Multi-Use Water Systems (MUS): Potential to Address Multiple Community Needs

Presented by PRO-WASH & SCALE and Partners

World Water Week
OFFICIAL SESSION

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SCALE
Strengthening Capacity in Agriculture Livelihoods and Environment

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ENVIRONMENTAL LAW INSTITUTE

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Agenda

1	Welcome & Introductions
2	Session Overview
3	MUS Research Findings – Environmental Law Institute
4	Experiences from Zimbabwe – Amalima Loko
5	Experiences from South Africa – International Water Management Institute
6	Guided Discussion – All Participants
7	Wrap Up & Thank You

Successful Partnerships for Multiple-Use Water Services in Zimbabwe – Study Overview

Jessica Troell

Senior Attorney

Director, International Water Program
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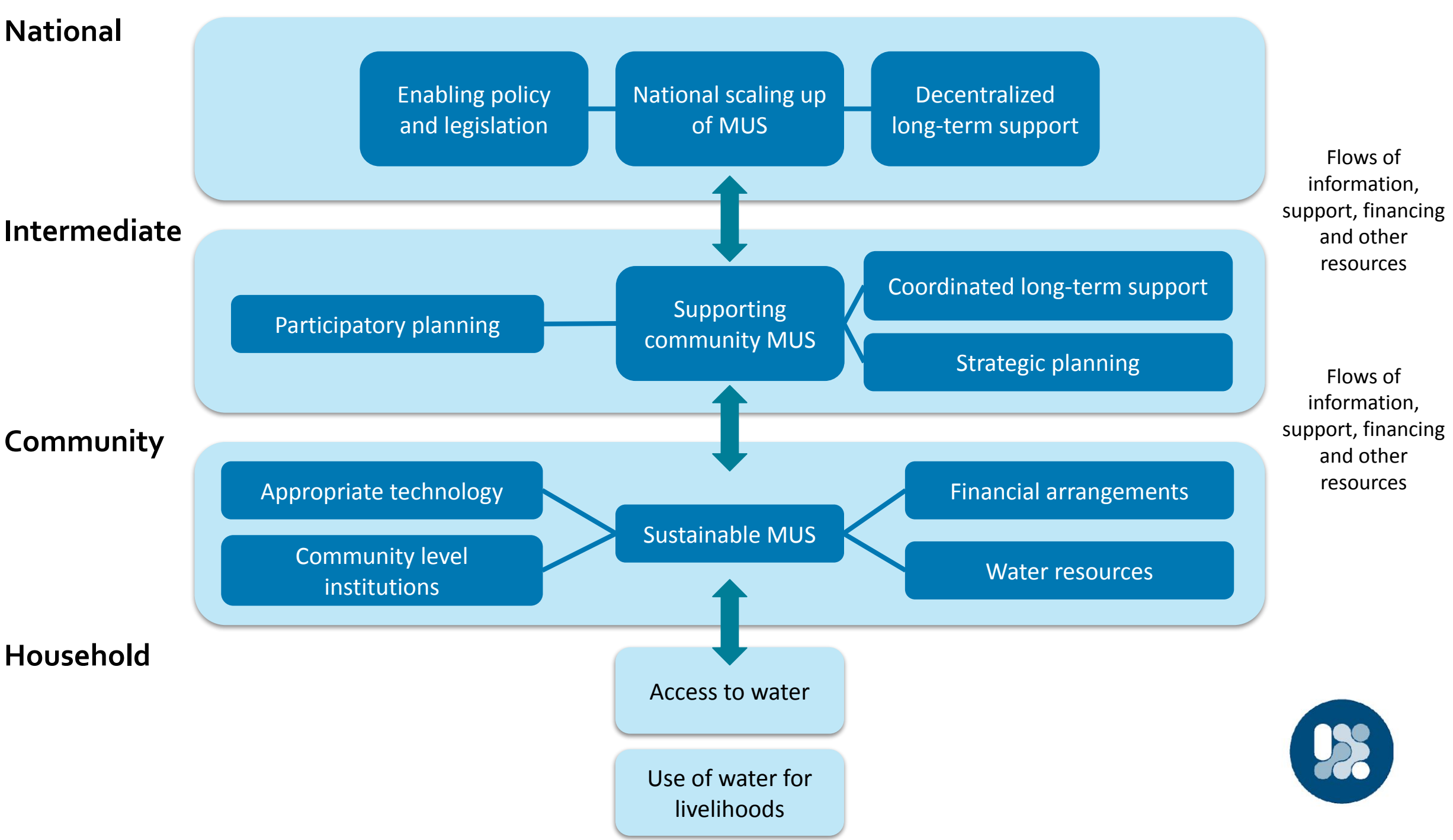
What is MUS?

