Learning Brief

Monitoring and evaluation – how to measure successes of Ecosystem-based Adaptation

December 2017

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Experiences from practitioners on how to set up monitoring and evaluation (M&E) systems and indicators for monitoring and evaluating adaptation results and linking M&E specific to Ecosystem-based Adaptation (EbA) to other monitoring and reporting systems.

Mangrove restoration in Hua Hin, Thailand. Photo: ©GIZ/Mathias Bertram

Why monitoring and evaluation is important in the context of (ecosystem-based) adaptation

M&E is vital for understanding the extent of progress against objectives and identifying uncertainties, gaps and barriers to progress in the short to longer-term, and should be carried out throughout the lifetime of an EbA project and beyond. It enables policy-makers, planners and practitioners to improve EbA actions by adjusting processes and targets to ensure that tangible benefits are realised over time. M&E provides critical evidence to support learning about 'what works' in EbA (including suggestions for improv-

Key messages ...

- Monitoring and evaluation (M&E) is vital for understanding 'what works' in EbA in order to promote future investment and motivate uptake and involvement (e.g. by local communities).
- There is no one-size fits all approach to the M&E of EbA since the purpose, target group, modes of information dissemination and available human, time and financial resources are very context-specific.
- Challenges for monitoring (ecosystem-based) adaptation results include long time horizons to achieve adaptation results, complexity of socio-ecological systems and uncertainties about future development pathways.
- There is growing knowledge on and experience in how EbA projects have addressed these challenges by setting up M&E frameworks and project-specific indicators that focus on the assessment of only a few, but essential, tangible outputs that can be measured during the life cycle of a project and by actively engaging local actors from the beginning.
- It is crucial to link EbA-related M&E frameworks with existing global, national and subnational climate change, biodiversity and development frameworks; further collection and assessment of experiences is also needed.

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ing planning and design), to **promote future investment**, and to **motivate uptake** and **involvement** (e.g. by local communities).

Monitoring refers to the systematic collection of data and/or information on whether planned activities to implement an EbA measure are on track and to inform any adjustments needed to processes and objectives.

Evaluation refers to an assessment of whether and how well objectives have been met and whether prescribed measures have been effective in reducing vulnerability and increasing resilience at a specific point in time.

M&E is especially important in the context of international commitments including the following:

- United Nations General Assembly: 2030 Agenda (and Goals) for Sustainable Development (SDGs);
- United Nations Framework Convention on Climate Change (UNFCCC): Paris Agreement and nationally determined contributions (NDCs); Cancún Adaptation Framework and national adaptation plans (NAPs); Nairobi Work Programme; national adaptation programmes of action (NAPAs);
- Convention on Biological Diversity: Strategic Plan for Biodiversity 2015 and 2020; Conference of the Parties decisions XII/20 and X/33;
- United Nations International Strategy for Disaster Reduction (UNISDR): Sendai Framework for Disaster Risk Reduction 2015 – 2030; and
- United Nations Convention to Combat Desertification: 10-year strategic plan and framework to enhance the implementation of the Convention (2008 – 2018).

However, the concrete results of locally implemented EbA measures and projects also need to be both integrated into national and sector-specific policy and planning frameworks and communicated to stakeholders. This document summarises the experiences and recommendations from the EbA Community of Practice on how to set up M&E systems and indicators for monitoring and evaluating adaptation results and linking EbA-specific M&E to other monitoring and reporting systems.

Structuring M&E systems for EbA measures: approaches, experiences and recommendations

Adaptation initiatives – especially EbA – aim to achieve long-term outcomes and occur under changing climate hazards. The success of adaptation is often very context-dependent. The following **key messages** regarding the setup of an M&E system – including challenges, potential solutions and key starting points – have been shared within the community of practice:

Challenges for monitoring (ecosystem-based) adaptation results:

1. **No universal metrics for adaptation:** What exactly needs to be monitored (risk reduction, health, ecosystem service provision)? How might indicators be selected?

2. **Long time horizons:** The success of adaptation is only visible after extended timeframes. This is especially true for EbA, where the conservation, management and restoration of ecosystems require longer time periods. Intermediate indicators are required.

3. **Complexity:** Climate hazards are entangled with various social and economic stressors that affect society and ecosystems, and thus the success of EbA measures.

