

Ecosystem-based adaptation, developing the evidence base and mainstreaming in adaptation planning processes



Mara Baviera

Task Manager

Climate Change Adaptation Unit, UNEP

16 November 2018

Outline

1. Information requirements and gaps for preparing funding proposals
2. Focus on ecosystem-based adaptation (EbA)
3. Opportunities (and limitations?) in NAPs in providing the evidence base for adaptation options and projects, including EbA

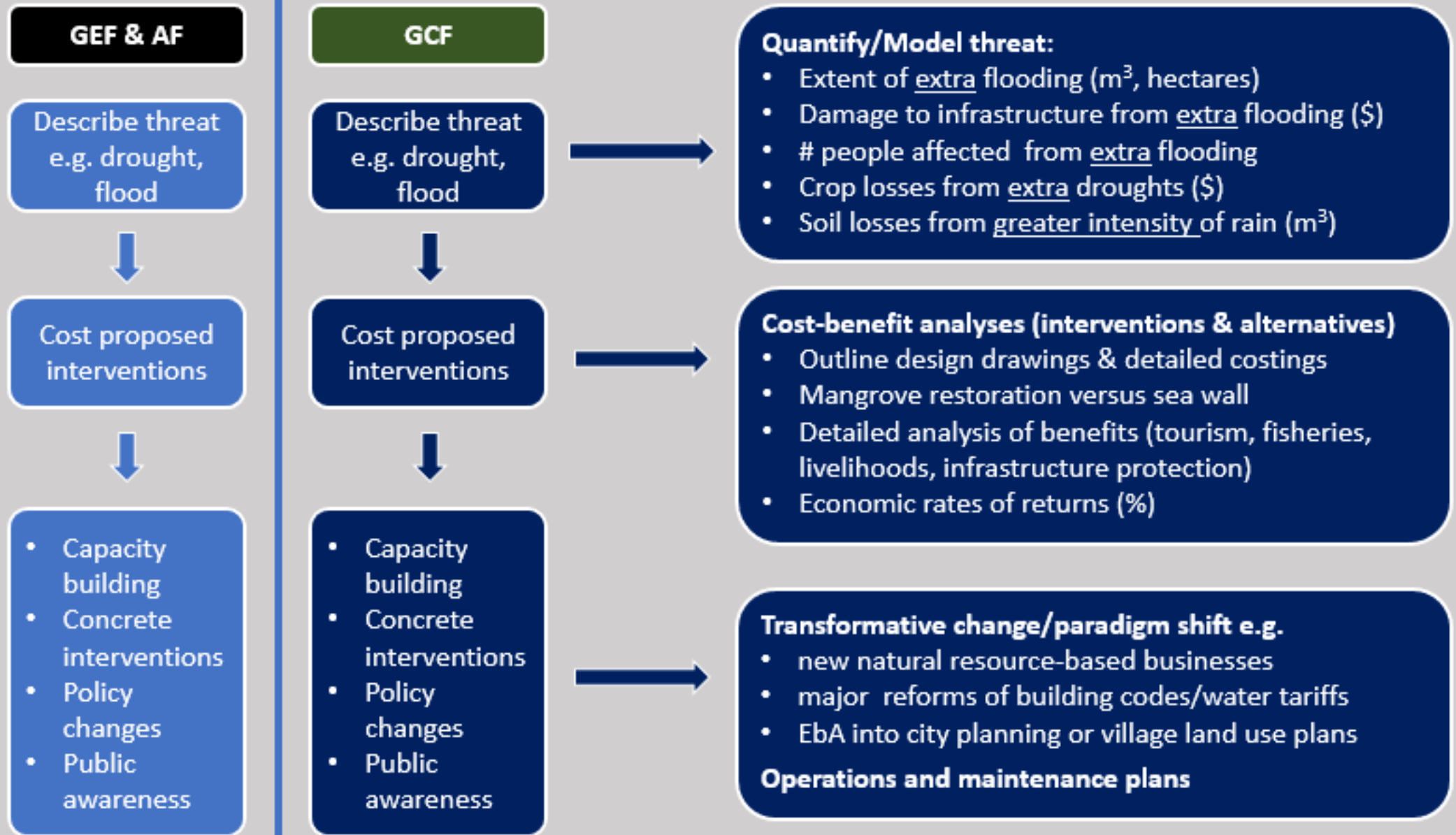
Climate change as a “wicked problem”

Stakes are high, decisions urgent, facts uncertain, and values disputed (Funtowicz and Ravetz 1991)

- The science of climate change projections are getting better but still have uncertainties, large information gaps
- The urgency is only increasing we are living in a 1°C world now
- Lives and livelihoods are at stake
- (...and funding is scarce!)

What adaptation decisions do we make amid urgency and uncertainty?

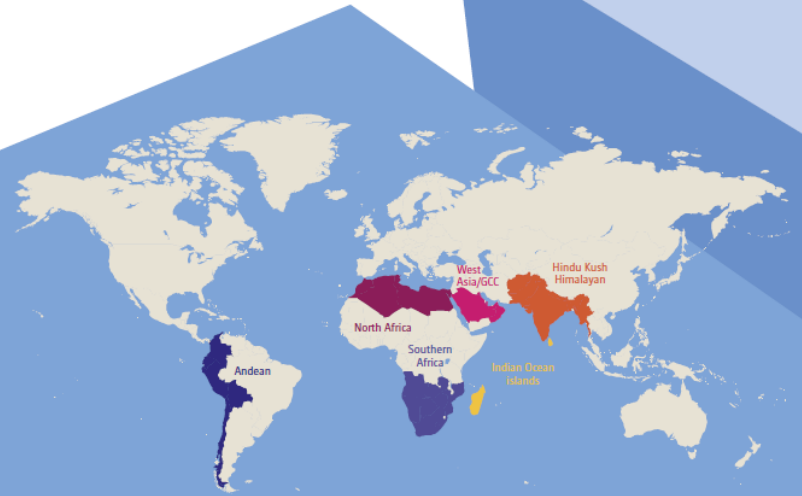
Expectations



Reality

Lima Adaptation Knowledge Initiative:

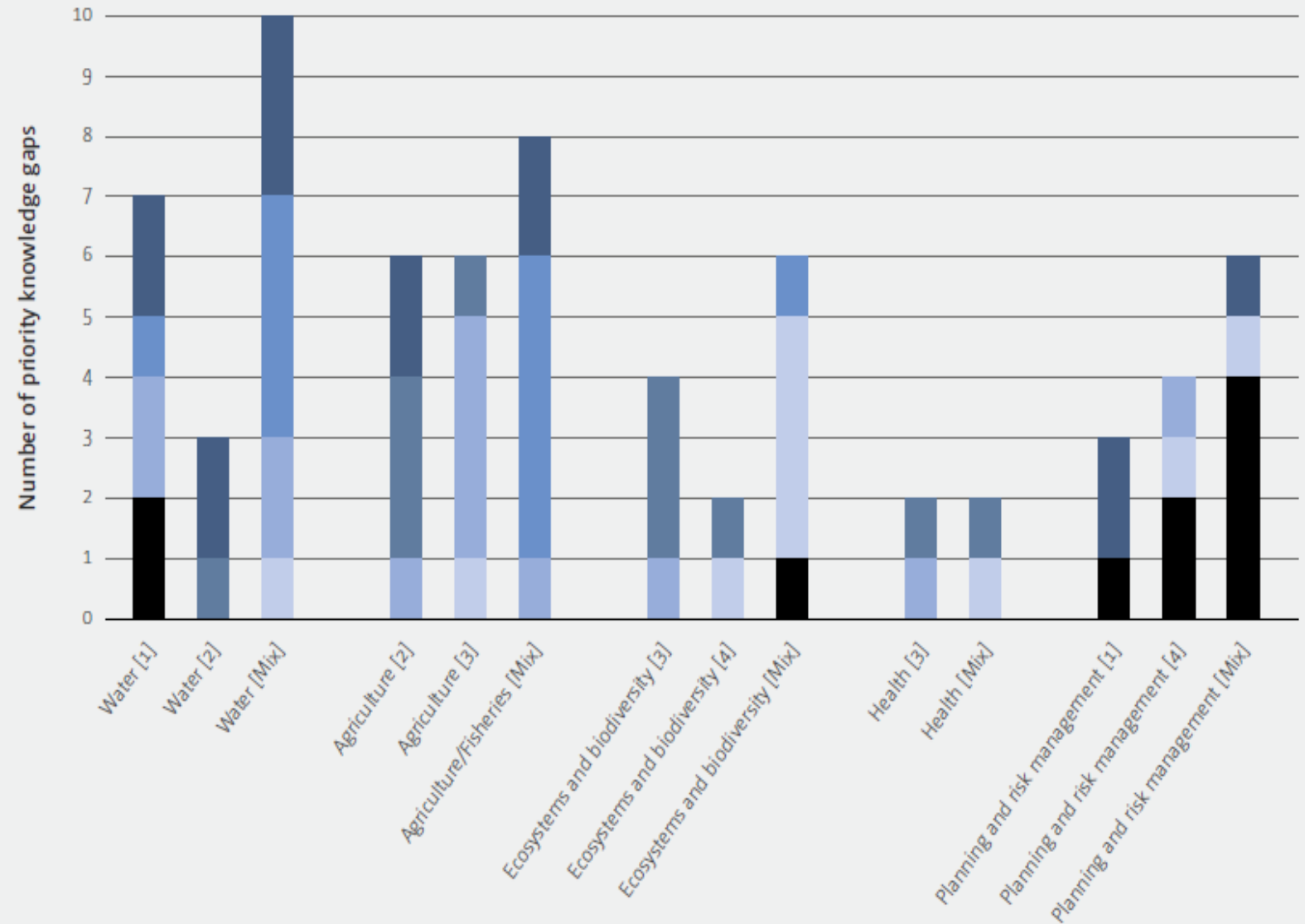
Closing knowledge gaps
to scale up adaptation



6 Subregions 38 Countries 85 Priority knowledge gaps

Knowledge gaps constitute significant barriers to successful climate change adaptation actions, whether it is the absence of knowledge, lack of access to existing knowledge or the disconnect between knowledge holders and users. The Lima Adaptation Knowledge Initiative (LAKI) identifies and prioritizes adaptation knowledge gaps, and catalyzes action to bridge these gaps. This document provides an overview of the first phase of the LAKI.

Figure 2 Common priority knowledge gaps across subregions



Dealing with the disconnect

- How do we balance the need for data and information (and financing for these) with the urgency of adaptation?
- Can we use the best available science or is the production of new research and data necessary?
- What are the ranges of timelines and costs associated with the production of this information?
- Where does the money come from?
- What is the practice in other financing institutions?

What is ecosystem based adaptation?

As defined by the CBD, EbA is 'the use of biodiversity and ecosystem services as part of an overall strategy to help people adapt to the adverse effects of climate change.' This encompasses 4 core principles:

1. The use of biodiversity and ecosystem services
2. To help people
3. Adapt to climate change
4. As part of an overall adaptation strategy

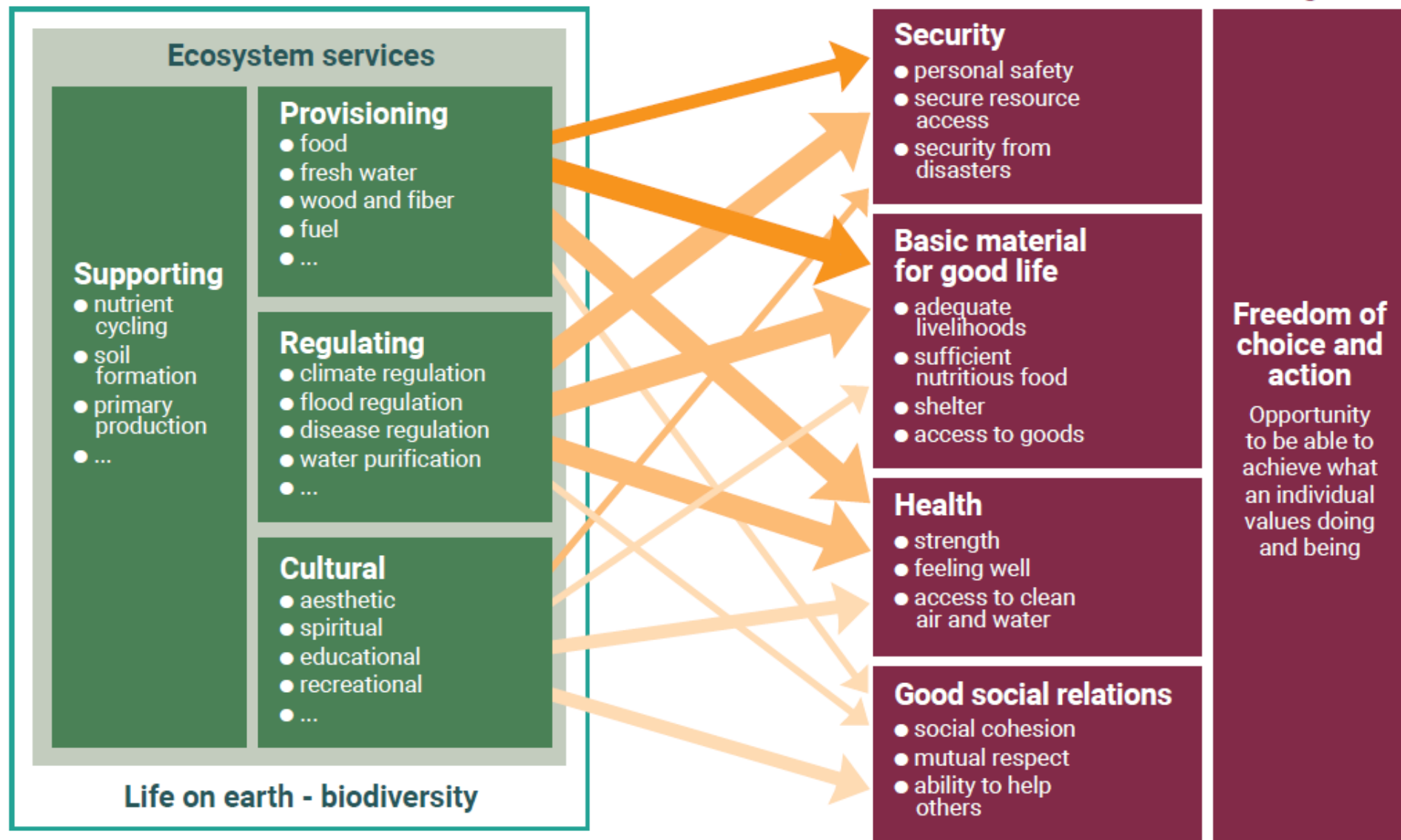


Figure 2. Linkages between ecosystem services and human well-being
(source: Millennium Ecosystem Assessment).

