InReF News

Innovating for resilient farming systems in semi-arid Kenya

Issue 1 No. 1 **August 2011**

Introducing the Project: *Enhancing Ecologically Resilient Food Security Through Innovative Farming Systems in the Semi-Arid Midlands of Kenya*

The Kenya Agricultural Research Institute (KARI) and McGill University have teamed up for a new project funded by the International Development Research Centre (Canada) and the Canadian International Development Agency. The project, entitled *Enhancing Ecologically Resilient Food Security Through Innovative Farming Systems in the Semi-Arid Midlands of Kenya,* focuses on food security in Makueni, Embu and Tharaka counties. The project was officially launched by Ministry of Agriculture Permanent Secretary, Romano Kiome, on 18 May 2011 at KARI's Nairobi headquarters. In this first issue of the project newsletter, we provide a brief description of the project and its key objectives.

Hunger problems in Kenya's Arid and Semi-Arid Lands (ASALs) are chronic. These problems are exacerbated by increasingly frequent droughts, which pose severe threats to household food security, as illustrated by the current ongoing famine, the worst in 60 years. This project addresses an unfulfilled and urgent need to assist households in the semi-arid lands to reduce threats to their livelihoods and participate in the sustainable management of the environment through more emphasis on ecologically resilient farming system practices.

Through the promotion of innovative farm technologies and advocacy for policy and institutional changes, the project is expected to have, during its three-year lifetime, a real and measurable impact by increasing the resiliency of vulnerable households and improving their ability to address food insecurity and environmental degradation.

The general objective of the proposed project is to contribute to improved food security among women and men in hunger-prone communities. This is achieved by facilitating farmer adoption of proven agricultural technologies that enhance ecological resilience in the face of a changing climate. These technologies include indigenous technologies drawing on local resources as well as those promoted by agricultural research institutes and government extension services.

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IDRC International Development Research Centre | CRDI Centre de recherches pour le développement international

Canadian International Development Agency | Agence canadienne de développement international

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To meet this general objective, the project pursues five specific objectives:

Objective 1: To gain a shared understanding of traditional food and indigenous knowledge systems, and key social, institutional, environmental and economic drivers of food insecurity among women and men in communities included in the study;

Objective 2: To catalyze the adoption, and assess the social, economic and environmental impacts, of high value traditional crops, integrated livestock, soil, water and pest management practices, and postharvest technologies prioritized by participating women and men; and to assess mechanisms of upscaling these resilient farming system practices;

Objective 3: To increase the household consumption of locally produced food and improve levels of nutrition and health, especially among women and children;

Objective 4: To strengthen links to local and external input and output markets to allow women and men to diversify household livelihoods and increase farm welfare;

Objective 5: To contribute to the formulation of "resilience-focused" policies to enhance food security, livelihoods and environmental sustainability across the semi-arid regions; and to disseminate findings more broadly to other countries within the East African Community, the continent and world.

Kenya's new constitution provides a fertile institutional context within which the project's objectives, activities and expected outcomes gain a strong potential for success. These contributions are intended to address the inequity, hunger and poverty experienced by the most food insecure households. The project team recognizes that hungry farmers are least able to afford input-intensive farm technologies. They can least afford the risk of borrowing. Therefore, this project supports diverse and low-risk options by combining KARI and local farmers' technologies and social innovations, including the use of low-cost local and organic resources.

The project's integrated approach centralizes farmers in the process of developing resilient farming systems. The design and implementation of successful initiatives to enhance agricultural and ecological resilience need to go beyond "technical" performance of farm technologies to address the capacity of institutional and policy frameworks to enable local innovations and foster stakeholder participation.

The project contributes to development goals of enhanced food security and nutrition; improved incomes; enhanced performance of crops and organic and inorganic inputs; and strengthening of natural resource management practices. This will be achieved through the adoption of a participatory and iterative process of *analysis* of food insecurity challenges; *action* to address these challenges; and *assessment* of the impacts of the actions taken. This leads to a new round of analysis and action.

As farmer-to-farmer learning is encouraged, new information and experiences will be shared and analyzed by farmers and researchers. One of the key aims within this participatory process is to empower users and build their capacity to assess barriers to adoption, and to use that assessment to strengthen the adoption of innovative practices including local technical knowledge. By diversifying the farming systems under study, and promoting the adoption of a diverse array of climate-friendly farm practices, the project directly contributes to building farmer resilience in the face of chronic food shortages and ongoing climate change. ♦

Poultry-keeping is common on Kenyan farms.
Photo: L. Brownhill

Gender and Environment

A column featuring discussion of people (women and men, young and old) and the environment.

