

## Scaling Water bunds for climate Resilience Management in Kenyan rainfed agri-food systems (SWaRM)

Understanding how pastoral and agro-pastoral communities adopt water bunds and identifying efficient and equitable pathways to scale nature-based water retention solution across Kenya's arid and semi-arid lands.

### Background

Kenya faces an acute and compounding land and water crisis. With 98% of its agricultural sector being rainfed, prolonged droughts cost approximately 8% of GDP every five years, making the country one of the most climate-exposed economies in Sub-Saharan Africa. The most vulnerable landscapes are the arid and semi-arid lands (ASALs), which cover over 80% of the country and are home to millions of pastoralists, and agro-pastoralists whose livelihoods are tied directly to soil moisture, rangeland conditions and seasonal water availability.

Land degradation is at the centre of this vulnerability, in that

30% of Kenya's land is severely degraded, as a result of unsustainable farming practices, overgrazing, deforestation, population pressures and increasingly erratic climate conditions. Degraded soils lose their ability to retain water, accelerating runoff, reducing groundwater recharge and diminishing vegetation cover. In the mixed and communal tenure settings of Kenya's ASAL counties, coordinated restoration is further constrained by fragmented governance, tenure insecurity and insufficient long-term financing.

Water bunds which are simple semi-circular structures dug along contour lines to capture rainwater, reduce surface runoff, improve infiltration and promote vegetation regeneration have been presented as a promising and proven nature-based solution (NbS).



Maasai community digging semi-circular bunds to harvest rainwater and rehabilitate degraded rangeland. Photo by Justdiggit

Justdiggitt and their local Kenyan NGO partners have piloted this intervention extensively not only in Kenya but also in Tanzania and Senegal, with monitoring evidence indicating meaningful ecological recovery in two to four rainy seasons. For the Scaling Water Bunds for Climate Resilience in Kenyan Rainfed Agri-Food Systems (SWaRM) project, the question is not whether or not water bunds work, but rather how to accelerate adoption efficiently, equitably and sustainably across diverse tenure contexts, social groupings and governance settings.

**500,000+**

water bunds dug by communities in Kenya

**5,000 ha**

of degraded rangeland restored to date

**176,000**

households engaged in greening across Kenya, Tanzania and Senegal

## Project location

SWaRM is a four-year bilateral project funded under the Netherlands-CGIAR Water-Food Nexus call where the International Water Management Institute (IWMI), Vrije Universiteit Amsterdam (VUA), Tegemeo Institute Egerton University, Justdiggitt and its network of Kenyan NGO partners are working in Kenya's pastoral and agro-pastoral counties of Kajiado, Kitui and Makueni, within the Tana River Basin. Testing of scaling pathways will span approximately 1200 households across 60 communities, while stakeholder engagement and policy focus spans Kenya's national and county-level government (Figure 1).

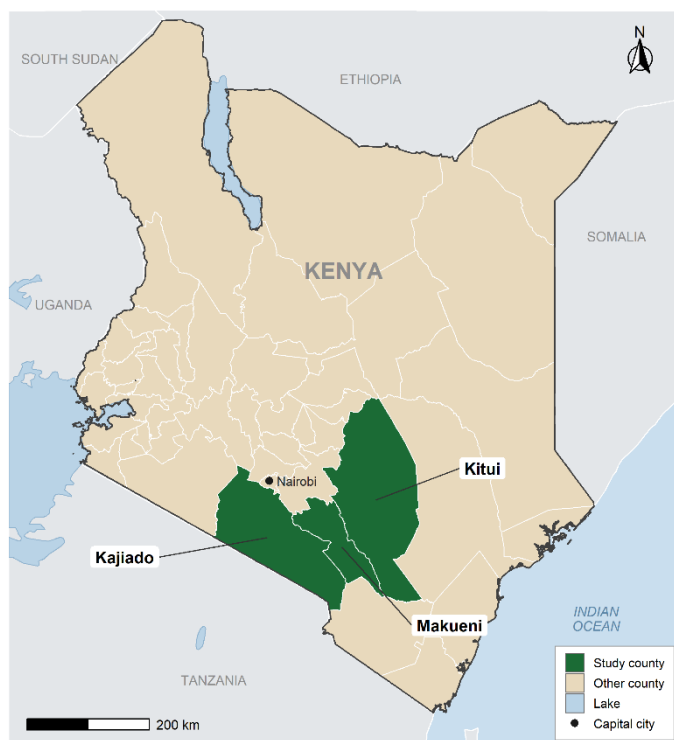


**Figure 1.** Location of the study areas.

Source: Authors, with country boundaries and lakes from Natural Earth (naturalearthdata.com)

## Overall objective

SWaRM will generate evidence on adoption determinants, inclusive scaling pathways, and enabling environment conditions to accelerate equitable uptake of water bunds for land restoration across mixed-tenure pastoral systems in Kenya.