4. **Uncertainty:** Different socio-economic development pathways (e.g. high-emission vs low-emission economy) will lead to very different climate risks.

Challenges for setting up M&E systems in general and potential solutions:

1. **Limited resources:** Projects normally have quite limited human, financial and technical resources for setting up M&E systems. It is crucial to allocate sufficient resources to M&E from the beginning.

2. **Data accessibility and quality:** Relevant data is often scattered, not openly accessible or even unavailable. Although M&E systems should be based on available datasets, it is often necessary to collect and generate original data.

3. **Continuity after the end of the project:** M&E systems are often very complex and not designed in a way that allows for long-term sustainability. Using participatory approaches (e.g. involving communities, institutions and other organisations from the public and private sector, as well as academia and civil society) can help to strengthen continuity. It is important to strengthen capacities and broad social engagement.

It is quite evident that there is **no one-size-fits-all approach to M&E in EbA**. In order to set up an appropriate, context-specific M&E system, the **following elements** need to be taken into consideration:

Key starting points for setting up an M&E framework:

1. **What is the specific purpose of the M&E?** For example, steering and supporting ongoing management, measuring effectiveness, learning, informing, ensuring accountability and/or communicating impact.

2. **Who should be using the information generated by M&E?** For example, national decision-makers, planners, researchers and/or communities.

3. **How will the information be disseminated?** For example, through reports, maps, infographics, meetings and/or public events.

4. **What resources are available?** For example, know-how, time and/or financial resources.

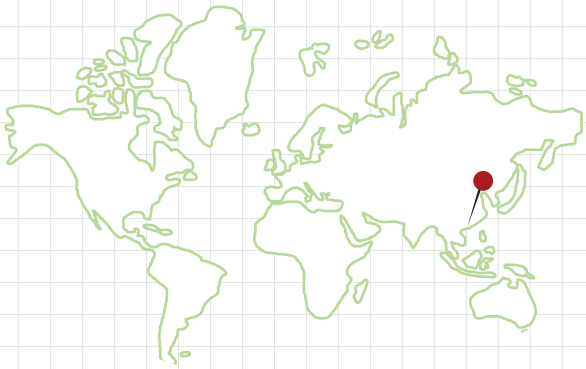
Further information

- Deutsche Gesellschaft für International Zusammenarbeit (GIZ) Toolbox for Adaptation M&E[i].

Lessons from Viet Nam

Monitoring and Evaluation for Ecosystem-based Adaptation Measures – the case of Ha Tinh and Quang Binh provinces

by Quyen Le Thi Le and Nguyen Sy Linh, Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE), as well as Ngoc Anh Nguyen Thi, GIZ Viet Nam



The Vietnamese-German project Mainstreaming EbA (2014–2018), supported by GIZ, aims at integrating EbA into national climate change adaptation and legal strategic frameworks and financing schemes. It also supports the implementation of EbA pilot measures in two provinces and fosters upscaling, capacity-building and networking.

The project created an M&E framework for climate change adaptation based on the GIZ 'adaptation made to measure' methodology, which involves five steps (example Quang Binh province):

Step 1 – Assessing the context for adaptation: Vulnerability assessment of social ecological systems (SES) in both Ha Tinh and Quang Binh provinces; mapping of SES of each province; identification of 10 of the most vulnerable SES; selection of potential EbA measures for pilot interventions; design and implementation planning for selected EbA measures with local partners and communities.

Step 2 – Identifying the desired contribution to adaptation: Restoration of coastal protection forest combined with livelihood development to strengthen resilience to climate change through improved ecosystem service delivery (e.g. climate regulation, erosion prevention, firewood provision); use of a three-dimensional approach by strengthening adaptive capacities, reducing risks and sustaining development.

Step 3 – Developing the results framework: Establishment of a framework of activities (EbA pilot measures), outputs (results from the measure), intermediate outcomes (short-term effects), outcomes (medium-term effects), results (long-term effects).

Step 4 – Defining indicators and setting a baseline: Definition of output, outcome and result indicators based on the subject (e.g. forest restoration), quantity of change (e.g. 1,000 trees planted), quality of change (degraded forest restored), time horizon (2017 – 2019), and location and group (land managed by women in commune x); establishment of a baseline and implementation of a baseline study (interviews, data collection and interpretation).

