

# Case study 11

## Cultivating health with leafy vegetables in coastal Tanzania

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### Background

Levels of food insecurity are persistently high in Tanzania, with 34 per cent (13.9 million) of the population undernourished (FAO, 2011). The main nutritional disorders affecting Tanzanians include protein-energy malnutrition and deficiencies in iron, vitamin A and iodine (Lorri, 1996; Kinabo, 2008).

Underlying causes of malnutrition are complex and multi-faceted, but have in part been attributed to declining consumption of nutrient-rich traditional and leafy vegetables (Pendaeli et al., 2010; Oniang'o et al., 2006; Ogoye-Ndegwa and Aagaard-Hansen, 2006). Low-income households typically have unbalanced diets consisting mainly of carbohydrates complemented by a small quantity of low-end protein. When consumed, leafy vegetables are often exotic (including cabbage and collard greens) and purchased at a high price from local markets. Even in relatively wealthy urban households, children consume low amounts of leafy vegetables due to lack of availability and knowledge. Other reasons for the declining consumption of traditional vegetables include Westernisation, negative perceptions associated with these foods, lack of awareness about their benefits, shortage of land on which to grow or collect them, as well as the time needed to gather and prepare them (RESEWO, 2009).

Local groups in many different countries are now taking action to reverse the negative effects of the 'nutrition transition' (which refers to 'changes in diet and activity patterns' – Popkin, 2001: 871), including declining dietary diversity and associated nutritional disorders such as obesity, high blood pressure, cholesterol and diabetes (Turner and Ommer, 2003).

In 2006, over cups of *Bidens pilosa* (Blackjack) tea, a group of senior women citizens – siblings, neighbours and old school friends – living on the Regent Estate in Dar es Salaam, Tanzania, decided to start the Regent Estate Senior Women's Organisation (RESEWO). Their aim was to promote the identification, cultivation and use of traditional foods and vegetables. RESEWO's original membership of 12 grew to 22 by 2006, and in 2011 counted over 60 members. Most are retired professionals over 60 years of age, and all but two are women. Reasons for membership include: maintaining heritage species, conserving agricultural biodiversity, teaching others about forgotten or underutilised foods



*Figure C11.1* RESEWO founder, Freda Chale, leading students through a demonstration garden in the Village Museum in Dar es Salaam. Photo credit: P. Bakewell-Stone

and the value of traditional vegetables, and improving the health of vulnerable groups as well as their own.

This case study reports on the findings of an ethnobotanical study conducted with RESEWO members in Kinondoni district and their counterparts, mature home gardeners, in Bagamoyo district (Dar es Salaam and Pwani regions, respectively). Research focused on documenting the use of traditional plant species by communities for health and food security, as well as factors promoting and influencing leafy vegetable cultivation.

Kinondoni district covers an area of 531 km<sup>2</sup> and in 2002 housed a population of over one million (Mbonile and Kivelia, 2008); the contiguous Bagamoyo district covers 9847 km<sup>2</sup> and has an estimated population of 277,673 (MoAFC, 2010). The region is characterised by a tropical climate with an average temperature of 28°C and average annual rainfall ranging between 800–1500 mm. Climatic changes, including a decrease in rainfall and increase in temperature (Mbonile and Kivelia, 2008), are affecting planting seasons, as well as yields and types of vegetables grown.

Whereas in Bagamoyo, agriculture, livestock-keeping and fishing are the population's main livelihood strategies, in Kinondoni most households depend on informal businesses such as selling agricultural commodities.

In addition to drought and pest epidemics, major challenges faced by the agricultural sector include low levels of education and a lack of extension services. This results in low access to improved technology and farm inputs, weak irrigation, limited processing, storage and marketing infrastructure, lack of credit and low investment. Rural–urban migration, particularly among the

younger generations, and the prevalence of HIV/AIDS and other diseases put pressure on the availability of farm labour. In addition, due to unsustainable land management practices, deforestation and over-grazing, soils are being heavily degraded and becoming more susceptible to erosion.

### **The benefits of agricultural biodiversity: why, what**

The cultivation and use of micronutrient-rich leafy vegetables with medicinal properties has been promoted as a means to improve health and food security (Turner and Ommer, 2003), their use underlining the ‘multiple roles of botanicals as constituents of both an indigenous diet and herbal pharmacopoeia’ (Etkin and Ross, 1983: 232). High in antioxidants, folic acid, protein per calorie and omega-3, leafy greens are an important component of diets in many places in the world (Nabhan, 2004) and contribute significant amounts of vitamins A and C to the diets of resource-poor households in sub-Saharan Africa (van Rensburg et al., 2004). The nutritional quality of these vegetables is characterised by biologically-active plant metabolites including carbohydrates, vitamins, hormones, organic and amino acids, phenolics, flavonoids and glucosinolates. Essential for plant growth, development and defence, metabolites determine plant colour, taste and smell along with the plant’s medicinal and nutritional properties (Hounsome et al., 2008: 48). This explains the sustained use of leafy greens throughout history as essential ingredients for relishes, herbal preparations and other traditional forms of phytotherapy amongst communities and traditional healers in Tanzania, as well as the supplementary role they play in diets by adding variety and improving palatability and taste of staple foods (Lyimo et al., 2003). Research carried out by Marshall (2001) on the use of wild and weedy greens by a community in Kenya demonstrated that patterns of harvesting and using these plants results in greater dietary diversity while maximising the plants’ nutritional benefits. In Marshall’s study group wild greens were gathered and cooked with between one and four other taxa of weedy greens, and combinations of greens eaten varied from day to day, providing different sources of nutrients, vitamins and minerals.

