Climate Change Risk & Adaptation Assessment (CRA)

Evidence Based Climate Proofing

Presented by
Asif Turangzai
ADB, PRM

ADB Policies/Strategies

- ADB revisited Climate Finance opportunities in 2014 and documented the approach in “ADB and the Climate Investment Funds Climate Change Innovation”
- Climate Change Operational Framework 2017–2030 were developed to strategies course of action for climate Finance
- ADB strategy 2030 prepared in 2018 also opted CC as one core thematic area for ADB priorities
- ADB CPS 2021-2025 also prioritizing CC investments
- ADB recently published Climate Change Profile of Pakistan and strongly implementing ADB Adaption Mitigation Guidelines (aligned to MDBs methodology) for resilience investment
- The ADB Paris Alignment targets, as recently announced by President Masa – ADB is also support Pak through its TA 9695-REG: Establishing a Support Facility for Article of the Paris Agreement
- ADB is closely aligning's its investment to the National Determined Contribution (NDCs) - http://www.mocc.gov.pk/SiteImage/Misc/files/Study%20Pakistan%20July%202019%20FINAL.pdf
- ADB,PRM through its Knowledge resources supporting Country Climate Investment Tracker Dashboard development in collaboration with MoCC
- ADB Knowledge Management Action Plan (2021-2025) also prioritizing knowledge management to drive climate operations
- ADB dashboard to trace Climate investments - https://data.adb.org/dashboard/climate-change-financing-adb

ADB's corporate-level climate targets

2015

- $6 billion per annum (of own resources) by 2020

2018

- $80 billion cumulatively between 2019-2030
- 75% of all projects include climate components by 2030

2021

- Full Paris Alignment of sovereign projects by 2023; non-sovereign by 2025
- Cumulative $9 billion adaptation between 2019-2024

Scaling up adaptation requires more adaptation-oriented projects, and less ‘climate ‘proofing’

Type 1: Climate proofing	Type 2: Activities predicated on the need for adaptation

• Need to manage climate risks to the asset
• Later stage assessment of risks and design
• Examples:
  • Changes in materials, specifications, dimensions
  • Adjust project siting
	• Sole or primary purpose of project
	• Early stage climate assessment for project development
	• In line with government climate priorities
	• Examples:
	  • Addressing sea level rise
	  • Early warning systems
	  • Climate-resilient agriculture and hydro

Climate Change Risk & Adaptation Assessment supports climate action through science!

What is CRA & CCA

- The qualitative and/or quantitative scientific estimation of risks.
- Understanding climate-related hazards (existing and future) and their impacts on populations and assets.
- Systematic evaluation of risks and risk management associated with climate variability and change to development activities.
  It is a part of Climate Risk Management (CRM)

How CRA supports climate action

- Aids informed decision-making about the allocation of climate finance investments (where to invest?)
- Identifies climate risks for adaptation planning. e.g. National adaptation planning should be informed by CRA.
- Aids climate proofing of development and other investments. e.g. infrastructure project in a developing country.

CRA & Tracking Climate Finance

UNFCCC and the Paris Agreement emphasizes on the **provision of climate finance** by the developed countries to the developing countries.

Tracking the climate finance is also emphasized to monitor the effectiveness of climate investments supporting adaptation & mitigation efforts.

CRA aids in **tracking climate finance** to ensure transparency and accountability concerning climate finance flows.

CRA for MDBs - Significance

MDBs are committed to **assessing the climate risks associated with their investments** and ensuring that they reflect the **adaptation priorities** of developing country governments.

Donor Perspective

- Demonstrating accountability and transparency to donor countries and agencies.
- Aligning funding flows with international climate goals (e.g. Paris Agreement).
- Enhancing the credibility by showcasing climate-resilient project pipelines.

Investment Planning

- Integrating climate risk assessment to inform robust investment decisions.
- Ensuring project portfolios align with climate resilience and low -carbon development.
- De-risking investments by identifying exposure to climate -related hazards.

Subject of CRA

- **Ecosystems** (**terrestrial**, ocean, freshwater)
- Human Systems (infrastructure)

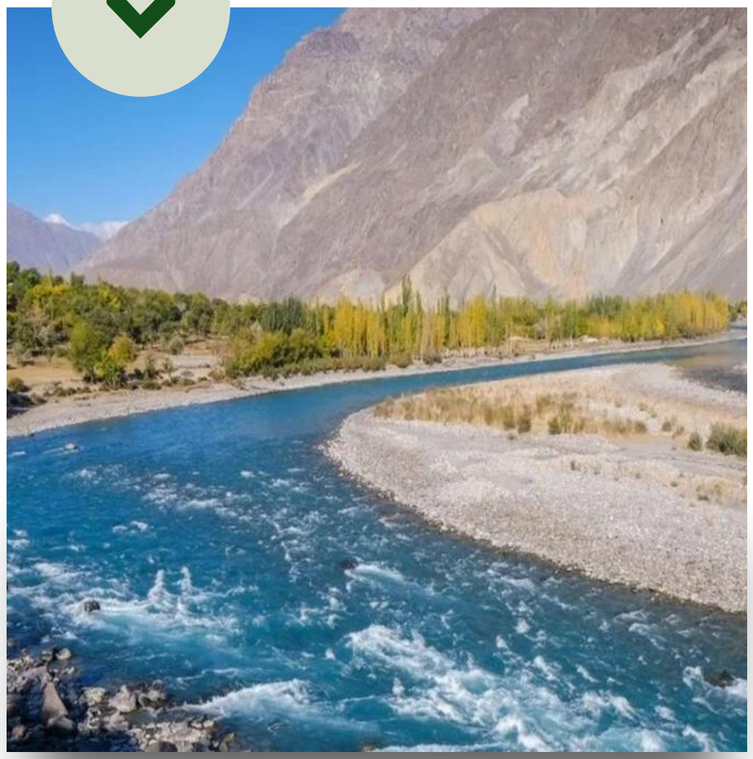
Rainforest

Tundras

Subject of CRA

- **Ecosystems** (terrestrial, **ocean, freshwater**)
- Human Systems (infrastructure)

