Adaptation in developing countries

Stéphane Hallegatte
Centre International de Recherche
sur l'Environnement et le Développement (CIRED),
and
Ecole National de la Météorologie, Météo-France

1. What is adaptation?

Adaptation in not compensation

- **Adaptation funding** means providing support to developing countries to help them adapt to climate change
- **Compensation** means providing funds to compensate for climate change impacts
- **The amounts at stake are different**:

  Compensation = Adaptation cost + Residual impacts
- **The tools are different**: adaptation funding can be done through loans; compensation cannot.
- Different positions in developing and developed countries on this point.
- Seems difficult to disregard compensation in all cases, especially where adaptation is inefficient or unprofitable (e.g., low-lying areas, small islands).

Definition of adaptation

Table 1: Four definitions of adaptation, from the strictest (Def. 1) to the broadest (Def. 4)

Climate change only or Climate change and variability Climate is the main justification or not	Climate change only (including future extreme events)	Climate change and variability (including extreme events in the current climate)
Climate is the main justification of the action	Def 1	Def 2
Other benefits are sufficient to justify the action; the reduction in climate vulnerability is a co-benefit.	Def 3	Def 4

Sources of (strict) adaptation costs

- *When climate change makes new investments necessary* (e.g., irrigation becomes necessary; natural coastal defences have to be replaced by man-made defences).
- *When climate change increases the cost of investments* (e.g., where coastal defences – needed in the current climate – will have to be made higher because of sea level rise).
- *When climate-sensitive investments have a long life-time compared with the climate change time scale* (e.g., climate evolution creates additional investment costs in the housing sector through reduced investment lifetime or continuous retrofit).
- *When uncertainty on future climate makes it necessary to make investments more robust to many possible climates* (e.g., making water management infrastructures able to cope with an increase or a decrease in precipitation).
- *When economic activities can become unprofitable because of a change in climate conditions* (e.g., agriculture, tourism): (i) social costs to help the most affected households and regions; and (ii) the investment aid needed to create new activities to replace the unprofitable one.

What are the needs?

- **Two types of assessment**:
  - **Top-down**: World Bank, UNFCCC, UNDP, Oxfam : from $4 to $109 billion per year from now to 2030.
  - **Bottom-up** (NAPAs or sectoral studies): very small amounts.

- Top-down methodologies are very questionable, as they are based on ad hoc assumption on the cost of climate-proofing infrastructures.
- Bottom-up methodologies are very questionable, as they are very narrow and disregard many mechanisms (e.g., coastal protections).

- An important difference is that top-down approaches use a broad definition of adaptation, while bottom-up approaches use a very strict definition.

- The real number is probably somewhere in between.

2. What is most needed now?

Adaptation and development stages

- Difference between developed and developing countries:
  - In developed countries, infrastructures are in place; they need retrofitting to cope with changing climate conditions;
  - In developing countries, most infrastructures are lacking (e.g., sanitation in cities); they need to be built, taking into account climate change.
  - In the least developed countries, capacity building and poverty reduction are priorities; their capacity to « absorb » adaptation aid is low.

- Infrastructure development is key in economic development;
- Most benefits from infrastructure development are independent from climate change (e.g., coastal protection, drainage infrastructures).
- Focusing on a strict definition of adaptation would lead to the rejection of the most efficient strategies to reduce climate change vulnerability (**anti-selection**).

- **It is desirable to focus on strategies with adaptation as a co-benefit (no-regret strategies)**.

Adaptation needs in the next 20 years

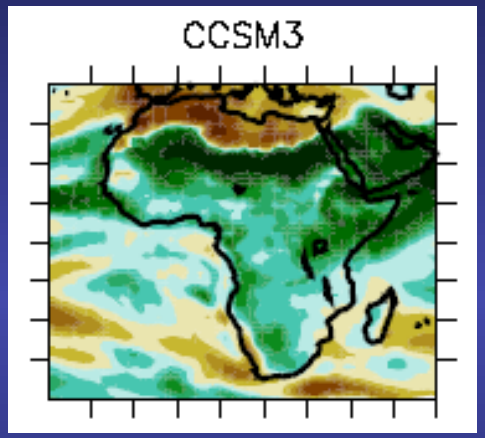
- Most of climate change impacts will occur after 2050.
- We need to focus on sectors with very long timescales, where adaptation actions are efficient only after a long delay.
- If these adaptation actions yield benefits only from climate change adaptation, benefits will be delayed by decades.
- **Focusing on no-regret strategies would also bring welcome short-run benefits.**