Step 5 – Operationalising the results-based monitoring system: Set-up of an M&E operational framework that specifies indicators, data needs, data source, collection method, analysis method, responsibilities and costs.

The project faced several challenges in indicator development, such as complexity (capturing vulnerability of socio-ecological systems), uncertainty (e.g. about socio-economic developments), time horizons (most EbA results become visible after many years), data availability and unpredictable changes in national and/or local policies.

A key success factor of the application of the methodology was that it included a highly participatory approach, where local partners and communities have active roles in the whole process. The project also succeeded in strengthening capacities of partner staff and communities for operationalising the M&E system. This will increase the sustainability of the M&E framework, especially after the project's end.

Rice Field in Ha Tien, Vietnam. Photo: ©GIZ/Integrated Coastal Management Programme, ICMP

Developing appropriate indicators to measure EbA benefits

Evaluating the efficacy and effectiveness of (ecosystem-based) adaptation measures in reaching set goals is achieved by using indicators of success.

Indicators also serve various purposes including the following:

1. **Accountability** to justify funding and results.

2. **Communication** to policy-makers and decision-makers and other stakeholders (including transparency to the public) within and between sectors.

3. **Showing achievements** of initiatives (e.g. in the context of NDCs and across sectors, regions and countries).

4. **Informing** the international community on the achievement of SDGs.

Adaptation indicators can be divided into four main areas:

1. **Climate parameters:** Information about observed climatic conditions (e.g. temperature, rainfall, extreme events) that help track the climatic context within which adaptation strategies are being implemented.

2. **Climate impacts:** Information about the observed impacts of climate variability and changes to socio-ecological systems (e.g. number of people displaced due to floods) to help track the climate context within which adaptation strategies are being implemented.

3. **Adaptation action:** Information to help track the implementation of adaptation strategies (e.g. number of awareness-raising workshops organised, % of building codes updated, etc.).

4. **Adaptation results:** Information to help monitor and evaluate the outcomes of adaptation strategies (e.g. % increase in crop yield per hectare during dry season, % of household income used to treat water-borne diseases following floods) where outcomes are broadly understood in terms of increased adaptive capacity (often framed as development outcomes), decreased sensitivity to climate stress, or some combination thereof.

The following **key messages** regarding the M&E of EbA have been shared within the Community of Practice:

- **Indicator standards vs. standard indicators:** EbA indicators should fulfil **minimum standards** and the **SMART** criteria for good indicators in being **s**pecific, **m**easurable, **a**ttainable, **r**elevant and **t**ime-bound. In addition, the **ADAPT** principles (**A**daptive, **D**ynamic, **A**ctive, **P**articipatory, **T**horough) provide a useful reference. However, a **general standard indicator set** for measuring EbA actions and benefits would not be appropriate for EbA measures, since the framework conditions (purpose, ecosystem, climate risk, target groups) are very diverse.
- **EbA indicators should be oriented towards and focus on vulnerability and risk:** They should be able to measure high risks or low risks and how EbA measures (e.g. river bed restoration for flood risk reduction/mangrove restoration for storm risk protection) reduce risk over time. It is important to define 'risk layers' and prioritise which risks should be measured using indicators.
- **Indicators should address the needs of various stakeholders, especially at local level:** There is often a clash between national, regional and local needs for monitoring and indicators. Externally imposed indicators do not work at local level as these are unlikely to relate to the specific context of the measure.
- **Indicators should be aligned with existing M&E systems wherever possible:** Setting up new and complex systems will make long-term M&E very difficult, as they often exceed human, technical and financial capacities.
- **Focusing on intermediate effects when assessing adaptation results:** Most adaptation results and benefits manifest themselves after a project's lifecycle. It is therefore recommendable to focus on tangible indicators and intermediate effects (e.g. 'x' ha of restored wetland in year 'y') instead of benefits (e.g. 'x' ha of restored wetlands have resulted in improved water availability by 'y' litres for community 'z'), which cannot be properly measured in the short term.

