

Hidden Resources

**Non Timber Forest Products for livelihood
improvement and biodiversity conservation:
documenting Kenyan experiences**



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Colophon

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Foreword

Land scarcity and conflict are frequently the result of environmental degradation.

Forests and woodlots play an important role in preserving both the environment and ecological services and one of the most devastating results of the rapid decline of Kenya's forests has been the erosion of water reserves and biodiversity.

Today, as a result of exploitative human activity, the once rich forests of Kenya now cover little more than 2% of the country. Interventions at household level are needed to reverse this trend and - to be successful - these interventions must to be informed by an understanding of the relationship between forest vegetative cover and a healthy ecological environment - one capable of providing social as well as economic benefits. The experiences recorded in *Non Timber Forest Products for livelihood improvement and biodiversity conservation: documenting Kenyan experiences* are intended to stimulate an innovative and constructive approach to environmental management particularly in those woodland areas threatened by increasing aridity. The case studies selected by PELUM Kenya and its partner organizations document the way communities living adjacent to forest areas identified and developed NTFP activities that have contributed to livelihood improvement and biodiversity conservation. Now that these experiences have been documented they can be shared with other communities living and working in similar agro-ecological zones.

The case studies described in this AgroSpecial focus on how communities came to realize the potential of their forests and - by adopting specific NTFP activities – called a halt to practices that lead to woodland degradation.

At the national level, the commercial value of NTFP production is difficult to assess but

the impact of the activities described here are clear. The careful development of NTFPs not only leads to enhanced community health and welfare, but also contributes to restoring and conserving local biodiversity. We hope that these experiences will stimulate others to explore the hidden resources of their forests and woodlands and discover that NTFP can provide a sustainable livelihood and contribute to the development of a greener environment capable of resisting some of the impacts of climate change.



ZACHARY MAKANYA, october 2009

Abbreviations

ASF	Arabuko Sokoke Forest
ASFADA	Arabuko Sokoke Forest Adjacent Dwellers Association
ASAL	Arid and Semi-arid Lands
BIODICOMO	Biodiversity Community Mobilization Volunteers
CBO	Community Based Organisation
CFA	Community Forest Association
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
COFEG	Community Food and Environmental Group
COSDEP	Community Sustainable Development Empowerment Programme
DIFAAFA	Dida Forest Adjacent Area Forest Association
EAWS	East African Wildlife Society
FAN	Forest Action Network
FAO	Food & Agriculture Organisation
ICCO	Interchurch Organization for Development Cooperation
ICIPE	International Centre of Insect Physiology and Ecology
ICRAF	World Agro-Forestry Centre
INADES	Africa Institute for Social and Economic Development
IPR	Intellectual Property Rights
ISCATI	Integrated Sustainable Community Agro-forestry Technology Initiative
KAFU	Kenya Association of Forest Users
KAPP	Kenya Agricultural Productivity Project
KARI	Kenya Agricultural Research Institute
KEEP	Kakamega Environmental Education Programme
KEFRI	Kenya Forestry Research Institute
KEMRI	Kenya Medical Research Institute
KFS	Kenya Forest Services
KWS	Kenya Wildlife Services
MFCG	Mutiro Farmers Conservation Groups
MOTNG	Msulwa Organisation for Tree Nursery Groups
NECOFA	(Kenya) Networking for EcoFarming in Africa
NMDT	Ngua Malambo Development Trust
NTFP	Non timber forest products
PELUM	Participatory Ecological Land Use Management
PFM	Participatory Forest Management
RPSUD	Regional Programme for the Sustainable Development of the Drylands
ROD	(Kenya) Rural Outreach Development Initiative
SACDEP	(Kenya) Sustainable Agriculture and Community Development Programme
SWAK	Society for Women and AIDS in Kenya
USAID	United States Aid programme
VIFAN	Vihiga Integrated Farmers Network
WN	World Neighbours

Content

Foreword	3
Abbreviations	4
Captured in words: tapping into the potential of NTFP	6
NTFP: the context	8
Section One: Foods and forage	13
Guavas offer new livelihood opportunities for ex-convicts.	15
<i>Moringa</i> : providing a livelihood for small-scale farmers	16
Good Weeds: an individual initiative	20
Feeding indigenous and dairy goats with <i>Acacia tortilis</i>	22
Section Two: At work in the forest	24
Honey production in Gatunyu: a farmer's experience	25
Kavingoni Beekeepers – the INADES Foundation	26
Bees solving community conflicts: Wanjuki Beekeeping Self-help Group	29
Beekeeping offers a livelihood in arid and semi-arid lands	31
Section Three: Health and welfare	33
Stinging nettles: a local tradition helps revive health and welfare	34
Promoting <i>Prunus africana</i> as a herbal medicine	37
Conservation through utilization: on-farm pharmacies	38
Commercializing an indigenous medicinal plant: <i>Mondia whytei</i>	41
Section Four: Linking with Tourism	44
Ecotourism – <i>Kakamega Environmental Education Programme (KEEP)</i>	45
<i>ZUIA NDOVU na Casuarina</i> : finding a solution to human wildlife conflict	47
Mwalunganje Elephant Sanctuary	50
Millennium woodcarvers cooperative: creative conservation	51
Section Five: Not just for export	52
Wealth from Africa's aloes: aloe promotion and utilization	53
Aloe vera potential yet to be exploited in Dida	56
Butterfly farming: habitat development strengthens biodiversity	58
A question of marketing	59
Getting to grips with the challenge	60
Appendix: Some useful addresses for further information	62

Captured in words: tapping into the potential of NTFP

Many innovative and successful attempts to strengthen livelihoods and welfare in poor and marginal areas have never been documented. They remain inaccessible even though they could be of great value to communities and households living in similar ecological and economic areas. The objective of the write-shop *Non Timber Forest Products for improved livelihood and biodiversity conservation: documenting Kenyan experiences* was to encourage those who had taken initiatives in the Non Timber Forest Product (NTFP) sector to come forward and describe their experiences.

PELUM Kenya, Kenya Association of Forest Users (KAFU) and *Agromisa* together with the Kenya Forest Research Institute (KEFRI) and representatives of NGOs, Community Forest Associations (CFA), government departments and research institutions guided the documentation process. They developed a framework for the initial stages of data collection and – during the writeshop itself - worked with participants to clarify the issues and concerns raised during discussion. Their understanding of the needs of those living and working in often under-utilized forested and woodland areas played an important role in ensuring that the factors involved in initiating and managing sustainable

NTFP activities were fully documented.

This *AgroSpecial* emphasises the two main objectives of the writeshop. First, to show those living in close proximity to potential NTFP how they can integrate these into their livelihood strategies and second to illustrate how livelihood improvement can be effectively combined with conservation. The relationship between resource use management and biodiversity conservation is particularly critical in areas where the market-orientated innovations of small-scale producers take place in degraded or endangered forest environments.

The NTFP experiences presented during the writeshop had been selected according to specific criteria. The initiatives described had to be economically viable and contribute to livelihood security. They also had to be technologically appropriate, show awareness of current health, safety and environmental standards and be developed from sustainable resources in an ecologically sensitive way. This included showing how, for example, the commercial exploitation of a particular plant species can affect local ecology and natural biodiversity - an issue that is particularly relevant in areas where beekeepers were introducing flowering shrubs and trees. Attention was also given to the social



NTFP write-shop participants at work: considering the implication

and economic impact of newly introduced NTFP activities. Did changing work patterns have a negative effect on the workloads and physical strength of those involved, for example, and were these new activities socially acceptable to men as well as women and youth?

Efforts were made to ensure that the processes involved in developing NTFP were described as fully as possible. Some of the experiences documented were comparatively recent and the communities involved were still dealing with the challenges of ensuring regular production. This gave an insight into the particular difficulties of sustaining NTFP and during discussion participants shared experiences of meeting these challenges.

In some of the case studies no specific details were given of production processes and marketing strategies. This was because they involved commercially valuable innovations and knowledge. It was left up to the participants themselves to decide how far they were prepared to share information that might be protected by intellectual property rights (IPR), farmers' rights or patents.

In order to make a precise estimate of the socio-economic impact of NTFP activities on community livelihoods, data is needed on the amount of labour and time involved in

production and the volume of monetary and non-monetary returns per production cycle. It was difficult to meet these criteria not only because they involved issues of confidentiality, but also because there are considerable variations in the extent to which communities keep records of their activities. The writeshop highlighted the importance of enabling communities to monitor and document their work so they could more accurately calculate the volume of non timber forest resources needed to produce regular and satisfactory returns while conserving biodiversity.

NTFP: the context

The term non-timber forest products refers to all biological materials other than timber that are extracted for human use from natural forests, farmlands or managed woodlands. They include spices, essential oils, fodder, resins, gums, latex and dyes as well as tanning materials, ornamental plants, wildlife products and the fibres and wood used by builders and craftsmen. Many communities rely on their knowledge of the nutritional and medicinal properties of trees and shrubs to cure disease and improve health.

Local and national value

The way households use forest-derived products and services depend on the socio-cultural and economic values of their communities. Urban consumer demand and the interests of local and international traders also play a significant role in determining the commercial value of NTFPs. In Kenya, for example, 80% of medicines used locally come from traditional herbal or forest sources while exports of NTFPs also make an important contribution to the national income.

In many communities NTFPs are an important source of food particularly in the period between harvests. However,

these contributions go unrecorded in national statistics. Little is known about the yield and regeneration levels of species delivering NTFPs because it is difficult to monitor the way these commodities are produced and used. The fact that there are many types of NTFPs - all of which are managed by different government departments and agencies - increases the complexity of integrating effective and sustainable non-timber forest production into rural livelihood strategies.

Long value chains and growing interest

Since 1992 and the Rio Summit on environment and development there has been a growing interest in the way NTFPs can support the livelihoods and welfare of rural communities. Although modern forestry favours timber production and large-scale enterprises over NTFPs, in many countries NTFP-based enterprises employ more people than the formal timber trade. In addition, the production of NTFPs generally involves many different types of activity and when production, collection, processing, storage, transportation and marketing takes place at the local level, the value generated is more likely to be retained by the communities, households and groups involved.

Factors determining NTFP value chain development

The factors that determine the way a NTFP value chain develops include:

- Institutional setting: legal framework, policy and IPRs;
- Source of the interventions that has stimulated the NTFP initiative: individual experience, CBOs programmes, government policy, international/local NGOs etc;
- Access to market information and understanding of consumer needs;
- Skills, aptitude, motivation and access to training particularly in management and marketing;
- Infrastructure: credit and finance; transport; marketing network; publicity;
- Benefit of initiatives to the community: benefit sharing.

Kakamega forest, one of the last remnants of the once extensive Guinea Congo forest and a rich source of NTFPs





Forest Act 2005: Enabling non-timber production

The recent Forest Act (2005) builds on Kenya's experiences with Participatory Forest Management (PFM) and emphasizes the role of communities in forest conservation and the maintenance of environmental services. It explicitly promotes the sustainable production and utilisation of NTFP and highlights the importance of intensifying research and training initiatives that could lead to the domestication of commercially viable species. The Community Forest Associations (CFA) defined in the Act are seen as creating an enabling environment for resource management and benefit sharing. They can participate in the conservation and management of a state forest or local authority forest and are responsible to the Director of *Kenya Forest Service (KFS)*.