Freshwater ecosystem



Coral reefs

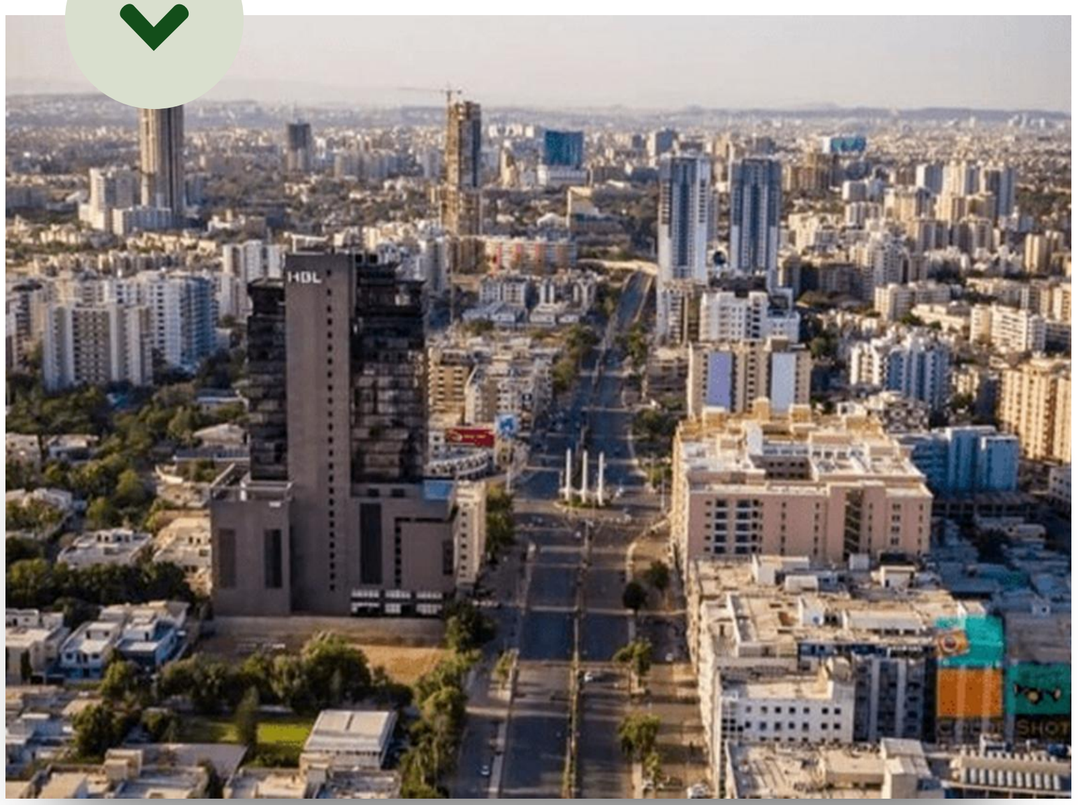
Mangroves

Subject of CRA

- Ecosystems (terrestrial, ocean, freshwater)
- **Human Systems** (**infrastructure**, agriculture)

