

Adaptation to Climate Change and Variability

Introduction to the main concepts

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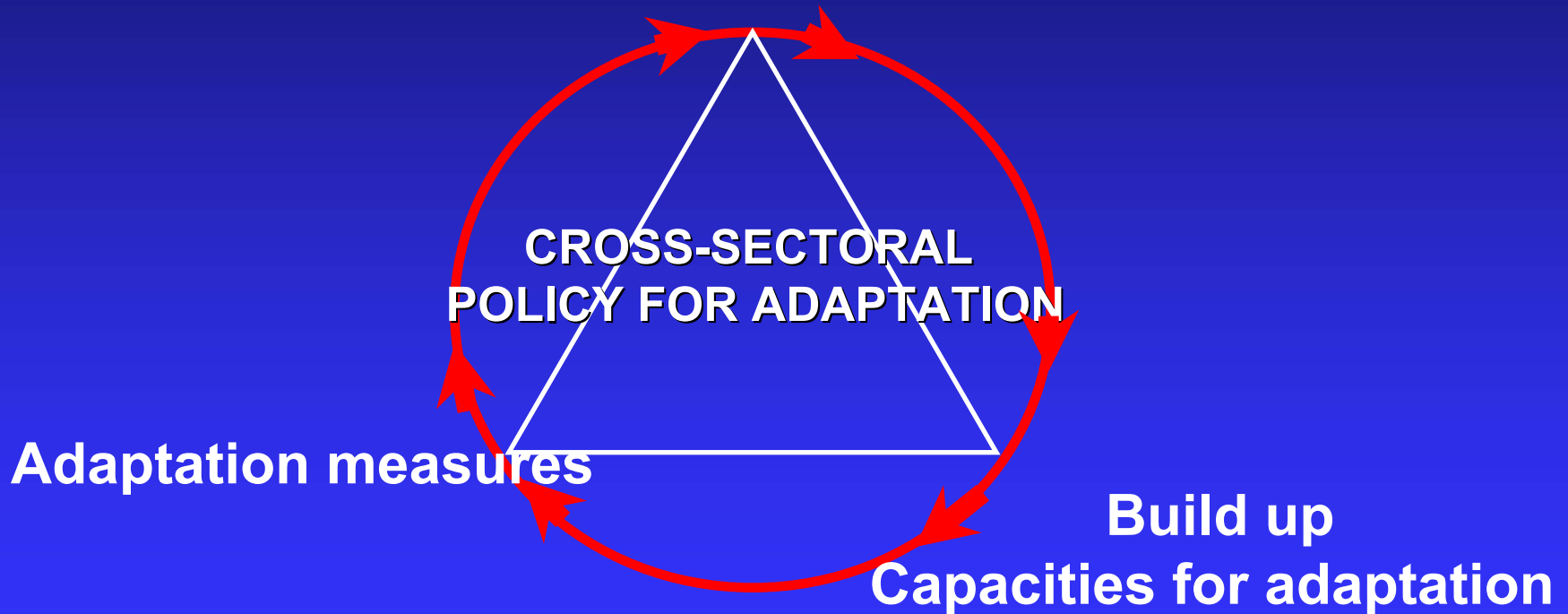


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Adaptation process

Identification and assessment of the impacts and the vulnerabilities of the natural and social systems



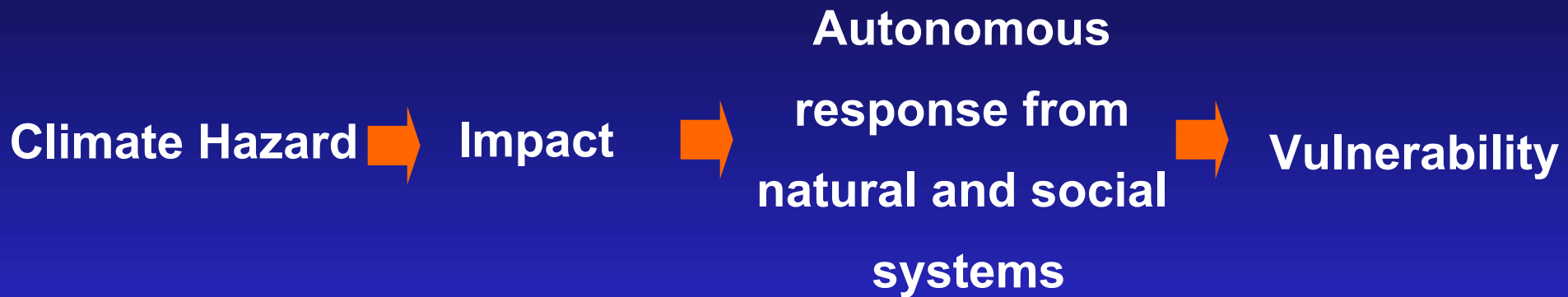
1. Understanding and assessing vulnerability

