, totalling millions of hectares, have led to significant gains in forest cover and natural capital (Gilmour, 2016). Nepal is another example of a successful handover of state forests to communities, in an effort to improve conservation and restoration of degraded forests (Box 3.9).

Engaging indigenous peoples in consultations regarding government decisions that may have an impact on their communities and the land where they live is equally important. There are several examples of social conflicts sparked by the infringement of indigenous peoples' rights in implementing legal and administrative measures. For instance, Peru, in an effort to adapt the country's legal framework to the requirements of the Peru Trade Promotion Agreement with the United States, issued a number of legislative decrees in 2008 (Greenspan, 2011). These decrees invoked an active protest by indigenous peoples' groups and civil society. It was argued that among other implications, some of the decrees would subject 45 million ha of forest to the risk of conversion for various uses, including agriculture. The conflict that spiralled into a violent clash leading to casualties was eventually resolved by the revocation of the controversial decrees and introduction of prior consultation legislation (EIA, 2012) (Box 3.10.).

Box 3.10. **Indigenous peoples in the management of the Peruvian Amazon**

In 2008, the administration of the President Garcia issued 99 legislative decrees, commonly referred to as the Law of the Jungle, some of which would affect the use of ancestral lands and managing the Peruvian Amazon. This sparked a prolonged indigenous strike. The decrees were signed under the special powers delegated to the government by the congress to implement the 2006 Peru Trade Promotion Act with the United States, and did not involve prior consultations with the indigenous communities. According to legal experts and indigenous organisations, including AIDESEP (Asociación Interétnica de Desarrollo de la Selva Peruana – Interethnic Association for the Development of the Rainforest), at least nine of the decrees were in breach of the government's obligation under the Indigenous and Tribal Peoples Convention (International Labour Organization [ILO] Convention 169) to consult indigenous communities. Moreover, under the Peruvian Constitution, indigenous communities have the right to consultations and participation in decision-making processes affecting their territories.

Some of the decrees were of particular controversy. For instance, DL 1090, the Forestry and Wildlife Law, amended the definition of forest patrimony, reducing the forest area under the Forestry Heritage protection system, effectively releasing 45 million ha or 60% of Peruvian forests for potential forest concessions. DL 1015 and 1073 were criticised for promoting private investment in the indigenous lands, facilitating the fragmentation in the ownership of communally owned territories. The two decrees permitted indigenous communities to decide on the sale of their land with a simple majority vote, instead of the previous two-thirds requirement. Finally, DL 1064 eliminated the prerequisite for extractives companies to seek an agreement from landowners prior to initiating operations on their territory.

While the government made some efforts to amend the decrees, these were deemed insufficient, with the unrest gradually escalating, leading to road and river blockages by indigenous groups across the Amazon and the declaration of a state of emergency. The conflict reached its peak on 5 June 2009 in the province of Bagua, where in a violent confrontation between police and protesters, 33 people were killed. In response to the bloodshed, the Law of the Jungle was repealed, and the legislation to introduce mechanisms for prior consultation with indigenous peoples was adopted.

Box 3.10. **Indigenous peoples in the management of the Peruvian Amazon**
(continued)

An important milestone for engaging indigenous peoples in sustainable forest management in Peru was the adoption of the Forestry and Wildlife Law in 2011. The law was preceded by a consultation process – the Forestry Law Platform – which brought together the representatives of civil society, indigenous organisations, academia, government and professional organisations. However, as it was the first such experience of prior consultation for both the government and stakeholders, several deficiencies in the process remained. For instance, there was no clarity on the criteria used by the government to decide which stakeholder inputs to include in the law.

The new Forestry and Wildlife Law determines key principles for inclusive access to, and a sustainable use of, forest resources by all people. It also adopts an ecosystem-based approach to forest and wildlife management. Importantly, Article 3 makes it mandatory to conduct consultations with indigenous peoples prior to developing new legislation that may affect their territories and rights. In 2015, bylaws referred to as Productive Forests for Life were adopted to guide the enforcement of the Forestry and Wildlife Law. The regulations pay significant attention to forest management by the indigenous peoples, and promote forestry businesses by local and indigenous communities.

In addition, the Peruvian Congress unanimously approved in 2011 the Law on the Right of Consultation of Indigenous Peoples (29785), in recognition of Convention 169 of the ILO on indigenous and tribal peoples. Peru has been signatory to the convention since 1993, but had not implemented it at the national statutory level. The Consultation Law requires the government to consult indigenous peoples to secure their agreement before implementing administrative and legal measures, or development projects that may affect their ancestral territories.

Provided effective enforcement, the Consultation Law could be a useful instrument to reduce social conflicts. The successful implementation is contingent on addressing a number of gaps, as identified in the report by the UN Special Rapporteur on the Rights of Indigenous Peoples. These include, among others, improving government capacity, ensuring that consultations take place before the issuance of mining concessions, and involving indigenous peoples throughout the life cycle of projects.

Sources: EIA (2012), "The laundering machine: How fraud and corruption in Peru's concession system are destroying the future of its forests"; EIA (2009), "Peru's forest sector: Ready for the new international landscape?"; FIDH (2009), *Peru – Bagua: Bloodshed in the Context of Amazon Protest – Urgent Need for Good Faith Dialogue*; Greenspan (2014), "Protestors and UN report test Peru's new indigenous peoples' consultation law"; Rénique (2009), "Law of the Jungle in Peru: Indigenous Amazonian uprising against neoliberalism'; Rodriguez-Ferrand, G. (2011), "Peru: New law granting right of consultation to indigenous peoples"; UNHRC (2014), *Report of the Special Rapporteur on the rights of indigenous peoples, Addendum: The situation of indigenous peoples' rights in Peru with regard to the extractive industries*; WWF (2015), "Peru's Forestry and Wildlife bylaws finally promulgated".

Sustainable management of production forests

The development of forestry as a commercial productive sector is often associated with degradation and depletion of forest resources, and a negative impact on biodiversity (OECD, 2012). However, while 60% of forest degradation can be traced to timber extraction and logging[52] (Hosonuma et al., 2012), production forests need not necessarily compromise biodiversity, provided they strike a balance between environmental and economic objectives (Carnus et al., 2006; Brockerhoff et al., 2008). Although any type of forestry activity is likely to have some impact on forest biodiversity, these may vary significantly depending on forest management approaches adopted (Chaudhary et al., 2016). In a meta-analysis of 287 studies, Chaudhary et al. (2016) explore the impact of different forestry techniques

on local forest biodiversity. The analysis concludes that, based on local species richness loss, the approaches may be ranked from best to worse, as follows: selection and retention systems; reduced impact logging; conventional selective logging; clear-cutting; agroforestry; timber plantations; and fuelwood plantations.

Payment for ecosystem services

PES has become a commonly used instrument to promote conservation and sustainable use, by seeking to overcome market failures associated with public good characteristics of ecosystem services (OECD, 2010). PES schemes provide financial incentives to landowners to protect the provision of ecosystems services on their land.[53] PES programmes may focus on securing the provision of one or a bundle of ecosystem services, depending on their main objective (Wunder, 2006). Global income generated by PES programmes seems to have increased over time, with an average of nearly USD 2 billion reached between 2005 and 2010. China and the United States account for the majority of the overall PES income, followed by Mexico and Costa Rica (FAO, 2014b).

While PES programmes vary in design and financing modalities, government-funded PES schemes prevail. One example is Viet Nam's Payment for Forest Environmental Services (PFES) programme – the first nationwide PES in Asia (Box 3.11). However, public PES programmes may suffer from funding uncertainty, given that financing often comes from tax revenues, e.g. water tax in Mexico or fuel tax in Costa Rica, which are susceptible to macroeconomic volatility (Blackman and Woodward, 2010). In order to improve funding stability, some government-financed PES programmes pool finance from both the government and other sources. For instance, one of the first national PES programmes in the world launched in Costa Rica in the 1990s, funded to a large extent through a fuel tax, but also a combination of water tax, loans from the World Bank and KfW, and contributions from agreements with private companies, e.g. hydroelectric companies Energía Global, Platanar and CNFL (Compañía Nacional de Fuerza y Luz – National Power and Light Company) (OECD, 2013e; Porras et al., 2013; Wunder, Engel and Pagiola, 2008).

Box 3.11. **Viet Nam's Payment for Forest Environmental Services**

As part of efforts to increase forest cover to 43%, a nationwide PFES programme was launched in 2004. PFES seeks to preserve biodiversity by way of improving the quality and quantity of the country's forest resources, and to reduce the financial burden imposed on the government by seeking alternative financing sources for forest protection and management. An elaborate legal framework, comprising 20 instruments including decrees, prime ministerial decisions and circulars, has been established to support and govern the programme implementation. However, while this legal framework is considered one of the PFES's key successes, it is important to ensure that its complexity does not undermine compliance and enforceability.

Among the achievements of PFES is also the level of funding mobilised by the programme predominantly through payments from hydropower companies. In its design, PFES resembles an electricity user fee or tax, since the level of payment is determined and payments are collected by the government, without voluntary participation from sellers and buyers. As of December 2015, 40 provinces had established provincial forest protection and development funds that had cumulatively collected approximately USD 238 million. Up to 90% of this funding will be allocated to the forest owners and non-owners to manage, restore and protect around 5.4 million ha of forest per year (accounting for 38% of the total current national forest area), contributing to the reforestation commitment.

Box 3.11. **Viet Nam's Payment for Forest Environmental Services**
(continued)

The PFES also contributed to creating jobs for more than 348 000 households, and 5 734 household groups and communities. In an effort to improve quality and transparency of data collection and analysis, Viet Nam has developed a database specifically for PFES aimed at strengthening capacity of stakeholders responsible for programme implementation.

However, PFES has also faced a number of challenges, including a varying, but on average low, disbursement rate of 46% across provinces. There seems to be a lack of documented records of land tenure at the provincial level. This undermines the ability of PFES to meet the conditionality criterion of disbursing payments only upon the delivery of services that distinguishes PES schemes from ordinary government expenditure programmes. Without clear information on forest ownership, it is difficult to associate forest condition with a specific landowner and their responsibility to protect it. PFES also lacks guidelines to inform disbursement decision making.

Sources: Pham et al. (2013), "Payments for forest environmental services in Vietnam: From policy to practice", VNFF (2016), Assessment of the PFES Policy for the period of 2011-2015; VNFF (2015), "Lessons and experiences from the implementation of the PFES in Viet Nam".

Another concern often raised in relation to the effectiveness of PES is the extent to which these programmes are or should be compatible with development objectives, e.g. poverty reduction. While the knowledge base is limited, the available evidence from low- and middle-income countries points to little complementarity between conservation and poverty reduction in PES programmes (Samii et al., 2014). There is a policy trap in that poor households are less likely to participate in PES programmes than the better off. Among the possible barriers are high transaction costs (e.g. complexity of application process), lack of access to start-up capital and insecure land tenure with land title being an eligibility requirement. While some conclude that PES programmes should aim to remove these barriers and support the poor in their participation (OECD, 2013b), it has also been argued that seeking to pursue multiple side objectives may undermine the effectiveness of PES to achieve its primary goal of conservation (Wunder, Engel and Pagiola, 2008).

Reducing emissions from deforestation and forest degradation

Although payments for forest carbon remain limited (3% of PES income in 2005-10) (FAO, 2014b), programmes for reducing emissions from deforestation and forest degradation (REDD+) that draw on the conditionality criterion of PES schemes have a significant potential to mobilise results-based finance in developing countries.

While REDD+ is about avoided emissions and enhancement of carbon stocks (i.e. carbon sequestration), which is one of the ecosystem services provided by forests, it may also generate broader co-benefits for biodiversity (Karousakis, 2009), though it can also pose risks – if, for example, mixed forest is converted to fast-growing mono-plantations (which tend to be lower in species diversity).

Biodiversity offsets

Biodiversity offsets[54] are a policy instrument intended to mitigate the impacts of a development activity, based on the assumption that sufficient habitat can be protected, enhanced and established elsewhere and ensure that development activities yield no net loss, and preferably, a net gain of biodiversity (Gibbons and Lindenmayer, 2007).[55] Biodiversity offsets are based on the "polluter pays" approach, in that developers incur an extra cost to mitigate the adverse residual impacts of their activities, and a number of features must be considered in their design and implementation in order for them to be effective (OECD, 2016b).

The Business and Biodiversity Offset Programme has developed a set of criteria and indicators to guide the implementation of biodiversity offsets and evaluate their performance. These principles include adherence to the mitigation hierarchy, i.e. that offsetting is a last resort and should be employed only after appropriate measures have been taken to avoid, minimise and rehabilitate biodiversity on-site. It is also acknowledged that there are limits to what can be offset, referring to cases of irreplaceable or highly vulnerable biodiversity (BBOP, 2012). Clearly defining these limits is thus of fundamental importance for the use of voluntary and mandatory biodiversity offsets (OECD, 2016b). For instance, the South African provinces of KwaZulu-Natal (EKZNW, 2009) and Western Cape (DEADP, 2010) have developed guidelines specifying upper limits for biodiversity offsets.

Key design and implementation features that need to be considered for biodiversity offset programmes to be effective include the need to establish thresholds for which impacts can or cannot be offset; determining ecological equivalence for biodiversity loss and the proposed offsets; and developing robust monitoring, reporting and verification systems to evaluate progress towards offset activities (OECD, 2016b). In 2016, the IUCN developed the first global policy on biodiversity offsets (IUCN, 2016). The policy addresses the design, implementation and governance of biodiversity offsets in the context of the mitigation hierarchy, and also includes consideration of those circumstances where the use of biodiversity offsets might not be appropriate. In collaboration with The Biodiversity Consultancy, IUCN launched a global biodiversity offset policy database in 2017 – the Global Inventory on Biodiversity Offset Policies, containing national environmental laws and legislation with regard to offsets provisions from 198 countries.

Biodiversity offsets can be applied in a variety of sectors, from the extractives industries to agriculture. Examples in the context of forestry are the Environmental Compensation for Land-Use Changes in Forested Areas Programme (CUSTF)[56] in Mexico and the offset scheme under the Forest Code in Brazil (Box 3.12).

Box 3.12. **Biodiversity offset schemes in Mexico and Brazil**

CUSTF in Mexico

Mexico's CUSTF programme came into effect in 2005, following the adoption of the General Law on Sustainable Forestry Development. CUSTF is a compensation programme which obliges developers requesting authorisation of land-use change for an activity causing a negative impact on biodiversity in forested areas to pay an in-lieu fee into the Mexican Forest Fund, managed by the National Forestry Commission (Comisión Nacional Forestal) (CONAFOR). Compensation activities are then conducted through agreements between CONAFOR and the landowners of affected forest areas. This enables CONAFOR to achieve economies of scale by pooling compensation finance and implementing compensation activities throughout the country. These activities seek to restore degraded land and soils, and vegetation of affected forest areas.

Box 3.12. **Biodiversity offset schemes in Mexico and Brazil** *(continued)*

However, one of the challenges faced by CUSTF relates to CONAFOR's primary role of matching supply and demand for compensation projects. Up until 2016, the programme had not managed to achieve its fund disbursement target, due to an insufficient number of applications for compensation projects submitted. Another important limitation is the programme's ability to conduct robust monitoring, reporting and verification of projects and to assess their ability to measure the equivalence of the compensation activities to the land-use change envisaged by an intervention.

Offsets under the Forest Code in Brazil

In 2012, Brazil adopted a new Forest Code that has introduced a number of changes to legal instruments used to protect forested areas. Under the previous 1965 code, landowners were required to preserve a certain proportion, depending on the region, of native vegetation on their land – legal reserve. The new code has preserved the legal reserve requirements, which vary from 20% to 80% depending on biome. Given that compliance has historically been limited, the new Forest Code aims to improve enforceability, by way of using high-resolution satellite imaging and mandatory registration of all rural properties in cadastre, including information on legal reserve. The new Forest Code complements the use of legal reserve with tradable forest quotas – Environmental Reserve Quotas issued for each hectare in excess of legal reserve requirements. Landowners who did not meet legal reserve requirements prior to 2008 can purchase an Environmental Reserve Quota within the same biome to compensate for the deforested area on their land. Forest reserve quotas had already been previously used in Brazil in the past, with trades limited to the same watershed. As a result, Environmental Reserve Quotas have created a larger market for forest reserve surplus (May et al., 2015). However, the new code has also been criticised for reducing the total forest area to be restored by 58%, affecting particularly the Amazon, Atlantic Forest and Cerrado.

Sources: OECD (2016b), *Biodiversity Offsets: Effective Design and Implementation,* https://doi.org/10.1787/9789264222519-en; OECD (2015b), *Environmental Performance Reviews: Brazil 2015*, https://doi.org/10.1787/9789264240094-en; Soares-Filho, B. et al. (2014), "Cracking Brazil's forest code".

Reform of environmentally harmful incentives

Along with the economic instruments that promote forest and biodiversity conservation, there might be forestry-related financial incentives in place that support activities which contribute to forest degradation and fragmentation, and thus undermine the effectiveness of the former. These include subsidies for the commercial forestry sector that reduce the price of forest resources below the social marginal cost, leading to intensive production and consumption patterns that are not sustainable and cause overexploitation.[57] While these subsidies may yield a positive impact for the development of the forestry sector in the short term, they often result in inefficiencies, allowing firms to operate profitably at low productivity levels (McFarland, Whitley and Kissinger, 2015).

