



# *Tanzania*

Restoring Kilimanjaro one step at a time

## Into the garden

Devotha Tumainieli was born into a Chagga family in Mawio Village, Lawate Catchment, on the steep western slopes of Mount Kilimanjaro. She is a farmer, tending a small plot of two hectares to produce bananas for her family's table and as a cash crop. Like most of the farmers in this major banana-producing district – and much like her parents, and their parents before them – she uses a traditional multi-cropping system known as a homegarden. This complex system includes a scattered upper tree layer (made up of banana plants and other shade trees), below which various lower-growing crops, such as coffee, taro, medicinal plants, and vegetables are grown. As is usual in these homegardens, Devotha also keeps a few cows for milk.

Over the past decade, the productivity of Devotha's homegarden – and those of other farmers around her – declined dramatically, almost to the point where farming became non-viable. *"The banana plants were stunted and produced very few bunches. And those bananas that were produced were so small that they hardly provided enough food for the family. To feed our family of four in a single meal, we needed two whole bunches, whereas, years ago, even one bunch would have fed us adequately for two meals or more. The situation was so bad, that I thought there was no point in farming anymore."*

The volcanic soils of the region are naturally fertile, and the tried-and-tested Chagga homegarden system had sustained communities on the slopes of Kilimanjaro for hundreds of years. The Chagga people are profoundly attached to their environment – an attachment based on cultural, social, and symbolic values, as well as on survival instinct – and they know that their survival depends directly on the natural ecosystems of the mountain. The Chagga display a vast knowledge of their environment and their traditional practices show respect for natural resources.

So what had gone wrong?



## Steps to sustainability

A complex set of factors relating to rapid population growth, structural market issues, and changed patterns of land use, had caused extensive deforestation, resulting in worsening soil erosion, declining soil fertility, and an increase in damaging surface run-off. For farmers like Devotha, this translated into decreased land productivity, greater food insecurity, and hardship. With support from a UNDP-supported and GEF-financed Sustainable Land Management (SLM) project (known as the Kilimanjaro SLM Project), the regional government provided training to farmers in sustainable farming practices to address these issues. Devotha Tumainieli jumped at the opportunity to enhance her traditional practices with new land management technologies that would enable her to restore the productivity of her homegarden. She describes what she learnt, *"I was trained to use bench terraces – which we call 'fanya juu' – to conserve soil and water. The terraces help to reduce the slope length and steepness*

*and prevent the loss of soil downhill. We were also taught to grow grass along the terraces to hold the soil in place. Since I started this, I have gone back to farming with bananas. I have terraced an area of two hectares from which I expect to harvest about one ton of bananas – this yield is four times greater than before. The banana bunches are bigger than those grown in unterraced plots, and the fruit reaches double the price at the market. Depending on the season, I can sell a bunch of bananas from a terraced plot for between TZS 2,000 and 10,000 (about US\$1 to US\$5). People selling bananas grown in unterraced plots only get about TZS 2,000 to 5,000 for a bunch, so I can see that farming with terraces has given me a great competitive advantage."*

Since the adoption of sustainable land management measures, Devotha has diversified her crops to include vegetables such as beans and potatoes, and the grass she plants to stabilize the terraces provides fodder for her cattle. This represents an important cost saving to her, as previously she had to buy grass from the lowlands at great cost. Devotha's family is now more food secure and hers has become one of the most productive farms in the Lawate catchment. She was elected by her community to the local Environmental Conservation Committee, through which she champions SLM and advises other farmers on the use of soil and water conservation measures. With a sparkle in her eye, she says, *"I am optimistic that everyone in my area will soon adopt these practices – it will secure our income and food supply, and is better for the land."*

## Spreading the benefit

The benefits of adopting sustainable land management practices are not only being felt in the highlands of Kilimanjaro, but also in the woodlands and savannas of the surrounding plains. Lower down in the catchment of the Mawoi Stream, in the semi-arid district of Hai, a group of elders in the vicinity of Roo Sinde village has taken decisive action to reverse the extensive degradation that has affected their area. Previously, these plains were watered by numerous perennial streams flowing down from the highlands, but five years ago, most of these had dried up. This was partly due to deforestation and desertification higher up in the catchment, but also because of local overgrazing, removal of natural forest along waterways, and the impacts of more frequent and intense droughts.

*Devotha Tumainieli*



## Natural defenses

The Mawoi Environmental Group have established tree nurseries, using wild seed they have collected in patches of remaining forest, and seed supplied by forestry officials. The saplings are planted out to restore deforested areas, as well as in public spaces such as school yards. As part of their efforts to conserve remaining riverine forest, the community have joined forces with nature's own forest wardens – bees. Beehives have been suspended in forest trees along the river banks, where the trees provide the pollen needed by the bees, and the bees provide protection for the trees. With a chuckle, Jubilate explains, *“The logic is really very simple. Most people are naturally afraid of bees, and do not want to be stung. So, they tend to avoid places where there are hives. This deters would-be law breakers who might be tempted to cut down trees, and protects the forests and water sources.”* As an important advantage, bee-keeping provides this ecologically-minded community with a valuable source of nutrition and an alternative income-generating activity that avoids future deforestation and land degradation. The use of the modern bee-hives and bee-keeping practices introduced by the SLM Project has increased honey yields, bringing greater food security, and economic stability to the villagers.