Gender Themes in the Project

By Leigh Brownhill and Maureen Miruka

Social relations – relationships between people of different genders, ages, ethnicities and geographic locations – are central to efforts to overcome food insecurity, hunger and poverty. Tensions and conflicts between people tend to be exacerbated by food insecurity. Likewise, peaceful and harmonious social relations are key to achieving food security. Gender equality is of particular concern in this project, as it is a cross-cutting theme touching on all other considerations: economic, environmental, social and institutional.

Rural and farm women's specific needs, knowledge and capacities have been taken into account in the design of this project in three ways. First, the project rests on the premise that effective food security policy requires gender-balanced access to and control over resources including land, seeds, knowledge, livestock, water, preservation, utilization and marketing facilities.

Second, the project builds on rural women's interests in and responsibilities for food provision within the household and the community by strengthening the scope of tools available for the success of their ventures. By including women's groups, the project serves to reinforce the already-existing capacities for organization found among women in many rural communities. By reinforcing women's organizational capacities, for instance through supporting their knowledge-sharing on ITK and utilization of high value traditional crops, the project situates women as experts in their own survival and in their innovative productive processes.

Third, the project is likely to have a positive impact on women insofar as it succeeds in supporting their food provision efforts; generating new, gender disaggregated knowledge about sustainable solutions to the hunger problem which disproportionately affects women and children; and finally, in improving household livelihood strategies by raising the quantity and quality of foodstuffs available for home consumption, storage and preservation, and market exchange. Farmer Field Days will offer one opportunity for women's expertise to be recognized and demonstrated, as part of project efforts to encourage production, use and exchange of nutritious and drought resistant indigenous food crops.

Dr. Leigh Brownhill of McGill University and Dr. Maureen Miruka of KARI, Nairobi, coordinate the project's gender stream.

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Farmer Phyllis Nduva prepares a lunch of traditional foods and welcomes project manager, Bernard Pelletier, to the table. Wote, February 2011. Photo: L. Brownhill

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Introducing the Project's Environment Stream

By Jim Fyles

The environment and natural resources stream of the project evaluates the influence of natural resource availability on household decisions to adopt farming practices. It also evaluates the potential effects of farming practices on long-term resource availability. The choices of which farming practices are used or adopted by farmers are closely related to which environment and natural resources are available and accessible in the area.

Farm households use many resources, including firewood, charcoal, bush foods, medicines, forage, timbers and natural building materials. The ability to obtain these resources affects what farmers can practice. For instance, grazing of livestock in nearby woodland can allow farmers to manage their fields differently than if the livestock grazed only on the farmers' fields. Conversely, farm practices can increase or decrease the need of households for resources from natural areas and thus influence the potential for overuse.

As the project progresses, the environment stream is focusing on finding a McGill graduate student who will focus on these areas of inquiry. We have reviewed 90 applications, including many excellent candidates. Unfortunately, we have budget for only one student and are making the difficult choice required to have a student appointed for January 2012. The environment stream has also contributed relevant questions to the baseline survey that has been developed collectively by the McGill-KARI research team. The baseline survey results will give valuable guidance to more in-depth interviews and participatory activities to be conducted next year by graduate students and project team members.

Dr. Jim Fyles and Dr. Elena Bennett of McGill University coordinate the project's natural resource management research stream. ♦

Policy Comment

Dr. Romano Kiome, Permanent Secretary in Kenya's Ministry of Agriculture, officially launched the project at KARI headquarters on 18 May 2011. In his remarks, Dr. Kiome noted that the project area has low crop yields and high risk of poverty and food insecurity. Ironically, there is great potential for expanding rural settlement in these counties. A project of this kind, in his opinion, was needed to address the complex problems facing farmers in the Arid and Semi-Arid Lands (ASALs). He expressed confidence that the project will create a major difference, especially with interactions and knowledge exchange between KARI, McGill, farmers and policy makers.

He commented that this is one of the rare instances that the Ministry of Agriculture has launched a project spearheaded by socio-economists. He expressed hope that the project will address one of the bottlenecks of food security in ASALs, that is, low rate of farmer adoption of technologies. The PS acknowledged that the KARI-McGill project represents substantial resources from the Canadian government and taxpayers, and he thanked the Acting Canadian High Commissioner, Richard Le Bars, who also attended the launch. Dr. Kiome reminded all present and in particular, members of the project team, that expectations are very high for this project to create positive and lasting impacts. Having made these remarks, he declared the project officially launched. ♦

Post-harvest Issues

A column addressing post-harvest issues, from field to plate.