Under the terms of the Act, CFAs can enter into agreement with the KFS and take responsibility for the management of specific NTFP resources. These include the collection of medicinal herbs, the harvesting of honey and timber and the use of grass for fodder and grazing. The Forest Act also makes provision for the development of ecotourism, recreational programmes as well as scientific and educational activities in forest areas. Contracts for the development of community timber and non timber forest based industries must not conflict with the conservation of biodiversity.

Women and youth are seen as playing an important role in conservation and the Act indicates that more opportunities will be provided for women and youth to take part in forest training and education. The Government also intends to involve women and youth in participatory forest management (PFM) and the improved control of resources. The role of youth is especially significant. Encouraging young people to take more responsibility for the management of forests will ensure that future generations grow up with an understanding of the value and vulnerability of their forests and woodlands and a readiness to become involved when decisions affecting them are made.



As the illustrations on these pages show, tree nurseries are established to increase access to nutritious and functional NTFPs. At the same time - at a convenient distance from the rural homestead - stinging nettles are carefully cultivated, plucked and dried to ensure that added value remains within the community.

The value chain can be used to highlight the value realized during each stage of a production process and can indicate, for example, where improvements or changes are needed in order to ensure producers benefit as fully as possible. Information generated by value chain analysis can also help households weigh the advantages of market-orientated activity against the benefits of investing in NTFPs that contribute to strengthening the social, cultural and physical well-being of their communities.

Such considerations are important because they focus attention on the need to develop strategies to coordinate processing, marketing and quality control in such a way that communities do not become unnecessarily dependent on monopolists, middlemen and processors who will absorb a disproportionate amount of any profit generated. If communities get returns that reflect the full value of their product and work they can be motivated to abandon unsustainable practices that deplete forest reserves.

Challenges

Ecological, commercial and legislative issues determine how far NTFP enterprises can maintain a sustained flow of products that are consistent in quality and quantity. As long as the market for NTFP remains undeveloped much trading will take place in the informal sector. Often com-

munities do not have a good overview of the actual and potential markets for their NTFPs. This puts them at a disadvantage when it comes to setting a value on their products and work. In the same way, some communities are unable to take advantage of the resources of their forests and wooded areas because they lack information about market opportunities. It has been suggested that there has been an insufficiently “aggressive approach” to marketing NTFPs and that, in general, more market research is needed to identify consumer needs and preferences.

Other common problems in the NTFP sector include low levels of production and unreliable sources of raw materials. High rates of post-harvest losses and poor production techniques that lead to the waste of valuable resources during extraction also seriously undermine productivity. Technical support and farmer-orientated research are needed to deal with these types of problems and also to ensure optimal levels of quality control and product diversification.

Better access to credit facilities and training in management can help communities improve sustainability and facilitate scaling-up. Institutional factors also play a critical role in the effective development of non-timber forest production. Primary producers who organise themselves into traders groups and cooperatives can limit the number

of intermediaries involved in processing and marketing. This enables them to retain more of the profit generated by their NTFP activities.

Alternative livelihood strategies

There is an increasing need to find ways in which local forest resources can be used to strengthen local livelihoods and welfare in areas characterized by food insecurity and where income generating opportunities are severely restricted. Aridity, underdeveloped infrastructure, unfavourable agro-ecological conditions as well as a lack of access to financial and other services have led many communities to exploit timber reserves in an unsustainable way. Once promising NTFPs initiatives have been identified, scaling-up and replication is often complicated by problems associated with land tenure and user rights.

The Kenyan experience of non-timber forest production shows that community motivation to conserve biodiversity increases when households are introduced to the benefits and commercial value of incorporating NTFP activities into their livelihood strategies. However, it is important to draw a distinction between initiatives that aim to strengthen community relations and improve welfare, health, and nutrition in rural households and the - often - quite different processes involved in bringing commercial products onto wider national, regional or international markets.

Legislative provisions and Community Forest Associations (CFAs)

The Kenya situation is particularly interesting because of the Forestry Act that came into force in 2005. While the implications of the Act for those whose livelihoods increasingly depend on NTFP are considerable and offer many opportunities, those involved in implementing its provisions face many challenges including ensuring that the role and responsibility of the new CFAs is well understood and supported by all concerned.

Foods and forage

Guavas offer new livelihood opportunities for ex-convicts.

Moringa: providing a livelihood for small-scale farmers

Good Weeds: an individual initiative

Feeding indigenous and dairy goats with *acacia tortilis*



Guavas offer new livelihood opportunities for ex-convicts.

Kazi Mbele Self-help Group is a Community Based Organisation (CBO) located in Mumias district in Kenya's Western Province. The group was set up in 2006 by Swed Atibuk who is a member of the community but had been in prison because he could not pay his fines. Things looked bleak for him and his wife and children and - what was worse - they were stigmatized by their community. However, while in prison Atibuk had been trained in jam and juice making and when he was released he used these skills to start a new life. Now it is not only his family who are enjoying the benefits but his neighbours as well.

Resources Oriented Development Initiatives (RODI) - a registered NGO - and the Kenya Prisons Department work together on projects designed to rehabilitate prisoners by introducing them, for example, to food processing, sericulture, beekeeping and mushroom growing. *RODI* works with penal and correctional reform networks and runs special capacity building and counselling programmes for prisoners with HIV/AIDS in Nyanza, Western, Central, Rift Valley and Nairobi provinces.

Twenty-three prisons and an estimated one hundred men and women prisoners have been involved in programmes designed to shorten the process of rehabilitation and speed up community acceptance. *RODI* monitors the progress of its trainees and the case of Swed Atibuk illustrates how successful it can be.

Taking the initiative

While in Kakamega prison, Atibuk attended one of *RODI*'s jam and juice making training sessions. The training had focused on making guava, mango, avocado, tomato and paw-paw jam and juice but Atibuk seemed most interested in guavas because - although the fruit was available - it had not attracted much interest. He also understood that it could help provide those living with HIV/AIDS with better nourishment. Guavas are known to contain high levels of zinc, a mineral that is important for the chronically sick.

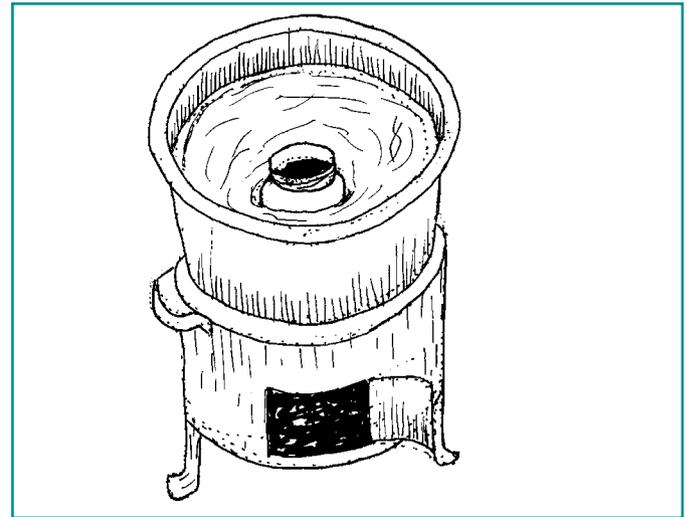
Psidium guajava - commonly known as guava - flourishes in areas below 2000m where the annual rainfall is about 900mm. The tree tolerates water logging, dry spells and a variety of soil conditions and can be found in many parts of Western Kenya. It is easy to propagate and an estimated 47 to 52 tonnes of fruit can be obtained per hectare. These must be harvested with care to avoid bruising. With his *RODI* certificate in hand Akibuk finally left prison. He did not find it difficult to set up guava processing activities. Costs are low and the utensils needed can be found in every kitchen. The only ingredients that have to be bought are lemons and sugar. Pots and bottles for storing and marketing jams and juices can be collected locally. Akibuk shared his knowledge with his neighbours and a guava production group - *Kazi Mbele* - was set up. Fifty percent of the jam the group now produces is eaten by the families of group members while the rest is sold at local markets. When energy costs, sugar and the jam makers' labour - collecting the fruit, preparing the jam, marketing the product - are taken into account the Group still make an acceptable profit. Turning a fruit that would otherwise be left to rot in the forest into a money earner has meant a lot to these household and is in line with the objectives of *RODI*'s community development programmes.

Challenges

Even though local people do not eat much bread and eating fruit and fruit products is not common there are niche markets for guava products particularly in the urban areas and as demand grows so does the demand for fruit. Tree breeding programmes that focus on the production of larger, more succulent fruit than those found in the wild could contribute to the quality of jams and juices. To keep up with demand *Kazi Mbele* members have planted about 50 guava seedlings. But as trees flower and fruit at the same time good storage is essential to maintain year-round production. Finding effective ways of storing and preserving their fruit is one of the issues currently being discussed by *Kazi Mbele* members.



A mature guava tree



A utensil used in sterilizing guava jam

Lack of clean water has also proved to be a major challenge. Particular attention has to be given to the purity and cleanliness of ingredients and equipment if product quality and consumer confidence is to be maintained. Technical interventions as well as the development of a government endorsed certification system to support these types of NTFP activities are essential. In addition experience has shown that communities engaged in (fruit) tree propagation often do not have the information they need to enable them to cultivate without putting pressure on their soil and water resources.

Documenting the experiences of ex-prisoners in setting up guava and other fruit processing activities and sharing these through community development networks and the media helps pinpoint these challenges and focuses attention on the measures needed to ensure sustainable development. A critical factor highlighted in this example of NTFP activity is the importance of developing market demand. Cottage industry in Kenya has - to some extent - a negative image and this - combined with a relatively inelastic market for fruit products - is a problem for those trying to enter the retail market.

One of the lessons *RODI* has learned from its experi-

ence with guava processing is that efforts to produce the best quality product possible must be complemented by activities that stimulate and create a market for what - for many - may be an unfamiliar product.

Moringa: providing a livelihood for small-scale farmers

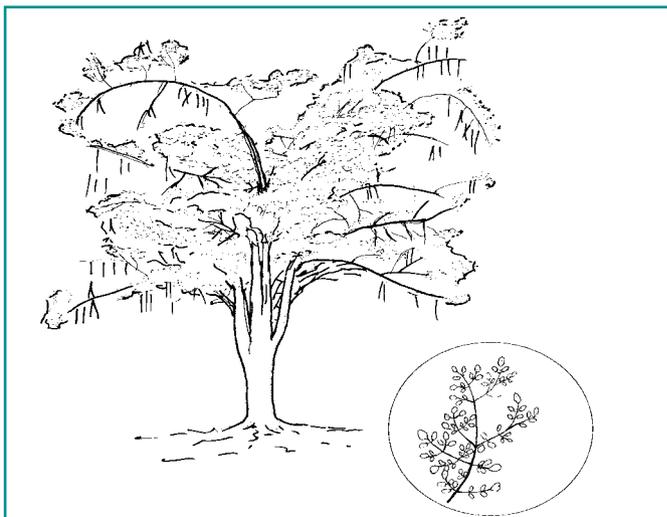
The Vihiga Farmers Action Network (VIFAN) aims to popularize useful agricultural and agroforestry technologies. Its integrated community development and health programme includes establishing family nutrition gardens in an effort to fight malnutrition, address micro nutrient deficiency and provide farmers with an opportunity to diversify their on-farm income.

The moringa tree project started in 2000 and the benefits to farmers have been considerable. When introduced into a farming system, moringa can provide an important safety net and help prevent households falling into poverty. The tree has considerable value and its bark and leaves can be used in many ways.