One example of a forestry incentive that is harmful for biodiversity conservation is subsidies that support monoculture plantations in order to boost domestic industrial sectors. As in the case of Indonesia, these may include support to timber plantations for pulp and paper production (Box 3.13.), and palm oil plantations (McFarland, Whitley and Kissinger, 2015). Given that monoculture planted forests tend to sustain lower levels of biodiversity, the decisions to subsidise the expansion of these plantations should be carefully weighed against their potential harmful environmental impacts. Reforming and gradually phasing

out subsidies for plantations posing a high risk to natural ecosystems is an important instrument for biodiversity conservation (OECD, 2008a).

Box 3.13. **Direct and indirect subsidies for monoculture plantations in Indonesia**

Indonesia's total exports of timber, pulp, paper and wood products amounted to USD 10 billion in 2012, while the estimates of forestry subsidies point to an annual total value of USD 5.7 billion. Timber is sourced mostly from natural forest, while plantations of softwoods on previously deforested land supply the paper and pulp industries.

According to a recent stocktaking exercise, there are ten government subsidies promoting timber consumption and production, with a clear emphasis on the development of industrial timber plantations. This is in line with the government priority to develop the forestry sector, as outlined in the Road Map for the Revitalization of the Forest Industry adopted in 2007. Forestry is also identified as a key sector in green growth strategy as part of the Masterplan for Acceleration and Expansion of Indonesia's Economic Development, which seeks to expand industrial plantations to alleviate pressures on natural forest.

Over the past years, Indonesia has seen a dramatic rise in pulp, and also palm oil, plantations, which has invoked criticism that the expansion has occurred in standing biodiverse forests and in traditional territories occupied by local communities dependent on forest for their livelihoods.

It is also argued that the expansion in plantations is unlikely to meet the demand for timber, driven by the ambition to significantly increase the size of the paper and pulp industry. In the first phase of the Road Map (2007-14), the Ministry of Forestry expected industrial timber plantations to have produced 46% more than has reportedly been used by the industry.

Besides the formal subsidies, timber companies may benefit from additional indirect support in a form of reduced royalty payments as a result of lower index prices used to calculate the payments dues, and uncollected forestry taxes and fees (USD 240 million in 2009). Illegal logging also contributes to forgone government revenues. Based on estimates for 2014, the industry consumed 30% more wood than had been legally produced, as reported by the Ministry of Forestry. It is estimated that between 2006 and 2011, losses in government revenues from forest mismanagement and illegal logging totalled USD 7 billion.

Sources: Forest Trends (2015), "Indonesia's legal timber supply gap and implications for expansion of milling capacity"; Human Rights Watch (2013), "The dark side of green growth: Human rights impacts of weak governance in Indonesia's forestry sector", McFarland, W., S. Whitley and G. Kissinger (2015), "Subsidies to key commodities driving forest loss: Implications for private climate finance".

Forest management certification and green public procurement

Independent third-party voluntary forest certification schemes also play an important role in promoting sustainable forest management (FAO, 2016a). As a policy instrument, these schemes enable consumers and businesses to make an informed decision regarding the origin of the forest products they purchase. Certification may also incentivise suppliers and producers to source their intermediate products from sustainably managed forests. The demand for certified products is a clear signal to governments, particularly in developing countries, of the benefits in adopting sustainable agricultural and forestry practices and gaining access to international markets for sustainable forest products (Box 3.14).

Box 3.14. **Forest Stewardship Council certification for sustainable use of forest resources**

The Forest Stewardship Council (FSC) has developed a set of core principles applied to forest managers seeking management certification. These often address, for instance, the establishment of legal tenure rights and upholding of indigenous peoples' rights to ownership and use of land. The requirement to develop FMPs tends to lead to improved productivity and variety of forest products. FSC also offers Chain of Custody certification to manufacturers, processors and traders of forest products, verifying FSC-certified material and products along the production chain.

FSC certification has had an important impact on smallholder foresters and farmers. For instance, Patneshwari Agri Cooperative Ltd., run by farmers, obtained the first FSC group certification for small or low-intensity managed forest in India for its roundwood. The certification has supported farmers in achieving sustainable agroforestry practices, in order to restore their degraded farmland, create wildlife corridors and improve soil quality. Another example of FSC's positive impact is improved access to international markets for non-timber forest products in Nepal. This was achieved through an introduction of FSC certification by the Asia Network for Sustainable Agriculture and Bioresources and the creation of a partnership among industry, government, non-governmental organisations and communities – the Private Public Alliance (PPA) on the Certification and Sustainable Marketing of Non-timber Forest Products. The objective of the PPA, funded by the United States Agency for International Development (USAID), was to connect domestic and foreign buyers of non-timber product with Nepali producers. Among the outcomes reported under the PPA are improved income and employment of producers of non-timber forest products in Nepal, particularly in remote rural areas.

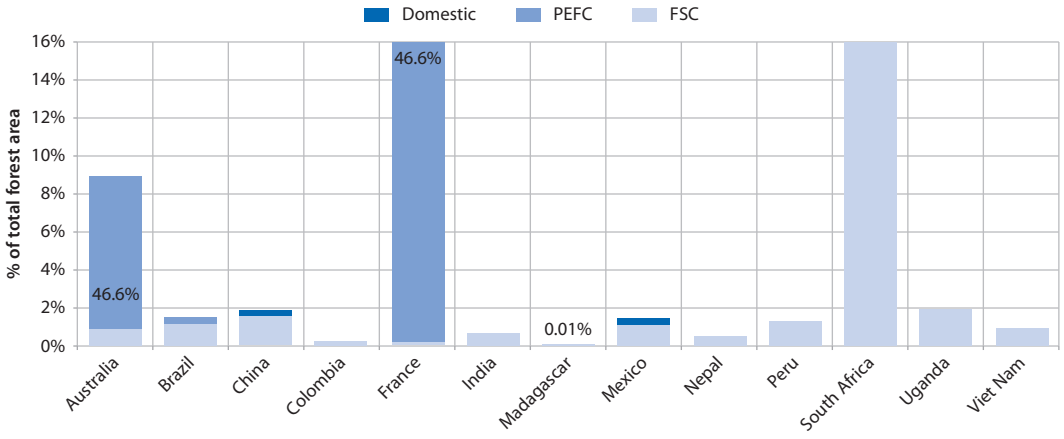
In Peru, in the context of the policy agenda to develop the forestry sector, one of the promising initiatives is the emergence of green public procurement practices in public infrastructure projects at the national and regional levels. As a pilot project, in 2014 the Co-operation Fund for Social Development acquired, on behalf of the Ministry of Education, school furniture made of FSC-certified timber supplied by indigenous communities in Ucayali and forest concessions in Madre de Dios regions. There are plans to expand this initiative to include the Ministries of Production and Housing. Given the growth of the construction sector, green public procurement could create a potentially large domestic market for certified timber and support the expansion of the currently largely underdeveloped commercial forest sector.

Sources: ANSAB (2005), *Nepal NTFP Alliance: Final Report*; FSC (2018), Forest Stewardship Council International, website, https://ic.fsc.org/en; FSC (2013), "Patneshwari Agri Cooperative Ltd. in India", FSC (2011), *Celebrating Success: Stories of FSC Certification;* WWF (2014), "Peruvian government takes first steps towards responsible procurement of wood products".

There are two major international certification schemes, launched in the 1990s – the Programme for the Endorsement of Forest Certification (PEFC) and the FSC. While different in their respective certification processes, the schemes share the objective of promoting sustainable growing and harvesting of timber.[58] By certifying a "chain of custody" in the supply chains, these schemes provide assurance to buyers that the wood is sourced legally from sustainable forests and processed accordingly (PEFC, 2016). The forest area under the two programmes expanded dramatically over the past years, from 14 million ha in 2000 to 438 million ha in 2014 (FAO, 2016b). As of 2013, public forests in 61 countries were certified by FSC and in 30 countries by PEFC, mostly in Europe and North America, and the governments of 20 predominantly developed countries had adopted green public procurement policies for wood and non-wood products from certified sources (FAO, 2014b). Among the

focus countries of this study, 14 countries have acquired FSC or PEFC certification for their forests (Figure 3.4). China and Mexico also have domestic certification schemes in place – the China Forest Certification Scheme and Mexico's National Certification of Sustainable Forest Management and Preventive Technical Audit (FAO, 2016a). However, subnational data on forest certification remain scarce (Kraxner et al., 2017).

Figure 3.4. **Forest area under certification schemes in selected countries**



Note: France has 46.6% of forest area under FSC and PEFC management. For scaling reasons, the graph only partly features this exceptionally high share compared with other countries featured.

Source: Authors, based on data retrieved from FAO (2016b), *Global Forest Resources Assessment 2015: How Are the World's Forests Changing?*, www.fao.org/3/a-i4793e.pdf.

The demand for sustainably harvested timber is also illustrated by the European Union's efforts to eradicate trade in illegal timber on the EU market. These include the EU Timber Regulation,[59] adopted in 2010, which bans the use of illegal timber in EU wood-based industries, and the Forest Law Enforcement, Governance and Trade Action Plan (FLEGT), adopted in 2003, which aims to promote legal timber imports into the European Union. One of the main activities under FLEGT is the issuing of timber licences to timber-exporting countries that have ratified a Voluntary Partnership Agreement (VPA) with the European Union (EU FLEGT, 2016). To obtain a FLEGT licence, countries must introduce measures specified in a VPA, including timber legality assurance systems, and ensure that timber exports comply with their laws and regulations. To date, VPAs are being implemented or negotiated by 15 tropical countries. Viet Nam is currently in the negotiation stage (FLEGT Licensed Timber, 2016).

3.3. Mainstreaming biodiversity in fisheries

The biodiversity-fisheries nexus and its role in economic development

The fisheries sector contributes to development and growth in many countries, playing an important role in food security and nutrition, poverty reduction, employment, and trade (OECD/FAO, 2015). About 2.6 billion people rely on oceans for their protein intake, and the livelihoods of 10-12% of the world's population are assured by the fisheries and aquaculture sector (FAO, 2014c). In 2014, 56.6 million people were engaged in the primary sector of capture fisheries and aquaculture (FAO, 2016a).[60]

Fisheries trade is especially important for developing nations, in some cases accounting for more than half of the total value of traded commodities (FAO, 2014c). In other countries and regions, such as the European Union, the United States and Japan, there is high dependency on fisheries imports to satisfy domestic consumption.[61] In 2014, the combined imports of these countries represented 63% by value and 59% by quantity of world imports of fish and fisheries products. The European Union is by far the largest single market for fish imports, valued at USD 54 billion in 2014 (USD 28 billion if trade within the European Union is excluded), up 6% from 2013 (FAO, 2016).

At the same time, fisheries and aquaculture depend directly on the natural environment for their productive capacity. Despite this, overfishing as well as destructive fishing techniques have contributed to deteriorating a growing number of fish stocks. Based on the FAO's analysis of assessed stocks, the share of fish stocks within biologically sustainable levels has been steadily declining, from 90% in 1974 to about 69% in 2013. Thus, 31% of fish stocks were estimated to be overfished. Of all the stocks assessed in 2013, 58% were fully fished and about 10% underfished (FAO, 2016).

Inefficient and ineffective management that results in excessive capacity[62] and illegal, unreported and unregulated (IUU) fishing are the main causes of overfishing and use of environmentally destructive fishing techniques.

IUU fishing alone is estimated to account for up to 26 million tonnes of fish a year, or more than 15% of the world's total annual capture fisheries output (FAO, 2016). IUU fishing undermines governments' capacity to manage fish stocks sustainably, adding pressure on resources that are not accounted for in management plans, while making use of fishing techniques that are detrimental to resources and ecosystems and targeting species that need to be protected (OECD, 2018). IUU fishing often leads to damaged coral reefs and destructive by-catch of endangered species (Liddick, 2014).

Environmentally destructive fishing techniques include bottom trawling and dredging that have adverse impacts on vulnerable marine ecosystems, and non-selective fishing. The use of poison and explosives (also called blast or dynamite fishing[63]3), and ghost fishing as a result of abandoned, lost or otherwise discarded fishing gear[64] are also harmful. Use of bottom trawling and dredging accounts for about 25% of world fish catch,[65] and catch from trawls is an important element in food security in much of the world. The use of poison to kill or stun fish still occurs in certain regions, in both fresh and marine water, including coastal lagoons and coral reefs (Slowfish, 2018). Cyanide fishing, for example, is used on the already devastated reefs of the Philippines. According to MacFadyen et al. (2009), an estimated 640 000 tons of abandoned nets are spread across the world's oceans, comprising up to a staggering 10% of oceanic litter. In addition, globally at least 8 percent of fish are being thrown back into the sea, and hence not utilised by humans (i.e. by-catch) (FAO, 2016a).

Reducing waste in the fisheries sector is also relevant to improving the efficiency of resource use. The global value of waste attributable to the fisheries sector is estimated to be in the order of USD 100 billion per year, and USD 45 billion if economic waste attributable to overfishing is excluded (OECD, 2015).

The challenges in the fishing sector are therefore many and pressing. Numerous international goals and targets have been established in response, with initiatives under way that aim to address these challenges. A few these are highlighted in Box 3.15.

Box 3.15. **Examples of international goals, targets and initiatives relevant to sustainable oceans and fisheries**

SDG, notably Goal 14 to conserve and sustainably use the ocean, seas and marine resources for sustainable development. Targets include:

- **14.1** By 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution.
- **14.4** By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible …
- **14.6** By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies …
- **14.b** Provide access for small-scale artisanal fishers to marine resources and markets.

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

The **United Nations Convention on the Law of the Sea**, which entered into force in 1994, lays out the legal regime for the world's oceans and seas, and establishes a framework for ocean governance, specifying the rights and responsibilities of maritime countries with respect to their duty to use living resources sustainably while protecting and preserving the marine environment.

FAO Code of Conduct for Responsible Fisheries. Developed in 1995, the Code of Conduct consists of a collection of principles, goals and elements for action. The code is voluntary and includes provisions for reducing the negative impacts of fishing activities on marine ecosystems, and for monitoring and reporting on implementation (via a biennial self-assessment survey). More than 170 members of the FAO adopted the code in 1995.

Mainstreaming biodiversity in fisheries in practice

At a national level, the way governments organise themselves to make decisions and manage fisheries and environment issues can have an impact on how efficiently resources are used, how effectively objectives can be reached and the health of the marine environment. There are a number of governance models in place, with regard to both the environment and the fishery sector, from highly centralised to highly decentralised. An efficient decision-making process involves keeping some responsibilities centralised while devolving others to subsidiary bodies better suited to them. Overall, good institutions tend to reflect three characteristics: good availability of information, transparency in the decision-making process, and accountability in decisions made and on enforcement measures taken (OECD, 2015a).

Inter-ministerial (or multisectoral) commissions can provide the platform to bring relevant stakeholders together, to develop strategies and plans that take into account the various dimensions. A number of countries have some forms of these in place (e.g. the Multisectoral Commission for Management of the Marine Environment in Peru [Box 3.17]). China established a high-level co-ordinating body, the National Ocean Committee, bringing

together leadership from multiple ministries to formulate China's ocean development strategy (OECD, 2015b), and India established the National Fisheries Development Board in August 2014 to enable a more integrated fisheries governance system. The board is intended to promote the fisheries sector and co-ordinate activities related to fisheries undertaken by different ministries or departments in the central government and state or union territory governments (OECD, 2015b).

With regard to information availability, in Australia, a Marine Biodiversity Decline Working Group[66] was established to prepare the report "A National Approach to Address Marine Biodiversity Decline" for the Natural Resources Management Ministerial Council. The 2008 report identified threats and causes of marine biodiversity decline, identified high-level gaps in information, and proposed key policy directions and priority actions for responses to the threats. Australia has also been undertaking comprehensive assessments of the state of Australian fish stocks with reports released in 2012, 2014 and 2016. These types of national assessments are very relevant to biodiversity mainstreaming, and could be undertaken at regular intervals to evaluate progress and identify areas for further improvements. Mexico, for example, has recently undergone a series of sector assessments, including for fisheries, which review the existing public policies in place and identify opportunities for biodiversity mainstreaming. One element of this is the creation and strengthening of information systems needed to monitor and evaluate strategic lines of biodiversity mainstreaming, including baselines and indicators. The need for comprehensive assessments in this regard was only recently mandated in Viet Nam, for example, in its new law on fisheries (effective from 2019).

At the domestic government level, a number of policy instruments are available to mainstream biodiversity in fisheries (Table 3.3.).

Table 3.3. **Examples of policy instruments to mainstream biodiversity in fisheries**

Regulatory instruments	Economic instruments	Information/Voluntary instruments
Restrictions or prohibitions on access and/or use: Total allowable catch (TAC) Bans on fishing of particular species (e.g. Convention on International Trade in Endangered Species of Wild Flora and Fauna [CITES]) Restrictions on gear types (e.g. fish net size, bottom trawling) Mandatory gear selectivity (e.g. turtle excluders) Temporal restrictions Bans or restrictions on harvest of prey species Restrictions on the use of fish aggregating devices Marine protected areas (MPAs) Discard bans	*Price-based instruments* • Taxes • Charges/fees • Subsidies to promote biodiversity (e.g. positive environmental outcomes, green technologies)	Eco-labelling and certification (e.g. Marine Stewardship Council [MSC], other)
Single- and multi-species fish management plans	Fleet reduction schemes (fishery buy-backs)	Green public procurement
Zoning of aquaculture operations Environmental permit requirements for aquaculture operations	PES	Voluntary approaches (e.g. negotiated agreements between businesses and government)
Planning tools and requirements (e.g. EIAs and SEAs)	Reform of potentially environmentally harmful subsidies (e.g. fuel tax concessions)	
Marine spatial planning	Tradable permits (i.e. individual transferable quotas [ITQs])	
	Fines on illegal fishing and environmental damages	

Source: Adapted from OECD (2013g), *Scaling-up Finance Mechanisms for Biodiversity*, http://dx.doi.org/10.1787/9789264193833-en.

