Hands-on training workshop on enhancing institutional arrangements and effective implementation of the Enhanced Transparency Framework

Analysis of climate change impacts, vulnerability and risks; assessment frameworks; planning and implementation

22-24 January 2024
Maldives

Outline…

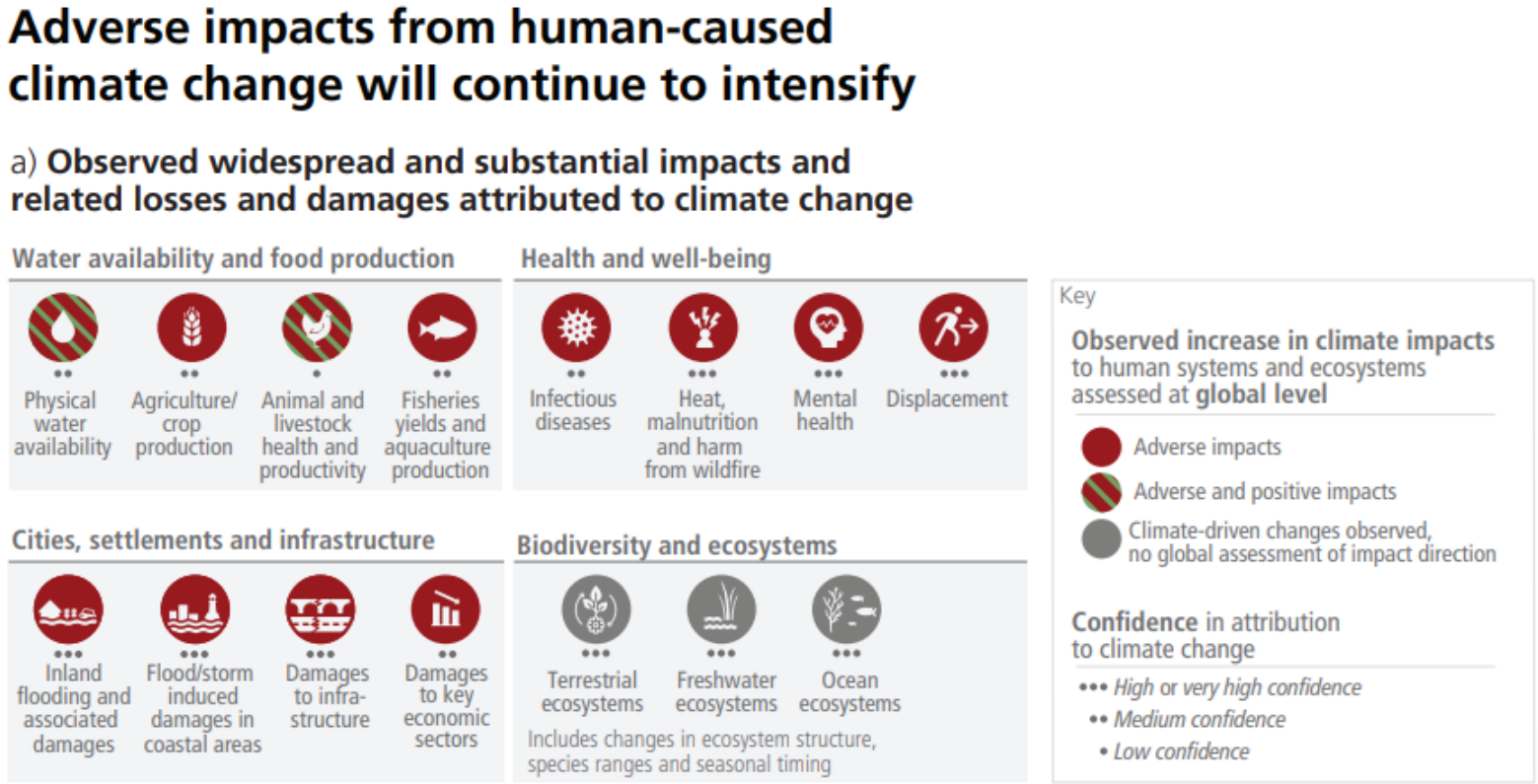
1. Introduction
2. Adaptation needs
3. Assessment of climate risks
4. Dealing with uncertainty
5. Methodologies
6. Adaptation planning
7. Key highlights
8. Exercise

1. Introduction

Countries around the world are already feeling the impacts of climate change, facing severe hazards such as floods, wildfires, droughts and heat waves. Approximately **3.3 to 3.6 billion people live in contexts that are highly vulnerable** to climate change (IPCC 2023)

Most climate-related hazards set to intensify and become more frequent, it is vital for countries to take critical action to build resilience against climate change.