Across East Africa the domain of leafy vegetables is both large and diverse, encompassing a wide variety of edible plants (over 50 different species reportedly used in Tanzania). Many are cultivated, although there is a large amount of variation in management intensity from wild gathered to fully domesticated. A number of species of wild and weedy leafy vegetables traditionally consumed in East Africa show potential for domestication. These include *Talinum portulacifolium*, *Cleome gynandra*, *Solanum nigrum*, *Bidens pilosa*, *Basella alba* and *Portulaca oleracea*. They are often preferred due to their environmental suitability and contribution to ‘climate proofing’ by resisting drought. Growing leafy vegetables is amongst a portfolio of livelihood strategies used by smallholders to adapt to climate change, improve nutritional security and become more self-sufficient.

For the present study, besides management status, leafy vegetables were differentiated on the basis of leaf shape, life cycle, abundance, propagation



Figure C11.2 Fatuma Shariff, Chairwoman of a community-based organisation in Kiromo village, Bagamoyo district, showing *kilemba cha bwana* (*Emilia javanica*) a wild leafy vegetable used traditionally in the coastal region of Tanzania. Photo credit: P. Bakewell-Stone

technique, perceived status, use, preparation method and taste. Whilst the great majority of plants described as leafy vegetables were herbaceous, some tree species were also included such as Guava (*Psidium guajava*), Baobab (*Adansonia digitata*) and Moringa (*Moringa oleifera*). This variation can be explained by the biocultural diversity existing across Tanzania's 120 tribes and nine agro-ecological zones.

During the documentation phase of this study, the most commonly nominated leafy vegetables were *Launaea cornuta* and *Bidens pilosa*. Their frequency of mention indicates the underlying criteria for their utilisation in coastal Tanzania including bitter-tasting, weedy, use reliant on traditional knowledge and medicinal. Both are used in traditional healthcare as anti-malarials and are good candidates for improving micronutrient status. *Bidens pilosa* is valued as a nutritious vegetable, tea-substitute and home remedy for a number of ailments.

### **The benefits of agricultural biodiversity: how**

In order to promote the use of these plants and raise awareness of their nutritional properties, the founders of RESEWO transferred traditional vegetable seeds from their native areas to homegardens. The organisation now grows and promotes a range of different traditional leafy vegetables on their demonstration plots at the Village Museum in Dar es Salaam and in their own

homegardens. They also distribute seeds, vegetables and information materials, such as recipe books (Pendaeli et al., 2010), as well as helping establish school gardens and developing a community seed bank. Members of RESEWO adopt such approaches because they attribute protein–energy deficiency not only to poverty but also to lack of education and awareness, particularly with regards to nutritious foods.

### **The benefits of agricultural biodiversity: health impacts**

Whether used as foods or for their medicinal properties, the consumption of leafy vegetables and the ingestion of the phytochemicals they contain ‘can explain diverse cultural food behaviours and health outcomes’ (Johns et al., 1996). Growing leafy vegetables is providing homegardeners in the coastal region of Tanzania with daily access to safe and nutritious food and medicine. This is important, for example, in reducing iron and vitamin A deficiencies in vulnerable groups such as the elderly and in pregnant women, and for improving maternal health and reducing child illness and mortality (Lyimo et al., 2003). Cowpea (*Vigna unguiculata*) and sweet potato (*Ipomoea batatas*), both known to have high iron contents, are being recommended for pregnant women and for treating anaemia. Other nutrient-rich leaves include those of squash (*Cucurbita maxima*) that provide vitamin A and *Cleome gynandra* containing high levels of vitamin C, iron and calcium.

A wide range of leaves are used traditionally for the treatment of diarrhoea and other stomach complaints. The increasing incidence of HIV/AIDS and diabetes has seen a rise of people turning to traditional plants to treat disease-related problems, e.g. lemongrass for lesions and ulcers. Leafy vegetables and plants in general are considered a safer alternative to (often counterfeit) store-bought medication. They are often associated with longevity and increased immunity – as is the case for baobab (*Adansonia digitata*) – and sometimes also increased appetite (*Caylusea abyssinica*).

