



SCIENCE AND
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SUSTAINABLE
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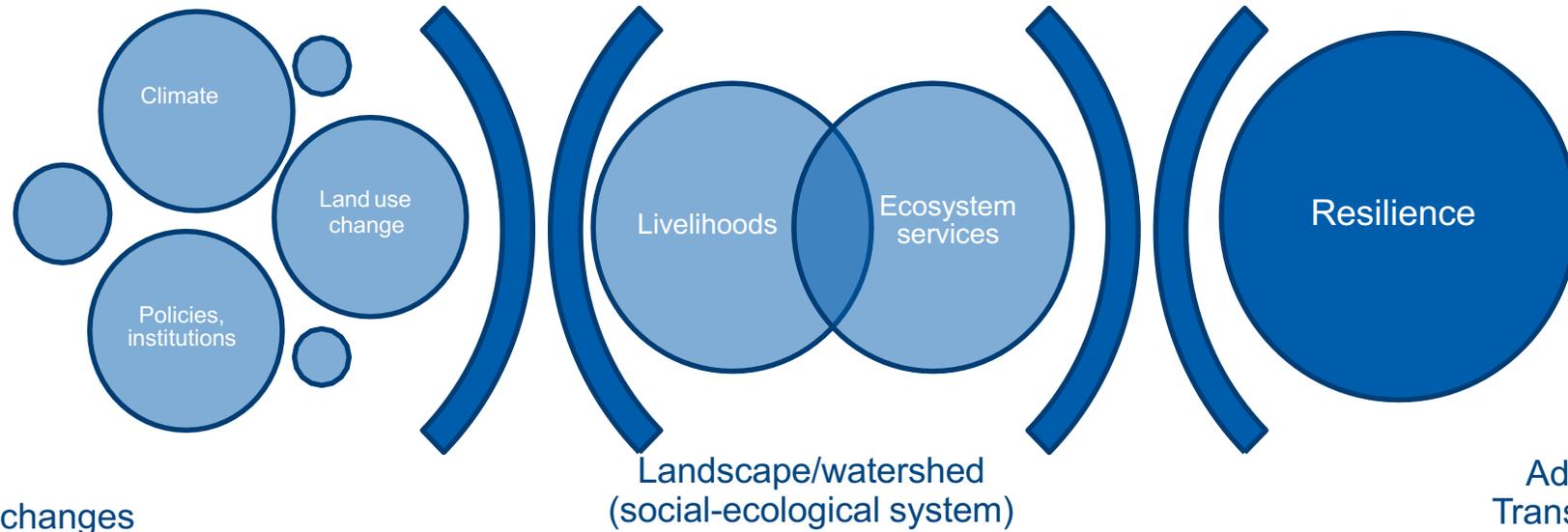
Opportunities in building resilience in degraded watersheds: experience from the field in African context



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Building climate resilience for people in landscapes: a complex systems approach!



Content

- Frameworks for resilience at landscape scales
- Testing participatory tool for agriculture landscapes resilience action
- Emerging evidence on transforming landscapes

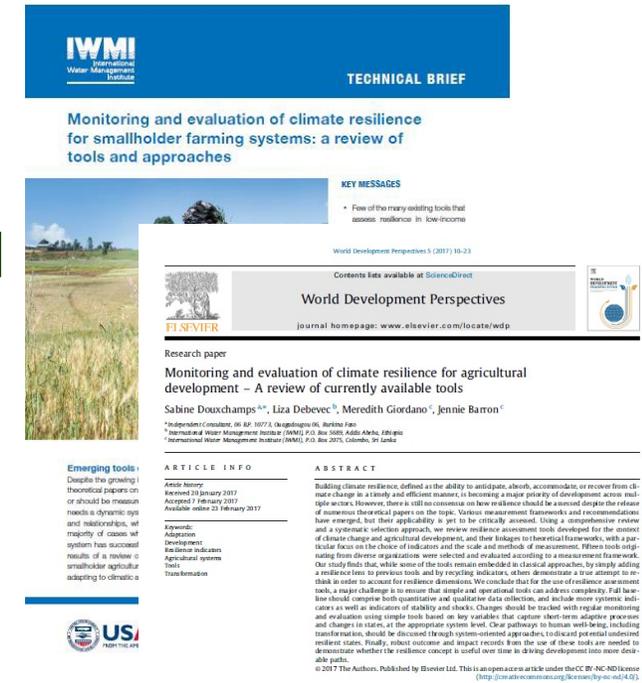


Frameworks for resilience at landscape scale: How do we measure?



