A collective research, learning & demonstration project for increasing productivity and adapting smallholder farmers to climate change in rainfed dry areas

Gumara-Maksegnit Watershed, North Gondar, Ethiopia

COMMUNITY BASED RAINFED WATERSHED MANAGEMENT

A partnership of scientists, smallholder farmers, development organizations and government

ICARDA
Science for Better Livelihoods in Dry Areas

BOKU

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COMMUNITY BASED RAINFED WATERSHED MANAGEMENT PROJECT

An undeveloped and low performing agriculture sector is directly linked to food insecurity and poverty. A team of scientists are working with farmers in the Gumara–Maksegnit basin to demonstrate a model approach to increasing rainfed productivity and reducing vulnerability to climate change through community–based watershed management.

EMPOWERING SMALLHOLDER FARMERS FOR BETTER LIVELIHOODS:

- Higher productivity and incomes
- Sustainable management of natural resources
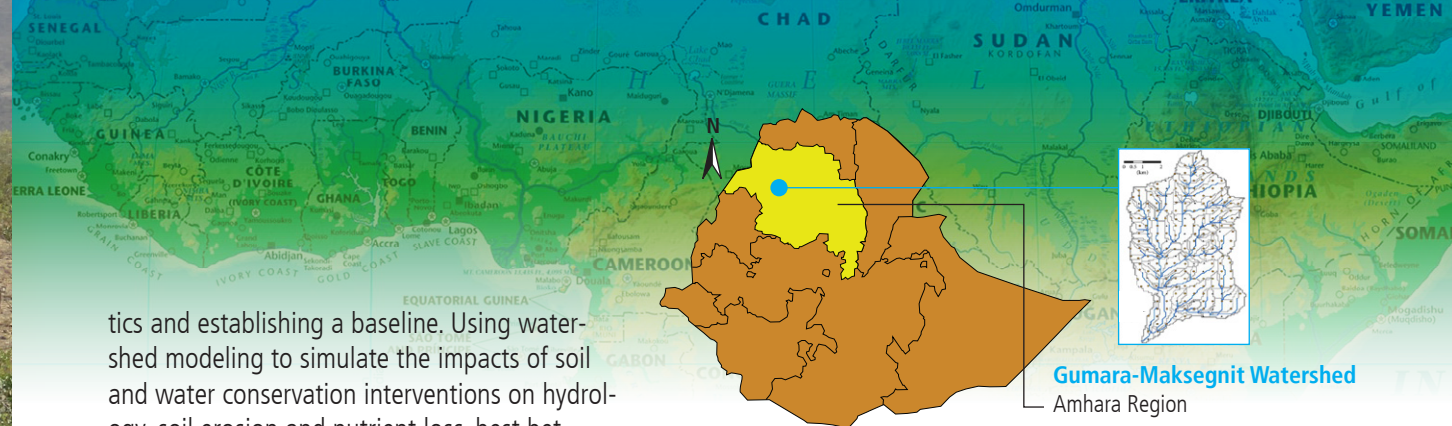- Reduced vulnerability to climate change

Bringing Systems Solutions

The project is applying systems approach to increase productivity – promoting sustainable management of natural resources, increasing land, water and livestock productivity, and identifying policy options for climate change adaptation.

The project is implemented in two phases.

Phase 1 **July 2009 – November 2012 (Completed)**

In Phase 1, the project aimed to improve agricultural productivity and the sustainability of land and water resources through a range of interventions. The project started with identifying the watershed's major problems by mapping biophysical and socio economic characteris-

tics and establishing a baseline. Using watershed modeling to simulate the impacts of soil and water conservation interventions on hydrology, soil erosion and nutrient loss, best bet measures were identified and a comprehensive monitoring system set up to track the effects of interventions at field and watershed levels.

The project implemented activities along four pathways: watershed modeling and combating land degradation, increasing water productivity, improving land productivity through high yielding crop varieties and improved agronomic practices, and improving livestock (goat) productivity to build resilience in the livelihoods of the smallholder farmers.

Phase 2 **July 2013 – June 2016 (Current)**

In Phase 2, the project aims to capacitate farmers to sustainably manage their resources and as a final outcome, disseminate policy and technology recommendations as a public good to facilitate more climate change resilient production systems in dry areas. Adopting a wider agricultural systems perspective, the project is developing, adapting, evaluating, and demonstrating improved land, water, crop, and livestock management technologies through a holistic view of the resources-community interactions within a "watershed".

