Small-scale irrigation: the answer to ecosystem health?

SIWI World Water Week 2018 – 26th August

Small reservoirs for sustainable agricultural landscapes: Synthesizing the evidence from West Africa

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Case study overview

- This case combined results from different studies to provide insights on the present and future role of small reservoirs for ensuring food security while preserving the ecosystems

- Based on work done by IWMI and partners in the past six years, with funding support from several donors

- Most field activities were carried out in the Volta and Niger basins, but results are applicable to other parts of the region.

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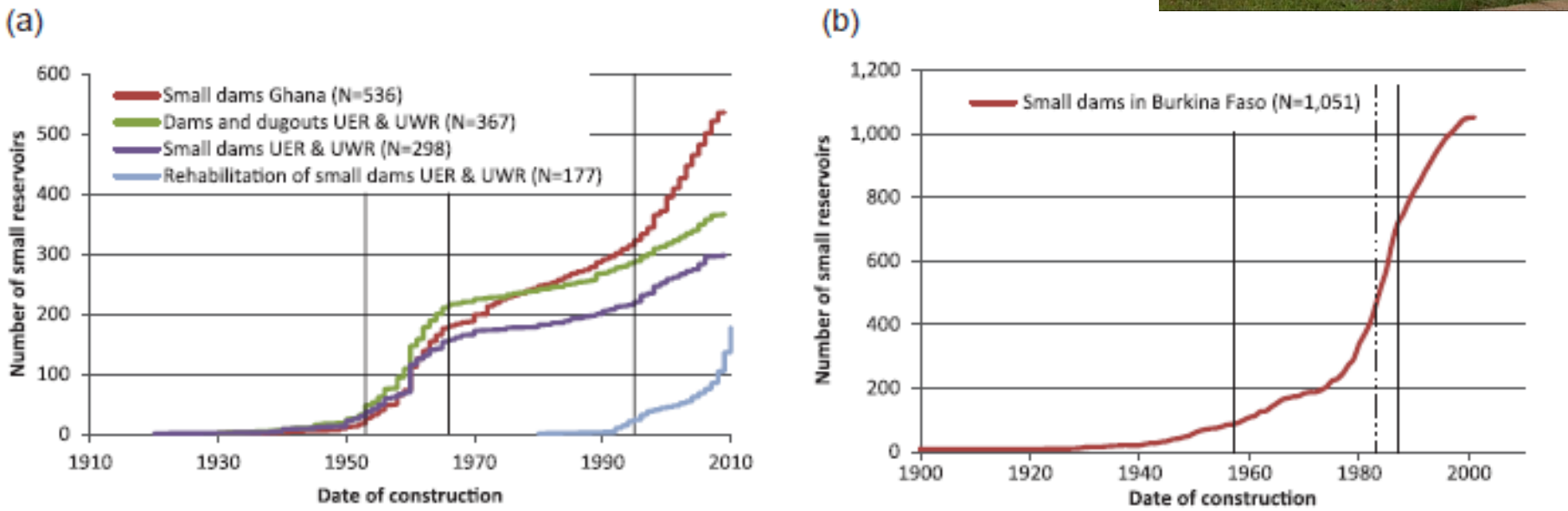
Key case study results

- Small Reservoirs:
  - dams with height between 1 – 15m or storage capacity less than 3MCM
  - have been promoted in West Africa since the 1970s
  - major water management adaptation strategy in Sahel zone
- Increasing political / donor interest in SR



History of the construction of SR in (a) Ghana and (b) Burkina Faso (Source: Venot et al 2012, IWMI)