Vulnerability – degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change.

Vulnerability = Impacts – auton. adaptation capacity – planned adaptation



1. Understanding and assessing vulnerability

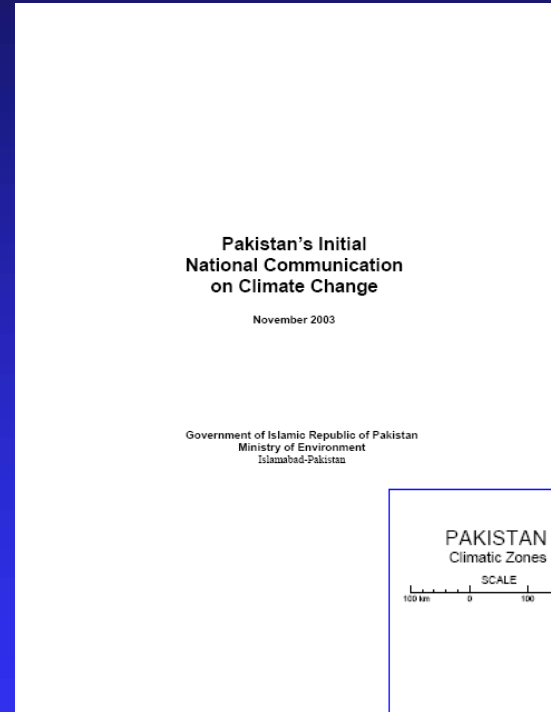


Example



Stage I: Assessment of the impacts of and vulnerability to climate change:

- Assessment of
 - Direct impacts
 - Indirect impacts
 - Incremental impacts



Including both natural and social systems

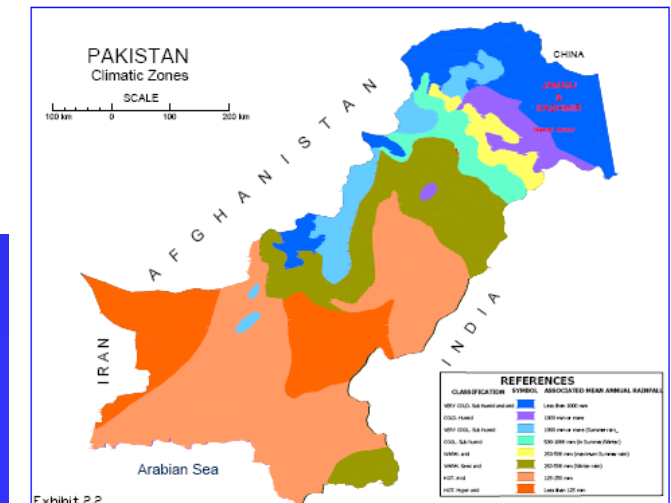


Exhibit 2.2: Climatic Zones of Pakistan

Some key issues of the NatCom

- Water resources and irrigation systems
- Agriculture
- Livestock
- Forestry and Land Use
- Biodiversity
- Energy
- Coastal Zone
- Socio-economic conditions

Stage 2. Preparing to adaptation

- **Definition of an adaptation policy**
 - Adaptation priorities
 - Adaptation & sustainable development
 - Adaptation Plan
 - Coordination with other sectors
- **Improving human resources**
 - Awareness,
 - Communication and
 - Capacity building
- **Improving technologies**

Factors that determine the planned adaptation capacity

- Economy and equity (incl. access to resources)
- Technological development
- Technical capacity / human resources
- Infrastructure
- Institutional development

Stage 3. Adaptation measures: How to decide what to do first?