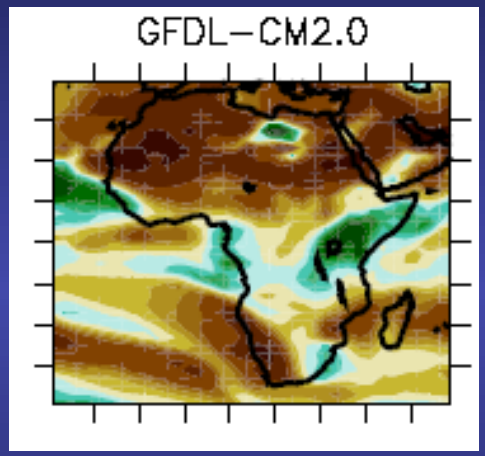
Table 3: List of sectors in which adaptation measures should already be implemented, because of their investment time scales and their exposition to climate conditions. In this table, exposure is estimated empirically by the author.

Sector	Time scale	Exposition
Water infrastructures (e.g., dams, reservoirs)	30–200 yr	+ + +
Land-use planning (e.g., in flood plain or coastal areas)	>100 yr	+ + +
Coastline and flood defences (e.g., dikes, sea walls)	>50 yr	+ + +
Building and housing (e.g., insulation, windows)	30–150 yr	+ +
Transportation infrastructure (e.g., port, bridges)	30–200 yr	+
Urbanism (e.g., urban density, parks)	>100yr	+
Energy production (e.g., nuclear plant cooling system)	20–70 yr	+

Dealing with uncertainty

- One obstacle to climate change adaptation is uncertainty on future climate. e.g., how will precipitation change in Africa? What is the best adaptation strategy in such a situation?





- **Development actions often yield benefits for almost any change in climate**: drainage infrastructure in cities, water reservoirs, control of water leakages, coastal protection, etc.
- These strategies yields short-term benefits, which are not related to climate change.
- If climate change is taken into account in their design, they also reduce climate-change vulnerability.

3. What can be done?

An "Adaptation-Driven Development Fund" ?

- Adaptation-driven Development funding is likely to be the most efficient way of reducing future climate change impacts.
- But, if focusing on no-regret development strategy, the difference between adaptation and development becomes fuzzy (risk of crowding-out from previous development funding).
- Specificities of an "adaptation-driven development fund":
  - An adaptation-driven development fund **is directed in priority toward the most climate-vulnerable countries and sectors**, and **supports only projects that reduce the vulnerability to climate change and weather extreme events**.
  - An adaptation-driven development fund **is additional to ODA; it is funded through specific channels**, explicitly distinct from ODA channels; and the contribution of each country can be defined by climate-related criteria (e.g., through a carbon tax (Swiss proposal), a tax on air travel, or the CDM adaptation levy).

In which sectors? Water management

- **Water management (including providing drinking water, sewage and sanitation, and treating used water).**
- **No regret**: These investments provide large benefits over the short-term even in absence of climate change (e.g., health and disaster risk reduction).
- The Camdessus report (2003) estimated that meeting the 2015 water-related goals of the UN Millenium Declaration would require an additional $17 billion funding per year for water and $32 billion per year for sanitation and sewage.
- An international adaptation scheme may decide to focus first on providing to developing countries the water infrastructures they need, making sure that these infrastructures are climate-proof.
- Since international funding of these infrastructure already exists, the additional funding from adaptation aid would be easy to integrate into already-existing frameworks.

In which sectors? Disaster risk reduction

- **To fund investments in risk reduction, in the spirit of the U.N. Trust Fund for Disaster Reduction and the Global Facility for Disaster Reduction and Recovery**.

- **No regret:** As disasters kill thousands of people every years, affect hundred of millions of people, and cost tens of billions dollars per year, it is well accepted that investing in disaster reduction pays off in the current climate, and that it promotes sustainable development.

- There is no published assessment of the funding needs in this domain, but an envelope of a few billions or a few tens of billions USD per year would already represent a huge improvement compared with the current situation.

- Rapidly growing urban places have a disaster vulnerability that is growing exponentially because of rapid urbanization and infrastructure shortage. Additional investments in cities could, therefore, yield particularly high benefits.

Summary

- Adaptation needs are different in developed and developing countries.
- To be most efficient and most useful over the short-term, adaptation funding in developing countries should focus on development actions, with adaptation as a co-benefit.
- All development actions must take into account future climate change, including uncertainty on future local climates.
- Required amounts are still unknown.
- A possibility is to create an “Adaptation-Driven Development Fund”, which differs from ODA because:
  - It focuses on the most vulnerable countries and sectors; It funds only projects that reduce climate vulnerability;
  - It is funded through independent channels, possibly linked to climate criteria.
- A possibility is to direct this aid in priority toward two sectors:
  - Water management
  - Disaster risk reduction