Rethinking the Design and Management of Small Dams in West-Africa

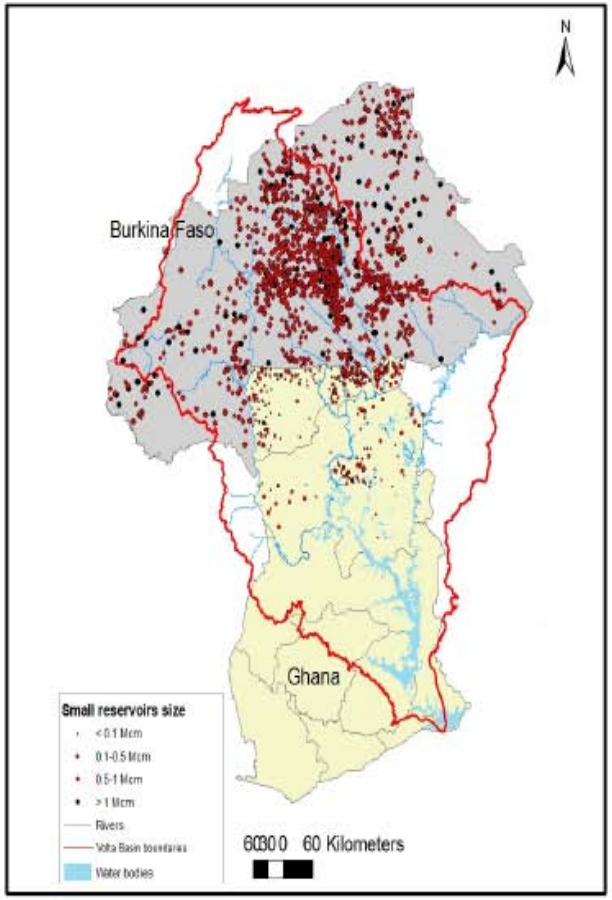
Jean-Marc Faurès
Food and Agriculture Organization

Based on the results of the AgWater Solutions Project,
J.P. Venot, IWMI, FAO and SEI