Road infrastructure

Buildings

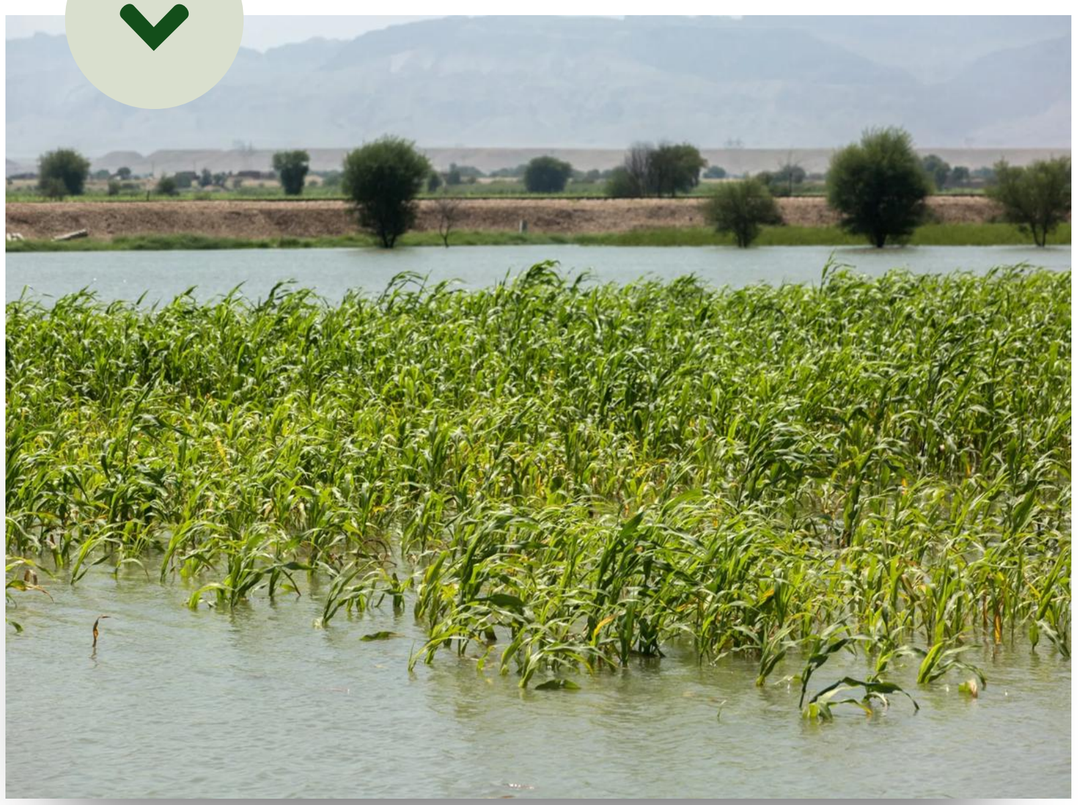


Subject of CRA

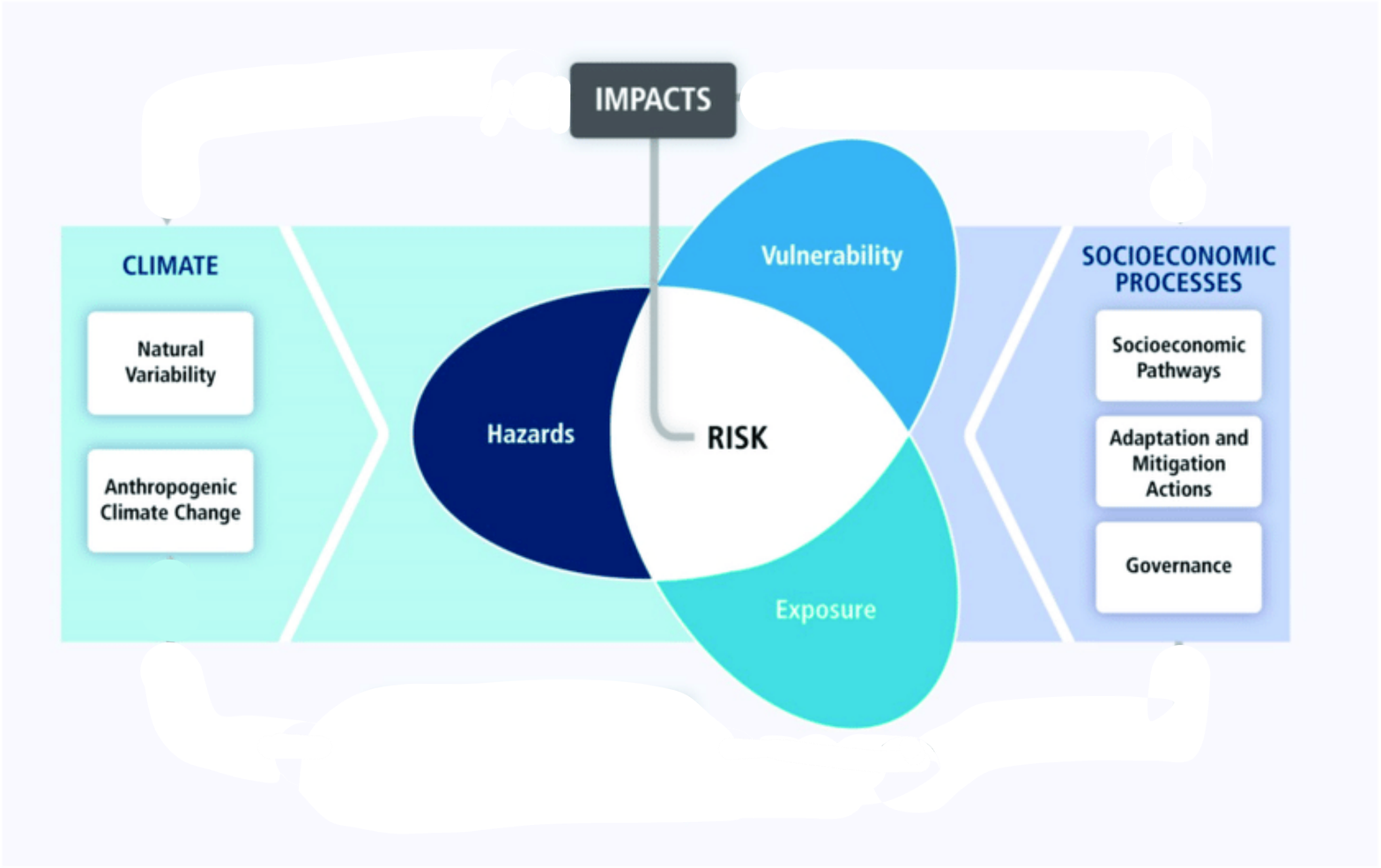
- Ecosystems (terrestrial, ocean, freshwater)
- **Human Systems** (infrastructure, **agriculture**)

Farming communities

Crops



IPCC Risk Framework



Hazard

Floods

A village underwater in Sindh province Pakistan. (Photo: Emmanuel Guddo/Concern Worldwide)

Drought

A dried-up stretch of land in Balochistan. (Photo: Asim Khan/File)

Hazard

Landslide

Mud and debris after a landslide in Kerala, India. (Photo: Rafiq Maqbool/AP)

Heatwave

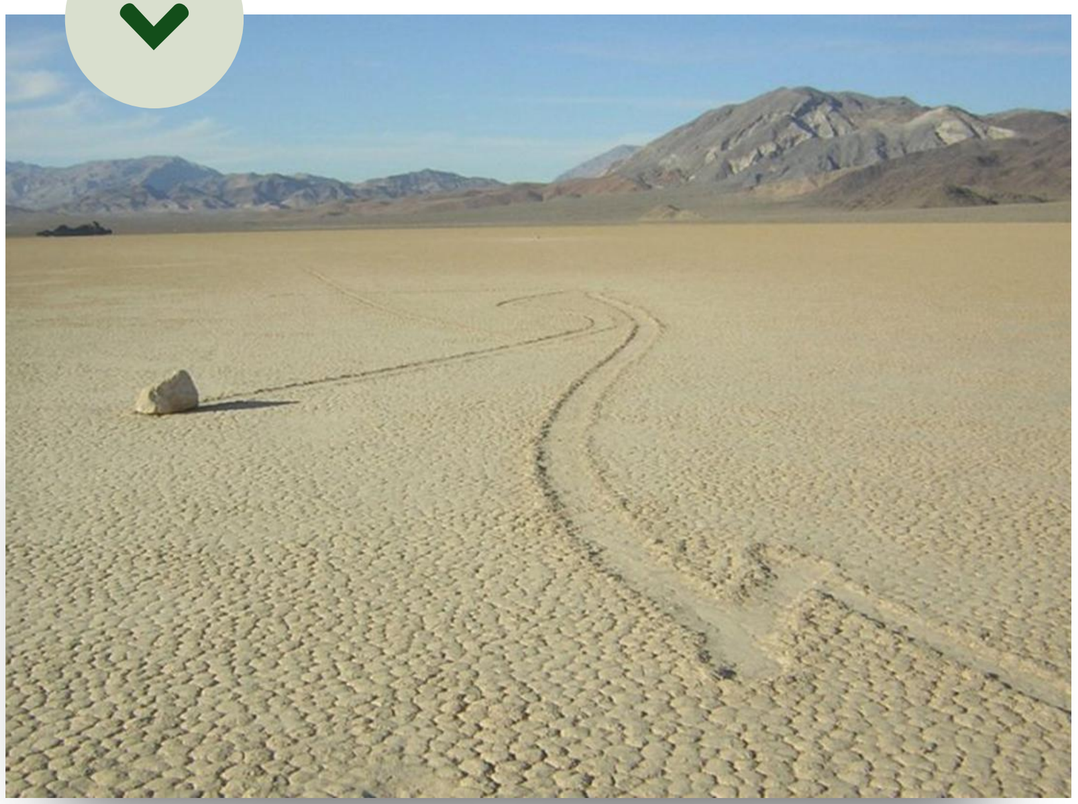
A man has his face sprayed on to cool off during a heat wave in Karachi. (Photo: Dawn)

Exposure

Heat in urban centers

Focus of study= human system (exposed)

Heat in desert



Focus of study = human system (not relevant);
Focus of study = ecosystem (relevant)

Vulnerability

Solar-powered homes during heatwaves

Low Vulnerability

Decoding Climate Risk

Risk = Hazard x Exposure x Vulnerability

Hazard

Possible occurrence of climate-related physical events

Exposure

Population, infrastructure, ecosystems subjected to hazards

Vulnerability

Sensitivity of exposed entities to hazards

Risk

Probability of adverse impacts on exposed assets

Exploring Climate Risk

Risk = Hazard x Exposure x Vulnerability

Region 1

Hazard

Floods

Exposure

Settlements and infrastructure in close proximity to rivers

Vulnerability

Lack of flood resilient infrastructure in rural areas heightens vulnerability + Poor rural socio-economic limit evacuation ability

Risk

High

Region 2

Hazard

Floods

Exposure

Settlements and infrastructure in far off from rivers

Vulnerability

Improved flood protective measures reduces vulnerability + Better socio-economic and civic conditions enable evacuation

Risk

Low

Region 1 at high risk compared to region 2

CRA Outcomes

A detailed assessment report of project site's vulnerability and hazard exposure to **inform decision-making** and risk management strategies, enabling targeted adaptation planning for the most critical components of the project.

