

Institutional and Policy Related Challenges that Limit the Adoption of Improved Agricultural Water Use Technology and Practice:

Enhancing Rainfed Agricultural Systems in the Zambezi Watercourse

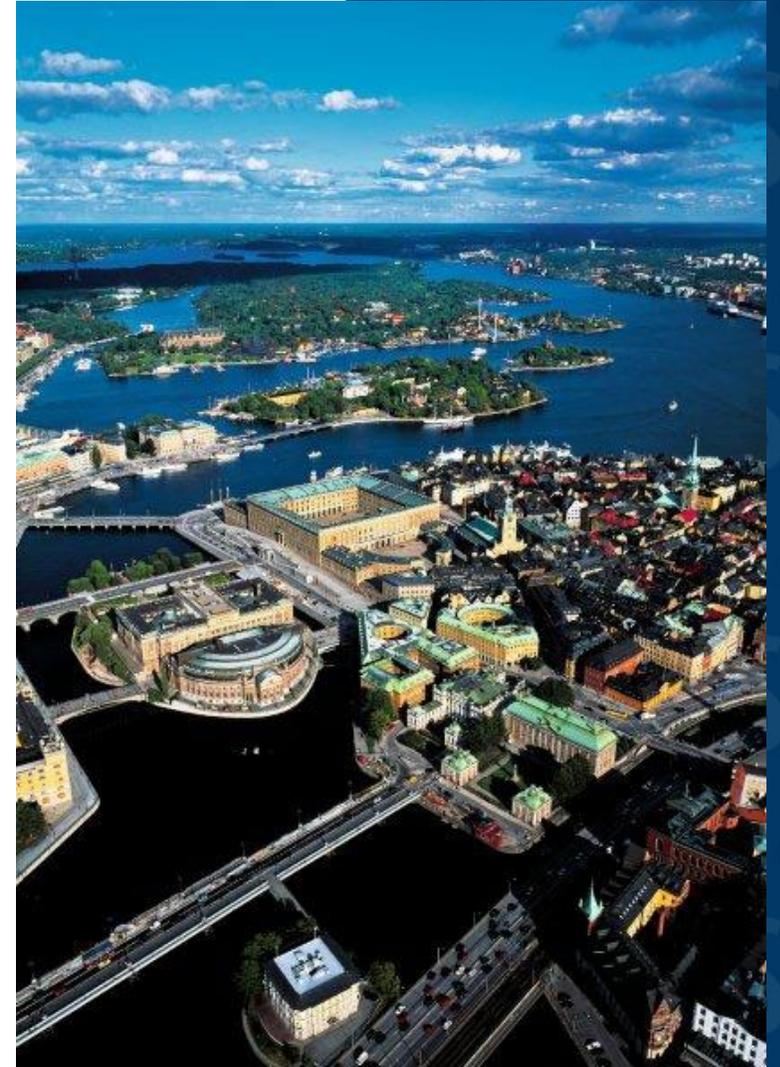
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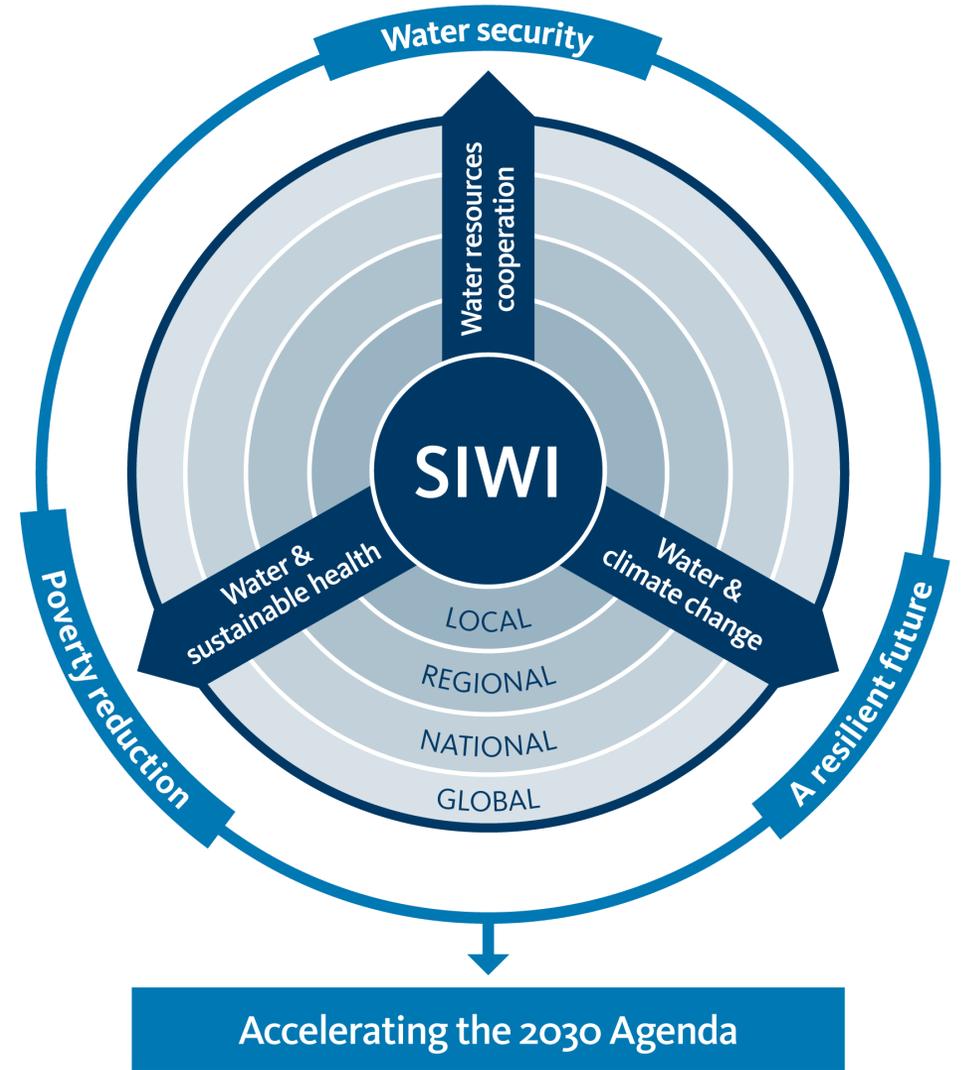
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About SIWI