Arrow's colour

Potential for mediation by socioeconomic factors

Low Medium High

Arrow's width

Intensity of linkages between ecosystem services and human well-being

Weak Medium Strong

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*					
Water quality regulation	Water purification	Re/afforestation and forest conservation					Water treatment plant
		Riparian buffers					
		Reconnecting rivers to floodplains					
		Wetlands restoration/conservation					
		Constructing wetlands					
		Green spaces (bioretention and infiltration)					
		Permeable pavements*					
	Erosion control	Re/afforestation and forest conservation					Reinforcement of slopes
		Riparian buffers					
		Reconnecting rivers to floodplains					
	Biological control	Re/afforestation and forest conservation					Water treatment plant
		Riparian buffers					
		Reconnecting rivers to floodplains					
		Wetlands restoration/conservation					
		Constructing wetlands					
	Water temperature control	Re/afforestation and forest conservation					Dams
		Riparian buffers					
		Reconnecting rivers to floodplains					
		Wetlands restoration/conservation					
		Constructing wetlands					
		Green spaces (shading of water ways)					

Making EbA an effective part of balanced adaptation strategies: Introducing the UN Environment EbA briefing notes

Adaptation to climate change is about helping people and economies thrive in the face of climate. As adaptation solutions can often be found in nature, this has given rise to the ecosystem-based adaptation (EbA). EbA has grown in profile and importance since it was defined by the Convention on Biological Diversity (CBD) in 2009. The concept has been embraced by intergovernmental and non-governmental organisations across the globe, and EbA projects

Navigating the adaptation challenge

Climate change adaptation is a multi-faceted challenge. Adaptation interventions need to both address current negative climate impacts and help people deal with future climate change in the long term. Adaptation also has to address many uncertainties: scientific uncertainty about projected changes in impacts, especially locally; technical uncertainty about the effectiveness of measures for addressing identified vulnerabilities now and in the future; socio-economic uncertainty about livelihood impacts and options, and capacities needed to adapt; political uncertainty about immediate and long-term structural and institutional changes needed; and financial uncertainty about funding and sustaining change over the long term.

BRIEFING
2
NOTE

EbA in different ecosystems: placing measures in context

The climate change adaptation challenge varies geographically and with local circumstance. The pressures on, and condition of local ecosystems affect their capacity to deliver ecosystem services, and consequently people's vulnerability. Ecosystem-based adaptation (EbA) measures can help to secure ecosystem services and reduce people's vulnerability in ecosystem contexts ranging from largely natural to heavily modified landscapes, such as cities or agricultural lands.

This briefing note provides an overview of EbA measures commonly implemented in particular ecosystems (mountains, drylands, wetlands, coasts, and urban systems), and highlights through

BRIEFING
3
NOTE

Selecting complementary adaptation measures

To respond to climate change hazards, an overall adaptation strategy should be devised drawing on the full range of possible adaptation solutions. This includes ecosystem-based adaptation (EbA), which restores and/or builds on ecosystem goods and services that underpin people's resilience (Briefing Notes 2 and 3), as well as 'hard', or built solutions, hybrid options, and 'soft' approaches that target changes in markets, institutions, policies and behaviour.

BRIEFING
4
NOTE

Developing the economic case for EbA

It is often suggested that ecosystem-based adaptation (EbA) can be more cost-effective, provide both the desired adaptation benefits and multiple co-benefits, and be more sustainable in the long term. Assembling the evidence to present this case, however, remains a challenge in practical terms.

This briefing note highlights the range of information that should be incorporated in making an economic case for EbA, and the relevance of compiling it for all adaptation solutions to help ensure that EbA options are fairly compared with other adaptation approaches.

BRIEFING
5
NOTE

Integrating EbA into national planning

To effectively address the negative impacts of climate change now and in the future, climate change adaptation strategies need to be integrated into wider national policies and planning processes – adaptation cannot stand in isolation. A conscious effort is needed to ensure that ecosystem-based adaptation (EbA) options are both incorporated into climate change adaptation strategies and included in work to integrate adaptation into other planning processes such as national development planning or sectoral policies and strategies.

BRIEFING
6
NOTE



Effective adaptation will often require implementing a mix of different adaptation measures, drawn from a scale of 'grey to green' (Figure 1), to build on the strengths, and compensate for potential weaknesses, of individual measures. The need for such complementarity also applies through time, as some measures may take longer to produce adaptation benefits (e.g. ecosystem restoration) than are ultimately more effective. Importantly, the final selection of adaptation measures should always directly respond to the identified climate change impacts and aim to achieve a primary adaptation goal. Furthermore, the measures and their outcomes must in themselves be robust to climate change.

This briefing note provides an overview of the range of adaptation approaches that can be implemented alongside EbA measures to form a holistic adaptation strategy. It explores complementarities and limitations between measures, as well as how to bring together the various approaches effectively under one strategy.



The challenge

Climate change adaptation should be financially sustainable but economic returns could and should be large. Increasingly, EbA projects around the world are confirming some economic advantages of EbA, in particular that EbA can be more cost-effective. However, a recent review of EbA-relevant valuation methods highlighted a key challenge being the lack of 'hard' evidence of the physical effectiveness of EbA measures in responding to climate hazards and meeting adaptation goals. Most studies simply assume that conserving or restoring a particular natural habitat will secure certain benefits, rather than investigating which management actions are required to reach specified adaptation goals. There is also limited information about the exact processes through which EbA can generate wider co-benefits.

These evidence gaps can make it difficult to build a business case to convince planners and decision makers that EbA will yield a worthwhile return on investment and should therefore be integrated into wider adaptation strategies. Investing in building such evidence can help planners understand the potential impacts of different options and trade-offs among them, and integrate any necessary mitigation measures into the design process.