An evaluation of countries' implementation towards the FAO Code of Conduct provides a partial overview of the current state of some elements relevant to biodiversity mainstreaming in the fisheries sector, as well as some of the implementation challenges (Box 3.16.). The Environmental Performance Index, developed by Yale University, has also developed fisheries scores, by country, combining information on coastal shelf fishing pressure and fish stock data.[67]

Box 3.16. **Progress in the implementation of the Code of Conduct for Fisheries**

With the exception of two members in Latin America and the Caribbean, all FAO members reported that they had fishery management plans in place in 2014. Moreover, 76% of the members reported that they have started to implement the ecosystem approach to fisheries, the majority of which have established ecological, socio-economic and governance objectives and have identified issues to be addressed by management actions. Sixty percent of members implementing the ecosystem approach have also established monitoring and evaluation mechanisms. Members reported that they have obtained reliable estimates on stock status for a total of 1 828 stocks exploited in their national fisheries, equivalent to 41-50% of the main national stocks.

Sixty-three percent of members reported that by-catch and discards occur in major fisheries, and more than half of the members report that they contribute to unsustainability. Over 50% of members have formal monitoring schemes for by-catch and discards in place and/or have implemented management measures to minimise by-catch and discards, some of which also address the protection of juveniles and/or ghost fishing.

Eighty-seven percent of responding members reported that they faced some constraints in implementing the code. These constraints and their solutions to the implementation remained similar. The top constraints were related to insufficient financial resources (58%), human resources (42%), incomplete policy and/or legal frameworks (35%), inadequate scientific research, statistics and information access (31%), and lack of awareness and information about the code (27%). The top-ranking solutions proposed by members were access to more financial means (56%), more training and awareness (38%), access to more human resources (35%), alignment of policy and legal frameworks with the code (34%), improvement of research, statistics and access to information (28%), and improvement of institutional structures and collaboration (25%).

Source: FAO (2014c), *State of the World Fisheries and Aquaculture*; FAO (2014c), "Progress in the implementation of the code of conduct" COFI/2014/Inf.15/Rev.1 Available at www.fao.org/3/a-mk051e.pdf.

Examples of success include Australia, which ended overfishing in the fisheries managed by the Government of the Commonwealth of Australia in 2014 (though there are only a few), and Mexico, which succeeded in restoring its abalone stock (FAO, 2016). Examples of the fisheries management policy in Peru are highlighted in Box 3.17.

Box 3.17. **Fisheries management in Peru**

The fisheries sector in Peru is one of the mainstays of the national economy. Peru has one of the most productive seas in the world, with the biggest single-species fishery, for the Peruvian anchovy. Anchovies account for 86% of the catch, most of which has traditionally been destined to fishmeal and fish oil. Fish products currently represent about 7% of total exports and constitute the second-largest source of foreign income, after mining. The key pressures on marine ecosystems in Peru include overfishing, by-catch, environmentally harmful fishing methods, pollution, infrastructure development and climate change.

Box 3.17. **Fisheries management in Peru** *(continued)*

The General Law on Fisheries regulates fisheries in Peru. It defines fisheries under the following framework: a) purpose of extraction (i.e. commercial, research, recreational or subsistence); b) scale (i.e. artisanal, small-scale or large-scale); c) geographical area; and d) destination of the end product (i.e. direct or indirect human consumption). The Ministry of Production (PRODUCE) is responsible for all fisheries and aquaculture activities in Peru, and oversees the formulation, approval and supervision of all policies. As part of the law, PRODUCE can create Reglamentos de Ordenamiento Pesquero (ROPs), or Fisheries Management Regulations, which are management instruments that can establish a suite of potential restrictions on a fishery, such as access regimes, fishing seasons, TAC, fishing gear requirements, minimum size requirements and designated fishing areas. According to a 2014 study, however, there are only nine ROPs in place, covering seven species. Of the 72 most important commercial species in Peru, 35% are not subject to any management regulations, 35% are subject to a minimum catch size regulation, 20% are subject to two management measures (minimum size and gear restrictions), and just 10% (7 species) have more than these two management measures in place. A lack of management measures and enforcement commonly precipitates fishing practices that are unsustainable and environmentally damaging (e.g. dynamite fishing is still commonly reported in some regions of Peru).

An individual vessel quota (IVQ) system for the Peruvian anchovy (where transfer of quota is allowed) was introduced by PRODUCE in 2009, and has resulted in a significant reduction of overcapacity and a more than doubling in the length of the fishing season. OECD-ECLAC finds, however, that for most of the remaining fish species, no catch quotas have been set and the protection of marine and inland aquatic species is "clearly inadequate" as there are no lists of threatened species, no conservation plans, no specific measures to minimise illegal fishing, and no control over environmentally harmful fishing methods. Certified aquaculture is beginning to appear in Peru (e.g. via the Aquaculture Stewardship Council) but still constitutes only a very small proportion of total aquaculture production in Peru (Potts et al., 2014).

Moreover, OECD (2017) found that despite better inter-agency co-ordination, fisheries policy is still a sectoral rather than an ecosystem approach, as responsibilities for the ocean are divided among many agencies that have little representation in the only nominal co-ordinating body, the Multisectoral Commission for Management of the Marine Environment.

Sources: OECD-ECLAC (2017), *Environmental Performance Review of Peru*; David and Lucile Packard Foundation (2014), Young and Lankester (2013), *Catch shares in action: Peruvian anchoveta northern-central stock individual vessel quota program*; Potts et al. (2014), *The State of Sustainability Initiatives Review 2014: Standards and the Green Economy*, http://unctad.org/meetings/en/Contribution/ditc-ted-oceans-ssi-blue-economy-2016.pdf.

The TAC can be described as a catch limit set for a particular fishery, generally for a year or a fishing season. If set correctly with accountability measures, TAC can prevent fish stocks from being overfished. However it is generally pointed out that setting a TAC without additional appropriate management measures tends to cause a race to harvest the fish. Individual quotas (IQs) assign the right to harvest a set portion of the TAC to individual fishermen or vessel owners, which removes the need to race to fish. ITQs, a kind of IQ which can be sold to others, are introduced to be expected as a mechanism to allow quotas to pass to more efficient operators and reduce the existing overcapacity of the fleet through consolidation. Examples of ITQs in the countries examined here include for abalone in Tasmania, Australia, as well as finfish species and rock lobster species in Australia; for abalone and a number of finfish species in South Africa; and for anchovy in Peru (see Box 3.17).

Territorial use rights for fisheries are a spatial form of property rights in which individuals or a collective group of fishers are granted exclusive access to harvest resources within a geographically defined area (Christy, 1982), and help to align fishers incentives with sustainability. Examples of their use include fisheries in Brazil, Chile, Mexico and the Philippines (Afflerback et al., 2014).

The coverage of MPAs, which can help protect marine biodiversity, including from overfishing and habitat degradation from harmful fishing practices, also varies significantly among countries reviewed. Coverage ranges from 1% of the exclusive economic zone in India, 2% in Brazil and Mexico, 3% in Indonesia, 11% in South Africa, and 40% in Australia (OECD, 2016). In Madagascar, the government has recently pledged to triple the size of its marine protected areas and set up a legal framework for this. The framework will formalise existing locally managed marine areas, which now cover over 7% of Madagascar's waters. Greater efforts are needed more generally, however, to ensure that MPAs are ecologically representative and that they are effectively managed. An important challenge, especially in lower-income developing countries, is mobilising sufficient finance to effectively design and implement MPAs. Key design and implementation features that need to be considered for effective MPAs, including financing instruments and approaches, are provided in OECD (2017).

Marine spatial plans are instruments that aim to ensure a more co-ordinated and comprehensive approach to using the ocean space, given the multiple stakeholders involved. They have been developed in Australia, China, Colombia and Mexico, and with the EU Directive of Maritime Spatial Planning (France). These are also being developed in South Africa and are under discussion in Brazil, Chile, Madagascar, Thailand and Viet Nam (Ehler, 2015).

Other economic instruments in addition to ITQs (discussed above), such as PES and biodiversity offsets, in the context of the marine environment and for fishery management, are in their infancy worldwide. For a review of marine-related PES-like examples and challenges, see Bladon et al. (2014). In Madagascar, an agreement is in place between local communities and a fishing company, Unima, for the preservation and the restoration of mangroves. This is considered an important and significant programme, albeit an isolated one. Unima, the largest shrimp producer in the country, has developed and implemented a range of better management practices across its trawling and aquaculture operations (Rajaosafara and du Payrat, 2009). Similarly, the Blue Forests programme aims to make tangible contributions to poverty alleviation, climate-change preparedness and biodiversity protection in vulnerable coastal communities by assessing the feasibility of mangrove REDD+ and other PES opportunities for Madagascar's mangroves (Jones, 2013).

Government support to the fisheries sector is also prevalent in numerous countries. The impact of subsidies on fisheries resources depends on how they are designed and how the fishery resource is managed. Support for monitoring and managing fisheries can contribute positively to mainstreaming biodiversity in the fishery sector. Provision of other types of support, including for fuel, can enhance fishing capacity and thus undermine the sustainability of fish stocks. A few of the review countries are currently reporting to the OECD Fisheries Support Estimate database (e.g. Australia, Chinese Taipei, Colombia, France and Indonesia), enabling the tracking of government support to this sector over time. Examples of subsidies in place in France that contribute to the over-exploitation of the sea and fish stock, as well as opportunities for improvement, are highlighted in Box 3.18.

Box 3.18. **Opportunities for further reform in France**

Commercial fishing benefits from a number of subsidies, including exemption from the domestic consumption tax on petrol-based fuels. Moreover, there is no tax mechanism to internalise the environmental costs deriving from impacts on marine biodiversity. Many activities use coastal and marine resources, yet the taxes and charges levied on these activities remain weak compared with the benefits obtained by the economic sectors concerned (fishing, shellfish production, sailing and scuba diving in particular). Prospects for making better use of charges in the public maritime domain nevertheless abound. The potential resources for the state of such changes are estimated at EUR 150 million per year by 2020.

Source: OECD (2016d), *OECD Environmental Performance Review: France 2016*, http://dx.doi.org/10.1787/9789264252714-en.

Information instruments such as certification schemes can help consumers make more informed choices and can therefore also provide incentives for suppliers to source sustainable products and for producers to act more sustainably to maintain access to markets. The two main private fishing eco-labels are the MSC and the Friend of the Sea. For both, the volume has been steadily rising.[68] The percentage of global wild catch that is MSC-certified, for example, has almost doubled from 5% in 2010 to 9.4% in 2015. Today, 281 fisheries in 33 countries are MSC-certified. While this is strongest in developed countries, India and China, for instance, recently achieved their first MSC certifications, following programmes of improvement by the Ashtamudi short-necked clam fishery in Kerala, India, and the Zoneco scallop fishery in Zhangzidao, China (MSC, 2016).

Annex 3.A1

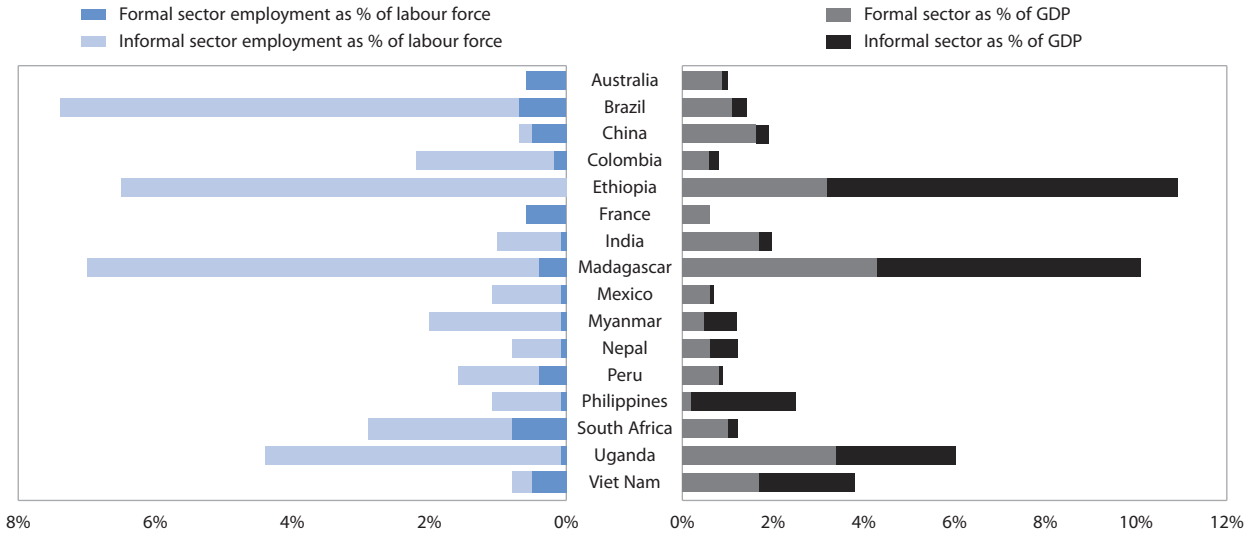
Share of agriculture as % of GDP and in employment in the 16 countries, 2016

Country	Agriculture value added (% of GDP)	Employment in agriculture (% of total employment)
Australia	2.6	3
Brazil	5.5	10
China	8.6	18
Colombia	7.1	16
Ethiopia	37.2	68
France	1.6	3
India	17.4	43
Madagascar	24.7	74
Mexico	3.8	13
Myanmar	25.5	50
Nepal	33.0	72
Peru	7.6	28
Philippines	9.7	26
South Africa	2.4	6
Uganda	25.8	69
Viet Nam	18.1	41

Source: World Bank (2018), *World Development Indicators* (database), http://data.worldbank.org/data-catalog/world-development-indicators (accessed 1 June 2018).

Annex 3.A2

Contribution of the forest sector to employment and GDP in focus countries, 2011



Source: Authors, based on data retrieved from FAO (2014b), *State of the World's Forests: Enhancing the Socioeconomic Benefits from Forests*, www.fao.org/3/a-i3710e.pdf.

Notes

1. In the agricultural sector, for instance, the European Union (EU) Common Agricultural Policy (CAP) at the EU level interacts with national agricultural plans and policies of EU member states. Based on this, priority setting and programming is undertaken by regional administrations in countries such as France.

2. Some countries, including Ethiopia and Peru, are in the process of developing land-use plans. The development of a national land-use policy and a national land-use plan was announced in Ethiopia in June 2016. A technical committee co-ordinated by the Ethiopian Ministry of Agriculture and Natural Resources, consisting of representatives from various ministries and government agencies that have a mandate to use or regulate land and natural resources, is tasked with preparing a draft policy. A high-level ministerial committee comprising eight ministers will oversee the formulation of a policy which balances the priorities of various sectors. Similarly in Peru, an ambitious and comprehensive national land-use planning initiative is under way, based on economic and ecological zoning. The zoning exercise aims at classifying landscapes by the type of climate, soil and biodiversity, at micro (community or forestry concession), meso (district or province) and macro (regional) levels. This, together with a series of specialised studies, will feed into the development of a national land-use plan.

3. This has also been reported in the Fifth National Reports reviewed by SCBD (2016).

4. Annex 3.A.1.

5. Compared with 9% in middle-income and 1% in high-income countries.

6. Around 36% of land area.

7. For example, alpine pastures and low-intensity paddy fields.

8. The report states: "The main impact of the sector on terrestrial biodiversity is through land use, through the conversion of natural lands into agricultural lands. Other impacts of the sector are through encroachment, the introduction of exotic species and the contribution to climate change due to greenhouse gas emissions from livestock. Furthermore, nutrient losses and nitrogen and pesticide emissions cause major stresses to the functioning of ecosystems and biodiversity. The agriculture sector also has major impacts on aquatic biodiversity through nutrient and pesticide leaching, soil erosion and consequent sedimentation and the introduction of exotic species. For example, terrestrial MSA [mean species abundance] loss associated with crops and pastures is directly linked to the agricultural production of food, feed and fibre. However, the contribution made by land use and land-use change related emissions responsible for climate change is also allocated to agriculture. Fragmentation and encroachment are also closely linked to agriculture, though human settlements and infrastructure play a role as well."

9. Other factors include lack of water, climate change-related impacts and narrow genetic background (Fan et al., 2011; Peng, Tang and Zou, 2009).

10. Sustainable intensification is defined as a process or system where agricultural yields are increased without adverse environmental impact and without the conversion of additional non-agricultural land. While the term does not refer to a specific method of production, the objective is to indicate desirable outcomes of increased agricultural production and improved environmental goods and services which could be achieved by a variety of means (Pretty and Bharucha, 2014).

11. Strategy 4.10 of the plan.

12. Other objectives or "vision components" include "self-reliant", "competitive", "inclusive growth", "livelihood" and "food and nutrition security".

13. Indicators for the sustainable agriculture component include maintenance of forest cover (no net change and effective land-use management regulation enforcement), increase in soil organic matter (through promotion of integrated soil and plant nutrient management; improvement in

agricultural practices for cultivation, crop residue use, integrated crop nutrition; no increase in deforestation) and decline in area of degraded land (through rehabilitation/ reforestation; poverty reduction; land conservation and land rehabilitation programmes; reduced wood fuel demand).

14. La loi d'avenir pour l'agriculture, l'alimentation et la forêt, 2014.

15. Similar support for conversion to sustainable agriculture was provided in Australia with the Australia's Farming Future initiative.