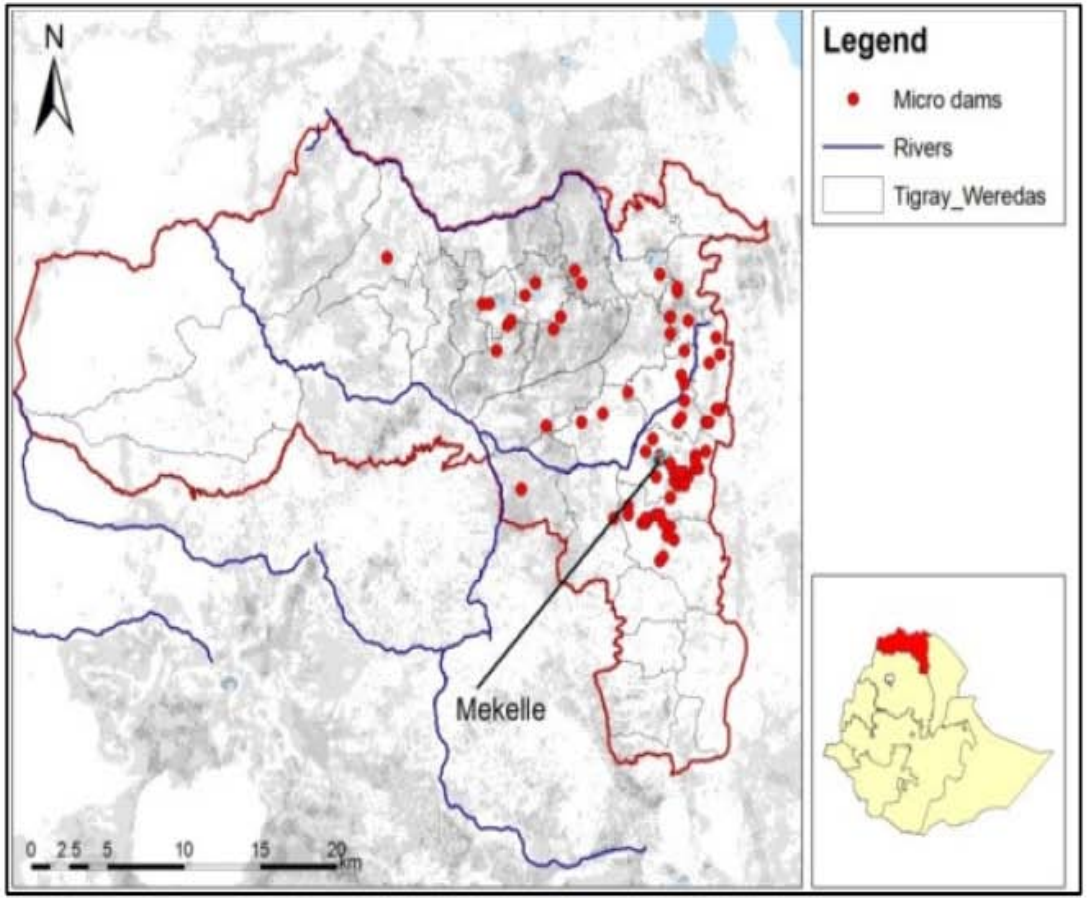
Looking at storage from a new angle

Study areas

Ghana – Burkina Faso



Ethiopia



Water storage, and in particular