A fundamental step for authorities to build resiliency to climate change is to conduct a country-wide climate risk and vulnerability assessment as a basis to developing necessary solutions.



(IPCC report, 2023)

2. Adaptation needs “defined”

- Assessment of adaptation is relevant on a wide range of spatial scales, from local and project-specific to national, regional and global perspectives.

- Planning and implementation of adaptation at any scale is generally preceded by assessment of adaptation needs.

- The term “adaptation needs” appears in the Cancun Adaptation Framework, Article 7, paragraphs 4 and 7, of the Paris Agreement; and the IPCC AR5 report.

- Adaptation needs are no longer considered simply a starting point for the adaptation process but rather refer to actions and resources required for the entirety of that process – from **assessment of impacts and vulnerability through adaptation planning, implementation, and monitoring and evaluation.**

- Adaptation is fundamentally a **process of managing risk.** Uncertain outcomes are a fundamental aspect of understanding risk, and hence dealing with uncertainty is an inherent element of climate change decision-making.

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2. Adaptation needs: five step process for assessing -Overview-

Five step process in assessing adaptation needs		
Stage	**Scope**	**Indicative methods (broad categories)**
1. Framing the assessment	• Setting goals and objectives of the needs assessment • Establishing desired level of detail and complexity • Identifying resources and capacity needed and available • Compiling and collecting required data and information	• Participatory multi-stakeholder engagement • Stocktake of available information, resources and capacity • Data collection
2. Assessing climate risks and vulnerabilities	• Identifying differential vulnerabilities and their underlying causes • Assessing projected climate impacts, including cascading impacts • Analyzing projected changes in climate risks and vulnerabilities (environmental, social, economic, institutional) • Assessing existing adaptive capacity • Identifying climate risks (including transboundary risks) and opportunities	• Climate and socioeconomic scenario analysis • Impact, vulnerability and risk assessment approaches, including: a. Risk-based b. Community-based c. Ecosystem-based d. Sector-based
3. Identifying desired adaptation actions	• Identifying adaptation pathways and options, including timescale for feasible and effective implementation • Appraising potential effectiveness, feasibility and justice and equity of the adaptation pathways and options • Considering trade-offs and ability to balance across perspectives and values	• Adaptation and climate-resilient development pathways • Equity analysis • Multi-criteria decision analysis • Cost–benefit analysis • Real options analysis

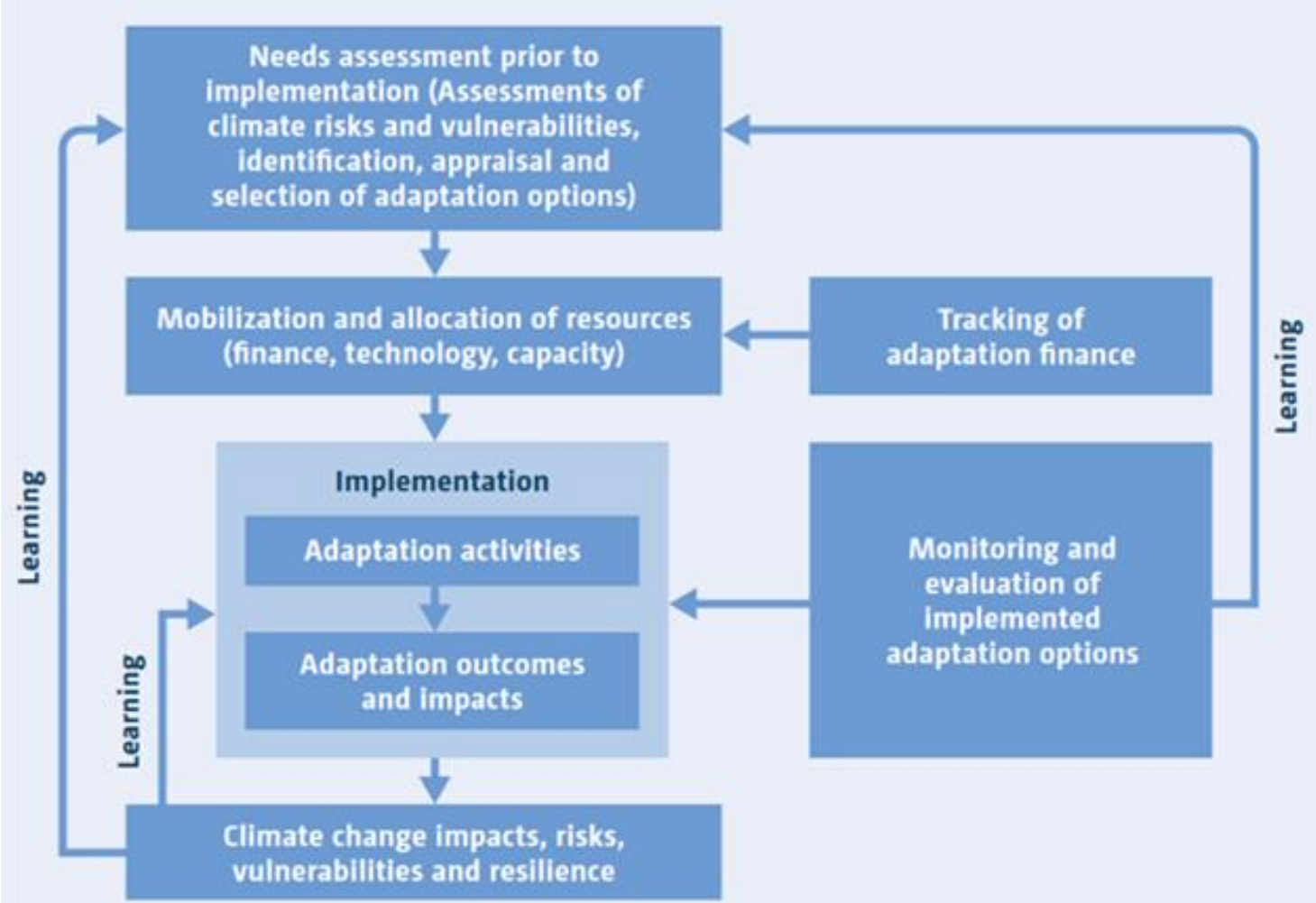
2. Adaptation needs: five step process for assessing -Overview-

