Adapting to drought – learning from Africa

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1. Adaptation research isn’t new

• What can we learn from earlier, long term studies on ‘coping’, adaptation, transformation?
• From Darwin to human and cultural ecology. Do we really lack good empirical examples of human and societal adaptation to climate?
• Julian Steward 1955, then Robert Netting 1993, Paul Richards 1985, Harold Brookfield’s “pro-poor empiricism”
• Household economics, rural livelihood research Susanna Davies 1996, Frank Ellis, etc…
“the identification and measurement of adaptations — and assessment of their sustainability — is not possible without long-term observation or reference to the multiple constraints that can impede the process of adaptation.”
2. Northern Nigeria

• Mike Mortimore – northern Nigeria 1961-1986 – adaptation research with very little funding ($10,000). 25 years continuous research and monitoring of rural households, plus later restudies

• *Adapting to Drought*, 1989
• *Roots in the African Dust*, 1998
• *Working the Sahel*, w Bill Adams, 1999
• *More people less erosion* 1994 w Tiffen, Gichuki
In the 1970s famine

- *adaptation to agricultural drought*: eg replanting and advanced varietal selection
- *adapting to poverty*: asset sales and alternative incomes; use social networks
- *adapting to hunger*: rationing and wild foods
- Reversible changes are made first
- Result: mixed effectiveness. Excess mortality and too much reliance on cash crops, as Michael Watts argues
In the 1980s famines – better integration of livestock and secondary occupations

Figure 2. Simple diversification model for a household economy

Table 2. Local adaptation strategies

<table>
<thead>
<tr>
<th>Adaptation strategy</th>
<th>Components</th>
<th>Arbiters of change</th>
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<tbody>
<tr>
<td>Land-use intensification</td>
<td>Labor or capital intensification</td>
<td>Population density</td>
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<td></td>
<td>Crop-livestock integration</td>
<td>Technological inputs</td>
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<td></td>
<td>Conservation</td>
<td>Investment resources</td>
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<td></td>
<td>Tree husbandry</td>
<td>Knowledge of new practices</td>
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<td>Economic diversification</td>
<td>Monetization</td>
<td>Value of products</td>
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<td></td>
<td>Income diversification</td>
<td>Enabling climate and physical environment</td>
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<td></td>
<td>Mobility/migration</td>
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<td>Institutional change</td>
<td>Changes in law or custom</td>
<td>Institutional reform</td>
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<td></td>
<td>Social differentiation</td>
<td>Changes in wealth distribution</td>
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<td></td>
<td>A new division of labor</td>
<td>Gender and age roles</td>
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<td></td>
<td>Development interventions</td>
<td>Education</td>
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<td>Demographic transition</td>
<td>Fertility</td>
<td>Availability of finance</td>
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<td></td>
<td>Development interventions</td>
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Aspects of adaptation strategies in northern Nigeria

Migration circuits as a major contributor to household persistence

By 2008: without much impact of any development or state assistance, in northern Nigeria:

- Population of the region increasing, hence strong agricultural intensification without a ‘green revolution’
- Better integration of livestock and agricultural production
- More indications of monetization (inc. remittances) and investment
- Drought is integrated with household decisions and obligations
- Monetary wealth is a poor indicator of survival in drought; ‘the opportunity framework’ for a household (or its capabilities) is a better descriptor

Disagreement over role of colonial history and groundnut booms. Political problems continue but do not seem to have affected grassroots adaptive strategies
3. The francophone Sahel-2 examples

- Similar drought responses applied in the francophone Sahel, but an international aid response to the 1970s and 1980s droughts has *endured*.
  
- 1) In the Central Plateau of Burkina Faso, rural livelihoods have been supported by development interventions—environmental impact and sustainability have been positive.

- 2) In SW Niger, no development interventions or state support existed for many years in the 1990s - environmental impacts worse where livelihoods diversification was high – but diversification is the livelihood…. 
Zai farming technique
-Done independently, not project supported

Central Plateau,
Burkina Faso

Chris Reij, J Arid Envts. 2005
PATECORE/GTZ – participatory resource management since 1989-2004

- Attachment to terroir – village scale dimension

- Build on tradition and social organization
- Participatory mapping
- Trained locals
- Village committees
- Built stone lines (diguettes)
- Loans of trucks for stone collection

Ibi and Toessin, N. Burkina 1990s and 2001
The results of trend analyses of time series of NDVI amplitude (top) and NDVI seasonal integral (bottom) of NOAA AVHRR NDVI-data from 1982 to 1999.
Impacts of PATECORE development project

*Diguettes* generally improve soil fertility and crop yields through water infiltration. (a form of ‘resilience’)

Social impact 1 - important gender dimensions – women pay a price – social differentiation concealed by overall community resilience?