small reservoirs provides a range of benefits in rural areas

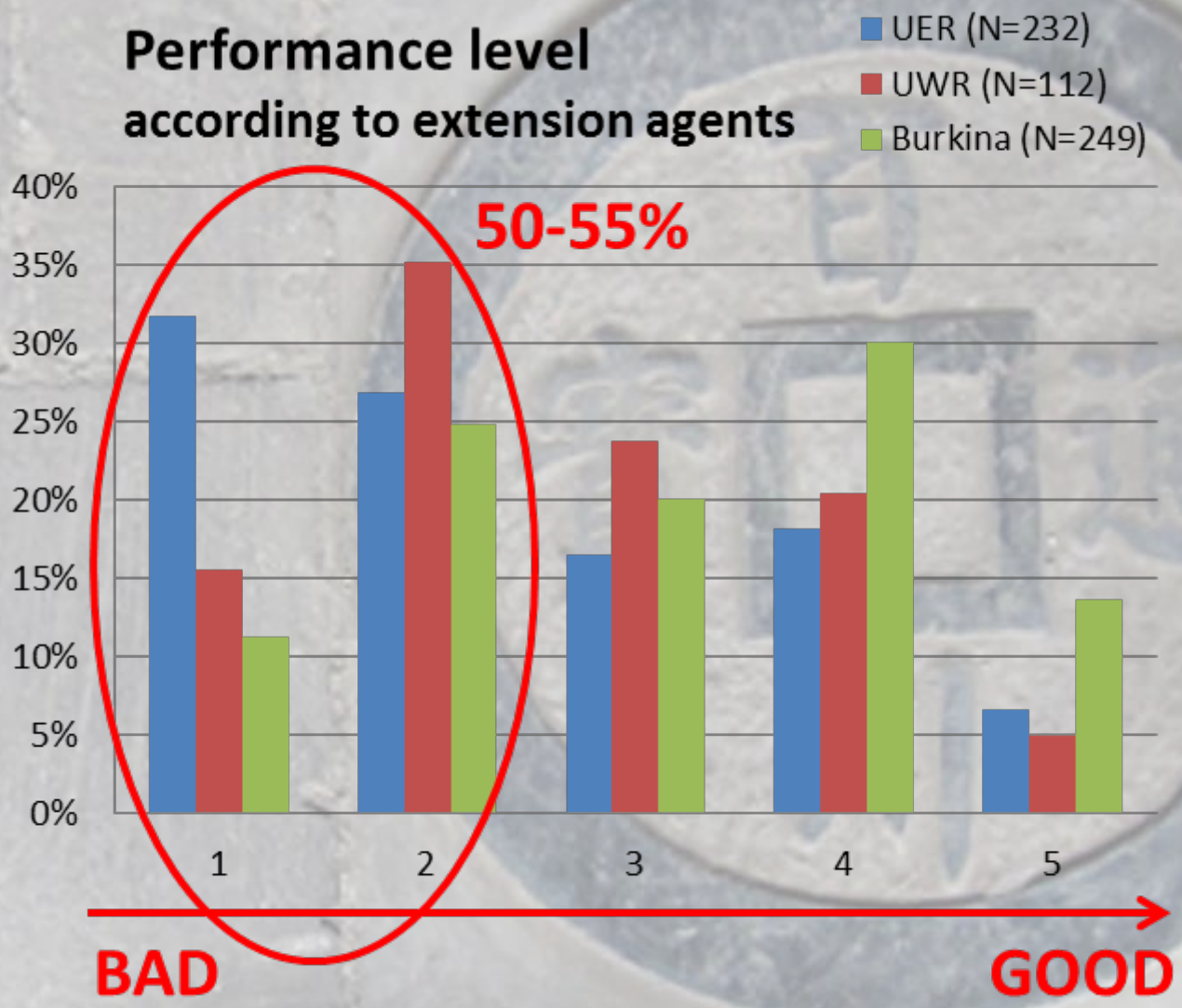
- Irrigation
- Livestock
- Fisheries
- Domestic