Five step process in assessing adaptation needs		
Stage	**Scope**	**Indicative methods (broad categories)**
4. Assessing resource needs (including for monitoring and evaluation)	• Identifying resources required considering environmental, social, economic and institutional needs: a. For addressing underlying vulnerabilities b. For planning and implementing adaptation actions c. For monitoring and evaluating adaptation actions	• Capacity needs analysis • Technology needs assessment • Costing adaptation actions • Framework for monitoring and evaluation • Economic analysis • Analysis of responsibilities
5. Compiling adaptation needs	• Compiling adaptation actions • Compiling resource needs (capacity, technology, financial, information)	Guidelines for different end uses, including for: a)NAPs, to facilitate implementation b)Mobilizing and accessing support c)Adaptation communications, BTRs, BURs, d)national communications and NDCs, to facilitate e)reporting under the UNFCCC f) Other national processes, such as subnational g)and sectoral planning and implementation

2. Adaptation needs -adaptation planning

Adaptation planning – process to address adaptation needs

Cyclical nature of adaptation planning intended to address adaptation needs over time



Source: Modified from figure 1.8 of the contribution of Working Group II to the AR6 (IPCC, 2022, glossary).
Note: Figure encompasses actions and resources needed for assessing climate risks and vulnerability through adaptation planning.

3. Assessment of climate risks

WHAT IS CLIMATE RISK?

- Climate Risk can be broadly defined as the potential for adverse consequences due to climate change on lives, livelihoods, health and well-being, ecosystems and species and where the occurrence and degree of an outcome is uncertain.
- Risk results from the interaction of vulnerability (of the affected system), its exposure over time (to the hazard), and the likelihood of its occurrence.

HOW TO MANAGE CLIMATE RISK

- conduct a climate risk and vulnerability assessment to identify, measure and monitor key climate risks, and
- identify and implement adaptation actions and plans to control the risk.

3. Assessment of climate risks

-Generally, 5 steps process:
-Product of **probability** of an event and its **effects** at the exposure unit:

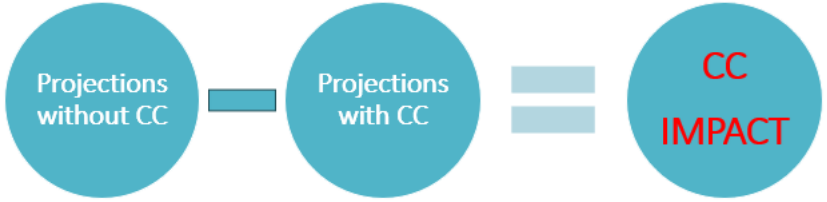
1. Define the exposure unit specific territory (region, a country, a river basin) and/or sector (water, agriculture, human health, etc.).
2. Identify the climate hazards that have affected and/or can affect the exposure unit in a certain period of time (observed/projected).