A review show a plethora of tools shaped by creator discourse with little impact assessments (yet)

- <50 tools and approaches evaluated
- No tool specific to agriculturally dominated livelihoods and landscapes in developing context
- Tools are highly diverse in theory grounding, methods and data
- Capacity, time and costs (data and analysis) challenges implementation
- There are very few consistent use of tools, weakening evidence of actual resilience strengthening



1. Introduction

The interactions between climate change trends and smallholder farming systems vulnerability put increasing pressure on the livelihoods of the world's poor. To deal with these new and unpredictable risks, resilience has emerged as a key concept for policy and program development (Barrett & Connor, 2014), possibly – and controversially – replacing sustainability as the ultimate objective (Anderson, Pollock, Walker, & Dixon, 2013; Béné, Newsham, Dixon, Uricchi, & Coffey-Wood, 2014; Chappin, 2007; Redman, 2014). The European Union, for example, has announced that it intends to mobilize €1.5 billion for resilience programming in the Sahel between 2014 and 2020¹, the UK Department for International Development (DFID) recently committed £140 million, and USAID, the Rockefeller Foundation, and Swedish International Development Cooperation (SIDA) have jointly committed US\$100 million through the Global Resilience Partnership (GReP, Transformation & Nelson, 2015). Numerous countries and NGOs have made resilience one of their major programmatic priorities, and the resilience concept is frequently referred to in the formulation of the Sustainable Development Goals². The African Union declared in June 2014 in Malabo its commitment to enhancing resilience of livelihoods and production systems to climate variability and other related risks³.

¹ http://media.europa.eu/en/press-attachments/13-10-13_m3_en.
² <http://www.sustainabledevelopment.un.org/?menu=1300>.
³ http://pages.au.int/members/department/2014/04/13/2014_1312036.pdf.

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Emerging properties of resilience difficult (or not assessed...)

- Choice of indicators and linkages to characterise “resilience” tools



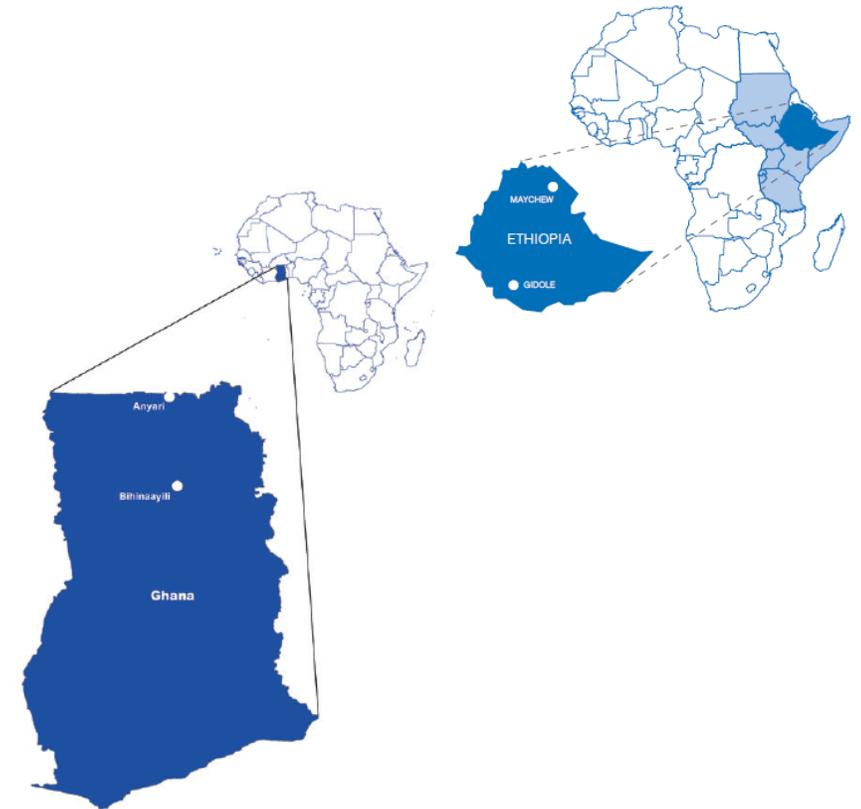
Average proportion of indicators used in each category, by intended purpose, i.e. for tools considering resilience as (a) an opposite to vulnerability, (b) as a desired characteristic to preempt risk, (c) as a stepping stone for improved well-being, (d) as the equivalent of adaptation, and (e) as a route to transformation. A tool can be represented with more than one intended purpose.

Testing participatory tool for agriculture landscape- community resilience action



Four agricultural smallholder farming dominated landscapes (watersheds) in dry sub-humid regions

Watershed / Indicator	G1	G2	E1	E2
Poverty	50%	< 9%	35%	63%
Education	<50%	>60%	75%	68%
Water and sanitation	Drinking water: 50%; sanitation: <15% lack improved sanitation.	Drinking water: >80% sanitation: 10% lack improved sanitation.	Drinking water: 69% have access to improved water; sanitation: 94% lack improved sanitation in rural areas	Drinking water: 42% have access to improved water in rural areas; sanitation: 94% lack improved sanitation in rural areas
Agricultural management	Water for irrigation and livestock from reservoir (0.025Mm ²); Soil and water conservation; intercropping and crop rotation; rainfed.	Fertilizers. Irrigation Dec-Jun from small reservoir (<6Mm ²); Soil and water conservation; intercropping and crop rotation; rainfed.	Mineral fertilizers and irrigation; Soil and water conservation; rainfed.	Mineral fertilizers and irrigation. Soil and water conservation; rainfed
Farm size	94% / <2 ha	67% / <2 ha	55% / <1ha	<1ha



