Infrastructure and Climate Change

Raffaello Cervigni
Regional Coordinator for Climate Change
The World Bank
Contents

1. The context: infrastructure, growth and funding gap
2. Effects of climate change: what do we know
3. A closer look: new initiative UNECA-World Bank
Infrastructure could boost Africa’s growth four-fold…

Source: Africa Infrastructure Country Diagnostic (AICD)
..but there is a $50 billion gap to fill…

Source: Africa Infrastructure Country Diagnostic (AICD)
WHAT HAPPENS WITH CLIMATE CHANGE?
Economics of Adaptation to Climate Change (2010):
by looking at extremes of climate models (for a 2°C warmer world…)

Change in average annual precipitation, 2000 – 2050

CSIRO (DRY)  NCAR (WET)

A2 SCENARIO
The World Bank's East Asia and Pacific (EAP) estimated adaptation costs are approximately $18 billion per year. The annual costs of adaptation by region for the years 2010 to 2050, in US$ billion, are as follows:

**Wet Scenario** - $89.7 billion

- East Asia and Pacific (EAP): $25 billion
- South Asia (SSA): $18.1 billion
- Latin America and Caribbean (LAC): $21.5 billion
- Europe and Central Asia (ECA): $9.4 billion
- Middle East and North Africa (MNA): $3 billion
- South Asia (SSA): $15.6 billion

**Dry Scenario** - $77.6 billion

- East Asia and Pacific (EAP): $19.6 billion
- South Asia (SSA): $16.9 billion
- Latin America and Caribbean (LAC): $16.9 billion
- Europe and Central Asia (ECA): $5.6 billion
- Middle East and North Africa (MNA): $3 billion
- Sub-Saharan Africa (SSA): $3 billion

All costs are in 2005 constant prices and 0% discounting. The source of this analysis is the World Bank.
...broad scope of assessment...

Dry $77.6 B

- Agriculture: 29.6
- Water Resources: 18.8
- Health: 13.7
- Coastal Protection: 6.5
- Infrastructure (urban, transport): 4.7
- Extreme Weather Events: 2.6
- Fisheries: 1.6

Wet $89.7 B

- Agriculture: 30.1
- Water Resources: 29.5
- Health: 13.7
- Coastal Protection: 6.7
- Infrastructure (urban, transport): 5
- Extreme Weather Events: 2

Source: World Bank Analysis
..but global figures can under-estimate national costs

Ethiopia Total Cost: indirect components more important than sector-level ones
Also, need to broaden analysis to a wider range of climate outcomes

Source: UNEP, Emission Gap report (2011)
How does climate change affect infrastructures?

• More frequent extreme events → the cost of meeting a given infrastructure reliability standard can be expected to increase
  – e.g. more storage may be needed to keep flood risk at existing levels

• More frequent damages to infrastructure → change in optimal investment-maintenance balance
  – e.g. reduces the traffic threshold for which paving becomes optimal

• Changing performance of different types of infrastructure → effects on optimal choice of infrastructure technologies
  – e.g. a drier climate may make hydro-power less attractive

• Altering the pattern of demand for infrastructure
  – e.g. changes in crop patterns will affect need for rural roads
Support investments in Africa’s infrastructure under a future uncertain climate: proposed new analytical work.
Objectives

• Estimate range of impacts
  – unit costs
  – design standards
  – demand patterns
• Develop framework for robust investment decisions
• Enhance the “investment readiness” of African to help attract climate finance
Scope

• Climate analysis framework
• River basin hydrological analysis
• Downstream uses
  – Roads
  – Hydro-power
  – Irrigation
  – (Water supply)
  – (Flood control)
Building on river basin modeling work...

- E.G.: Niger basin

- Request from Heads of State - Bank supporting Niger Basin Authority on a **climate risk assessment** of the SDAP

- $8.3b 20 year **Sustainable Development Action Plan (SDAP)** - investments in storage, irrigation, hydropower, transport, water supply, fisheries, environment, capacity-building
...and on existing models for power pools
## Indicative timetable for implementation

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter</th>
<th>Concept Review</th>
<th>Procurement of consultants</th>
<th>Setting modeling framework</th>
<th>Roads analysis</th>
<th>River basin analysis</th>
<th>Power analysis</th>
<th>Irrigation analysis</th>
<th>Synthesis report</th>
<th>Final Review</th>
<th>Dissemination</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>Q3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>Q1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td></td>
<td></td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td></td>
<td>Central</td>
<td>South</td>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td></td>
<td>East</td>
<td>Central</td>
<td>Central</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>Q1</td>
<td>West</td>
<td>East</td>
<td>East</td>
<td>West</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td>West</td>
<td>West</td>
<td>West</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td></td>
<td>West</td>
<td>West</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thank you

Contact:
Rcervigni@worldbank.org