Moringa oleifera is a pan-tropical species that is known by many names. It is a shrub that grows into a small tree. In Vihiga, it is known as “*omunavulamu*” meaning that it gives health or “*mrina*” because it is mother’s best friend. Although there are more than 13 species of moringa within the monogeneric family *moringaceae*, *moringa oleifera* is the most widely cultivated species in Kenya. Moringa is already an important crop in most parts of Western Kenya and is especially prevalent in Vihiga where it has been grown for nearly ten years.

All parts of the tree are edible and have beneficial properties. Currently scientific research indicates that moringa is a nutritional power house and can be used to relieve up to 300 health problems. Not only does the moringa tree offer new business opportunities to small-scale farmers in Western Kenya, it also contributes to the development of their natural resources.

Moringa has many uses. Fresh leaves can be cooked and eaten as vegetables. Adding moringa to cattle feed has the potential to increase the milk yield of dairy cows and the daily weight gain of beef cattle by 30%. Moringa leaves also contain nutrients important to the development of pigs and poultry and the juice from fresh moringa leaves can be used as a plant growth hormone that can



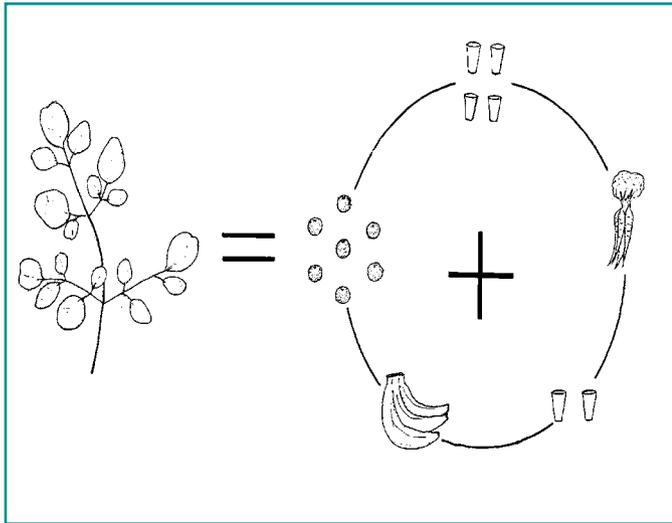
A moringa tree and its leaf structure

increase the yield of most crops by 25% to 30%.

Moringa leaves can also be used for biogas production, its shoots for green manure and the seeds of *Moringa oleifera* are recognized as one of the most effective primary coagulants in water treatment as they have the capacity to remove up to 99% of any bacteria present. The seeds harvested from a single mature tree – about 3kg – are sufficient to treat about 30,000 litres of water. Moringa’s purifying properties also make it an effective domestic cleaning agent and bio-pesticide. In powdered form moringa seeds can be used to treat bacterial skin infections. Moringa has commercial uses as well. Moringa oil, when used in cooking, has a quality similar to olive oil. It is also used to lubricate delicate machinery, fuel lamps and in the manufacture of soap, perfume and hair care products.

Taking the initiative

VIFAN participated in several of the high-value tree projects organized by the *World Agroforestry Centre (ICRAF)* including one related to the propagation and utilization of moringa. From this experience a project was developed that aimed to promote moringa as an essential household



From moringa seeds to the powders that can be sold to help relieve common complaints



Expressing valuable moringa oil using a ram press

vegetable. VIFAN works closely with social development assistants, community health workers attached to hospitals, the *Society for Women and AIDS* in Kenya and the *Ministry of Agriculture* in Vihiga and Western Province. Through these networks it has been able to stimulate interest in the moringa project.

Information on the benefits and uses of moringa were collected to demonstrate the value of establishing moringa gardens. VIFAN's outreach programme included community sensitization seminars and monthly forums. Information was distributed to self-help groups and during farmers meeting and women church leaders' conferences. Schools, hospitals and dispensaries were encouraged to plant moringa and training was provided for those interested in growing, managing and using it. Efforts were also made to further develop the technologies being used at village level to process and add value to moringa.

Early in 2005, VIFAN established the *Moringa Development Programme* and developed a social marketing strategy. Relatives and friends were encouraged to pass on their experiences of using moringa products to help promote the cultivation and use of organic moringa. An *Agribusi-*

ness Development and Marketing Centre was opened in Gambogi-Vihiga District to collect, package and market moringa powder. Posters describing the benefits of moringa were also printed in local languages as part of VIFAN's effort to meet a growing demand for information. Teachers were also approached because it was realised that what children learn at school is often passed on to the family at home. Books, booklets, pamphlets, T-shirts and hats were used to promote moringa as well.

There is a growing demand for moringa products. As more medical professionals and nutritionalists discover the effectiveness of using moringa to treat high blood pressure, diabetes, anaemia, TB and other disorders, a growing number of dispensaries and clinics are stocking moringa powder. It is much less expensive than conventional types of medication.

However, before farmers start or plan to up-scale moringa-based products, they need information on the opportunities and challenges they are likely to face. VIFAN keeps a careful watch on the way the moringa production chain is developing to ensure that opportunities for increasing production and upgrading are identified and promotional

Processing moringa leaf powder

Once leaves have been harvested, they are washed in warm water to remove sand and dust. During harvesting and leaf cleaning strict hygiene must be maintained and hands must be thoroughly washed with soap and a lot of water. After the leaves have been rinsed they are stripped from their branches and placed in a drying room or solar drier. The moist leaves are spread out on a table or screened tray in thin layers to allow air to circulate freely. The drying area should be kept very clean and although a window should be kept open for ventilation, the leaves must be protected against direct sunlight because this can destroy their Vitamin A content. The time leaves take to dry will depend on humidity levels. During the rainy season four days are needed but in the dry season two days are enough. Once the leaves have been dried they are crushed using a pestle and mortar, a mill-stone, a blender or sent to a posho mill depending on whether they are intended for domestic or commercial use. The powder is then sieved several times and stored in plastic containers and bags ready for sale.

activities are well focused. In doing so, it takes all aspects of the chain into consideration from strengthening seedling production and distribution to supporting the position of women on family land. It also lobbies for more research.

Challenges

But there are challenges. Moringa trees are susceptible to dipodia roof rot in waterlogged conditions and this can discourage farmers. Termites, caterpillars and birds feed on moringa leaves and if nurseries and plantations are not well protected cattle, goats and poultry will not only eat moringa seedlings but also any leaves within their reach. Improved processing methods and equipment are needed but it is difficult to find funds to up-scale activities and support farmers in gaining access to niche markets in the face of increasing competition from sophisticated international companies.

Extension services as well as NGOs, churches and government agencies concerned with improving the health and welfare of rural households can play a strategic role in overcoming these challenges by supporting the further development of moringa. As a dietary supplement, medicine

and marketable product moringa can help break the cycles of ill health, malnutrition and physical weakness that undermine the labour productivity of many rural communities. But promotion is essential. Marketing surveys are needed to monitor existing demand, identify new market opportunities and ensure that moringa products meet customer needs. As access to moringa products improves and new sales outlets are established VIFAN continues to focus on awareness and training.



Tree nurseries ensure the sustainability of NTFP activities and have a critical impact on the local ecology.



Good Weeds: an individual initiative

The good weeds project is an initiative of Mrs Hellen Murangiri, a farmer from Embu district in Central Kenya. She became interested in weeds as a source of nutrition and health and also saw business opportunities in processing them. Mrs Murangiri began to grow, harvest and process weeds long before she won the FAO award for the best focal area project in Embu District. Today, she owns a registered herbal clinic at Runyenjes which is known as the *Murangiri Herbal Clinic*.

Farmers consider many plants to be weeds because they compete with crops and are expensive to remove. But good weeds contain calcium, phosphorus, potassium, magnesium, manganese, zinc, iron and Vitamins A, B, C, E and K - all elements essential for human health. The good weeds identified by Mrs Murangiri include *bidens pilosa*, *comelina bengalensi*, *launea cornuta* (wild lettuce), *achyrtasia gargetica*, *oxygonum sinuatum* (double thorn), *crotalaria brevidens* (rattle weed or Ethiopian rattle box), *gynadropsis gynadra*, *porturacea oleracea* (purselane) and *basela alba*. *Launea cornuta*, for example, is an erect herb with underground rhizomes which can be eaten as a vegetable. It contains proteins, fibre, sodium, phosphorous, calcium, magnesium, potassium and Vitamin C. It can be used to treat stomach disorders and is an effective malaria prophylactic. Good weeds are especially important for those living with HIV/AIDS, children suffering from the prolonged effects of malnutrition and in helping relieve the specific problems of women and the elderly. Good weeds can also be used to increase the body's resilience to cancer, hypertension and diabetes.

Taking the initiative

Mrs Murangiri has increased her capacity to produce good weed powder by involving local farmers. She has trained them to domesticate good weeds, raise them as farm crops and process and package them for sale. Once weeds have matured they are harvested, cleaned, sterilized, chopped into small portions and put into solar driers until they are completely dehydrated. They are then ground into

a powder, packaged, labelled and sold. Mrs Murangiri has been able to produce 150kgs of good weed powder herself and in addition she now collects an additional 50kgs from local farmers. The enterprise has been so successful it is now able to employ three permanent members of staff and it can afford to hire casual labour when necessary.

Challenges

Mrs Murangiri has faced some challenges in establishing her enterprise. Sometimes it was difficult to convince farmers to domesticate plants they considered rabbit food. Young people - used to exotic vegetables - also had to learn the value of eating these good weeds. In addition, farmers had to be persuaded to abandon chemical farming to ensure that good weeds were grown in a healthy environment. It has also been difficult to maintain a steady supply of plant materials during the dry season.

Mrs Murangiri initiative shows that a well-chosen, small-scale farming project can provide an adequate and sustainable household income. Her plans for the future focus on ensuring sustainability. She now employs a professional organic farm manager and an increasing number of farmers have been trained in cultivating and processing techniques. Demand has increased and more and more people are coming forward with good weeds collected from their shambas and from the wild.

Farmers are trained to recognize the value of plants such as *Bidens pilosa*



Launea cornuta a good weed



A solar dryer used for drying leaves.

Feeding indigenous and dairy goats with *acacia tortilis* pods to enhance nutrition and improve the income of vulnerable women in Taita Taveta district

Thirty-four self-help groups came together in 1999 to form the *Acacia Ngua Mlambo Development Trust (NMDT)* - a membership organization operating in Taita district. In 2000, it was registered by the Kenya Government under the Trustees Perpetual Succession Act Cap 164. Current membership stands at 153 groups and the main goal of the organization is to facilitate the mobilization, organization and management of locally available resources in order to eradicate poverty and ensure sustainable development.

Taking the initiative

The organization's mandate is to ensure that her members are food secure, have sustainable incomes and improved nutrition. To accomplish this *Ngua Mlambo* partnered with *World Neighbours* to undertake a *Sustainable Agriculture and Rural Livelihood Programme* in which crop and livestock development, nutrition, the regeneration of the natural resource base and the strengthening of rural livelihoods and income opportunities were the principal objectives.

