NAP Regional Training Workshop for Asia Mainstreaming Climate Change Adaptation into Water Resources

Ecosystem Based Adaptation

Mozaharul Alam
Regional Coordinator, Climate Change
UN Environment
Office for Asia and the Pacific
Bangkok, Thailand

About presentation – learning objectives

- What are ecosystems and ecosystem services;
- Interlinkage - climate change, ecosystem and human well-being;
- What is Ecosystem based Adaptation (EbA);
- Linkage between EbA and National Adaptation Plan (NAP)/Planning Process;
- Approaches and tools for supporting EbA planning;
- Benefits of EbA

What are ecosystems?

"Ecosystem" means a dynamic complex of ***plant, animal and micro-organism communities*** *and their* ***non-living environment*** (e.g. air, water, soil) *interacting as a* ***functional unit*** *(CBD, Article 2)*

- Biodiversity makes the building blocks of ecosystems;
- An ecosystem is an interaction between **living organisms** and the **non-living environment;**
- Humans are an integral part of ecosystems;
- **Ecosystems vary in size**, for example from **a small pond to a watershed or mountain system.**

Ecosystem services – the benefits people obtain from ecosystems

Provisioning
Goods or products produced by ecosystems

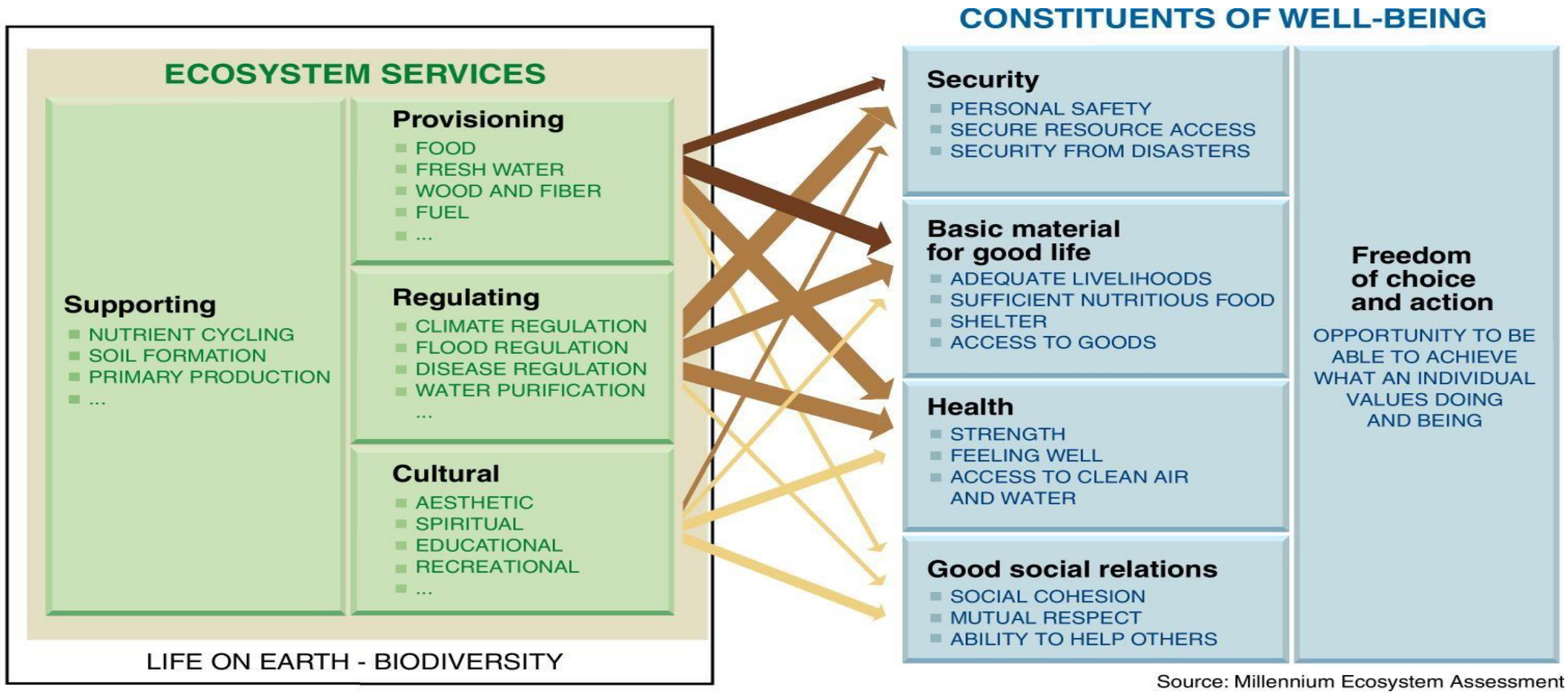
Regulating
Natural processes regulated by ecosystems

Cultural
Intangible benefits obtained from ecosystems

Supporting
Functions that maintain all other services

As described in the *Millennium Ecosystem Assessment*, 2005; images: WBCSD

How do ecosystems affect human well-being?



