Adaptation to climate change in coastal areas: more than technology

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Outline

- Technology: part of the solution
- Technology: part of the problem
- Towards a comprehensive adaptation strategy
- Conclusions

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Traditional approach to adaptation

- Adaptation needs follow from a scenario-driven model-based assessment of potential impacts
- Action to meet adaptation needs is a government responsibility
- Adaptation options are primarily technological in nature
- There are no constraints on implementing the adaptation options identified

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Technologies for adaptation

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- Society has a long history of coping with and preparing for climate variability and weather-related hazards. Many existing technologies can therefore be considered technologies for adaptation.
- Not everybody has knowledge of or access to these technologies.
- Existing technologies vary from hard to soft, from simple to highly complex, from inexpensive to unaffordable, and from locally available to requiring international technology transfer.

Types of technologies

- Traditional technology: bed nets, houses on stilts, traditional cropping patterns
- Modern technology: storm barriers, air conditioning, vaccines
- High technology: satellite monitoring, seasonal forecasting, genetically modified seeds
- Future technology: who knows?

Each type of technology has its own advantages and disadvantages, depending on its purpose, location of deployment and stakeholder involvement.

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Risks of adaptation technology

- Disregarding uncertainty, leading to lock-in
- Focus on exposure as the primary driver of vulnerability, possibly causing maladaptation
- Possible conflicts with other interests
- False sense of security

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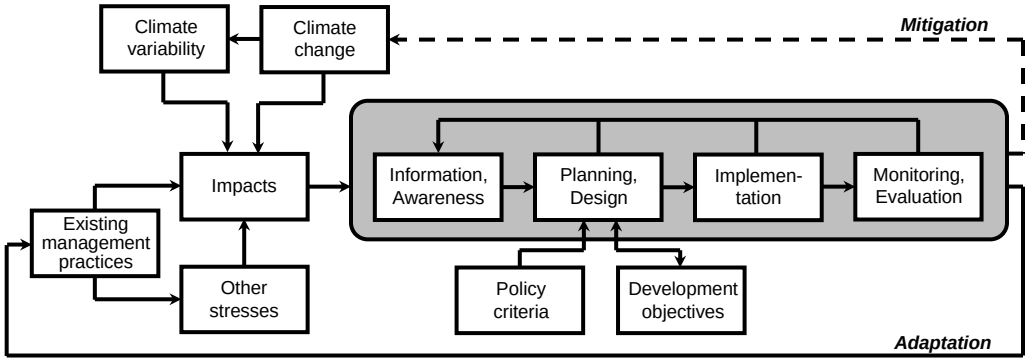
The process of adaptation



Klein et al., 1999

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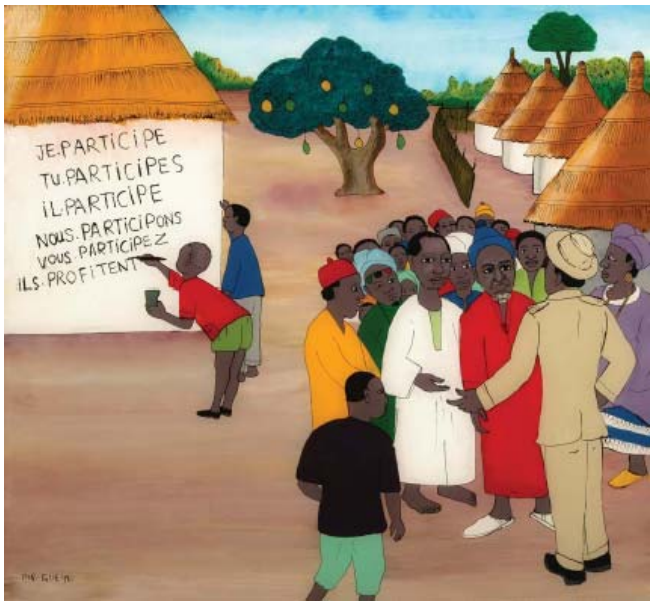
Barriers to implementation

- Implicit in much of the discussion and in the negotiations to date is the assumption that there are no constraints on implementing the adaptation options identified.
- Institutions and mechanisms need to be in place and technological, human and other resources need to be available to (i) collect information and raise awareness, (ii) plan and design adaptation options, and (iii) monitor and evaluate their performance.
- Successful implementation of technologies relies on the presence of an 'enabling environment.'