The Stockholm International Water Institute (SIWI) is a water policy institute focused on water governance and contributing to international efforts to combat the world's escalating water crisis.

- HQ in Stockholm, Sweden; ARC in Pretoria, South Africa; LAC Regional Office in Bogota, Colombia; West Asia and North Africa Regional Office in Jordan, Amman
- 25 years of ongoing operations in water governance, sanitation, resilience, international policy, and transboundary water cooperation and diplomacy
- World Water Week, Water Prize, Junior Water Prize



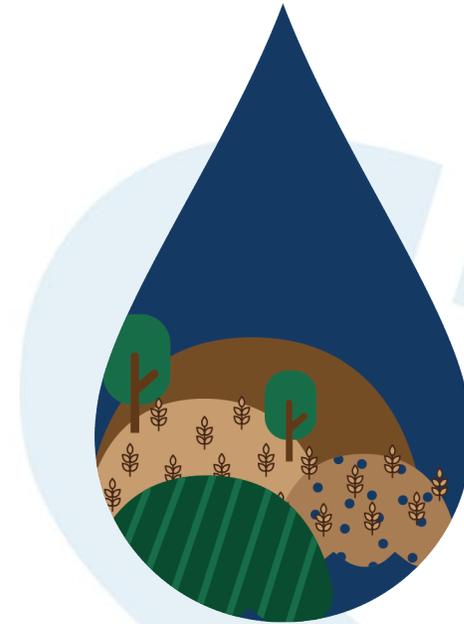


SIWI PROGRAMS

Smallholder farmers - frontline water managers

80% of all agricultural activity in Sub-Saharan Africa is on **smallholder rainfed farms**

Which have the lowest crop yields and agricultural productivity in the world.



TIARA calls upon governments and development finance institutions to recognise what farmers value the most, yet struggle to manage to their best ability – rainwater

Green Water, farmers, food production & climate change

- Focus on **'green water'** as an essential part of the water cycle (Falkenmark & Rockström, 2006)
- Water is only absorbed by plants at the root zone
- Water availability & soil moisture management are key determinants of crop yields and agricultural productivity
- #slowwater



Leveraging Green Water – process of slowing water down

- TIARA addresses the water security challenge in rainfed agriculture by unlocking the potential of green water.

