3. TRADITIONAL, NEGLECTED AND UNDER-UTILISED CROPS

Children from May-Chena refugee camp in a rehabilitated field of finger millet with the local and drought-resistant variety *walye* (Tigray, north Ethiopia).

Description

In Sub-Saharan Africa, many poor and small-scale farmers cultivate and rely on a rich diversity of crops and crop varieties. However, these resources are at odds with mainstream agricultural development discourses and processes. The notion of "traditional, neglected and under-utilised crops" accounts for a unique and heterogeneous assemblage of crop genetic diversity (comprising both crop species and varieties) that is notably unrecognised, displaced and often threatened (box 14). However, these genetic resources represent grassroots resources with potential to improve the agriculture and livelihood systems of the rural poor.

Traditional, neglected and under-utilised crops constitute a rich portfolio of crop genetic resources that farmers conserve, cultivate, use, exchange and improve (table 2). They represent locally available resources that broaden farmers' options to cope with the most pressing needs and evolving circumstances, such as AIDS impact. In fact, the mobilisation and improvement of traditional, neglected and under-utilised crops would expand the local capacities to cope with farm labour stresses, household economic insecurity, nutrition needs, agroecological management, and income generation.

Box 14. Description of traditional, neglected and under-utilised crops

- **Traditional crops.** Crops and their local varieties that ground customary agricultural and food systems. These resources are *traditional* in the sense that they are integrated and coevolving with the indigenous knowledge, agricultural practices, food habits, and cultural dynamics of the rural communities and peoples that hold them. Many traditional crops are also considered as minor crops due to their little relevance in global agricultural production and trade, as well as to their scant attention in science, rural development programmes, and agricultural policies. They also include neglected and under-utilised crops (Eyzaguirre *et al.*, 1999).

- **Neglected crops.** Crops, including their associated genetic variability, that peasants cultivate in centres of crop origin or diversity, and that are allegedly *neglected* by science and development. They play relevant roles in the agriculture, nutrition, livelihood and cultural dynamics of countless rural communities, but they are not accordingly supported.

- **Under-utilised crops.** Crops that used to be widely cultivated but are rapidly diminishing, often as a result of socio-economic, cultural, policy, agronomic or other forces. They often encompass advantageous traits and potential for food security, such as specific nutritional properties and ecological adaptation, but their cultivation and use are rapidly declining.

Traditional, neglected and under-utilised crops comprise crops that were domesticated in Africa, as well as crops that, coming from other regions, have become indigenised and generated a myriad of landraces and varieties in rural communities. They include cereal crops like fonio (*Digitaria* spp.) and pearl millet (*Pennisetum glaucum*), tuber crops like yams (*Dioscorea* spp.) and American-origined cassava (*Manihot esculenta*), legume crops like bambara nut (*Vigna subterranea*), and leafy vegetables like African amaranth (*Amaranthus* spp.) - see table 2 for a broader list.

Woman displaying bambara nuts (Cercle Kati, Mali).

Women examining local varieties of *eboga* [amaranth] (Soroti, Uganda).

Table 2. Selected traditional, neglected and under-utilised crops in Sub-Saharan Africa

Common name	Scientific name	Distinctive properties and values
African *Cucurbitaceae* crops: e.g. cucumber, gourd, melon, pumpkin, squash.	*Cucurbita* spp., *Cucumis* spp., *et al.*	Very diverse family of crops with significant, yet overlooked agricultural, economic and nutritional values. Cultivated in a wide range of agroecological conditions, from drylands to humid areas. Relevant in household nutrition, including excellent supplies of micronutrients. Some species and varieties represent a fast source of food, and are critical in household food security and nutrition during seasonal food shortage periods. Some *cucurbits* are easily stored for long time. Some seeds are used as a source of oil. Some species have multiple uses, including use of dried fruits as seed containers, which have proven to be an easy, cheap and safe indigenous practice for seed storage.
African rice	*Oryza glaberrima*	Farmer varieties are adapted to a wide range of habitats in humid and sub-humid areas. Compared to Asian rice (*Oryza sativa*), African rice is better adapted to West African environments, requires lower labour and management efforts, has flexible planting timing, and constitutes a faster food supply in emergency situations, among other values.
Amaranth	*Amaranthus* spp.	Highly diversified and widely cultivated plant, also gathered from the wild in some areas. Species and cultivars are adapted to a very wide range of agroecological conditions. Low labour requirements. Grains and leaves provide superior protein and micronutrient supplies.
Bambara nut	*Vigna subterranea*	Legume crop for semi-arid lands, tolerant to drought and poor soils. Excellent protein content. Soil fertilisation properties.
Cassava	*Manihot esculenta*	Adapted to poor soils. Optimal production/area ratio. Flexible labour timing. Root crop adapted to intercropping systems. Efficient and reliable source of energy and carbohydrates in most environments of Sub-Saharan Africa. When consumed, leaves provide valuable micronutrient supplies.
Cowpea	*Vigna unguiculata*	Versatile legume crop. Grains and leaves provide excellent supplies of protein and micronutrients, including especially iron and vitamins A and B. Suitable in different African environments, drought-tolerant, able to fix nitrogen even in extremely poor soils, and very adapted to intercropping systems.
Finger millet	*Eleusine coracana*	Adapted to uplands and subhumid lands. Superior source of protein and micronutrients, particularly iron and calcium. Represents a critical nutritional complement to diets based on starchy foods (e.g. cassava, plantain), which is the case of millions of poor people in Sub-Saharan Africa.
Fonio	*Digitaria exilis* and *Digitaria iburua*	Highly adapted to drought, poor soils and extreme agroecological conditions, growing where other crops fail. Minimal material and labour input requirements. Staple and critical food security crop in the Sahel region. Early-maturing cultivars are a fundamental food source in famine periods. Highly nutritious, very palatable, and easily digestible. Therapeutic and medicinal properties. Low labour requirements during farming, but higher labour requirements in post-harvesting.

(.../...)

