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

Increasing Knowledge, Building Capacity and Developing Adaptation Strategies

POLICY BRIEF 1
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Perceptions and Knowledge of Climate Change and Ecosystem Goods and Services

A closer look at Kilimanjaro in Tanzania, and Taita Hills in Kenya

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A shot of Mt. Kilimanjaro taken in Moshi, Tanzania.

Introduction

Rising temperatures and changing precipitation patterns are affecting crop growth, livestock performance, water availability and the functioning of ecosystem services. More important, however, is the acknowledgement that farmers have their own ways of perceiving and understanding these dynamics.

In recent years, communities, especially farmers, have experienced numerous challenges in providing food for a growing population by supplying demands for various crops and meat, while at the same time ensuring the integrity of ecosystems.

Climate change is altering their farming environment in a mostly negative way.

What action is being taken?

The CHIESA Project, in its research, conducts valuation of ecosystem goods and services in Tanzania and Kenya, particularly along the altitudinal gradients of the Kilimanjaro Mountain and Taita Hills respectively.

While the immediate intent of this research is to provide information about the economic values that the communities can derive from various ecosystem goods and services, CHIESA also seeks to enrich understanding of how the non-market goods and services are providing and maintaining human welfare, and the impacts of climate change on the livelihoods of people who depend on these goods and services.

What do we know so far?

• Farmers' current perceptions on climate change ally closely with scientists' projections of climate change

• About 95 percent of the respondents in this study indicated that they expect more extreme weather, changing seasons, and droughts

• All respondents pointed out that they are experiencing changing patterns of rainfall, with delays in the onset of rainfall and high variability in the amount of rainfall

• Crops like mango, pawpaw, cabbage and tomatoes were once lowland crops, but are currently performing well in the middle and high altitudes

• Emergence of diseases, like Malaria, which were uncommon in the high altitudes

• Disappearance of some high altitude tree species which were common in the past

• Drying up of perennial rivers

• Fishing is no longer one of the economic activities of the communities in the high altitudes of Kilimanjaro and Taita

• Farmers are increasingly diversifying their sources of livelihoods, from solely farm to combined farm and non-farm sources, as a coping strategy to climate change

• More than 80 percent of the respondents believe that the climate changes they are experiencing are a result of human actions

• The impacts of climate change are seen as a pressing threat, though farmers lack resources to deal with these shocks, especially the extreme weather events.

What more can we do?

Efforts to develop climate change mitigation measures and adaptation ability should acknowledge that local

communities, users of these measures, are rational actors and have their own ways of perceiving and understanding the causes and impacts of climate change. They should be seen as key partners in the design and implementation of climate change mitigation and adaptation strategies.

The role of research is becoming increasingly challenging now more than ever, but in a positive sense. Stakes are higher and demands for better standards welcome, because effective adaptation and mitigation is informed by precise and accurate research findings.

Even more important is the need to encourage positive action through dissemination of clear messages about climate change and its impacts on ecosystems and livelihoods. Use of different media and communication styles offer practical, easy-to-understand and impactful sharing of information and technologies.

Adequate political will and support for livelihood diversification in the rural economy is also necessary. However, it should be noted that livelihood diversification is only one of many adaptation strategies available.

Other measures such as tree planting and ecosystem restoration campaigns, dissemination and expansion of cheap and readily available technologies to save energy, irrigation development to minimize dependence on rainfed agriculture and introduction of crop varieties, all demand similar levels of support from the government.

Rains often do not begin at their regular times, delaying planting time and resulting in a short growing season and poor harvest.

When rains come, they often fall with great intensity and soil can't absorb it all, resulting in soil erosion, landslides, flooding, and failure to trap water for agriculture.

Droughts often occur before crops mature.

Maize field in a typical agricultural landscape

Summary of Recommendations for Dealing with Perceptions and Knowledge of Climate Change and the Ecosystem

- *Local communities should be seen as key partners in the design and implementation of climate change mitigation and adaptation strategies.*
- *Effective adaptation and mitigation is informed by precise and accurate research findings.*
- *Encourage positive action through dissemination of clear messages about climate change and its impacts on ecosystems and livelihoods.*
- *Provide adequate political will and support for livelihood diversification in the rural economy*

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.

WP3 - Valuation of Ecosystem Services

WP3 provides information about the economic value communities derive from various ecosystem services, which in turn aids decision making regarding different land use options due to the monetary value involved.

Valuation also enhances understanding of the importance non-market goods and services have in providing and maintaining human welfare.

This work package will identify and characterize the benefits, as well as beneficiaries, of ecosystem services that are necessary in order to understand the impact a changing climate will have on the livelihoods of communities.

The purpose of using a monetary unit in assigning value to these benefits is that it allows people and decision makers to understand more clearly the tradeoffs between alternative and competing uses of a given resource.

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For more information about the CHIESA Project, contact:

The Project Coordinator - CHIESA
icipe – African Insect Science for Food and Health
P.O. Box 30772–00100 Nairobi, Kenya
Email: chiesa@icipe.org
Telephone: +254 (20) 863 2000
Website: http://chiesa.icipe.org

CHIESA Lead Partners:
University of Helsinki (Finland), University of York (United Kingdom),
University of Dar-es-Salaam (Tanzania), Sokoine University of Agriculture (Tanzania).

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