Hazard: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.

3. Assessment of climate risks

Effects of climate-related hazards, including extreme weather and climate events refer to us as potential **climate impacts**.

CC impact is difference over study time between env/soc-ec. conditions projected without CC and those projected with CC



Some hazards identified in SIDS:
Sea level rise, Extreme weather events (flooding, heavy rain and storms)

Potential bio-physical impact
- Land loss
- Coastal inundation
- Coastal and beaches erosion
- Wave-driven direct flooding (surface)
- Salt water intrusion into aquifers
- Crop and biodiversity loss

Potential socio-economic impact:
- Loss to the national economy,
- Reduction of viability and profitability of tourism
- Damage of residential areas, resorts and critical infrastructures
- Malfunction of the community
- Reduced yields and quality of crops

3. Assessment of climate risks

- Using the hazards identified in the Hazard Assessment step, identify the main impacts of the hazards on your country in different sectors,
- Describe impacts that have occurred in the **past**, and the impacts you expect to occur in **future**, considering the demographic, socio-economic and other **non-climatic trends identified**, and the **future projections of the climate hazard:**

  ✓ **Social impact (People)**: What are the impacts on people and their livelihoods, particularly vulnerable groups most exposed to the hazard? Does it affect community health and wellbeing?

  ✓ **Environment impact (Planet)**: What impacts could the hazard have on the local environment e.g., biodiversity, air and water quality?

  ✓ **Economic impact (Profit)**: What are the impacts on the city's economy? Which industries and assets will be impacted?

3. Assessment of climate risks

3. Indicate a level of probability for each climate hazard (can be quantitative such as “a 1 in a 100 years event”, or qualitative, such as “highly probability”).

3. Analyze the level of vulnerability of the exposure unit, and thus define the level of consequence the climate hazard will have upon the exposure unit.

Limits of predictability:

Due to the large uncertainties related to long-term climate projections most of GCM simulations have been conducted for periods up to about 100y into the future. For this reason, the outer horizom commonly adopted in impact studies has been 2100.

3. Assessment of climate risks

Vulnerability…

Concept that refers to **a condition of the subject** (community, an ecosystem, economic activity, a territory, etc.) Specific conditions make the subject as a such more or less susceptible to the same climatic effect:

- “Predisposition to be adversely affected" by climate change based on its sensitivity and exposure
- Assess how well a subject will be able to cope with and adapt to climate effects
- Vulnerability differs within communities and across societies, regions, and countries, and can increase or decrease over time
- Climate change does not affect people/ economic activities/ ecosystems in the same way. It can have a bigger impact on some groups and some sectors more than on others such as women, the elderly, refugees, poor…sectors: agriculture, water managements…
- Similarly as for climate risk assessment, tools for vulnerability assessment vary depending on the sector, the scale at which the study is being carried out, and the entity or system which is thought to vulnerable.