Table 2 *(continuation)*

Common name	Scientific name	Distinctive properties and values
Groundnut	*Arachis hypogaea*	American crop that has become indigenised, widely spread, and highly diversified throughout Sub-Saharan Africa. Cultivar diversity provides different options concerning agroecological adaptation, labour requirements, and maturation time, among others. High nutritional values, including protein and fat contents.
Jute	*Corchorus* spp.	Leafy vegetable adapted to a wide range of habitats and agroecological conditions. Good source of proteins and micronutrients.
Pearl millet	*Pennisetum glaucum*	A leading cereal crop in Sub-Saharan Africa, particularly in drylands such as the Sahel and savannas, though not accordingly supported from science, agricultural programmes, and policies. Tolerant to drought and poor soils. Low vulnerability to diseases and pests. Good nutritional values compared to other cereal crops, including an excellent energy/protein ratio.
Roselle	*Hibiscus sabdariffa*	Minor crop with recognised nutritional and medicinal properties.
Sorghum	*Sorghum bicolor*	A global crop (the 5th most important world crop), yet its condition among small-scale farmers is poorly supported. Vast genetic diversity at the farmer level, yet highly neglected. Tolerant to a wide range of habitats and agroecological constrains, including drought. Staple crop in many African drylands. Very versatile: e.g. broad culinary uses, fodder source, used for beer-making, source of manure, stems may provide sugar. Some farmer varieties can be ratooned (successive croppings without need of replanting), thus saving labour.
Sweet potato	*Ipomoea batatas*	American crop that has become indigenised and highly diversified throughout Sub-Saharan Africa. Leaves and yellow tubers represent a good source of micronutrients, particularly vitamin A. Income source for some rural people. Some cultivars are adapted to marginal environments. Labour requirements vary according to cultivar, soil features, agroecological conditions, and farming practices.
Tef	*Eragrostis tef*	Endemic crop in the Ethiopian lands, where it is a staple and the most valued crop, indispensable in local diets. Cultivars are adapted to a broad scope of agroecological conditions and constraints, including a wide altitude and rainfall variation range. Although it is high labour demanding, it represents an income source for some poor rural people, and it is highly nutritious, including superior protein and iron contents compared to other cereal and grain crops.
Velvet bean / Mucuna	*Mucuna* spp.	Multipurpose legume crop, with some species growing wild and occasionally harvested. High potential in soil conservation and improvement strategies because of its superior capacity in both soil fertilisation and weed suppression. Increasingly recognised and used as cover crop in fallow periods and in practices for recovering soil fertility. Fair potential as food and animal feed source.
Yams	*Dioscorea* spp.	Staple crop in West Africa, well integrated in local diets. Subsidiary crop in a diverse range of habitats, becoming critical in emergency situations. Flexible labour timing and requirements. Low input requirements. Tubers have a large sink capacity and continue growing through time, representing a good on-farm food reserve. Long storage life compared to other root crops.

Source: Personal compilation from diverse sources, including field experience in rural communities in Ethiopia, Kenya, Mali, Tanzania, and Uganda.

Traditional, neglected and under-utilised crops suffer notable disregard and erosion (box 15). Mainstream agricultural development models, which are largely tied to urban economies and lifestyles, have for decades focused on a selected bunch of global crops and pedigree varieties; basically those that foresee intense market exchange and preferably if connected to international food trade networks. Agricultural research and extension services concentrate on these crops and on the release of a limited group of high-yielding varieties. Consequently, the crop genetic diversity of poor farmers results excluded in the entire process of agricultural and rural development. Most recently, a growing fascination with genetically-modified crops is again reinforcing this discrimination. The disregard and erosion of traditional crops and farmer varieties has even lead to a decline of their value and use among rural people themselves.

Box 15. Constrains and causes of erosion in traditional, neglected and under-utilised crops

a) **Cultural discrimination.** Dominant modern and urban cultures despise, even if unconsciously, many crops that the rural poor cultivate as "indigenous" or "peasant" crops. This cultural discrimination results in the exclusion of these crops in policies, agricultural research, extension programmes, markets, and rural development plans. Such cultural discrimination is so pervasive that often results in a decline of the dignity and use of these crops among rural people themselves, as they are persuaded or feel compelled to abandon their crops and varieties in order to become *modern* and achieve *development*.

b) **Socio-economic exclusion.** Many traditional crops suffer socio-economic exclusion because they have a weak policy and programme support, and very restricted access to market niches.

c) **Insufficient knowledge and awareness.** Many traditional crops have received little research support to the point that their value and potential are poorly known, including their distinctive agroecological properties, nutritional quality, and roles in local food habits. Consequently, such crops seem *worthless* for agriculture compared to other major crops whose features are well established and whose limitations are being addressed. This poor knowledge base leads into unawareness and impairs their further improvement and use. The lack of formal research efforts on many traditional crops washes away technical, developmental and investment options to improve their cultivation and use.

d) **Technical constrains.** Some traditional, neglected and under-utilised crops suffer technical constrains that impair their wide cultivation, consumption and marketing. For instance, some crops require high labour efforts in specific phases that farmers could overcome with selected technical assistance. Other crops have a reduced market value due to consumer prejudices or to the lack of simple added-value actions that could boost their marketing. The deployment of appropriate technologies, commercialisation skills and policies may support rural people to overcome such technical constrains, hence optimising the use of their crops for the goals of food security and income generation. Often it is just needed an initial support that could boost the development of such crops.

e) **Exclusion in agricultural research and extension programmes.** Agricultural research and extension programmes are often disconnected from the customary agricultural dynamics of small-scale farmers, partly because they are designed up-down and far away from the farmers, partly because they respond to policy considerations that are alien to the priority needs and interests of peasants, partly because they focus on certain crops and agricultural market trends, and partly because they are tied with ambitions to follow Western agricultural development trends. That is detrimental to many local crops and crop varieties, which result displaced and are left unsupported. In addition, the obsession with high-yielding varieties excludes the diversity of farmer varieties and the potential of farmer-based crop improvement, which would better address the agroecological conditions, food needs, and agricultural constrains of farmers themselves.

Strategic values and potential

Traditional, neglected and under-utilised crops represent locally available resources with value and potential to contribute to the food security, household nutrition, agricultural diversification, and rural livelihoods of poor farmers. Their value is already recognised at the international level (box 16), yet there is an enormous need for agricultural policies and programmes to effectively recognise and promote their dignity, values and potential.

Box 16. Under-utilised crops and species

"While a small number of species provides a large proportion of global food needs, hundreds of other species are utilised at a local level, either through cultivation or harvesting. These under-utilised species contribute substantially to household food and livelihood security; they are often managed or harvested by women. Knowledge concerning the uses and management of these species is likewise often localised and specialised. Many under-utilised plants have potential for more widespread use, and their promotion could contribute to food security, agricultural diversification, and income generation, particularly in areas where the cultivation of major crops is economically marginal. However, current programmes for conservation, research and development tend to neglect these species." (12/189)

Global Plan of Action for the Conservation and Sustainable Utilisation of Plant Genetic Resources for Food and Agriculture, FAO, 1996.

[Endorsed by 155 countries that met in Leipzig (Germany) in June 1996, by the FAO Commission on Plant Genetic Resources for Food and Agriculture, by the Conference of the Parties to the *Convention on Biological Diversity*, and by the 1996 World Food Summit.]

Crop diversity is relevant as strategy to combat food security and to cope with HIV/AIDS impact, partly because it fulfils critical functions in subsistence agriculture, partly because it provides farmers with specific services, and partly because it broadens the options and means for agricultural development, food security and livelihood. Traditional, neglected and under-utilised crops as a whole comprise strategic values and potential as follows:

1. **Agroecological management.** Increasing crop diversity helps coping with local agroecological constrains and risks, such as drought and poor soils. For instance, some crops or specific farmer varieties tolerate poor fertility soils, grow in marginal lands, or serve farmer-based environmental risk management strategies. In addition, the use of legume crops improves soil fertility. In addition, many traditional, neglected and under-utilised crops are highly useful for agricultural diversification strategies, which result very beneficial for poor rural households to cope with labour, economic, agroecological and nutrition difficulties, as it will be discussed later in chapter 4.

