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Understanding Links Between Gendered Local Knowledge of Agrobiodiversity and Food Security in Tanzania

Tanzania, with many mountain ranges, has outstanding biodiversity due to diverse ecosystems. It is one of 14 biodiversity hotspot countries in the world. The majority of Tanzanian men and women depend directly on natural resources, biodiversity, and knowledge and experience of how to ensure their family's food security. Women and local communities have possessed specialized knowledge and skills relating to selection and conservation of genetic resources and biodiversity for centuries. However, this knowledge is being eroded by modernization, underestimation, and lack of awareness. The FAO LinKS project (Gender, Biodiversity and Local Knowledge Systems for Food Security), which started in 1998, has worked mainly in the agricultural sector, aiming to raise awareness of men's and women's knowledge about the use and management of the agrobiodiversity systems that they depend on for food security. The project has strengthened the capacity of agricultural institutions to apply approaches that recognize the knowledge of men and women farmers in their programs and policies, and has assisted in the creation of a Trust Fund to propagate local knowledge issues in the country.

Traditional practices in rural communities

Tanzania is a huge country comprising 25 regions inhabited by more than 120 ethnic groups, and a wide variety of social relations and knowledge systems whose components are passed from one generation to the next. Traditional agriculture has increasingly proved to be productive, sustainable, and ecologically sound, especially under extraordinarily difficult conditions such as those in the Southern Highlands, the Usambara Mountains, and the Uluguru Mountains. Most Tanzanian farmers rely on a wide range of local crop and animal varieties well adapted to the local environment (Figure 1). Only in this way are they able to secure a diverse food supply and sustain their livelihoods by minimizing the risk of crop failure and animal losses.

Local knowledge about edible and cultivable fauna and flora, medicinal herbs, and shrubs has contributed tremendously to the development of current agricultural systems, both in terms of production techniques and in developing processing,

FIGURE 1 Young woman threshing rainfed rice. (Photo courtesy of FAO, FAO/17574/A. Conti)

FIGURE 2 The agricultural production of farmers living in the fragile ecosystems of the Southern Highlands and the Central Zone of Tanzania depends mainly on local seed varieties. These seed varieties are recycled by the farmers year after year. (Photo by Giuseppe Bizzarri)

preservation, and storage technologies. Such knowledge, which has been accumulated over millennia, is fundamental for food production and the development and adoption of coping strategies during food shortages and in times of hardship.

Agrobiodiversity and local knowledge in the Southern Highlands and the Central Zone

Agriculture is the main source of livelihood for 80% of the population in Tanzania. Similarly, the majority of people in the Southern Highlands and the Central Zone are occupied with agricultural activities. The mountain ranges in the Southern Highlands and the Central Zone, which cover large flat lands and gentle hills, have a wide range of biodiversity. These two areas are ecologically diverse, with diverse farming systems (Figure 2).

The main crops grown in the Southern Highlands are sorghum, cassava, sweet potatoes, tobacco, pearl millet, bulrush millet, groundnuts, *bambara* nuts, sunflower, cowpeas, and pigeon peas, as well as a wide range of horticultural crops such as tomatoes, cabbage, and onions. In the dryer Central Zone, the main crops are sorghum, pearl millet, maize, paddy, groundnuts, *bambara* nuts, sunflower, and sesame. Sweet potatoes, finger millet, cowpeas, beans, pigeon peas, grapes, onions, tomatoes, and pumpkins are also grown. This rich source of agrobiodiversity in both areas is the result of natural and careful selection processes, as well as experimentation and innovative developments by farmers over millennia.

More than 90% of the farmers in Tanzania depend on this kind of informal seed production, whereby traditional seed varieties and landraces are used and multiplied year after year by the farmers themselves. Far from being utilized by governments, local knowledge and traditional seeds, well-adapted to often harsh local conditions, are actually being lost for different reasons. This trend leaves small-scale farmers increasingly vulnerable to hunger and poverty.