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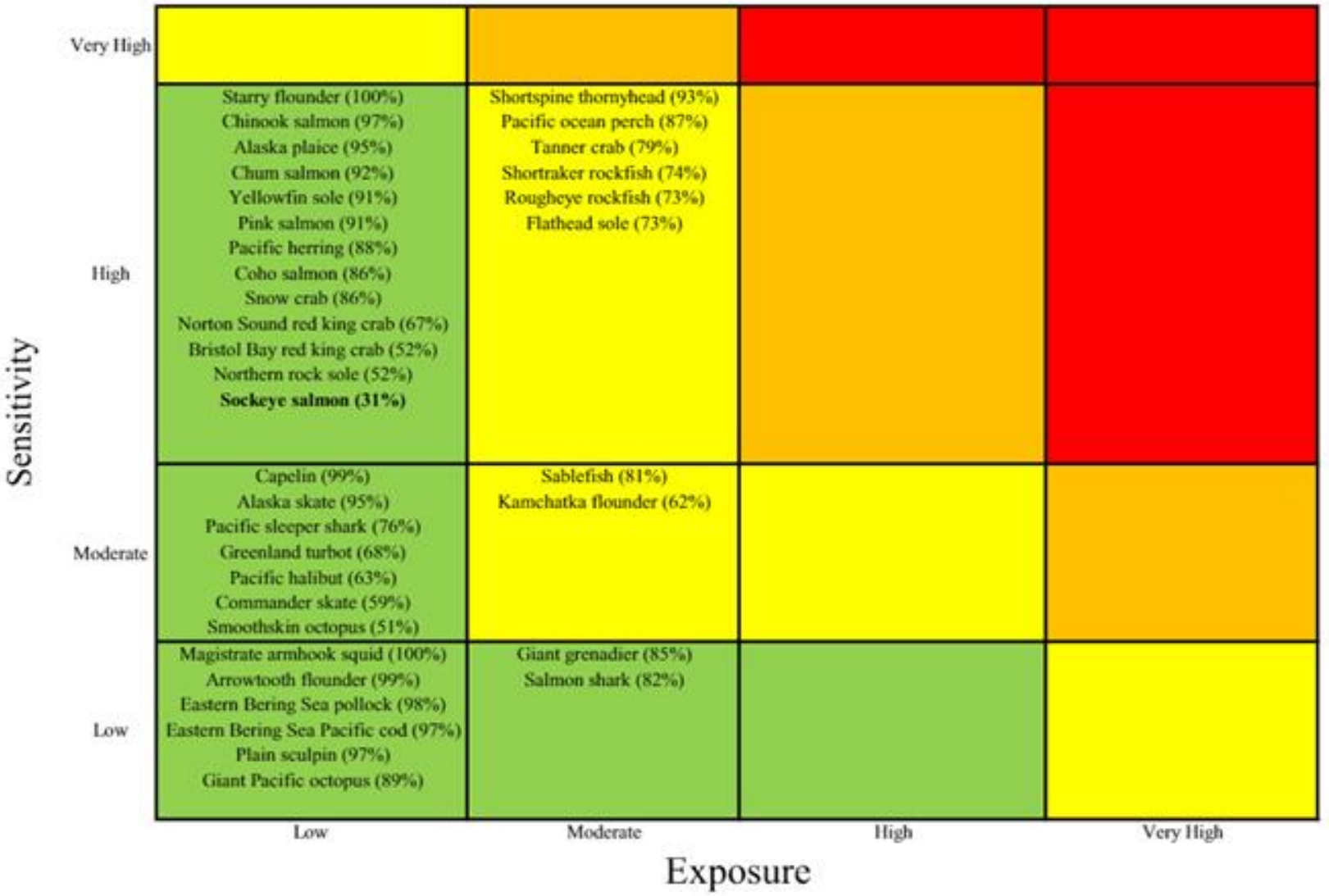
Vulnerability assessment…



Climate vulnerability assessment of fish species in Bearing Sea, NOAA Scientists and partners
https://www.fisheries.noaa.gov/data-tools/bering-sea-vulnerability-assessment-species-specific-results

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3. Assessment of climate risks

5. Prepare a double-entry matrix using **likelihood** and **consequence/impact** for each climate hazard, thus achieving a relative risk assessment for all climate hazards affecting the exposure unit.

			Impact			
			0 Acceptable	1 Tolerable	2 Unacceptable	3 Intolerable
			Little or No Effect	Effects are Felt but Not Critical	Serious Impact to Course of Action and Outcome	Could Result in Disasters
Likelihood	Improbable	Risk Unlikely to Occur				
	Possible	Risk Will Likely Occur				
	Probable	Risk Will Occur				