Five groups were supported in an effort to introduce dairy goats into the programme area. Three groups received dairy goats. The does and bucks were destined to help breed and upgrade the community's indigenous goats. One of the three groups involved was the *Tote Uplifting Women Group*. *The Tote Women Group* is located in Mlundinyi village in Taita district. The group was formed in 1988 and at present it has 30 members all of whom work in a arid and semi-arid environment. Rainfall is extremely erratic, crop failure is common and 80% of group members can be classified as vulnerable. In this environment poverty, food insecurity, water shortage and human-wildlife conflict are common problems.

Ngula Mlambo - in collaboration with *World Neighbours* - gave the group three bucks (two Toggenburg and one

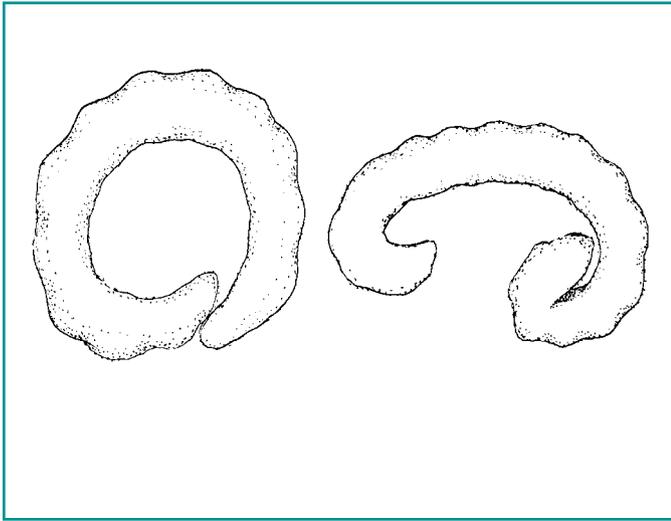
German Alpine) to help them upgrade their indigenous stock and increase milk production. The group established three buck camp stations at strategic locations within the community. The aim was to enhance the nutrition of group members and provide women with income generating opportunities.

Dairy goats require intensive management. Given local ecological conditions, feeding the goats during the dry season was a major challenge. In 2007, members started feeding their goats with the highly nutritious pods of *acacia tortilis*. The sale of these pods generated an income for the target group and information was exchanged on the pre- and post- harvest handling of the *tortilis pods*, their value as fodder and their marketability. Plans for the further development of *acacia tortilis* have been informed by the need to ensure biodiversity conservation.

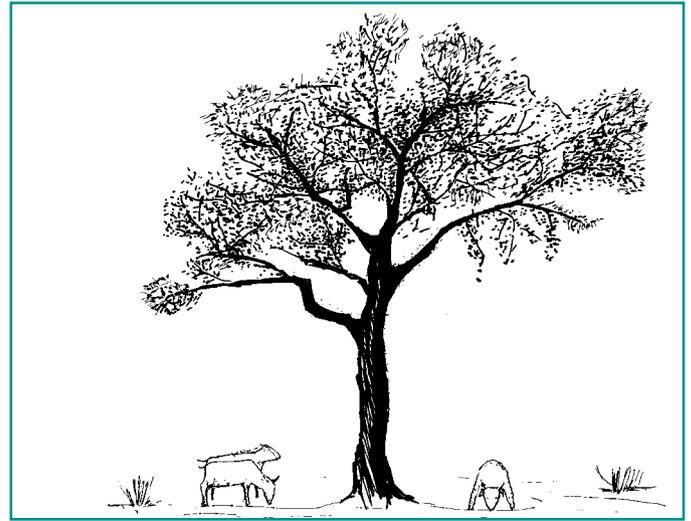
Acacia tortilis trees grow wild on range lands and farms. They can be domesticated by subjecting the seeds to pre-germination treatment like boiling or soaking in cold water before sowing or even passing them through a goat's alimentary canal to facilitate germination. Members subject the indigenous goats to a free range grazing system where goats are fed on dry pods that have already fallen. Since dairy goats were introduced into the group in 2007 management has become more intensive. Farmers collect freshly fallen pods, discard those that are diseased and either feed the rest to their goats or grade and store them for sale. Goats are fed about 3kgs of acacia pods a day in addition to a ration of shrubs and twigs.

Acacia pods are highly nutritious and rich in proteins and carbohydrates and goats fed on acacia pods gain weight rapidly. This means farmers no longer have to pay for supplementary commercial feed. In addition, local goats as well as cross bred and dairy goats produce more milk when fed on acacia pods and the additional income generated by the sale of milk is particularly important for women.

Communities have become increasingly aware of the value of the acacia tree and as a result more attention



Acacia tortilis pods



Goats feeding on Acacia tortilis pods

is being given to conservation and protecting the acacia tortillas from short-term exploitation by charcoal burners.

Challenges

The *Acacia Ngua Mlambo Development Trust* faces many challenges. Acacia pods are seasonal and efforts need to be made to ensure their year round availability. The properties of acacia pods also need to be documented with specific reference to the nutritional value of the pods. Several lessons can be drawn from the experience of the *Acacia Ngua Mlambo Development Trust*. In arid and semi-arid areas feeding goats with acacia pods has many advantages. They provide an excellent source of nutrition during the “lean” period and when crushed and mixed with other feeds they can be used to fatten goats. Acacia tortilis is also an excellent alternative to expensive commercial feeds and in rural communities the collection of acacia tortilis pods provides income generating opportunities for many women.

The *Acacia Ngua Mlambo Development Trust* now works with some 153 groups and its primary concern is the up-scaling of the *acacia tortilis* project. It is currently seeking

support from the Ministry of Agriculture and other NGOs involved in goat rearing projects. In order to extend the benefits of *acacia tortilis* to other communities, it emphasises the need to document and communicate experiences with *acacia tortilis*.

At work in the forest

Honey production in Gatunyu: a farmer's experience

Kavingoni Beekeepers – the *INADES* Formation

Bees solving community conflicts:

Wanjuki Beekeeping Self-help Group

Beekeeping offers a livelihood in arid and semi-Arid lands



Honey production in Gatunyu: a farmer's experience

Experiences from Gatunyu, Kiambu District in Kenya's Central Province illustrate how one farmer can inspire a self-help initiative. Mrs Jecinta Waweru – a member of the *Gatunyu Farmers Group* and a vegetable producer - received training in honey production from the *Community Sustainable Development Empowerment Programme (COSDEP)* and went on to set up beekeeping activities on her 1.5 acre farm.

Taking the initiative

The initial costs of setting up a beekeeping enterprise are not high. Beekeeping is not labour intensive and it requires minimal capital investment. With occasional help from family members and hired casual labour Mrs Waweru has been able to develop her enterprise alone. To attract bees, she planted the trees and flowers they liked – calliandra, macadamia, white supporter - as well as fruit trees such as avocado and banana which are also useful sources of food. If bees have good forage they live longer and collect more. To make sure there were sufficient flowering plants for her bees she also provided neighbouring farmers with sunflower and calliandra seeds. Her neighbours benefited from this arrangement in two ways. Positioning bees near sunflowers stimulated pollination and leads to a 60% increase in yield and - when sold to vegetable oil traders - the harvested seed provided a good return. Another advantage of encouraging bees into the area has been that vegetable crop pollination has improved.

Mrs Waweru has seven Kenya Top Bar hives (KTBH). They are affordable and easily available because they are made locally. She used her own timber to construct them and a local carpenter made them for her following the standard specifications provided by the *Ministry of Livestock Development*.

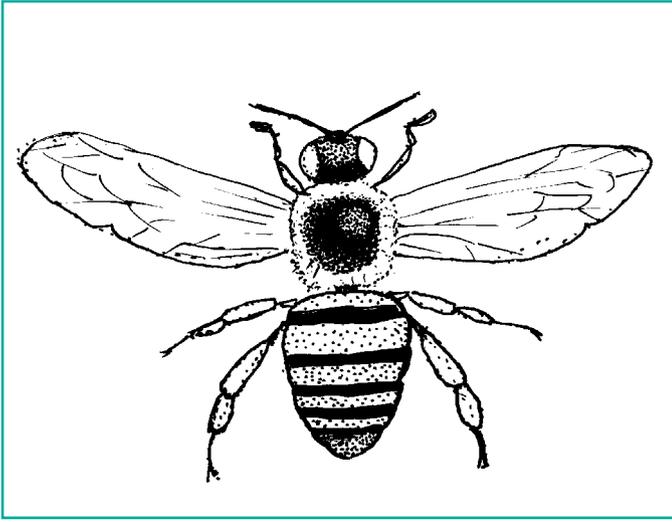
Knowledge and skill are needed to manage bee health and productivity. Mrs Waweru's hives are situated close to the homestead so she can inspect them at least twice

a week. They have been hung in sheltered areas safe from high winds and where there is sufficient shade to ensure that the temperature within the hives is well regulated. They have also been placed as far away from schools, homes and roads as possible to minimize problems.

Hives are vulnerable to pests and diseases. In addition to keeping the ground around the base of the trees clear of vegetation, oil is usually spread on their bark to prevent ants climbing up and raiding the hives. Mrs Waweru has also constructed water tanks in the vicinity of the hives to ensure bees have sufficient moisture. Stones - carefully positioned in the tanks – ensure that the bees can alight and drink without drowning.

The Kenya Top Bar Hive is superior to the log hive and makes it easier for beekeepers to carry out routine checks. They can easily see when honey is ready for harvesting and the productive capacity of the KTBH is higher than the traditional log hive. There are different types of KTBHs. Some are designed to be hung in trees while others are mounted on legs and can be placed in suitable positions on the ground.

Honey is harvested twice a year - in June and December. Work begins in the late evening or early morning when bees are less active. Mrs Waweru uses family or hired labour to actually harvest the honey because - according to her cultural traditions - women should not climb trees. During harvesting protective clothing - including gloves, veil, overalls and gumboots – is worn and the harvester carries a smoker, knife and bucket. Some combs are left behind in the hive after harvesting so the bees will have enough to eat and not be tempted to migrate. Honey is extracted by crushing the comb and running it through a sieve until it is sufficiently clear. It is then left in a clean plastic container so remaining impurities can rise to the surface and be removed. Mrs Waweru packs her honey in 1kg containers and sells it either at the local market or directly to her neighbours. Because her production



During the dry season efforts must be made to prevent worker bees from deserting their hives



Flowers that bees love

costs are low she is able to use part of her profit to develop her farm further.

Challenges

Despite the success of her beekeeping activities, Mrs Waweru also faces challenges. These include poor infrastructure which adds to transport costs, the difficulty of attracting bees which keeps the rate of expansion low and her fears that – as beekeeping practices change – she may not have the time or money to invest in learning new techniques and acquiring the modern beehives or processing and packaging equipment needed to meet changing market demand. However, she is determined to gradually up-scale her project. She has been keeping records of her beekeeping activities so she can monitor progress and she also keeps in touch with developments taking place in the beekeeping and honey production sector.

Kavingoni Beekeepers the *INADES* Formation

Kavingoni beekeepers self-help group is located in Kathonzeni location, Makueni district, in the Eastern province of Kenya. The area is characterized by low rainfall and high temperatures with bushes and shrubs as the main vegetation cover. Subsistence agriculture dominates and poverty levels are high: 64.3% compared to a national average of 52%. Drought and famine are endemic and sometimes the community has to depend on relief food to survive.

Taking the initiative

To cope with this situation, Kavingoni farmers have taken up beekeeping. Small-scale farmers with a common interest in beekeeping started the group in 2001 and a year later formally registered themselves with the Social Services Department. Currently the group has 34 members 10 of whom are women.