Green water is water derived from rainfall that is available in the soil for plant growth through transpiration / moisture stored in the soil from rainfall.

It's a critical but often overlooked component of the hydrological cycle.

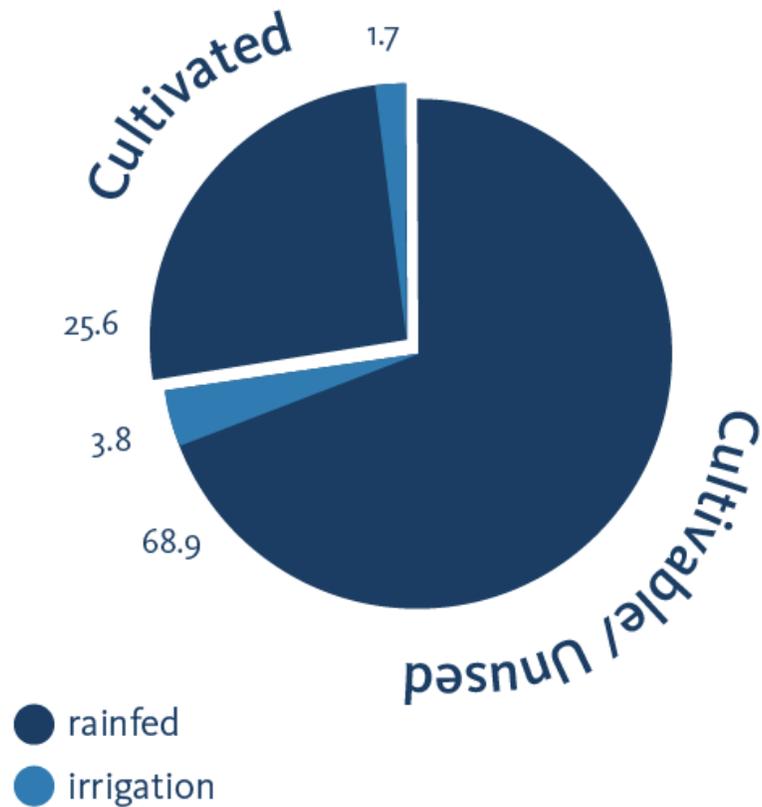
The utilization of this untapped resource presents an opportunity to enhance water security.

Green water enhances water security by regulating soil moisture, boosting agricultural productivity, promoting resilience, supporting local water availability, and fostering biodiversity and sustainable land management.

This approach not only addresses water scarcity but also contributes to climate resilience by managing the impacts of changing weather patterns.



Types and use of cultivable land in Africa



728 million ha of land in Sub-Saharan Africa is suitable for **rainfed agriculture**, of which nearly **69% is unused** but fit for cultivation. The smallholder sector makes up 80% of all farms.

The potential for job creation is immense if **investments are made in rainfed agriculture**, to boost productivity to a point where **imports of primary foods are no longer necessary**.

Why transform Investments

Agriculture vs. investments

95% of food production in Africa relies on rainwater



5% is irrigated

5% of public investments go to rainfed agriculture



95% are dedicated to irrigated agriculture

The business case

Rol for Farmer

- Increased yield (typically from 1 ton/ha to 3 ton/ha)
- Reduced risk of moisture variability
- Higher initial labour costs
- Construction materials
 - Biophysical and socio-economic data
 - Rainfall, soil types
 - Land holding capacity, crop yields,
 - Number of farmers practising rainfed agriculture technologies
 - Incomes, HH size
 - Agroforestry field land mapping (digitizing farm plots) for carbon accounting at the farmer level

Environmental benefits

- Reduced soil erosion
- Lower sedimentation of watercourses
- Increased infiltration and percolation of rainwater
- Aquifer recharge
- Carbon sequestration in soils
- Vegetation & biodiversity increase
- Soil moisture conservation
- soil fertility
- Package for reducing cost of inputs
- Increasing rooting area and depth
- Rainwater harvesting
- Increased soil fertility