Post-harvest Concerns: An Introduction

By Charity Mutegi

What is "post-harvest"? In agriculture it is the stage after harvest. Post-harvest activities include: cooling, drying, preserving and processing crops through deliberate action. The instant a crop is removed from the ground, or separated from its parent plant, it begins to deteriorate.
Causes of food deterioration:

- Micro-organisms, bacteria, fungi
- Activity of food enzymes
- Infestation by pests
- Moisture loss or excess
- Reaction with oxygen

Consequences include loss of crops through rot, mould, desiccation and, in extreme cases, deadly pathogens such as aflatoxin.

A granary for drying and storing crops, Makueni County.
Photo: L. Brownhill

Why major post-harvest losses in the region?

1. Poor harvesting techniques
   - Late harvesting/early harvesting
   - Mechanical damage
   - Wounding, e.g., mangoes falling from trees
2. Poor storage
3. Poor packaging
4. Poor infrastructure: lack of electricity, roads impassable during the wet season
5. Poor transportation
6. Poor marketing linkages and lack of processing industries
7. Poor drying that results from negligence or lack of knowledge

By making improvements in post-harvest practices, farmers can reduce losses and avoid the risk of infestations and other forms of deterioration, including aflatoxin. This project focuses attention on these issues at all stages.

Watch for information on aflatoxins in the Post-harvest Issues column of the next newsletter.

Aflatoxin information available online at
http://www.irinnews.org/report.aspx?reportid=93105
KENYA: Tackling aflatoxin - if the price is right
June 2011

Dr. Charity Mutegi's work focuses on post-harvest and value-addition issues. ♦

Field Notes

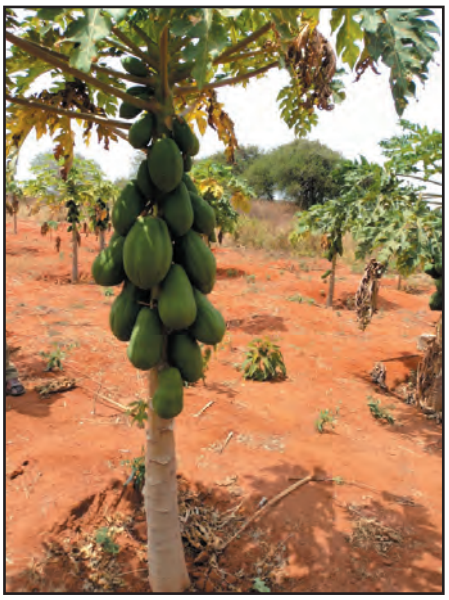
Investigation of the anti-inflammatory and antioxidant properties of local vegetables and fruits in Kenya: An approach to kwashiorkor

By Heather Tufts

Kwashiorkor is a form of severe acute malnutrition that is characterized by edema, skin lesions, fatty liver, hair discoloration, and hypoalbuminemia. Although these clinical features are clearly defined, the etiology of kwashiorkor is still unknown. Evidence has shown that markers of oxidative stress and inflammation are consistently increased in children with kwashiorkor.

Rich, and commonly underutilized, resources that can contribute to this area of research are local vegetables and fruits, which have been demonstrated to have antioxidant and anti-inflammatory properties. This study will investigate the antioxidant and anti-inflammatory properties of the local vegetables and fruits in Makueni County.

In collaboration with Kenya Agricultural Research Institute (KARI), interviews are currently being conducted in five sub-locations within Kaiti Division, Makueni County, with mothers who have at least one child less than five years of age, in order to identify target species for collection and analyses. The interview consists of a food frequency questionnaire spanning intake in the past week and throughout each season, and a traditional knowledge/ethnobotanical questionnaire, which asks about the medicinal use of plants for treating illness in children.



Papaya tree. Photo: L. Brownhill

A riverbed in the dry season in Makueni County.
Photo: H. Tufts

The vegetables, fruits, and medicinal plants that are most commonly used and available during this season, as identified from the questionnaires, are being collected and freeze-dried. They will be brought to Canada, where the samples will be analyzed at McGill University for antioxidant and anti-inflammatory properties.

The findings of this study could be an aid in promoting more research into the etiology, prevention, and treatment of kwashiorkor, and may serve to increase knowledge on the benefits of local leafy green vegetables and fruits for sustainable health, food security, and biodiversity promotion.