→High demand among rural population everywhere

→High potential for rural poverty reduction across sub-Saharan Africa


But....

Small reservoirs are underperforming



Constraints to small storage performances

1. **Planning** based on few models, not considering the full range of options, no time for consultation of stakeholders

2. **Design and construction flaws**, little involvement of users in design phase, poor construction quality and poor monitoring capacity, heavy reliance on external contractors

3. **Barriers to optimal use** of existing infrastructure: poor market conditions, no flexibility in water use, poor intensification

4. **Inappropriate management models** (do not reflect the variety of uses and stakeholders)

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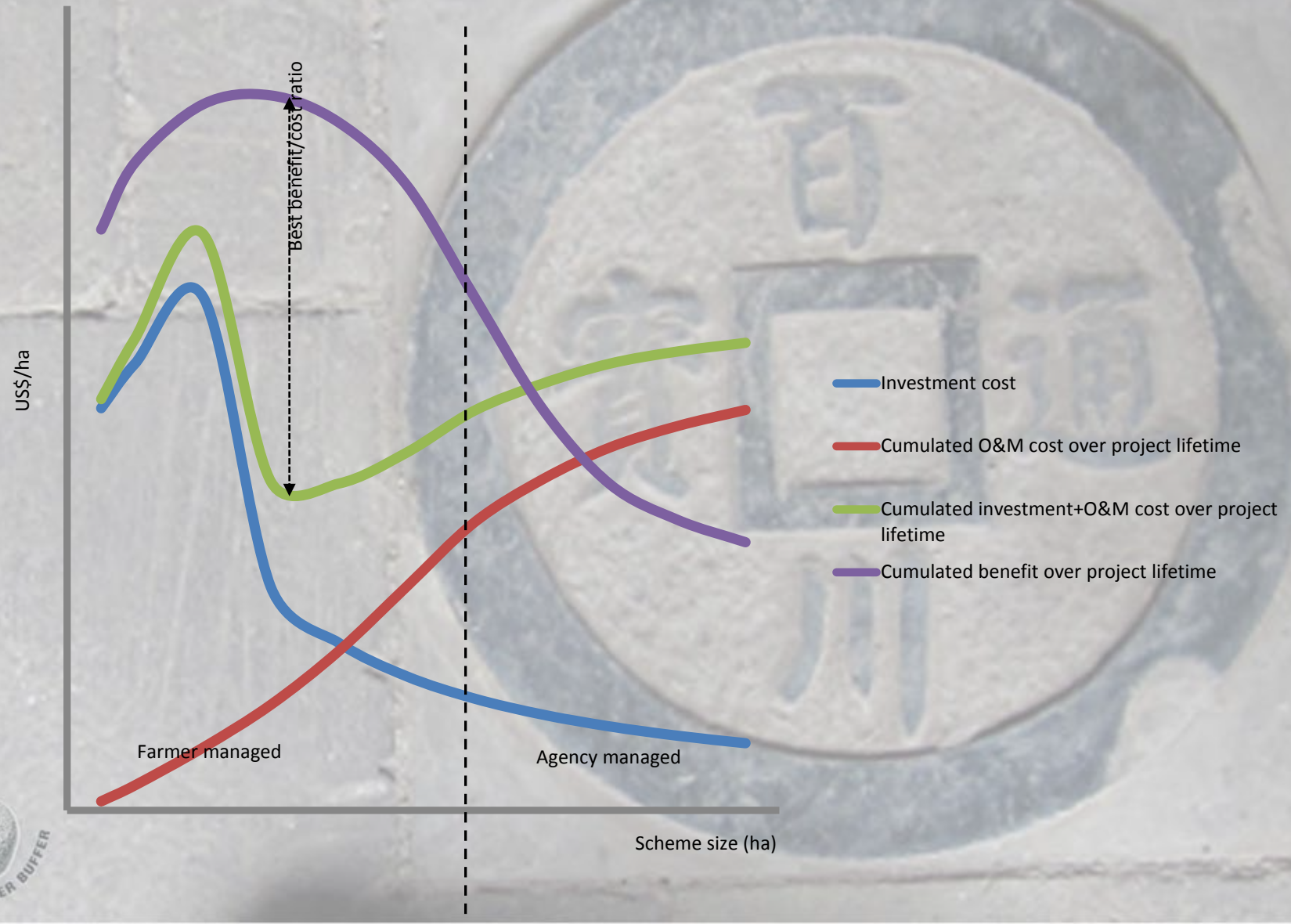
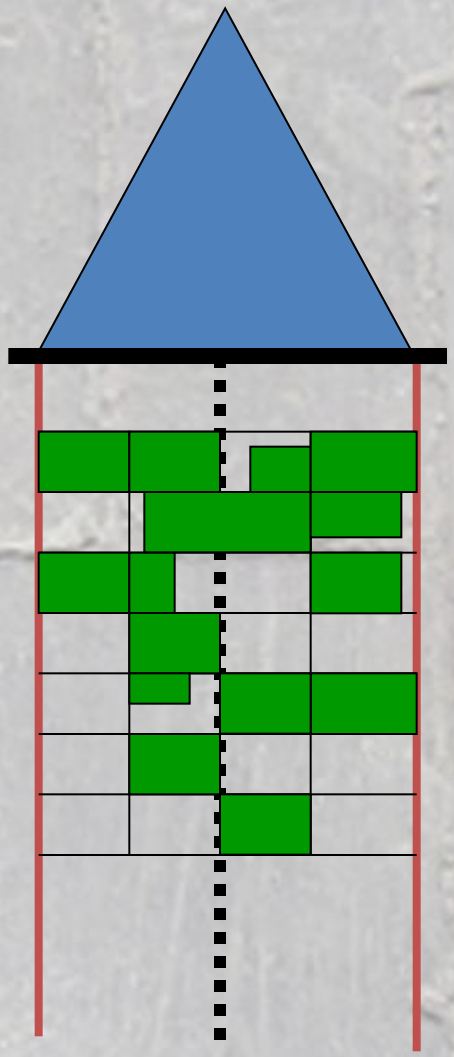
Scale economies and the cost of O&M