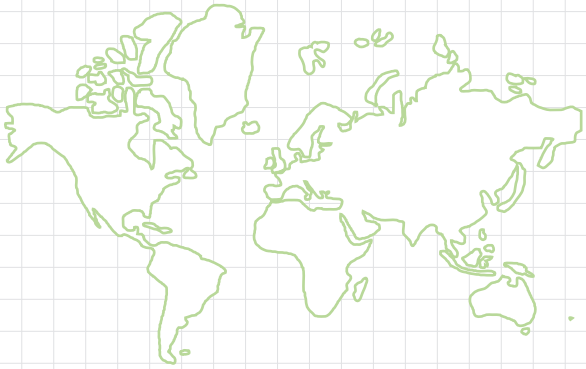
Further information

- GIZ Repository of Adaptation Indicators [ii]

Lessons from the international level

A review of 62 EbA projects and their indicators to MEASURE ADAPTATION OUTCOMES

(by Giacomo Fedele, Conservation International, USA)



Conservation International reviewed 62 projects funded by UNFCCC, United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP) and the Global Environment Facility that include EbA activities and assessed the types of indicators used.

A major lesson learned from the review was that only about 35 % of indicators monitored adaptation outcomes (e.g. how projects improve the well-being of people by increasing food security, increasing adaptive capacity against risks, etc.).

The review divided indicators into five dimensions of well-being with relative units (%) or absolute units (#):

1. Assets: % and/or # of damages (homes, roads, parks, agricultural land, ecosystem services).

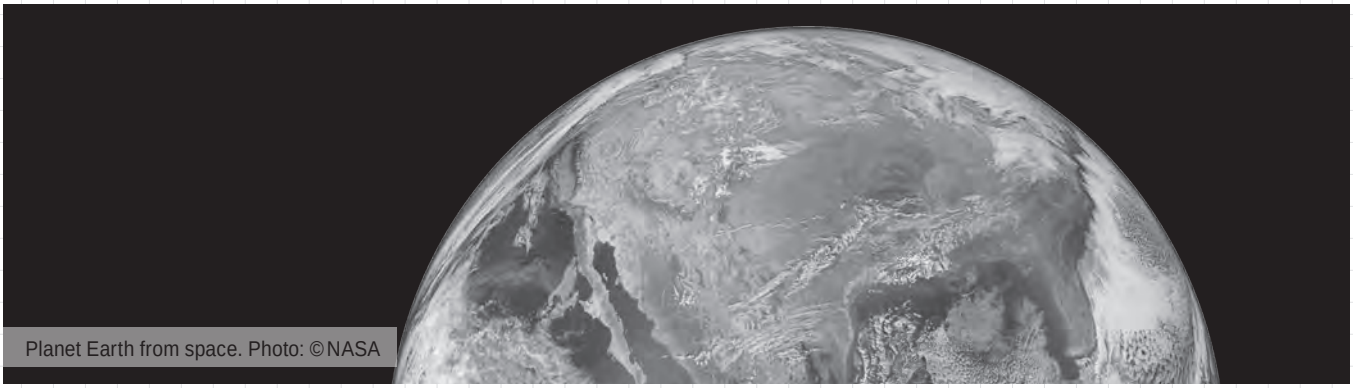
2. Food security: % of people (undernourished, using the food insecurity experience scale as a common metric suggested by the Food and Agriculture Organization of the United Nations to monitor hunger worldwide).

3. Livelihoods: $ income (sustainable crops, livestock, fisheries, non-timber forest products, tourism, small businesses).

4. Health and security: % and/or # of people (Disability-Adjusted Life Year (DALY) as a World Health Organization metric to quantify and monitor the burden of diseases, deaths, injuries and lack of clean water access).

5. Culture: % and/or # of damage (cultural and recreation sites, local knowledge and traditions).

Since EbA initiatives intend to rehabilitate ecosystems and their functions on a spatial scale, quantitative outputs tend to be preferred (e.g. area of rehabilitated forest or grasslands, wetlands, etc.). Another argument against outcome indicators was that, in many cases, measuring change mostly exceeds project lifetimes.