Heather Tufts is a graduate student in Nutrition at McGill University. ♦

Focus on the County – Makueni

Geography

Location: Located in the southern part of Eastern province and borders four counties with Kitui to the east, Taita Taveta to the south, Kajiado to the west and Machakos to the north.
Area (km²): 8008.8 km²
Climate/Weather: Temperatures range from a minimum of 12 °C to a maximum of 28 °C. Rainfall ranges from 150 mm to 650 mm per annum, typical of ASALs in Kenya.

Mangoes ready for market, Makueni County.
Photo: L. Brownhill

Population

Population: 884,527
(Male – 49 %, Female – 51 %)
Population Density: 110.4 people per km²
Age Distribution: 0-14 years (43.7 %), 15-64 years (51.1 %), 65+ years (5.2 %)
Number of Households: 186,478

Government

County Capital: Wote (proposed)
Number of Districts (2009): 7 (Makueni, Mukaa, Mbooni East, Mbooni West, Kilungu, Nzaui, Kibwezi, Kathonzweni)
Number of Local Authorities (2010): 3 (Town Council of Wote, Town Council of Mtito Andei and County Council of Makueni)

Indigenous cattle breed, Makueni County.
Photo: L. Brownhill

Economics

Poverty Level: Urban (34 %), Rural (67 %) of population live below poverty line.
Resources: Forests, wildlife, minerals, building sand, water (rivers), pasture and land
Tourist Attractions: Kyulu Hills, History of AIC Church in Nzaui District, Irrigation in Kibwezi

Main Economic Activities/Industries: Subsistence agriculture, beekeeping, small-scale trade, dairy farming and limited coffee growing; Ecotourism; Commercial businesses

Agricultural Products: Fruits (mangoes, pawpaws, watermelons), maize, cow peas, beans, pigeon peas and lentils, livestock keeping, dairy farming

Health

Doctor to Population Ratio: 1:119,879
Infant Mortality Rates: 46/1000 Live births
Under-Five Mortality Rates: 84/1000
Prevalent Diseases: Malaria, respiratory infections, HIV/AIDS

Source: Makueni County at a glance, *Daily Nation*, April 13, 2011. ♦

Food News from Other Counties

Food Markets: Is Barter Better?

Here is one answer to that question, in an extract taken from a recent story in the Daily Nation.

Such methods may have been long abandoned by people across the world, but at a market in Kilos in Kerio Valley of Elgeyo-Marakwet County, barter trade is a most treasured means of exchange. The market is also known as Kipchunda by the villagers who come to exchange goods for goods. They say barter trade fosters peace and tranquility among the residents of Elgeyo-Marakwet, Baringo and Pokot counties that have been adversely affected by banditry and cattle rustling.

The Marakwet bring cassava, bananas, vegetables, mangoes, maize flour, beans and even sugarcane, while the Tugen and Pokot, from Baringo North and East respectively, cross River Kerio loaded with tins of honey, sour and fresh milk, live goats and sheep.

Mzee Philemon Katoron, who has lived in the area since his youth, says the Keiyo, Marakwet, Tugen and Pokot used to converge at the same spot and exchange food. "We don't value money; we are concerned with supplying food to a hungry brother," says the 87-year-old man when asked why they have not embraced cash.

"This place has brought us together with our traditional arch-rivals, the Pokots and our Tugen brothers, and it has really helped cement our relationship for lasting peace. We don't miss the weights and measures since we are not doing business, but literally feeding one another," Mzee Katoron says.

Young kid.
Photo: L. Brownhill

Another man, Mzee Ezekiel Cherop, says residents have learned to appreciate this form of trade. Mzee Cherop says conflicts have been minimized due to such markets, adding that a bond is struck whenever people exchange food.

Source: Kenya News Agency, Brisk trade without money changing hands, *Daily Nation*, 22 May 2011, http://www.nation.co.ke/News/regional/Brisk+trade+without+money+changing+hands+/-/1070/1167538/-/10cpnqlz/-/index.html. Accessed 11 August 2011. ♦

Terraces on the hillside in Machakos County.
Photo: H. Tufts

For more information about the KARI-McGill project contact:

Dr. Lutta Muhammad
Kenya Agricultural Research Institute
P.O. Box 57811-00200,Nairobi, Kenya
Tel 254-20-4183301-20
FAX 254-20-4183344
Email: lwmuhammad@kari.org
Website www.kari.org

Dr. Gordon M. Hickey
McGill University, Macdonald Campus
21, 111 Lakeshore Road
Ste. Anne de Believue
Quebec, Canada H9X3V9
Email: Gordon.hickey@mcgill.ca