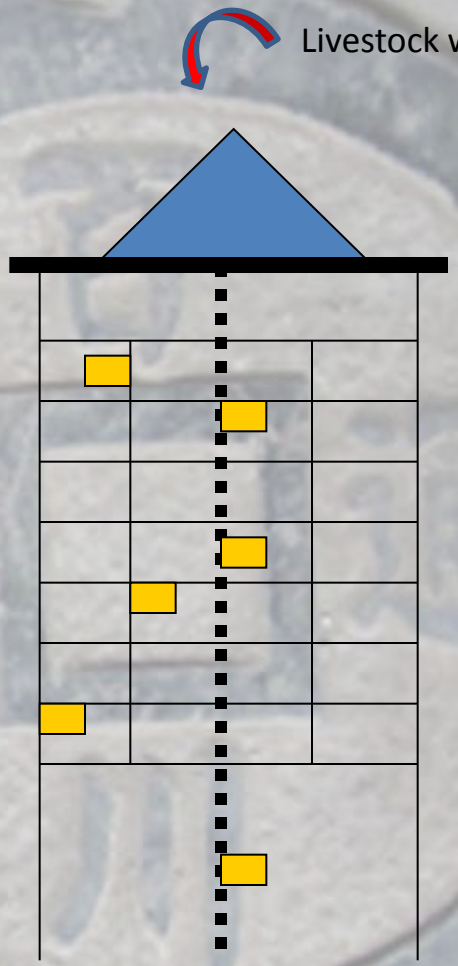
THE DOWNSTREAM MODEL

Design

Rainy season



Dry season



Livestock watering

Legend

Small reservoir

embankment