Source: Millennium Ecosystem Assessment

Ecosystem affect climate, climate change affect ecosystem and services

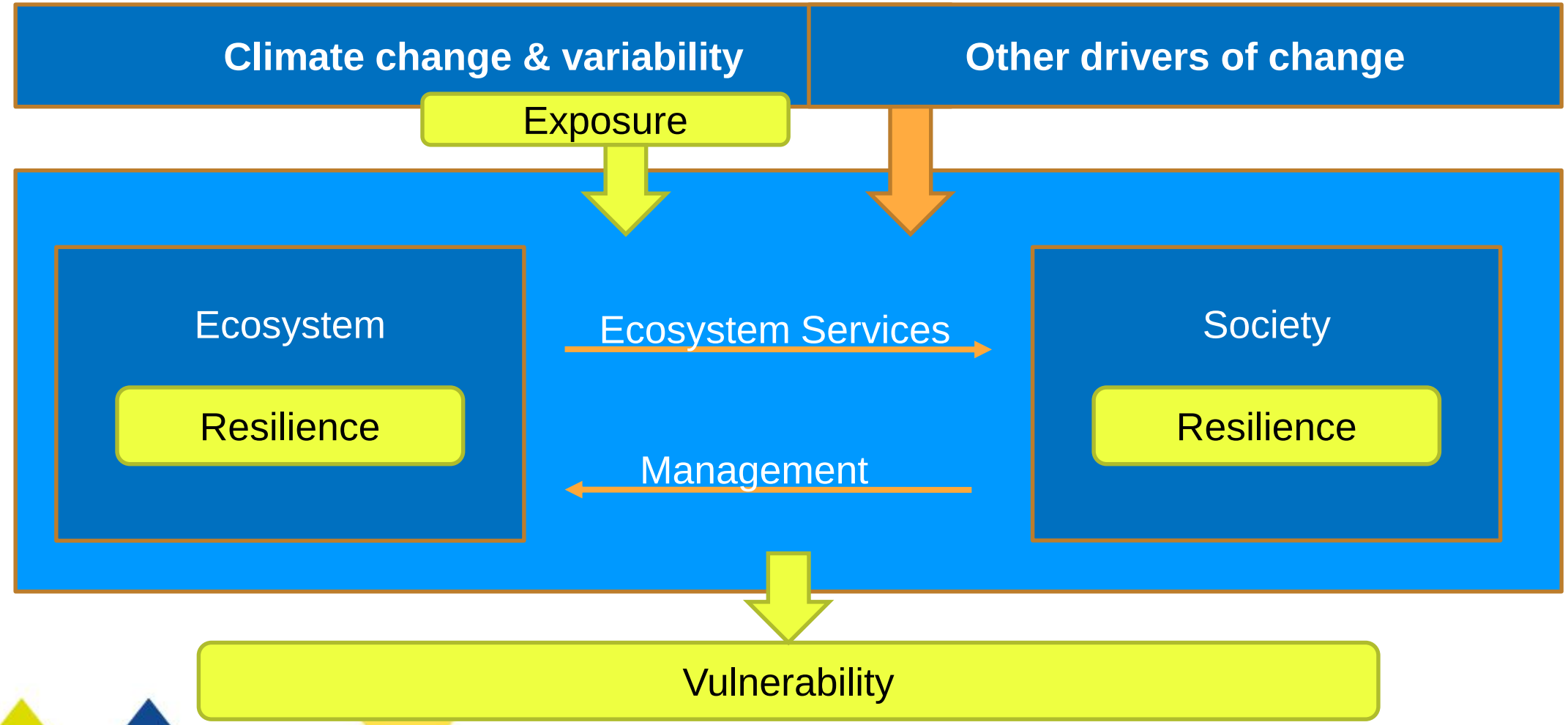
- Ecosystems affect the climate and play an important role in adaptation to climate change;

- Climate change affects ecosystems, their functions and the many benefits and services they provide to people