2. **Nutrition and health properties.** Traditional, neglected and under-utilised crops are indispensable in agriculture-based nutrition action. For instance, legume crops provide high protein supplies and traditional leafy vegetables are often excellent sources of micronutrients. Furthermore, some local crops are particularly useful to nourish people suffering from AIDS, helping them to cope with eating difficulties (such as digestive problems and sore mouth that makes eating painful) and to arrest loss of appetite (which

has negative health effects). Traditional crops can also enhance food supply, helping HIV/AIDS affected households to cope with food shortages and the need for faster food supply. For example, some crops and varieties are particularly advantageous in maturing in a shorter time period. Some crops can remain un-harvested in the field for a long period, hence representing a prolonged food source. In addition, the use of traditional crops improves in relation to food processing and preservation practices, for which rural women hold specific knowledge and skills. That increases the values of these crops in household food security, nutrition, and marketing. Finally, traditional crops are well integrated in local cultural dynamics and food habits. They thus represent a superior force for agriculture-based nutrition strategies, for advancing sustainable rural livelihoods, and for recognising the dignity of rural lifestyles.

3. **Labour.** Crop diversity provides means for coping with AIDS-related labour stress in different ways, such as follows: (a) reducing labour inputs, (b) optimising labour inputs, or (c) diffusing labour loads. For instance, traditional, neglected and under-utilised crops comprise crops and varieties that are low-intensive in labour terms, crops that provide an optimal nutrition supply per labour unit, and crops that allow flexible agricultural timing (helping labour-stressed households to diffuse labour through time).

4. **Low-input agriculture.** Many local crops are adapted to their environments and require low external inputs. They are thus responsive to the economic security of poor and impoverished households. Crop diversity is at the roots of agroecological strategies that increase net rural economic gains. For instance, some crops grow well without the need of fertilisers and pesticides, whilst some legume and cover crops improve soil fertility.

5. **Income alternatives.** Some neglected and under-utilised crops have untapped economic potential, as they could fit in agroindustrial and market niches. The deployment of small-scale pilot initiatives and support programmes could be enough to expand such potential.

6. **Seed access.** The use of farmer varieties and the maintenance of farmer seed systems are relevant to ensure affordable seed access among the rural poor (see further discussion in chapter 8 on community seed systems). The promotion of modern and high-yielding varieties often impoverishes farmers because such varieties deteriorate shortly due to the breeding practices involved, forcing farmers to regularly buy new seed or engage in seed-related credit. However, farmer seed systems are more affordable and economically sound for the rural poor and for households needing to divert scarce economic resources to non-farm needs, such as healthcare or education. Accordingly, local crop genetic diversity is indispensable to build up community seed systems and maintain viable seed access for the rural poor, in connection with farmer seed knowledge and practices.

Traditional, neglected and under-utilised crops are relevant in coping with HIV/AIDS impact, particularly as follows: (a) strengthening food security; (b) improving the nutritional quality of the diet; (c) helping designing agricultural practices that suit labour shortages; (d) advancing agricultural systems with low external inputs that are responsive to household economic security; and (e) exploring income-generating options. They also provide AIDS affected households with a wider range of options for agriculture, allowing coping responses tailored to the conditions and needs of every household, community and agroecological area.

Crop diversity in arid and semi-arid ecosystems

Sub-Saharan Africa has vast arid and semi-arid lands, such as the Sahel and dry savannas. In these areas, average annual precipitation does not exceed 1,000 mm., but often falls below 400 mm. That poses severe constrains for agriculture. In addition to adverse agroecological conditions, rural people in these areas often suffer socio-economic marginalisation.

Arid and semi-arid lands house livestock and adapted agricultural practices, depending on the land uses, agroecological conditions and cultural dynamics. There is an extensive, dynamic and evolving use of natural and agricultural resources. Arid and semi-arid lands have been often stigmatised as non-favourable and useless for agriculture, hence receiving little hope and support. However, the African drylands are home to a unique diversity of crops, livestock, and wild food plants that have coevolved with the agroecological conditions and indigenous practices. Accordingly, the recognition, support and improvement of these crop genetic resources represents the basis for agricultural development. The farming systems in African drylands is unique in world's agriculture, and it reveals the wisdom of their peoples. Next there follows a concise allusion to traditional crops and farming systems in the Sahel (West Africa) and in the central drylands of Tanzania (East Africa). These dynamics have been notably ignored in agricultural development efforts, when these have existed.

In the Sahel [desert bank], which is the arid strip south of Sahara desert, rural people hold a unique crop genetic diversity. Their crops and the farmer varieties are well adapted to the local agroecological conditions, playing a critical role in the food security and livelihoods of millions of poor and excluded farmers. In particular, the Sahel is home to both cereal and legume crops, such as pearl millet, fonio, cowpea and bambara nut (box 17). Most of these crops were domesticated in this region some millennia ago, and some later expanded across Sub-Saharan Africa. Many of these crops are neglected or under-utilised, such as fonio, bambara nut, and the farmer varieties of pearl millet.

Among the traditional and neglected crops of the Sahel, fonio has unique properties and potential (Garí, 2001). This crop is extremely well adapted to semi-arid lands, requires minimal inputs, grows where other crops fail and is highly nutritious. Many rural women cultivate this crop in the Sahel, using it for farming any marginal land left. In addition, fonio helps women to improve the diets of their children and family, as well as to feed sick people because fonio is particularly digestible and even therapeutic. Although fonio requires significant post-harvesting efforts (e.g. threshing), small-scale technological innovation could substantially alleviate this labour constrain. Fonio has also good prospects for commercialisation, yet it requires policy and programme support, such as support for producer's associations, creation of production-commercialisation chains, and education and promotion activities among urban consumers in the countries where fonio grows.

Informal sale of fonio in the streets of Bamako (Mali).

In the drylands of Dodoma, in central Tanzania, the agriculture of the Gogo people is based on a unique intercropping system that basically combines 2 cereal crops, 2 legume crops and about 6 vegetable crops (table 3). This system proves well adapted to the dryland conditions and the subsistence needs of local farmers, therefore constituting the best basis for agricultural development programmes. The cereals millet and sorghum, named collectively as *uhemba,* are the dominant crops. They are supplemented by 2 legume crops (cowpea and lablab bean) and a rich diversity of *Cucurbitacea* species and varieties (pumpkins, gourds, cucumbers *et al.*). For seeding, farmers mix the seeds of all those crops in a gourd recipient called *chihali.* Seeds of millet and sorghum dominate, including a rich diversity of farmer varieties for such crops, whilst seeds for the rest of crops are present in a lower proportion. Farmers pick up randomly some seeds and bury them in small holes in their fields. That creates a diverse intercropping system. In agreement with local farmers, I have named this indigenous farming practice as the *chihali* agricultural system after the name of the recipient where seed diversity is combined.