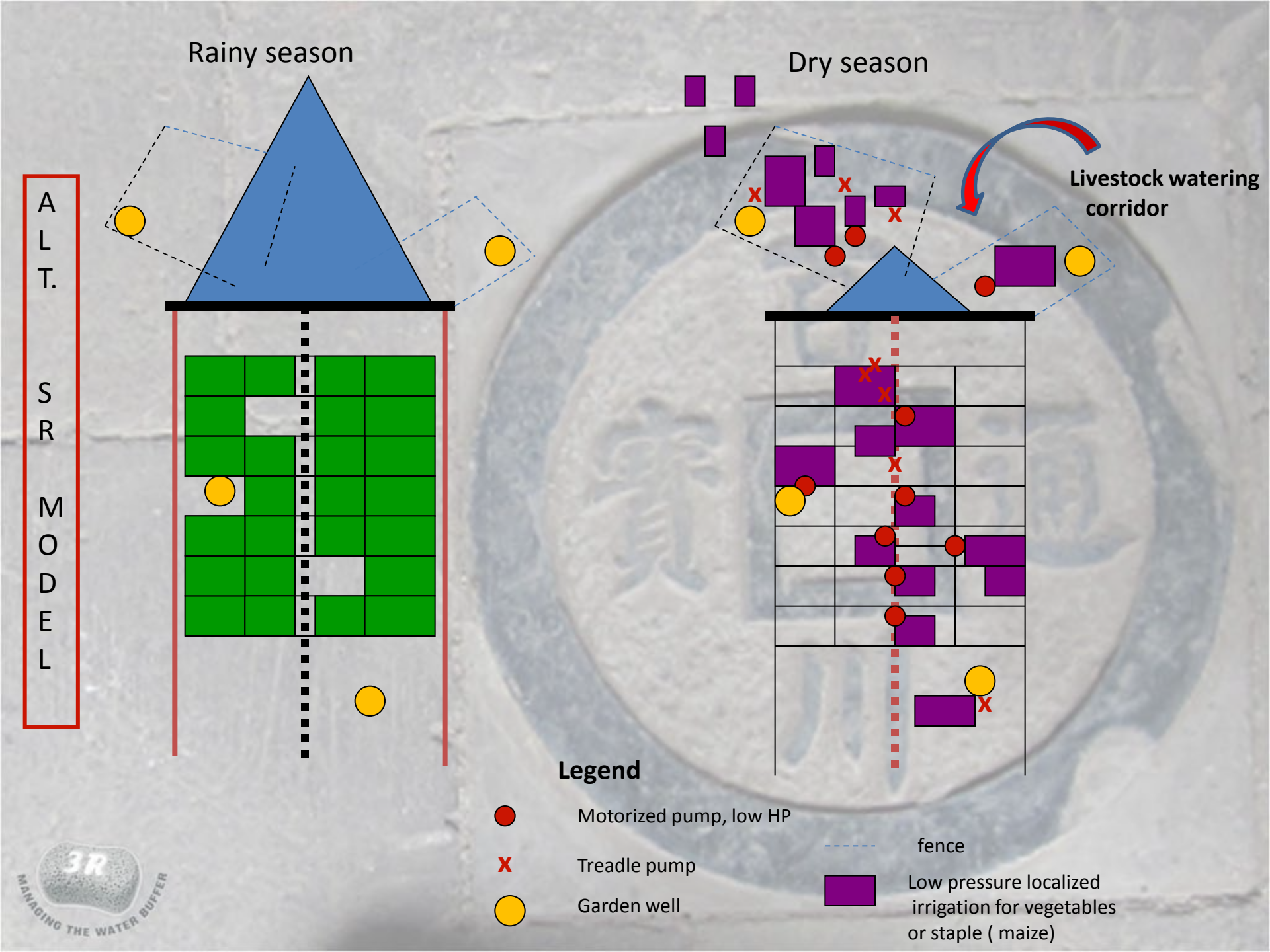
canal

Main drain

Rice plot

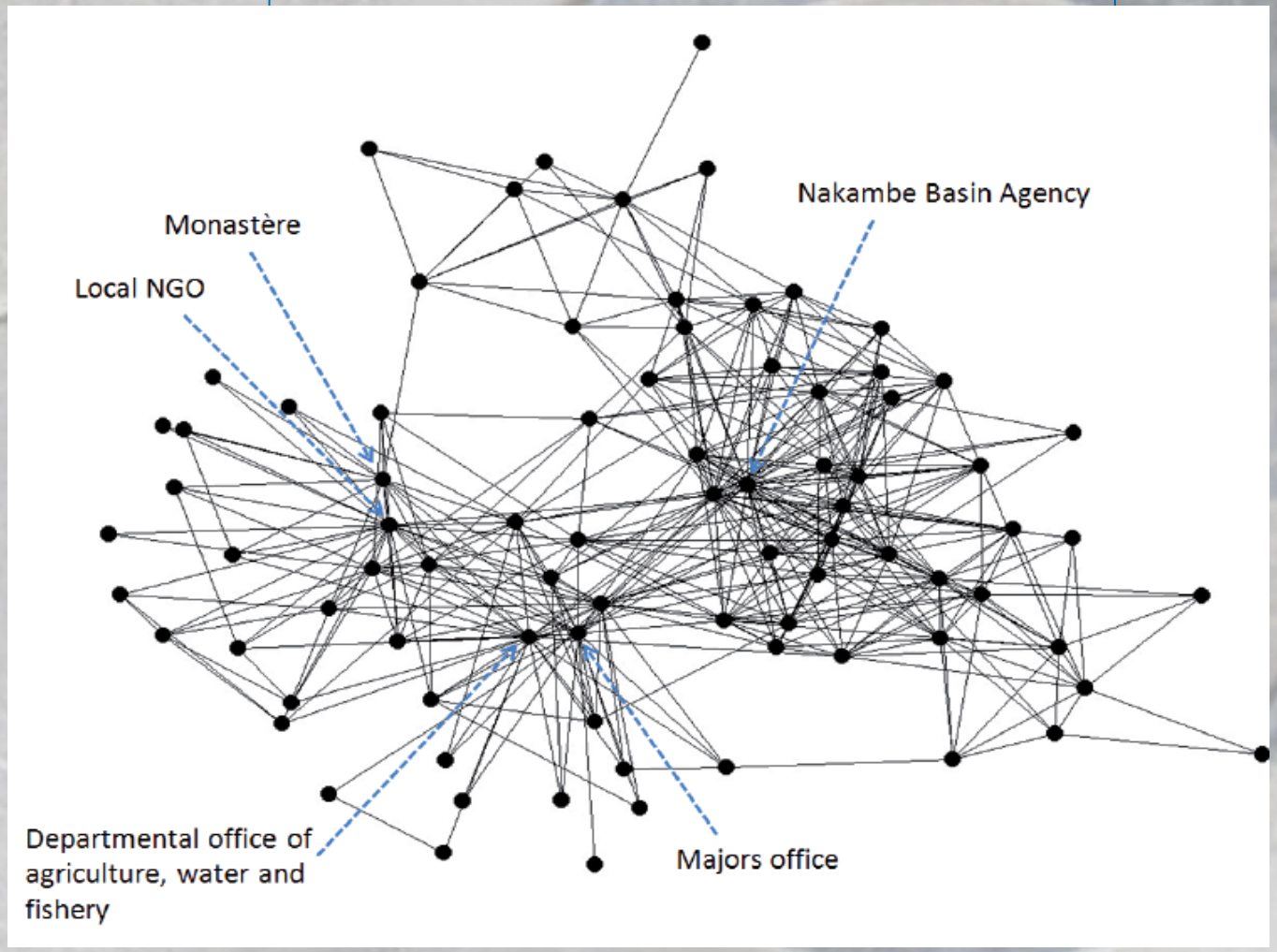
Micro-plot of vegetable crops Irrigated with watercan