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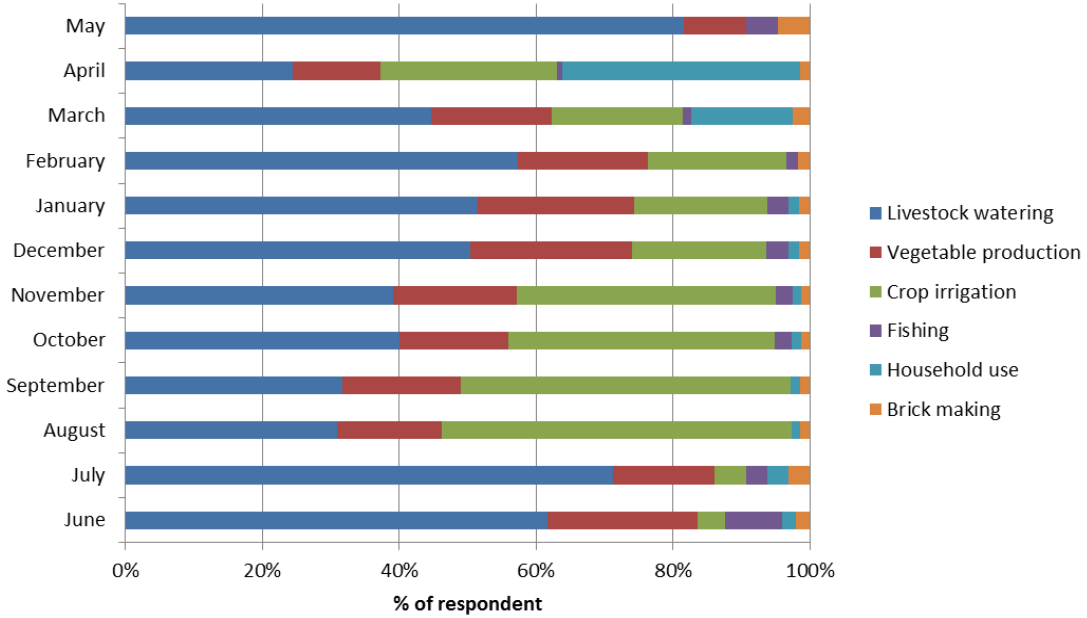
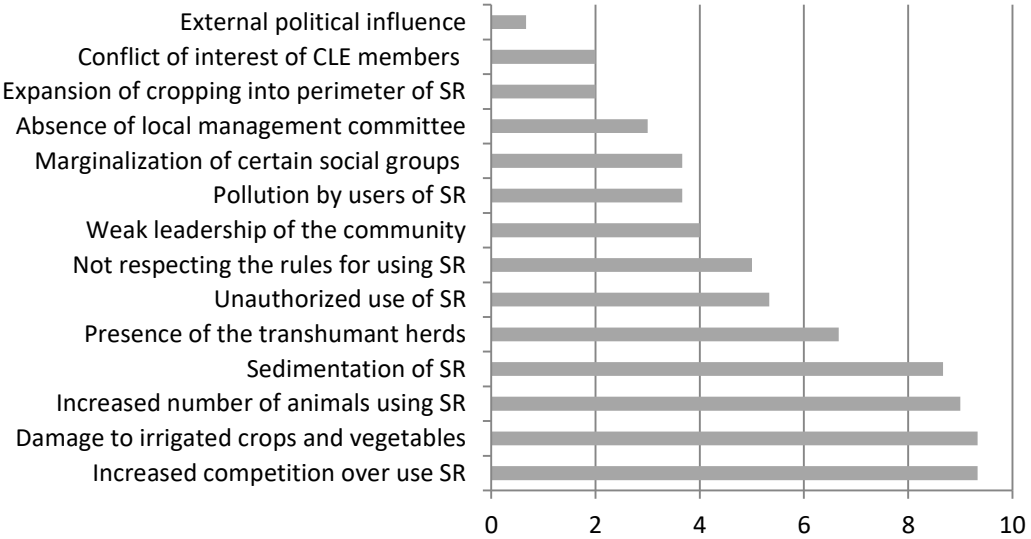
Multiple uses of small reservoirs for livelihood support



- Increasing use of SR for irrigated vegetable production and livestock watering all through the year
- Most influential event on livelihoods
- Conflict among users