The *chihali* system in the Tanzanian drylands provides many benefits and options for food security. The *chihali* crop diversity includes crops that produce food after just 2 months of seeding (e.g. some of the *Cucurbitaceae*), which arrest the risk of malnutrition and famine since seeding time is generally a food shortage period in drylands. In addition, this crop diversity entails balanced nutritional supplies, since the cereals are good sources of energy, the legumes provide both energy and protein supplies, and the *Cucurbitaceae* crops are rich in micronutrients. Many of these crops can contribute to food security in terms of long-term food access strategy: grains of *uwele* [indigenous varieties of pearl millet] have excellent storage properties, leaves of *matanga* [cucumber] are stored for long time if treated under women's food preservation practices, and fruits of *mahikwi* [bitter melon] and *majenje* [pumpkin] are stored for months during the dry season. Finally, the *chihali* system already represents an excellent basis for agricultural diversification. In addition, Gogo farmers cultivate separate fields with crops like *nharanga* [groundnut], *nzugu* [bambara nut], and *matama* [maize], among others, which enhance food production.

There are many traditional farming practices like the *chihali* system that are based on crop diversity and indigenous knowledge, and that play a critical role in the agriculture, food security and rural livelihood in arid lands. However, these systems are poorly known, receive little agricultural research and technical assistance (if any), and lack policy support for their improvement and further development. Accordingly, the challenge ahead is to deploy policy and programme support aiming at: (i) recognising the dignity, values and potential of such crop diversity; (ii) improving, through participatory approaches, these resources and their uses at the local level.

Box 17. Main crops of the Sahel region in West Africa

CEREALS

- **Pearl millet** (*Pennisetum glaucum*). Staple crop in the Sahel. Adapted to drought and poor soils. Long storage capacity.
- **Sorghum** (*Sorghum bicolor*). Staple crop in the Sahel, yet research efforts are comparatively poor. Adapted to a wide range of adverse conditions. Highly versatile. Its agricultural, food and commercial potential at the farmer level remains untapped.
- **Fonio** (*Digitaria exilis*, *Digitaria iburua*). Superior adaptation to drought and poor soils, growing where other crops fail. Easy cultivation, requiring very minimal labour inputs, and only consuming labour in post-harvesting (threshing). Fast and reliable food source, critical in the dry-wet seasonal interface before main crops can be harvested (i.e. critical in so-called *famine* periods). Nutritional and digestive properties.

Farmer couple with their fonio harvest in Kolle village (Mali).

LEGUMES

- **Bambara nut** (*Vigna subterranea*). Native legume crop of West Africa, named after the Bambara people. Highly adapted to drought. Soil fertilisation capacity. It is often neglected as a women's crop.
- **Cowpea** (*Vigna unguiculata*). Legume crop native to, and widely cultivated in the drylands of West Africa, feeding millions of poor people across the African drylands. Adapted to drought and tolerant to poor fertility soils. Different plant parts are used for food and are highly nutritious, particularly in protein and micronutrients. Soil fertilisation capacities. Excellent adaptation in intercropping with cereal crops, therefore facilitating agricultural systems that are nutritionally responsive (i.e. cereals provide energy and cowpea provides protein and some micronutrients).
- **Groundnut** (*Arachis hypogaea*). Indigenised crop, often excluded as "women's crop". Good source of protein and oil. Favourable commercial value and prospects in local markets.

Note: Average annual precipitation in the Sahelian agroecological area is about 200-500 mm.
Sources: FAO (1997), Garí (2001), IITA (2002), NRC (1996), and field research in Mali (2001).

Table 3. Crop diversity in the *chihali* system of the Gogo people, Tanzania

crop type	local name	common name	edible part	initial harvest	storage / preservation	other qualities
cereal	uwele	pearl millet	grains	3 months	grains (stored)	Drought resistant. Excellent grain storage for a long time and with little losses (n traditional granaries). Local varieties provide many values.
cereal	hemba-hemba, lugugu	sorghum	grains	4 months	grains (stored)	Drought resistant. Local varieties provide a wide range of values.
legume	fwili	lablab bean	beans	6 months	beans (stored)	Highly drought resistant. Soil fertilisation properties. Women's cash source.
legume	nhandala	cowpea	beans, leaves	2 months	beans (stored) and leaves (preserved)	Highly drought resistant. Soil fertilisation properties. Cash value at village level.
Cucurbitaceae	mahikwi	bitter melon	fruits	2 months	fruits (stored)	Fruits are stored for months throughout the dry season.
Cucurbitaceae	matanga, magogo	cucumber	fruits, leaves	2 months	leaves (preserved)	High drought resistance. Cash value at village level
Cucurbitaceae	mayungu	gourd	fruits	2 months		Important food security crop, as it starts providing nutritious food just after 2 months of seeding (that is a critical food shortage period). Women's cash source in villages.
Cucurbitaceae	nhungu	gourd	(non-edible)			Multipurpose fruit: house utensil, water recipient, seed storage, handicraft, cash source.
Cucurbitaceae	majenje	pumpkin	fruits, leaves, flowers	2 months	fruits (stored) and leaves (preserved)	Flowers are edible and a rich vitamin A source (as revealed by their yellowish to orange colours). Fruits are stored for months throughout the dry season.
Cucurbitaceae	matikiti	sweet watermelon	fruits	4 months		Cash value at village level

Source: Field research in Dodoma, Tanzania, 2001 (fieldwork was conducted in the villages of Ihumwa, Iringa-Mvumi, Iyumbu, Makangwa, and Mvumi-Makulu)

A neglected cereal: The African rice

The African rice (*Oryza glaberrima*) is native to, and mainly cultivated in West Africa since millennia ago. It is often disregarded and increasingly displaced by the hegemony of Asian rice (*Oryza sativa*). However, there are about 20 million farmers in West and Central Africa, most of them extremely poor, who rely on the African rice for their food security and livelihood (WARDA, 2000). The hegemony of the Asian rice in scientific, agricultural and development circles internationally has eroded the potential and opportunities for the African rice.