A participatory approach to water services that takes the multiple domestic and productive water uses and needs of communities as the starting point for planning, designing, and managing investments in water services.


National
Enabling policy and legislation
National scaling up of MUS
Decentralized long-term support
Intermediate
Participatory planning
Supporting community MUS
Coordinated long-term support
Strategic planning
Community
Appropriate technology
Community level institutions
Sustainable MUS
Financial arrangements
Water resources
Household
Access to water
Use of water for livelihoods
Flows of information, support, financing and other resources
Flows of information, support, financing and other resources

MUS Provides More than Financial Benefits

- Food security, incomes and livelihood diversification, and poverty reduction—farmers grow a wide variety of crops, which contribute to **improved health and nutrition**
- **Welfare of women and girls** has improved but needs more in-depth assessment
- Communities gain **experience with irrigation technology** and development
- Collective action in constructing small dams and irrigation management can **strengthen communities' cohesion and reduce water conflicts**

Research Questions and Context

- What are the **institutional and organizational factors** that are important in designing, implementing, and sustaining MUS in Zimbabwe?
- What **promising interventions** can be identified? What are the **challenges** to implementation and innovation?
- Focus on **lessons from 13 sites** across two USAID-funded Resilience Food Security Activities (RFSAs): Amalima Loko and Takunda (and their predecessors)

Legal and Governance Findings

- **Sectoral silos**: Overlaps and Fragmentation
  - Uncertainty and overlap in institutional mandates
  - Limited alignment of provincial, district, and catchment boundaries
  - Institutional coordination mechanisms compromised by lack of a framework
- **Severe resource constraints** for government agencies mandated with support for MUS
- **Key legislative gaps** undermine effective community-driven MUS approaches
- **Ongoing decentralization and sectoral reorganization** amplifying challenges

Community Participation

- **Inclusive and meaningful participation from planning and design** is fundamental to MUS sustainability
- Community-led MUS requires **balancing community priorities for multiple uses with financial and sustainability concerns**
- **Community institutional structures** for MUS are critical
- Additional investment in community-led approaches can also:
  - Define community (and partner) **capacities and resources**
  - Identify the range of **social benefits** associated with specific MUS interventions

Financing MUS

- Communities consistently unable to meet O&M costs and government departments lack coordination and resources to provide necessary support
- Irrigation + projects demonstrate capacity to provide household-level profits with 10% reinvestment into operation maintenance and replacement costs
- Actual ability to pay levels → 10 years to raise necessary capital for these costs
- High value crops could increase income, but market constraints often prohibitive
- Small plot sizes also constrain profitability
- Additional constraints: high initial investment costs (e.g., solar); increasing water shortages; and community-led co-design of prioritized solutions and full agreement to budgets that include life-cycle cost analysis

Water Quality

- Poor water quality at all sites: only boreholes provide potable water
  - Health threat (fecal coliform)
  - High salinity makes unsuitable for many domestic uses
- Need to fill gaps left by failures in water quality assessment and monitoring → testing inconsistent due to limitations of government agency resources
- Potential, cost-effective ways of supplying safe water to communities:
  - Treating water at household level using available remedies on the market (e.g., Waterguard)
  - Improved hygiene practices
  - Training communities with respect to handling and storage of drinking/domestic water

Amalima Loko:

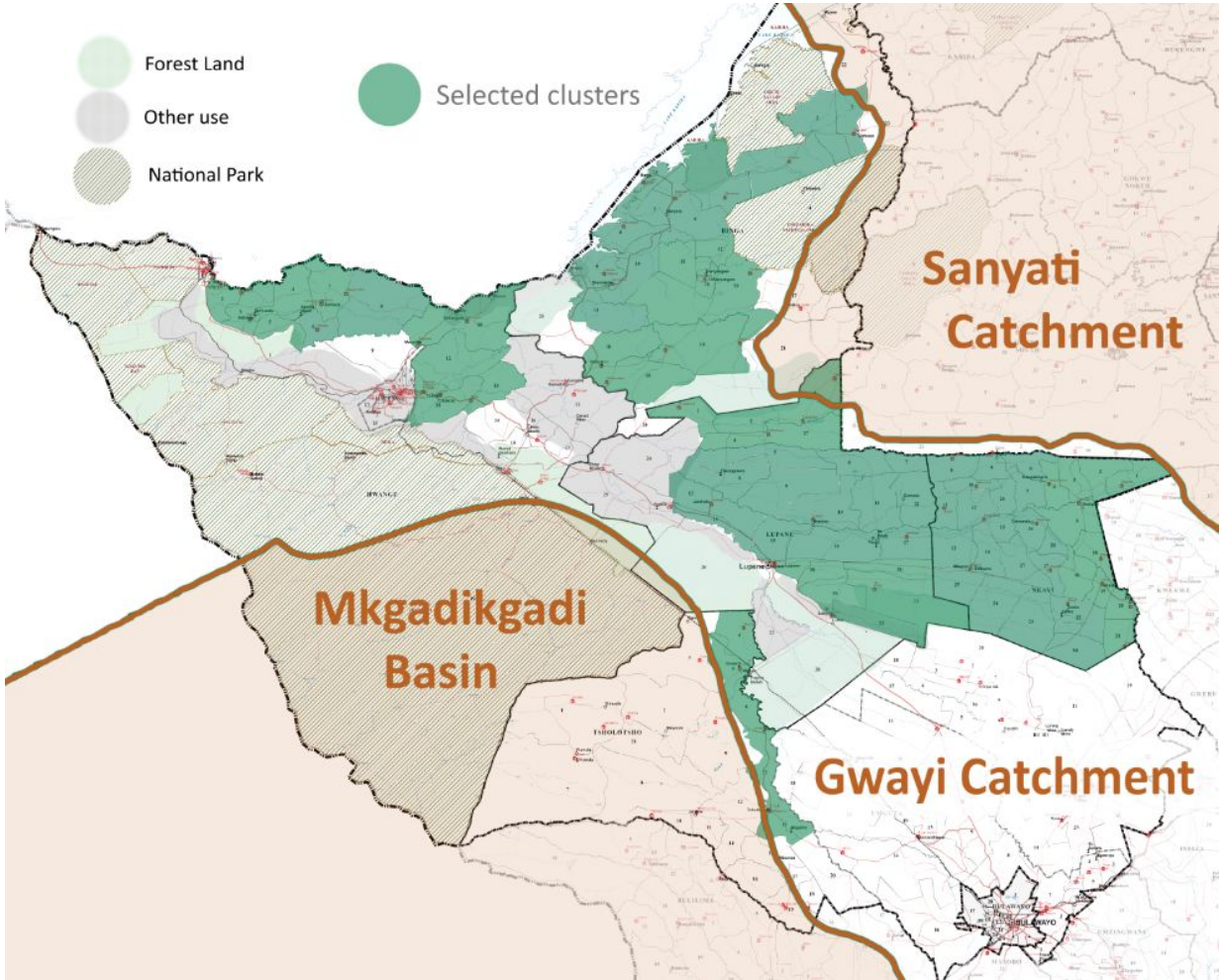
Community Visioning: Prioritization, Design, Maintenance of MUS
Vacuum Tank Technology in MUS

LESSONS LEARNT

Amalima Loko's Goal: *To improve food and nutrition security through increased food access and sustainable watershed management*