Their initiative attracted the support of the *Makueni Agricultural Project (MAP)*. It supplied them with 160 langstroth hives and a honey extractor so they could increase extraction efficiency and honey quality. The hives were provided on a cost sharing bases with the farmers contributing 25% of total costs. The number of hives each farmer could buy depended on his or her resources but each farmer in the group had at least one langstroth hive.

The hives were placed near the homestead at a time of year when trees were in flower and bees were beginning to swarm. It can take between one week and six months to colonize a hive depending on the site. To facilitate colonization, farmers use some shrubs or goat oil to treat the hives. Because the hives are positioned close to where farmers live and work they can be inspected as part of regular farming activity.

The farmers have planted trees around their homesteads to provide forage for their bees and for their own domestic use. The group manage a commercial tree nursery with over 5000 seedlings of different tree species to provide seedlings for group members and the local community. These

activities have contributed to environmental conservation in the area and the money raised by the sale of seedlings is invested in other projects selected by the group. One such project involved constructing poultry houses for group members.

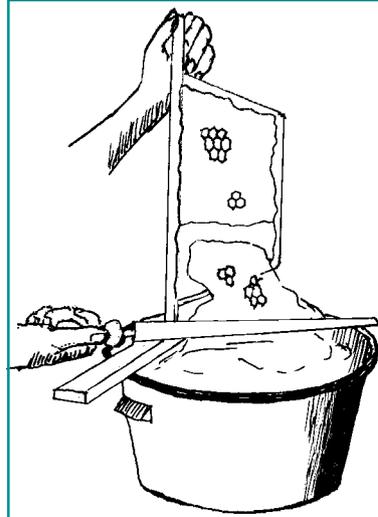
Since 2002, there has been a marked improvement in the quantity and quality of honey produced. It now meets the standards set by the national beekeepers association for sale on local and national markets. The group has branded and packaged its products and although the honey is sold collectively each farmer receives a return equivalent to the amount of honey he or she supplies.

Challenges

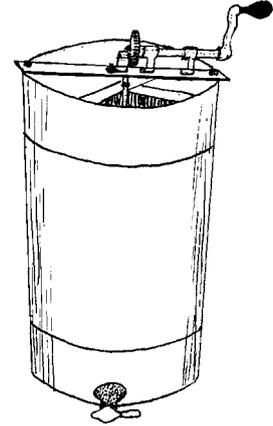
Amongst the challenges facing beekeepers in arid areas are the frequent and prolonged periods of dry weather. Under these conditions yields fall and bees may abandon their hives. Experience has shown the Kavingoni group that planting trees bees love can help stop them migrating during the dry season. Supplementary feeding also helps but this requires high standards of hygiene.

The Group depend on middlemen for marketing and market information and this affects the amount the beekeepers are able to earn. The Group realise the importance of building up their own network so they can judge market demand, fix their own prices and resist pressure from brokers and marketers. Negotiating bulk deals with traders might offer a secure market but transport costs are high and this affects earning. If local markets could be further developed there would be less need to rely on external markets. Building up local demand means that time will have to be invested in sensitizing local communities to the medicinal and nutritional value of honey.

As demand for honey grows, pressure to expand production increases. One of the difficulties facing Kavingoni beekeepers is it is not easy to get more farmers to take up beekeeping. Currently, the Group has to purchase honey from non-members to keep up with demand but more predictable supplies are needed to ensure the sustained operation of its extraction plant and to enable it to fulfil its contracts. With support from the *African Institute for Eco-*



Extracting honey the traditional way



Beekeepers need modern equipment like this extractor to maintain the quality of their product and the interest of their customers

Beekeepers can benefit considerably from modern equipment. Using a honey extractor, for example, instead of traditional crushing and sieving methods increases extracting efficiency, leads to improved honey quality and enables beekeepers meet the quality standards of the *Kenyan National Beekeepers Association*. However, this type of equipment is difficult to obtain and most traditional beekeepers cannot afford it.

conomic and Social Development (INADES Formation) scaling-up activities are being planned and when training opportunities become available more farmers may be stimulated to take up beekeeping.

Beekeepers have become particularly sensitive to the quality of the local environment. Tree planting activities to ensure sufficient forage not only directly affects the health and productivity of the bees but also helps secure essen-

tial ecological services. A serious problem that has led to considerable mortality amongst worker bees is the dependence of local cotton growers on chemical pesticides. The *INADES Formation* is trying to deal with this problem by promoting organic cotton growing in the district.

Bees solving community conflicts: *Wanjuki Beekeeping Self-help Group*

The *Wanjuki Self Help Group* has often had conflicts with the Forest Department over access to the Mucheene forest. The Kironya water catchment is drying out and wild animals - especially elephants - increasingly cause damage to homesteads and crops in their search for water. Beekeeping was seen as a solution that could lead to the restoration of catchments through reforestation and at the same time provide farmers with an environmentally friendly source of income.

Initiating the process

Wanjuki Self Help Group is an initiative of 30 small-scale farmers in Muruguma village in Meru Central District. These farmers practice mixed farming on small land holdings of about 0.6 hectares. To supplement their livelihoods they depend on the Mucheene Forest where they get firewood, herbs and medicines as well as fodder for their animals. In the early 1990s, the community was banned from grazing livestock in the forest because of the extensive damage caused by illegal tree cutting. Overgrazing resulted in soil erosion which in turn damaged the catchment areas. The community reacted strongly to this sudden ban and members rioted against the forest management decision. They started to cut down trees illegally and even set fire to the forest. As a result the water catchments dried up completely and wild animals – desperate for water – started storming homesteads and demolishing water tanks. The problem of water scarcity and animal damage encouraged the communities to form a Forest Users Group and together with the Forest Department they began to make plans to rehabilitate the catchment areas and protect the forest and its ecological services. One of the interventions was to start beekeeping in the area and in 1997 the *Wanjuki Beekeepers Project* came into being. As a first step - efforts were made to conserve and plant forage trees. Over the last ten years the beekeepers have planted 3000 trees in and around the Mucheene forest and these efforts have

not only contributed to the productivity of their hives but also to the rehabilitation of the heavily eroded catchment areas.

Beehives located on members farms and in the forests have helped discourage elephants from grazing in cultivated areas. The Group now has 30 members who between them manage some 300 hives. Stocked with bees, these hives hang some 6 meters above the ground in mature trees where there is good quality forage. However, fire restrictions in the forest mean that honey must be harvested without the use of smoke and the beekeepers themselves cannot afford protective equipment or clothing. Harvesting honey under these conditions is far from safe.

Once collected the honey is sold in unrefined form because the Group does not have the expertise or equipment to process it further. Honey is not sold collectively. Each farmer sells as much as his or her hives have been able to produce.

Beekeeping has helped reduce poverty at household level and while some farmers have used their earnings to pay their children's school fees, others have reinvest it in their farms. Community involvement has been important in this project not only in supporting the conservation of the forest and creating a bee-friendly environment but also in ensuring that no honey is stolen from working hives.

Challenges

Poor harvesting and processing techniques seriously reduce honey quality. The challenges faced by the *Wanjuki Group* are familiar to beekeepers all over Kenya. Modern beehives and equipment for handling bees and their products are in short supply and because of their lack of protective equipment and skill many beekeepers are hurt during harvesting.

Plans have been made to strengthen the Group's beekeeping activities. They intend to hire an extension worker on a one-year contract to provide training for members and support environmental conservation efforts. The proposed extension worker will help the group plan and monitor its beekeeping activities as well as help members to source funds to buy a modern honey extractor, organise product

quality assessment and create a wider market for the honey produced. Plans are also underway to plant 5000 trees with seedlings provided by *Mucheene Forest Management* with labour supplied by the Group.

As technology changes, there is a need to adopt modern beekeeping equipment capable of producing good quality honey in larger quantities. The Group, therefore, wants to up-grade their bee-handling equipment and purchase modern tools. They also need support to enable members to market their honey products more effectively. More market information is needed to enable beekeepers to promote

their product themselves and avoid being dependent on brokers who may only be prepared to pay low prices. The Group is aware that it will take some time before they are able to produce market quality honey at a reasonable price and during this intermediary period they are being supported by the *Ministry of Agriculture, KARI* and tertiary institutions such as the *Methodist University, Meru*.

Beekeeping offers livelihood opportunities to communities living in semi arid and degraded environments



Beekeeping offers a livelihood in semi-arid lands

Beekeeping is proving an important source of livelihood for communities living in the arid or semi arid areas of Kenya. *The Sustainable Agricultural Community Development Programme (SACDEP)* has been supporting a self-help group in the Mwinga district of Eastern Kenya. The Group has established the infrastructure of water and plants needed for a successful apiary and SACDEP continues to encourage its members to produce good quality honey so local households can get optimal benefit from its nutritional and medicinal properties.

Taking the initiative

To make a living in arid and semi-arid conditions requires skill and creativity. Droughts are frequent and often the only way to get food is through “Food for Work” relief programmes. It was against this background that the *Mutanda Self Help Group* was set up in 1996 with the objective of working together to improve livelihood opportunities.. The idea of setting up the group came from an elder in Thaana Nzau village who had been taught traditional beekeeping skills by his father. He had also seen the positive effects of self-help groups in other areas and convinced community members that beekeeping would deliver positive results. In this way the *Mutanda Self Help Group* came into being and today it has 25 members - 12 women and

Training: from colonization to healthy hives and incomes

SACDEP focused on training beekeepers in the skills they needed to encourage bees to colonize their hives and to ensure they remained healthy and productive. During the training the *Mutanda Self-help Group* learned to attract swarms using a catcher box and - once a hive had been settled - the best way to protect it against pests and disease.

The Group also learned how to harvest honey using large clean plastic buckets, kitchen knives, hive tools and a bee smoker. Dressed in a protective overall, veil, gloves and gumboots, the beekeeper is instructed to light the bee smoker and approach the hive from behind. After smoking the entrance to the hive twice and removing the roof, the hive tool can be knocked against the bars to identify the ones that contain combs. A high pitched sound indicates the bar is empty while a dull echo indicates the presence of combs.

After checking to see that the combs are well capped and the honey is ready for harvesting some of the filled combs are removed from the bars, placed in the bucket and covered. The bars are then returned to the hive. Three or four full combs are left in the hive to ensure the bees have sufficient food to continue their work. At the peak of the dry season, bees are given supplementary feeding to prevent them deserting the hive. Sugar diluted with clean water at a ratio of 1:1 is made into a syrup and put into feeders so the bees can find it easily

The honey is refined in clean dry surroundings. It is melted gently by heating it indirectly in medium-sized stainless steel saucepans that have been placed in larger water-filled containers. The honey is strained into a bucket through a double layer of fine netting. Any scum that floats to the surface is scrapped off. The honey is then packed and labelled ready for sale.



Trainers help new groups to master the basic techniques of beekeeping

13 men all between the ages of 45 and 60 years. One of the Group's first activities was to raise money to buy a pump so they could get water from the Tana River to their farms and homes. It proved difficult finding a donor to finance this project so - in the meantime - they decided to help one another in other ways. Members entered into a merry-go-round agreement and agreed to contribute a certain amount of money to the Group each month. The amount collected was then handed over to each member in turn until everyone in the Group had had a chance to benefit. Money generated in this way enabled members to make investments they would not otherwise have been able to afford and helped them meet their immediate household needs.

