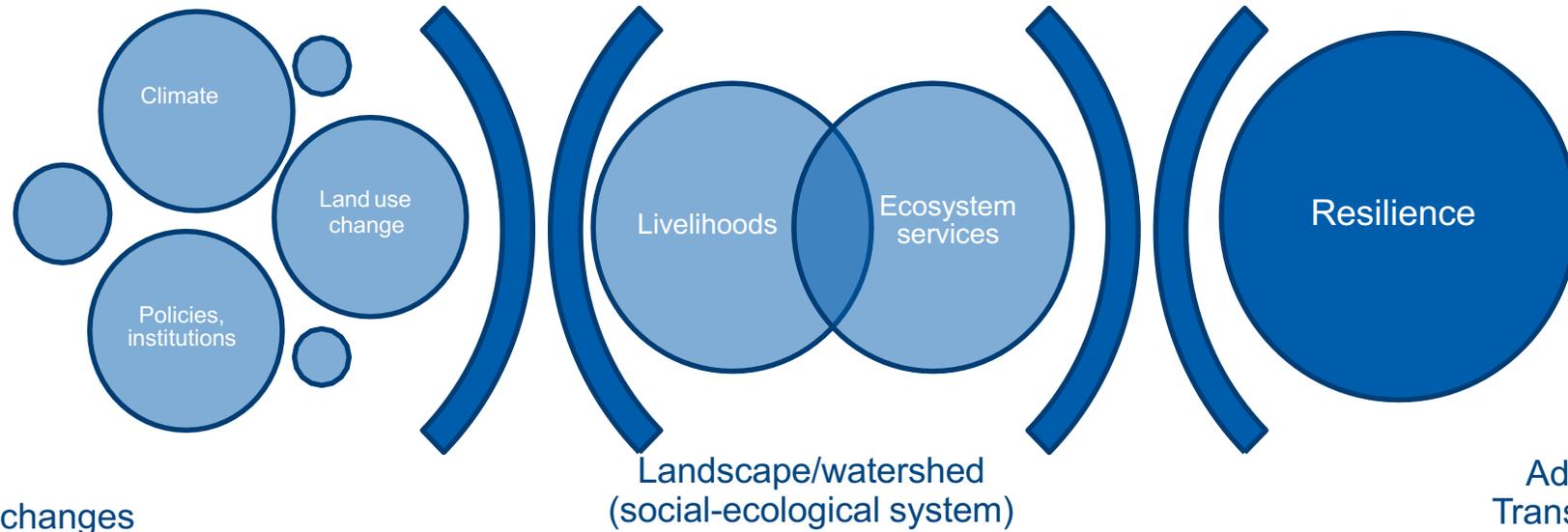SLU

SCIENCE AND
EDUCATION FOR
SUSTAINABLE
LIFE

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!

Climate

Land use change

Policies, institutions

Livelihoods

Ecosystem services

Resilience

Pressures and changes

Landscape/watershed
(social-ecological system)

Adaptability
Transformability

Content

- Frameworks for resilience at landscape scales

- Testing participatory tool for agriculture landscapes resilience action

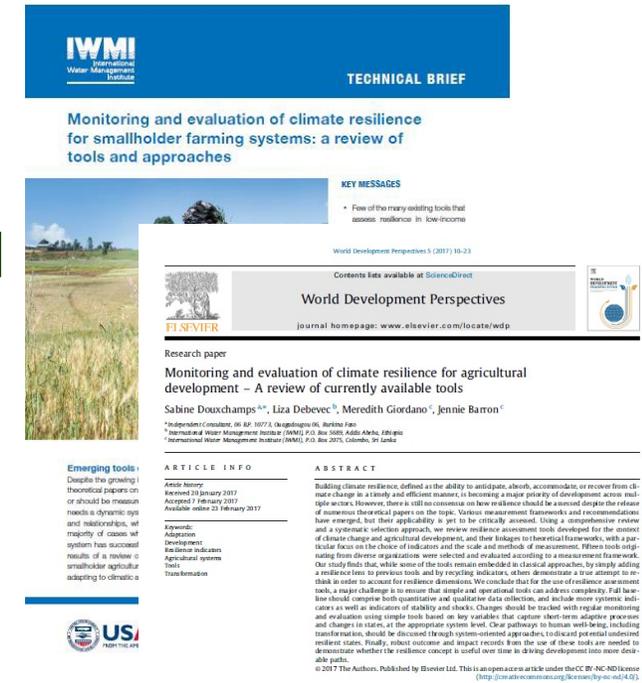- Emerging evidence on transforming landscapes

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

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.