In addition to evidence gaps, deeper analysis of EbA options may also reveal political economy challenges. EbA solutions are less likely to be supplied by markets, or by suppliers currently offering conventional engineering approaches, and are more likely to generate benefits that are more dispersed and 'public' in



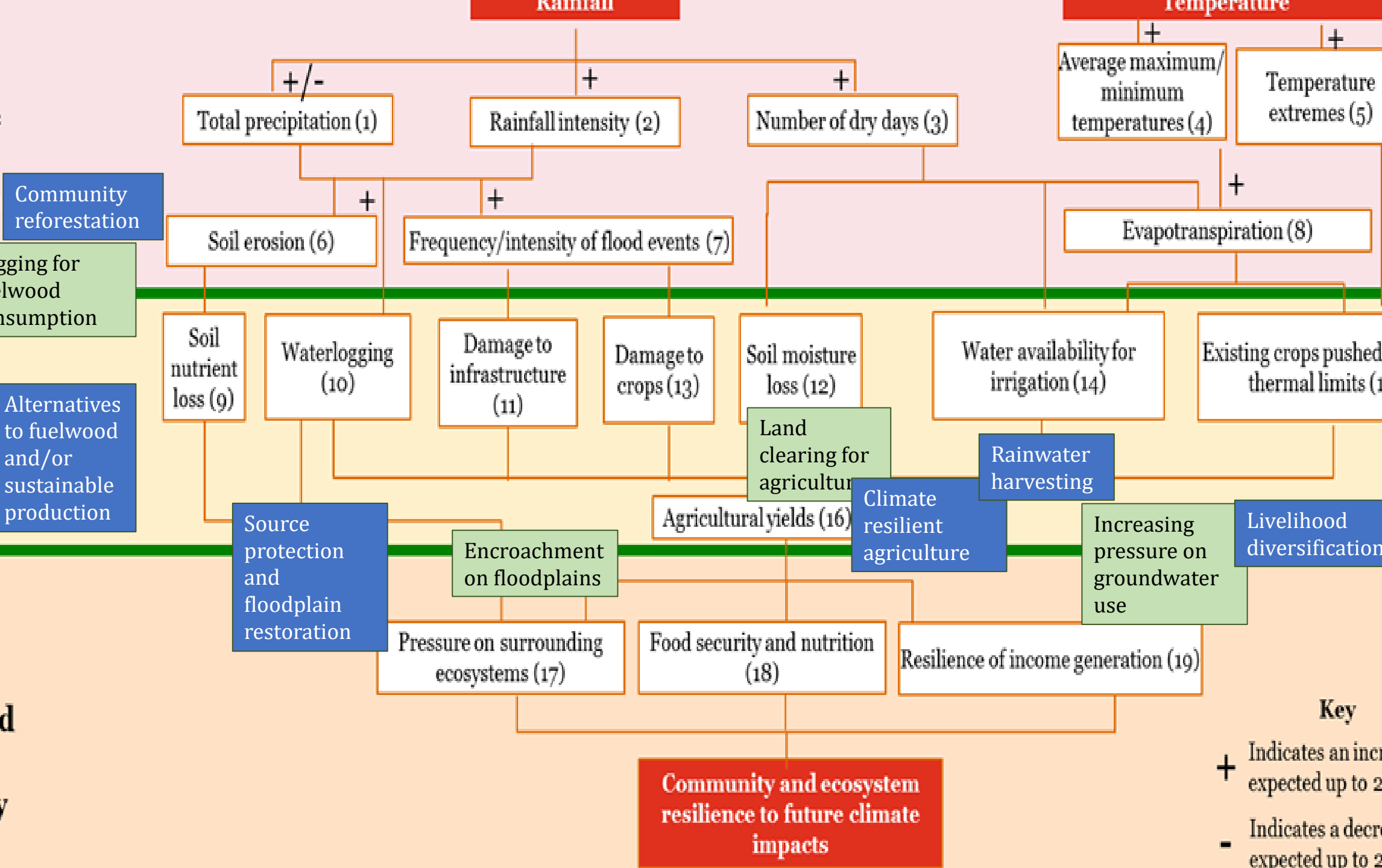
In order to identify the potential role of EbA for different sectors, an understanding of the climatic and non-climatic drivers (see Briefing Notes 1 and 2) in each sector should be developed and the possible contribution of ecosystem services towards addressing these should be analysed. The effective integration of EbA into adaptation strategies and wider sectoral or cross-sectoral planning can then be promoted by making a solid case for EbA that can be understood by decision makers in the context of their own political remit. Ensuring uptake of EbA will further depend on understanding the policy, planning and financing landscape to identify and/or create opportunities and entry points for integrating EbA. Developing evidence of the costs, benefits and cost-effectiveness of EbA measures will also be crucial for their wider adoption and replication on the ground (see Briefing Note 5).

This Briefing Note covers why, where, when and how to integrate EbA into national adaptation strategies and other sectoral policy, planning and budgetary processes.

Current and future climate challenges

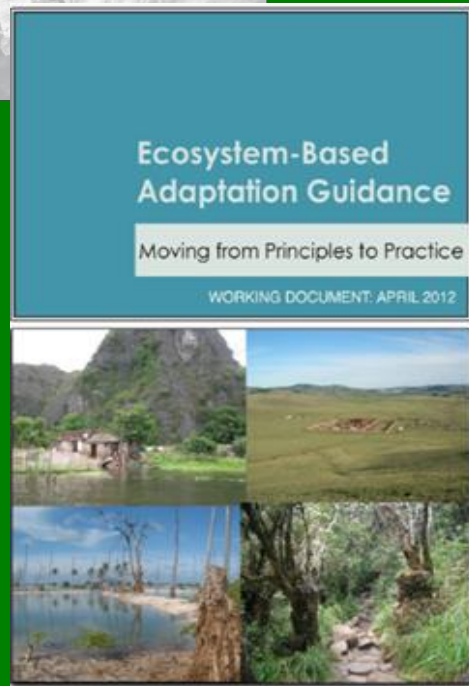
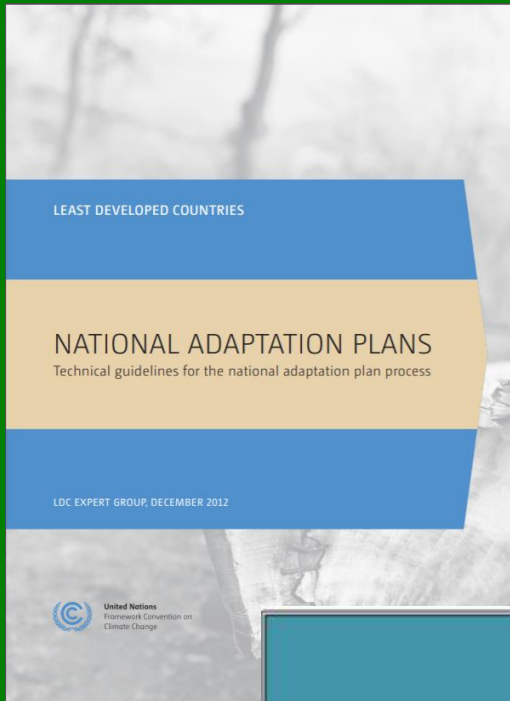
Impact on agro-ecological systems

Impact on farmers in refugee and host community



NAPs and the evidence base for adaptation projects

- Ecosystems respond slowly to the restoration efforts. Long term research is needed to assess EbA effectiveness and prepare protocols of EBA interventions, building in capacity in government, university, or other institutions beyond timelines of projects is necessary
- Low awareness of methodologies and low capacity to conduct economic valuation of EbA options
- NAPs present the opportunity for countries to have institutionalized capacity to generate information and have robust monitoring systems



Step	Element B – Prep elements	EbA guidance
B.2	Assessing climate vulnerability and identifying adaptation options	<ul style="list-style-type: none"> -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	<ul style="list-style-type: none"> -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	<ul style="list-style-type: none"> -Monitor progress -Data interpretation -Reflect and adapt -Develop evidence for persuation

