Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa

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Increasing Knowledge, Building Capacity and Developing Adaptation Strategies

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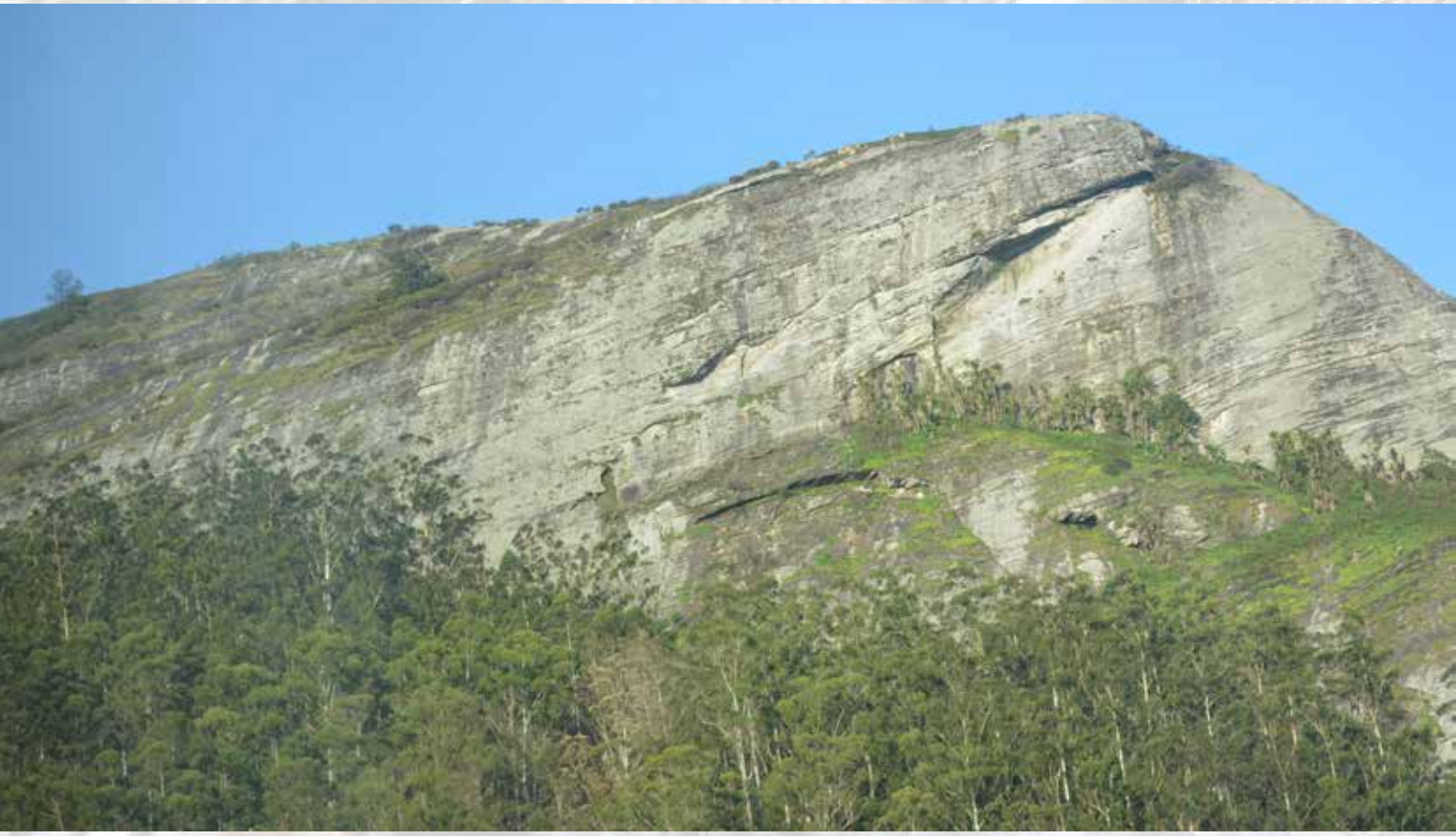