## Specific objectives

- Designing interventions and scaling pathways that are effective for both communal and individual land ownership with diverse stakeholders.
- Identifying affordable communication mechanisms that support widespread awareness and assist underserved communities, including women and youth, to benefit from land restoration adoption.
- Specifying the required conditions that support an enabling environment that results in restoration efforts at scale, supported by equitable outcomes.

## Research approach

SWaRM is structured around three interconnected work packages. WP1 (led by VUA) generates the foundational understanding of adoption behavior, values, and barriers through remote sensing, cost-benefit assessment, and discrete choice experiments, informing both WP2 and WP3. WP2 (led by IWMI) rigorously evaluates the effectiveness and inclusiveness of co-designed scaling tools through a randomized controlled. WP3 (led by Tegemeo Institute) functions as the central coordination and translation hub, running a multi-stakeholder platform that co-designs scaling pathways, feeds stakeholder insights back into WP1 and WP2, and ensures research evidence reaches policy and investment audiences (Figure 2).

## Expected results

- Co-designed scaling tools adopted by stakeholders in the target counties with degraded landscapes.
- Increased awareness and knowledge among national and international stakeholders on the potential and effectiveness of scaling water bunds.
- Increased investment by national and international actors, namely NGOS, INGOS and donors, in the scaling of water bunds in Kenya.
- Policy integration of research evidence, including scaling pathways reflected in the Land Reclamation Policy which is currently under development.
- Adoption beyond Kenya, with investments and policies toward soil moisture retention taken up in other Justdiggitt implementation countries and the wider arid and semi-arid zones of Sub-Saharan Africa.



**Figure 2.** SWaRM project design. *Source:* Authors.

## Beneficiaries

Pastoral and agropastoral households in ASAL counties, with priority given to women, youth and marginalized groups, women grass seed bank groups, grazing committees, implementing NGOs (Justdiggitt, Laikipia Wildlife Forum, Amboseli Ecosystem Trust and Big Life Foundation) and their field technicians (which are referred to as “fundis”), county and national government departments responsible for land reclamation, water, agriculture and environment, national research institutions, and donors and investors financing land restoration (Table 1).



Women grass seed bank group in Kajiado County.  
Photo by Mahlatse Nkosi/IWMI

## Consortium and partnerships

SWaRM is built on research, implementation, policy and investment partnerships to support the equitable scaling of water bunds across Kenya’s ASAL landscapes. Each institution contributes a distinct set of capabilities from impact evaluation, environmental economics, policy engagement, field implementation, community mobilization and investment alignment. The table below summarizes the consortium structure and the contributions of each partner.

## Other strategic partners

- Bilateral projects from the Landscape Alliance, the International Livestock Research Institute (ILRI) and the International Water Management Institute
- The Netherlands (NL) - CGIAR Water-Food Nexus Research Program
- CGIAR Science Programs and Accelerators: Sustainable Animal and Aquatic Foods (SAAF) and Scaling for Impact (S4I).

**Table 1.** SWaRM project partners.

| Institution                                                                                                                                                                                      | Role                           | Contribution                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| IWMI                                                                                                                                                                                             | Consortium lead; WP2 lead      | Impact evaluation; natural resources management; quantitative and remote sensing methods; CGIAR network mobilization. |
| VU Amsterdam                                                                                                                                                                                     | Consortium member; WP1 lead    | Environmental economics, discrete choice and deliberative valuation.                                                  |
| Tegemeo Institute                                                                                                                                                                                | Consortium member; WP3 lead    | Agricultural policy research, Kenya stakeholder convening, MSP facilitation, evidence-to-policy translation.          |
| Justdiggitt                                                                                                                                                                                      | Implementation partner         | Field implementation of water bunds; KIJANI mobile application; monitoring, evaluation and learning data.             |
| Laikipia Wildlife Forum, Amboseli Ecosystem Trust, Big Life Foundation                                                                                                                           | Implementing NGO network       | Community-based natural resource management, rangeland and pasture restoration, community mobilization.               |
| KALRO; Ministry of Water, Sanitation and Irrigation; Ministry of Agriculture and Livestock Development; Ministry of Environment, Climate Change and Forestry; NEMA; KIPPRA; Kenya Forest Service | Government and policy partners | Policy alignment on land reclamation, soil and water management science, county-level coordination.                   |

*Source:* Authors



The same landscape before (left) and after (right) through water bund land restoration, Southern Kenya. Photo by Justdiggitt.

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