4. Dealing with uncertainty

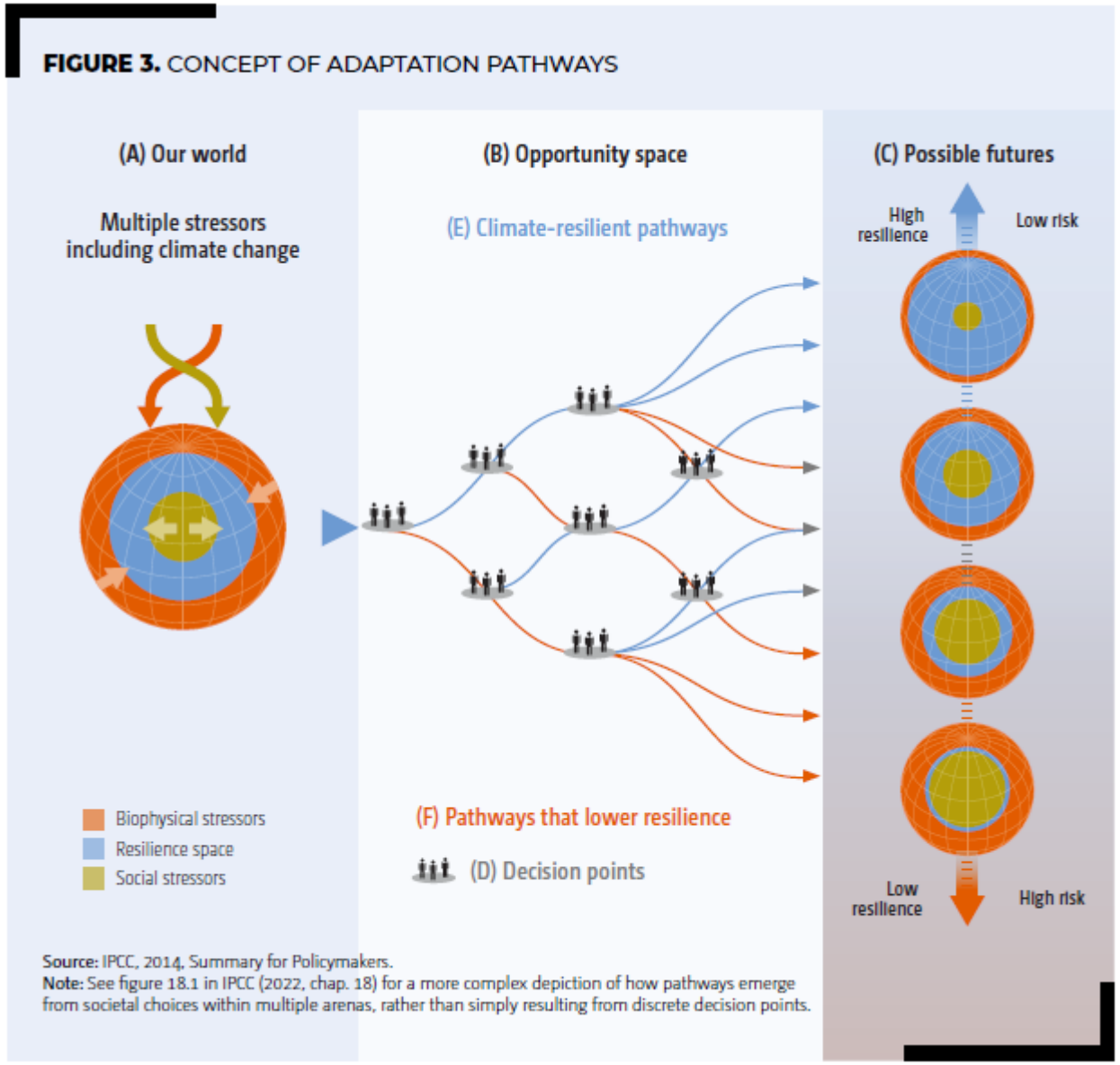
Deep uncertainty characterizes many dimensions of assessing adaptation needs, and may relate to impacts, changing socio-economic conditions, preferences and priorities, and responses over time.

The most common approach to dealing with deep uncertainty is to focus on **low-regret options**, which are measures that deliver benefits over a wide range of climate and socioeconomic **scenarios**.

An alternative approach to dealing with deep uncertainties is to examine **adaptation pathways**.

Pathways are iterative, continuously evolving processes for managing change in complex systems that involve a series of choices and trade-offs between **short- and near-term goals.**

4. Dealing with uncertainty: Pathways



4. Dealing with uncertainty: Approaches

Summary of existing and emerging approaches to **impacts, vulnerability** and **adaptation assessments**, and their associated methods and tools

APPROACH	Motivation	Practical goals	Underlying methods
Impact-based	Research-driven	Actions to reduce risks	– Standard methods following the impact scenarios (biophysical impacts and socio-economic implications sequence) – 'Driver-pressure-state-impact-response' (DPSIR) methods – Hazard-driven risk assessment methods
Vulnerability-based	Research-/ stakeholder-driven	Actions to reduce vulnerability	– Vulnerability indicators and profiles – Past and present climate risks – Livelihood analysis – Agent-based methods – Narrative methods – Risk perception including critical thresholds – Development/sustainability policy performance – Relationship of adaptive capacity to sustainable development
Adaptation-based	Research-/ stakeholder-driven	Actions to improve adaptation	
Integrated assessment	Research-/ stakeholder-driven	Global climate policy options and their economic implications	– Integrated assessment modelling – Cross-sectoral interactions – Integration of climate with other drivers – Stakeholder discussions – Linking models across types and scales – Combining assessment approaches/methods
Risk management	Decision making-	Robust climate risk management	– Methods applied under all other approaches – Methods for characterizing and managing

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5. Methodologies

All adaptation assessments have the **methodologies**, that provide a conceptual framework for analysis,
and usually these are clearly laid out as part of the assessment process.