Rationale of the
Adaptation Measures

- Accepting the costs
- Sharing and/or compensating for the losses
- Preventing the impacts or modifying the circumstances
- Searching for alternatives
- Changing location
- Research
- Educating, creating awareness and dissemination

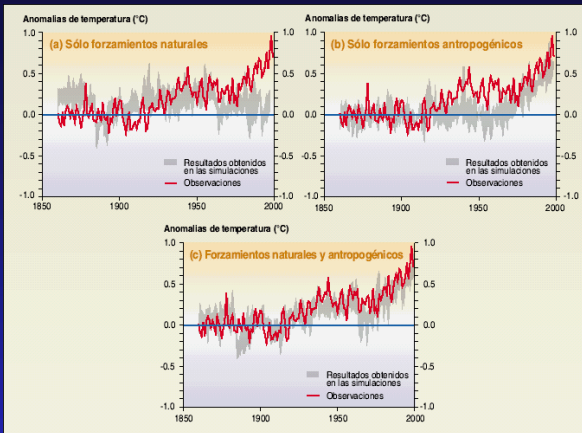
Examples of adaptation measures

- Promote management practices adequate for future climate scenarios and aimed at reducing vulnerabilities in time
- Improve the design of new infrastructure considering additional stresses due (especially) to extreme events
- Measures to reduce risks to disasters caused by extreme events
- Improve social network and resilience
- Relocate towns/infrastructure
- Which are the priorities in Pakistan?...



Methods & tools for adaptation

The challenge



Methods and tools should allow linking
Knowledge from science, decisions from policy-makers
and Knowledge/realities/coping strategies
of farmers

Why do we need methodologies and tools?

- Methodologies allow us to systematically
 - analyse the impacts of climate change on given social and biophysical scenarios
 - undertake a process of decision-making
- Tools are useful for developing scenarios as well as for analysing partial results

Tools

- Expert's judgment
- Dynamic models (e.g. climatic models)
- Geographic Information Systems
- Statistic analysis of historical data
- Sector specific tools (e.g. Holdrige classification of life zones)
- Sensitivity analysis

Basic process

System definition



Modelling scenarios
Climatic, socio-economic,
biophysical & environmental



Analysing scenarios



Recommendations

Methodology of the Intergovernmental Panel on Climate change (IPCC)