Integrating climate resilience measures (**adaptation strategies**) into the development projects to enhance resilience among communities, infrastructure, and economies in the region.

Risk assessments assist in decision making (1/2)

Low-income communities with a predominant outdoor workforce are at higher risk to heat wave impacts as compared to high-income communities with predominantly indoor workforce

Climate proofing measures

Low-income communities require assistance accessing air conditioning, low-cost healthcare facilities for heat related illness, and heat resilient housing (ventilation, vegetation, covered roofs)

The information helps governments, MDBs and donors to **design need responsive projects** and enhance adaptive capacity as well as community resilience against climate change.

Risk assessments assist in decision making (2/2)

Settlements with close proximity to the rivers are at high risk to floods

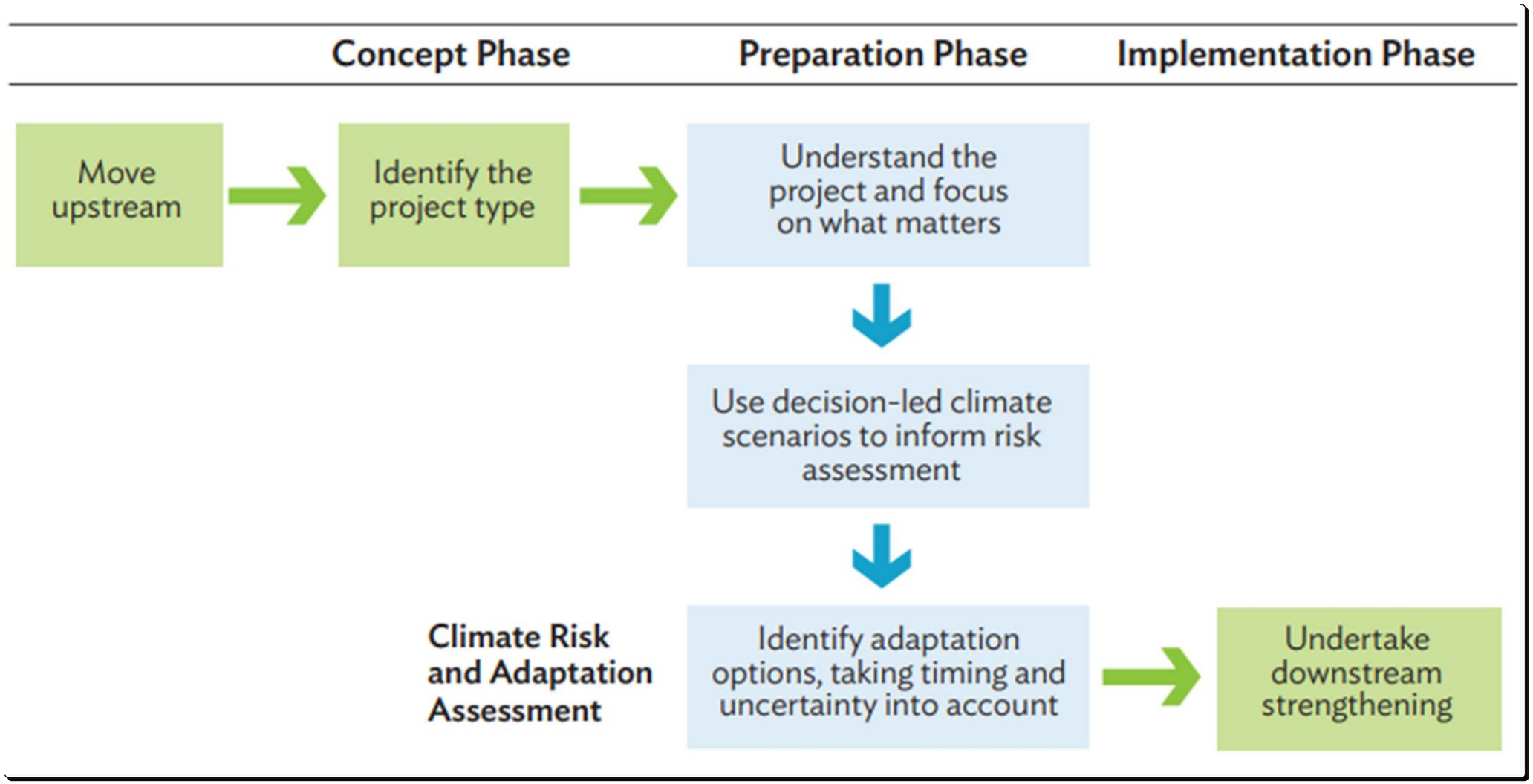
Climate proofing measures / adaptation measures

settlements require resilient housing e.g. elevated construction, sloping surroundings, and efficient drainage