16. Loi pour la reconquête de la biodiversité, de la nature et des paysages, 2016.

17. The NRM division concentrates on rehabilitating degraded areas to return them to productive use, and other directorates work in productive landscapes.

18. However, large-scale commercial agriculture, supported under the targets of the current NDP, is increasingly becoming a factor.

19. 2014 figures.

20. For a discussion on the arguments for and against earmarking revenue, see Chapter 3 in OECD (2013e), *Scaling-up Finance Mechanisms for Biodiversity*.

21. Support potentially most harmful for the environment includes market price support, payments based on commodity output (without imposing environmental constraints on farming practices) and payments based on variable input use (without imposing environmental constraints). Support considered potentially the most beneficial are measures that impose environmental constraints and decoupled support payments based on non-commodity criteria (such as support for farming practices beneficial to biodiversity) (OECD, 2013f).

22. The Mexican government carries out annual surveys of expenditure on and distribution of subsidies and taxes. This could be built upon to identify the environmental, economic and social impact of these taxes (OECD, 2013b).

23. Tax reform is also required in France to adjust the planning tax rate to support activities which use less space, including eliminating exemptions for public infrastructure to discourage land take and urban sprawl.

24. That is, market price support, payments based on commodity output without environmental constraints on farming practices, and payments based on variable input use without imposing environmental constraints.

25. The PSE data are obtained at the national level and then aggregated for the OECD as a whole, as depicted below. PSE estimates are calculated for the OECD countries (PSE for the European Union is obtained as whole) and eight non-OECD countries (Brazil, China, Colombia, Indonesia, Kazakhstan, the Russian Federation, South Africa and Ukraine).

26. It should be emphasised, however, that neither the total PSE nor its composition in terms of different categories of policies can be interpreted as indicating the actual impact of policy on production and markets. The actual impacts (ex post) will depend on many factors that determine the aggregate degree of responsiveness of farmers to policy changes, including any constraint of production. For example, while it is true that market price support mechanisms and payments based on output are potentially the most harmful for the environment, whether they actually are harmful depends on a host of other factors, including whether production quotas are attached to them and whether they incorporate strong cross-compliance requirements, or are constrained by agri-environmental regulations independent of the support payments. Similarly, payments based on area, animal numbers, farm receipts or income, and historical entitlements are only potentially neutral in their effects on the environment, but may be harmful – or even beneficial – depending on specific programme designs and other regulation. Moreover, "potentially environmentally harmful" does not necessarily mean "potentially harmful for biodiversity".

27. These criteria are: maintenance of areas of environmental interest on the farms, maintenance of regional ratio of permanent grassland to cropland and crop diversification with three annual crops.

28. Under the rural development programming process, regional authorities decide the operations to be mobilised, geographical zoning and priority issues

29. Ley de Mecanismos de Retribución por Servicios Ecosistémicos (Act on Compensation Mechanisms for Ecosystem Services), approved in July 2016 (http://busquedas.elperuano.com.pe/normaslegales/aprueban-reglamento-de-la-ley-n-30215-ley-de-mecanismos-de-decreto-supremo-n-009-2016-minam-1407244-4/).

30. Fewer countries have such programmes for livestock at present.

31. This has also been identified as a key challenge in generating demand for the Vietnamese government's certification scheme, Viet Nam Good Agricultural Practices.

32. In countries of the European Union where conversion payments to farmers have been made for organic farming, the share of land under organic farming is 10-17% compared with 2% on average in the OECD (OECD, 2015d).

33. Organic agriculture is an approach to food production that seeks to develop environmental and economically sustainable production systems with a strong emphasis on the use of local, renewable resources and minimum use of external inputs (OECD, 2016e).

34. Organic agriculture covers 43.7 million ha of agricultural land and approximately 2.3 million farmers across 172 countries (Willer and Lernoud, 2016).

35. https://ncof.dacnet.nic.in/objectiveandimplementation/ObjectivesandImplementationcomponents.pdf.

36. The EU GPP legislative framework is one of the most elaborate pieces of GPP-related legislation. Currently it provides definitions and verification techniques for organic food under the "food and catering" sector; however, the purchase of organic food by governments is not mandated, unlike for instance timber, energy-efficient vehicles, buildings and information technology.

37. Nearly a third of forests worldwide have production as their primary use, compared with 13% that are managed for conservation (FAO, 2016b).

38. While there is no single commonly agreed definition of the forestry sector, forestry can be "defined to include all economic activities that mostly depend on the production of goods and services from forests. This would include commercial activities that are dependent on the production of wood fibre … It would also include activities such as the commercial production and processing of non-wood forest products and the subsistence use of forest products. It could even include economic activities related to production of forest services (although it would be difficult to determine exactly which activities are really dependent on forest services)" (FAO, 2014d).

39. Some estimates point to the informal sector generating up to 60 million additional jobs (Agrawal et al., 2013).

40. Reliable, comprehensive and comparable data on historical global forest cover change prior to 1980 are scarce and incomplete, being fragmented by regions and countries. According to an FAO special study of tropical forests, conducted in 1990, around 450 million ha of forest were lost in the tropics between 1960 and 1990 (FAO, 1995).

41. Agriculture is associated with nearly 80% of global deforestation (Kissinger et al., 2012).

42. By comparison, net gain in forest area in the forest area was recorded by 88 countries, totalling 113 million ha (FAO, 2016c).

43. Projections indicate that wood removals are likely to triple by 2050 from 2010 levels, when wood removals reached 3.4 billion cubic metres (WWF, 2012). In 2012, 46.3% of industrial roundwood supply came from planted forests (Payn et al., 2015).

44. SFM is defined as "a dynamic and evolving concept, [that] is intended to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations" (UNGA, 2008).

45. SFM indicators as proposed by FAO (2016b) include: policy and legal framework supporting SFM; national platform for stakeholder involvement; forest area under permanent forest land use; national reporting to SFM criteria and indicator process; forest area under an FMP; FMP subdivided by production and conservation; FMP includes soil and water protection; delineation of high-conservation-value forests; and social considerations.

46. FAO (2015) does not include information on the existence of a forest management plan in Ethiopia.

47. As defined by Dudley (2008), a PA is "a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values".

48. A forest PA refers to a PA that includes a substantial amount of forest, covering part or the whole of its territory (Dudley and Phillips, 2006).

49. In an effort to meet its 2003 commitment under the Durban Vision, Madagascar increased the coverage of PAs from 1.7 million ha to nearly 7 million ha by 2015 (Government of Madagascar, 2015).

50. PAs vary by their main purpose, depending on the degree of activities permitted within them, from strict nature reserves to protected areas with sustainable use of natural resources. IUCN distinguishes among six categories of protected areas: Strict Nature Reserve or Wilderness Area, National Park, Natural Monument or Feature, Habitat/Species Management Area, Protected Landscape/Seascape, and Protected Area with Sustainable Use of Natural Resources (Dudley, 2008). In the past, PAs that followed a stringent exclusionary "Yellowstone approach" (IUCN categories I-IV) were a widespread tool. However, recent developments point towards more integrated approaches to PA establishment that include sustainable use considerations (Andrade and Rhodes, 2012).

51. FAO defines community forest management as "processes and mechanisms that enable key direct stakeholders in forestry to be part of decision-making in all aspects of forest management, from managing resources to formulating and implementing institutional frameworks" (FAO, 2017).

52. In Latin America and Asia, this share reaches more than 75%. While agriculture is widely recognised as the most important driver of deforestation worldwide, forest degradation is linked.

53. PES are broadly defined as "a voluntary transaction where a well-defined environmental service or a land use likely to secure that service is being 'bought' by a (minimum one) service buyer from a (minimum one) service provider, if and only if the service provider secures service provision (conditionality)" (Wunder, 2005).

54. The Business and Biodiversity Offsets Programme defines biodiversity offsets as "measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken" (BBOP, 2017).

55. This includes species composition, habitat structure, ecosystem function and cultural value attributed to biodiversity.

56. Programa de Compensación por Cambio de Uso de Suelo en Terrenos Forestales.

57. Such government support may come in a variety of forms through both direct and indirect subsidies. Direct subsidies constitute direct transfer of funds, while indirect subsidies may include tax breaks, access to undervalued public land through forest concessions, and accelerated depreciation for forestry investments (Rautner et al., 2013). Recent estimates of the value of global public support to the commercial forestry sector are scarce. This could be partly due to the lack of a co-ordinated data collection effort, similar to that for agriculture and fossil fuel subsidies within the OECD (McFarland, Whitley and Kissinger, 2015).

58. Apart from certifications for sustainable timber, certification in other sectors can also address deforestation, such as the Roundtable on Sustainable Palm Oil and Rainforest Alliance, which target agricultural drivers of deforestation and forest degradation (Section 3.1).

59. EU Timber Regulation (EUTR, Regulation 995/2010).

60. In 2014, 84% of the global population engaged in the fisheries and aquaculture sector was in Asia, followed by Africa (almost 10%), and Latin America and the Caribbean (4%).

61. The top five importing countries are the United States, Japan, China, Spain and France.

62. I.e. when the capacity of the fleet is higher than that required to harvest the stock at the targeted level.

63. Illegal in a number of countries but still common in e.g. parts of Southeast Asia, particularly Indonesia and the Philippines.

64. Ghost fishing is the result of nets and other fishing materials that are accidentally or intentionally abandoned in the sea.

65. www.seafoodsource.com/features/global-impacts-of-trawling-quantified-in-new-study.

66. The working group consisted of representatives from the Australian, state and Northern Territory governments, including representatives from both the Department of the Environment, Water, Heritage and the Arts, and the Department of Agriculture, Fisheries and Forestry.

67. http://archive.epi.yale.edu/epi/issue-ranking/fisheries.

68. The list of Friend of the Sea-approved fisheries is available at www.friendofthesea.org/fisheries.asp?ID=71.

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Chapter 4

Mainstreaming biodiversity in development co-operation

This chapter examines the key role development co-operation plays in supporting biodiversity conservation and sustainable use, as well as integrating biodiversity and ecosystem services into decision making in partner countries. Besides providing financial resources and expertise to biodiversity projects, development co-operation also supports the creation of enabling policy frameworks for biodiversity mainstreaming at the national and sector level. The chapter also analyses the extent to which biodiversity is being prioritised in development co-operation portfolios and operations.

Development co-operation is a key source of support for addressing environmental challenges in developing countries through financing biodiversity projects. It is equally important as an entry point for reciprocal integration of biodiversity and development, by supporting the creation of enabling frameworks at the national level, and active biodiversity mainstreaming in sectors, by improving policies and institutions and data and information systems, and mobilising finance. Development co-operation providers have acknowledged the importance of better mainstreaming. In 2010, the OECD Development Assistance Committee (DAC) adopted a Policy Statement on Integrating Biodiversity and Associated Ecosystem Services, endorsed by all members[1] of the DAC. The policy statement identifies support to partner countries and implementing the necessary changes in development co-operation agencies as two priorities for better biodiversity mainstreaming. This chapter discusses progress made in these two areas, highlighting lessons learned and challenges remaining.

4.1. The role of development finance in funding for biodiversity in developing countries

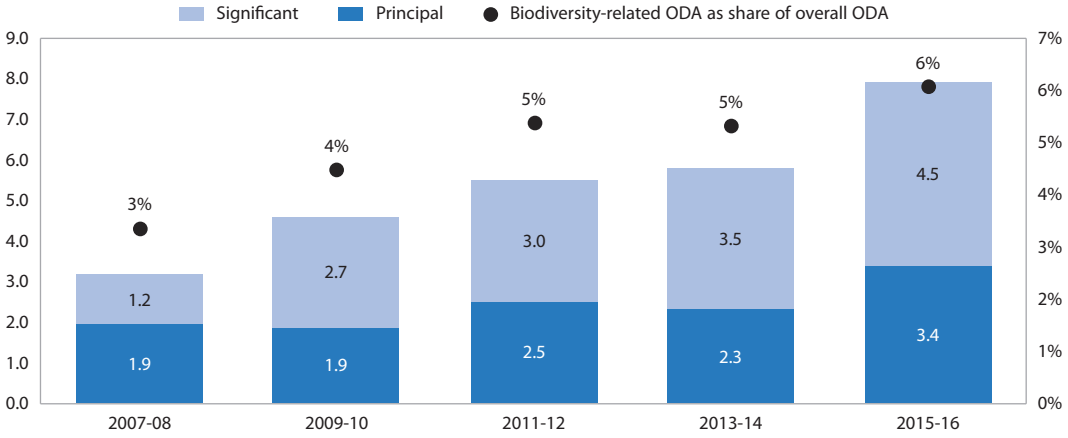
Given a large global funding gap for biodiversity, estimated in the order of hundreds of billions of dollars per year,[2] development finance from bilateral and multilateral providers remains a significant, and sometimes the largest, source of funding for biodiversity programmes in many developing countries (Drutschinin and Ockenden, 2015; OECD, 2013; Waldron et al., 2013). Madagascar, for instance, has traditionally relied to a significant extent on external finance to supplement government spending on environment. Up to 70% of the budget of the Ministry of Environment has historically been supported through foreign assistance[3] (Freudenberger, 2010). The government has also identified securing the support – both financial and technical assistance – from multilateral and bilateral providers as a key factor for the successful implementation of the country's National Biodiversity Strategy and Action Plan (NBSAP) (Government of Madagascar, 2015). Similarly, Ethiopia, as one of the largest recipients of bilateral biodiversity-related official development assistance (ODA) (OECD, 2016a), has stated that further external funding would be required to close the estimated finance gap of 45%[4] and implement the NBSAP over 2015-20 (EBI, 2015).

Globally, bilateral biodiversity-related ODA by members of the OECD DAC to ODA-eligible countries reached USD 7.9 billion (United States dollars) on average per year in 2015-16,[5] with the past decade seeing a steady increase. Of this, USD 3.4 billion was committed to activities which targeted biodiversity as their primary objective, while the remainder represented activities where biodiversity was not the primary objective but was a co-benefit of the project (Figure 4.1). France, Japan, Germany and the United States were the top providers over a three-year period (2014-16); however, when considering the share of portfolios dedicated to biodiversity objectives, France, Norway, Iceland and Belgium dedicated the highest shares to biodiversity-related activities (Figure 4.2). In addition to bilateral sources, multilateral biodiversity-related development finance from select providers that report to the OECD DAC[6] amounted to USD 568 million per year over 2006-14. While the reporting on biodiversity-related multilateral development finance is currently limited, the figures available indicate that this broader finance may be significant.

Much of this support was invested in projects for biodiversity conservation and sustainable use and related to natural resource management. As shown in Figure 4.4, bilateral biodiversity-related ODA is concentrated in five sectors that account for 73% of this finance: environmental protection, water supply and sanitation, agriculture and fisheries, forestry, and multisector projects. In recent years, among the large bilateral biodiversity projects are, for instance, a concessional loan provided by Japan International Cooperation Agency (JICA) to India to address the severe pollution of the River Yamuna and a concessional loan committed by the Agence Française de Développement (AFD) to support Turkey's forestry policy.

Figure 4.1. **Bilateral biodiversity-related ODA, 2007-16**

Two-year averages in USD billion (constant 2015 prices) and shares of total bilateral ODA

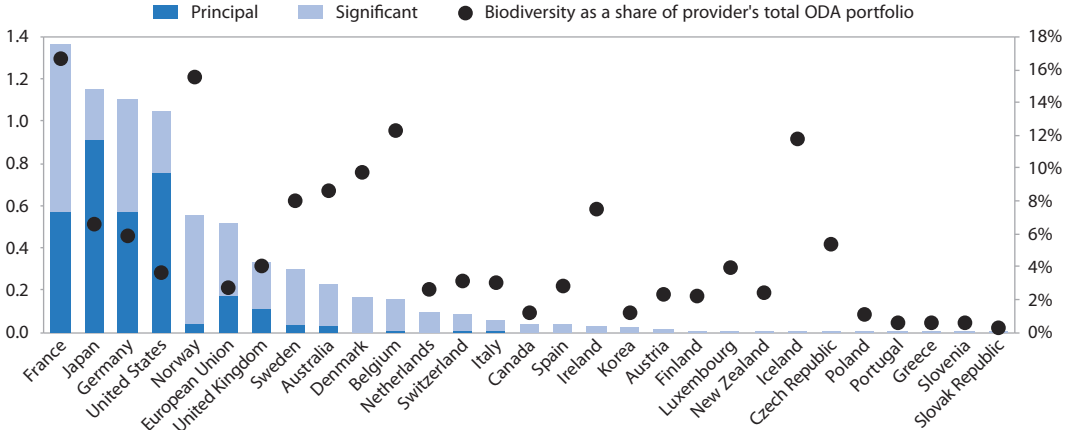


Note: The data in this figure represent commitments.

Source: Authors, based on data retrieved from OECD (2018c), *DAC Creditor Reporting System* (database), stats.oecd.org (accessed 12 February 2018).

Figure 4.2. **Providers of bilateral biodiversity-related ODA**

USD billion (constant 2015 prices) and shares of total bilateral ODA, three-year average, 2014-16



Note: The data in this figure represent commitments.

Source: Authors, based on the data retrieved from OECD (2018c), *DAC Creditor Reporting System* (database), stats.oecd.org (accessed 12 February 2018). The figures in this graph represent commitments.