There are several risk factors that lead to a loss of agrobiodiversity in the Southern Highlands and the Central Zone. Recurring droughts during the past decades have forced small-scale farmers to

"We started growing the black variety of castor oil crop when the village started. We would extract oil from the seeds and use it to soften our skin. This oil extraction process consumed our time and was tedious, and the new generation of women were not patient enough and could not cope. In recent years, petroleum jelly products have become available at very cheap prices. There was a loss of interest in castor seed oil, and therefore the crop has disappeared from the village in the last 20 years." (Elderly woman farmer in Shinji village)

FIGURE 3 Farmers preparing a local pesticide from leaves and stems of selected plants to spray on vegetables in Mgeta village, Morogoro region, Tanzania. (Photo by Giuseppe Bizzarri)

eat the seeds that they planned to keep for the next planting season. However, without seed there will be no crop, and the cycle of seed recycling as well as closely related knowledge will be endangered. Other risk factors are outside influences on rural communities that lead to changed interests and attitudes on the part of the younger generation. The example of the disappearance of the castor oil crop from some of the Southern Highland villages highlights how fragile these systems are.

HIV/AIDS also has a strong influence on farming systems. Sick farmers are not able to plant the usual variety of plants; very often they limit the number of different crops they cultivate to only a few that are not very labor-intensive. Local varieties that are no longer used get lost, and people do not recall how to treat the seeds of these varieties because local knowledge is no longer transmitted from one generation to the next (Figure 3), and a downward spiral is set in motion. Migration of younger farmers to towns in search of a better livelihood has also brought about changes in local knowledge.

Tanzania's policy and LinKS activities

In many countries the local knowledge of millions of small-scale farmers is not treated as a genuine national resource. Programs that support production-oriented agriculture and cash crops take precedence over those that capitalize on, for example, local seed varieties, women's roles in seed management, or indigenous systems for managing natural resources. Also, in Tanzania, local knowledge has in the past been considered backwards and outdated. The role of traditional crops and seed varieties is often undervalued by policy makers, despite the fact that such varieties contribute significantly to rural small-scale household food security.

In recent years, government policies focusing on local knowledge have recognized traditional healers and rural midwives, and have also encouraged the use of people's knowledge in sustainable management of agrobiodiversity, especially in forestry. Some of the policies formulated to acknowledge use of local knowledge include the Agriculture and Livestock Policy (1997) and the National Health Policy (1990), while the National Science and Technology Policy (1995) addresses the conservation of indigenous plants and animals on land and in the sea in order to preserve biodiversity.

In response to local needs, LinKS sponsors three main activities—training, research, and networking and communication—to strengthen the position of extensionists, researchers, and policymakers. These professionals are well placed to promote integration of the traditional sector and its accumulated wisdom into modern policy and practice. LinKS specifically promotes understanding of the linkages between local knowledge systems, gender roles and relationships, food security, and the conservation and management of biodiversity.

Research in the Southern Highlands and the Central Zone

LinKS supported several research activities in Tanzania. One study focused on improving understanding of local knowledge of the management of agrobiodiversity, with a main focus on local seed varieties and management. It was carried out in close collaboration with different national research institutions, NGOs, and

the Ministry of Agriculture. The study areas were in the Southern Highlands and the Central Zone. The 2 villages involved for each zone were Malinzanga and Shinji in the Southern Highlands, and Misughaa and Dabalo in the Central Zone.

Farmers in these areas have a long tradition of selecting good seeds from the main food crop harvest and keeping them for planting or multiplication during the next season. Thus, by saving their own seeds after harvesting, or by sharing with neighbors, smallholders have survived setbacks and managed to sustain crop production. In these areas, the vast majority of the land is planted with farmer-saved landraces. Only a few farmers irregularly purchase limited volumes of seeds, mainly for marketable crops such as maize, rice, and sunflower.

The study focused on different categories of crops: main cereals, main legumes, neglected and collected crops. The local seed management studies in the 2 zones showed that farmers notice that local varieties are being replaced by industrially improved seeds. However, these local varieties are still maintained in the rural communities on a very small scale by knowledgeable farmers, referred to as "nodal farmers". These farmers are integral managers and conservers of agrobiodiversity, as they innovate and exchange seed and planting material with family, friends, and other farmers. They are the main keepers of agrobiodiversity.