Compared to the Asian rice, the African rice is considered inferior in terms of yielding capacity and commercial value. However, the Asian rice has received intense scientific and development support for some decades, to the extreme that many farmers in West Africa have become persuaded to abandon the African rice for the Asian rice. However, adequate analysis reveals the critical advantages and roles of the African rice in the agriculture, food security, and sustainable livelihoods of poor farmers in West Africa (NRC, 1996; WARDA, 2000). Compared to Asian rice, the African rice displays the following features and advantages:

- The African rice is much better adapted to the West African environments. In particular, farmers hold local varieties that are well suited to rainfed farming systems and to a wide range of agroecological conditions of West Africa, such as coastal wetlands, riverine ecosystems, and dry uplands.
- The African rice is more tolerant to the drought patterns, soil types, pests and weeds of West Africa. For instance, the strong plant structure of African rice varieties resists and suppresses local weeds, hence reducing weeding efforts. That is crucial for low-labour-intensive agriculture, particularly as rural women are often rice farmers. In addition, the soil, pest and weed tolerance of African rice varieties reduces the need for pesticides and fertilisers, hence reducing economic inputs, contributing to the economic security of poor rural households, and enhancing the sustainability of agriculture.
- The African rice requires much lower labour and management efforts than the Asian rice. It is, therefore, a valuable crop in labour sensitive strategies, which are particularly needed in coping with HIV/AIDS: (a) its capacity to resist and even compete with local weeds reduces weeding efforts; (b) its adaptation to drought avoids irrigation and water management efforts; and (c) its flexible planting timing is also likely to alleviate labour stresses.
- The African rice is as rich in most nutrients as the Asian rice, and far superior in some micronutrients, notably some essential amino-acids (e.g. methionine, tyrosine), vitamins (e.g. vitamin B components), and minerals (e.g. iron, phosphorous) (NRC, 1996).
- The African rice represents a faster food supply in emergency situations, compared to the Asian rice, therefore being more relevant for food security in cases of civil unrest or under heavy HIV/AIDS impact.
- The African rice provides better opportunities for grassroots-based agricultural reconstruction and development. As millions farmers in West Africa hold countless local varieties of African rice, poor farmers that cultivate African rice have more affordable and accessible means to restore their seed systems in case of emergency, and can easily engage in farm-based crop improvement (Richards and Ruivenkamp, 1997).

The African rice is increasingly supported and integrated in agricultural development in West and Central Africa. In particular, scientists have developed NERICA (New Rice for Africa), which is a new rice plant developed through breeding African and Asian rice varieties to optimise their respective advantages and minimise its limitations in Africa (WARDA, 2000; WARDA, 2001). The effective and sustainable progress of initiatives such as this relies on the conservation and use of farmer varieties of African rice.

In general, participatory conservation, selection and breeding of crop genetic resources will support poor farmers to cope with their specific agroecological, labour and economic conditions. Targeted interventions through agricultural policies and programmes are also required to effectively connect smallholder farmer production of African rice with markets and, particularly, with the increasing food demands from growing urban populations. Rural livelihoods can improve if traditional and neglected crops like the African rice receive the policy, research, and agricultural development support that they deserve.

A neglected, but reviving root crop: Yams

Yams (*Dioscorea* spp.) constitute a very diverse group of tuberous plants that belong to the genus *Dioscorea,* and that typically have climbing stems and produce edible tubers. Cultivated yams represent a neglected but valuable root crop that is common in diverse rural areas of Sub-Saharan Africa, from tropical rainforests to savannas. In fact, most of the world's yams are cultivated in Central and West Africa. There is also a rich diversity of wild yams that are gathered for human consumption, and that in some cases undergo a process of domestication (Hamon *et al*., 1995). Yams are also used in some traditional pharmacopoeia throughout Africa, as part of traditional medicine.

Yams produce tubers with a large sink capacity, growing and storing food on-farm for a long period. This feature maximises labour flexibility, as harvesting has no timing at all. After harvesting, yams usually have a long storage life: about 4-6 months at ambient temperature, much longer than other root crops such as cassava and sweet potato. Therefore, yams have superior on-farm and off-farm storage capacity that benefits food security and livelihood options, particularly in households suffering labour shortages and famine risks.

Yams are often disregarded before cassava and sweet potato, which are considered as important root crops. However, the value and potential of yams in the agriculture and food security of peasants in Africa deserves further attention. Smallholder farmers in East Africa are increasing considering yams after the cassava mosaic virus devastated cassava production in vast areas in this region in the late 1990s. Consequently, diversification of root crops has become a critical food security strategy. For instance, a farmer group in Nabulamu village (Busia Province), in Uganda, has set up yam multiplication plots, aiming at a wide distribution of yams among farmers in the area (field research, 2001). In a different context, farmers of Kagera region, in Tanzania, are focusing more on yams as strategic agricultural and food resource after their banana production is increasingly more vulnerable to pests and diseases.

Crop genetic diversity and farmer varieties

Emphasis on crops as the basic farming unit overlooks the enormous genetic diversity within crop species level that farmers conserve and use throughout Sub-Saharan Africa. Crop genetic diversity, which comprises countless farmer varieties, represents a vast and unique dimension of agrobiodiversity that is relevant in small-scale agriculture. In particular, it provides farmers with further options and strategies for agriculture and food security, as varieties differ in aspects such as drought resistance, pest susceptibility, maturing time, yield potential, labour demand, market value, culinary uses, and even nutritional properties. The wider the range of crop varieties that farmers can access, the better they can address their agricultural, food and livelihood needs. In fact, crop genetic diversity is not redundant or superfluous resources, but the resource base for planning and conducting agriculture, particularly among the rural poor.

In the context of HIV/AIDS, crop genetic diversity can further support affected households to better cope with their specific needs. In particular, crop genetic diversity is relevant to cope with three major constrains that AIDS affected farmers often report: labour shortages, need for faster food production, and need to increase flexibility in agricultural practices (field research in Uganda and Tanzania, 2001). For instance, there are varieties of finger millet that require less threshing efforts, there are varieties of fonio and sorghum that mature faster, and there are varieties of groundnut that can be cultivated in minor agricultural seasons under lower rainfall. The specific cases of groundnut and sweet potato varieties in Uganda, described in boxes 18-19, illustrate the value and potential of crop genetic diversity in the context of smallholder farmers. Since AIDS-affected households are often less capable of maintaining crop genetic diversity (due to labour constrains), community systems for the management of crop resources represent a viable strategy (see further analysis on community seed systems in chapter 8).

Farmer and his children in their sorghum field, planted with *lefo* variety, which is early maturing and resistant to bird attacks (South Wello, Ethiopia).

Box 18. Farmer genetic diversity of groundnut in Asuret area, Uganda

Poor rural communities maintain a rich diversity of varieties of groundnut (*Arachis hypogaea*), including both traditional varieties and introduced modern bred-lines. As field research in eastern Uganda illustrates, groundnut varieties differ, *inter alia*, in maturity time, labour demand, and cultivating period.

Early maturing varieties like Erudurudu optimise the rainfall period and provide food in short time, even in less than 3 months. Varieties like Emoit require lower labour inputs because one weeding suffices, whilst harvesting is easier because of the root structure. In groundnut, the root structure is a key feature in harvesting: varieties with vertical roots are easy to harvest, whilst varieties with a horizontal rooting network are labour-intensive in harvesting because they require digging. The variety Egoromoit have significant resistance to drought and a good market value. Finally, there are varieties that can be successfully cultivated in the second rainfall period (a minor cultivating season, from July to October), hence enhancing the agricultural, food production and nutrition system.