- Healthy ecosystems can play in increasing resilience and helping people to adapt to climate change through the delivery of the range of services that play a significant role in maintaining human well-being

Linkages between the resilience of ecological and social systems



Climate change impacts are visible

- The impacts of climate change are already affecting the functioning of ecosystems;
- Currently over 1 billion people in over 100 developing countries are locked in the cycle of poverty and environmental degradation – effects of climate change making it worse;
- Approximately 60% of the ecosystem services are being degraded or used unsustainably, including freshwater, capture fisheries, air and water purification, and the regulation of regional and local climate, natural hazards, and pests. *(Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Washington, DC: Island Press)*
- Healthy ecosystems and their services provide opportunities for sustainable economic prosperity and at the same time provide defence against the negative effects of climate change

What is EBA?

- Ecosystem-based adaptation (EBA) is an emerging approach that helps people and the environment to adapt to the adverse impacts of climate change. *EBA is reflected in the Cancun Adaptation Framework, UNEA Resolution;*
- EBA uses **sustainable management, conservation and restoration** of ecosystems taking into account anticipated climate change impact trends to maintain and increase the resilience and to reduce the vulnerability of ecosystems and people to climate change impacts; and
- EBA is the use of biodiversity and ecosystem services as part of an overall adaptation strategy

Principles for an effective EbA

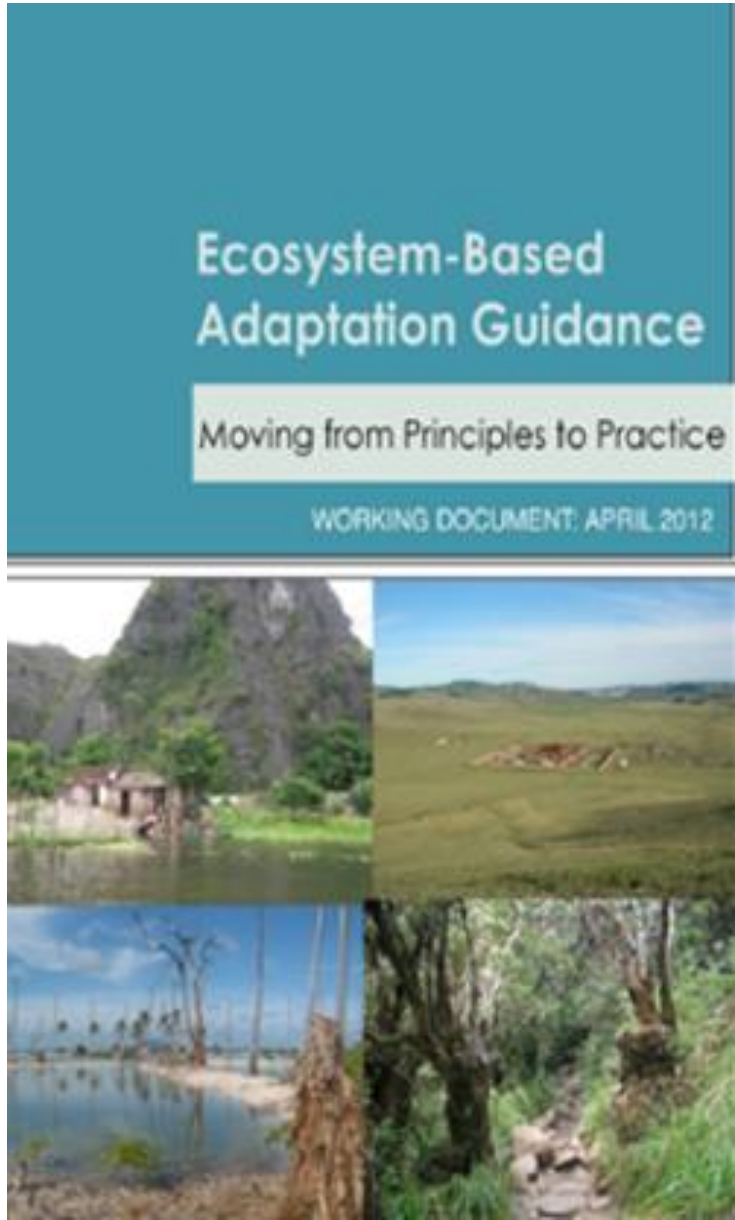
- Promote multi-sectoral approaches and operates at multiple geographical scale
- Multiple benefits
- Promote resilient ecosystems
- Maintain ecosystem services
- Support sectorial adaptation
- Reduce risks and disasters
- Complement infrastructure
- Avoid maladaptation
- Participatory
- Requires comparatively small investment relative to long term benefits
- Measurable