4.2. Development co-operation support for mainstreaming in developing countries

Besides directly financing biodiversity projects in developing countries, development co-operation supports mainstreaming in partner countries by strengthening frameworks for mainstreaming at the national level as well as directly supporting the mainstreaming of biodiversity into specific sector policies, plans and projects. Both of these include efforts to a) improve policies and institutions; b) improve data and information systems; and c) mobilise financing for biodiversity conservation and sustainable use.

Improving institutions and policy frameworks for biodiversity mainstreaming

Development co-operation agencies support developing countries to create and strengthen their institutions and capacity for the achievement of national and subnational biodiversity priorities. Belgian Development Co-operation, for instance, has developed a programme – Capacities for Biodiversity and Sustainable Development (CEBioS) which focuses on building partner country capacity specifically in biodiversity conservation and sustainable use (RBINS, 2013). GIZ's The ProAmbiente programme set up by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in Peru has supported the government's efforts to create a legal and institutional landscape for mainstreaming since the establishment of the Ministry of Environment in 2008 (GIZ, 2017). ProAmbiente has assisted the ministry in developing central environmental policies, such as the National Environmental Action Plan 2010-2021, which placed biodiversity among the seven key environmental priority areas for the forthcoming decade (MINAM, 2010).

There are also development co-operation programmes that actively support partner countries in mainstreaming biodiversity in different sectors. For example, in Ethiopia, a programme supported by the Global Environment Facility (GEF) has been developing a policy and institutional framework to integrate agro-biodiversity in the agriculture sector and improve market access for biodiversity-friendly agricultural products (UNDP, 2013). Another example is an Asian Development Bank project that has supported the Ministry of Natural Resources and Environment of Viet Nam to strengthen biodiversity considerations within the national safeguards system, and the environmental impact assessment (EIA) regulations in particular. The technical assistance programme developed biodiversity impact assessment guidelines to enable EIA practitioners to specifically take into account biodiversity impacts and mitigation measures when evaluating infrastructure projects (ADB, 2015).

Development co-operation also contributes to promoting policy coherence between biodiversity, and national and sector development plans and strategies. A number of providers – Denmark, France, Germany, Norway, Sweden, the United Kingdom and the United States – have expressed their commitment to supporting Ethiopia in implementing its Climate Resilient Green Economy (CRGE) strategy (US Department of State, 2015). The CRGE is a cross-sector plan that envisages Ethiopia achieving middle-income economy status by 2025 through a climate-resilient low-emission development path, by prioritising the sustainable development of the forestry, agriculture, energy, and transport and infrastructure sectors (FDRE, 2011). Another example of the effort to reconcile economic development with biodiversity conservation is the Conservation, Impact Mitigation and Biodiversity Offsets in Africa (COMBO) project, funded by the AFD, the French Global Environment Facility and the Mava Foundation. Piloted in Madagascar in 2016, COMBO aims to build countries' capacity to improve the application of the mitigation hierarchy and reduce the impacts of development projects on biodiversity (COMBO, 2017).

Strengthening data and information, and monitoring and evaluation systems

Providing access to international expertise and technology for developing data collection and management systems is important for creating a robust evidence base on biodiversity and informing policy making. A number of initiatives that have become important enablers of mainstreaming have been implemented through continued development co-operation support. These include the World Bank's Wealth Accounting and the Valuation of Ecosystem Services (WAVES) programme, which supports partner countries in developing natural capital accounts (Section 2.5), and the United Nations Development Programme

(UNDP) Biodiversity Finance Initiative (BIOFIN), which assists countries with conducting biodiversity expenditure reviews and finance needs assessments (Section 2.6).

Among the bilateral efforts is, for instance, the National Biodiversity Database System (NBDS) in Viet Nam jointly developed by JICA and by the Biodiversity Conservation Agency, the Vietnam Environment Administration and the Ministry of Natural Resources and Environment. The NBDS is designed in accordance with the international standards to store nationwide biodiversity data, and aims to facilitate effective biodiversity monitoring and management, and inform decision and policy makers, researchers, and the public (JICA, 2015a). JICA has also signed an agreement with the Japan Aerospace Exploration Agency (JAXA) to provide partner countries that face a deforestation challenge with advanced technology to monitor changes in forest cover. As part of this partnership, an Initiative for Improvement of Forest Governance was launched to create a tropical forest monitoring system that tracks deforestation and forest loss with the Advanced Land Observing Satellite-2 (ALOS-2). The ALOS-2 satellite has a system aboard which allows the monitoring of illegal logging and other changes in tropical forests even through the cloud cover that often impedes surveillance in the tropical areas (JICA, 2015b).

Partner countries also often require support to develop monitoring and evaluation (M&E) methodology to assess biodiversity mainstreaming itself, and identify the lessons learned to guide the process in the future. The joint International Institute for Environment and Development (IIED) and United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) two-phase project, funded by the Darwin Initiative and the German Ministry of Economic Co-operation and Development (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung) (BMZ), focuses on supporting eight sub-Saharan African countries in their reciprocal biodiversity mainstreaming (IIED, 2018). As one of its elements, the project looks at developing the mechanisms for M&E of mainstreaming (IIED and UNEP-WCMC, 2015).

Mobilising private and public finance to bridge biodiversity funding gap

Besides directly financing biodiversity projects, development finance can also be used strategically to mobilise additional finance from the private sector, by providing de-risking instruments for private investors through "blended finance" mechanisms (OECD, 2018a; UNDP, 2016). Currently, there is a lack of data on the scale of finance mobilised for biodiversity from the private sector. However, efforts are under way to improve tracking of mobilised resources for sustainable development, including effective management of natural capital (Box 4.1). Between 2012 and 2015, USD 81.1 billion in private finance was mobilised by official development finance interventions[7] from the private sector, and 26% or USD 21.3 billion was climate-related, with the majority targeting climate change mitigation (Benn, Sangaré and Hos, 2017).

A number of bilateral development co-operation institutions target the mobilisation of private capital for development goals and these are increasingly active in the environment sphere, including biodiversity. One example of a donor-supported initiative to mobilise private investment for biodiversity is the Moringa Fund, managed by ONF International (ONFI)[8] with support, among others, from the French Promotion and Participation Company for Economic Co-operation (Proparco), the Netherlands Development Finance Company (FMO) and the Finnish Fund for Industrial Cooperation (Finnfund). The USD 84 million fund targets profitable large-scale agroforestry projects in Latin America and sub-Saharan Africa that are able to demonstrate significant environmental and social benefits.[9] The International Finance Corporation's (IFC) forest bond is another example

where investors can be repaid through carbon credits linked to a REDD+ project, and which has raised USD 152 million in support of halting deforestation (Box 4.4).

Despite these cases, in general, efforts to mobilise the private sector have somewhat bypassed biodiversity-related projects. For example, an analysis of blended finance funds and facilities and the extent to which they target different Sustainable Development Goals (SDGs) found that Goals 14 (Life on Land) and 15 (Life below Water) were among the least targeted (OECD, 2018a). This is due to development partners and governments facing a number of challenges, primarily related to the lack of bankable biodiversity projects in the pipeline that can deliver both environmental outcomes and commercial returns (Crishna Morgado and Lasfargues, 2017). Private investment may be further hindered by an unclear business case for investing in and protecting natural capital. There is thus a need for development co-operation to continue to support partner countries in creating an enabling environment and value chains to attract private investment for biodiversity.

Development co-operation providers also contribute to strengthening individual and organisational capacity, and enabling conditions to build a stronger business case for biodiversity prioritisation within domestic budgets (Drutschinin and Ockenden, 2015). One example is the Policy Guidelines for Public Investment in Biodiversity and Ecosystem Services, developed by the Peruvian Ministry of Environment and the Ministry of Economy and Finance, with the support from UNDP BIOFIN and German development co-operation through GIZ (MINAM, 2015). The guidelines aim to facilitate public investment in biodiversity conservation and sustainable use by formulating biodiversity-specific requirements that need to be taken into account by public agencies when applying for funding[10] (BIOFIN, 2015).

Box 4.1. **Total official support for sustainable development: An emerging measure to track broader financial resources for sustainable development**

In addition to tracking biodiversity-related development finance, there is a need in light of the focus of the Addis Ababa Action Agenda on mobilisation to capture resources mobilised from other sources that also contribute to sustainable development outcomes. This includes private-sector investment through blended finance or various other pooling and risk mitigation mechanisms.

To this end, as part of wider DAC modernisation, work is currently under way in consultation with the international community to develop a new international statistical measure of the total official support for sustainable development (TOSSD). TOSSD aims to track all official financing regardless of the instrument or level of concessionality. It seeks to complement the ODA measure by improving transparency, and supporting innovative incentives for using public finance to mobilise additional resources, targeting the SDGs under the 2030 Agenda for Sustainable Development, including the SDG targets related to biodiversity.

Source: OECD (2016c), "TOSSD compendium for public consultation", www.oecd.org/dac/financing-sustainable-development/TOSSD%20Compendium2016.pdf.

Development partners can also assist with the implementation of the economic instruments under environmental fiscal reforms, such as taxes and charges on natural resources (Drutschinin and Ockenden, 2015; OECD, 2012). For example, in Viet Nam, GIZ's Macroeconomic Reforms/Green Growth Programme has supported the Ministry of Finance

in implementing fiscal reforms through expert knowledge transfer, including on the design of the environmental tax law in accordance with international standards (OECD, 2018b). In 2010, Viet Nam passed a law on an environmental protection tax, which came into effect in 2012. The government now levies a tax on environmentally harmful substances, such as fossil fuels (coal and gasoline), selected pesticides, herbicides, hydrochlorofluorocarbons (HCFCs) and plastic bags (OECD, 2018b; Johannes and Olearius, 2011).

Despite progress, limited financial and human resources in partner countries hinder the effectiveness of biodiversity support

While significant progress has been made in providing support to partner countries to protect and mainstream biodiversity, several issues remain. A limited focus on biodiversity in relation to other development priorities in the policy agendas of partner countries can be a significant undermining factor for the success of biodiversity projects. The inadequate domestic resource allocation to biodiversity may prevent the existing development activities from being continued or scaled up, beyond the lifetime and scope of externally funded interventions (European Commission, 2015).

Persisting limitations in individual and organisational technical capacity also have the potential to hinder the continuity of positive change initiated by development co-operation programmes. For instance, a thematic evaluation of European Union (EU) environment and climate change programmes concludes that the success of interventions to build local capacity and improve the availability and access to biodiversity data might be undermined by constraints on maintaining and further developing the databases in the future (European Commission, 2015).

Furthermore, complex implementation arrangements and activity cycles of development co-operation when coupled with capacity limitations in partner country governments may also raise the transaction costs and increase the difficulty in accessing biodiversity finance already available (ADB, 2007; UNDP, 2010). For instance, there has been a reduction in environment-related ODA to Uganda, given the government's lack of time and technical skills to meet funding requirements and development proposals (Thomas, 2014). This suggests a need to streamline and simplify administrative procedures in place to better manage development finance allocation (Drutschinin et al., 2015).

4.3. Mainstreaming biodiversity within development co-operation

Providing sufficient support to partner countries in their biodiversity mainstreaming efforts requires that biodiversity is adequately prioritised within development co-operation own policies and operations. There is an indication that the development community is increasingly recognising the co-benefits of biodiversity for a broader development agenda (Drutschinin et al., 2015). A comprehensive analysis of biodiversity mainstreaming in the international development agenda concludes that 12 DAC members[11] give significant attention to biodiversity in their programming, although climate change remains a more prominent focus (Roe, 2010).

Biodiversity in development co-operation policies and strategies

A number of development partners either have introduced dedicated biodiversity policies and strategies, or have included biodiversity-related considerations within broader development co-operation strategies, to guide the integration of biodiversity objectives

within their environmental programming and broader development activities (Table 4.1). For instance, the United States Agency for International Development (USAID) has formulated a comprehensive package for mainstreaming biodiversity throughout its development projects. This includes *USAID Biodiversity Policy* (USAID, 2014), complemented by a comprehensive *Biodiversity and Development Handbook*, which is considered a foundational component of policy implementation (USAID, 2015a). The handbook provides practitioners with a step-by-step guide on integrating biodiversity projects in different sectors, outlining the main programming and policy linkages. Further, USAID has developed the Biodiversity and Development Research Agenda, with an aim to build the evidence base for synergies between biodiversity conservation and development objectives, e.g. economic growth, food security, health, governance and gender equality (USAID, 2015b).

Table 4.1. **Examples of biodiversity-specific policies and strategies by DAC members**

Provider	Strategy
Belgium	"Building capacities for biodiversity for sustainable development and poverty reduction: Strategy 2014-2023", as its title suggests, focuses on developing capacities for managing biodiversity and ecosystem services that it considers a means to achieving the goal of sustainable development.
European Union	The EU Biodiversity for Life flagship initiative (B4Life) is considered a flagship initiative as it marks a new direction in EU development co-operation that focuses on strengthening the linkages between biodiversity conservation and poverty eradication.
France	"Nature and development: Convergent objectives – Action plan 2013-2016" places mainstreaming ecosystem conservation in all sector development policies in partner countries among its top three priorities. The plan also restates a commitment to ensuring no net biodiversity loss in critical habitats from any AFD projects. AFD's commitment to biodiversity is also illustrated by *Biodiversity: Cross-Sectoral Intervention Framework 2013-2016*.
Germany	The German Development Co-operation has had a biodiversity strategy in place since 2008 which includes guidance on cross-sectoral mainstreaming of biodiversity. Over the past years, progress updates and further guides, such as *Committed to Biodiversity* and *Biodiversity in German Development Cooperation*, have been developed to present the lessons learned from supporting partner countries in biodiversity conservation and mainstreaming.
United States	The *USAID Biodiversity Policy*, which has been developed through a highly consultative process with government entities, civil society, academia and the private sector, aims to enhance the USAID understanding of the importance of biodiversity for development. It reiterates USAID commitment to conservation, and introduces the new focus on mainstreaming biodiversity within sector programming. The policy is complemented by the *Biodiversity and Development Handbook* to facilitate its implementation.

Sources: AFD (2013); AFD (2014a); BMU and BMZ (2014); BMZ (2010); BMZ (2008); EU (2014); RBINS (2013); USAID (2015a); USAID (2013),

Some development co-operation providers choose to prioritise biodiversity as a pillar within a holistic environmental thematic area, as the development of stand-alone biodiversity strategies is not a guarantee for increased mainstreaming and may, on the contrary, sometimes be viewed as contributing to silo thinking. For instance, sustainable management of biodiversity is one of the four priorities in the environmental action plan of the Norwegian Agency for Development Cooperation (Norad) (Norad, 2006). Similarly, in its *Policy Framework for Swedish Development Co-operation and Humanitarian Assistance*, the Swedish government has identified sustainable management of ecosystems as its priority under the thematic direction "environmentally and climate-related sustainable development and sustainable use of natural resources" (Government of Sweden, 2016). Furthermore, the Swedish International Development Co-operation Agency (Sida) adopted

in 2017 an environmental policy where the sustainable use of natural resources, including biodiversity and ecosystems for "increased resilience, poverty alleviation and development", has a central consideration (Sida, 2017).

Equally important is to integrate biodiversity considerations within development co-operation sector strategies, beyond the thematic axis of environment, to ensure that development activities in different sectors fully harness synergies with biodiversity. AFD, for instance, made efforts to integrate environmental priorities into agriculture-related development activities through its work on agroecology over the last 15 years (Levard et al., 2014). In its action plan for the agriculture sector, AFD emphasises the importance of linking the sustainable development of the sector with the provision of global public goods, such as biodiversity, climate, water and health (AFD, 2015).

Although the majority of development partners tend to recognise the importance of biodiversity and have integrated relevant considerations within their programming, in one form or another, some policies and strategies guiding their development activities at present are substantially out of date. As the evidence base of the co-benefits between biodiversity and development, and the understanding of how to best capture them, continues to improve, development co-operation policies and strategies need to reflect this change to remain aligned with the evolving thinking.

Furthermore, the lessons on mainstreaming learned from DAC peer reviews point to a weak link between the strategic policy and implementation level, and insufficient organisational change to effectuate mainstreaming in practice (OECD, 2014a).

Safeguard systems for zero net biodiversity loss

An effective mainstreaming process requires a thorough assessment and mitigation of risks to ensure that at a minimum, development activities do not exacerbate biodiversity threats. The majority of bilateral and multilateral providers have environmental safeguard systems in place which in one way or another aim to screen development activities for their impacts on biodiversity and the environment in general (DFAT, 2014). Such safeguard systems usually comprise various stages: initial screening, environmental assessment, risk mitigation and eventually, monitoring the adequacy of the measures during the project implementation.

During the initial activity screening phase, agencies map all potential linkages of a project to biodiversity. For instance, AFD has developed a Sustainable Development Opinion mechanism that pursues cross-sectoral integration of sustainable development concerns, including biodiversity conservation, in all its operations. The system incorporates an activity-rating grid, coupled with a second opinion formulated independently from the AFD Operations Division (AFD, 2014b) (Box 4.2).

Should the screening find a significant negative impact of an activity on biodiversity, assessments, e.g. the strategic environmental assessment (SEA) and Environmental Impact Assessment (EIA) are conducted. DAC members with environmental assessment instruments in place include Australia, the European Commission, Germany, Japan, Sweden, and the United States (European Commission, 2016; GIZ, 2015; JICA, 2010; Sida, 2004; USAID, 2013). Most multilateral development banks (MDB) have also introduced environmental safeguard policies featuring biodiversity-specific requirements (Table 4.2).