3R MANAGING THE WATER BUFFER


Rainy season
Dry season
ALT. SR MODEL
Livestock watering corridor
Legend
Motorized pump, low HP
Treadle pump
Garden well
fence
Low pressure localized irrigation for vegetables or staple (maize)
3R
MANAGING THE WATER BUFFER

Complex institutional setting

Nariarlé Basin, Burkina Faso



Based on research by Stockholm Environment Institute, AWMSolutions project

Solution pathways to improve performances of water storage

1. Ensure strategic planning

- 1a: Invite decision-makers to consider the full range of water storage options
- 1b: Plan storage on the basis of a clear understanding of water demand and availability
- 1c: Mainstream appropriate planning and implementation methods inside government and partners (ODAs, NGOs,..)
- 1d: Favour 'Distributed storage': bring storage closer to the users
- 1e: Use stakeholder valuation in cost-benefit analysis
- 1f: Budget for participatory design and implementation

2. Raise design and construction quality

- 2a: Design with people and integrate multiple uses
- 2b: Improve designers'know-how about options and design issues
- 2.c: Build flexibility in the design
- 2d: Move beyond the downstream model of gravity irrigation
- 2e: Improve knowledge on hydrological and other design parameters
- 2f: Strengthen the construction process: quality assurance in procurement and supervision

3. Make best use of storage infrastructure

- 3a: Encourage and facilitate multiple uses of water
- 3b: Integrate and support upstream users in small reservoirs
- 3c: Strengthen farmers' technical knowledge
- 3d: Provide better marketing conditions for irrigated products

4. Adopt new management approaches

- 4a: Identify appropriate institutions and strengthen organisations for water management
- 4b: Recognize and address water use conflicts
- 4c: Better assess and mitigate environmental impacts at multiple scales

with focus on…

- Promoting ‘diffused’ storage
- Integrating upstream users in planning and design
- Improving construction and quality control
- Reducing management burden and interdependency among users
- Developing inclusive local institutions

Contacts

www.fao.org/nr/water

www.awm-solutions.iwmi.org