Adaptation assessment methodologies have frequently been characterized as being either **top-down (impact driven) or bottom-up (vulnerability driven)**

Top-down methodologies use climate model output as a starting point to determine the climate change impacts that would need to be adapted to, whereas **bottom-up methodologies** use an understanding of current vulnerability to climate change as the starting point for determining adaptation needs.

Temporal scale: Adaptation needs assessments are undertaken knowing that risks will change over time and uncertainty regarding both climate and non-climate factors increases with time.

Spatial scale: The complexity of assessing adaptation needs increases markedly when moving from site or situation-specific needs to the national and global level.

Improved understanding of the development and application of methodologies for assessing adaptation needs benefits Parties and a wide range of public and private sector institutions and organizations as they continue to plan and implement adaptation strategies and actions and seek or provide related support.

5. Methodologies

No single methodology or suite of methodologies allows for comprehensive assessment of adaptation needs in all situations; only on a **case-by-case basis**.

Principles for methodologies for assessing adaptation needs include **participation and inclusiveness, relevance, replicability and responsiveness**.

Methodologies should **fit the purpose** and be adapted to available information and capacity.

The **best available scientific information** on climate risks and societal vulnerabilities and goals, usually from risk and vulnerability assessments, is a starting point for assessing adaptation needs.

Top-down and bottom-up methodologies have **different strengths** for assessing adaptation needs, and most recent approaches have incorporated elements of both.

Currently employed methodologies have largely developed through **learning-by doing**, often following broad guidance provided by the UNFCCC (e.g. the process to formulate and implement NAPs);

Pathway approaches (e.g. adaptation and climate-resilient development pathways) are emerging as a powerful concept for understanding adaptation needs at a range of temporal and spatial scales;

5. Methodologies

TABLE 1. ECONOMIC APPRAISAL METHODS FOR SUPPORTING ADAPTATION DECISION-MAKING

METHOD	DESCRIPTION	LEVEL OF COMPLEXITY
COMMONLY USED APPRAISAL METHODS		
Cost–benefit analysis	Appraises options in terms of their monetary value, weighing the life-cycle costs of options against projected benefits, with the option with the highest net present value or benefit–cost ratio selected. Analysis requires establishing a baseline against which costs and future expected benefits are measured, which is challenging. The method does not explicitly deal with uncertainty.	Medium
Cost-effectiveness analysis	Identifies the most economically efficient option for achieving a specific adaptation goal. Useful when the primary benefit metric cannot be expressed in monetary terms. It can only be used to compare options in relation to a single benefit metric. Analysis requires establishing a baseline against which costs and future expected benefits are measured, which is challenging. The method does not explicitly deal with uncertainty.	Medium
Multi-criteria decision analysis	Uses multiple metrics in addition to economic efficiency to assess adaptation options in terms of achieving specified adaptation goals. It can combine qualitative and quantitative information, so it is useful when it is difficult to assign monetary values or otherwise quantify some outcomes. Analysis requires establishing a baseline against which costs and future expected benefits are measured, which is challenging. Uncertainty can be incorporated as an evaluation criterion, typically relying on the judgment of experts or stakeholders.	Low to medium

5. Methodologies: Challenges

- Lack of detailed documentation on the methodologies used by countries in assessing adaptation needs;
- Lack of practical methodologies for quantitative assessment, which tend to be complex and data and resource intensive, while recognizing that qualitative and semiquantitative analyses of adaptation needs can be extremely useful.
- Lack of practical methods for assessing financial and technological needs.
- Lack of methodologies for evaluating non-market costs and benefits, such as ecosystem services, and monetizing adaptation actions and the benefits derived from them, particularly for countries with limited capacity.
- Lack of methodologies for assessing adaptation needs related to monitoring and evaluation
- Lack of methodologies for identifying needs and opportunities for transformative adaptation.
- Lack of methodologies for integrating multiple sectoral assessments.
- Lack of methodologies for prioritizing adaptation options.

With respect to <u>analysis</u> of existing methodologies for assessing adaptation needs, gaps include:

- Lack of an analytical framework that would enable a systematic analysis of existing methodologies;
- Lack of empirical data that would allow for analysis of the relative utility of different methods and tools.