Watershed and livelihood characterization both confirms and show some surprises

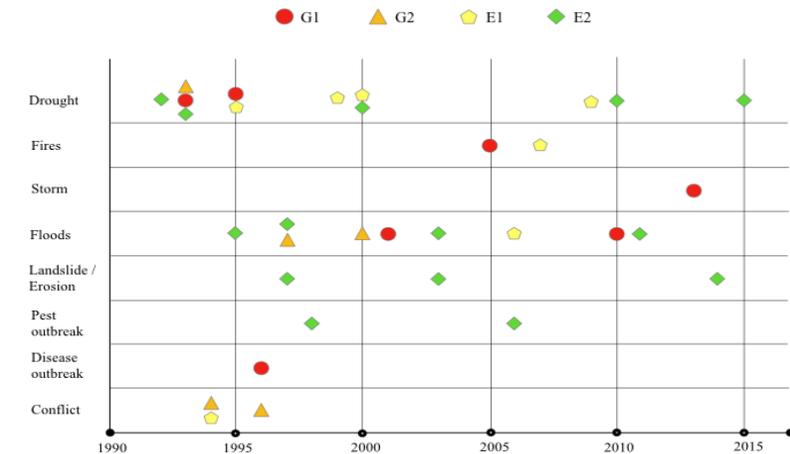
Confirming:

- Recurring multiple risks/challenges in livelihood-landscape systems
- Inherent relative low and/or unclear capacity to cope

Surprises:

- Trends in rainfall patterns, and internal growing pressure on available resources
- Show stagnant or growing 're-greening'

Shocks experienced at 4 watersheds (Ghana, Ethiopia) last 25 years



30-year trends of rainfall landuse in 4 watersheds (Ghana, Ethiopia)

	Rain amount	Rain distribution	Vegetation yield	Vegetation trees
ETH1	0	-	(+)	+
ETH2	0	-	(+)	+
GHA1	0	-	(+)	0
GHA2	0	-	(+)	0

Can community developed action plans towards resilience make the difference?

Protocol modular approach

- i. Link livelihoods and landscapes water- ecosystem services (internal and external data)
- ii. Map major events, shocks and coping/adaptation strategies
- iii. Create a watershed action plan for improve resilience

Analysis of action plans

- Communities proud of plan(!)
- Joint learning of social –environmental linkages
- ***“doing more of what is already known”***
- **External input needed to make transformative shifts?**

Sustainable Management of Water, Land and Ecosystems for Resilient Communities

Community Workshop Modules



Emerging evidence on transforming landscapes

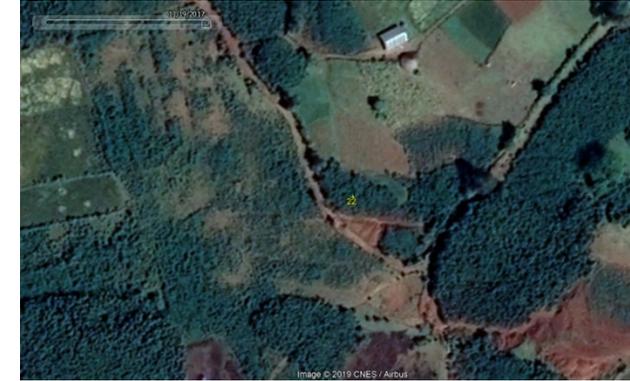


Yet landscapes transforms into better states?

A range of cases /examples that agricultural landscapes transforms:

Example:

- *Acacia D. for charcoal Amhara region Ethiopia (Karlton et al, SLU, Univ. Gondar, Wondo Genet College)*
- *Rainfed systems Ne Tanzania*
- *Niger-FMNR*
- *Small reservoirs W Africa for horticulture . . .*



- **Market developed**
- **Investment input**
- **Knowledge and innovation**
- **Locally recognising environmental value (governance)**

Afforestation with *Acacia D.* Amhara region: Supplying charcoal with 5 yrs rotations 2002-2017

- *Acacia decurrens* cultivation area increased from <1% to 42.1% of the woreda area – c. 31000 ha of plantations
- Open cropland decreased from 67% to 30% and grazing land from 19% to 12%; Forest land (except *Acacia d.*) increased and bushland density increased
- Built a sector of small and large entrepreneurship locally and beyond
- Livelihood income, wellbeing and labour
- Farmer –entrepreneur driven!
- Landscape sustainability (carbon, water, soil)



Lessons learned and ways ahead?

- Market developments as a driver for agricultural sustainability?
- We have little global data on where and how landscapes has changed, especially in positive (resilient) direction
- Manage emerging properties (change, transformation) such as resilience in landscapes
- Long-term landscape scale environmental monitoring gap



Thank you!

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