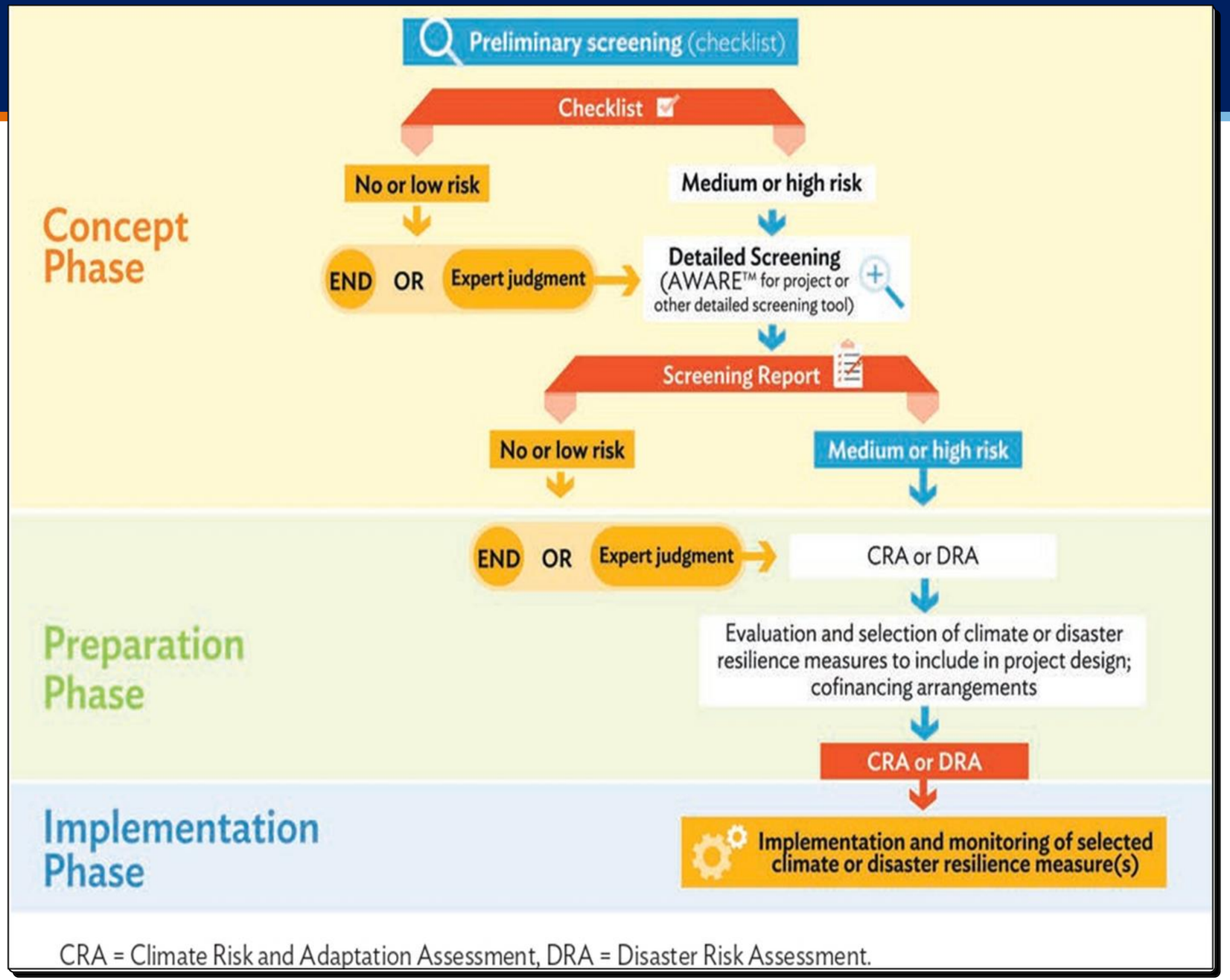
The information helps governments, MDBs and donors to **design need responsive projects** and enhance adaptive capacity as well as community resilience against climate change.