Douxchamps et al 2017

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 (0.025Mm2); Soil and water conservation; intercropping and crop rotation; rainfed.	Fertilizers. Irrigation Dec-Jun from small reservoir (<6Mm2); 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
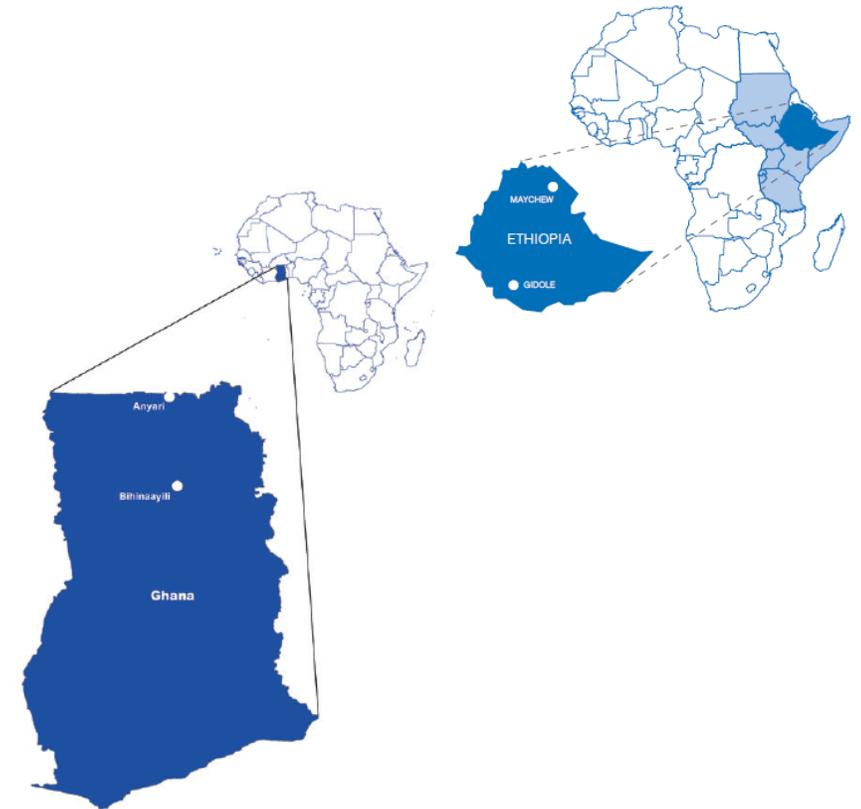
Watershed and livelihood characterization both confirms and show some surprises

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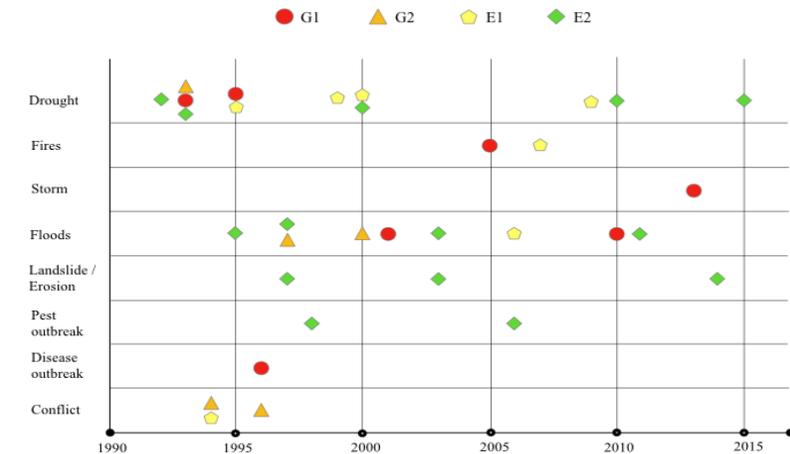
30-year trends of rainfall landuse in 4 watersheds (Ghana, Ethiopia)

	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

IWMI International Water Management Institute

USAID FROM THE AMERICAN PEOPLE

# 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** *(Karltun et al, SLU, Univ. Gondar, Wondo Genet College)*

- *Rainfed systems Ne Tanzania*

- *Niger-FMNR*

- *Small reservoirs W Africa for horticulture…*

From 3 to 42 houses with corrugated iron roofs
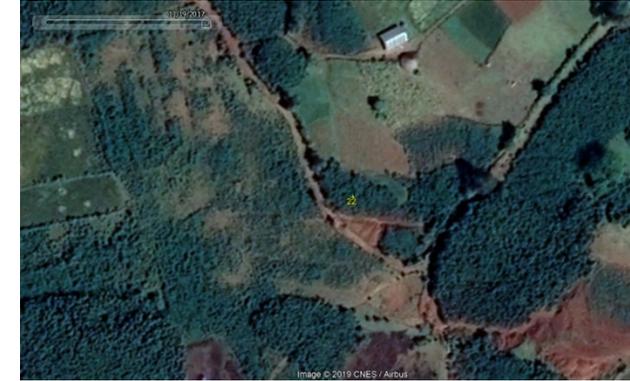
- **Market developed**
- **Investment input**
- **Knowledge and innovation**
- **Locally recognising environmental value (governance)**

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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