The maintenance and development of this crop genetic diversity at household and community level eases agricultural planning and benefits food security, particularly in constrained households such as those affected by HIV/AIDS. For instance, AIDS affected households may find that the maintenance and access to the local genetic diversity facilitates agricultural planning tailored to their specific conditions of labour availability, food security, or livelihood needs at a given time.

Variety	Origin	Maturity time (days)	Required weedings	Labour demand in harvesting (1)	Cultivating season (2)
Egoromoit	traditional	110	2	high	1st
Emoit	traditional	90	1	low	1st / 2nd
Erudurudu	traditional	75	1	low	1st / 2nd
Etesot	traditional	120	2	high	1st
Egola I	introduced (3)	110	2	high	1st

1. The root structure of every groundnut variety determines the degree of labour effort for harvesting (i.e. uprooting).
2. There are two agricultural seasons in the study area: the 1st rain season (March-June), which is the main agricultural season, and the 2nd rain season (August-October), which is a shorter rain season less favourable for agriculture. Varieties adapted to the 2nd rain season maximise food production and reduce risks of food shortages year round.
3. Variety Egola I was introduced from Uganda's National Agricultural Research Organisation (NARO) in the mid-1990s. Despite the promises of this improved variety, farmers state that it has a poor taste and is late-maturing.

Source: Fieldwork in Okunguro village (Asuret subcounty, Soroti), Uganda, 2001.

Box 19. Traditional sweet potato varieties in eastern Uganda.

The diversity of sweet potato (*Ipomoea batatas*) is also an important resource for food security, as well as valuable in the coping needs of households affected by AIDS and other pressures.

In Busia, eastern Uganda, rural people maintain a high diversity of sweet potato varieties. On average, communities maintain over 5 traditional varieties and households cultivate a range of 2-4 varieties. Each variety provides different values and options in terms of drought resistance, maturation time, market value, and yielding features, among others. Drought-resistant varieties are important for a resilient food security system. Maturation time is a critical feature, especially for AIDS-affected households because it helps coping with sudden food shortages. Varieties with market value represent income options. Varieties that continue producing tubers after harvesting optimise food production per labour and time unit, and improve food security in cases of labour shortages, such as particularly in the case of households affected by HIV/AIDS.

Farmer with *bungoma* variety of sweet potato (eastern Uganda).

Name	Drought resistance	Maturation time	Market value	Continuous yield	Observations
Bundugusa	+	2 months	-	+	Very early maturing variety.
Bungoma	++	5 months	+	+	Very yellow tuber, likely to provide high amounts of vitamin A.
Kikuyu	-	3 months	+	-	
Maraoko	++	4-5 months	-	+	
Mukokola	+	6 months	+	+	
Siliki	-	3-4 months	-	-	Low yielding variety, but the most appreciated for its superior taste and culinary properties.
Soroti	-	2-3 months	+	-	Poor taste, but represents a fast food and income source.

Source: Field research in Mawero parish (Busia Province), Uganda, 2001, including information from farmers of the villages Agoriata, Akipeneti, Alupe, and Amagoro.

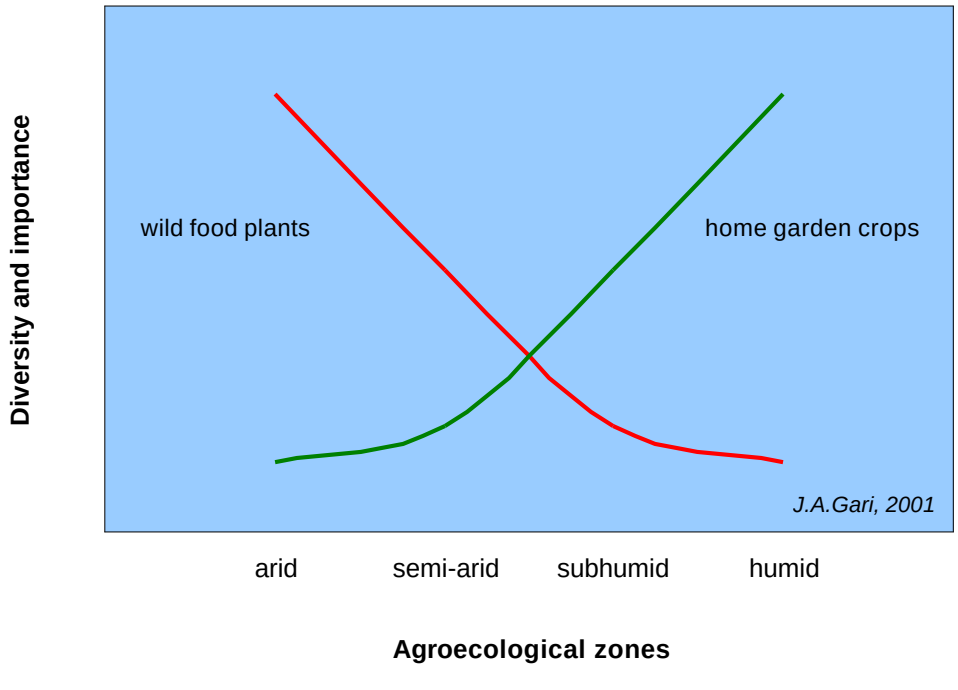
Crop genetic diversity at the farmer level is thus a strategic resource for agricultural development among the rural poor, particularly for food security, managing labour, and mitigating AIDS impacts. Accordingly, efforts around the conservation, use, management and improvement of crop varieties at the farmer level are required. However, the way formal crop actors design and introduce new and "improved" varieties dislocates and even depletes farmer varieties and local crop diversity. The full appreciation of the values and roles of farmer crop diversity can become visible only under a different agricultural development paradigm.

Home garden crops and wild food plants

Home garden crops and wild food plants are a very heterogeneous group of plants that are cultivated or harvested as supplementary food source. Their roles and potential in household food security and nutrition deserve adequate attention. Home gardens are small plots of land, often close to homesteads, where a diversity of leafy vegetables, fruit plants, legumes and root crops, among others, are cultivated as a food complement or to provide additional income. Wild food plants typically grow in wild areas or around farmland, being harvested as food source. Both home garden crops and wild food plants have analogous functions and value, generally as source of leafy and fruit vegetables. They represent an excellent supply of micronutrients (vitamins and minerals). In addition, wild food plants are critical for household food security and nutrition during seasonal food shortage periods and in emergency situations. Home gardens and, to a lesser extent, wild food plants are a potential source of income.

The respective importance of home garden crops and wild food plants depends largely on the agroecological conditions. In humid areas, rainfall allows farmer women to satisfactorily cultivate home gardens, and consequently wild food plants play a minor role. In contrast, rural people inhabiting arid and semi-arid lands rely heavily upon wild food plants, since home gardening is severely constrained. Consequently, home garden crops and wild food plants play equivalent roles, respectively, in humid and arid zones across Africa (box 20). Rural women are the principal actor in both the cultivation of home garden crops and the harvest of wild food plants. They hold extensive knowledge on these plants and on their cultivation, location, and uses. However, all this food plant diversity is notably neglected in agricultural development programmes. Given their significance, home garden crops and wild food plants will be specifically treated later in chapters 5 and 6, respectively.