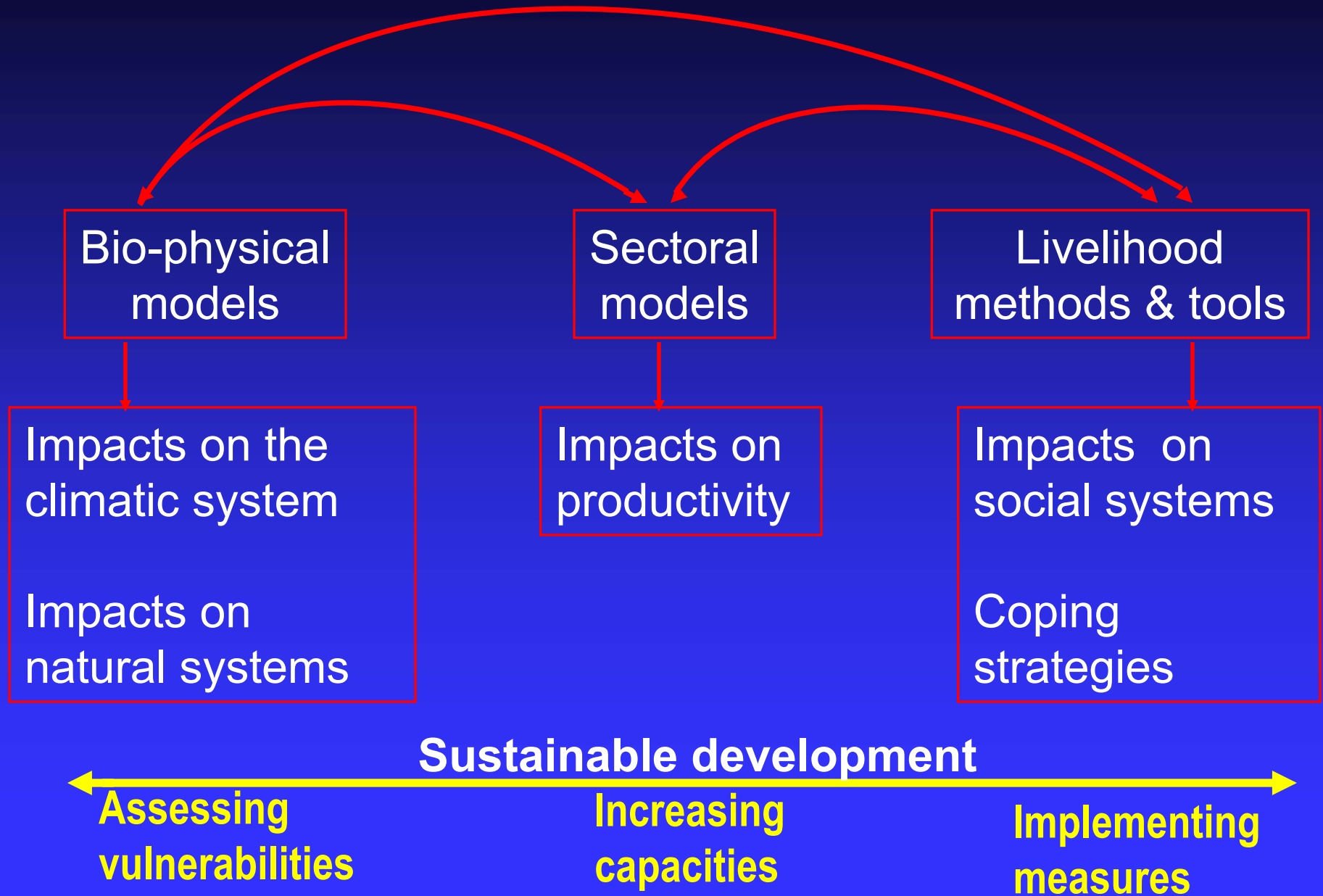
➤ Approaches

- “of impacts”. It is the simplest of the three and is based on a cause-effect relationship. It is limited to the identification of changes in certain climate variables and analyzes their possible effects on the system units exposed to those changes.
- “of interaction”. It includes other processes that can interact to exacerbate its impacts, extending the vulnerability assessment to other factors that cause negative impacts on the system.
- “integrative”. The units under study must be integrated to a system and the system to a sector, so that an analysis can be made of all possible interactions among systems and elements of the systems affected by climate change

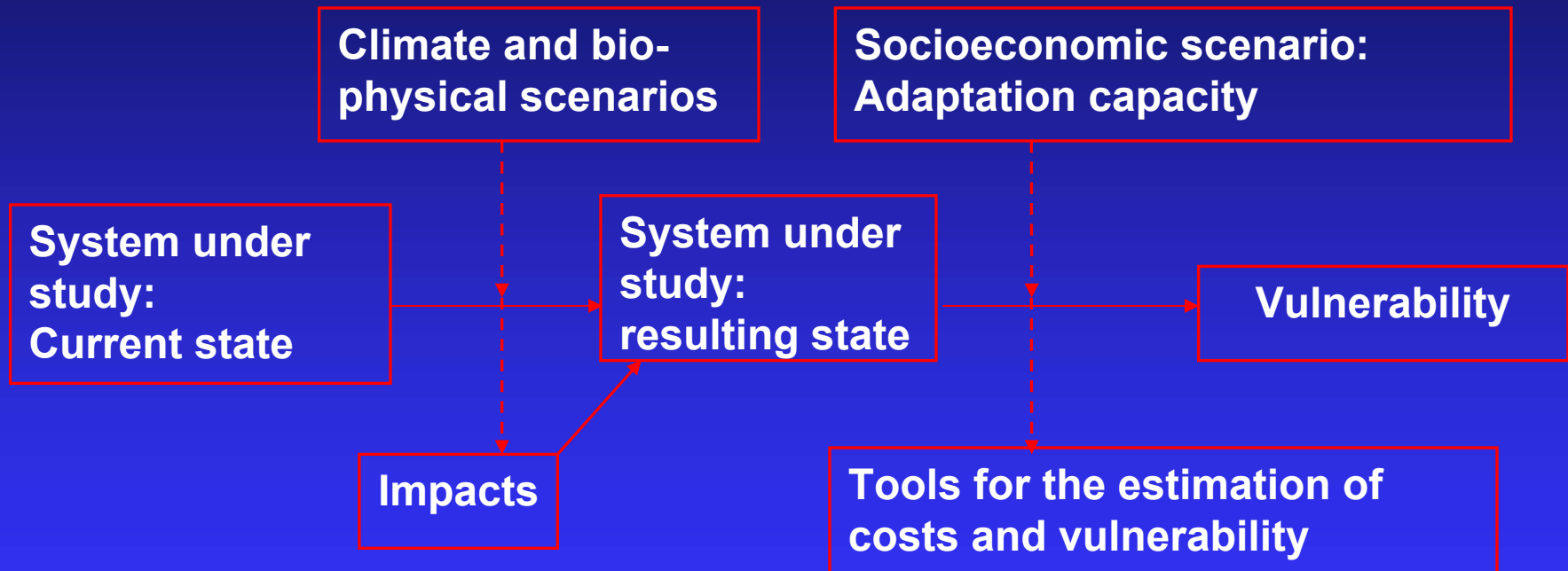
Methodology of the Intergovernmental Panel on Climate change (IPCC)