Planet Earth from space. Photo: © NASA

Lessons from Ecuador

Setting up indicators within the Climate, Biodiversity and Sustainable Development (ProCamBío II)

(by Aracely Salazar, GIZ, Ecuador)

The ProCamBío programme is a joint initiative between the Ecuadorian Ministry of the Environment and Ministry of Agriculture, Livestock, Aquaculture and Fisheries, supported by GIZ, with the key objective to support vulnerable communities in fragile mangrove, mountain and forest ecosystems. ProCamBío addresses various international frameworks and national strategic lines of action, including the SDGs, national climate change strategy (NDC/NAP), national biodiversity strategy and protected area policy. It is also supporting the implementation of the national development plan.

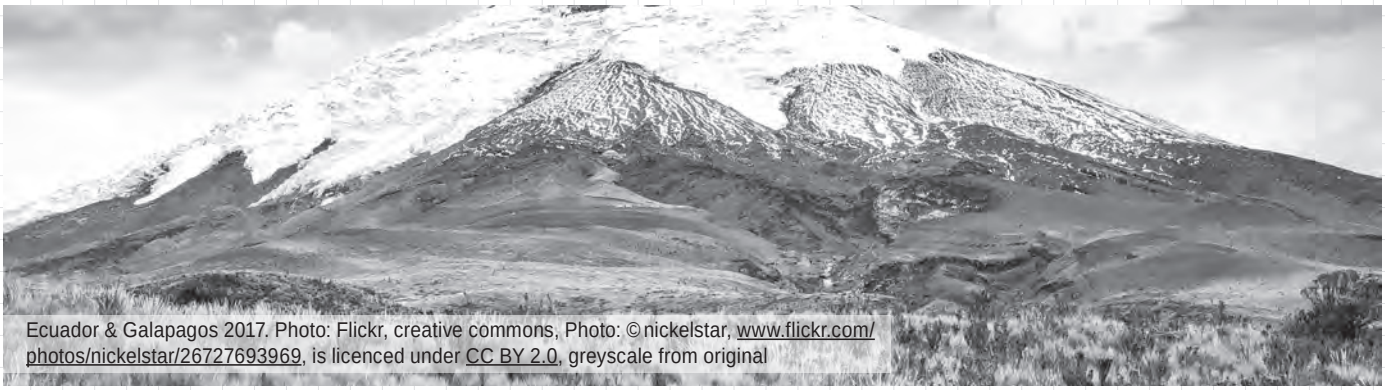
A **key challenge** was how to develop a baseline for measuring the adaptive capacity of local communities and which indicators might be suitable. ProCamBío's approach for developing EbA indicators comprised the following steps:

1. Assessment of ecosystem services (extreme event buffering, food provision, etc.).
2. Identification of climatic and social pressures.
3. Development of adaptation measures with specific outcomes.

During the process, it was essential to assess how changes in the quantity and quality of ecosystem services can be measured.

A **key success factor** in the development of indicators was to focus on the biggest social and climatic pressures on ecosystem functionality. Consequently, the programme selected seven indicators for monitoring changes and benefits, including two for political systems, three for ecosystems, and two for the adaptive capacity of local communities (livelihood improvement).

A **key lesson learned** was that the setup of M&E systems and the definition of tangible and meaningful indicators and their measurement significantly helps to build capacities of local stakeholders and boost local acceptance of projects.



Ecuador & Galapagos 2017. Photo: Flickr, creative commons, Photo: © nickelstar, www.flickr.com/photos/nickelstar/26727693969, is licenced under CC BY 2.0, greyscale from original

Lessons from Peru

EbA indicators within the Mountain EbA Project for landscape restoration in the Andes

(by Erin Gleeson, The Mountain Institute, USA and Karen Podvin, International Union for Conservation of Nature (IUCN), Ecuador)

Restoration of puna (high elevation grassland) landscapes in Peru was a national priority in piloting EbA measures under the Mountain EbA Project (2012 – 2016) in the landscape nature reserve of Nor Yauyos Cochas. Grasslands are shrinking due to melting glaciers and many communities depend on livestock grazing for their livelihoods.

A **key challenge** was to identify an appropriate and measurable set of indicators. In December 2013, stakeholders from government and civil society came together and developed a set of 80 potential indicators for measuring the project's success. After a selection process, the most important 25 indicators were used by the project to address social impacts, ecosystem impacts and ecosystem service impacts, as well as to measure exposure and sensitivity of communities. In many cases, indicator measurement discontinued due to a lack of resources, time and changing priorities of the stakeholders involved.