COMMUNITY BASED CLIMATE CHANGE ADAPTATION FOR THE TAITA HILLS, KENYA 2015 – 2019

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Overview

High-resolution climate projections for 2041 – 2070 indicate a warmer climate with more intensive wet seasons in East Africa. Specifically, in the Taita Hills, a hotter future with wetter rainy seasons and drier dry seasons is projected. Rural communities that largely depend on rain-fed agriculture are most vulnerable to climate change impacts. Therefore there is need for adaptation to bring immediate benefits and reduce the impacts of climate variability and change which pose challenges to communities' livelihoods. Community-based adaptation approaches that consider the local knowledge, experiences and priorities, and address vulnerabilities to current climate conditions are necessary to reduce risks and ensure resilience to future climatic shocks.

Community-based adaptation to the impacts of climate change in the Taita Hills

The Taita Hills sustain a rich natural capital, such as mountain forests, which provide ecosystem services for communities living on the slopes and on the surrounding lowlands. However land use change has disrupted ecosystem functionalities which support community livelihoods. The impacts of climate variability and change may further accelerate degradation of these services. Therefore, there is need to design integrated adaptation responses to maintain the flow of ecosystem services in order to support the livelihoods of local communities. The CHIESA project coordinated by the International Centre of Insect Physiology and Ecology (*icipe*) therefore engaged the community and other key stakeholders in a participatory process to develop a Community-based Climate Change Adaptation Action Plan for the Taita Hills during 2014 – 2015.

Aim and Scope of the Adaptation Action Plan

The goal of the process is to build the capacities of local communities and institutions in the Taita Hills to identify existing climate-induced problems and vulnerabilities, to identify priority adaptation options and plan responses and implementation strategies. This will enhance their resilience and capacity to adapt to the current and projected impacts of climate variability and change in the area.

The plan was developed through a consultative process with local stakeholders over a period of one year and involved over 77 participants from different beneficiary and end user groups, including special needs groups. Over 39% of the participants were women. The process was guided by the UNDP (2010) 'Six-step' approach for designing climate change adaptation initiatives.[1]

The Climate Change problem in the Taita Hills

During a series of workshops, local stakeholders (Fig 1) identified the key climate change-induced problems in the Taita Hills as "*changing water quantity and quality*" or "*water shortage*" and "*reduced food yields*" and formulated problem statements (Fig 2) to guide the Adaptation Action Plan development.

Figure 1: Participants of the Taita Hills Adaptation Action Plan development workshops. Photo by Sarah Ndonye/CHIESA

"Changing water quantity and quality affects negatively the livelihood of community members in the Taita Hills."
(Community and institutional stakeholders, Taita Hills)

"Water shortage and reduced food yields cause poverty and increase hunger (malnutrition) especially for people living with disabilities in the Taita Hills."
(Community members with disabilities, Taita Hills)

Figure 2: Climate change induced problems as identified by stakeholders

The Intergovernmental Panel on Climate Change (IPCC) assesment criteria was used to analyse the additional risks presented by climate change to the identified causes of the key climate change-induced problems (Table 1).

Table 1. Prioritized causes of the key climate change induced problems and level of climate change risk.

Climate change risk	Prioritized causes of key climate change problems
Very High	• Encroachment & over-exploitation of water resources and catchment areas. • Expansion/ increase of irrigation • Increased demand and competition for water and land resources
Medium	• Deforestation/ cutting and non-replacement of indigenous trees • Introduction of exotic tree species • Land use change • Destruction of useful insects and pests • Increase of pests and diseases
Low	• Diminishing of traditional ways of catchment protection • Increased settlements/ land scarcity • Pollution • Poor water harvesting and storage methods • Poor agricultural methods/ Failure of post harvest storage for quality seeds • Conflicting/ un-harmonized policies/ issuing title deeds to individuals in water catchments • Corruption and poor management of water resources

[1] UNDP (2010). Designing Climate Change Adaptation Initiatives. A UNDP Toolkit for Practitioners. UNDP Bureau for Development Policy.

