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: Input	Process	Output	Outcome	Impact	Data source and availability
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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