Farmers like Justus Ngangi were using the forests around their homes to produce honey. They used traditional log hives and traditional harvesting methods. Harvesting honey at night, they wore no clothes to reduce the risk of being stung. They sold the honey cheaply in unrefined form to other villagers.

Mr. Ngangi and other group members have now been trained in modern beekeeping techniques by SACDEP, Kenya. On-farm as well as institutional training and expo-

sure visits are being used to pass on beekeeping skills. SACDEP also helped the farmers get Kenya Top Bar Hives and bee-handling equipment like overalls, veils, gloves and smokers. This new equipment has increased the income of the *Mutanda Self Help Group* and enabled it to fund further improvements in refining and packaging their honey. SACDEP combined training farmers in the technical aspects of beekeeping with making community members aware that good quality honey had important nutritional and medical properties. Therefore, to ensure local demand for their honey, quality had to be maintained and any temptation to adulterate it had to be resisted. Beekeepers also came to realise the need to conserve their bees' woodland foraging area and to avoid destructive practices such as charcoal burning.

Challenges

Drought and long periods of dry weather are a major challenge to the small-scale beekeepers of the *Mutanda Self Help Group*. During the dry months honey production is low and there is a constant danger that bees may desert their hives because they cannot find sufficient forage.

KTBH and bee-handling equipment are expensive and often beyond the reach of small-holder farmers. These initial costs can be reduced, however, if communities are trained in hive construction. A more serious challenge is the problem of market access. Although the demand for honey continues to rise as the population grows and consumer tastes and preferences change, it is still difficult for small-holder beekeepers to access mainstream markets. These are extremely competitive and demand regular supplies of specified quantity. To some extent these problems can be overcome by creating beekeepers associations to handle marketing issues.

Health and welfare

Stinging nettles: a local tradition helps revive health and welfare

Promoting *Prunus africana* as a herbal medicine

Conservation through utilization: on-farm pharmacies

Commercializing an indigenous medicinal plant: *Mondia whytei*



Stinging nettles: a local tradition helps revive health and welfare

The *Rift Valley Stinging Nettle Community* harvests, processes and markets stinging nettle in Molo and Nakuru districts. Fifteen self-help groups as well as women and youth groups are involved in its activities. Most of the *Community's* members are small-scale farmers who practice organic farming and live in the vicinity of government forests. In Kenya, the stinging nettle - referred to in Swahili as *llaila* grows in forested, highland areas some 2500 meters above sea level. Those living in or near the Mau forest have been using it as a traditional food for generations and it was known to be particularly beneficial for pregnant and lactating mothers. It can also be used as a food supplement for weaning children and the sick. However, as human settlement increased, the forest was exploited and degraded. Land was cleared for crops such as maize and wheat and eating habits changed. The nutrient rich nettle lost its prominence in local diets.

The stinging nettle (*Urtica massaica*) is a perennial plant belonging to the nettle family *Urticaceae* and it grows best in shaded, moist wooded areas. It has spiny hairs and when touched these break-off transforming the hair into a needle that can inject a cocktail of poisons. This mix of poisons causes the sting which gives the species its name. The leaves of the stinging nettle are about 10 cm long, roughly heart-shaped with serrated edges. It can grow to a height of about one meter and the flowers that develop on the nettle later fall off as seeds. The plant propagates itself through its rhizomes or underground roots.

Initiating the process

Initially the *Rift Valley Nettle Community* consisted of self-help groups working independently of each other to improve the livelihoods of local communities. In 2003 - stimulated by the *Network for Ecofarming in Africa (NECOFA)* - these groups came together, established the *Tuko Organic Producers Association* and started growing nettle

as a domestic crop. The *Rift Valley Nettle Community* with the support of *NECOFA* and the *Slow Food Central Rift Convivium* is domesticating the stinging nettle and supports farmers in managing, cultivating and processing the plant. Today, some 180 women and 150 men – members of the *Rift Valley Stinging Nettle Community* – are involved in this activity.

NECOFA has played an important role in building up the capacity of network members to manage the production, processing and marketing of nettle products. Together with farmers, it has carried out research into the technologies and conditions that would enable effective organic cultivation. It has also taken responsibility for linking farmers to market outlets and promoting and marketing nettle products at food fairs and agricultural shows. As a result the *Rift Valley Stinging Nettle Community* has been able to progress from producing small quantities of stinging nettle powder using a pestle and mortar to growing large enough amounts to justify industrial milling.

Nettle powder has a sweet, pleasantly mild taste. It resembles chamomile tea but it has strong medicinal and therapeutic qualities. Its leaves are rich in calcium and iron. Herbal practitioners and the *National AIDS Council*, for instance, have identified stinging nettle as an important nutritional supplement in the management and care of HIV/AIDS. It is also an effective anti-fungicide.

The stinging nettle has many culinary uses as well. It can be taken as an infusion or health drink, added to millet or sorghum porridge or used as a weaning supplement. When cooked, the leaves can be eaten as a green vegetable. The *Rift Valley Nettle Company* - with the help of such organisations as the *Slow Food Movement* and the *Terra Madre* - has been working to stimulate the international market for nettle powder. In 2004, for example, nettle products were exhibited at *Terra Madre's* annual international meeting of food communities in Italy. At the present time about 1.5 tons of ground nettle powder is being sold annually and these sales have had a strong socio-economic impact. Stinging nettle products are now an important source of income for all members of the *Rift Valley Nettle Community* – especially women and young people.



Milling nettle leaves for commercial use



Packing nettle powder



Displaying nettle powder at local shows

The production and processing of *Urtica massaica* – the stinging nettle



Community members harvesting nettle leaves with gloved hands

The process of producing the powder involves propagated the plant through cones/rhizomes on well-manured soil until the leaves are sufficiently developed for harvesting some six months later. Whilst leaves can be harvested throughout the year, the most productive period is during the rainy season. The process is not mechanized and collectors have to be careful because the hairs on the plant can sting even through layers of clothes.

Once the leaves have been harvested they are laid out to dry. High temperatures can destroy nutrients so drying takes place in shady, well-ventilated buildings. This also helps preserve the colour. Abandoned timber mills, for example, are sometimes used as drying sheds because they are both large and well ventilated. The drying process takes about a week to ten days depending on humidity levels and the wind. Once the nettles are dried, they are roughly crushed to remove their stalks and stems. Pestles and mortars are used to ground the leaves into a fine powder for domestic use while leaves destined for more commercial purposes are taken to a local mill to be roughly ground and packed ready for sale. Once they have been treated, the sting becomes ineffective and - in fact - the mild venom adds to the nutritional quality of the product.

One elderly woman - who had lost her house and livestock due to ethnic clashes - has bought a new house and livestock with the proceeds from this project. Another member, a young man whose resources did not allow him to further his education, is now able to help his family and support his younger brothers and sisters through school. Other members of the Community are using money earned from nettle production to participate in a revolving fund to enable them to meet household expenses, school fees and generally improve their standard of living.

Challenges

One of the major challenges in promoting stinging nettle cultivation is the lack of adequate research and documentation. Most of the information on domesticating and processing nettle relate to species not found in Kenya. As a result the Community - supported by *NECOFA* – have had to learn by trial and error.

Although progress has been made with the domestication of the stinging nettle, community members still gather it from the wild. Continued deforestation has forced them to venture deeper and deeper into the forest and this compromises the safety of women members in particular. Culturally, women also experience problems with the type of protective clothing – trousers – that have to be worn to protect the body against stings.

Drying nettle leaves is labour intensive. They have to be kept away from direct sunlight and turned regularly – even at night. To meet this challenge *NECOFA* and the Community are looking into the possibility of acquiring solar drying systems.

The group also face challenges in marketing their nettle products. There is a widespread negative attitude to the nettle as a vegetable and in some communities it is known only as a medicine. *NECOFA* is putting extra effort into giving publicity to the variety of stinging nettle products available and has set up promotional sessions on food and nutrition.

NECOFA is also working to upgrade its activities. It has registered itself as a company under the name “*NECOFA*

Health Products” with its members as shareholders. The company’s mandate is to explore further markets for their product and to find ways of adding value to it by developing packaging and presentation in a way that appeals to different categories of customer. At the moment *NECOFA* products - sold through supermarkets - are packed in small containers. To attract new customers and add value to the product plans are being made, for example, to sell the powder in tea bags to make it easier to brew infusions.

Promoting *Prunus africana* as a herbal medicine

The *Community Food Environmental Group (COFEG)* is a community forest association located in Molo district, in the West Mau forest block of the Rift Valley province. It was founded in 1995 on the initiative of S.J. Amisi. Most of its members are small-scale farmers many of whom were already involved in CBOs.

Initiating the process

The community - consisting of 600 members - works to collect seeds, establish plant nurseries and teach members how to propagate indigenous forest species on their farms. It deals with many different types of plants and trees but the focus at the moment is on *Prunus africana* commonly known as the African plum or *Red stinkwood*. The tree, which is on the United Nations *CITES* list of endangered species is known and used locally for its medicinal properties. It is particularly vulnerable because its timber is also in demand. *Prunus africana* grows in highland areas above an altitude of 900 meters. In Kenya it is found in South Nandi, the Central Highlands, the Mau Ridges, the Cherangani hills and in the Londiani and Kakamega forests. Deforestation has reduced the number of trees and irresponsible harvesting of the bark is putting the existing population at risk.

Despite massive deforestation, encroaching human settlement and the re-allocation of land to agricultural use, there are still communities who depend on the forest and its resources. They regard the forest as a larder and pharmacy and it provides them with fruits, medicinal plants, herbs and small animals. For generations they have successfully managed their natural resources but these management skills are now in danger of being lost and, along with them the sustainability of the forest environment.

COFEG's main objective is to re-establish a thriving population of *Prunus africana* and to educate the community in the sustainable harvesting and utilisation of its bark. They have been motivated by the successful programmes

carried out by community groups in the Cameroon and Madagascar. In the Kilum forest in Cameroon, the species plays a protective role in the demarcation of forest boundaries and it is illegal to fell *Prunus africana* without special permission. *COFEG*'s protocol for sustainable harvesting in the Mau forest is based on the Cameroonian experience. Because the natural population of *Prunus africana* is very low and scattered, *COFEG* has taken the initiative to farm this tree like any other cash crop and has taken the lead in seed collection, nursery management and establishing woodlots. This on-farm planting has made it possible for the Group to get enough seeds to ensure further propagation and sufficient bark to meet market demand. Seeds are collected and packed in nylon sachets filled with special soil scooped from the forest. These sachets are watered for about two to two and half months and - when the seedling are well germinated - they are planted in farmers' fields. A recent survey indicated that to date *COFEG* has successfully established over 20,000 *Prunus africana* seedlings on farm woodlots.

COFEG assists the communities in harvesting bark and adding value to prunus materials. Bark is only harvested from mature trees and great care is taken to avoid damage. A fraction of bark is peeled from the tree using a cutlass or specially designed tool. This is done in panels that begin one meter above the ground and end at the first major branch. Bark is harvested once a year for a period of eight consecutive years.

Both the bark and the leaves of *Prunus africana* have nutritional and medicinal properties. The leaves are picked and used as tea and the bark can be harvested, dried and powdered for use as a nutritional supplement. *Prunus africana* has a unique combination of chemical compounds that work to prevent benign prostatic hyperplasia, a condition seen in middle-aged and elderly men. Its extracts also provide a mild and well-tolerated treatment for both bacterial and non-bacterial chronic genital infections. They are equally effective whether taken alone or in combination with antibiotics.