Lessons from the NAP Global Support Programme

- Anchoring on the UNFCCC LEG Technical Guidelines
- Link project activities to national priorities
- Provide rigorous evidence base and additionality determination; distinguishing clearly and focusing the project on the climate change adaptation component
- A combination of tools and methods for appraisal and prioritization of adaptation options can inform decision-making better
- More in-depth trainings at regional and national level on vulnerability assessment, the appraisal and prioritization tools and mobilization of finance
- Collaboration with universities on climate change science can be win-win for both sides
- Including the private sector in NAP processes

Steps	Checklist of building blocks	Sample NAP outputs
Element A. Lay the groundwork and address Gaps		
1. Initiating and launching of the NAP process	<ul style="list-style-type: none"> □ Briefing on NAP process – adaptation challenges & opportunities □ Coordinating mechanism □ National vision and mandate for NAPs □ Access to technical and financial support □ NAP framework/strategy and road map 	<ul style="list-style-type: none"> • Mandate for the NAP process • Framework and strategy for climate change adaptation • Funded project to support operations of the NAP process • Road map for the NAP process
2. Stocktaking: Identifying available information on climate change impacts, vulnerability and adaptation and assessing gaps and needs of the enabling environment for the NAP process	<ul style="list-style-type: none"> □ Stocktaking of adaptation activities □ Synthesis of available knowledge on impacts, vulnerability and adaptation □ Capacity gap analysis □ Barrier analysis 	<ul style="list-style-type: none"> • Report on synthesis of available information • Geospatial database in support of the NAP process • Knowledge base of observed climate impacts, vulnerabilities and potential interventions • Gap and needs analysis report • Barrier analysis report
3. Addressing capacity gaps and weaknesses in undertaking the NAP process	<ul style="list-style-type: none"> □ Building institutional and technical capacity □ Opportunities for integrating adaptation into development □ Programmes on climate change communication, public awareness, raising and education 	<ul style="list-style-type: none"> • Strategy document(s) for capacity-building, awareness-raising, communication and education • NAP website
4. Comprehensively and iteratively assessing development needs and climate vulnerabilities	<ul style="list-style-type: none"> □ Develop between development and adaptation objectives, policies, plans and programmes 	<ul style="list-style-type: none"> • Report on stocktaking of development/adaptation activities • Report on approaches for ensuring synergy between development and adaptation
Element B. Preparatory elements		
1. Analyzing current climate and future climate change scenarios	<ul style="list-style-type: none"> □ Analysis of current climate □ Future climate risks and uncertainty/scenario analysis □ Communicating projected climate change information 	<ul style="list-style-type: none"> • Report on climate analysis • Report on climate risks/projected climate changes • Strategy for climate information services
2. Assessing climate vulnerabilities and identifying adaptation options at sector, subnational, national and other appropriate levels	<ul style="list-style-type: none"> □ Climate vulnerability assessment at multiple levels □ Ranking climate change risks and vulnerabilities □ Mapping adaptation options 	<ul style="list-style-type: none"> • Vulnerability and adaptation assessment report
3. Reviewing and appraising adaptation options	<ul style="list-style-type: none"> □ Appraisal of adaptation options 	<ul style="list-style-type: none"> • Report on appraisal of adaptation options • Sectoral and subnational plans or strategies
4. Compiling and communicating national adaptation plans	<ul style="list-style-type: none"> □ Draft national adaptation plans □ Realize NAPs and process endorsement □ Communicate NAPs at national level 	<ul style="list-style-type: none"> • Draft NAPs for review • Endorsed NAPs
5. Integrating climate change adaptation into national and subnational development and sectoral planning	<ul style="list-style-type: none"> □ Opportunities and constraints for integrating climate change into planning □ Building capacity for integration □ Integration of adaptation into existing planning processes 	<ul style="list-style-type: none"> • Report on integration of adaptation into development
Element C. Implementation strategies		
1. Prioritizing climate change adaptation in national planning	<ul style="list-style-type: none"> □ National criteria for prioritizing implementation □ Identify opportunities for building on existing adaptation activities 	<ul style="list-style-type: none"> • Report on prioritization of adaptation in national development
2. Developing a (long-term) national adaptation implementation strategy	<ul style="list-style-type: none"> □ Strategy for adaptation implementation □ Implementation of NAPs through policies, projects and programmes 	<ul style="list-style-type: none"> • Implementation strategy for the NAPs
3. Enhancing capacity for planning and implementing adaptation	<ul style="list-style-type: none"> □ Strengthening long-term institutional and regulatory frameworks □ Training at sectoral and subnational levels □ Outreach on outputs nationally & promotion of international cooperation 	<ul style="list-style-type: none"> • National training and outreach programme(s)
4. Promoting coordination and synergy at the regional level and with other multilateral environmental agreements	<ul style="list-style-type: none"> □ Coordination of adaptation planning across sectors □ Synergy at the regional level □ Synergy with multilateral environmental agreements (MEAs) 	<ul style="list-style-type: none"> • Report on regional synergy • Report on synergy with MEAs
Element D. Reporting, monitoring and review		
1. Monitoring the NAP process	<ul style="list-style-type: none"> □ Identify (few) areas of the NAP process to monitor progress, effectiveness and gaps (PIG) □ Define metrics for documenting PIG □ Collect information throughout the NAP process to apply the metrics developed 	<ul style="list-style-type: none"> • Metrics report/Monitoring Plan • Database of metrics
2. Reviewing the NAP process to assess progress, effectiveness and gaps	<ul style="list-style-type: none"> □ Synthesis of new assessments & emerging science and the results and outcomes from implemented adaptation activities □ Evaluate metrics collected to assess progress, effectiveness and gaps of the NAP process 	<ul style="list-style-type: none"> • Evaluation report
3. Iteratively updating the national adaptation plans	<ul style="list-style-type: none"> □ Repeat some steps and update NAPs and related documentation □ Production of updates to the NAP outputs aligned with relevant national development plans 	<ul style="list-style-type: none"> • Updated NAPs
4. Outreach on the NAP process and reporting on progress and effectiveness	<ul style="list-style-type: none"> □ Disseminate the NAPs and related outputs to the UNFCCC secretariat and others □ Provide information in national communications on progress in and effectiveness of the NAP process 	<ul style="list-style-type: none"> • Progress report and information in national communications

<https://globalsupportprogramme.org/about-nap-gsp-0>

NAP Proposal for Malawi

Table 1: stock-take of climate change scenario analysis in Malawi

Study	Modelling method	Emissions scenario	Year modelled to	Variables modelled	Historic data	GCM data used	Spatial resolution
McSweeney (2010)	Dynamical downscaling	SRES A2 (High); A1B (Med), B1 (Low)	2030, 2060, 2090	Temperature Rainfall 7 climate extremes including 'hot days', 'hot nights', 'heavy rainfall events' etc.	Temperature <u>Gridded station data</u> Climatic research Unit (1961-2000) University of Delaware (1961-2006) NCEP (reanalysis) 1960-2006 Era40(reanalysis) 1960-2001 Rainfall <u>Gridded station data</u> Climatic research Unit 1961-2000) University of Delaware (1961-2006) <u>Merged station and satellite data</u> Global Precipitation climatology centre 1960-1979 Extreme events <u>HasEX</u> Gridded station data	CMIP 3 (15 models)	2.5°x2.5°
For 2NC (2011)	Pattern scaling: <u>MAGICC/Scengen</u>	?	2075	Temperature Rainfall	Station data	4 GCMs	2.5°x2.5°
UMFULA (2017)	Dynamical downscaling	RCP8.5	2040s, 2090s	Temperature Rainfall (annual and seasonal)	Rainfall CHIRPS: 1981-2017 Temperature Climatic Research Unit: 1901-2015	CMIP5 (34 GCMs)	?