Further, options are considered to avoid or mitigate the harm (Drutschinin et al., 2015). In Australia, for example, environmental assessments are accompanied by an environmental management plan (EMP) developed for all aid activities classified as medium or high risk

(DFAT, 2014). Besides managing environmental risks, an EMP is required to provide for monitoring and reporting on these risks throughout project implementation, and adjusting the measures to new risks. Where significant impacts cannot be avoided or mitigated, an activity is referred to the Australian Minister for the Environment (DFAT, 2016).

Table 4.2. **Biodiversity and environmental safeguards in multilateral development banks**

Multilateral development bank	Environmental safeguard policy	Biodiversity-specific component
Asian Development Bank	Safeguard Policy Statement (2009)	Safeguard requirement 1: Environment Requirement 1.8: Biodiversity conservation and sustainable natural resource management
African Development Bank	Integrated Safeguards System (2013)	Operational safeguard 3: Biodiversity, renewable resources and ecosystem services
European Bank for Reconstruction and Development	Environmental and Social Policy (2014)	Performance requirement 6: Biodiversity conservation and sustainable
European Investment Bank	Statement of Environmental and Social Principles and Standards (2009) Environmental and Social Handbook (2013)	Environmental and social standard 3: Biodiversity and ecosystems
Inter-American Development Bank	Environment and Safeguards Compliance Policy (2006) Implementation Guidelines for the Environment and Safeguards Compliance Policy (2007)	
IFC	Performance Standards on Environmental and Social Sustainability (2012)	Performance standard 6: Biodiversity conservation and sustainable management of living natural resources
World Bank	Environmental and Social Framework (2016)	Environmental and social standard 6: Biodiversity conservation and sustainable management of living natural resources

However, the mere existence of safeguard systems does not guarantee that screening for negative environmental impacts is performed effectively and in a timely manner prior to the clearance stage (Laurans and Haddad, 2015). For the co-benefits to be realised and potential negative impacts to be mitigated, it is important that biodiversity-specific considerations and objectives are formulated and explicitly integrated at the design stage of programmes and projects, alongside other development objectives (SDC, 2009). The successful implementation of biodiversity strategies and application of screening methodologies to individual programmes and projects is also contingent on the staff capacity.

Reciprocal risk assessment and management systems

To bridge the gap between policy and implementation, besides traditional safeguard systems, there is a need for holistic reciprocal risk assessment approaches which would not only explore the biodiversity threats from development activities but take into account also the risks that the loss of biodiversity creates for the sustainability of development projects. The Swiss Agency for Development and Cooperation (SDC), for instance, has developed the Climate, Environment and Disaster Risk Reduction Integration Guidance (CEDRIG), which supports its staff and project partners in assessing whether an existing or planned development activity – strategy, programme and project – is at risk from environmental degradation and climate variability, and whether the activity itself poses a risk to environment (SDC, 2012). Besides initial screening CEDRIG incorporates risk and impact assessment stages, representing a comprehensive environmental assessment tool (Box 4.2).

Box 4.2. **Risk assessment approaches to support biodiversity mainstreaming**

AFD "sustainable development opinion" mechanism

The sustainable development opinion mechanism is a system by which the AFD explores the relevance of its operations for addressing cross-cutting challenges of sustainable development. Biodiversity conservation and natural resource management is one of the six dimensions of sustainability (Dimension 4), as defined by AFD, with the other five including economic development; social well-being and reduction in social imbalances; gender equality; climate change; and project sustainability (e.g. additionality, governance and capacity, contribution to country priorities).

The approach adopted for Dimension 4 on biodiversity conservation is consistent with the AFD 2013-2016 Biodiversity Strategy and the OECD DAC Rio marker methodology for tracking development finance in support of the Rio Conventions. The mechanism includes three steps:

a. The project's impacts (both positive and negative) on each of the six sustainable development dimensions are analysed and described in the main project description document.

b. The project team provides a rating for the project based on these impacts.

c. An independent second opinion is formulated by a unit separate from AFD's Operations Division, and submitted to the agency's Credit Committee.

An important characteristic of the sustainable development opinion mechanism is that the rating grid which assesses projects against the sustainable development dimensions allows the identification of both positive and negative impacts of a project. For example, project ratings for linkages to biodiversity conservation are as follows:

- highest positive score (3): project's principal objective is biodiversity conservation
- positive score (2): one of the project's main objectives is to manage biodiversity sustainably
- positive score (1): The project's objective is to reduce negative impacts of development on biodiversity and natural resources
- score 0: no discernible impact
- negative score (-1 or -2): project poses a risk to biodiversity (i.e. net loss of biodiversity) or to ecosystems as a whole.

SDC's Climate, Environment and Disaster Risk Reduction Integration Guidance (CEDRIG)

CEDRIG is a rigorous tool developed by SDC for its staff and partners to assess a project from both a risk perspective (environmental risks that may affect project implementation) and an impact perspective (the potential impacts of a project on the environment, including loss of biodiversity, deforestation, and soil and water pollution).

CEDRIG comprises three consecutive modules, for each of which a detailed guide is available to guide practitioners:

- Module 1: "CEDRIG Light" or rapid risk and impact screening serves as an initial filter to assess climate change- and environment-related risks and impacts of an activity – strategy, programme or project. The result informs whether a more through and detailed assessment is needed.
- Module 2: "CEDRIG Strategic" helps conduct a detailed assessment at a strategic or programme level, and integrate climate change, environment and disaster risk into the strategy or programme, addressing both the risk and impact perspectives.
- Module 3: "CEDRIG Operational" allows conducting detailed risk and impact assessments at a project level. The impact assessment includes identifying and selecting mitigation options, and defining impact, outcome and output indicators for the measures to be implemented.

Sources: AFD (2014b), *Methodology guide to the "sustainable development opinion" mechanism;* SDC (2012), CEDRIG Climate, Environment and Disaster Risk Reduction Integration Guidance.

Sida has also adopted a comprehensive contribution management system (CMS) that supports mainstreaming of key cross-cutting themes, such as environment and climate change and gender equality, across all the agency's development co-operation activities (OECD, 2014b). An important feature of the system is the Helpdesk for Environment and Climate Change, which provides advice and guidance to support Sida's staff in in integrating environmental considerations at policy, programme and project levels (Sida, n.d.). A recent evaluation of the CMS concluded that the adoption of the tool has led to a better-structured assessment process, though the risk assessment process could benefit from simplification (Danielsson, Dahlgren and Lindström, 2016).

The importance of providing adequate support and training to staff, particularly those working on the ground in the offices in partner countries, has been recognised also by other donors. For instance, in addition to the biodiversity policy and handbook discussed above, USAID has released three Biodiversity How-To Guides which provide detailed guidance to practitioners on the design and management of biodiversity programmes in accordance with the broader policy (USAID, 2016).

Prioritisation of biodiversity in development finance portfolios as an indicator for mainstreaming

The degree to which biodiversity is prioritised within ODA portfolios can also serve as a useful indication of the implementation in practice of development co-operation strategies and screening tools, discussed above, to harness the synergies between biodiversity and other development activities, including active support to mainstreaming biodiversity in sectors.

The OECD DAC Rio marker methodology used by bilateral providers to report on their biodiversity-related development finance allows distinguishing between projects that target biodiversity as their primary objective, and those that have biodiversity as their secondary objective (Box 4.3). The number of projects where biodiversity is mainstreamed has more than doubled over the past decade, contributing to over half of overall biodiversity-related ODA activities (Figure 4.3). In monetary terms, USD 4.5 billion of bilateral ODA in 2015-16 targeted biodiversity as a secondary objective,[12] compared with USD 1.2 billion in 2007-08 (Figure 4.1).

When seeking to scale up biodiversity finance by harnessing synergies with other development activities, it is also useful to explore the opportunities for reciprocal mainstreaming, i.e. the mainstreaming of other environmental and developmental objectives into biodiversity activities. The share of biodiversity-related ODA (targeting biodiversity both as primary and secondary objective) in total bilateral ODA remained limited to 6% in both 2014-15 and 2015-16 (Figure 4.1) (OECD, 2016a). By comparison, climate-related ODA accounts for 17.5%, or USD 25.9 billion per year, which is over threefold the amount committed to biodiversity in the same time period (OECD, 2016b; 2017). Given the relatively large size of climate ODA portfolios, and the close inter-linkages between biodiversity and climate change projects, an emerging approach among bilateral providers is to support biodiversity by capturing synergies with climate projects. In 2014-15, nearly 80% or USD 6.8 billion of bilateral biodiversity-related ODA simultaneously pursued climate change objectives, which is an increase from 38% in 2006-07.

However, this overlap represents less than a quarter of the climate ODA portfolio, signalling that more efforts could be made to promote co-benefits between climate and biodiversity projects. Moreover, as the experience of REDD+ shows, realisation of the co-benefits for biodiversity climate projects is not always self-evident (Box 4.4). Therefore,

stronger deliberate efforts are required to ensure the alignment of biodiversity objectives with other climate change and development priorities. Improving the understanding of the substantial co-benefits that biodiversity-focused projects can deliver for other environment and development activities would help to build a case for funding these biodiversity projects in the first place.

Box 4.3. **Capturing the mainstreaming component in ODA through the OECD DAC Rio marker methodology**

For nearly two decades, the OECD DAC has been tracking development finance targeting the objectives of the Rio Conventions through its project-level CRS, using a Rio marker methodology. Rio markers aim to capture the mainstreaming component of biodiversity and other environmental objectives across development co-operation. Every development co-operation activity reported to the OECD DAC CRS should be screened and marked, whether it is targeting the objectives of the Convention on Biological Diversity (CBD), using the score "principal", "significant" or "not targeted". Activities scored "principal" would not have been funded but for their biodiversity objective. Activities scored "significant" have a primary objective other than biodiversity but have been formulated or adjusted to help meet biodiversity concerns. Biodiversity is essentially mainstreamed into these activities, being targeted as a secondary objective.

Over the five years between 2012 and 2016, sectors and sub-sectors attracting the highest number of these activities related to biodiversity mainstreaming were:

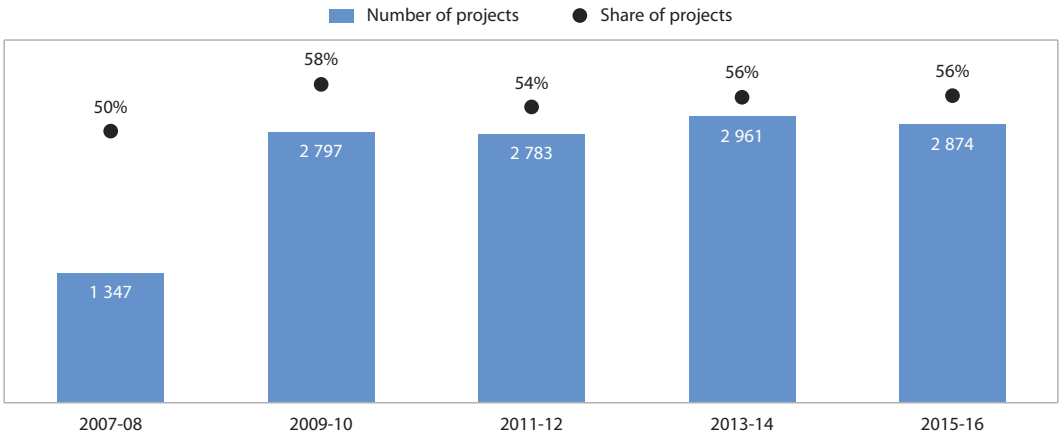
- agriculture – activities related to agricultural development, agricultural policy and administration management, research, and land resources
- general environment protection – activities related to environmental policy and administration management, environmental research, biosphere protection, and education and training
- government and civil society – activities related to democratic participation and civil society, public-sector policy and administrative management, human rights
- water supply and sanitation – activities related to water resource policy and administrative management, drinking water supply and basic sanitation, water resource protection
- other multisector – activities related to multisector aid, rural development.

The quality of the data on biodiversity-related development finance reported by the DAC members to the OECD CRS depends on the consistency and rigour of applying the Rio marker methodology. Therefore, efforts are under way to improve the understanding and clarity of the use of the Rio marker methodology, particularly in relation to the activities that score "significant" that target biodiversity as a secondary objective. The OECD DAC Secretariat in consultation with the DAC members is in the process of developing supportive material to guide the application of the Rio marker for biodiversity, following the recent successful exercise to clarify the use of the Rio markers for climate change adaptation and mitigation by updating the "OECD DAC Rio Markers for Climate: Handbook" (OECD, n.d.).

Note: For more information, access OECD CRS data and methodology at http://oe.cd/RioMarkers.

Source: OECD (n.d.), *OECD DAC Rio Markers for Climate: Handbook*, https://www.oecd.org/dac/environment-development/Revised%20climate%20marker%20handbook_FINAL.pdf.

Figure 4.3. **Bilateral official development assistance activities with biodiversity as a secondary objective 2006-15, two-year averages**



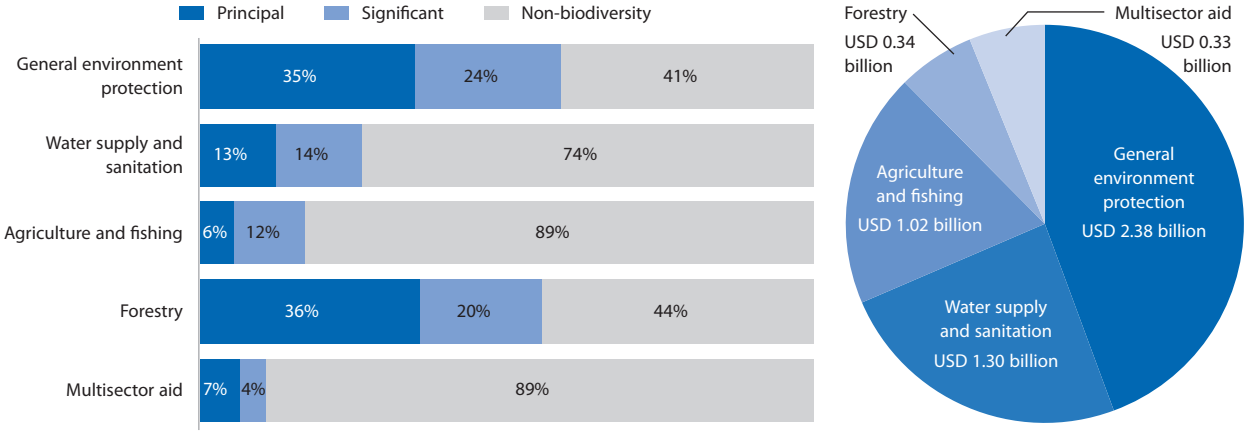
Note: The data in this figure represent commitments.

Source: Authors, based on data retrieved from OECD (2018c), *DAC Creditor Reporting System* (database), stats.oecd.org (accessed 12 February 2018).

More needs to be done to also ensure that development activities in high-impact sectors sufficiently exploit biodiversity co-benefits. The level of mainstreaming across the top sectors attracting biodiversity finance varies substantially (Figure 4.4). For instance, of the total bilateral ODA to the forestry sector per year, ODA in support of biodiversity accounted for 56% on average in 2014-16, whereas for the agriculture and fisheries sector, the share is 18%. Some other sectors with a potentially high impact on biodiversity receive even smaller shares of bilateral biodiversity-related ODA, such as transport (1%) and energy infrastructure (2%), mining (2.8%), and tourism (9%). More analysis on what approaches can be used to promote biodiversity considerations into development co-operation efforts in these sectors would be useful to support greater mainstreaming.

Figure 4.4. **Top five sectors receiving bilateral biodiversity-related ODA: Total commitments and biodiversity as share of overall ODA to sector**

USD billion, constant 2015 prices, three-year average, 2014-16



Note: The data in this figure represent commitments.

Source: Authors, based on data retrieved from OECD (2018c), *DAC Creditor Reporting System* (database), stats.oecd.org (accessed 12 February 2018).

Box 4.4. **Harnessing synergies between biodiversity and climate change mitigation in REDD+ projects**

Climate change mitigation programmes that aim to reduce deforestation and forest degradation, such as REDD+, have a significant potential to generate co-benefits for biodiversity, given that the loss of tropical forests is also one of the main drivers of biodiversity loss When integrated in REDD+ programmes, biodiversity conservation projects could benefit from a larger finance pool and a robust results-based REDD+ monitoring and verification system. In part to strengthen these links, the original focus of the mechanism on reducing emissions from deforestation and forest degradation, REDD, has expanded since the Bali Action Plan in 2007 to include conservation and sustainable management of forests and enhancement of forest carbon sinks (i.e. REDD+).

However, the realisation of these synergies in practice is not always self-evident (Belna, 2015). The REDD+ net accounting system for monitoring reductions in carbon emissions may promote afforestation along with the efforts to reduce the loss of natural forests. Similar levels of carbon reduction may be achieved from both conserving primary forests and planting new forests, which are not necessarily as biodiversity-rich. It is also argued that while not benefiting biodiversity, REDD+ programmes may create additional damage through a leakage effect if biodiversity considerations are not explicitly addressed. Since high-carbon areas do not always coincide with high-biodiversity zones, there is a risk of displacement of land-use pressures that drive deforestation and forest degradation from REDD+ forests to the areas of high biodiversity but low carbon. REDD+ programmes may also divert funds for conservation away from high-biodiversity, low-carbon areas. Better alignment of spatial prioritisation of biodiversity-rich zones with climate change mitigation objectives in REDD+ projects is thus a key factor in a successful delivery of biodiversity co-benefits.