Recommended responses to facilitate adaptation in the Taita Hills

The Adaptation Action Plan highlights below, the desired responses and activities identified by stakeholders to achieve four key objectives. When implemented these will facilitate the realization of the overall goal of *"a healthy and well conserved environment which guarantees equal access to sufficient, reliable and safe water as well as food security for healthy communities and rich biodiversity in the Taita Hills in the next 5 years."*

Objective 1: Catchment area conservation and protection enhanced to ensure sustainable water resources, rich biodiversity and food security.

Strengthening law enforcement structures by:

- Effective enforcement of laws and regulations concerning catchments, forests, water resources and pollution
- Revising conflicting policies especially on land use and harmonizing county government's sectoral plans

Strengthening local and national governance institutions by:

- Introducing supporting policies and laws, strengthening political goodwill and enhancing capacity of NEMA to regulate land use
- Reducing overlaps and confusion in leadership structures of Community Based Organisations (CBOs) in charge of Natural Resource Management (NRM)

Strengthening water catchment management and protection by:

- Delineation of forest lands, marking clear boundaries within water catchments, identification and gazettement of protected areas and creation of buffer zones between gazetted forests and farms
- Development of land use plans and enforcing laws on land ownership to protect water-sensitive areas

Strengthening water catchment conservation and rehabilitation by:

- Planting of more and preventing cutting of indigenous trees species in catchment areas, constructing soil and water conservation structures, land reclamation and rehabilitation of degraded sites
- Revising traditional management practices in catchment areas, practicing modern farming technologies and enhancing monitoring and verification to ensure success of conservation efforts

Strengthening integrated approach in catchment management by:

- Strengthening Participatory Forest Management initiatives
- Encouraging and introducing incentives for on-farm tree planting and introducing carbon credit schemes for farmers

Strengthening engagement with other organizations to address and find solutions to climate change related problems by:

- Conducting more research to inform decisions e.g. on types of trees to plant
- Enhancing cooperation in research between existing cross-sectoral initiatives and policies

Objective 2: Capacity of community in Taita Hills to actively participate in implementation of climate change strategy enhanced for improved environmental conservation and food security.

Training and capacity building communities, environmental groups and CBOs on environmental issues through:

- Continuous awareness and capacity building of farmers, community, CBOs and technical officers
- Training the community on water resources management, water harvesting and sustainable agricultural practices
- Introducing demonstration plots for community members

Enhancing involvement of all stakeholders in environmental conservation and creating a supporting policy by:

- Enhancing community participation in planning and implementation of prioritized plans and in county and national policy formulation
- Strengthening collaborations among stakeholders, institutions, sectors, initiatives, programs and policies in NRM
- Establishing a forum as an entry-point for joint working relationships

Enhancing sharing of knowledge and experiences by:

- Capacity building through sharing good practices
- Organizing institutions and stakeholder exchange joint learning and sharing events
- Formation and joining of groups to address environmental issues

Taking into account the needs of disabled people and other vulnerable groups e.g. orphans and vulnerable children and widows in planning and implementation of responses by:

- Integrating the needs of vulnerable groups including disabled people and their special requirements in future infrastructural and other planning

Objective 3: Increased availability and access to adequate clean water for domestic and agricultural uses, to eradicate poverty and improve environmental conservation in the Taita Hills.

Enhancing water harvesting and storage by:

- Construction and de-silting of dams and reservoirs and developing alternative water sources
- Training on use of water harvesting and soil conservation technologies

Improving water use efficiency through:

- Introducing efficient irrigation technologies and reducing water wastage
- Irrigating crops suited for different areas and deploying trained officers to monitor irrigation projects

Strengthening relevant local and national water governance institutions by:

- Formulating laws and regulations for improved water management and revision or harmonization of existing policies
- Strengthening capacity of Water Resource Users Associations (WRUAs) on water resources management

Monitoring, regulation and enforcement of laws on water use and management through:

- Establishing mechanisms to control points of pollution
- Implementing the Irrigation Water Management Plan, introducing rules for securing water sources and establishing mechanisms for monitoring water demand and supply