Links between NAP Elements and EbA Components

Step	Element B – Prep elements	EbA guidance
B.2	Assessing climate vulnerability and identifying adaptation options	▪ Analyze the current and future vulnerability ▪ Analyze the role of ecosystem services and impact of CC to them ▪ Select the area of intervention and the problem statement ▪ Select adaptation measures
B.3	Reviewing and appraising adaptation options	▪ Compile a shortlist of adaptation measures ▪ Consider how adaptation measures translate into discrete options in your context ▪ Develop evaluation criteria ▪ option against criteria
Step	**Element C – Implementation**	**EbA guidance**
C.1	Prioritizing climate change adaptation in national planing	• Prioritize adaptation options with EbA lenses
C.2	developong a long term adaptation implementaion strategy	• Design for evidence base for effective EbA
Step	**Element D – M&E and reporting**	**EbA guidance**
D.1	Monitor the NAP process	• Monitor progress • Data interpretation • Reflect and adapt • Develop evidence for persuasion

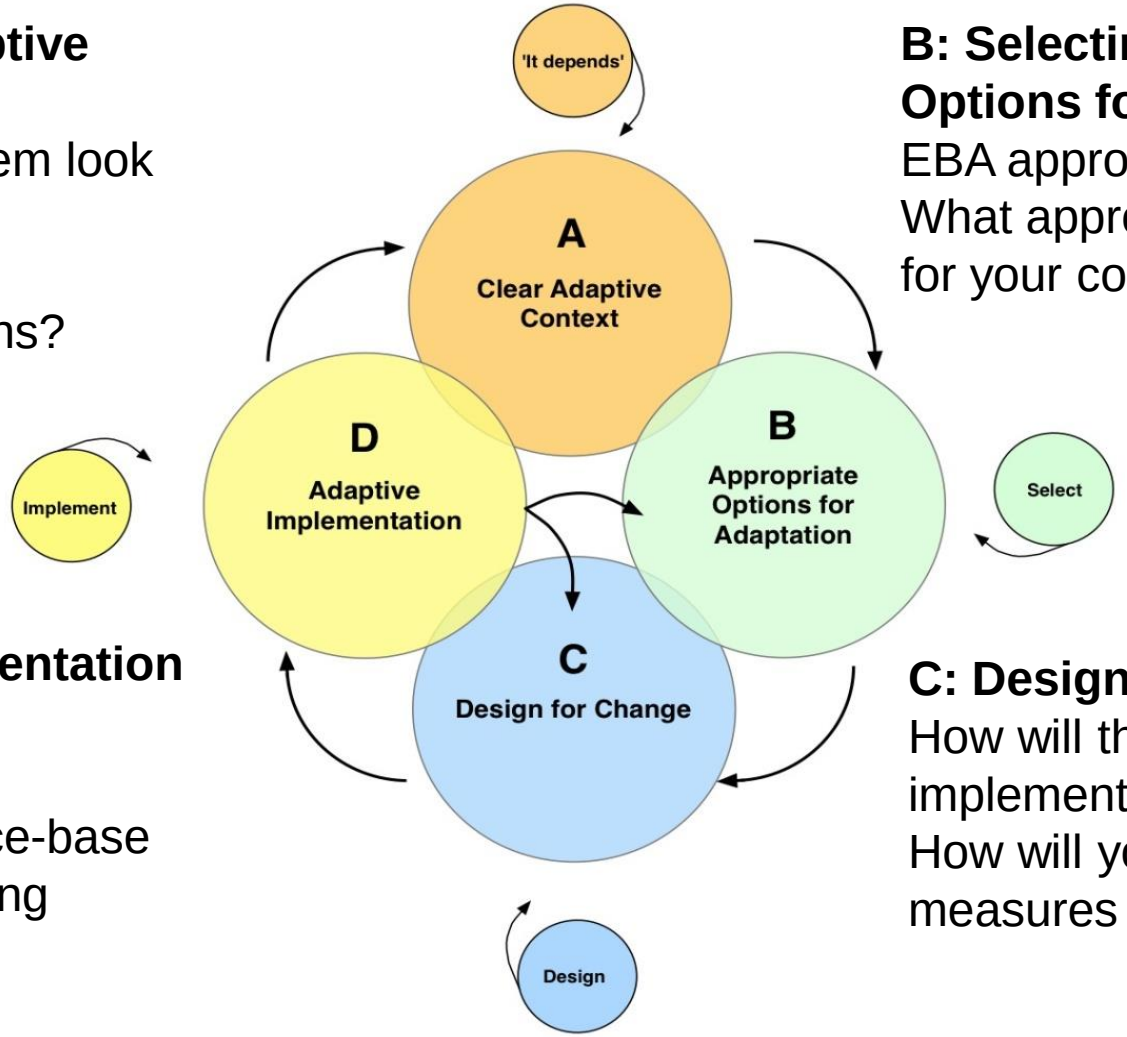
EbA decision support framework

- Enable consideration of EBA alongside a suite of other alternatives – EBA is not always the right option and often complements infrastructure projects;
- Enables decision-making incorporating a range of ecosystem services given the accuracy at which they can be quantified;
- Built around an adaptive M&E framework, and pro-active in framing M&E for project design and the intervention life-cycle, and beyond; and
- Ensures that the user has the ability to monitor the effectiveness of their selected intervention in achieving its intended outcomes.



EbA decision support framework - A Planning Tool

A: Setting the Adaptive Context
What does your system look like?
How is it used?
Management concerns?
Adaptation goals?



B: Selecting Appropriate Options for Adaptation
EBA approaches available?
What approaches are suitable for your context?

D: Adaptive implementation
Monitor
Reflect and adapt
Contribute to evidence-base
Sound decision-making

C: Design for Change
How will the measure be implemented?
How will you know if the measures are effective?

DSF: Components and Associated Activities

Component	A: Setting the Adaptive Context	B: Selecting Appropriate Adaptation Options	C: Design for Change	D: Adaptive implementation
Description	Supports selection of the most appropriate options for adaptation in a given context. Component A explores this context with a view to establishing where information gaps exist.	Identification of appropriate intervention measures and associated, context specific, adaptive actions.	Supports the transition from a list of selected intervention measures, to develop a program that will guide implementation and define a plan to evaluate and reflect on performance.	Provides users with guidance to be confident in implementing change if and when required.
Outcome	Clear adaptation decision making context defined with a particular understanding of the role of ecosystem services	Appropriate adaptation options prioritised in project context	Plan for implementation and evaluation	An adaptive approach to EBA implementation