Traditionally *Prunus africana* bark was pounded in water to a red liquid which - when drunk - helped to relieve stom-

ach aches and chest infections. Infusions made from the leaves were used to treat fever in both adults and children. The Nandi community, for example, use medicine extracted from *Prunus africana* bark to treat hoof infections in cattle. Today - with help from COFEG - bark collected from mature *Prunus africana* is dried in the open and then crushed into smaller pieces. This crushed material is then taken to a local posho mill and once it has been ground it is packed in sachets. Each sachet is clearly labeled with a prescription tag indicating how the powder should be used. COFEG is also working to sensitize people to the value of *Prunus africana* in treating other ailments as well. Its marketing efforts are supported by the *Network for Ecofarming in Africa* (Kenya) and there are plans to establish a marketing council to promote *Prunus africana* bark and other NTFPs as well.

Challenges

Challenges have been encountered. The population of *Prunus africana* on farmland and forest estates remains low and this affects the production of bark and seeds. Also *Prunus africana* seeds do not germinate easily. Therefore, other methods of propagation need to be explored like taking cuttings or perhaps using tissue culture techniques. In addition, the tree itself takes a long time to mature. However, there is a growing awareness of the value of conserving *Prunus africana* and this has motivated community members to continue planting it on their farms. Efforts are being made to up-scale the *Prunus africana* project. In addition to sensitizing local communities, the Government - through the *Kenya Forest Service* - is being asked to assist registered CFA to establish *Prunus africana* woodlots on both farmlands and forest estates. COFEG is also lobbying the Government through the *National Community Forest Association (NACOPA)* to formulate regulations and develop a forest management plan which will enable group members to have access to the forest and its products.

Conservation through utilization: on farm pharmacies

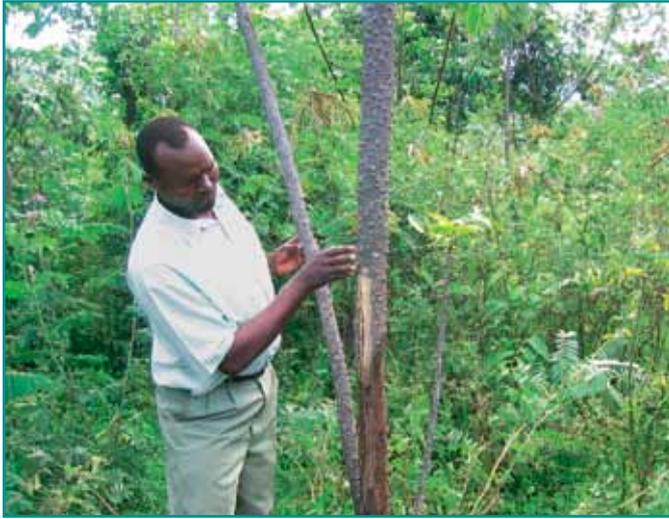
Prunus africana, *Warbugia ugandensis* and *Zanthoxylum gilleti* commonly known as the Red stinkwood, East African Greenheart and East African Satinwood respectively are indigenous tree species that can be found in moist rainforests. All three species are currently over-exploited and there has been little planting. As forests continue to dwindle there is an urgent need to cultivate these essential tree species on-farm.

Traditionally, the sustainability of high value trees was ensured by myths restricting over-exploitation. For example, trees should not be left without roots, bark should never be removed from all around the tree, heavy branches should not be broken to reach leaves and some seeds must always be left for planting. However, as the human population increased and forest cover declined little was done to check the growing social permissiveness that led to the destructive exploitation of these important tree species.

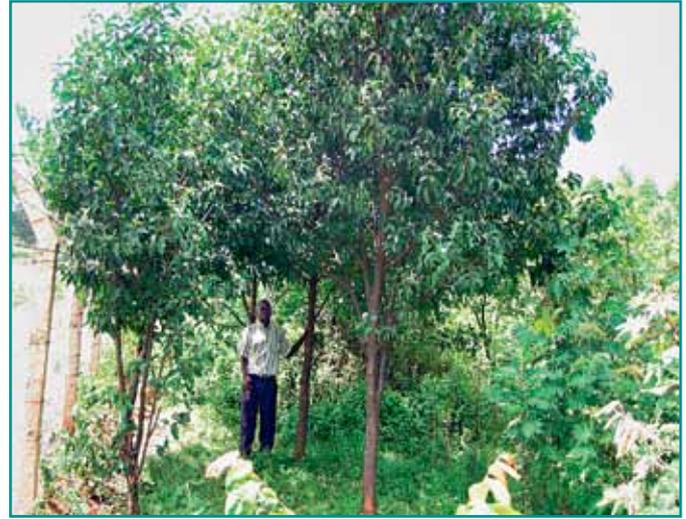
The *World Agroforestry Centre (ICRAF)* and her partners in Western Kenya have set up a pilot project funded by the *European Union* to integrate high-value trees on farms. The project planned on-farm tree growing activities in Vihiga and Siaya districts while in-situ conservation efforts were concentrated in the Kakamega area.

Western Kenya has a tradition of tree planting and *ICRAF* and *KEFRI* have anchored their project in the knowledge and traditions of these local communities. First, they carried out participatory community tree species ranking. Farmers identified the tree species which used to be in the community, how the trees were used as well as use according to gender. Medicinal tree species received the highest ranking. If farmers could be encouraged to plant these trees on their farms they would – in fact - be creating on-farm pharmacies.

Using the information gained during these participatory inventarisations sessions, farmers in Emuhaya and Yala divisions were introduced to the objectives of a project



Irreparable damage has been done by unskilled collectors



A farmer standing amongst his Prunus Africana

that aimed to re-establish the species they had identified, improve lost biodiversity and contribute directly to community health and welfare. Farmers wishing to take part in the project would be trained in the management of on-farm woodlots.

Calculations were made to establish how much farm acreage would be available and how many trees would be needed to stock the proposed woodlots. *KEFRI* took responsibility for collecting seed and together with farmers it established nurseries to raise the required number of seedlings. Farmers were trained in simple methods of tree cultivation and sustainable harvesting. Training sessions on making the concoctions needed to treat different types of diseases were organised and posters were developed for use during these training sessions.

Bark is already being harvested from the more mature on-farm pharmacies. It is collected in paper bags and taken back to the farmer's home. Here - depending on the patient's needs - it is washed and then boiled in a clay pot. Water is added until all the ingredients are evenly covered. The pot is then tightly sealed and put on the fire where it is left to boil until steam starts to break through the cover.

When the concoction has cooled it is ready for use. Colds and allergies as well as upper respiratory tract infections can be treated by the steam produced during the boiling process although care should be taken to avoid scalds. When stomach ulcers are being treated with concoctions derived from these tree species, it is advisable for patients to go for a barium meal test before and after treatment so its effectiveness can be assessed.

The market value of bark from medicinal trees is considerable and traditional medical practitioners require several kilos of bark from each species every week. This makes the project attractive for young people. One group that has recently become involved in the project is the *Salem Youth Group*. At the moment its members have about 10,000 young *Prunus africana*, 2000 *Warbugia ugandensis* and 1000 *Zanthoxylum gillettii* plants in their nursery.

Challenges

In the communities covered by this project there is a high incidence of families living with HIV/AIDS and other diseases. The expense and lack of success of conventional medicine has created a demand for traditional (herbal)



Care must be taken when harvesting *Prunus africana* bark

medicine. Demand for materials derived from *Prunus africana*, *Warbugia ugandensis* and *Zanthoxylum gilleti* continues to grow but difficulties in accessing bark and other tree parts prevent farmers from taking advantage of this market to improve their household income. Although efforts are being made to establish on-farm wood lots, it is difficult to keep pace with the rate at which the destructive extraction of medicinal products from natural forests continues to take place.

Other challenges faced by CBOs and farmers engaged in on-farm pharmacy projects can be illustrated by the experience of the SALEM Youth Group. Funding for their project came from ICRAF and when ICRAF's commitment came to an end, the Group found it extremely difficult to raise community funding to enable the project to continue. This brings into question the issue of how to ensure the sustainability of this type of initiative.

Land tenure issues can also create problems especially for the young. They often do not know what land they will inherit and they do not have the funds to buy land of their own. This makes it difficult for them to commit themselves to tree projects which are typically long term in nature.

More generally, poverty often means that families are unable to put land aside for this type of investment when they have a pressing need for food. As population increases and the demand for food grows, fewer farmers will be prepared to set aside land for trees.

Socio-cultural issues and community attitudes also affect tree-based projects. Some religious organizations see traditional medicine as evil, while others consider it to be primitive and out-dated. These negative attitudes can also affect a farmer's decision to grow medicinal trees. At another level where community attitudes are strongly against women planting trees, women - who are often household heads and capable of establishing and managing on-farm wood lots - are effectively excluded from taking advantage of the market opportunities offered by this type of activity. The idea of conservation through utilization is an important one and can help to ease the pressure on forests resources as well as provide better access to medicines for those with limited resources. Herbalists - who prefer being called traditional medical practitioners - have a wealth of knowledge about the medicinal properties of tree and other plant species that could be used to encourage the conservation and propagation of valuable species and support health. Building on this traditional knowledge using modern communication techniques could be an important part of scaling-up activities. Communities need to understand the context in which they are working and documenting the dynamics of conservation and market demand can provide them with important insights into the value and necessity for on-farm cultivation.

Commercializing an indigenous medicinal plant: *Mondia whytei*

Kakamega forest is a biodiversity-rich rainforest managed by the *Kenya Forest Department* and *Kenya Wildlife Services*. These organisations regulate access to the forest and the utilization of its biodiversity. Communities adjacent to the Kakamega Forest graze their livestock there and collect fuel wood, construction material and herbal medicines. They also use it for cultural and recreational activities. Currently, it is one of the leading tourist attractions in Western Kenya.

Research shows that poverty is one of the main factors that cause local communities to over-exploit their forest resources to the point where sustainability is threatened. In 1998, research conducted by *KEFRI* emphasized how highly dependent local communities were on non-timber forest resources. Some of these resources were identified as having development potential and - if followed through - this could help improve incomes and stimulate conservation.

Plants of medical value were among the forest products generating cash incomes. One in particular was in great demand: the vine known as *Mondia whytei*. About one ton of raw *Mondia* roots were being sold in local small-scale markets every month and the Kakamega forest was one of the main sources of supply. Dealers bought *Mondia whytei* materials from young collectors who had harvested them from the wild rather than from the small number of farmers who - with donor support - had started to domesticate the plant.

Mondia whytei: a golden root

Mondia whytei - (*Asclepiadaceae*) is sometimes referred to as the golden root and it has a slightly bitter taste. There are more than 300 genera and 2000 species of *Mondia whytei* and 104 species are found in East Africa. Its products are widely used for spiritual and medical purposes. Amongst the medical conditions that respond to treatment

with *Mondia whytei* are anorexia, sexually transmitted diseases, stomach ailments and impotence. It has also been effective in dealing with hypertension, strokes, anaemia, sleeplessness and asthma. *Mondia* can help alleviate the symptoms of heartburn, measles, hepatitis, rickets, typhoid, vomiting, meningitis and pneumonia. *Mondia* has a social and cultural significance in some communities as well. Amongst the Luhya of Western Kenya, for example, it symbolizes peace, is a sign of power and an important ingredient in love potions. It also warms the body, helps improve sleep, eases afterbirth pains and enhances vision.