During the documentation phase of the study, many people were keen to testify to the efficacy of leafy vegetables in preventing, alleviating or treating different ailments. *Bidens pilosa*, for instance, has been successfully used to treat high blood pressure and anaemia as well as preventing malaria; one couple reported not suffering from malaria since 1965 as a result of drinking one to two cups of *Bidens pilosa* tea on a daily basis. Therapeutic claims made about its use are well supported by the literature (Moshi et al., 2010), with a number of studies reporting similar ethnomedical uses in other countries and providing evidence of its phytochemical and curative properties (Boily and van Puyvelde, 1986; Chhabra and Mahunnah, 1994; Rivera and Obon, 1995).

### **Scale up efforts and challenges**

In and around Dar es Salaam leafy vegetable cultivation is reportedly increasing, in part due to the efforts of RESEWO to promote them. These include

strategies being developed with the Slow Food movement including cookery demonstrations and disseminating traditional food cookbooks, alongside nutritional education and education on preserving agricultural biodiversity through utilisation.

In addition, the World Vegetable Centre in Arusha is distributing nutritional seed kits containing germplasm of improved varieties of *Amaranthus* spp., *Corchorus olitorius*, *Brassica carinata*, *Crotalaria* spp., *Solanum scabrum*, *Cleome gynandra*, *Moringa oleifera* and *Vigna unguiculata*.

When asked to envision their ideal future, RESEWO members said that they wanted to see more Tanzanians eating traditional foods and Tanzania 'a healthier nation in which malnutrition and poverty have been alleviated and food security and incomes improved by the increased cultivation and use of traditional foods and vegetables' (RESEWO, 2011: 8).

To achieve this vision, it is recommended that RESEWO continues to advise people on establishing and maintaining traditional food and medicine homegardens. The organisation provides a valuable service to surrounding communities by offering nutritional advice and informal health counselling. Intergenerational transfer of knowledge between older members of the community and school children or students is particularly important.

There is a need for strengthened awareness raising, publicity, training, outreach, extension, practical cooking demonstrations and taste education to promote appropriate preparation of foods that maximise their nutrient value. Increased human and financial resources are required for this mission. The need for more sites for cultivation, marketing and demonstration was also highlighted. These focal points could be centres for learning, networking and advocacy around traditional foods, as well as loci for seed-saving and seed bank establishment, natural pest control and post harvest management. Other priorities include establishing rainwater harvesting and irrigation facilities, as well as heightened investment in solar drying, for a simple technique that can be widely applied to most types of leafy vegetables using easily constructed and efficient solar dryers (Martin et al., 1998).

## Stakeholder involvement

Rather than acting in isolation, individuals cultivating leafy vegetables are part of social networks. RESEWO, Slow Food and other local groups and networks are tightly linked, allowing for the effective exchange of knowledge and planting materials between homegardeners and women's groups across the country.

RESEWO also seeks institutional involvement by carrying out extensive consultations with local government actors and district agricultural authorities through meetings, workshops, community trainings, conferences and seminars, as well as informal networking. This is facilitated by the fact that the *Chagga* community, which is mostly involved in RESEWO's work, tend of have large and well-connected families, with a high representation in government institutions.

## **Policy impact**

Global agricultural policies emphasise common food crops such as cassava, maize, pigeon peas and beans, meaning that other traditional vegetables have received less attention. In addition, the introduction of imported vegetables, often considered more highly than local varieties by extension services, has undermined the use of indigenous and traditional vegetables (Eyzaguirre and Linares, 2004).

Although rarely promoted in policy, there is great scope for traditional leafy vegetables to be incorporated into national health and nutrition programmes. One good example is the campaign promoted by the Tanzania Food and Nutrition Centre that encourages the cultivation of nutrient-rich vegetables (particularly those rich in iron and vitamin C, which enhances iron availability) at the household level (Lorri, 1996). Further suggestions to promote the use of traditional leafy vegetables in diets as a way of improving dietary diversity and micronutrient status of vulnerable groups – including orphans and people living with HIV/AIDS and kwashiorkor – include: i) engaging district hospitals to carry out awareness-raising campaigns targeting pregnant women and lactating mothers; ii) working with district agricultural projects to monitor food security; iii) carry out research on improved varieties of traditional leafy greens; and iv) provide training on nutrition, food preservation and improved growing practices.

## **Key lessons learned**

Leafy vegetable diversity is an important part of Tanzania's biocultural heritage, particularly in the context of changing dietary patterns, food security, nutrition and health. Supported by the background literature, RESEWO firmly believes that traditional leafy greens can provide a substantial contribution to poverty reduction, as well as increasing food security and improving health in vulnerable communities, showing great promise to reliably and cost-effectively provide food, medicine and, potentially, cash income.

The reasons for growing leafy vegetables not only relate to the plants' phytochemical characteristics, but also to the traditional knowledge and cultural beliefs associated with these species, along with the way they shape the communities' livelihood strategies. In particular, traditional leafy vegetables are grown because of their environmental suitability, ease of cultivation and preparation, and culinary and medicinal uses. Integrating promising taxa into existing crop systems is an affordable means of mitigating malnutrition.

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