1. Problem identification – definition of the system
2. Methode selection
3. Test methode / sensitivity analysis
4. Select and apply scenarios
5. Appraise biophysical and socioeconomic stakeholders
6. Appraise autonomous adaptation
7. Assess the adaptation strategies

Selecting methods & tools



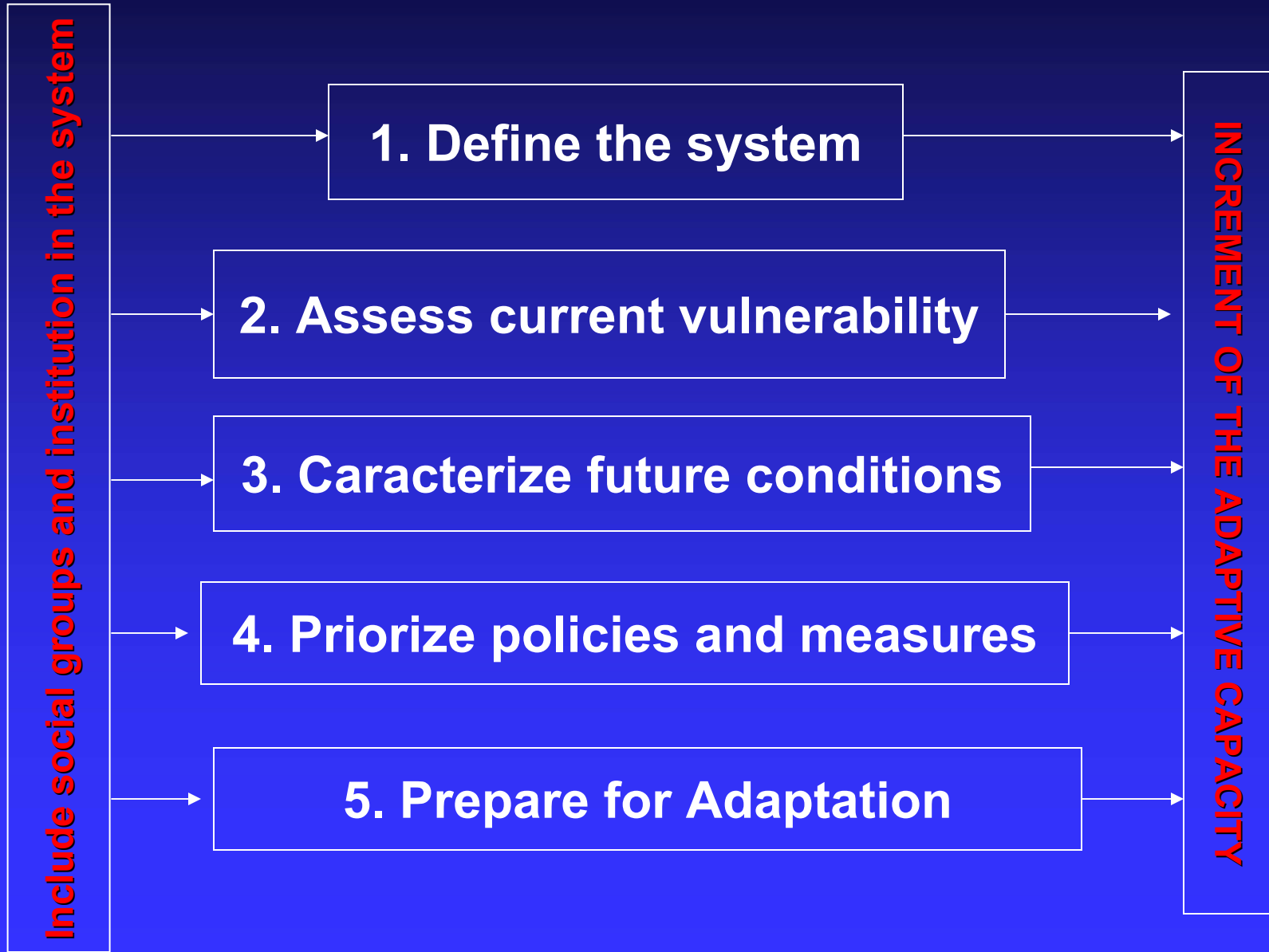
Methodology of the United Nations Environment Program (UNEP)