Area of Operation

Zimbabwe



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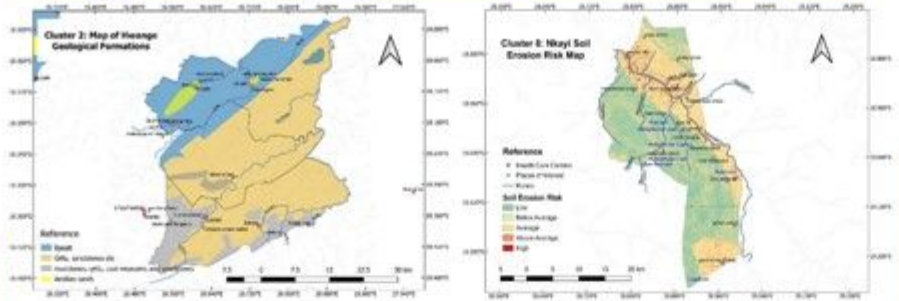
Community Visioning

- Build trust and social cohesion
- Collective, equitable decision-making
- Accountability, ownership of communal assets
- Community pride and motivation

Amalima Loko
Social Accountability Training: Jimila

High Level GIS/Remotely Sensed Maps



Refined Maps

Watershed Cluster Steering Groups

Visioning process

Selection and Training of Watershed Youth Champions

Ground truthing by Watershed Champions

Watershed Activity Prioritization

Watershed Infrastructure/Asset Development, Rehabilitation and Conservation

Ward Transformative Plan -Watershed Cluster Plan

Designing for Effective MUS

Hydrological & Water Use Aspects in the Gwayi Catchment

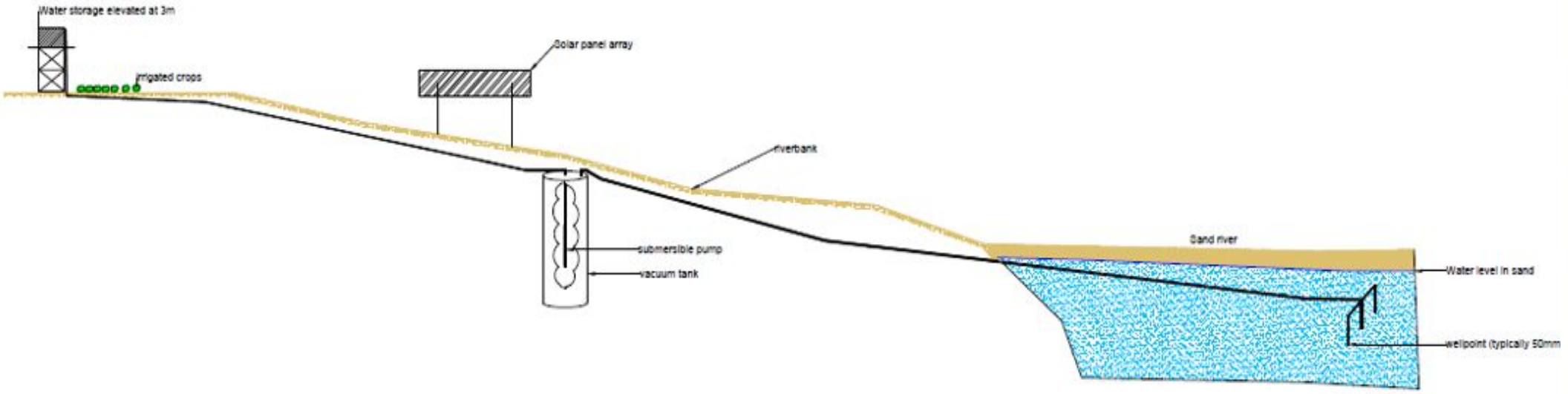
- Network of Alluvial Aquifers
- Water Use: Domestic and productive use

Traditional Sand Abstraction System

- Pumps inserted in concrete rings or connected to a manifold system
- Challenges
  - Flood damage
  - Cost and accessibility of fuel
  - Inability to self-finance repairs

Innovation: The Vacuum Tank Technology for MUS

- **Community Engagement and Action Research**
  - Simple to operate and maintain
  - Utilise low cost renewable energy (PV)
  - Ease to access spares
  - Not damaged by floods



Amalima Loko: Innovation in Designing MUS Ntonjeni Sand Abstraction System

MUS Typology: Community Led MUS

Asset Level

- Project specific Asset Management Committee
- Active sub committees
- Embedded in the Local structure
- Traditional leader support

Institutional/Stakeholder level:

- Agricultural Extension Support from AGRITEX
- Environmental Health Service – Water quality Monitoring
- Sub catchment Council - water permits

Financing MUS

User Experience: Willingness to Pay vs. Ability to Pay

- Subscription-based financing model
- Usd $1 per Irrigator/month
- Unable to meet O&M costs
- Emergency Mobilisation of Funds for Major breakdowns

Amalima Loko MUS Financing Strategies

- Promote Startup Initial Payment
- Linking Users to Insurance Companies for High value assets (solar panels and pumps)
- Promote Subscriptions based on an analysis of cost breakdown of key components

Designs that Address Water Quality

- Water quality of alluvial aquifers are generally good
- Wellpoints are installed at a depth of +2.5m below the sand level
- Encourage good environmental hygiene practices
- Water Treatment – Disinfection
  - Inline UV treatment or Inline Chlorination
  - Cost of community-based treatment systems is high and not sustained
  - Inaccessible consumables

MUS Reflections & Lessons

- **MUS is an emerging and growing concept**
  - Shift from Single-Use Systems
- **Institutions to support MUS are compromised**
  - No explicit framework for MUS
  - Institutions are burdened with resources constraints
- **Costs related to financing MUS, complexity of design, specialized O&M**
  - High initial setup
- **Limitations of communal management of MUS**
  - Governance
  - Linkages with Private/Public Sector Service providers

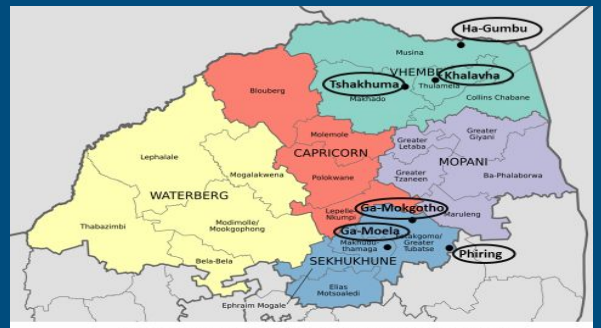
MUS Reflections & Lessons

Promising Future for MUS

- **Institutional Level**
  - Willingness to move towards coordinated planning, resource mobilization
- **Programming Level**
  - Shift in purposive design of MUS, funding availability for such systems
- **Community Level**
  - Willingness to pay, role of traditional leaders in supporting AMCs

Community-Led Water Services for Multiple Uses in South Africa: Lessons Learnt

South Africa | A MUS Champion Project: Community-led water services for multiple uses by African Development Bank, with Water Research Commission, NGO Tsogang, IWMI, government, and six communities in Limpopo Province



Map of the six demonstration communities of the project 'Operationalizing community-driven Multiple-use water services in South Africa'

… ensure that all new water infrastructure is planned, developed and used as multi-purpose facilities, especially to meet social needs.

A new approach to planning for community water supplies is required; one that considers and provides for the multiple water needs of the community..

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Community-led Project Cycle

1. Initiating collaboration
   - Agreeing on goals
   - Creating community structure
2. Diagnosing
3. Envisioning Solutions
4. Fitting the Financial Framework
5. Implementing
   - Procuring Materials
   - Recruiting Workers
   - Constructing
6. Using Infrastructure

Findings Diagnosis (n=654)

- **Multiple uses at multiple sites**
  - Homesteads (livestock; irrigation by 14–59%)
  - Distant fields (irrigation)
  - Other sites of use: (e.g. streams)
- Most **infrastructure** is multi-purpose
- Multiple **sources** e.g. 71–100% of homesteads
- **Self-supply**: the most important source at homesteads in 5 of 6 communities

Communal Self Supply Tshakhuma: 72% of 2,360 Households

Envisioning Solutions

1. Initiating collaboration
   - Agreeing on goals
   - Creating community structure
2. Diagnosing
3. Envisioning Solutions
4. Fitting the Financial Framework
5. Implementing
   - Procuring Materials
   - Recruiting Workers
   - Constructing
6. Using Infrastructure