5. Methodologies: Capacity challenges in applying methodologies

- Lack of financial and institutional support necessary for effective application of any methodology
- Limited access to data and data analysis tools
- Lack of information on the economic impacts of slow onset changes, relative to that available on damages associated with extreme climate events
- Lack of understanding of the strengths and weaknesses of existing institutions for supporting adaptation
- Lack of private sector engagement and of documentation of private sector adaptation needs and actions

6. Adaptation planning

Adaptation planning: include implementing new activities that are designed specifically in response to climate change, and modifying existing activities to make them more resilient to current, as well as future, climate change risks

Planning oriented UNFCCC instruments:

-Nationally Determined Contributions (NDCs)

-National Adaptation Plans (NAPs)

-National Adaptation Plans of Actions (NAPAs)

Non UNFCC adaptation planning:

-Equivalent national adaptation plans and strategies

Examples of effective adaptation options include: cultivar improvements, on-farm water management and storage, soil moisture conservation, irrigation, agroforestry, community-based adaptation, farm and landscape level diversification in agriculture, sustainable land management approaches, restoration of wetlands and upstream forest ecosystems have been effective in reducing flood risks and urban heat (high confidence), early warning systems and structural measures like levees have reduced loss of lives in case of inland flooding (medium confidence)….etc. (IPCC 2023)

6. Adaptation planning

The Conference of the Parties (COP) to the UNFCCC acknowledged that national adaptation planning can enable countries to assess their vulnerabilities, mainstream climate change risks, and address adaptation.

The UNFCCC established the national adaptation plan (NAP) process as a way to facilitate adaptation planning in least developed countries (LDCs) and other developing countries

The agreed objectives of the national adaptation plan process are:
(a) To **reduce vulnerability to the impacts** of climate change, by building adaptive capacity and resilience,
(b) To **facilitate the integration of climate change adaptation**, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate

6.Adaptation planning

Guiding principles of the adaptation planning process:

- Follow a country-driven, gender-sensitive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems;
- Be based on and guided by the best available science and, as appropriate, traditional and indigenous knowledge, and by gender-sensitive approaches, with a view to integrating adaptation into relevant social, economic and environmental policies and actions, where appropriate;
- Not be prescriptive, nor result in the duplication of efforts undertaken in-country, but facilitate country-owned, country-driven action.

Four steps of adaptation planning:

A. Laying the groundwork and addressing gaps;
B. Preparatory elements;
C. Implementation strategies;
D. Reporting, monitoring and review

6. Adaptation planning

Steps of the formulation of Adaptation Plans	
Element A. Lay the Groundwork and Address Gaps	1. **Initiating and launching of the process** 2. Stocktaking: identifying **available information** on climate **change impacts**, and assessing **gaps and needs** of the enabling environment for the NAP process 4. Comprehensively assessing **development needs for alignment**
Element B. Preparatory Elements	1. Analyzing current climate and future **climate change scenarios and impacts** 2. Assessing climate **vulnerabilities and identifying adaptation options** at the sector, subnational, national and other appropriate levels 3. Reviewing and appraising adaptation options 4. **Compiling and communicating national adaptation plans** 5. Integrating climate change adaptation into national and subnational development and sectoral planning
Element C. Implementation Strategies	1. **Prioritizing climate change adaptation in national planning** 2. Defining a (long-term) national adaptation implementation strategy 3. **Enhancing capacity for planning and implementation** of adaptation 4. Promoting coordination and synergy at the regional level and with other multilateral environmental agreements
Element D. Reporting, Monitoring and Review	1. Monitoring the NAP process 2. **Reviewing the NAP process to assess progress, effectiveness and gaps** 3. **Regularly updating the national adaptation plans** 4. **Outreach on the NAP process** and reporting on progress and effectiveness

7. Key highlights

- ✓ Adaptation needs refer to actions and resources required for the entire process – from assessment of impacts, risk and vulnerability through adaptation planning, implementation, and monitoring and evaluation.
- ✓ **Top-down methodologies** use climate model output as a starting point to determine the climate change impacts that would need to be adapted to, while **bottom-up methodologies** use an understanding of current vulnerability to climate change as the starting point for determining adaptation needs.
- ✓ The national adaptation plan (NAP) process as a way to facilitate adaptation planning in least developed countries (LDCs) and other developing countries with aim:

  (a) To **reduce vulnerability to the impacts** of climate change, by building adaptive capacity and resilience,

  (b) To facilitate the **integration of climate change adaptation**, in a coherent manner, into relevant new and existing policies, programmes and activities

- ✓ A systematic process can be helpful to assess and address adaptation needs at the national level.

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THANK YOU FOR YOUR ATTENTION

Questions?
Reflections?

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