NAP Proposal for Malawi (contd.)

Sector	Model or method used	Year modelled to	Variables modelled or <u>discussed</u> and <u>locations assessed</u>	Gaps
Crop production	Century model	2075	Maize, national	
Livestock	Discursive extrapolation based on trends	n/a	Rangeland quality, animal growth and reproduction, disease incidences – country trends	No modelling has been undertaken because of lack of data.
Forestry	Holdridge Model (using relationship between PET and bio-temperature) Gap Model (species-based model of plant processes to environmental conditions);	2020, 2075, 2100	Holdridge model: 15 grid location points in Malawi that cover most forest areas; Gap model: <u>Dzalanvama Forest Reserve</u> : productivity of 6 tree species out of 100 in <u>Dzalanvama Forest Reserve</u>	<ul style="list-style-type: none"> Assessments in vulnerable areas in as many districts as <u>possible</u>, <u>such</u> as those that lie along the Great East African Rift valley. Productivity changes in other tree species; Fire risk. Soil erosion risk from deforestation and how that interacts with climate change; Health effects from deforestation and how that interacts with climate change
Energy	LEAP	2095	Projected energy demand (wood, charcoal, kerosene, Electricity) in 4 cities: Lilongwe, Blantyre, Zomba and Mzuzu	<ul style="list-style-type: none"> Soil erosion projections and effects on hydro-power Temperature and other climatic effects and other factors (eg. nutrient run-off) on aquatic weeds and hydro-power; Projected surface run-off and effects on hydro-power Forest productivity and effects on <u>woodfuel</u> production;
Water resources	Discursive extrapolation based on trends. Water balance equation for Lake Malawi which was developed in 1983.		Rainfall scenarios of increases or decreases of 50%, 25% and 10% were used for 7 different rivers.	<ul style="list-style-type: none"> Hydrological modelling for key water basins using climate risk projections, and effects on surface flows and ground water; Flood risk
Fisheries	ECOPATH II model	n/a	Stocks of fish and catches in Lake Malawi	Genetic robustness of different types of fish to changing conditions
Human Health	Discursive extrapolation based on trends.	n/a	Malaria, cholera, diarrhoea, malnutrition – country trends	Malaria distribution ranges; other factors influence disease burden such as public health

NAP Proposal for Malawi (contd.)

USAID (2013)				
Water Resources	Secondary data analysis & key informant interviews	n/a		Distance of villages where PRA was carried out was between 5-60 kms from station data making correlations tentative and unreliable. Crop phenology information tentative and in some cases conflicting.
Crops	Secondary data analysis &	n/a	Maize, Groundnuts, Pigeon peas, Cow-peas, Soybeans Pests and diseases	
Fisheries	Secondary data analysis & community perceptions	n/a	Fish stocks	

Climate resilient development

Theory of Change

To reduce vulnerability of people in Malawi and to promote community and ecosystem resilience to the impacts of climate change and gender-equitable adaptive capacity for planning and implementing adaptation interventions

Skills developed in the NAP process will be used for future NAP processes

Political leadership for replicating the NAP process and to enforce regulation

Funds available to replicate the NAP process

Lack of financing and design expertise will not be barriers to implementation of NAPs

assumptions

1. Capacity developed for the coordination and execution of future iterations of the NAP process

2. NAP adaptation priorities are operationalized through Ministry spending plans

3. Private sector finance mobilized for investment in climate risk management.

Leadership & management foundation for NAP process established

NAP Working groups meet 4 times

Downscaled climate risk Scenario analysis

Learning by doing is possible

There is enough absorption capacity to take on NAP responsibilities

There is enough continuity of government staff to achieve the outcome

Improved evidence base leads to political leadership of NAP systems and processes

Private sector remains engaged throughout the process

Climate risk assessments

Training materials

Civil society consultations

Economic appraisals developed

National adaptation plan developed

Climate change adaptation funding window operationalized

Tailored communication productions developed actions

Flood zoning guidance

Climate Change Bill

Sectoral planning tools and MTEF and annual spending plans Integrating CCA.

Climate risk mapping tool

2 GCF concept notes

Recommendations for tax & regulation regime to promote investments in adaptation

Resource mobilization strategy

Public-private adaptation Investment strategy developed

Training provided to planning and technical units in ministries

Tailored messaging for the Private sector

Adapted building and infrastructure codes

Indicator frameworks and targets for 5 ministries

Technical inputs, training, consultations and institutional coordination to:

- Establish institutional and political leadership
- Develop NAP web platform
- Do training needs assessments
- Digitise climate records
- Develop climate risk assessments and capacity development around this process
- Develop socio-economic projections
- Carry out economic appraisals
- Develop national adaptation targets
- Develop policy harmonization gaps and needs
- Develop summary for policy makers
- Develop 3 District level adaptation plans
- Develop NAP and NDC targets
- Hold consultations for the development of the Climate Change Bill and for flood zoning guidance

Technical inputs, training, consultations and institutional coordination to:

Data gathering and work to develop the climate risk mapping tool

- Convene stakeholders to produce planning tools, indicator frameworks, training and spending plans
- Develop climate risk mapping tool
- Convene stakeholders to develop GCF concept notes

Technical inputs consultations and institutional coordination to:

- Assess private sector profile
- Develop tailored messaging
- Convene stakeholders for policy meetings
- Develop assessments and reports
- Draft revisions to building codes

Technical inputs, training, consultations and institutional coordination to:

Data gathering and work to develop the climate risk mapping tool

- Convene stakeholders to produce planning tools, indicator frameworks, training and spending plans
- Develop climate risk mapping tool
- Convene stakeholders to develop GCF concept notes

Technical inputs consultations and institutional coordination to:

- Assess private sector profile
- Develop tailored messaging
- Convene stakeholders for policy meetings
- Develop assessments and reports
- Draft revisions to building codes

Discussion points

- If NAPs can be used to prepare projects, how different are they as a GCF funding window to the Project Preparation Facility?
- Is it a linear process of NAPs/Readiness -> PPF -> Funding proposals? Can funding proposals also contribute to NAPs?
- Are there ecosystem-based approaches reflected in NAP processes? Are EbA approaches included in planning frameworks? Why or why not?

Dealing with the disconnect

- How do we balance the need for data and information (and financing for these) with the urgency of adaptation?
- Can we use the best available science or is the production of new research and data necessary?
- What are the ranges of timelines and costs associated with the production of this information?
- Where does the money come from?
- What is the practice in other financing institutions?

Thank you!