Adaptation Policy Framework

Aimed to be “*a structured approach to formulating and implementing adaptation strategies, policies, and measures to ensure human development in the face of climate variability and change. The APF links climate change adaptation to sustainable development and global environmental issues*”

Policy Framework for Stage II of Adaptation



Models

- **Climatic models:**
 - General Circulation Models (GCMs) (e.g. Hadley) and Regional Circulation Models (RCM)
 - Downscaling models
 - Other more available possibility is to interpolate predicted differences and add these in to an existing detailed climate grid (e.g. FloraMap and MarkSim)
- **Sectorial models** aimed to identify potential impacts in the given sector
 - Agriculture: dynamic growth and yield models (e.g. CERES-maiz) combined to modelled climate scenarios (e.g. MarSim)
 - Water: water balance models combined to modeled climate scenarios

Prototype Tool for Adaptation to Climate Change (WB): ADAPT

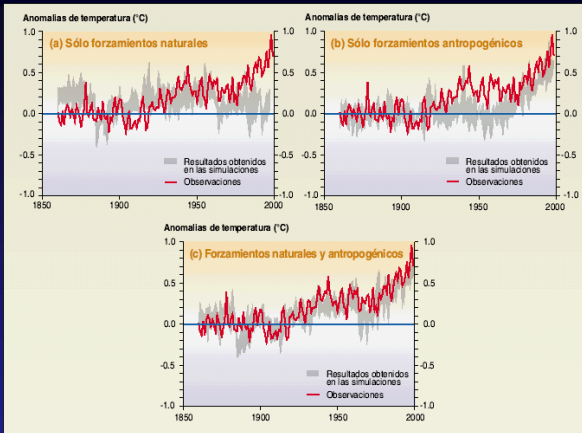
- Aimed to assess whether a project might be sensitive to the effects of climate change.
- Expected to provide guidance to the best sources of information to help take these potential effects into account in the project design.
- The tool provides a first level of assessment based on a simple description of the project and its location.
- The guidance is based largely on expert assessment of the risks and opportunities that arise from climate change.

Regarding preparedness for extreme events

- Methodologies for risk assessment
 - Definition of the risk (including analysis of the potential disaster and damages)
 - Identification/quantification of (potential) impacts
 - On infrastructure
 - On economy
 - On society (health, social networks,...)
 - On environment
 - (Identification of strengths/facilities)
 - Recommendations

Understanding linkages between (natural) disasters and climate variability is a relatively new field of work

however...



Social issues as well as local knowledge have been not yet systematically integrated into the adaptation process (assessment of vulnerabilities, increasing preparedness and planning and implementing adaptation measures)

Next session:

some experiences in project work in adaptation

In the forest sector:

- Guidance for adaptation in the forest sector
(FAO – Intercooperation)

At the livelihood level:

- V&A in semi-arid India
- Assessing vulnerability and coping strategies with the CRISTAL
 - Mali
 - Bangladesh
 - Sri Lanka
 - Tanzania
 - Nicaragua



Thank you very much for your attention!!

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