Resources	A range of resources to assist in completing Component A is presented in Annex A1-A5. This includes tools, toolkits, reports and papers on ecosystem service valuation and climate risk screening.	A selection of resources for considering adaptation options is presented in Annex B1-B3. Key tools and methods for adaptation option analysis as well as a thorough overview of adaptation technologies is provided	A range of resources to assist in initiative design and monitoring and evaluation are provided in Annex C1-C3. Example indicators are aligned to ecosystem services and guide for selecting indicators are presented.	In text boxes outlining an adaptive approach to initiative implementation and links to adaptive management resources are presented in Annex D1
EBA Focus	Users are asked to consider their ecosystems and the associated services they provide to informing a problem development and goal definition. By defining the problem that an adaptation intervention may wish to address with an ecosystem lens, EBA options are placed on a 'level playing field' with respect to traditional adaptation technologies	Example adaptation technologies are grouped by ecosystem service with their associated benefits and limitations provided to guide the selection of ecosystem-based approaches to adaptation.	Users are guided in project design and evaluation to facilitate long-term adaptive management and deliver 'evidence for persuasion'. This sets the foundation for continued support for EBA initiatives whilst ensuring transparency and accountability in implementation.	Ecosystems-based approaches to adaptation require a long-term view. An adaptive, flexible and sustainable approach is advocated to meet this challenge.

AT A GLANCE.....

Component A is intended to assist the user in defining a clear adaptive context for decision making at the outset of adaptation project design. Context setting is undertaken with an ecosystem lens.

Component A:

Setting the Adaptive Context

Why should I use this guidance?	You want to establish clear context specific adaptation goals and objectives built around: • Understanding of vulnerability. • Understanding the role of ecosystem services within your area of interest. • Vision of alternative future where adaptation has occurred.
What do I need to know to inform decision making process?	• Awareness of your vulnerability profile: sectors, locations. • Projections for future change in climate for your area. • Understanding of likely impacts on 'key elements' in your specific project context. • Consensus from key stakeholders on what a preferred future would look like.
What activities do I undertake to help me make decisions?	• Select demonstration sites (Question A1). • Compile information on system characteristics & ecosystem services (Question A2). • Clearly define your problem statement (Question A3). • Clearly define your adaptation goals (Question A4).

