

# ADDUNET

An ACP-EU Technology-Transfer Network on Rainwater Harvesting  
Irrigation Management for Sustainable Dryland Agriculture, Food  
Security and Poverty Alleviation in sub-Saharan Africa



# ASSESSING THE CAPACITY NEEDS, POTENTIAL AND MARKET ORIENTED PRODUCTS IN RAINWATER HARVESTING AND SMALL-SCALE IRRIGATION IN KENYA

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# Outline

- Available practices and technologies, technical capacities, socio-economic and climatic conditions
- Mapping of best practice of integrated rainwater harvesting and small-scale irrigation
- Research and Innovation needs Technology transfer and market oriented needs
- National capacity and training needs
- Policy and Institutional framework

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# Available practices and technologies, technical capacities, socio-economic and climatic conditions:

- Sand and sub-surface dams:
- Surface dams
- Run-off irrigation

Arid and semi-arid areas in Kenya have huge potential for these rainwater harvesting technologies.



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# Siting sand and sub-surface dams is a function of a number of factors:

- Availability of ephemeral streams
- Presence of coarse sand in the catchment
- topography that allows construction of weirs,
- geology that suit the establishment of dam embankments or walls,
- existing water holes, and
- population to use the water

The high potential for sand and subsurface dams in Kenya is attributed to massive presence of coarse sand and seasonal streams.



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# Run-off Irrigation:

- It has enhanced productivity of arable and grazing lands and increased tree establishment and agroforestry.
- Floodwaters have high levels of sedimentation that has provided source of soil fertility to inundated farms.
- It is cheap to implement and a viable alternative where irrigation water from other sources is not readily available or too costly.
- Run-off irrigation technologies in Kenya:
  1. retention ditches (for fruits and Napier grass) – common in Eastern Kenya;
  2. stone, contour, earth bunds, etc.

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# Mapping of best practice of integrated Rainwater Harvesting:

- Rainwater harvesting should be an integral part of sustainable land and water management.
- Best practice of integrated rainwater harvesting in Kenya include:
  1. *Case study 1: Kenya Rainwater Association Models – Upgraded farm ponds and simple metallic greenhouses*
  2. *Mwala, Machakos County – Underground reservoirs*
  3. *Case study 3: Laikipia – On-farm water pans*



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## Research and innovation needs:

Available and planned institutions in Kenya with research expertise in RWH:

- Academic institutions: University of Nairobi, JKUAT, Egerton etc.
- National research institutions e.g. KARI, KIRDI,
- Local and international NGOs e.g. KRA, Kickstart, SearNet, IWMI, ICID, etc.

NB: However, research on rainwater harvesting and irrigation is limited and uncoordinated



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# Research gaps in RWHI:

- Assessing impacts, benefits, and economic viability of different rainwater harvesting and irrigation technologies in different parts of Kenya;
- Determining environmental sustainability of rainwater harvesting and irrigation interventions
- Quantifying cost-effectiveness of different rainwater harvesting and irrigation products;
- Reviewing policy, legal and institutional issues that may affect adoption and scaling up of rainwater harvesting and irrigation technologies;
- Estimating the distribution and spatial extent of specific rainwater harvesting technologies to be able to monitor adoption rate and impacts;
- Assessing the impacts of different financing mechanisms such as subsidies and credits on the adoption of rainwater harvesting and irrigation technologies;
- Assessing the rainwater harvesting potential, planning, siting and scaling-up best practices and hydrological modeling using GIS tool for assessment and mapping of RWH technologies and potentials to incorporate agronomic, engineering and socio-economic principles



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# Main research outputs and outcomes:

- Technology adaptation
- Policy evaluation studies
- Mapping potential of rainwater harvesting technologies

## Conclusion:

Research and innovation in rainwater harvesting should consider:

- Technical (hydrological impacts and environmental sustainability),and
- Socio-economic (cost-effectiveness, social and economic impacts, and financial viability) factors



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# Technology transfer and market oriented needs

What should be promoted in RWHI management in Kenya:

- Showcasing potential of RWHI through successful and sustainable projects,
- Targeted practical training and establishment of technology promotion and demonstration centres,
- Establishment and strengthening of rainwater harvesting network.



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## Conclusion:

- Support the establishment of technology-transfer centres at Universities, research institutions and community levels to serve as hubs of knowledge and expertise in rainwater harvesting
- Integrate indigenous knowledge with modern technologies to enhance resilience and uptake of innovative and appropriate technologies.
- Ensure effective community participation and contribution to enhance ownership of rainwater harvesting projects



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# National capacity and training needs:

- Capacity building should focus on key stakeholders – farmers, CBOs, NGOs, extension agents, private sector, and researchers,
- Existing national capacities: Universities, research institutes, NGOs etc.



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# Capacity gaps

Rainwater harvesting is constrained by :

- inadequate data,
- technical training and financial support, and
- low recognition of its role and impact as climate change adaptation strategy and catalyst to rural enterprise development.



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# Capacity gaps include:

- participatory methodology for community mobilization,
- on-farm water management, and irrigation agronomy,
- system operation and maintenance,
- soil and environmental management,
- climate change mitigation and adaptation,
- surveying, design and construction techniques,
- design, planning, tendering, and supervision,
- information technology and GIS applications,
- project development, management, monitoring and evaluation,
- financing mechanism, financial management and cost-benefit analysis,
- irrigated crop husbandry and marketing,
- Agribusiness and cooperatives



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# Policy and Institutional needs

- Policy-making – Ministries of Water and agriculture
- Environmental issues
- Managing conflicts
- Promotion and advocacy
- Rainwater harvesting in Constitution of Kenya
- National Development plans, policies and strategies



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# *Potentials and barriers related to policy and institutional framework for rainwater harvesting*

- Inadequate coordination among different institutions and key
- Conflicting sector policies and strategies that need to be harmonized and aligned with the new Constitution.
- Inadequate national policy, legal and institutional framework
- Inadequate public and private sector investment
- Inadequate development of irrigation and water storage infrastructure
- Weak Irrigation Water Users' Associations (IWUAs): strong and functional farmer-based institutions are a pre-requisite for sustainable management of the irrigation schemes.
- Inadequate farmers' support services: support services are necessary for profitable and sustainable irrigation development.
- Tenure insecurity



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