Climate Proofing Investment - ADB

The process of Climate Risk Management

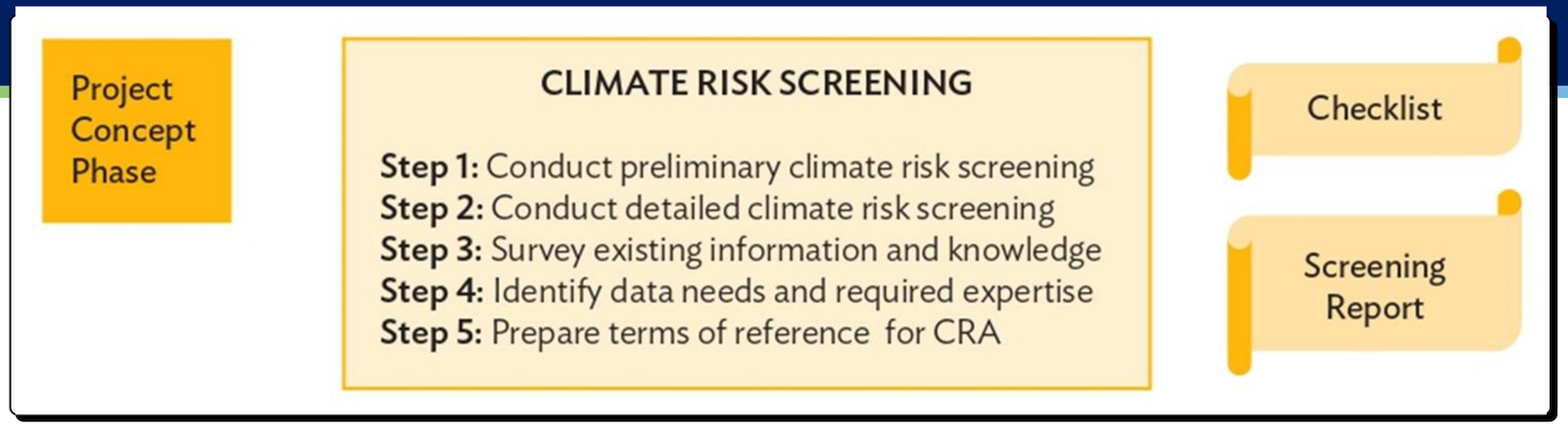


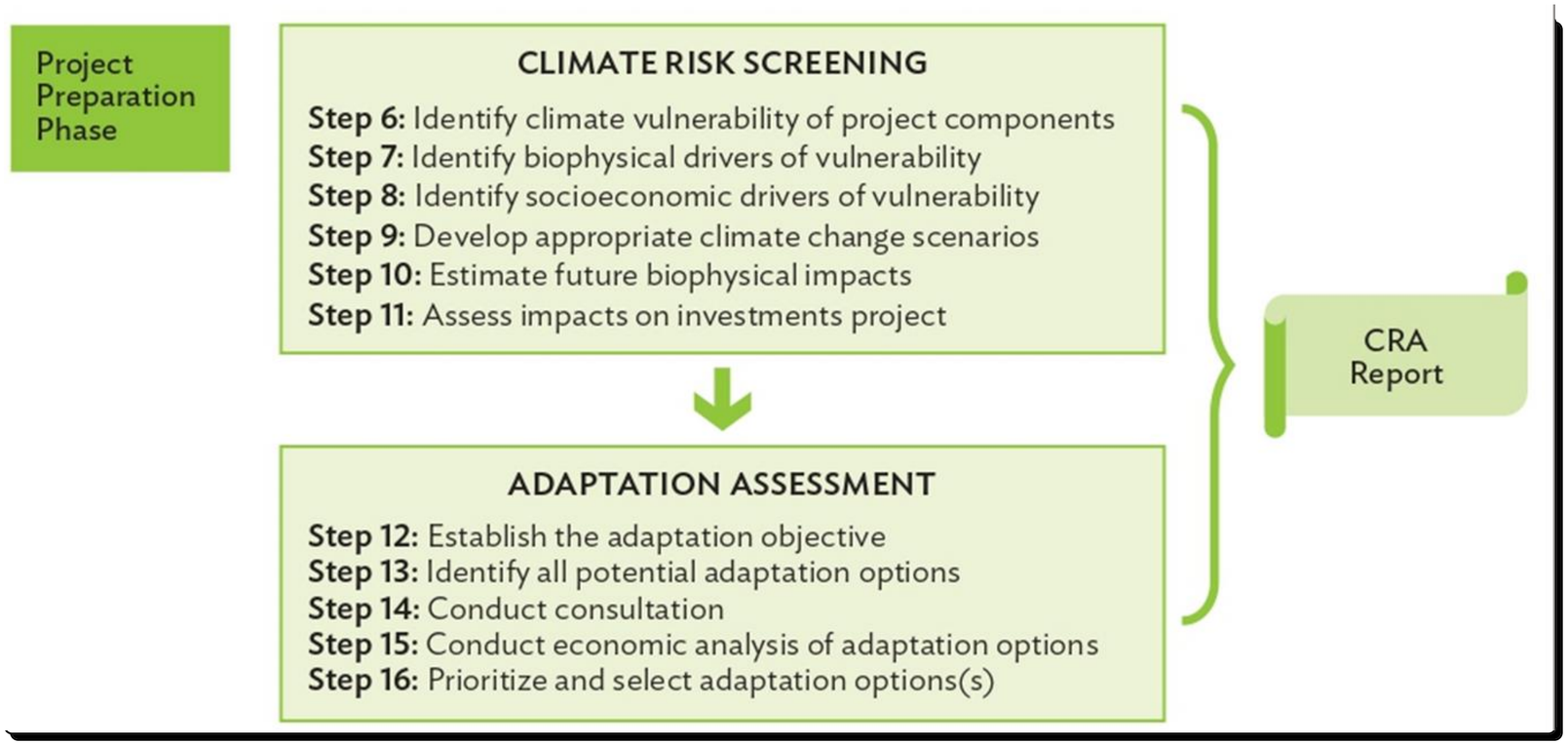
Source: Watkiss, P., Wilby, R., & Rodgers, C. A. (2020). Principles of climate risk management for climate proofing projects. Asian Development Bank.



Source: Watkiss, P., Wilby, R., & Rodgers, C. A. (2020). Principles of climate risk management for climate proofing projects. Asian Development Bank

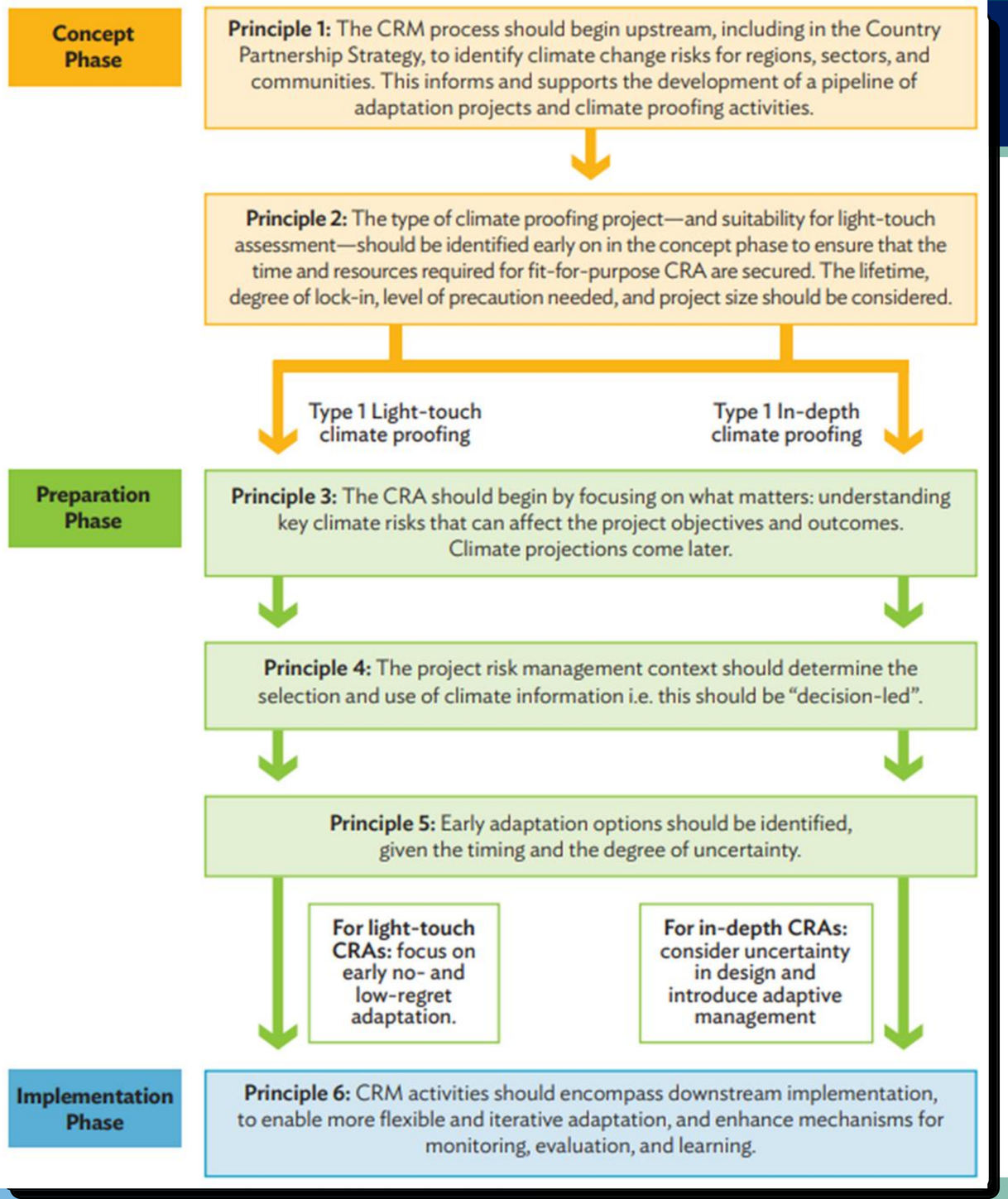
ADB's Climate Risk and Adaptation Assessment Process and the Project Concept Phase





ADB's Climate Risk and Adaptation Assessment Process and the Preparation Phase

ADB Guiding Principles for Climate Risk & Adaptation Assessment



Source: Watkiss, P., Wilby, R., & Rodgers, C. A. (2020). Principles of climate risk management for climate proofing projects. Asian Development Bank

ADB Project Classification

Type 1 Project

Climate Proofing

(climate adaptation is secondary objective)

Criteria: Development led; incorporated with climate proofing outputs to manage climate risks faced by the project asset or activity.

