IWRM Action Hub

CASE STUDY

Tanzania: Adapting to climate change through land and water management in Eastern Africa: Kiroka Village, Morogoro, Tanzania

Summary

Tanzania is facing increasing pressures on its water resources. To ensure environmental and economic sustainability in the face of water scarcity the local communities of Kiroka village, Morogoro, conceived a project to build capacity for climate adaptation through sustainable land and water management. The participatory approach coupled with capacity building and holistic problem solving that addresses livelihood issues has proven to be an effective method of implementing an IWRM plan.

Background

Tanzania is facing increasing pressures on its water resources due to a growing agricultural sector and the effects of climate change. According to the FAO, 85.4% of Tanzania's total water withdrawal of 5.184 km^3 is used in irrigation, enhancing the climate change vulnerability of the country's economy and food security. Additionally, as the population continues to grow, growing stress is placed on water resources, resulting in greater risk of water scarcity for small holder farmers.

In the highlands of the Kiroka Village, farmers face additional vulnerability from the cultivation of steep slopes without soil and water conservation measures. This results in a loss of soil fertility and low crop production, consequently leading to household level food insecurity. The region also faces pressures of illegal logging for energy which exacerbates the effects of high runoff.

In the lowlands, the high runoff from the highlands due to poor land husbandry and deforestation results in flooding. The flooding leads to the damage of crops, property and infrastructure and poor food security for many households. Both areas (highlands/lowlands) also face issues of water scarcity and encroachment upon water sources, leading to conflicts amongst farmers. Climate change has also played a significant role in the village. Reduced rainfalls are now common with water sources and irrigation canals completely drying up and resulting in crop failure.

There is a considerable potential for both rainfed and irrigated agriculture in Kiroka village and the surrounding areas. In the lowlands, the soils have good water holding capacity and remain moist for a long period during the dry season.

There is also abundant water supply, good road access, markets (Morogoro and Dar es Salaam) are close and there is high market demand. Despite this, potential, land degradation (soil erosion, loss of soil fertility and bush fires) is widespread in the highlands. One of the main reasons is poor land husbandry exacerbated by increasing weather variability and climate change. Furthermore, during the dry season, there is water shortage due to poor management of water sources. However, during the rainy season, flooding is experienced in the lowlands, causing damage to property and crops.

Appropriate, effective and informed decision making are required to allow people to organize their activities (both short- and long-term) for effective climate change adaptation.

Actions taken

The project ‘Strengthening the capacity for climate change adaptation through sustainable land and water management in Kiroka village, Morogoro’ was conceived by the local communities but was financed by FAO/Sida. Partnership for implementation was built within existing extension system between:- Communities in Kiroka Village, the Ministry of Agriculture Food Security and Cooperatives, Morogoro Zonal Irrigation and Technical Service Unit (MZITSU), Morogoro District Council, Sokoine University of Agriculture (SUA) and Food and Agriculture Organization (FAO-TZ). An implementation team led by Sokoine University of Agriculture (SUA) was formed.

The overall objective of the project is to: ‘Reduce the impact of climate change and variability on smallholder farmers through sustainable land and water management and thereby contribute to improved agricultural productivity, livelihood and ecosystem resilience in Kiroka village, Morogoro’.

The implementation team employed participatory methods to establish a bank of innovations that could serve to alleviate these issues. Meetings were held at the village to address specific requirements of the lowlands and highlands as well as cross cutting issues. In the lowlands, innovations adopted included capacity building and awareness raising through trainings on improved rice production techniques using the System of Rice Intensification (SRI), establishment of woodlots and the introduction of improved cooking stoves. The system of rice intensification requires farmers to transplant single seedlings, use wider plant spacing, allocates minimum water applications during vegetative growth period, keeping soils moist but well-drained and aerated, frequent weeding and the application of organic matter rather than chemical fertilizer.

To address the issues of deforestation, improved cook stove designs increase energy efficiency by providing heat containing, enclosed spaces that require less wood to be burned. Additionally, community woodlots were established in the form of tree nurseries and tree planting.

In the highlands, contour bunds have been used to prevent soil erosion and promote water retention. Farmers were trained to lay contour lines, dig trenches and throw soil on the down slope side. Bunds were further strengthened by planting pineapples which are high value crops. Between bunds bananas and some vegetables were planted; further promoting economic and food security.

Outcomes

Often IWRM solutions place too much importance on the direct management of water. This case study offers an excellent example where land and agricultural output can be better managed to improve the state of water resources. This case also underscores the importance of using participatory approaches to find innovations that are culturally acceptable and result in ready adoption. Additionally, the significance of economic incentives to stimulate behavioural change is well demonstrated.

SRI has consistently resulted in improved rooting and crop yields for farmers. Crop yields can be 166% higher than those of non-SRI fields. SRI not only addresses issues of soil erosion through improved rooting but also decreases pressure on water sources, improves household food and economic security and addresses the increased demand for food of a growing population.

Tree nurseries not only provided the means for future energy consumption but also a means for economic growth and food security through the planting of hardwood and fruit trees.

Lessons Learned

It was found that stakeholder consultations yielded a substantial number of recommended climate smart agriculture (CSA) practices that are culturally acceptable and can build environmental and economic resilience as well as resilience to threats against food security.

The participatory approach coupled with capacity building and holistic problem solving that also addresses livelihood issues has proven to be an effective method of implementing an IWRM plan that is sustainable and can be readily subscribed to.

This approach also allowed program operators to implement other beneficial programs such as beekeeping for economic, food and environmental security.

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Organisation
Sokoine University of Agriculture, Tanzania

Year
2014

Country
United Republic of Tanzania (the)

Region
Africa

Keywords
Food and Nutrition , Climate Change

Thematic Tagging
Climate , Gender , Youth , Ecosystems/Nature-based solutions , Water services
Language English

Supporting Materials
Complete FAO Report
GWP Southern Africa
Tanzania: Adapting to climate change through land and water management in Eastern Africa: Kiroka Village, Morogoro, Tanzania

Related IWRM Tools
Climate Change Policies, Vulnerability Assessment, Ecosystem Assessment, Environmental Impact Assessment, Nature Based Solutions, Behaviour Change Communication

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