Jubilate Kweka, the chairman of the Mawoi Environmental Group, describes the situation, *“If you had come here only five years ago, you would not believe how it looked – there was no vegetation and the streams were all dry – even in the Nkotuma Conservation Area. But look now,”* he says, gesturing with a wide sweep of his arm to the surrounding landscape, *“the landscape is turning green, the trees are growing well and the streams are flowing again! This has happened because we have passed, and are enforcing, village bylaws to manage grazing, control tree felling, plant trees, and restore the degraded land.”* Guided by the SLM Project's technical experts and trained District officials, the 36 members of the Mawoi Environmental Group focused their rehabilitation activities on the severely degraded Nkotuma and Kiamboni Valleys, and the Mawoi Stream, because of its importance as a water source – both for the people of the area, and for sustaining the riverine forest, which has become an invaluable asset to this community.

*“The landscape is turning green, the trees are growing well and the streams are flowing again.”*

– JUBILATE KWEKA

*Jubilate Kweka*



## Background to the story

Towering above the bustling town of Moshi in northern Tanzania, is the iconic, ice-capped peak of Mount Kilimanjaro – one of the most defining features of Tanzania’s landscape, and the pivot on which a thriving tourism industry turns. Peaking at 5,895 metres above sea level, this volcanic massif is both the highest mountain in Africa, and the highest free-standing peak on Earth. It’s diversity of ecosystems is exceptional, ranging from glaciers and alpine moorlands, through montane grasslands and rain forests on upper slopes, to woodlands on the foothills, and dry, open savanna on the surrounding plains.

Mount Kilimanjaro is the primary source of water for much of north-central and eastern Tanzania, and parts of Kenya. It also holds cultural and spiritual significance and provides food, fuel, and building materials for the local communities of Kilimanjaro Region. The capacity of the mountain to continue to provide these vital resources and ecosystem services is, increasingly, being compromised by extensive land degradation. The causes are complex and interrelated, including large-scale deforestation, rapid human population growth, shifts in land use and agricultural practices, changing market forces, and the impacts of climate change.

With support from the Kilimanjaro SLM Project, the Kilimanjaro Regional Government has worked to address land degradation through the adoption of sustainable land management practices and the creation of alternative income generating activities that do not cause deforestation. The project served to enhance local economic development, food security, and sustainable livelihoods, whilst combatting desertification in forest and woodland ecosystems in the Kilimanjaro Region (see page 59).

SLM is being scaled-up through ongoing GEF investments in UNDP- supported projects in the miombo woodlands of the Tabora and Katavi Regions, and the Uluguru and East Usambara Mountains.

# Digging Deeper

## Restoring productivity to traditional land-use systems

The Chagga people have been cultivating homegardens on the slopes of Mount Kilimanjaro for centuries. This traditional agroforestry system has been one of the most productive forms of agriculture in Tanzania, and is well suited to the soil, topography, climate, and traditional systems of land tenure and management. The multi-layer system maximizes both the use of limited land resources – especially in areas of high population density (on average 650 people/km<sup>2</sup> in the Kilimanjaro Highlands) – and returns from a diversity of crops. Minimal external inputs are needed, and soil cover is maintained, which helps to protect the environment. In some cases, an area of land is also used for traditional livestock rearing.

Traditionally, coffee was the main cash crop in these homegardens, with other crops grown largely to meet subsistence needs or for sale at local markets. In the 1970s, a combination of failing health of the ageing coffee plants, a decline in world coffee prices, and inherent structural weaknesses in the national coffee market, plunged local farmers into a downward spiral of poverty. This was aggravated by rapid population growth (about three percent per annum), which triggered large-scale changes in land-use practices, with devastating effects.

In the Kilimanjaro region, the SLM Project facilitated widespread uptake of practical technologies to improve average productivity of degraded land, reduce seasonal fluctuations in yields, underpin diversified production and improved income, and restore the capacity of agro-ecological systems to provide ecosystem goods and services. This includes measures to improve soil and water management (such as bench terracing, mulching, and improved efficiency of water furrows); improved coffee management (by replacing unproductive trees, training farmers in more sustainable and productive farming methods, and certification of production as organic and FairTrade to improve access to markets); and diversification of production (by including a variety of suitable fruits and vegetables, using improved varieties, and improved animal husbandry).

The project created opportunities for alternative income generating activities, such as micro-enterprises for bee-keeping, mushroom farming, and poultry-keeping (using improved breeds), that relieve pressure on limited land resources, and do not require consumptive use of forest and woodland resources. Demand for wood was further decreased by the introduction of fuel-efficient stoves for heating and cooking, combined with tree nursery and reforestation projects led by village committees and school groups.

Critical ingredients for success included the provision of practical training, strengthening existing community structures (such as Village Environmental Committees) to promote peer-to-peer learning and farmer-to-farmer extension services, strengthening skills for business and financial management, and providing improved access to micro-finance. The advances made through the GEF-financed intervention are now being sustained by the Kilimanjaro Regional Government.

Mr Josephat Samba, the SLM co-ordinator in the Rombo District Council says, *“These activities have helped a lot to conserve the environment and will help reduce poverty, especially amongst the women, who have demonstrated that they are strong agents of change.”*