Social benefits

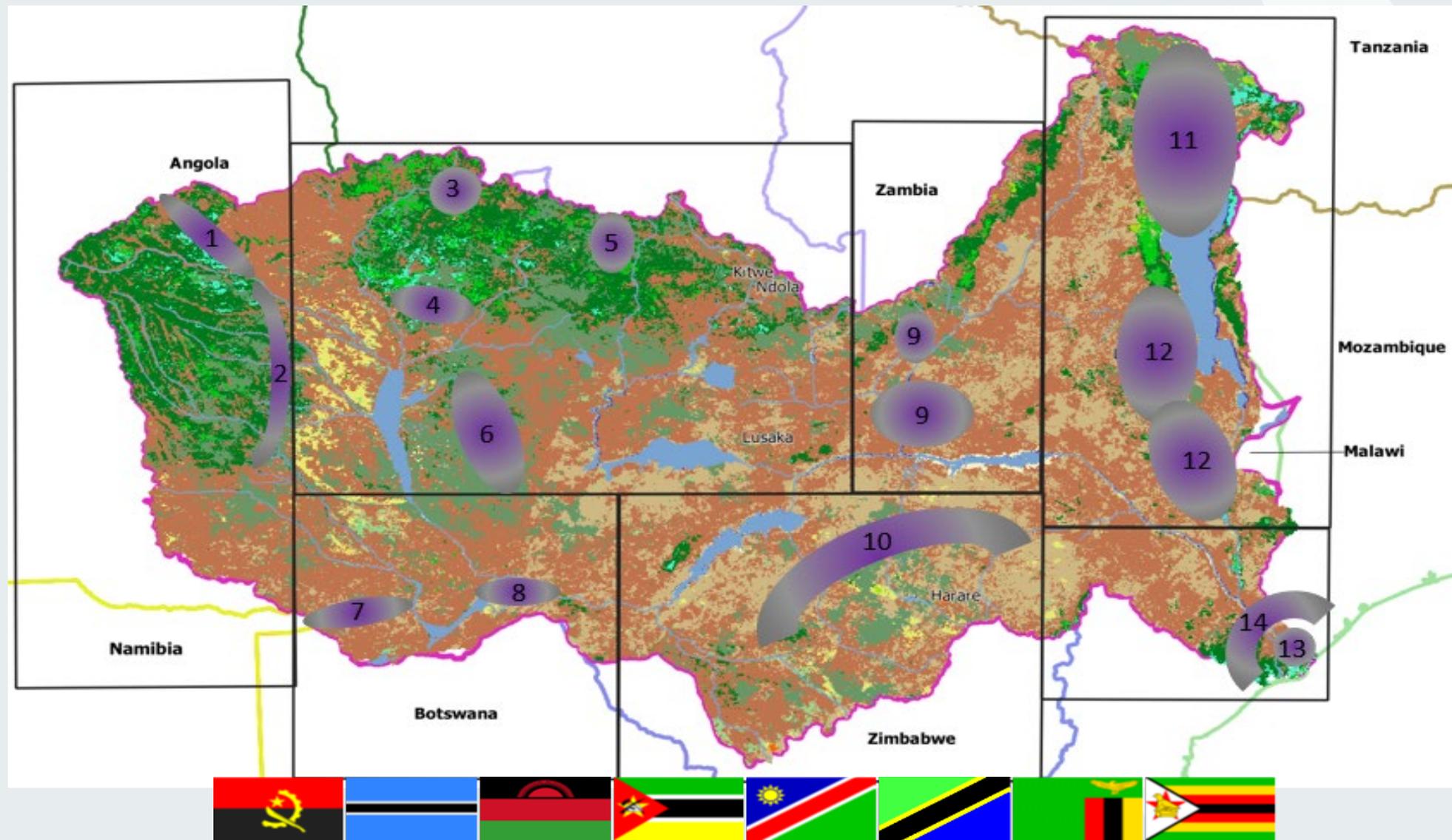
- Local agricultural value chains strengthened
- Job opportunities created in rural communities
- Yields increase from 2.0 t/ha (CR) to 6.0 t/ha (DBF)
- Average yield increase from CR to DBF = 146%
- Profits: Traditional = \$76.18
DBF = \$553.33