Identifying the project & CRA type

Type 1 Project

Climate Proofing (climate adaptation is secondary objective)

In-depth CRA

- Long lifetime (over 30 years)
- High risk of lock-in (irreversibility)
- High level of precaution required
- Big Project/large investment (over $400million)

e.g. Hydro-electric power plant and reservoir

Light-touch CRA

- Short lifetime
- Low risk of lock-in
- Low level of precaution required
- Small Project

e.g. upgrade of road project, wind power project

Adapted from: https://www.adb.org/sites/default/files/publication/621021/sdwp-69-climate-risk-climate-proofing-projects.pdf

ADB Project Classification

Type 2 Project

Near, Medium, & Long-term Resilience

(climate adaptation is primary objective)

Criteria:

1. Informed by national, subnational, sector, and/or regional adaptation issues, challenges, and priorities.
2. Should be based on climate risk assessment of the target system.
3. Projects should support output(s) that enable transformation.
4. Projects should include indicator(s) to track adaptation and resilience outcomes.
5. Projects should estimate climate adaptation finance in line with the joint multilateral development bank (MDB) climate adaptation finance accounting methodology.

Type 2a:

Projects that reduce long-term vulnerability and steer development in a resilient direction

Type 2b:

Building climate resilience primary objective. Intentionally designed to enable climate adaptation of a high-risk area/project

Identifying the project & CRA type

Type 2 Project

Near, Medium, & Long-term Resilience

(climate adaptation is primary objective)

In-depth CRA

- Long lifetime (over 30 years)
- High risk of lock-in (irreversibility, involves decision making)

e.g. coastal protections, Mass transit, engineering standards incorporating allowances for climate change, urban expansion

Light-touch CRA

- Adaptation focused but short lifetime
- Focus on enabling conditions for in-depth adaptation

e.g. TA projects, policy reform, resilience financing

Adapted from: https://www.adb.org/sites/default/files/publication/621021/sdwp-69-climate-risk-climate-proofing-projects.pdf

Studying interaction of exposure and vulnerability to determine risk

Exposure and Vulnerability score is evaluated using the Risk matrix to assign **risk level** to each component for hazards of concern. For example. Component rated **'Extreme' for exposure** and **'High' for vulnerability** will have an **'Extreme' risk** for hazard being evaluated.

		Exposure			
		Low	Moderate	High	Extreme
Vulnerability	Extreme	Moderate	High	Extreme	Extreme
	High	Low	Moderate	High	Extreme
	Moderate	Low	Moderate	Moderate	High
	Low	Low	Low	Moderate	High

Climate risk scoring matrix. Developed based on IPCC AR5 and ISO 14091: 2021 assessment of exposure and vulnerability of a climate hazard

Climate Hazards	Feedstock collection and transport*	Feedstock Storage	Building Infrastructure	Non-Building Infrastructure	SAF Storage	Stakeholders
Extreme Temperatures and Heatwaves	High	Extreme	High	Extreme	High	Extreme
Precipitation Increase and Floods	Extreme	Extreme	Extreme	Extreme	Extreme	Extreme
Precipitation decrease and Water availability	Low	Moderate	Moderate	Moderate	Low	Moderate

How to conduct in-depth CRA

1. Evaluation of climate hazards specific to project site (based on PCRS and CCA).
2. Identifying the indicators for climate Hazards (e.g. TXx for temperature & Rx1day for floods), Vulnerability (e.g. age group, literacy, poverty, housing material), and Exposure (e.g. population density for 21 districts of Sindh).
3. Climate Models are employed to acquire the hazard indicator data for reference period (historical) and future projections for the identified indicators. While survey data is employed to access the exposure and vulnerability indicator data.
4. The assessment included a time sampling approach for impacts of climate hazards on the proposed infrastructure areas during the selected timeframe from 2030 to 2050 while the historical timeframe was from 1980 to 2024.
5. Calculate the hazard, vulnerability and exposure indices. The indices values are normalized.
6. The risk index is calculated by summing equal percentages of the hazard, vulnerability and exposure indices.
7. A summary of impact of Risk on project outcomes.

Climate Services

Weather Forecast

Short term weather predictions (hours to days). Assists in planning daily activities.

For example, heatwave warning prompts postponing outdoor activities, staying hydrated etc.

Seasonal Prediction

Prediction of weather patterns and trends over a period of several months. Assists in season specific outlooks. For example, rainfall predictions for summer months helps farmers manage water resources accordingly.

Long-term Projections

Long term predictions for changes in climatic trends over a period of several years and expected resultant impacts. Assists in adapting to potential climatic threats. Global to Local levels. For example, flood projections help in resilient infrastructure planning.