To address biodiversity and other environment-related concerns, parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted a number of environmental and social safeguards to be applied to REDD+ programmes (the Cancun Agreement [2010], the Durban Outcome [2011], and the Warsaw REDD+ framework [2013]). These UNFCCC guidelines tend to focus on avoiding negative impacts rather than promoting benefits for biodiversity. They also remain general, with little elaboration of concrete conservation actions to be taken and monitoring methods required. Given the multidimensionality of biodiversity, measuring changes in biodiversity can be more complex than monitoring carbon emissions. There is thus a need for comprehensive guidance on linking reduction in carbon emissions to biodiversity conservation. Civil society initiatives, such as the Climate, Community and Biodiversity (CCB) Standards and REDD+ Social and Environmental Standards, developed under the Climate, Community and Biodiversity Alliance, may be able to fill this void. They tend to provide rigorous and concrete methods on the delivery of biodiversity co-benefits within climate change mitigation programmes.

There are a number of verified projects that have achieved biodiversity co-benefits in REDD+ initiatives – for instance, the Makira Forest Protected Area Project in Madagascar and the Natural High Forest Rehabilitation Project on Degraded Land of Kibale National Park in Uganda. However, in a recent review of 80 REDD+ projects that are using CCB Standards, Panfil and Harvey (2016) find that in practice, REDD+ will have variable outcomes on biodiversity, depending on how biodiversity goals are articulated, implemented and monitored. A key recommendation is to include more specific monitoring of biodiversity in REDD+ projects.

Sources: Busch and Grantham (2013); CCBA (2017); Harrison and Paoli (2012); Karousakis (2009); Lanius et al. (2013); Murray et al. (2014); OECD (2013); Panfil and Harvey (2014; 2016); Phelps, Friess and Webb (2012); REDD Standards (2012); Strassburg et al. (2010).

Challenges to effective development co-operation on mainstreaming

Besides the volume of development finance provided for biodiversity, the development community places an emphasis on the effectiveness of development co-operation in addressing the national priorities of partner countries and achieving the intended results (CBD, 2014). For development co-operation to be successful in driving biodiversity mainstreaming, interventions need to be designed and implemented in line with the international principles on aid effectiveness (Paris Declaration on Aid Effectiveness 2005, Accra Agenda for Action 2008, Busan Declaration 2011). These principles are common for all development co-operation activities, including those focusing on biodiversity mainstreaming, and are reflected in the "DAC policy statement on biodiversity" (OECD, 2010). They comprise:

- ownership of development priorities by partner countries, with interventions being demand-driven and in line with country priorities
- a focus on results with investments oriented at delivering long-term lasting impacts, e.g. reducing biodiversity loss and poverty
- inclusive partnerships characterised by mutual trust and learning, and recognising the different and complementary roles of all actors
- transparency and accountability to all citizens and stakeholders.

The progress towards the implementation of these principles is being monitored by the Global Partnership for Effective Development Co-operation, supported by a joint OECD-UNDP team. The results of the second round of monitoring completed in 2016 were presented at the Second High-Level Meeting of the Global Partnership in Nairobi (OECD/UNDP, 2016). An outcome document concluded at the meeting makes an explicit link between protecting biodiversity and climate stability as global public goods, and reducing international instability and risks. It highlights the importance of continued development co-operation support to middle-income countries that have a key role in the provision of these public goods (Nairobi Outcome Document, 2016).

However, in practice, several challenges exist that may undermine the effectiveness of development co-operation for biodiversity. First, there is a need to enhance co-ordination between development partners, to increase the cumulative effectiveness of their individual interventions on the ground, by ensuring complementarity and mutual accountability and avoiding duplication (Danilova and Pillai, 2010). Co-ordination can be achieved through country-level round tables and working groups, as well as by pooled funding arrangements around a common framework or programme. One successful example of such collaboration is the Forest Sector Support Partnership in Viet Nam, which was established to co-ordinate international funding in support of forest programmes, including REDD+, under the Forestry Development Strategy (Government of Viet Nam, 2007). For several years, the programme was able to mobilise and target donor support for protected area management and sustainable forestry. Another example is a consultation circle of technical and financial partners on environment[13] that was created in Madagascar, in response to the upsurge in illegal logging activity as a result of the 2009 political crisis. The group established three commissions to monitor ongoing developments concerning environmental governance, climate change and protected area management (Freudenberger, 2010). At the global level, the work of international fora such as the OECD DAC Network on Environment and Development (ENVIRONET) may be an additional useful tool to share knowledge and experiences (Council of the European Union, 2009).

Second, while harnessing the potential complementarities between biodiversity and other development projects, an effective planning process should also recognise and reflect the fact that benefits of mainstreaming become apparent only over long periods of sustained engagement (Drutschinin et al., 2015). Therefore, support for mainstreaming is needed over long time frames, of at least 10-15 years. This represents a challenge, given a typical development co-operation project cycle of 3-5 years (Manuel et al., 2016; Thomas, 2014).

Finally, there is a need for robust M&E to be built into the programme planning and implementation cycle, in order to ensure that interventions are adjusted over time based on the results they achieve. Some common technical barriers to M&E include the lack of suitable indicators to measure the process, as well as the difficulty and cost of determining a baseline assessment (OECD, 2015; Dinshaw et al., 2014). While there are mechanisms that can address these shortcomings (e.g. Norway's real-time evaluations that allow for adaptive management), there are more fundamental challenges which require a comprehensive organisational shift. An evaluation of Norad's interventions in the field found that a lack of prioritisation of M&E from the management, inadequate time and incentives for staff to engage in the process, and competing priorities all hindered the effective monitoring, and the subsequent application of results in practice (Norad, 2014). Therefore, for an M&E process to be effective in improving interventions and generating good practice and lessons learned, development co-operation agencies need to support results monitoring more broadly across their organisations.

Notes

1. At the time of the review, there were 29 DAC members. In December 2016, Hungary joined the DAC as its 30th member.
2. Parker et al. (2012) estimate public and certain private biodiversity-related finance flows at USD 52 billion in 2010. By comparison, the aggregate resource requirements for all countries to achieve Aichi Targets 2011-20 are between USD 150 billion and USD 440 billion per year (CBD, 2012).
3. Following the 2009 political crisis, Madagascar saw a partial or complete suspension of funding by the majority of providers. This led to a more than a twofold decline in biodiversity-related official development assistance (ODA) commitments by DAC members, as reported to the OECD DAC Creditor Reporting System (CRS). With resolution of the political crisis in 2013, provider support has started to return, including in support of biodiversity objectives.
4. Based on Ethiopia's submission to the CBD Financial Reporting Framework, https://chm.cbd.int/database/record/207306.
5. These statistics are based on the data reported by DAC members to the OECD DAC CRS as of November 2016. Data for 2015 are provisional. Detailed activity level data and information on the methodology are available online at http://oe.cd/RioMarkers.
6. Over the period 2006-14, three multilateral development banks (Asian Development Bank, Inter-American Development Bank, World Bank) and three biodiversity-related funds and programmes (Global Environment Facility, Nordic Development Fund, United Nations Development Programme) have to varying extents reported their biodiversity-related finance to the DAC CRS.

7. The survey focuses on the amounts mobilised from the private sector by guarantees, syndicated loans, shares in collective investment vehicles, credit lines and direct investments in companies.

8. ONFI is a subsidiary French Office National des Forêts (ONF).

9. Moringa Partnership www.moringapartnership.com/

10. In addition, the Ministry of Economy and Finance developed a set of standards for public investment projects in biodiversity and ecosystem services to further elaborate the process of public investment in biodiversity (MEF, 2015; BIOFIN, 2015).

11. At the time of the review, there were 23 DAC members (Roe, 2010).

12. Just under half of bilateral biodiversity-related ODA commitments (46%, USD 4.0 billion) targeted biodiversity as a primary or "principal" objective, meaning that these activities would not have been funded but for their biodiversity-related goal.

13. Cercle de Concertation des Partenaires Techniques et Financiers de l'Environnement.

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Chapter 5

Monitoring and evaluating biodiversity mainstreaming

Monitoring and evaluation of biodiversity mainstreaming is key for enabling the assessment of progress over time, and can therefore also play a key role in the deriving good practices that can be shared. This chapter provides a conceptual framework for indicator use and a review of existing and emerging indicators relevant for mainstreaming. Using these as a basis, an overview of possible indicators that can be used to monitor and evaluate biodiversity mainstreaming across the range of policy responses is presented.

5.1. Objectives of monitoring and evaluation of biodiversity mainstreaming

Monitoring and evaluation (M&E) is the systematic collection and objective assessment of data on specified indicators to provide information on the extent of progress and achievement of objectives of an ongoing project, programme, policy or intervention (OECD, 2002). Robust M&E of biodiversity mainstreaming is needed for several reasons. First, there is a need to establish baselines, i.e. the current understanding of the state of play, from which mainstreaming effectiveness can eventually be evaluated. M&E can help to close the knowledge gap and build the evidence base on mainstreaming effectiveness and, when combined with case studies from practitioners, can offer insights on mainstreaming best practices and possible improvements. Finally, it improves transparency by providing information on accounting of resources used in light of stated objectives and results achieved, thus informing the allocation and prioritisation of resources, and allows for adaptive management over time.[1] This is useful at the international level, but arguably even more important for domestic policy makers, to help identify what has worked and what can be made both more environmentally effective and cost-effective. Despite the importance of M&E, however, the Global Environment Facility (GEF), for example, 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 (Huntley and Redford, 2014).

Although M&E is crucial to assessing the effectiveness and efficiency of mainstreaming interventions, often little capacity and funds are devoted to it. Davies et al. (2013) highlight that M&E has typically been constrained by a shortfall in resources allocated to this task due, for example, to reluctance from managers to divert resources from implementation, or hesitancy to expose shortcomings of an intervention. Other challenges include ambiguous definitions,[2] lack of monitoring methodologies and indicators, lack of baseline data, lack of capacity and technical expertise – especially at regional and local levels – a limited understanding between natural science and social science, and a lack of adequate reporting (OECD, 2015a; Davies et al., 2013; Drutschinin et al., 2015). These are further compounded by an intrinsic mismatch between the short time frame of funding cycles and the longer time frame required for M&E of changes in outcomes. In addition to difficulties linked to implementation, there are other barriers to learning from M&E processes (Box 5.1).

Despite these challenges, the need to monitor biodiversity mainstreaming is likely to be increasingly recognised. In the context of cross-sectoral mainstreaming, the Convention on Biological Diversity (CBD) 13th Conference of the Parties (COP13) Decision XIII/3 invites parties: "To enhance monitoring of the use of natural resources, such as land, soil and water in all sectors, including agriculture, forests, fisheries and aquaculture, and tourism, among others, and to improve data collection, management and public access to monitoring data" (CBD, 2016c: para g). Though it is difficult to determine whether more recent biodiversity mainstreaming efforts have been effective, indicators to monitor this are beginning to emerge. This chapter therefore examines the types of indicators that could be used to track progress on biodiversity mainstreaming. It presents a conceptual framework for indicator use and, building on the indicator frameworks under the Aichi Biodiversity Targets and the Sustainable Development Goals (SDGs), provides an overview of indicators that are beginning to emerge. The chapter concludes with an overview of possible indicators that could be used to monitor and evaluate mainstreaming biodiversity efforts across the range of different types of policy responses.

Box 5.1. **Barriers to learning from M&E**

Barriers to learning from M&E, which apply to the national, programme and project levels, include:

- **Organisational culture:** In some organisational structures, poor performance is associated with blame, discouraging openness and learning. Other structures see failure to deliver expected results as an opportunity for learning.
- **Pressure to spend:** Pressure to meet disbursement targets reduces the time available to examine lessons learned and to integrate them in the planning process.
- **Lack of incentives to learn:** When staff turnover is high, the incentive to learn may be limited since the staff responsible will often have moved on long before the consequences of failure to learn are felt.
- **Tunnel vision:** Some staff or operational units prefer to stick to their old processes and procedures even when the shortcomings of these approaches are recognised.
- **Loss of institutional memory:** The organisational capacity to use M&E as a mechanism for learning may be reduced when staff turnover is high.
- **Insecurity and the pace of change**: Unclear and frequent shifts in priorities can have an adverse effect on learning.
- **Unequal nature of relationship:** In the case of development co-operation, the unequal relationship between development co-operation providers and partner countries can inhibit two-way knowledge sharing.

Source: OECD (2015b), *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*, http://dx.doi.org/10.1787/9789264229679-en.

5.2. Conceptual measurement framework

Conceptual framework for classifying mainstreaming indicators

Developing indicators to assess progress against mainstreaming objectives and targets is an essential part of the M&E process. One commonly applied measurement framework, used for the OECD Green Growth Indicators for example (OECD, 2011; 2017), is the pressure-state-response model. In that context, responses can cover a wide range of different actions including those by government, the private sector and civil society. The underlying objective of these responses is that these actions lead to measurable progress in terms of impacts (i.e. reduced pressures, and thus improvement in the state of the environment). Responses refer to environmental, general economic and sectoral policies and changes in awareness and behaviour – via government, households and firms, with examples of indicators including environmental expenditures, environmentally related taxes and subsidies, and enforcement and compliance activities (OECD, 2006). The conceptual framework used here to monitor and evaluate mainstreaming responses can be further elaborated by a conceptual framework that depicts the mainstreaming responses as a system whose key components include inputs, processes (or activities), outputs, outcomes and impacts. Some references also include a cross-cutting context dimension.[3] Indicators to monitor and evaluate biodiversity mainstreaming can be derived for each of these components (Table 5.1).

Table 5.1. **Indicator classification relating to biodiversity mainstreaming**

Indicator type	Definition	Examples
Input	Measure the material and immaterial pre-conditions and resources – both human and financial – provided for an activity, project, programme or intervention	• Finance allocated for biodiversity • Staff allocated to biodiversity
Process	Measure the progress of processes or actions that use inputs and ways in which programme services and goods are provided	• Establish an inter-ministerial committee for biodiversity
Output	Measure the quantity, quality and efficiency of production of goods or services as a result of an activity, project, programme or intervention	• Studies such as national ecosystem assessments or to identify and assess subsidies harmful to biodiversity • New policy instruments
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 number of threatened species
Context	Measure how the context (demographic, social, economic, etc.) informs and changes in relation to inputs, processes, outputs, outcomes and impacts	• Measures of stakeholder participation during the mainstreaming process*

*Such indicators include, for example, measures of stakeholder engagement, transparency, political leadership and donor co-ordination in the case of development co-operation. Mainstreaming interventions encompass a variety of dimensions, including economic, ecological, attitudinal and behavioural. According to Davies et al. (2013), for M&E to offer analytical insights, data collected need to cover several dimensions so as to highlight potential trade-offs.

Sources: Based on Huntley and Redford (2014), "Mainstreaming biodiversity in practice: A STAP advisory document", www.cbd.int/doc/case-studies/inc/Mainstreaming-Biodiversity-LowRes.pdf; Horsch (1997), "Indicators: Definition and Use in a Results-Based Accountability System"; Thomas (2014), "Defining and assessing success in mainstreaming"; UNICEF (2003), "M&E training module", Section 2.3 on Indicators.

Entry points for mainstreaming occur at different levels – from national plans, sectoral policies and local projects, to business practices and development co-operation – and M&E is relevant at each of these.[4]

Principles and criteria that can guide the development of suitable indicators for monitoring and evaluating mainstreaming efforts are that they are: measurable (good quality data, comparable across countries and coherent over time), analytically sound (methodologies have been/need to be developed) and policy-relevant (meaningful to target audience) (OECD, 2011). Indicators should also be SMART (specific, measurable, attributable, relevant and time-bound).[5]

Review of existing indicators proposed for or relevant to biodiversity mainstreaming

The concept of mainstreaming has been applied to other policy areas, including the environment, climate change adaptation and gender. Insights on mainstreaming indicators from these areas can therefore be relevant for biodiversity mainstreaming as well. The UN Environment-Development Programme Poverty Environment Initiative, for example, proposes possible (albeit general) indicators that can be used to measure successful environmental mainstreaming (Box 5.2).

Box 5.2. **UN Poverty-Environment Initiative indicators for successful environmental mainstreaming**

- Inclusion of poverty-environment linkages in national development and poverty reduction strategies.
- Strengthened capacity within finance/planning ministries as well as environmental agencies to integrate environment into budget decision making, sector strategies and implementation programmes.
- Inclusion of poverty-environment linkages in sector planning and implementation strategies.
- Strengthened capacity in key sector ministries to include environmental sustainability in their strategies.
- Widened involvement of stakeholders in making the case for the importance of environment to growth and poverty reduction.
- Improved domestic resource mobilisation for poverty-environment investments.
- Increased donor contributions to country-level environmentally sustainable investment.
- Improved livelihoods and access to environmental and natural resources for the poor.

Source: UNPEI (2007), "Guidance note on environmental mainstreaming into national development planning", www.cbd.int/doc/meetings/nbsap/nbsapcbw-seasi-01/other/nbsapcbw-seasi-01-undp-unep-guide-en.pdf/.

A number of other indicators, specific to biodiversity mainstreaming, have been proposed in the context of the Aichi Biodiversity Targets and the SDGs, in a few National Biodiversity Strategies and Action Plans (NBSAPs), and by multilateral development banks and, to a lesser extent, by or for the private sector. A review of these (below) illustrates the various approaches that are emerging.