A **key success factor** was to further reduce complexity by selecting a set of eight indicators based on simple criteria, such as available time, equipment, and human resources, and how well the indicators are aligned with the management plan of the landscape reserve. Monitoring focused on very tangible social and ecological indicators (four of each) that could be measured in the short to long term (e.g. family income, grassland conditions) and during the project's life.

A **key lesson learned** was that it is crucial to engage local stakeholders in M&E considerations from the beginning and to:

- find creative means to ensure continuation of monitoring;
- clearly communicate the benefits of monitoring;
- identify the needs of local people and to involve them actively; and
- be clear about roles of local people vs. researchers vs. governments.

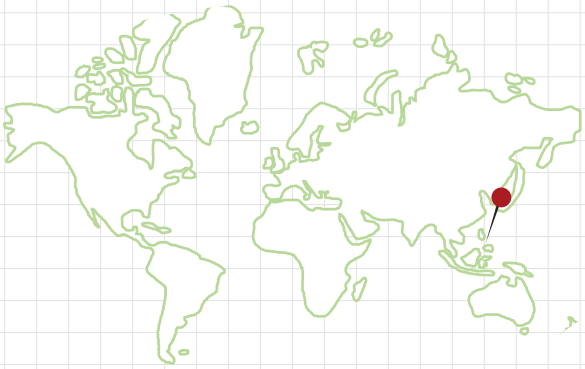
The project was able to significantly restore the puna grassland and its ecosystem services, which could be measured as a concrete ecosystem impact. In addition, seasonal wetlands were rehabilitated and allowed better water collection in the short term, which was clearly measurable even within the project's lifespan.

Lakes in Nor Yauyos Cochas Landscape Reserve, Peru. Photo: © GIZ/Mathias Bertram

Lessons from the Philippines

Developing project indicators for measuring EbA benefits – an example from the 'Proud of my Purok' Project

(by Annadel Cabanan, Wetlands International, Philippines)



The 'Proud of my Purok' Project (2014 – 2017) supported by Wetlands International helps local stakeholders and communities within the Agusan River Basin to reduce risks caused by landslides, erosion and sedimentation by using an integrated risk management approach in a landscape to support ecosystem restoration by planting native trees. A starting point for setting up indicators was a risk map of 'danger zones' for landslides as a key hazard for local people. Forest degradation and deforestation are the source of the problem.

A key challenge was how to measure risk reduction by complex ecological and socio-economic indicators, such as climate resilience indicators, during the lifecycle of a project, when ecosystem rehabilitation is still ongoing and ecosystem service delivery will improve at a later stage.

The project decided to focus on simple and tangible but measurable ecological output indicators, such as the number of hectares of rehabilitated forest and riparian zones.

A key lesson learned from the project was that a four-year period is too short to set up and measure adaptation effectiveness indicators. In this particular case, the follow-up project 'Partners for Resilience' will continue to monitor the adaptation effectiveness of the project between 2016 and 2020.

Peatland, Philippines @GIZ/Mathias Bertram

Linking EbA-specific M&E to other monitoring and reporting systems at all levels (incl. on SDGs)

Vertical integration of EbA-relevant indicators into existing M&E frameworks provides an opportunity to overcome many of the barriers to measuring EbA impacts over the long term. The monitoring of achievements is of particular importance in several EbA-relevant international agreements, although the monitoring objectives differ:

1. SDGs: 17 global targets with 230 indicators.

2. UNFCCC Paris Agreement: NDC implementation and global stock-take, but no clearly defined climate change adaptation indicators.

3. UNISDR Sendai Framework for Disaster Risk Reduction: Seven global targets, with two to eight indicators each.

4. Convention on Biological Diversity: 20 Aichi Biodiversity Targets, with sets of generic and specific indicators.

The following questions need to be answered to determine potential linkages between different systems:

1. Which parts of the agreements are EbA-related?

2. How far do the agreements overlap?

3. What provisions exist for M&E/reporting?

4. Is there a similar (global) M&E framework?

A new GIZ Climate Change Policy Brief[iii] assesses synergies in monitoring the implementation of the Paris Agreement, SDGs and the Sendai Framework by comparing objectives, quantitative goals, purpose of monitoring, and the M&E institutional framework.