Construction

1. Initiating collaboration
   - Agreeing on goals
   - Creating community structure

2. Diagnosing

3. Envisioning Solutions

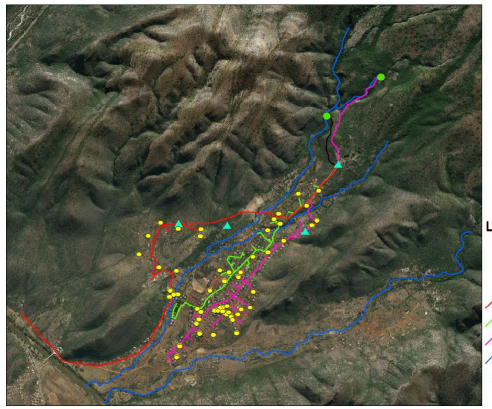
4. Fitting the Financial Framework

5. Implementing
   - Procuring Materials
   - Recruiting Workers
   - Constructing

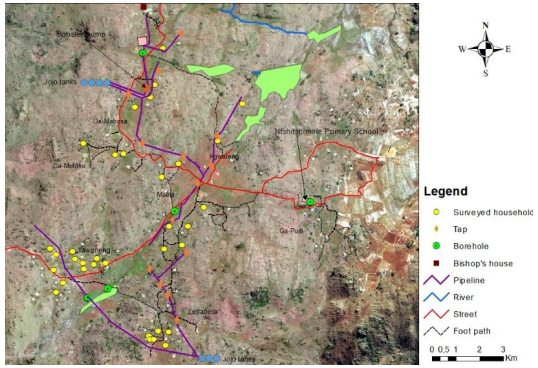
6. Using Infrastructure

Impact Assessment in Two Communities

Ga Mokgotho: upgrading underused, self-managed gravity scheme



Ga Moela: new storage and reticulation of 2 boreholes to 3 sections



Impacts on Water Uses and Productivity

	Ga Mokgotho oral recall (n = 59; 14 men; 45 women)	Ga Moela oral recall (n = 42; 12 men; 30 women)
WATER VOLUMES / TIME TO FETCH		
Pre-project water used (liters per household per week – hours per week)	733	613 – 9.5 hours
Post-project (% increase)	1,305 (78%)	1,167 (90%) – 4.3 hours
USES		
Domestic uses only (also at 18 lpcd)	10%	5%
Livestock	68%	82%
Irrigation	86%	54%
VALUE IRRIGATED PRODUCE		
Pre-project value irrigated produce extrapolated to village	R 2,324,123	R 164,666
Post-project estimated value irrigated produce extrapolated to village (% increase)	R 3,713,198 (60%)	R 289,136 (76%)
Gender: women solely managing irrigation	68%	60%

Lower Costs; More, Sustainable Wellbeing

Cost-effective mobilization of community resources

- Self-supply, local innovation, knowledge, skills
- Multi-purpose infrastructure by design
- 24/7 availability to improve access to water
- If procurement is local instead of national: -3% to 39% of suppliers' mark ups could have been saved

Possible: local employment creation

- MUS project: 3,550 person days

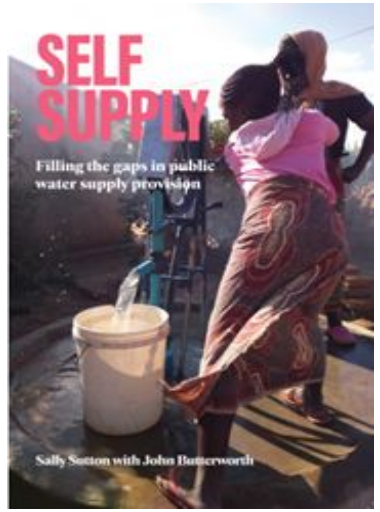
Sustainability

- Capacity development and ownership: "we worked hard for it"
- Strengthening community water institutions: "somewhere to go"