Source: Ayantunde et. al. 2017

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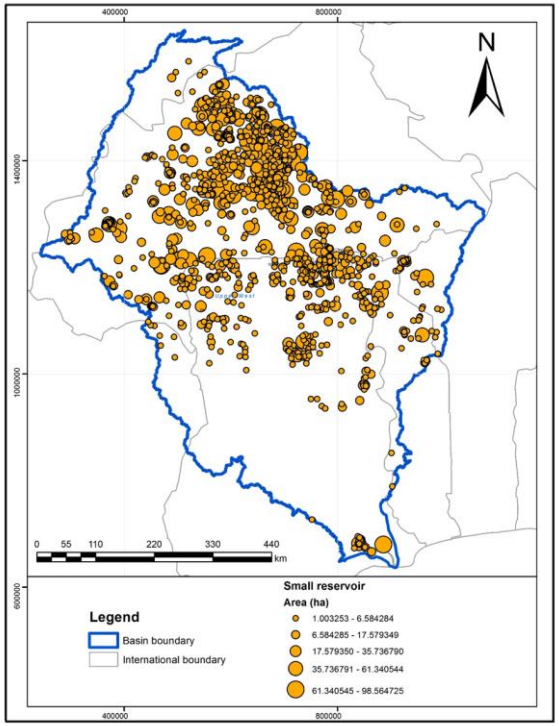
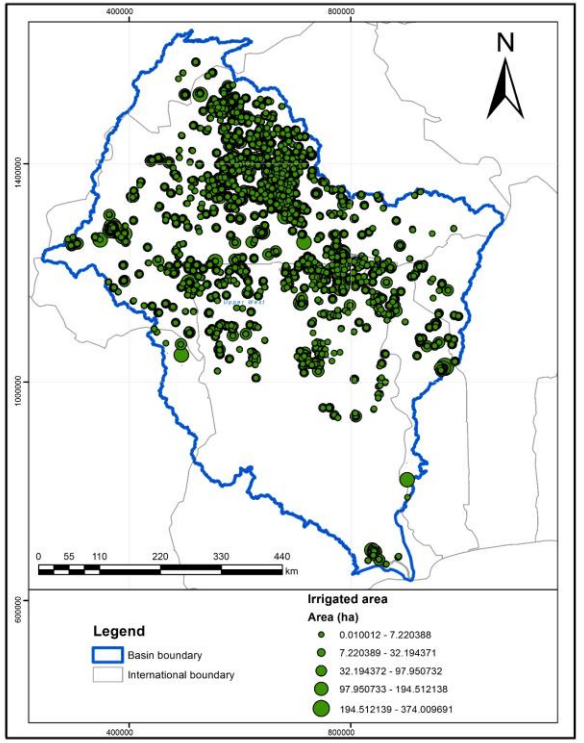


SR Distribution in the VB

Irrigated area around SR in the VB



Country	Average No. of SRs
Burkina Faso	>1700
Mali	>1000
Ghana	>1000
Ivory Coast	>600
Nigeria	>500
Niger	Several dozens

Source: Boelee 2009 (IWMI)

Sub basin	No. of small reservoirs	Irrigated area around SR (ha)
White Volta	809	39179.02
Black Volta	302	13855.48
Lower Volta	49	3615.96
Oti	151	4358.90
Total	**1311**	**61485.84**

Source: Ghanasah et al 2017 (IWMI)

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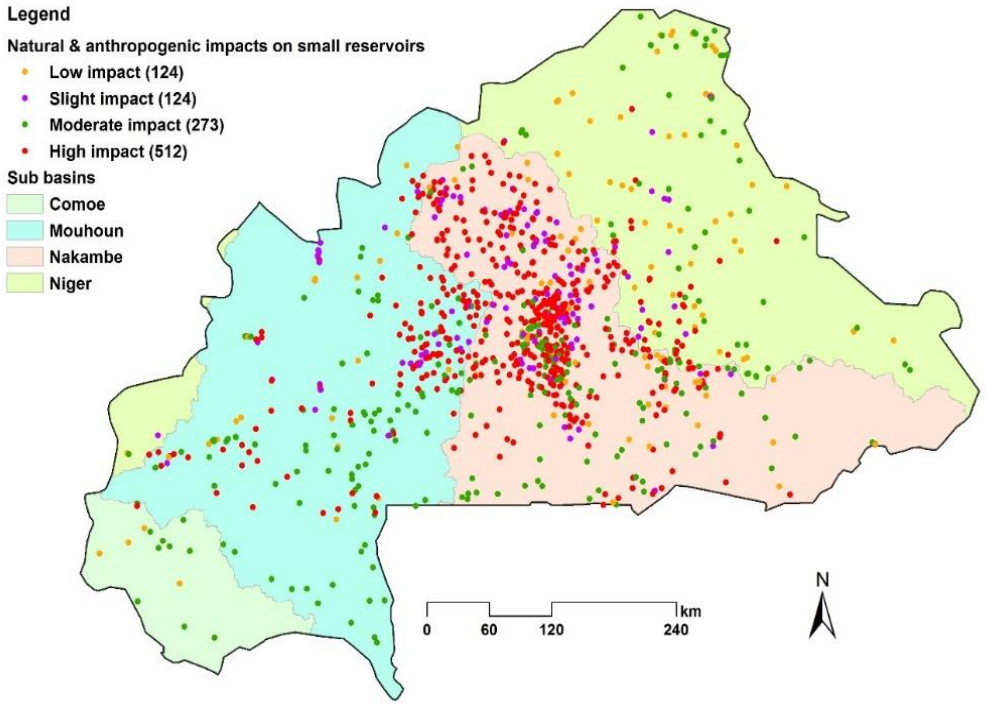
Increasing pressure on small reservoirs