What should I expect to get at the end of the process?

A clear adaptive decision making context defined with a particular understanding of the role of ecosystems.

AT A GLANCE.....

Assists the user in evaluating the applicability of adaptation options, including EBA options, to address specified adaptation goals. The user is provided with guidance on (i) a range of options available relative to ecosystem services; and (ii) decision making process to select the most appropriate for their context.

Component B:

Selecting Appropriate Adaptation Options

When should I use this component of the guidance?	You want to prioritise potential adaptation options to treat your identified problem and meet your specified adaptation goals. This guidance should be used during project planning phase to ensure that the full range of adaptation technologies, including EBA, are evaluated on relative merit for the discrete adaptation context.
What do I need to know to inform decision making process?	• Clearly defined adaptation goals and objectives that are cognisant of ecosystem services in your context. • Information on opportunities and limitations of available options. • Criteria to assess context specific applicability. • Evaluation scale to assist in prioritisation.
What activities do I undertake to help me make decisions?	• Select a shortlist of preferred adaptation measures for your context (Question B1). • Consider how adaptation measures translate to discrete options in your context (Question B2). • Apply evaluation criteria to assess to your adaptation options (Question B3).

What should I expect to get at the end of the process?

Prioritised, appropriate options for your adaptation context.

AT A GLANCE.....

Component C supports the transition from a list of selected prioritised intervention measures to develop a programme that will guide implementation and to define a plan to evaluate and reflect on performance.

Component C:

Design for Change

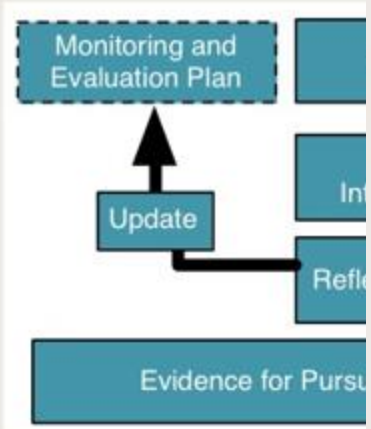
Why should I use Component C of the guidance?	You want to develop a plan to implement and evaluate an initiative built upon: • A participatory approach. • An understanding of short and long term adaptation goals. • An adaptive framework.
What do I need to know to inform decision making process?	• Prioritised adaptation measures that have been developed with a EBA lens. • Resources that support program design. • An understanding of performance evaluation.
What activities do I undertake to help me make decisions?	Develop an initiative that will demonstrate: • Accountability and transparency. • Deliver evidence for persuasion. • Enable long-term adaptive management.

What should I expect to get at the end of the process?

An EBA initiative that (i) has clear and context specific goals and objectives; (ii) is based on a foundation of participatory design and implementation; and (ii) enables monitoring for accountability and transparency as well as for long-term adaptive management.

AT A GLANCE.....

Component D provides users with guidance to be confident in implementing change if and when required.



Component D:

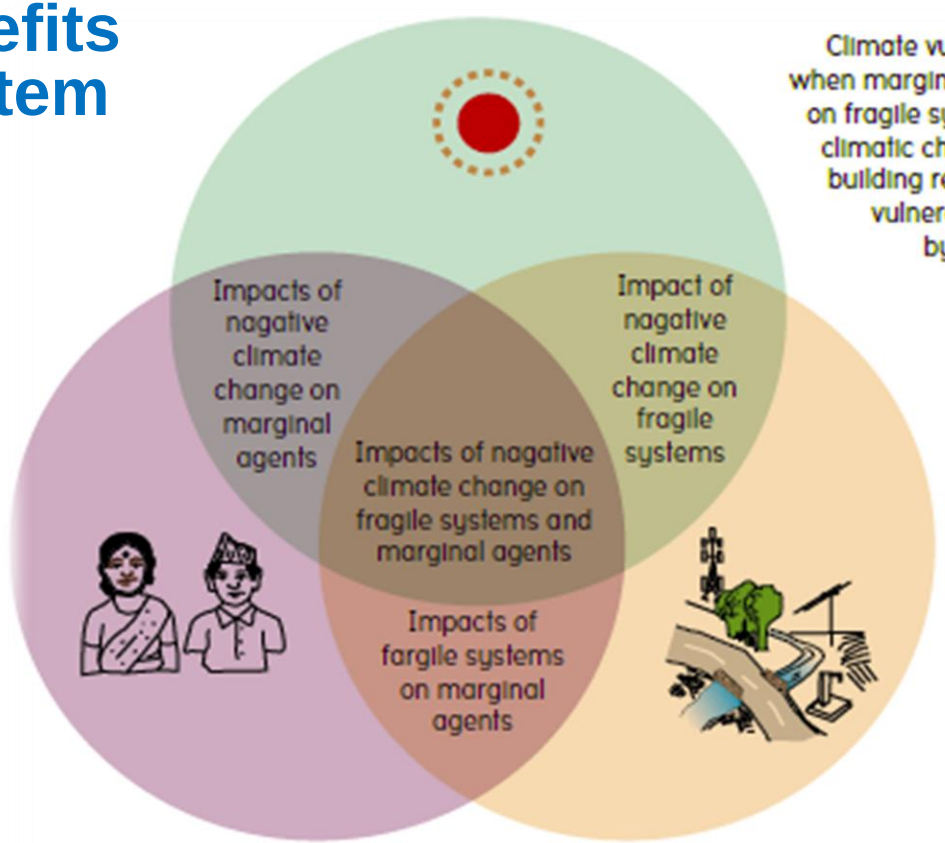
Adaptive implementation

Why should I use Component D of this guidance?	You want to ensure an adaptive approach to initiative implementation that will: • Demonstrate transparency and accountability; and • Facilitate adaptive management in the long-term to deliver positive outcomes for ecosystem services.
What do I need to inform the decision making process?	• A plan for performance assessment. • The schedule for performance reflection, including list of participants and mechanisms for reporting. • Flexibility of your initiative: who to notify when change is required, what changes are within the realm of the initiative and what changes must be delivered through broader activities.
What activities do I undertake to help me make decisions?	• Monitor progress. • Data Interpretation. • Reflect and adapt. • Develop evidence for persuasion.

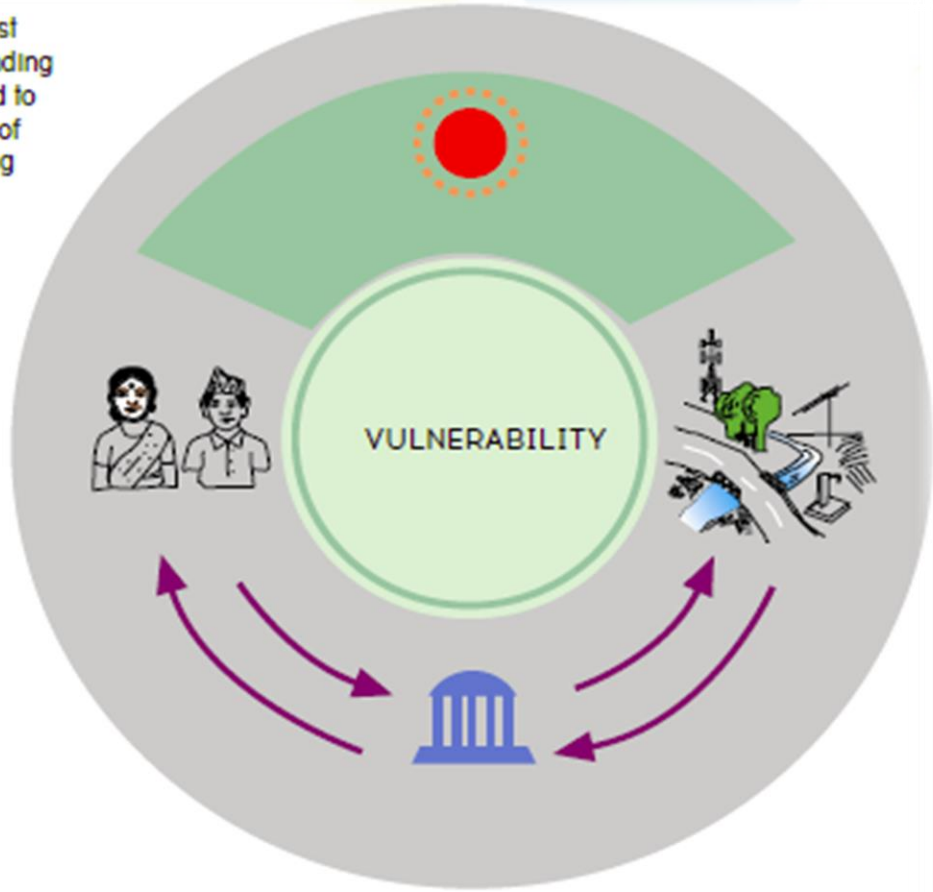
What should I expect to get at the end of the process?