Several of the Aichi Biodiversity Targets and the proposed global indicators for these are directly relevant to biodiversity mainstreaming. Strategic Goal A is to address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society. The four targets under this goal and the proposed global indicators for these provide a starting point from which to consider possible indicators for biodiversity mainstreaming. The indicators for Aichi Target 2[6] are shown in Table 5.2 as an example. Aichi Target 3 on incentives is another target relevant to mainstreaming biodiversity.[7] The Biodiversity Indicators Partnership (BIP) currently includes one indicator for Target 1, no indicator for Target 2, one indicator for Target 3, and two (active) for Target 4.[8]

Several of the most recent NBSAPs also refer to indicators to monitor biodiversity mainstreaming (Box 5.3), while others (such as those of Australia, France and Mexico) highlight the ongoing or planned development of indicators as an action in their NBSAPs.[9]

Other indicator initiatives can also be relevant to monitoring progress towards biodiversity mainstreaming. Conservation International (2015), for example, developed a set of national indicators that can be used to monitor progress towards sustainable development in Madagascar, several of which are also relevant for mainstreaming biodiversity. These include, for natural capital, percentage of essential natural capital that has formal protection status (with a baseline of 18%), and deforestation rate within areas of essential natural

capital 2010-12 (with a 0.3% deterioration). For sustainable production, the indicators are annual increase in efficiency (crop yield versus area harvested) (with an improvement of 0.4%) and percentage of essential natural capital with overlapping mining permits (with a baseline of 44%).

Table 5.2. **Indicators for Aichi Biodiversity Target 2 under Strategic Goal A**

Generic indicator	Specific indicator
Trends in incorporating measures of stock and flow of natural resources into national accounting	Number of countries implementing natural resource accounts, excluding energy, within the System of Environmental-Economic Accounting (SEEA)
Trends in number of countries that have assessed values of biodiversity, in accordance with the convention	Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020 (indicator for SDG target 15.9)
Trends in integration of biodiversity and ecosystem service values into sectoral and development policies	Number of countries that have integrated biodiversity in National Development Plans, poverty reduction strategies or other key development plans

Notes: Data for the first two indicators are not yet available. Roe (2010) is cited as the reference for the third indicator.

Source: CBD (2016a), "Indicators for the Strategic Plan for Biodiversity 2011-2020", https://www.cbd.int/doc/decisions/cop-13/cop-13-dec-28-en.pdf.

Box 5.3. **Examples of indicators proposed in NBSAPs to monitor biodiversity mainstreaming**

Ethiopia

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 addressed 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 expansion of agricultural land is halved from the existing rate of about 10% per year.

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

India

Target 2: By 2020, values of biodiversity are integrated into national and state planning processes, development programmes and poverty alleviation strategies.

Indicators: Trends in number of studies on biodiversity-inclusive environmental impact assessments (EIAs), cumulative EIAs and strategic environmental assessments (to be conducted by the Ministry of Economic Affairs and Planning Commission); and trends in identification, assessment, establishment and strengthening of incentives that reward positive contribution to biodiversity and ecosystems.

Monitoring/Reporting frequency is every three years.

Box 5.3. **Examples of indicators proposed in NBSAPs to monitor biodiversity mainstreaming** *(continued)*

Madagascar

Strategic Objective 2: In 2025, at the latest, biodiversity values, opportunities and benefits of conservation and sustainable use will be recognised and integrated into the country's socio-economic development activities.

Action: 2.1. Consider the values of biodiversity into sectoral strategies and programmes.

Indicator: 2.1.1. Number of sectoral plans and strategies incorporating and implementing the values of biodiversity implementation strategies.

South Africa

Objective 3: Biodiversity considerations are mainstreamed into policies, strategies and practices of a range of sectors.

Target 3.1: Effective science-based biodiversity tools inform planning and decision making.

Indicator: Number of tools developed to support mainstreaming of biodiversity assets and ecological infrastructure in production sectors and resource management. By 2020, 10 new tools produced and 15 knowledge resources demonstrating the value of biodiversity developed and disseminated.

Viet Nam

Strategic Goal 3: Strengthened sustainable use and equitable sharing of ecosystems, species and genetic resources.

Indicator: Percentage of important degraded ecosystems effectively recovered.

Strategic Goal 4: Reduce direct pressures on biodiversity.

Indicator: Rate of loss of natural forests and water surface area due to land-use conversion.

Other domestic initiatives, which have not been explicitly proposed as indicators for biodiversity mainstreaming but which merit consideration as such as they represent important milestones in the mainstreaming process, include national assessments on public subsidies that are harmful to biodiversity, such as the one undertaken by France (Sainteny et al., 2012).

The GEF has also recently developed indicators to monitor and evaluate biodiversity mainstreaming in its relevant GEF-6 programmes (Box 5.4).

Box 5.4. **Indicators for the mainstreaming of biodiversity in production landscapes/seascapes and sectors in the GEF biodiversity strategy**

Outcomes

Marine and terrestrial resource use is appropriately situated to maximise production without undermining or degrading biodiversity.

Indicator: Area of production landscapes and seascapes that integrate conservation and sustainable use of biodiversity into management.

Box 5.4. **Indicators for the mainstreaming of biodiversity in production landscapes/ seascapes and sectors in the GEF biodiversity strategy** *(continued)*

Production practices and sectoral activities in agriculture, forestry, fisheries, tourism, extractive industries (gas, oil and mining) are biodiversity-neutral, biodiversity-positive or less destructive of biodiversity.

Indicator: Area of production landscapes and seascapes that integrate conservation and sustainable use of biodiversity into management.

Increase in the amount of public and private financial flows that address threats to biodiversity.

Indicator: Financial resources mobilised for biodiversity management.

Policy and regulatory frameworks remove perverse subsidies and provide incentives for biodiversity-neutral or biodiversity-positive land and resource use that remains productive, but that does not degrade biodiversity.

Indicator: The degree to which sector policies and regulatory frameworks incorporate biodiversity considerations and implement the regulations.

Indicator: The degree to which biodiversity values and ecosystem service values are internalised in development, finance policy, and land-use planning and decision making.

Impact

Globally significant biodiversity conserved and sustainably used in production landscapes and seascapes (areas outside the protected area estate)

Indicators: 1) Intact vegetative cover and degree of fragmentation in production landscapes measured in hectares as recorded by remote sensing; 2) Coastal zone habitat and productive seascapes intact as recorded by remote sensing and where possible supported by other verification methods.

Source: GEF Secretariat (2016), "Biodiversity mainstreaming in practice: A review of GEF experience".

International organisations also have an important role to play in the context of indicators for biodiversity mainstreaming, as a number of these collect national-level data or have the ability to mobilise resources for global collection of data via satellite data or other means. Examples include the OECD, the Food and Agricultural Organization of the United Nations (FAO), the World Bank, and other research institutions. A recent review of indicators to measure progress on inclusive green growth at the country level (Narlof, Kozluk and Lloyd, 2016) includes several indicators that are relevant to biodiversity mainstreaming (Table 5.3).

Whichever indicators may eventually be used, at national and/or international level, to monitor and evaluate progress towards biodiversity mainstreaming, these need to be practicable. The concept of biodiversity mainstreaming covers multiple dimensions (institutional, national and sectoral plans, policies, budgets); multiple sectors; and various actors (government, private sector, development co-operation). This could in theory lend itself to hundreds of possible indicators, adapted also to national circumstances and socio-economic characteristics. To be able to make broad statements about the effectiveness of biodiversity mainstreaming, ideally one would need to start with a set of core indicators which are fairly easy and inexpensive to collect, and which are comparable across countries. In many ways, the Aichi Biodiversity Targets and the SDGs, together with the

ongoing work on indicators to monitor progress towards these, go a long way towards this. A few other indicators may also merit further consideration.

Ideally, existing national monitoring systems can be adapted to include mainstreaming indicators. UNPEI (2011) identifies seven steps in the integration of poverty-environment linkages in the national monitoring processes, which are also relevant to integrating M&E of biodiversity-development mainstreaming in the national monitoring system (Annex 5.A1). Selecting a core set of indicators (Step 6) is an important element of this, and aims should be made for these to be as consistent as possible across countries, so as to enable aggregation of data at regional and global levels.

5.3. Possible indicators for monitoring and evaluating biodiversity mainstreaming

Building on the key mainstreaming elements discussed in Chapters 2 and 3, and the review of indicators discussed above, Table 5.3 provides an overview of possible indicators that could be used to monitor progress towards biodiversity mainstreaming at national and sector level and in development co-operation. The table is not comprehensive and is intended to be illustrative. The type of data needed for these vary, with some requiring a simple binary response (e.g. has a national assessment of subsidies harmful to biodiversity been undertaken – yes/no); others requiring some kind of qualitative response (e.g. how has biodiversity been integrated into other national strategies – such as high, medium or low); and others requiring quantitative data.

Table 5.3. **Examples of possible indicators to monitor progress towards biodiversity mainstreaming**

Possible indicators	Indicator type					Data source and availability
	Input	Process	Output	Outcome	Impact	
NATIONAL						
Finance mobilised for biodiversity	x					Work under way. Biodiversity-relevant environmental protection expenditures (OECD, European Environment Agency), CBD national financial reporting, UNDP BIOFIN (Biodiversity Finance Initiative)
Trends in incorporation of physical measures of stock and flow of natural capital in natural accounting		x				World Bank Wealth Accounting and Valuation of Ecosystem Services
Implementation of natural resource accounts within the SEEA		x				
Integration of development into NBSAP		x				Not systematically collected. Roe (2010); OECD this document.
Integration of biodiversity into National Development Plan and other relevant national strategies*		x				Not systematically collected. Prip (2012); OECD this document
National ecosystem assessment (or other similar national assessments)			x			Not systematically collected – see http://catalog.ipbes.net/
National assessment of harmful subsidies (e.g. in agriculture, fisheries, forests, mining, tourism)			x			N/A
Inter-ministerial committee for biodiversity (mainstreaming)		x				N/A

Table 5.3. **Examples of possible indicators to monitor progress towards biodiversity mainstreaming** *(continued)*

Possible indicators	Indicator type: Input	Process	Output	Outcome	Impact	Data source and availability
SECTORAL						
Generic/Cross-cutting						
• Biodiversity integrated into key sectors' policies and plans (e.g. agriculture, forestry, fisheries, mining, tourism) • Trends in incorporation of natural resource, biodiversity and ecosystem service values into sectoral plans (e.g. agriculture, forestry, fishing, mining, tourism)		x				Not systematically examined
Number of biodiversity-relevant taxes, charges and fees, tradable permit schemes				x		OECD Policy Instruments for the Environment (PINE) database, about 80 countries
Number of other policy instruments (e.g. payment for environmental services [PES] schemes, biodiversity offset programmes, other)				x		Not systematically examined. Ecosystem marketplace. Work planned for OECD PINE database
Agriculture						
Trends in percentage of agricultural support that is potentially environmentally harmful, neutral and beneficial				x		OECD Producer Support Estimate (PSE) database, about 45 countries
Changes in land use and cover				x		OECD Environmental Statistics; FAO, national sources, e.g. CORINE land cover database
Percentage of agricultural area under sustainable certification				x		
Number of plant and animal genetic resources for food and agriculture secured in medium- or long-term conservation facilities				x		FAO
Amount of pesticide use per hectare				x		FAO and OECD Agri-Environment Indicators (AEI)
Amount of fertiliser use per hectare				x		FAO and OECD AEI
Agriculture ammonia emissions				x		OECD AEI
Agricultural freshwater withdrawal				x		OECD AEI
Status of water quality				x		OECD AEI
Nitrogen balance				x		OECD AEI
Phosphorous balance				x		OECD AEI
Index of farmland birds				x		OECD AEI
Land degradation (topsoil loss of agricultural land)				x		FAO Global Assessment of Soil Degradation (GLASOD) 1991, about 145 countries
Areas/population exposed to water scarcity				x		World Resources Institute Aquaduct 2014. Global
Water resources exposed to harmful pollution levels				x		
Fisheries						
Number of fisheries with management plans				x		
Number of fisheries with total allowable catch or other quota/licensing				x		N/A
Number of countries with individually transferable quotas for fisheries				x		OECD PINE
Bottom-trawling regulation in environmentally sensitive areas				x		
Percentage of fish from sustainable sources (eco-certification)					x	
Percentage of fish species overexploited or collapsed					x	FAO, Global (cannot be disaggregated at national level)

Table 5.3. **Examples of possible indicators to monitor progress towards biodiversity mainstreaming** *(continued)*

Possible indicators	Indicator type					Data source and availability
	Input	Process	Output	Outcome	Impact	
Forestry						
Changes in land use and cover				x		OECD Environmental Statistics, FAO, national sources e.g. CORINE
Land with different forest types and change over time				x		FAO Forest Resource Assessment, most countries
Value of forest resource depletion				x		World Bank World Development Indicators, about 130 countries
Percentage of forests with sustainable forest management (SFM) plans				x		
Percentage of harvested timber under sustainable certification				x		
DEVELOPMENT CO-OPERATION						
National strategy to mainstream biodiversity in development co-operation		x				N/A
Percentage of biodiversity-related bilateral ODA in total ODA	x					OECD CRS
Trends in flows and activities marked by development providers as "principal" and "significant" for biodiversity	x					OECD CRS

* Other relevant national strategies include, but are not limited to, national sustainable development strategies, green growth strategies and poverty reduction strategies.

Sources: Based on CBD (2015a), "Global indicators and sub-global approaches to monitor progress in the implementation of the Strategic Plan for Biodiversity 2011-2020", www.cbd.int/doc/meetings/ind/id-ahteg-2015-01/official/id-ahteg-2015-01-02-rev1-en.pdf; OECD (2013), *Policy Instruments to Support Green Growth in Agriculture*, http://dx.doi.org/10.1787/9789264203525-en; Narlof, Kozluk and Lloyd (2016), *Measuring Inclusive Green Growth at Country Level*.

Annex 5.A1

UNPEI steps in integration of mainstreaming into national monitoring processes

UNPEI (2011) defines seven steps in the integration of mainstreaming poverty-environment linkages in the national monitoring processes in its *Mainstreaming Environment and Climate for Poverty Reduction and Sustainable Development: A Handbook to Strengthen Planning and Budgeting Processes*. These are:

1. **Review literature and experience in other countries.** Undertaking a literature review helps identify issues that need to be taken into account in mainstreaming poverty-environment objectives into a monitoring system. Examples from a growing number of countries are available, outlining the process they have undertaken in the adoption of poverty-environment indicators.
2. **Analyse national priorities and identify entry points.** National monitoring systems are subject to continuous review and data collection cycles (e.g. five-year household surveys) that are closely linked with the review and elaboration of five-year National Development Plans and sector strategies. Timelines and targets need to be mapped out in order to inform and influence national monitoring systems at a strategic point in the review and planning cycle.
3. **Identify key institutions and establish cross-sectoral working groups.** Delineate the national, sector and subnational monitoring systems in place and the institutions charged with co-ordinating their application and those responsible for data collection. As noted above, the national statistics office, working in close collaboration with the ministry of planning, is typically responsible for the monitoring system; sector ministries are responsible for collecting data over time for a cluster of thematic indicators. Establish working relationships with these institutions and make the case to them on the benefits of revisiting and/or adding poverty-environment indicators into existing systems.
4. **Analyse existing monitoring and reporting systems.** National monitoring systems often ignore linkages with the environment, while environmental monitoring systems tend not to consider the poverty impacts of environmental changes. Assessing existing national monitoring systems and their associated data collection and reporting components provides essential information which can inform and influence changes to better reflect poverty-environment linkages. In addition, the availability, quality and relevance of existing datasets and indicators (including gender disaggregation) should be analysed, along with the institutional roles and responsibilities for collecting, analysing and reporting on data.
5. **Identify possible poverty-environment linkages through a consultative process.** Possible indicators should be formulated through a participatory process, drawing

on sector experts and statisticians from the national 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 poverty-environment indicators, 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.

6. **Select a core set of indicators.** Through a consultative process with policy makers from the ministries of planning and key sectors and the national statistics office, practitioners should facilitate a process in which a core set of indicators is selected from among the possible poverty-environment indicators identified in the preceding step. Keep the number of proposed new indicators realistic, as the national statistics office will raise justified concerns related to the costs of data collection, the feasibility of regular data collection and how the data will be used for reporting.

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.

Notes

1. M&E can also address the development and validation of the theory of change underpinning mainstreaming interventions. Theory of change is a specific type of methodology for planning, participation and evaluation that is used in the philanthropy, not-for-profit and government sectors to promote social change.
2. The terms "biodiversity" and "development" are not always clearly defined, or defined differently for different programmes, making it difficult to compare and assess performance (Davies et al., 2013).
3. Contextual factors are a source of inputs and constraints to inputs, processes, outputs, outcomes and impacts; conversely, inputs, processes, outputs, outcomes and impacts feed into the context. Examples of contextual factors include political leadership and stability, and macroeconomic and fiscal policies (Thomas, 2014).
4. Huntley and Redford (2014) classify mainstreaming indicators in seven categories: spatial, government, private sector, individual-based, multilateral donor, poverty alleviation and markets for ecosystem services.
5. According to Scheerens et al. (2011), indicator data should also be sufficiently granular or disaggregated so as to allow for better adjustments and valid causal inferences.
6. Aichi Target 2 states: "By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems".
7. Aichi Target 3 is to encourage positive incentives and to reform incentives, including subsidies, that are harmful to biodiversity.
8. These are: Target 1: Biodiversity barometer; Target 3: Trends in potentially harmful elements of government support to agriculture; number of countries with biodiversity-relevant taxes; number of countries with biodiversity-relevant fees and charges; number of countries with biodiversity-relevant tradable permit schemes; Target 4: ecological footprint and Red List Index.
9. Ireland has also defined indicators for measures that mainstream biodiversity and use the green, yellow, red traffic light signal to indicate the level of progress. For more information see: http://indicators.biodiversityireland.ie/index.php?qt=fa&id=5.

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