Between 2002-2014

- Majority of SRs were impacted by changes in land use and population
- Highest change was at 5 km radius around SRs
- Most SRs in the Volta basin in Burkina Faso fall within the moderate to high impact zones.



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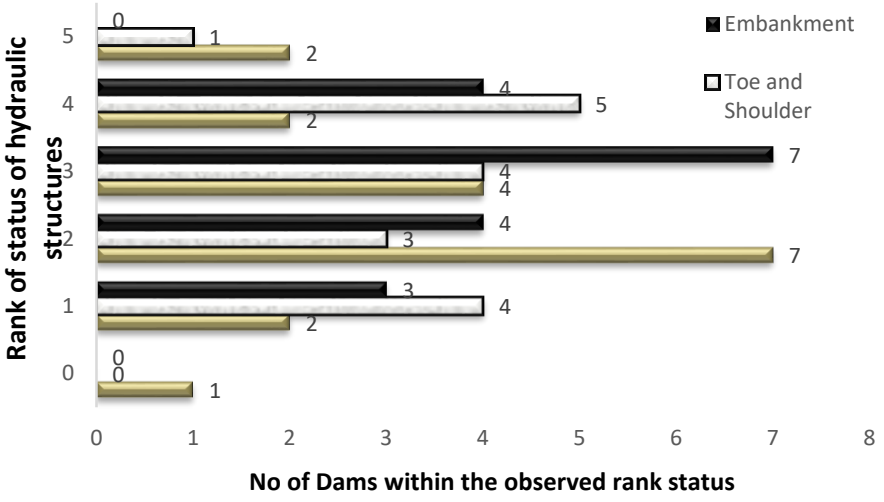
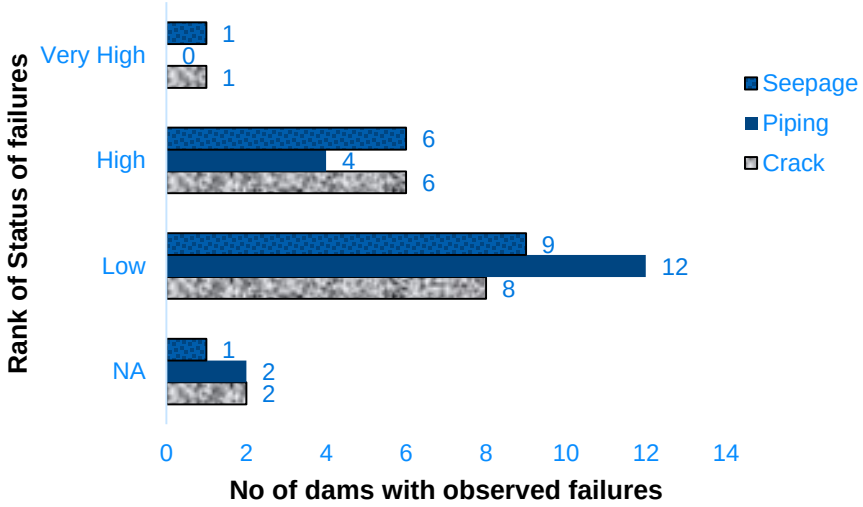
Failing hydraulic structures require rehabilitation

- Major failures include piping, cracks, eroded embankment and spillways seepages, and vegetation (shrub regrowth)
- Siltation and sedimentation of reservoirs
- Poor irrigation infrastructure or water lifting system