It became obvious that men and women farmers possess different local knowledge, reflecting their roles and responsibilities in food production. Crops are assigned to either sex, with subsistence crops—especially those with small seeds such as cowpeas and millet—usually regarded as female crops. Men are more involved in the production of cash crops, whereas women farmers focus more on food crops to feed their families. Accordingly, women have a wider knowledge of local food varieties, especially neglected and collected crops. Their knowledge and experience in seed management, which includes seed selection, treatment and storage of seeds, etc, is much more profound than that of men. It is therefore important to increase awareness and recognition of the key role of women in agrobiodiversity management, and of their effectiveness in addressing issues of food security thanks to their local knowledge systems.

Building capacity to research agrobiodiversity management

Capacity building activities were closely interlinked with research activities in the LinKS project. Before the multidisciplinary research teams started fieldwork, they attended an intensive 10-day training course which focused mainly on creating an in-depth understanding of the meaning and importance of gender, local knowledge, and agrobiodiversity, as well as of how these issues are interlinked. Furthermore, the workshop participants had the possibility to learn and practice various tools and methods for doing gender analysis, collecting data in a participatory way, capturing local knowledge, etc. After such a training course, the research teams did their field visits. Data were then compiled and structured, and reports written. The main findings were discussed with the rural communities and other stakeholders involved in the topic (Figure 4).

After a planning workshop during which the research team refocused their research questions, a second round of field visits followed and so forth, until the study was finalized. This was a very intense on-the-job learning process during which the researchers and the farmers collaborated closely. The iterative process ensured that more in-depth research results were obtained.

Networking and Trust Fund

Due to workshops and intensive collaboration between many national partner institutions, an increasing interest in local knowledge was observed in Tanzania. Based on a stakeholder workshop, several institutions—the Commission for Science and Technology (COSTECH), the Tanzania Food and Nutrition Centre (TFNC), the National Environment Management Commission (NEMC), the University of Dar es Salaam, and the National Institute of Medical Research (NIMR)—formed a

FIGURE 4 Women participating in a workshop discuss local seed varieties. (Photo by Giuseppe Bizzarri)

FIGURE 5 Women and men farmers have an enormous wealth of knowledge about how to treat their animals with medicine made of local plants. Pieces of *mkunde kunde* bark are pounded into a powder and mixed with water to cure animals of infestation with worms. (Photo by Giuseppe Bizzarri)

"We hope the next generation will integrate the best of the modern with the best of tradition." (Masaai herder)

taskforce to establish a "forum on local knowledge" for Tanzania. The formation of a trust fund was considered to be the best option to support mainstreaming of and networking for local knowledge; it was registered in April 2005.

The Trust Fund is an autonomous, non-governmental, non-profit organization that coordinates, promotes, monitors, and advises the government, NGOs, and communities on local knowledge issues and activities. The Trust Fund will be a leading forum for advocating, promoting, protecting, and networking local knowledge systems and ensuring their continuous use and sustainability for socioeconomic development.

Prospects for the future

In partnership with the local institutions in Tanzania, the LinKS project has managed to create awareness of the importance of local knowledge and women's knowledge systems, and of their usefulness in the management of agrobiodiversity. Through the project's assistance in formation of the Trust Fund, it is hoped that awareness of the value of local knowledge systems in sustainable management of agrobiodiversity will continue to increase. The Trust Fund will also propagate the issues raised by the project to assist in formulation of policy frameworks regarding local knowledge systems. These will be used in the development of protocols for benefit sharing agreements between farmers and other stakeholders, in order to ensure that farmers are not bereft of the profit of their knowledge and can continue to hand it on to the next generation (Figure 5). Indeed, under the International Treaty on Plant Genetic Resources for Food and Agriculture, such benefit sharing agreements are required to be in harmony with the Convention on Biological Diversity.

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