Box 20. Wild food plants and home garden crops throughout African environments



Crop dynamics and coping with HIV/AIDS impact

The labour and economic impacts due to AIDS are likely to change crop dynamics. Diagnostic studies have already shown that AIDS affected households reduce their farming area due to labour shortages. That may result in crop diversity loss, or a focus on specific crops. However, field research in Uganda and Tanzania suggests that crop diversity tends to significantly remain among AIDS affected households, which try to maintain crop diversity despite suffering labour shortages and having to reduce the farm area. This strategy probably responds to the food security, nutrition, agricultural and cultural values of crop diversity.

The most manifest change around crop diversity is the abandonment of certain cash crops, specifically those with high labour demand and risky market prospects. There is also some decline in the number of crop varieties maintained at the household level. However, lack of seed, rather than labour shortages, is often reported as the cause of crop diversity decline. This trend is consistent with the fact that the rural poor have been those that maintained most of agrobiodiversity as part of their subsistence and livelihood systems. In particular, rural women habitually manage enormous crop diversity despite overwhelming labour constrains. Accordingly, agrobiodiversity-based strategies to cope with HIV/AIDS and labour shortages are coherent with the agricultural dynamics of the rural poor and their current circumstances.

Crop diversity provides households different options to address constrains related to HIV/AIDS. For instance, many AIDS affected households indicate that short-season crops and early maturing varieties are often valuable to cope with sudden food shortages. In highly constrained households, some cash crops are often abandoned because of unequal balance between labour inputs and income prospects, but women struggle to maintain traditional crops with relevance in household nutrition and diets, no matter if labour inputs are high. In the context of HIV/AIDS, some crops receive added value because of a variety of criteria: for instance, some require low labour, some allow flexible labour timing, some are suitable for mobilising labour support from children and aged people, some are adapted to poor soils (in case households can only access such land), some require no economic expenses in terms of chemical inputs, some have good and lasting storage properties, some are highly nutritious, and some are more suitable to feed sick people. Accordingly, the strategic action is to provide poor households and communities with mechanisms to access crop diversity, so they can plan farming according to their needs and constrains in every moment and case.

Food storage, processing and preservation

The use of crop diversity improves through food storage, processing and preservation practices. These post-harvest aspects are key for food security and agricultural marketing. Adequate storage and processing-preservation techniques ensure the full contribution of some crops to food security and nutrition. Appropriate granaries enable households to store grain and beans for long time periods. For some crops, processing and preservation practices optimise their food security roles, aggregate market value, and ease meal preparation.

Indigenous knowledge on food storage, food processing, and food preservation represents an important basis to mobilise agrobiodiversity and improve food security, nutrition and

livelihood in the post-harvest stage. Rural people, notably women, hold enormous, yet neglected knowledge on food processing and preservation techniques. In particular, home garden crops and wild food plants are often linked to extensive indigenous knowledge around food processing and preservation (see chapters 5-6). This knowledge deserves recognition, support and improvement. There are simple and affordable technologies for food processing and preservation that could improve local practices through well targeted technical support.

Storage is a critical issue in household food security. In drylands, where there are distinct rain and dry seasons, the preservation of grains and legumes is essential. Many crops can be stored, such as millets, sorghum, groundnut, bambara nut, and beans. Storage has two main benefits:

(a) **Household food security**. Storage makes available the production of grains and legumes throughout the year. Since some crops are only cultivated and harvested in specific seasons, storage is basic to access them during the whole year.

(b) **Income**. Storage allows farmers to sell agricultural products when market prices are fairer and labour is available. After harvesting, markets are generally flooded with harvested produce and prices tend to be low. Furthermore, AIDS-affected and labour-constrained households cannot conduct harvesting, food processing and commercial activities at the same time, so storage allows them to manage labour. Therefore, storage allows farmers to do marketing according to price dynamics and labour availability.

Children next to traditional granaries in the Sahel (Mali).

Many rural communities have traditional storage systems, such as granaries. Storing food is a very advantageous strategy for AIDS-affected households, in view of their labour, economic, nutritional and food insecurity concerns. Adequate storage and crop diversification practices require a storage system, with more than one granary. For instance, in Soroti area, in Uganda, granaries [deero] are required for every crop or crop type; that is, adequate storage requires a separate granary for millet/sorghum, groundnut, bambara nut, and maize.

Having storage facilities is often a constrain for poor households, including particularly AIDS-affected households. The building of storage facilities often requires high labour and

even some investments that AIDS-affected and other troubles households cannot meet. The case of Joyce Igoru, in central Uganda, is a typical example. She is a poor woman, widow, with 2 children, and living with HIV/AIDS. She has only one granary and she has to keep a large part of her products within the house, lacking sufficient space and risking the production that is stored out of the traditional granary. She cannot afford more granaries, as she is weak to build them and she has no money to hire labour. She would ideally need 4 granaries, which would allow her to safely store her production of millet, sorghum, groundnut, and preserved root crops, among others. She states that traditional granaries are good and safe to store harvest. They are essential to maintain food and seed throughout the year. They also keep food products so that she can sell them in local markets when prices are favourable and she has the time and strength to go to the marketplace. In conclusion, support for adequate storage facilities, including traditional granaries and other affordable systems, is a key need for food security and mitigating AIDS impact, especially in relation to mobilising and optimising the use of local crop and food resources.

Farmer looking inside her traditional granary in central Uganda..

Gender aspects around crop diversity

The effective promotion and use of traditional, neglected and under-utilised crops is connected to gender approaches. Gender inequalities are often at the roots of the poor visibility and recognition that traditional, neglected and under-utilised crops suffer. In addition, gender co-operation is required to fully use crop diversity to meet the most urgent food security, nutrition and livelihood needs of poor rural people.

In rural Africa, a gender-based asymmetric division on crops prevails. Rural women usually manage the largest part of the local crop diversity, including especially crops used directly for household nutrition, whilst men focus on specific crops with the highest income-generating value. Gender inequalities tend to result in imbalanced recognition and support of the specific crops, needs and aims of women and men farmers.

Rural women are the dominant actor in most traditional, neglected and under-utilised crops. Their roles include cultivation processes (e.g. knowledge on soil requirements and intercropping potential), uses (e.g. food preservation techniques, culinary uses), and management of genetic resources (e.g. seed selection, customary genetic resource conservation, variety improvement). In many cases, crops and local varieties are neglected and under-utilised because of their *female* condition. This discrimination occurs simultaneously within and outside the communities. Rural people themselves have biases on crop importance according to who farms them or which crops yield income. Furthermore, agricultural research and extension programmes reinforce gender inequalities when they focus on crops with higher economic value and that are more prestigious in the communities. They generally focus on men's crops, whilst neglecting the wide range of women's crops.