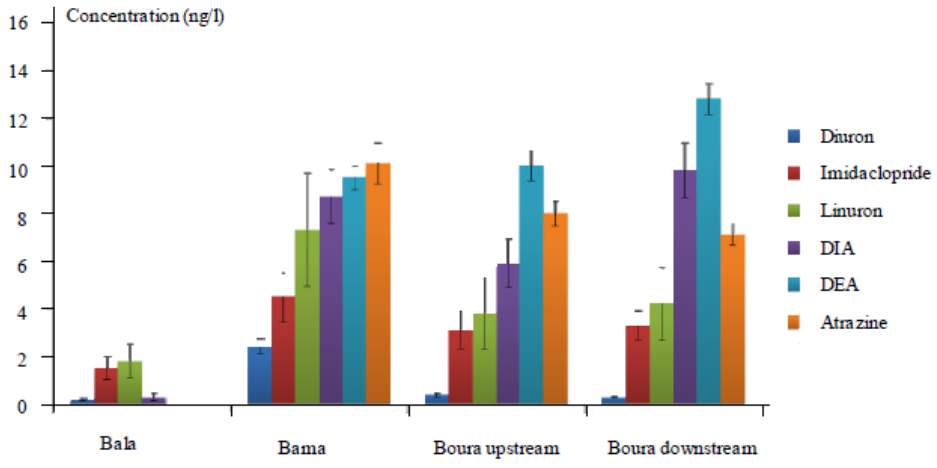


Source: Oke et al. 2018.

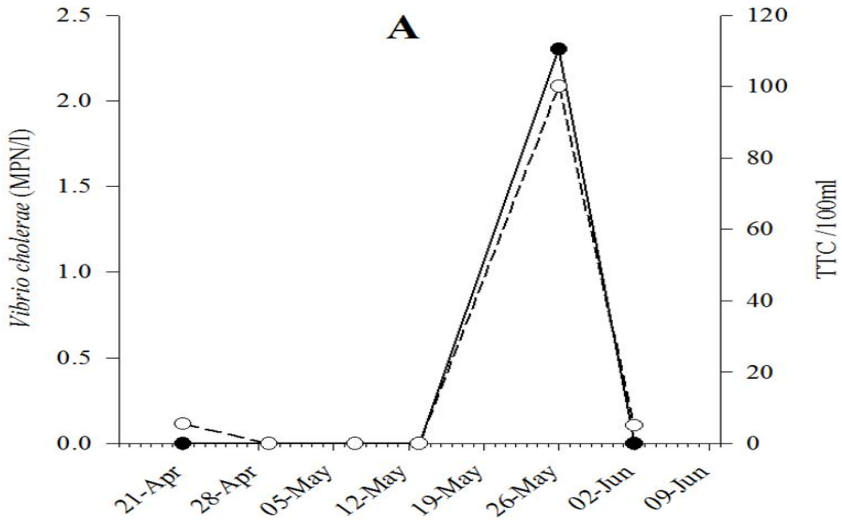
Deteriorating water quality of SRs constitute a health risk

In Burkina Faso:

- presence of aquatic weeds, e.g *Ceratophyllum submersum*
- presence of cholera causing pathogen *Vibrio cholera*
- high concentration and toxicity of herbicides Diuron and Atrazine



Cecchi et al 2015



Kabore et al 2017

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Poor agronomic and economic performance of irrigated fields

- Sub-optimal crop management, and poor product marketing
- Poor resources support system (access to credit, access to machinery, lack of performance management)

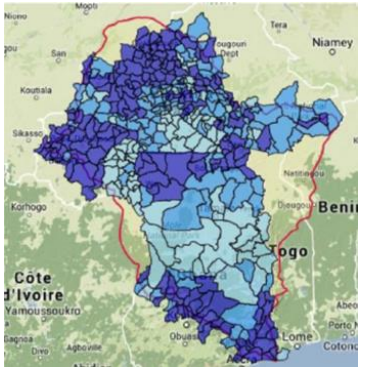
Exploiting and enabling the potential of SR for SSI

1. Protect the reservoirs given increased population growth and climate variability:

- better management of upstream landscape and rehabilitation of existing SR
- capacity building of smallholder farmers to enhance efficient water use
- strengthening reservoir management at multiple institutional scales to support sustainability aims

2. Strategic investment in SRs are required for better efficiency. Invest more in areas that can influence outcomes:

- better targeting of new investment – e.g use of TAGMI
- inclusivity in design/maintenance
- provision of support system to enhance the use of SR for SSI
  - agricultural inputs
  - access to credits
  - market driven mechanisms.



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Thank you

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