Gumara-Maksegnit Watershed
Amhara Region

The Gumara-Maksegnit Watershed

Location: North Gondar, Ethiopia, in the upper catchments of the Blue Nile River and Lake Tana.
Longitude: 120 24' 25"–120 30' 41" E
Latitude: 370 33' 20"–370 37' 10" N
Elevation: 1953-2851 m above sea level

Average rainfall: 1170 mm

Area: 56 km^2

Watershed use: Three-quarters of the watershed is cropland, with the main crops as sorghum, teff, wheat, barley, faba bean, lentil, chickpea, linseed and fenugreek.

THE CHALLENGES

Ethiopia is one of the most vulnerable countries to climate change in Africa, particularly the watershed region of Amhara. In spite of fertile land, a diverse climate and plenty of rainfall, agricultural productivity remains severely low. Farmers suffer from land degradation and rely on unimproved crop varieties and farming methods. Prevalence of pest and diseases further constrains crop yields.

Community Consultation

PROJECT STRATEGY & ACTIVITIES

The project uses a participatory approach

The project scientists work closely with a watershed committee, farmers' research and extension groups (FREGs), and stakeholder planning groups to ensure buy-in of all stakeholders and the rapid uptake of knowledge and technologies.

1 | Combating Land Degradation and Restoring Ecosystem

Deployment of sustainable land management technologies and practices are improving the soil, reducing erosion and losses of nutrients and organic carbon, enhancing soil water holding capacity, and restoring land productivity in the watershed.
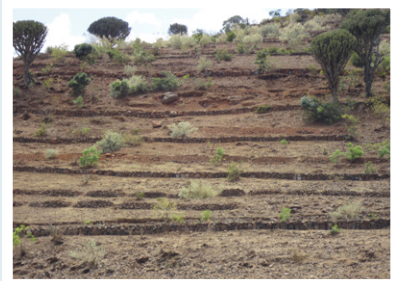
WATERSHED MODELING

Scientists monitor the effects of soil and water conservation structures and other sustainable land management technologies, and estimate soil loss and runoff using the Soil and Water Assessment Tool (SWAT).

2 | Enhancing Water Productivity

Water harvesting ponds and supplemental irrigation techniques are maximizing water productivity for the watershed communities. Continued monitoring and tracking is teaching the community an important component of successful rainfed watershed management.

Water harvesting used for supplemental irrigation

3 | Increasing Land Productivity

Introduction of high-yielding varieties of bread wheat, food barley, faba bean, chickpea and lentil, along with improved agronomic practices, have boosted productivity and incomes for farmers. Introduction of new high value crops like cabbage, Swiss chard and carrots are further helping to diversify their incomes.

Farmers participate in crop variety selection. Higher yields have increased productivity on average by 27 to 56%

4 | Improving Livestock Productivity

Collective research and capacity building activities by the scientists are bringing improved feed and nutrition, health and community-based breeding to the villages. An analysis of market value chain and niches is also guiding value addition to goat products to create new income opportunities for the farmers.

The community-based goat breeding program is helping characterize the goat population and allowing farmers to select sires and exchange breeding stock for improved productivity.

GENDER INITIATIVES

In Ethiopia, women carry most of the burden of collecting firewood from forests and gathering and drying cow dung for fuel. Additionally, women use smoky cook stoves, exposing them daily to hours of harmful smoke inhalation. The project is introducing strategic women-friendly activities targeting these challenges to promote gender equitable development in the communities.

Mirt stoves are changing the way women cook and invest their time in household activities. These fuel efficient devices could halve households' demand for firewood and is reducing risk of lung diseases in women and children as they emit less smoke.

Mobile tree nurseries are offering a unique opportunity to both help rehabilitate degraded lands while enabling women to participate as the trays are easy to move from place to place and can be placed near homesteads. Women can raise tree seedlings for reforestation, and sell saplings to bring in extra income.

Young women engaged in mirt stove production using locally available cement, sand and water

CAPACITY DEVELOPMENT

Capacity building is integrated into all aspects of the project. Leaders of community and watershed associations, service providers and non-governmental organizations that work with farmers receive practical training through short-term courses on farm, water, and crop and livestock management practices. Field days and traveling workshops encourage communities, farmers, and extension staff to directly participate in the project and to learn by seeing and doing.

The project is also imparting research training to farmers, students and scientists. Farmers' research and extension groups receive training to enable them to take part in the on-farm research, while graduate students are working toward their Masters and PhD degrees through research projects in the watershed. Students registered with the national universities conduct their research under the joint supervision of ICARDA and BOKU.

For more information, visit:

rainfedsystems.icarda.org

Dr. Wondimu Bayu, National Project Coordinator,
wondimubayu@yahoo.com

Dr. Feras Ziadat, Project Manager,
f.ziadat@cgiar.org