Interdisciplinary water research and education in Sub-Saharan Africa
-
the need for transboundary approaches

Pieter van der Zaag

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Overview

1. Water management is knowledge intensive
2. The global knowledge divide
3. The new water manager
4. Knowledge knows no boundaries
5. Water crosses political boundaries
6. By way of conclusion: Transboundary knowledge creation and sharing
1. Water management is knowledge intensive

Why are some water-related problems so persistent?

- safe drinking water
- basic sanitation
- food
- land degradation
- safety against disasters
1. Water management is knowledge-intensive.

Why is there so much non-linear change?

Lake Victoria water levels; Entebbe; 1948-2005

1. Water management is knowledge intensive

We need to sustainable systems with capacity to adapt to new circumstances

• premised on a sound understanding of biophysical, socio-economic and political processes

• requires an ability to reflect, analyse, plan, design, implement, manage, operate, maintain and renovate water systems, and to anticipate change

• need for home-grown solutions

• water management thus is knowledge intensive

But:

• the global knowledge divide
2. The global knowledge divide

Note: The size of the circle reflects the size of GERD for the country or grouping.

Source: UNESCO Science Report 2010
2. The global knowledge divide

<table>
<thead>
<tr>
<th></th>
<th>GERD as % of GDP</th>
<th>GERD per capita (PPP$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>1.7</td>
<td>171.7</td>
</tr>
<tr>
<td>RSA</td>
<td>0.9</td>
<td>88.6</td>
</tr>
<tr>
<td>SSA minus RSA</td>
<td>0.3</td>
<td>3.7</td>
</tr>
</tbody>
</table>

*Note: The size of the circle reflects the size of GERD for the country or grouping.*

Source: UNESCO Science Report 2010
2. The global knowledge divide

Source: UNESCO Science Report 2010

### Global share in Researchers and Publications

<table>
<thead>
<tr>
<th></th>
<th>Researchers</th>
<th>Publications</th>
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<tbody>
<tr>
<td>RSA</td>
<td>0.27%</td>
<td>0.53%</td>
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<tr>
<td>SSA minus RSA</td>
<td>0.57%</td>
<td>0.63%</td>
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<tr>
<td>SSA</td>
<td>0.83%</td>
<td>1.17%</td>
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</table>

### Population, Researchers, and GERD as % of GDP

<table>
<thead>
<tr>
<th></th>
<th>Population</th>
<th>Researchers</th>
<th>GERD as % of GDP</th>
<th>GERD per capita (PPP$)</th>
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<tr>
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<td>6,671</td>
<td>7.21</td>
<td>1.7</td>
<td>171.7</td>
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<tr>
<td>RSA</td>
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<td>0.0193</td>
<td>0.9</td>
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<tr>
<td>SSA minus RSA</td>
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<td>0.0408</td>
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<td>3.7</td>
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<tr>
<td>SSA</td>
<td>758.4</td>
<td>0.0601</td>
<td>0.8</td>
<td>21.3</td>
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</table>

*Note: The size of the circle reflects the GERD per capita (PPP$).*
2. The global knowledge divide

**Figure 2:** Scientific publications in sub-Saharan Africa, 2000–2008
For those countries that produced more than 100 publications in 2008

*Top 7 countries in terms of productivity*

Source: UNESCO Science Report 2010
2. The global knowledge divide

Figure 2: Scientific publications in sub-Saharan Africa, 2000–2008

Next 10 most prolific countries

Source: UNESCO Science Report  2010
2. The global knowledge divide

Access to improved sanitation

2. The global knowledge divide

Who sets the research agendas?
Who determines what is science?

<table>
<thead>
<tr>
<th>Sanitation</th>
<th>terms in title, abstract or key-words</th>
<th>articles 1998-2007</th>
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<tbody>
<tr>
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</table>

<table>
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<tr>
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<tr>
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<td></td>
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<tr>
<td>water AND (rainfed agriculture) NOT (irrigated agriculture)</td>
<td>11</td>
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</tr>
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</table>

Source: Gupta & Van der Zaag, 2009; data from Scopus (www.scopus.com)
2. The global knowledge divide

The need for critical mass!

Data of 177 countries taken from the Human Development Report 2006
3. The new water manager

A new type of water manager

• anticipate water problems
• careful in defining problems
• design and facilitate processes towards their resolution
3. The new water manager

A new curriculum

- the conventional engineer: power to solve problems, focus on things, control over processes
- challenge these deep preferences of engineers

So:

- broaden the required analytical and process-oriented skills
- combine disciplinary depth with interdisciplinary breadth
- open up to other disciplines
4. Knowledge on water knows no boundaries

The importance of sound **disciplinary** knowledge

- the need for sufficient critical mass in order to become massively critical
- through pooling of knowledge resources and connecting experts
- and crossing political boundaries
4. Knowledge on water knows no boundaries

The need for interdisciplinary understanding

- real-life water problems cut across disciplines
- disciplinary biases part of the problem (pipe, right or price?)
- interdisciplinary thinking is inhibited

So:

- kick start change by creating a new generation of water specialists who are exposed to different perspectives
- develop a common understanding of key concepts
- towards interdisciplinary methodologies and approaches
5. Water crosses political boundaries

- as water happily disrespects political and other borders, a transboundary approach is the obvious thing to do
- peoples are tied to each other in space (thus interdependent), and therefore also in time
  --> hence a regional approach

And:
- as sharing knowledge is a prerequisite for sharing water, and
- sharing water is more difficult than sharing knowledge
- start with sharing knowledge
5. Water crosses political boundaries

- as water happily disrespects political and other borders, a transboundary approach is the obvious thing to do.
- Peoples are tied to each other in space (thus interdependent), and therefore also in time — hence a regional approach towards water makes sense.

And:
- Sharing water is more difficult than sharing knowledge transboundary research projects regional capacity development projects

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**International River Basins of AFRICA**

- **transboundary research projects**
- **regional capacity development projects**

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In Search of Sustainable Catchments and Basin-wide Solidarities; Transboundary Water Management of the Blue Nile River Basin
In Search of Sustainable Catchments and Basin-wide Solidarities; Transboundary Water Management of the Blue Nile River Basin
In Search of Sustainable Catchments and Basin-wide Solidarities; Transboundary Water Management of the Blue Nile River Basin
Benefits of transboundary coordination - Blue Nile river basin

Source: Goor et al., 2010
6. By way of conclusion: Transboundary knowledge creation and sharing

Knowledge divide between Africa and rest of the world is huge

This is hugely sub-optimal
- not only from an African perspective but also globally
- results in biased research agendas

Clearly Africa cannot solve its problems on its own

The academically affluent nations have to open up their resources to Africa - see e.g. AGORA, OARE initiatives
6. By way of conclusion: Transboundary knowledge creation and sharing

1. Combine education and research activities
2. Both disciplinary and interdisciplinary approaches are needed
3. Collaborate at transboundary and regional level, S-S cooperation
4. Collaborate with the Global North (?), S-S-N cooperation
6. By way of conclusion: Transboundary knowledge creation and sharing

Transboundary knowledge creation and sharing:

• allows for critical mass
• creates a new generation of water experts:
  • think beyond singular disciplines
  • think beyond national boundaries
• is a prerequisite for water sharing
• is an investment in future peace

may seem costly yet is invaluable
Some projects

Riskoman
Some projects

Pangani river - Tanzania

Source: Mul et al., 2010

Source: Komakech et al., submitted
Some projects

Source: Komakech et al., submitted