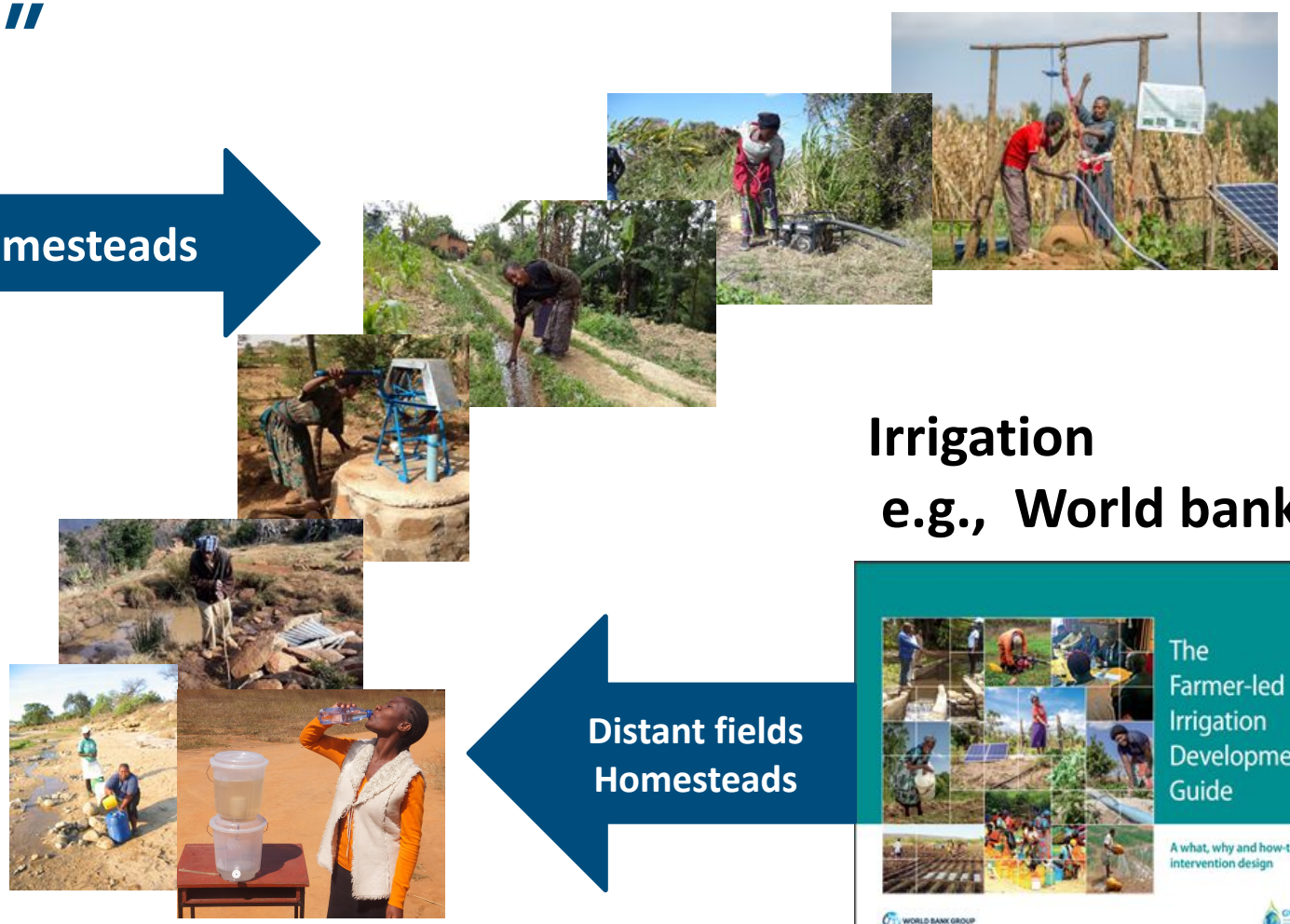
"It enables communities to do whatever they can do, and which is often easiest and simplest for government anyhow."
–MUS Forum member

Another Global MUS Practice: Supported Self Supply by Households "Climb the Water Ladder"

WASH e.g.,
Sally Sutton 2021



Homesteads



Irrigation
e.g., World bank

Distant fields
Homesteads

3 lpcd safe for drinking

Q&A and Guided Discussion

- Questions for the presenters
- Guided Discussion Questions:
  - What challenges remain in ensuring MUS systems can remain productive over the long term and support incomes for users? How might implementers and donors address them?
  - What challenges remain in ensuring community participation processes result in real community buy-in and ownership of MUS systems? How might implementers and donors address them?

Thank you!

Stay in touch with us:

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