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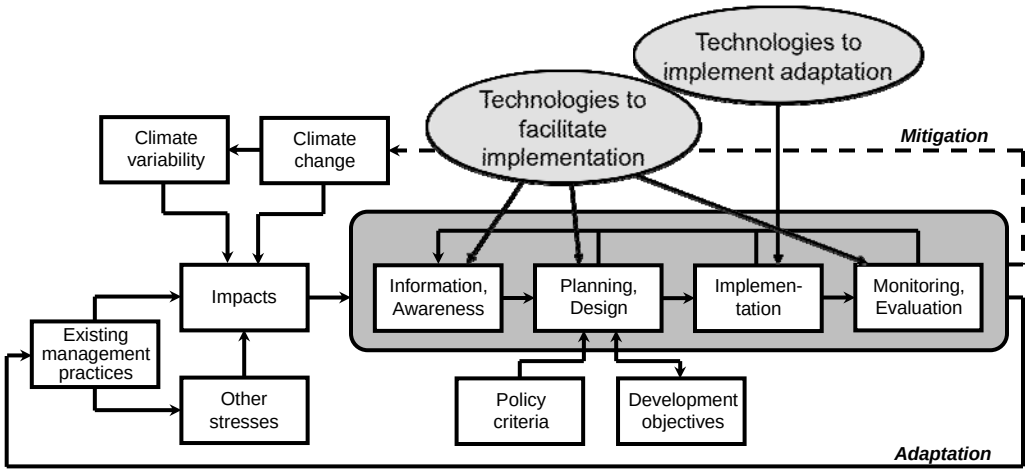

Information and awareness

- Observation systems (on all spatial scales)
- Hazard mapping, risk and vulnerability assessment (e.g., using models and scenarios, historical analogues and participatory methods)
- Awareness raising methods (e.g., printed information, audio-visual media, interactive tools)

Planning and design

- Simulation tools (economic models, demographic models, hydrological models, vector distribution models, land use models)
- Decision tools (cost-benefit analysis, cost-effectiveness analysis, multi-criteria analysis)
- Integration tools and frameworks (e.g., participatory methods, Adaptation Policy Framework)
- Cross-cutting technology: geographical information systems

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Implementation

- Protect: decrease probability of occurrence (e.g., dikes, seawalls, beach nourishment)
- Retreat: limit potential effects (e.g., establishing set-back zones, relocating threatened buildings)
- Accommodate: increase society's ability to cope with the effects (e.g., emergency plans, insurance, modification of land use and agricultural practices)

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Monitoring and evaluation

- Similar technologies as for information development (observation systems, mapping and assessment), in combination with an evaluation framework (requires agreement on indicators and criteria)

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Adaptation thinking today

- Adaptation needs are apparent from current climate-related vulnerability
- Adaptation is a process that involves many different actors, often with conflicting interests
- Adaptation options can be technological, behavioural, economic and institutional
- Adaptation must be integrated in ongoing planning and development

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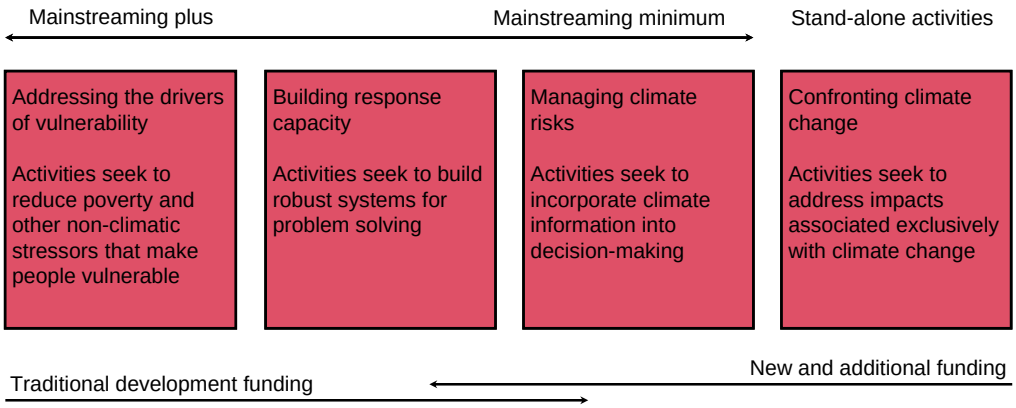
The adaptation continuum



Based on McGray et al., 2007

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Conclusions

- Adaptation is a process that comprises more than the deployment of some hardware; it also explicitly includes considering soft technologies, as well as non-technological options to complement and facilitate the use of technology.
- Technology can be very important in reducing vulnerability to climate change, but it can also introduce new risks. Moreover, its effectiveness depends on the economic, institutional, legal and socio-cultural contexts.
- Adaptation is no longer an engineering science. The greatest challenges are to be addressed by social scientists.

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