Social impact 2: undisclosed rationales for participation – Attract NGOs to boost symbolic power of the village and its community. Environment management is often linked to other agendas
Productive bricolage and livelihood diversification in post-development Niger

Development and the state “marched out” in Niger in the 1980s-1990s and military coups have continued to 2010. Very poor health and education. Famine conditions in mid 2000s

Fandou Béri, SW Niger
• Key environmental variables: examining environmental degradation discourse by measuring erosion on millet fields (as a proxy for environmental quality). CS137, biodiversity, and soil fertility surveys

• Social and political change assessed through livelihoods analysis – year-long surveys, 20 households, and 40-year social & environmental history
### Summary of changes observed in Fandou Beri’s farming system 1950-1997

<table>
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<tr>
<th>process</th>
<th>effect</th>
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<tr>
<td>- spatial fragmentation of fields</td>
<td>- agro-diversity, variability, long travel distances</td>
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<tr>
<td>- spatial expansion of farming since 1950s</td>
<td>- loss of in-field fertility, erosion on outfields, harvest difficulties</td>
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<tr>
<td>- extensive <em>bricolage</em> - capital switching</td>
<td>local markets and livestock trading exploited. Seasonal migration</td>
</tr>
<tr>
<td>- slow technological change and short history of external project support</td>
<td>- desire for fertilisers, but sporadic use.</td>
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<td>- search for tenure security</td>
<td>- retain customary system, but threat of formalisation</td>
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The case offers a refinement of Mortimore’s work in Nigeria

Greater erosion with high % of outmigrants (but these households have greater resilience to drought through non agricultural incomes)

Through diversification, farmers are opting for economic sustainability (livelihood and household reproduction) before local environmental sustainability (soil and water conservation, extending soil ‘life’).

This is capital switching

“Short-term survival may require soil erosion to run its course” (Warren, Batterbury et al, 2001).

Other Niger studies: David Rain and Adam Manvell – adaptation involved broadening an ‘action space’. 
Adaptive strategy sits within livelihood activity
Livelihoods research informs the adaptation debate

4. Conclusion

- Adaptation research, rooted in human ecology, precedes the current usage in climate policy by several decades. We can learn from it and apply similar methods today.
- Research is methodologically challenging – change in social, economic, environmental variables need to be assessed in the long-term. This research transitions into policy changes – e.g. enabling markets, movement, etc.
- The Sahel case illustrates survival of rapid and enduring environmental change, with drought impacts on a similar timeframe to the forecast warming impacts.
- Local powerlessness not evident in the Sahel from the 80s. Livelihoods diversification and productive bricolage are common responses by rural people, important in regions affected by hazards and climatic change.
• Livelihood diversification was the key route to “getting by” – “getting on” in Nigeria also occurred but without much external help.

• “..trying to isolate adaptation from the broader processes of development and change risks distortion”. (Mortimore 2010)

• Adaptation also should be led locally. “Adaptation should be proactive, not reactive”. (Mortimore 2010). In Burkina, the adaptation also involved exploiting external agencies in clever ways.

• External development support in the Sahel has mixed success, and is best when it enables or supports adaptive strategies (as in seasonal forecasting and soil/water conservation)
In this reading, adaptation is celebratory!

"In truth, he [Mortimore] says, African farmers are resourceful, knowledgeable, marketwise, innovative and able to transform their environments and their lives for the better. This analysis matters. It means we are wrong to assume that rising populations always damage the environment. And wrong to assume that global warming will mechanistically translate into so many more people going hungry. Mortimore's analysis is not a manifesto for disengagement. But it suggests that development aid should be targeted towards helping successful peasant farmers to innovate at least as much as towards rescuing the failures. Most important, it means that Africa is not a basket-case either, to be abandoned or treated as a test-bed for every latest development theory. From outsiders it requires assistance that is on tap rather than on top. It requires Africans themselves to start playing to the continent's strengths. And one of its greatest strengths is its farmers."

(Pearce, F. The real green revolution. *New Scientist*. 13 December 1997)