In addition, the Friends of EbA (FEBA) Technical Paper 'Making Ecosystem-based Adaptation Effective – A Framework for Defining Qualification Criteria and Quality Standards' provides a practical assessment framework for designing, implementing and monitoring EbA measures by proposing a set of 3 elements, 5 qualification criteria and 20 quality standards and example indicators, which can be linked with existing M&E frameworks. The paper is available online in English, Spanish and French.

The following key messages regarding the linkages of M&E systems have been shared within the Community of Practice:

- It is essential to carefully assess which existing M&E/reporting systems and indicators are already capturing (ecosystem-based) adaptation considerations at national or subnational level. For example, the national development plan of the Philippines has already included EbA as one of its key elements and identified indicators to track implementation until 2022.
- Countries need to assess at what level(s) linking the different aspects of EbA M&E to existing monitoring and reporting systems is most effective. In Tunisia, for example, a national meta-data catalogue collates and clusters information on which ministry is gathering what data.
- Project implementers should assess how the project-level M&E of EbA projects can be linked to other climate change adaptation M&E systems. In Bangladesh for example, Transparency International gained experience in monitoring community-based adaptation and EbA through random field tracking, based on defined transparency indicators and whether project budgets are reaching the target group. In addition, Transparency International also monitored a grievance mechanism for local people.

Further information

- GIZ Climate Change Policy Brief on country-specific M&E of adaptation[iv]
- GIZ Climate Change Policy Brief on adaptation metrics and the Paris Agreement[v]

About the EbA Community of Practice

The EbA Community of Practice, supported by the Global Project 'Mainstreaming EbA', which is funded through the International Climate Initiative of the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and implemented by GIZ, is a knowledge and exchange network of EbA practitioners primarily from governments and international organisations as well as civil society and research institutions with an interest in strengthening ecosystem-based adaptation in planning and decision-making.

This learning brief is a result of a learning and dialogue workshop, including three technical sessions, held within the 2nd international EbA Community of Practice Workshop that was conducted between 21 and 24 August 2017 in Bangkok, Thailand.

The following members have been involved in its development:

Andrea Bender (GIZ, Germany), Pam Berry (Environmental Change Institute at the University of Oxford, United Kingdom), Mathias Bertram (GIZ, Germany), Annadel Cabanan (Wetlands International, Philippines), Margarita Caso (National Institute of Ecology and Climate Change (INECC), Mexico), Mariana Echaniz (GIZ, Mexico), Giacomo Fedele (Conservation International, USA), Felipe Gomez-Villota (GIZ, Colombia), Erin Gleeson (The Mountain Institute, USA), Mike Harley (Climate Resilience Ltd, United Kingdom), Christina Kamlage (GIZ, Germany), Alexandra Köngeter (GIZ, Germany), Quyen Le Thi Le and Nguyen Sy Linh (ISPONRE, Viet Nam), Ngoc Anh Nguyen Thi (GIZ, Vietnam), Karen Podvin (IUCN, Ecuador), Timo Leiter (GIZ, Tanzania) and Aracely Salazar (GIZ, Ecuador).

Intact Coastal Landscape, Indonesia. Photo: © GIZ / Mathias Bertram

Endnotes

i. Deutsche Gesellschaft für International Zusammenarbeit (GIZ) Toolbox for Adaptation M&E, available at www.adaptationcommunity.net/monitoring-evaluation
ii. GIZ Repository of Adaptation Indicators, available at: www.adaptationcommunity.net/?wpfb_dl=221
iii. GIZ Climate Change Policy Brief available at www.adaptationcommunity.net/wp-content/uploads/2017/11/giz2017-en-cc-policy-brief-synergies-PA_SDG_SF.pdf
iv. GIZ Climate Change Policy Brief on country-specific M&E of adaptation , available at: www.adaptationcommunity.net/wp-content/uploads/2017/08/Policy-Brief-on-national-adaptation-ME-systems-and-the-Paris-Agreement-GIZ-2016-002.pdf
v. GIZ Climate Change Policy Brief on adaptation metrics and the Paris Agreement , available at: www.adaptationcommunity.net/wp-content/uploads/2017/11/giz2017-en-policy-brief-adaptation-metrics.pdf

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