Water as a Dimension of Land Use. Implications for Agricultural Intensification in sub-Saharan Africa.

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summary

• Problem of productivity and low production in African agriculture: rediscovery of the role of irrigation.
• Trajectory of irrigation development in Africa
• Learning lessons from irrigation experience
• Policy blind spot: land water linkages
Per capita value-added output of agriculture

Source: FAOSTAT, 2006
Diagnosing the productivity problem: CAADP’s 4 pillars

1. extending the area under sustainable land management and reliable water control system

2. improving rural infrastructure and market access

3. increasing food supply and reducing hunger

4. agricultural research and technology dissemination
Historical trajectory of African irrigation development

- 1920s -1950s state-led ‘modernisation’: large-scale irrigation (Gezira model: small-scale tenants)
- 1960s -1970s Post-independence dams for national development (Aswan, Akasombo, Kariba etc):
- 1980s public debt crisis, structural adjustment,
- 1990s failure of large irrigation schemes: moratorium on large dams
- 2005 – return to investment in large water infrastructure (hydropower, irrigation??)
Indicators of irrigation development (Svendsen et al, 2009)

<table>
<thead>
<tr>
<th>African agro-ecological region.</th>
<th>“equipped” irrigation area / total area cultivated</th>
<th>% use of “equipped” irrigation area</th>
<th>Total area of water management / total area cultivated</th>
<th>“Equipped” irrigation as % of potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td>28.1</td>
<td>80.4</td>
<td>28.1</td>
<td>88</td>
</tr>
<tr>
<td>Sudano-Sahelian</td>
<td>6.9</td>
<td>63.3</td>
<td>9.2</td>
<td>50</td>
</tr>
<tr>
<td>Gulf of Guinea</td>
<td>1.5</td>
<td>73.5</td>
<td>3.3</td>
<td>8</td>
</tr>
<tr>
<td>Central</td>
<td>0.7</td>
<td>47.5</td>
<td>2.8</td>
<td>1</td>
</tr>
<tr>
<td>Eastern</td>
<td>2.6</td>
<td>24.0</td>
<td>1.8</td>
<td>11</td>
</tr>
<tr>
<td>Southern</td>
<td>4.2</td>
<td>80.7</td>
<td>4.8</td>
<td>36</td>
</tr>
<tr>
<td>Indian Ocean Islands</td>
<td>30.4</td>
<td>99.4</td>
<td>30.7</td>
<td>71</td>
</tr>
<tr>
<td>Average Sub-Saharan Africa</td>
<td>3.5</td>
<td>71</td>
<td>4.5</td>
<td>18</td>
</tr>
<tr>
<td>Average Asia</td>
<td>33.6</td>
<td>66.9</td>
<td>34.3</td>
<td></td>
</tr>
</tbody>
</table>
Expanding irrigation (IRR > 12%)  
(You et al, 2010)

<table>
<thead>
<tr>
<th>African agro-ecological region.</th>
<th>Large Scale (dam-based) irrigation</th>
<th>Small-scale (&quot;local runoff&quot;) irrigation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost US$mn hectares IRR%</td>
<td>Cost US$mn hectares IRR%</td>
</tr>
<tr>
<td>Total SSA</td>
<td>2,640 1,352,277</td>
<td>19,401 3,754,317</td>
</tr>
<tr>
<td>Sudano-Sahelian</td>
<td>508 260,064 14</td>
<td>4410 853,363 57</td>
</tr>
<tr>
<td>Gulf of Guinea</td>
<td>1188 608,755 18</td>
<td>8738 1,690,930 36</td>
</tr>
<tr>
<td>Central</td>
<td>4 2,028 12</td>
<td>1118 216,328 42</td>
</tr>
<tr>
<td>Eastern</td>
<td>482 246,847 17</td>
<td>4006 775,199 44</td>
</tr>
<tr>
<td>Southern</td>
<td>458 234,583 15</td>
<td>1129 218,497 28</td>
</tr>
</tbody>
</table>
Current trends

• Large-scale private sector investment in agricultural land: irrigation implicit (sugarcane, bananas, wheat...)

• Funding initiatives for small-scale irrigation??

• Informal irrigation investment by small/medium scale farmers
Lessons from experience

- African irrigation has been expensive, mainly because it frequently failed (60% failure in 1970s) Inocencio et al, 2007
- where projects are successful, they are no more expensive than outside Africa.
- Small-scale irrigation is more productive, large projects more likely to succeed
- Reasons for failure:
  - poor engineering design (lack of data etc);
  - lack of market access (outputs, inputs)
  - lack of ‘fit’ of irrigation with rural livelihoods (opportunity costs of labour)
Formal vs informal irrigation
(million ha) FAO 2005
“Informal irrigation”

• “indigenous” water management
  – Both ‘irrigation’ and ‘soil and water conservation’
  – Continuum of investment intensity (planting site-selection, flood recession $\Leftarrow \Rightarrow$ furrows, terrace construction)

• Continuing adaptation / modernisation;
  – Peri-urban
  – Extensive hill furrow systems (E Africa)
  – Small-scale pump systems (Senegal, Nigeria)
  – Floodplain irrigation at periphery of ‘formal’ schemes
Socio-economic context

• Labour markets, off-farm income and differential capacity to invest in agriculture.

• Differential capacity to adopt ‘labour-intensive’ water-management technologies (furrows, terracing, mulching, conservation ‘basins’)

• Mobility and in-migration to high-value areas: land markets.

• Response to market opportunities
Policy blind spots?

- Invisibility of informal water management to development agencies
  - Definitions: ‘irrigation’ separate from ‘rainfed’
  - Informal initiatives ‘below the radar’ (scale, location)
- Continuing modernisation agenda
  - FDI land leases
- Missing opportunities? (new – adapted - models of water management?)
- Missing threats? (rising land value: increasing competition/inequality in access to land-with-water)