Laos Urban Ecosystem-based Adaptation

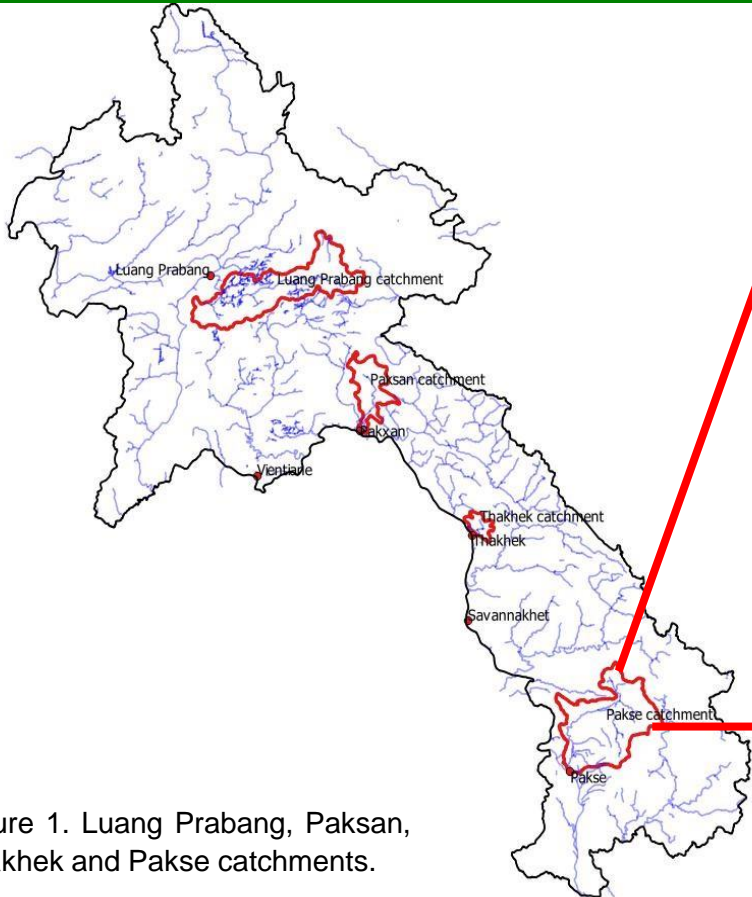


Figure 1. Luang Prabang, Paksan, Thakhek and Pakse catchments.

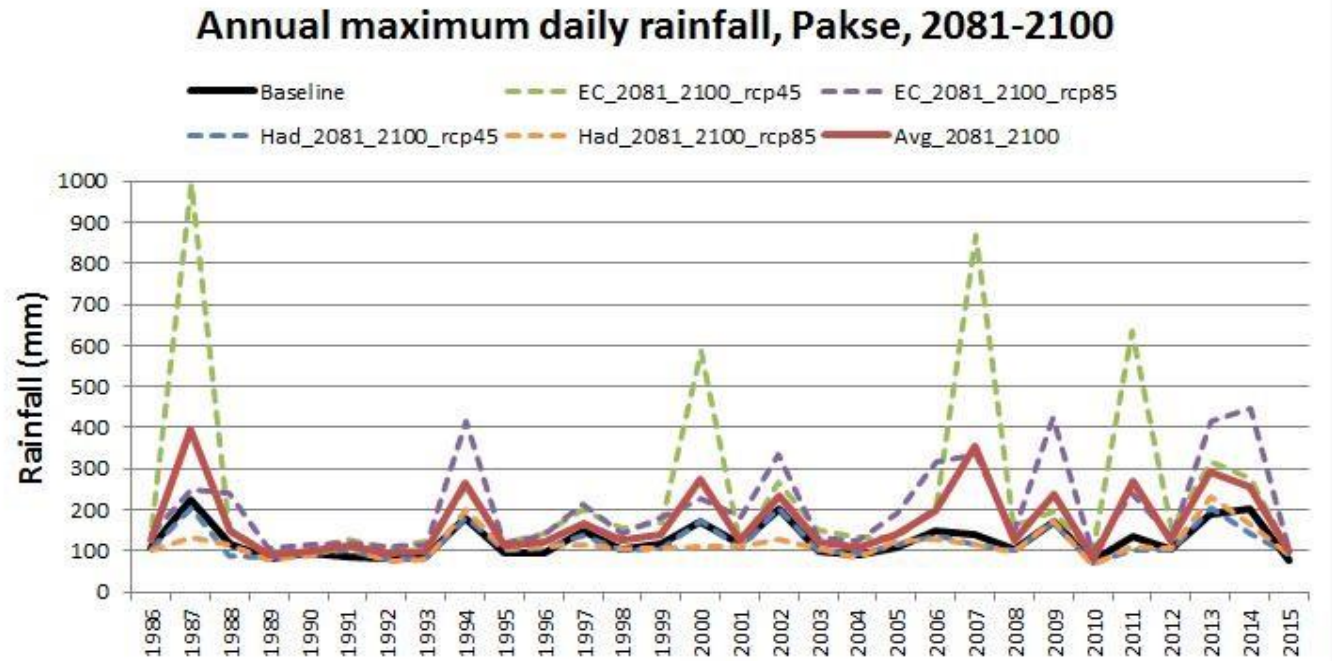


Figure 2. Pakse. Annual maximum daily rainfall

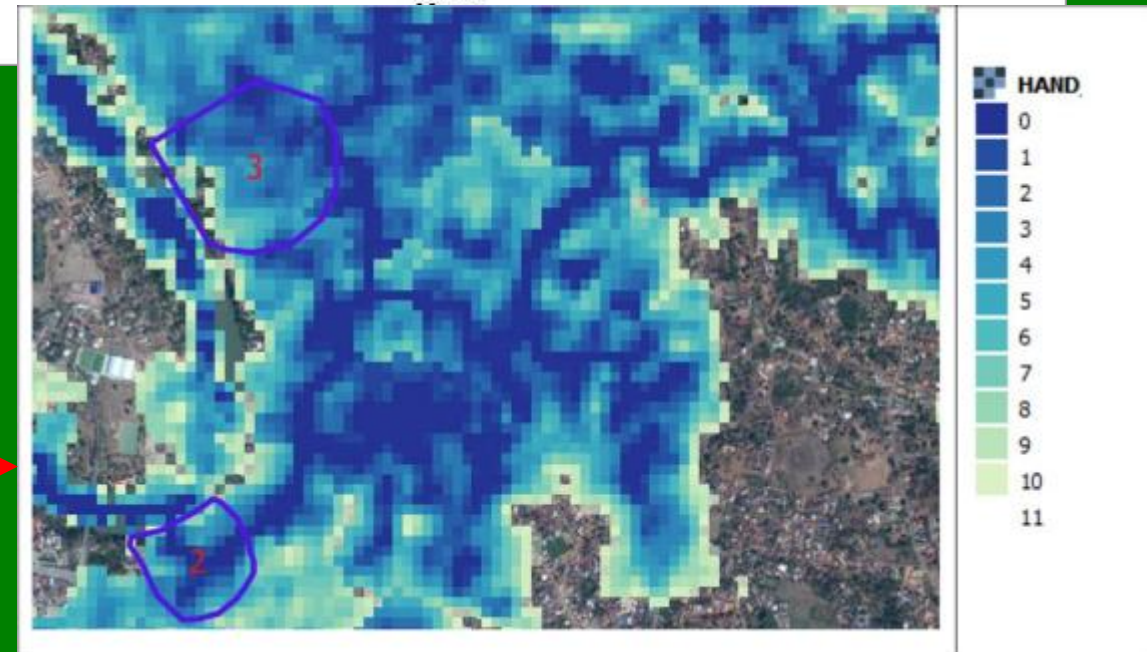


Figure 3. Pakse. Flooding hazard map



LIBERIA NAP

COUNTRY PROFILE



Liberia:

- 43,000 square miles
- Growing population of more than 4 million people
- Rich in tropical forests (42%),
- Approximately 80% of the country's population is poor
- Access to basic social services remains less than 45%
- Rural communities rely greatly on unsustainable methods for livelihood generation
- A coastline of 560 km, which host about 58% of the country's population within 8 of the 15 counties
- Average rainfall range from more than **4500 mm** along the coast to **about 2000 mm** in the interior
- Temperature ranges from 32°C in November to 28°C in June
- Relative humidity is about 90-100% during the rainy season and 60-90% during the dry season



FLOODS



SEA-EROSION



STORMS



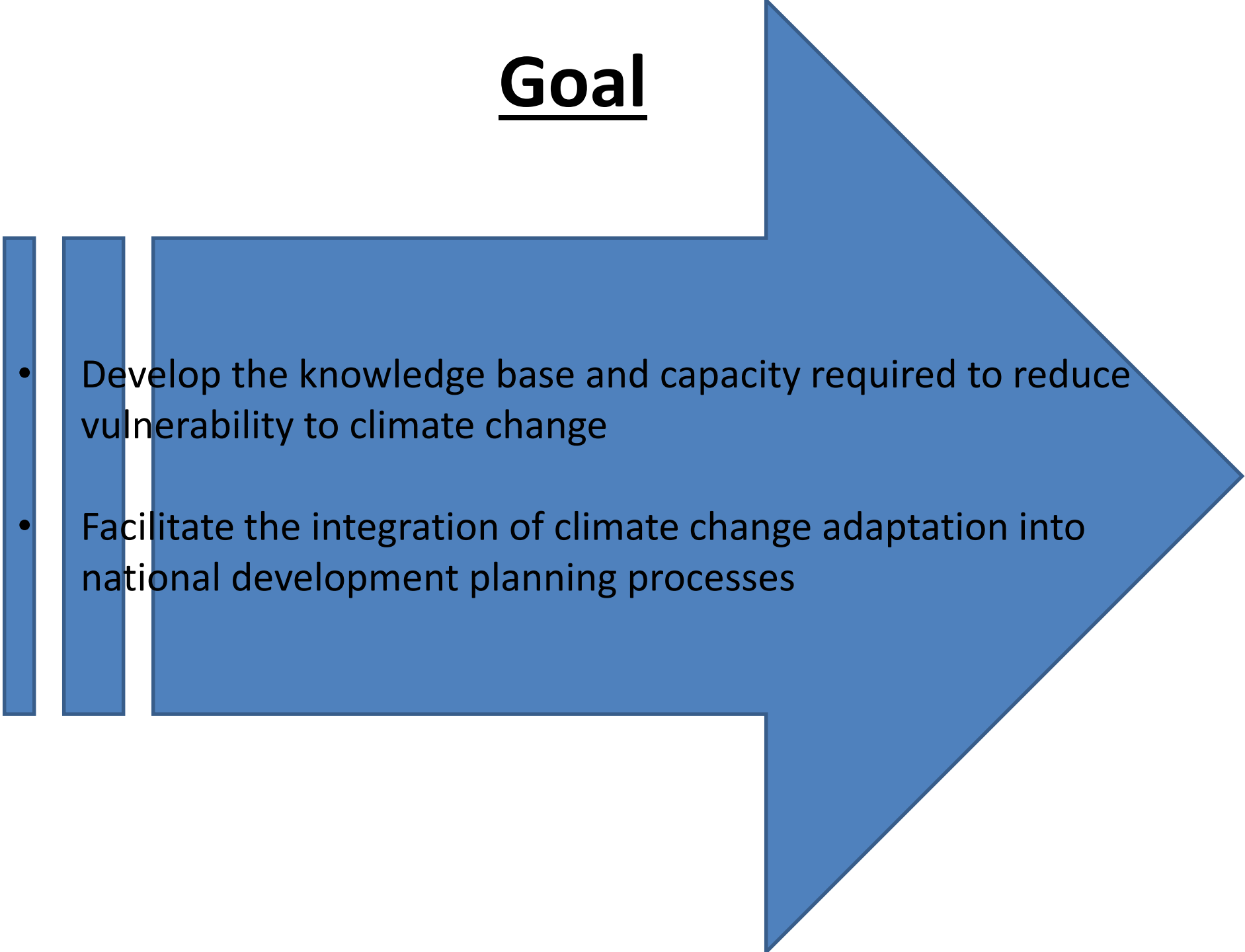
NATIONAL ADAPTATION PLAN

"To advance the National Adaptation Plans (NAP) process for medium-term investment planning in climate-sensitive sectors (i.e. agriculture, energy, waste management, forestry and health) and coastal areas in Liberia"



- UNDP
- Environmental Protection Agency
- Ministry of Finance and Development Planning
- Ministry of Gender, Children & Social Protection
- Ministry of Agriculture
- Ministry of Mines & Energy
- National Disaster Management Agency
- National Port Authority of Liberia,
- Liberia Maritime Authority,
- National Fisheries and Aquaculture Authority,
- Liberia National Department of Meteorology,
- Liberia Institute of Statistics and Geo-Information Services
and
- University of Liberia.

Goal

- 
- Develop the knowledge base and capacity required to reduce vulnerability to climate change
 - Facilitate the integration of climate change adaptation into national development planning processes

Expected Outputs

Strengthening institutional frameworks and coordination for implementation of the NAPs process

Expansion of the knowledge base for scaling up adaptation

Building capacity for mainstreaming climate change adaptation into planning, and budgeting processes and systems

Formulation of financing mechanisms for scaling up adaptation (including public, private, national and international)



Capacity building:

NAP project will:

Support studies on the economics of climate change;

Develop climate change vulnerability and climate risk assessments on key sectors and systems

Develop knowledge sharing platforms for easy access of data and information generated.

Develop programs to educate and learn from the private sector on how to identify and manage risks from climate variability and climate change;

Develop management and risk reduction strategies linked to natural disaster risk management policies;



LAUNCH OF NATIONAL CLIMATE CHANGE POLICY & RESPONSE
STRATEGY

MOBILIZING POLITICAL WILL FOR RATIFICATION OF PARIS AGREEMENT

INTEGRATION OF GENDER INTO PROGRAMME ACTIVITIES



- **DEVELOP GUIDELINES FOR Mainstreaming Gender in Climate Change National and Sectoral Adaptation Plans for M&E and Planning Staff**
- **Training of M&E and planning staff of government ministries and agencies**

Capacity building training for staff
of government (5 females and 7
males)

Support for graduate program in
environmental science including
climate change at the University of
Liberia



- ☐ Climate vulnerability & risk assessment-agriculture, fisheries sector
- ☐ Disaster risk assessment and disaster response strategies and action plans
- ☐ Climate change information gap assessment



- ☐ Community-based adaptation and disaster response training
- ☐ Setting up NAP coordination mechanism
- ☐ Training of Environmental Focal points in sectoral ministries & agencies
- ☐ Training on the production of energy efficient cook