Key policy & institutional challenges hindering the adoption of CSA practices: Perspectives from Local NGOs

- Fertilizer subsidy overshadowing other technologies
- Inadequate research and promotion resources for CSA activities
- Equal treatment of technologies (High vs Failing Impact)
- Low priority to support CSA high impact initiatives like the Deep Bed Farming system, RWH
- Non- incentives for Small-holder farmers: for their small-scale activities collectively having a significant impact on catchment management (PES)
- Inadequate funding to train extension workers & farmers in CSA (DBF) activities.
- Lack of legal entities in smallholder farmer sector to attract private sector investments – NGO model incompatible with private sector
- Farmers and extension staff lack training in CSA practices.
- Some CSA practices are labour-intensive and not suitable for all demographics.
- Essential CSA aspects like diversification and soil management aren't prioritized.
- The Farm Input Subsidy Program worsens farmer dependency.
- Agriculture in the Zambezi Basin faces resource destruction.
- Women and smallholders face food insecurity and labour exploitation.
- Seed laws weaken local seed systems
- Financiers /donors who tend to have specific sites of interest
- Subsidized inputs increase farmer dependency.
- The absence of suitable markets hinders proper practices.
- Historical policies favour large players, hindering sustainable practices.
- Low funding to operationalize the National Agriculture Policy, and the National Climate Change Management Policy
- Low access to mechanization by smallholder farmers.
- (Breaking soil hardpan & making DBF).

Entry Point for Rainfed Agriculture Investments: Livelihoods Support Pillar (ZSP): Delineated Vulnerability Zones With Validated Transboundary Hotspots (Source: ZAMCOM-CRIDF 2018)



win-win cooperation / cooperacao, ganhas tu, ganho eu

Innovations in Finance



Form of Capital

Who provide this form of capital?

Debt	SACCO, Community Bank, Warehouse Receipting Systems, MFIs, DFIs
Credit	Input seller or distributors
Partnerships (PPP's)	Anchor Farmer/ Government
Factoring, purchase order finance	Factor
Equity financing	Private investors, DFIs
Grants, In-Kind Donations	Government, philanthropy
Carbon finance	Private investors
Payment for Ecosystem services, Water Funds	Private sec, Water utilities

Improved productivity, resilience, and sustainability among farmers practicing CA (CTDT, Zimbabwe)

Name :		
Age	72 years	
Household size	6 (4M/2F)	
Crops grown: Mazie, cowpeas, finger millet, groundnuts, sorghum, p.millet		
Area planted	Before adopting CA	After adopting CA
Inputs	Cost s	
Seed	Maize: 0.37	Maize 0.37
Fert Comp D	US\$55.00	US\$54.00
Fert AN	US\$148.00	US\$69.00
Demise	US\$178.00	US\$172.00
Total input costs	US\$381.00	US\$359.00
Labour @US5 per person		
land prep	US\$0.00	US\$20.00
weeding	US\$30.00	US\$0.00
Mulching including collection	US\$110.00	US\$180.00
Harvesting	US\$56.00	US\$120.00
threshing	US\$11.00	US\$140.00
Total labour costs	US\$207.00	US\$460.00
Yield	27 buckets	360 buckets
selling @US5.00 per bucket	US\$135.00	US\$1,800.00
Profit (return)	-US\$453.00	US\$911.00
Return on Investment	-77%	111%



POTENTIAL NEEDS & PARTNERS

TIARA is a partnership between ZAMCOM, CIFOR-ICRAF, and NGOs supporting the implementation of The Zambezi Strategic Plan's Livelihoods component.

Who else do we **need on board?**



**Governments,
Research & policy
makers**



**Development
finance
institutions**



Private sector



**Farmers
& farmer
organisations**



**Community
& advocates**



**Market &
connectivity
experts**



Transforming Investments in African Rainfed Agriculture (TIARA)

Supporting farmers, the frontline water managers of Africa

Thank You!

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95% of public investments in African agriculture goes to irrigation, while 95% of food production relies on rainfed agriculture.

TIARA is developing the **business case** of how financial support to farmers can significantly improve food security along with soil and water conservation.

TIARA calls upon governments and development finance institutions to recognise what farmers value the most, yet struggle to manage to their best ability – rainwater.

In partnership with