Adaptive approach to initiative implementation, in the short and long term.

Multiple Benefits of EbA – System point of view



Climate vulnerability is highest when marginalized agent depending on fragile systems are exposed to climatic change. The process of building resilence (or reducing vulnerability) mediated by institutions.



marginalised	Agents	high capacity
nagative	Climate exposure	positive
fragile	Systems	resilient

EXPOSURE
Exposure to climate change encompasses the direct and indirect impacts that affect systems and agents.

AGENTS
The capacities of agents (individuals, households, communities, businesses, government organizations, NGOs, CBOs, etc.) help them adjust as exposure increases or changes.

INSTITUTIONS
Institutions are the rules and norms that guide the interactions of agents with each other and that govern access to services various systems provide.

SYSTEMS
Systems, including ecosystems, are the foundations that enable people of every society to adjust as exposure changes.

Adapted from ISET (2012)

Multiple Benefits of EbA

- Ecosystem-based approaches to adaptation are widely applicable at different spatial and temporal scales;
- Ecosystem-based approaches to adaptation have the potential to reduce vulnerability to a broad range of climate and non-climate stresses;
- Ecosystem-based approaches to adaptation may be more cost-effective and accessible by rural or poor communities than measures based on hard infrastructure and engineering;

Multiple Benefits of EbA

- Ecosystem-based approaches to adaptation can be particularly important to poor people, who are often the most directly dependent on the ecosystem services;
- Ecosystem-based approaches to adaptation also provide for the possibility of multiple economic, social, environmental and cultural co-benefits;
- Ecosystem-based approaches to adaptation are found most appropriate while integrated into broader adaptation and development strategies – complementing rather than being an alternative

EBA Ecosystem-based measures can contribute

- Livelihood sustenance and food security – protected areas, can contribute to food security by protecting essential water supplies for downstream farming;
- Sustainable water management – A third of 105 of the world's largest cities derive their water from forest protected areas;
- Disaster risk reduction – storms, flooding, droughts, fires, landslides, hurricanes and cyclones;
- Biodiversity conservation – medicine and recreation

Examples of EBA?

- Maintenance and/or restoration of mangroves, coastal wetlands to reduce coastal flooding and coastal erosion;
- Sustainable management of upland wetlands, forests and floodplains for the maintenance of water flow and water quality;
- Conservation and restoration of forests to stabilize land slopes and regulate water flows;
- Conservation of agrobiodiversity to provide specific gene pools for crop and livestock adaptation to climate change;
- Establishing and effectively managing systems to ensure the continued delivery of the ecosystems services.

Examples of EBA?

Water management issue (Primary service to be provided)		Green Infrastructure solution	Location				Corresponding Grey Infrastructure solution (at the primary service level)
			Watershed	Floodplain	Urban	Coastal	
Water supply regulation (incl. drought mitigation)		Re/afforestation and forest conservation	■				Dams and groundwater pumping Water distribution systems
		Reconnecting rivers to floodplains		■			
		Wetlands restoration/conservation	■	■	■		
		Constructing wetlands	■	■	■		
		Water harvesting*	■	■	■		
		Green spaces (bioretention and infiltration)			■		
		Permeable pavements*			■		
Moderation of extreme events (floods)	Riverine flood control	Re/afforestation and forest conservation	■				Dams and levees
		Riparian buffers		■			
		Reconnecting rivers to floodplains		■			
		Wetlands restoration/conservation	■	■	■		
		Constructing wetlands	■	■	■		
		Establishing flood bypasses		■			
	Urban stormwater runoff	Green roofs			■		Urban stormwater infrastructure
		Green spaces (bioretention and infiltration)			■		
		Water harvesting*	■	■	■		
		Permeable pavements*			■		
	Coastal flood (storm) control	Protecting/restoring mangroves, coastal marshes and dunes				■	Sea walls
		Protecting/restoring reefs (coral/oyster)				■	

REFORESTATION, REGENERATION, RENEWAL

252,914

indigenous trees replanted in deforested areas

4,300

community members trained at the Nursery Training Center and elsewhere, to support them to develop climate resilience.

1,891

families have received fruit trees for planting around their homesteads

300+

households with improved access to water as a result of water resource infrastructure development

MoE

ADAPTATION FUND

UNEP

GREEN INFRASTRUCTURE

GUIDE FOR WATER MANAGEMENT

Ecosystem-based management approaches for water-related infrastructure projects

Thank you