Water pollution control and quality management through:

- Conducting a comprehensive study on pollution to establish baseline data, and developing proper drainage and sewerage facilities
- Addressing issue of land unavailability for implementing sewerage treatment plant and establishing more water treatment plants

Improve availability and access to water sources by all community members by:

- Developing and improving conditions of community water projects
- Improving and expanding water distribution mechanisms and ensuring equal distribution between different users and uses

Strengthen the integrated approach in water management by:

- Enhancing cooperation between cross-sectoral initiatives and policies, and involvement of all relevant stakeholders in responses
- Harmonizing county government's sectoral plans, reducing overlaps

Objective 4: A healthy community that has access to adequate good quality water and improved food security.

Practicing agroforestry and nature-based enterprises by:

- Introducing water friendly and high economic value exotic trees for on-farm forestry and firewood harvesting to discourage deforestation
- Introducing alternative nature-based livelihoods and income generation activities and capacity building of nature-based groups

Capacity building to the community and mobilization of resources to facilitate initiatives through:

- Educating farmers on proper use of agro-chemicals, seed selection and storage, and enhancing land use and farms planning
- Introducing incentives for conservation, formation of conservation committees at village level and fundraising for community initiatives

Introduce soil and water conservation measures in all farms by:

- Improving rain water harvesting for irrigation and introducing soil and water conservation structures
- Building water storage facilities and infrastructure e.g. dams

Adopt new technologies and livelihood systems by:

- Introducing alternative livelihoods to reduce over-reliance on cultivation and introduction of energy efficient technologies
- Introducing climate resilient and sustainable farming technologies and practices and reintroducing growing of indigenous crops

Introduce regulatory mechanisms and enhance equal access to resources by:

- Improving access, regulating quality and prices of inputs supplied to farmers and ensuring higher returns to farming investments
- Introducing incentives to encourage resettlement of people to less populated areas e.g. improving infrastructure
- Introducing funding mechanisms and subsidies by county government and establishing mechanisms for reporting corruption

What is CHIESA?

The Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa (CHIESA) is a four-year research and development project aimed at increasing knowledge on the impacts of climate change on ecosystem services in the Eastern Afromontane Biodiversity Hotspot (EABH).

CHIESA is funded by the Ministry for Foreign Affairs of Finland, and coordinated by the International Centre of Insect Physiology and Ecology (icipe) in Nairobi, Kenya.

Through research and training, CHIESA will build the capacity of research communities, extension officers and decision makers in environmental research, as well as disseminate adaptation strategies in regard to climate change. The general areas for environmental research are in agriculture, hydrology, ecology and geoinformatics.

CHIESA activities focus on three mountain ecosystems in Eastern Africa, namely Mt. Kilimanjaro in Tanzania, the Taita Hills in Kenya and Jimma Highlands in Ethiopia. The project consortium monitors weather, detects land use/ land cover change, and studies biophysical and socio-economical factors affecting crop yields and food security.

The project also builds the climate change adaptation capacity of East African research institutions, stakeholder organizations and decision-makers through research collaboration and training.

Together with local communities, the project will develop, test and disseminate climate change adaptation tools, options and strategies at the farm level.

Further, CHIESA provides researcher training for staff members of the stakeholder organizations, enhances monitoring and prediction facilities by installing Automatic Weather Stations, and disseminates scientific outputs to various actors from farmers to policy-makers.

Work Package 7 - Elaboration of Adaptation strategies

WP7 focuses on instruments, technologies and practices that are needed to decrease the vulnerability of rural communities to the negative impacts of climate change.

It facilitates local stakeholders to identify adaptation options, targeting equally women, men and marginalised groups. Activities aim to build knowledge of the climate change impacts to ecosystem services and food security, to develop remedies, to build capacity to increase and generate knowledge and to disseminate information at all levels.

The WP7 builds on distinct bodies of knowledge from the other project components, as well the ongoing core work of the other partners. The final outcome is the development of adaptation strategies for all levels of beneficiaries from local communities to governmental decision makers.

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For more information about the CHIESA project , please contact:

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