AccuWeather

MEDSCOPE
MEDiterranean Services Chain based On climate PrEdictions
ERA4CS

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

INNOVA
Climate Service Provision

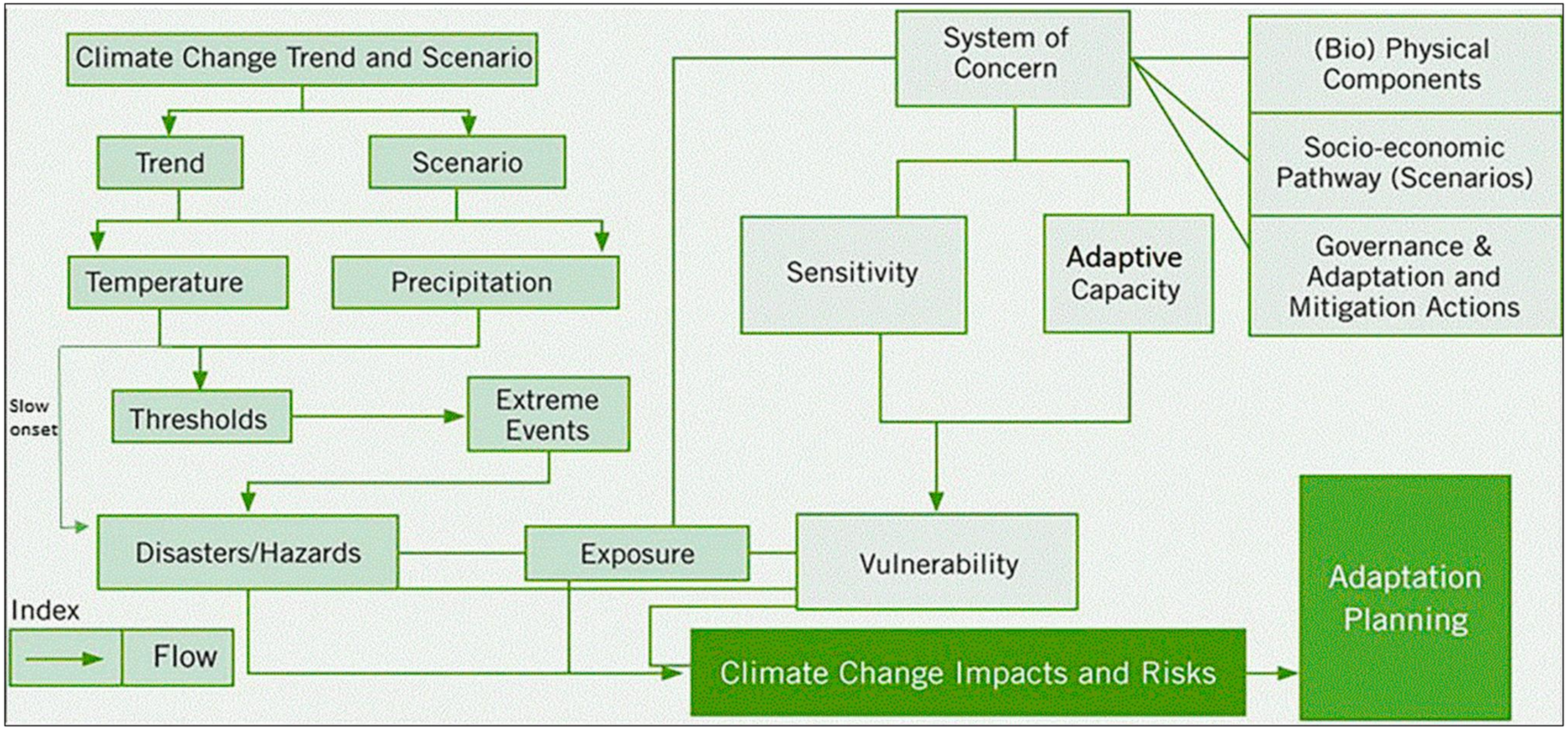
Climate Change Service
climate.copernicus.eu

Access Mechanisms

Source: Costa, M. M., Oen, A., Nesset, T., Celliers, L., Suhari, M., Huang-Lachmann, J. T., ... & Schuck-Zöller, S. (2022). Co-production of Climate Services: A diversity of approaches and good practice from the ERA4CS projects (2017–2021). Linkoping University Electronic Press.

ADB

A shift towards Climate Risk & Adaptation Services



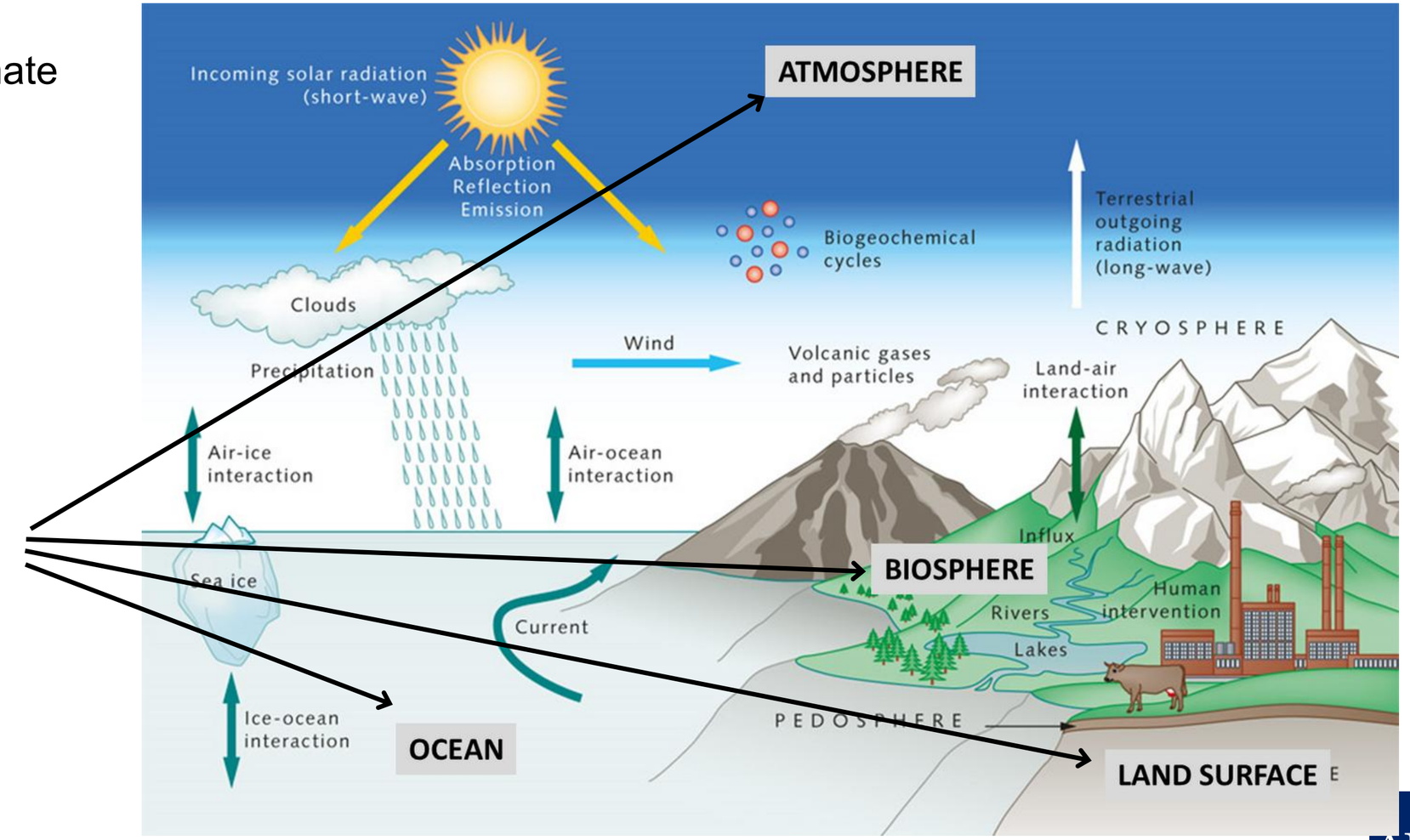
Source: MoFE,. (2021). Vulnerability and risk assessment and identifying adaptation options: Summary for policy makers. Ministry of Forests and Environment, Government of Nepal: Kathmandu, Nepal.

Climate Modelling

Use of mathematical models to simulate and predict Earth's climate system.

Purpose: To understand past climate variations, predict future climate trends, and assess the impacts of human activities on global climate

Integrates interactions between different **components** to simulate the Earth system.



Thank you