Gender inequalities often force crop asymmetries that are detrimental to effective food security. In particular, cultural barriers on men's and women's crops undermine the fair allocation of labour within households and communities. Thus, the large amount of crops under women's responsibilities are partly cause of women's workload excesses, along with the little recognition and support that women receive for playing such crucial roles. For instance, in Kagera (Tanzania), men focus on two permanent crops, banana and coffee, which are those that provide income, whilst women manage a wide range of annual crops with key food and nutritional roles in the household, such as sweet potato, beans, and groundnuts, aside from farming marginal areas such as the *rweya* (table 4). In rural areas of Soroti (Uganda), men concentrate on farming and commercialising cassava and, secondarily, sweet potato. Women, besides supporting men in the farming of cassava and sweet potato, are rather alone with the farming of finger millet, sorghum, groundnuts, sesame, cowpeas, green grams, and *oyototo* [vegetable crops], among other crops. In addition, women often suffer discrimination in the control over the income resulting from men's marketing of cassava. As agricultural economic research conducted precisely in Kagera illustrates, the asymmetric and unequal division of crop diversity leads to a deficient allocation of available labour at the household level (Tibajuka, 1994). The optimal use of labour is essential not just because labour scarcity is a critical and classical factor of poverty in Africa (Iliffe, 1987), but also because labour stress is among the most pressing needs in AIDS-affected households. Therefore, gender equality around crop diversity represents a fundamental objective for the optimal use of available labour.

Table 4. Gender roles and socio-economic aspects of crops in Kagera (Tanzania)

Crops	Cultivation roles	Income source	Importance in household diets
Bambara nut	women		+
Banana	men / women	+	+ +
Beans	women		+ +
Cassava	women		+
Cocoyam	women		+
Coffee	men / women	+	-
Groundnut	women		+ +
Maize	women		+
Sweet potato	women		+ +
Yams	women		+

Source: Field research in diverse villages of Kagera region, Tanzania, 2001.

Some traditional, neglected and under-utilised crops are important in household nutrition, yet they have low income generating prospects. Women are often key actors in these crops, which allow them to connect agricultural practices with household nutrition. However, gender inequalities depreciate these resources and their specific roles. Agrobiodiversity strategies with appropriate gender approaches can bear significant improvements in household nutrition.

The AIDS epidemic and renovated awareness on farming at the community level are leading changes in gender roles on crops. In particular, field research in Kagera region, Tanzania, suggests that the close border between male and female crops is becoming permeate, in particular as men are withdrawing cultural prejudices and starting to support women in female crops (box 21). The scale of food insecurity and HIV/AIDS impact are encouraging changes in gender relations towards gender equality, as men and women are increasingly aware and involved in joint farming.

Woman (household head) farming with her elderly father and 3 children in Kagera region (Tanzania). She teaches all her children (5 in total, including 2 adopted orphans) about the farming of every crop, irrespectively of the gender of the child and local gender prejudices in crop farming. She states that the pressing food and income needs in the household require everybody to cooperate, making "gender biases" irrelevant and even a threat to the household food security. She adds that her male children will become more complete farmers by knowing about all crops.

Box 21. HIV/AIDS and gender changes around crop diversity: Experiences from Kagera region (Tanzania)

In Kagera region there are incipient, but promising changes in gender relations as it matters farming crop diversity. Two main processes are forcing these changes: on the one hand, the scale of HIV/AIDS impact, especially as Kagera was one of the earliest affected regions and bears a long-lasting impact, and, on the other hand, exogenous development initiatives.

Farmer field schools, a participatory farmer-based learning and experimentation programme in rural communities supported by FAO and IFAD, has served to weaken gender barriers on farming. For instance, in one of the farmer field schools in Kagera, the group was considering to set up a commercial plot for cassava and bambara nuts, particularly aiming at selling bambara nuts and get income for the entire group. Men from this farmer field school were reluctant to do that because such crops were regarded as female crops in their culture and custom, notably bambara nuts. But they finally accepted, assuming the risk that other men may "laugh" at them. Nowadays, the men from that farmer field school are comfortable farming the mentioned female crops, and are even willing to consider contributing to farm labour for other female crops, either in their homes or in the farmer field school. Therefore, initiatives like farmer field schools represent farmer forums to comprehend gender inequalities, and to experiment potential responses and changes.

In some villages in Kagera region, farmers report that men with many orphans and children in their homes are starting to farm female crops to enhance agriculture and food security in the household. The rest of men farmers are looking at them, remaining attentive to which are the social perceptions in the community before potentially following their path.

In the village of Gera-Kashekya, a rural woman is teaching her male children to farm female crops. She is head of a household with many children and orphans, so she suffers overwhelming labour shortages to meet the basic food needs of the household. Consequently, the eldest children, male and female, help her in farming. She teaches them about all the crops, and she transmits her agricultural knowledge regardless of gender. Her male children are growing up accustomed to farm female crops, and they simultaneously are receiving the knowledge required to do that. These new tendencies, fuelled notably by the impact of HIV/AIDS, suggest changes towards gender equality, and reveal the soundness of gender-based approaches to crop diversity management.

Finally, the decline of the two crops traditionally farmed by men is likely to further changes in gender aspects on crop diversity. Men usually farm banana and coffee. However, banana is increasingly prone to diseases, and coffee prices are dramatically dropping, hence generating serious food and economic insecurity. In this context, other local crops, such as cassava or sweet potato, which are female crops, are likely to play more relevant roles in food and livelihood security. Hence, in one way or another, men will have to become involved.

Source: Field research in Kagera region, Tanzania, 2001. Personal communications with Julianus Thomas.

Conclusions and recommendations

Multi-criteria perspectives on traditional, neglected and under-utilised crops lead to the following policy and programme recommendations:

1. Promote the conservation and use of traditional, neglected and under-utilised crops.
2. Support farmer varieties, as well as the associated farmer knowledge and innovation systems, as essential resource for agricultural development.
3. Encouraging integrative and non-invasive means for the introduction of modern breed lines.
4. Deploy participatory crop genetic resource conservation, management and improvement strategies, such as community seedbanks, farmer-based crop breeding, and participatory research and documentation initiatives.
5. Implement programmes and initiatives that connect the use of traditional, neglected and under-utilised crops with food autonomy and nutrition well-being.
6. Explore and foster changes in gender relationships around crop diversity that bring more gender equality, mobilises and allocates more efficiently available labour within the households, and balances the agricultural, food security and livelihood roles of men and women farmers.
7. Support the consolidation and expansion of market niches for traditional, neglected and under-utilised crops, especially those typically managed by women and those adapted to marginal environments.

The case of traditional, neglected and under-utilised crops reveals that agrobiodiversity as a whole represents the foundations of strategies for food security, HIV/AIDS mitigation and rural development. In other words, the suggested strategy is not shift crops, either using some marginalised crops or introducing a new crop, but to operate with an agrobiodiversity mind. Thus expanding, consolidating and institutionalising the agrobiodiversity base available for poor rural households and communities allows new modes of agricultural and rural development that can better serve poor rural people to address their most pressing needs.