Initiating the process

Mondia whytei is already highly valued in Western Kenya and there is an established trade in its products. Research undertaken by *KEFRI* and the *African Academy of Sciences* confirmed that the plant has trace elements that strengthened the body's immunity and resistance to disease. These were among the considerations that encouraged the *International Centre of Insect Physiology and Ecology (ICIPE)* and *KEFRI* - with support from the *Marcuthur Foundation* - to actively promote *Mondia whytei* cultivation amongst small-scale farmers living and working near the Kakamega forest.

However, no protocols or certification procedure existed to ensure that *Mondia whytei* was collected and produced in a sustainable way. An institutional framework to coordinate, market and eventually upscale technical and commercial innovations had to be developed and research carried out to identify ways in which value could be added to *Mondia* materials.

In 2002, *KARI's Agricultural Research Fund (KARI-ARF)* and *KEFRI* started educational and awareness activities highlighting *Mondia whytei's* capacity to generate income, improve human health and increase the productivity of local livestock. Particular emphasis was put on the sustainable utilization and conservation of the plant.

Kakamega Environmental Education Programme (KEEP) was identified as an appropriate institution for promoting the utilization and marketing of *Mondia whytei* products.



Mondia cultivation in Kuvasali: binding a *Mondia whytei* vine



Mondia packaging material

An agreement was reached between the local communities - represented by *KEEP* - and the technical institutions involved - *ICIPE*, *KEFRI*, the *University of Nairobi*, and *Kenya Wildlife Services* - concerning the sustainability of the project and defining how benefits from the commercialization of *Mondia whytei* would be shared. It was agreed that 80% of profits would go to the communities involved and 20% to the institutions providing support.

ICIPE and *KEFRI* had a key role in community capacity building activities and - with the help of *Ford Foundation* funding - a plant was set up in Kakamega to process *Mondia* products. This plant has contributed substantially to the sustainability of the project. Research into new ways of adding value to *Mondia* products was initiated and the possibility of creating markets outside Western Kenya are being explored.

Most of the farmers in the self-help groups targeted by the *Mondia* project had quite small plots. As a first step, *Mondia whytei* nurseries were established. Seeds were collected from the wild taking care that they were harvested before the wind had time to disperse them. Once processed, the seeds were stored in special bags. After

about a month they began to germinate and two or three months later they were ready to be transplanted. *Mondia* flowers between March and July and its fruits take another six months to mature.

Mondia whytei is a climber and grows towards the light. Experience shows that given good, fertile soils and sufficient light it can grow vigorously and produce plants that have a sweeter taste than those cultivated in the shade. To achieve the best results *Mondia whytei* must be trained to grow upwards. If it is left unsupported on the ground there is a strong possibility it will die. However, getting the right type of poles and wire to support the plant can be expensive. *KEFRI* research has shown that *Mondia whytei* can be effectively trained over live support materials like banana, *Sesbania sesban* and *Croton microstachys*. It can also be inter-planted with crops like maize because it has a deep-rooting system.

There is a steady market for *Mondia* leaves, roots and twine although studies show sales are sometimes irregular. The main marketing season is between August and December. Roots are the main product sold, but twine, seeds, powder and - more recently a *Mondia whytei* tonic - are also traded.

Harvesting and marketing roots requires particular care. Studies show that the taste of the root varies with age. One or two-year old plants do not have a well-developed root system and are less sugary. Older more mature plants have roots that are about one meter long but these are not very tasty. Four to six-year old plants - depending on the characteristics of the soil - have relatively rich and characteristic flavours.

Repeated harvesting is sometimes possible if only lateral roots are removed. Otherwise farmers have to wait four or five years if they want a more substantial harvest. Before being sold roots are either graded according to size or cut into specific portions.

Roots can also be debarked immediately and the fresh bark offered for sale. However, debarking is very time-consuming and tedious work and great care has to be taken to avoid damaging the roots. Farmers complain that the price they receive for this type of *Mondia* product does not compensate for the amount of work involved. New harvesting and post-harvesting technologies are being investigated to address these issues. Seeds and *Mondia* plants are also sold but on a more limited scale.

ICIPE and *KEFRI* have been semi-processing the *Mondia* root into a powder and - after packaging - it is now being offered for sale through leading outlets like supermarkets. They also buy root bark from farmers living around the Kakamega forest to process into the new *Mondia* tonic. In the period 2004-2007 some 1546 tins of tonic were produced for sale and marketed through reputable Kenyan supermarkets.

Marketing is usually carried out through the community institution promoted by *KEEP*. Competent entrepreneurs within the community groups who are aware of the process of product development from farm-level to marketing facilitate this process. At the same time, *KEEP* continues to provide extension information to CBOs interested in becoming involved in *Mondia* production. Its management and extension system have been restructured to enable it to carry out this task effectively. It also monitors farming and post-harvest handling practices and ensures that

each batch of *Mondia* roots is well-labelled before being sent to *KEFRI/ICIPE* for processing.

Challenges

Mondia farming is a new practice and - as yet - there are no detailed agronomic figures to enable impact assessment. It is not easy to explain why farmers have not been more ready to take up *Mondia* cultivation. It can be suggested, however, that one important reason is that - although market prices are quite tempting - constructing climbing material, keeping the vine well-supported and digging, washing and preparing the root for sale is a tedious business and involves a lot of labour and expense. In addition, many farmers do not feel confident in the stability of market demand.

Several lessons have been learnt from recent project experience. Most significantly it has become clear that it is not easy to commercialize a new medicinal plant. A multidisciplinary approach is needed and the capacity of local institutions must be strengthened if the activity is to be sustained.

Mondia whytei is now considered to be a cash crop in Western Kenya. The Kenyan media have helped promote its cultivation by broadcasting information and reporting successes. *Mondia whytei* domestication has also been promoted through a series of radio programmes broadcast by a UK-based NGO concerned with encouraging the propagation of selected medicinal plants in developing countries.

Meanwhile, *KEEP* continues its efforts to ensure that its communities and partners have the information they need to keep them up-to-date with new developments in the cultivation, harvesting, processing and marketing of this versatile plant.

4 Linking with Tourism

Ecotourism – *Kakamega Environmental Education Programme*

Zuia Ndovu na Casuarina: a solution to human wildlife conflict

Mwalunganje Elephant Sanctuary

Millennium woodcarvers cooperative: creative conservation



Ecotourism – Kakamega Environmental Education Programme (KEEP)

Kakamega rainforest is the only remaining rainforest in Kenya and it is the eastern most remnant of the former dense Guineo-Congolian forest. Due to its isolation from similar forest types, it is home to many unique and rare animal and plant species including Colobus monkeys, hammer-headed fruit bats as well as many varieties of butterflies and orchid. Seventy years ago the forest covered some 240,000 ha. Today just 23,000 ha are left. The area is densely populated and the demands of the local population for timber, fuel wood, charcoal, medicinal plants and cattle grazing have led to extensive degradation. In addition illegal logging and forest clearance in the interests of the tea industry have speeded up the process of deforestation.

Initiating the process

Kakamega Environmental Education Programme (KEEP) is a community-based organization. It has 160 members each of whom pay an agreed annual contribution. Difficulties have been experienced, however, with institutionalising this structure because of membership instability. In 1995, *KEEP* came into being on the initiative of five guides who were aware of how quickly the forest was degenerating. Their approach was to focus on increasing the environmental awareness and conservation capacity of local communities. *KEEP* developed training and educational programmes in conservation that could be used at school and community level. It also set up a resource centre and encouraged visits from both schools and local villagers. *KEEP's* community training activities address practices that have a negative effect on the forest and its biodiversity. These include illegal hunting, overstocking and the collection of medicinal herbs without a permit. It focuses on enabling local communities to understand the value of forest resources and - by establishing tree nurseries - encourages them to take part in reforestation activities. Improved energy generating devices have been introduced and school children and students have been encouraged to take part

in monitoring biodiversity including studying the status of the forest's monkey population. Community Forest Associations (CFA) play an important role in stimulating community participation and involvement.

At the same time *KEEP* continues to explore ways in which the forest can be used to support local livelihoods without further eroding its natural biodiversity. Ecotourism was seen as a possible solution. *KEEP* has successfully leased a part of the forest from the government for an indefinite period to develop these activities.

KEEP now works with a network of partners to strengthen and upgrade its tourist services. Sites of interest to tourists have been carefully selected, walks planned and guides recruited and trained. These guides take visitors into the forest for different types of walks and the rates charged depend on the length and nature of the walk. *KEEP* - as well as over 20 specially trained guides from local communities - benefit directly from this service and the numbers of visitors using the organisations facilities has increased steadily from 900 in 1999 to over 6000 in 2006. Close contact is maintained with agents in the tourist sector and *KEEP* also promotes the forest's tourist attractions in guidebooks and on its website. *KEEP* manages tourist lodges called "*KEEP bandas*". These facilities are operated by seven members of staff drawn from the local community. Each room can accommodate three visitors. Other employment opportunities have been created as well. Ecotourists need transport and those visiting the forest have created a demand for local goods and services. Community members earn money by hosting tourists in their homes and introducing them to local customs and culture such as the songs and dances that accompany the Tiriki circumcision ceremony which is carried out in a biodiversity rich part of the forest. Revenues from ecotourism is shared between the Government forest services (5%) and *KEEP* (35%) while 60% is put aside for maintaining the bandas. In 2007, *KEEP* was able to invest in conservation work, upgrade tourist facilities and set up a cooperative society. It also uses revenue generated from tourism to provide loans to community members involved in *KEEP* activities.



Guides stand ready to show visitors the attractions of the Kakamega forest.



Kakamega landscape

Recently constructed attractions include a canopy watch tower erected some 19 meters above the ground where visitors can view canopy-based animals and plants. The fee paid by tourists to use this facility enables *KEEP* to employ an attendant to provide tourists with information and advice. There is also a gift shop where community members can offer their handicrafts for sale. This is a new venture and its impact has yet to be evaluated. Plans to increase the amount of tourist accommodation, develop a snake park and build a resource centre at Kibiri are underway. Today, ecotourism provides *KEEP* with a financial basis for its conservation work and – as its facilities are also used for research and study visits - the importance of its efforts to conserve the forests' unique resources continue to be highlighted. It has also created a source of revenue for local communities.

Challenges

KEEP faces many challenges in sustaining and developing its programme. These include a lack of funds and transport, its inability to offer more than fairly low salaries and the

difficulty of finding labour with skills relevant to the tourist sector: management and computer skills, public relations and the ability to advertising and promote activities. The movement from conservation to ecotourism has not been easy and experience and knowledge is needed to integrate services and resources within community into an ecotourism programme. Poor interface with Government, donors who do not fulfil promises and a lack of infrastructure all undermine the potential for further development. Developing a community-based ecotourist project is a complex business. Continuous effort is needed to secure a regular flow of visitors and tourists' expectations must be satisfied. More important still, community motivation and commitment has to be retained even though tourism is a seasonal trade and revenues and returns are not constant throughout the year.

Currently, *KEEP* is looking forward and plans are being made to extend the programme beyond Kakamega and to develop a system of bursaries for bright students as a way of increasing the benefits communities can derive from this type of project.

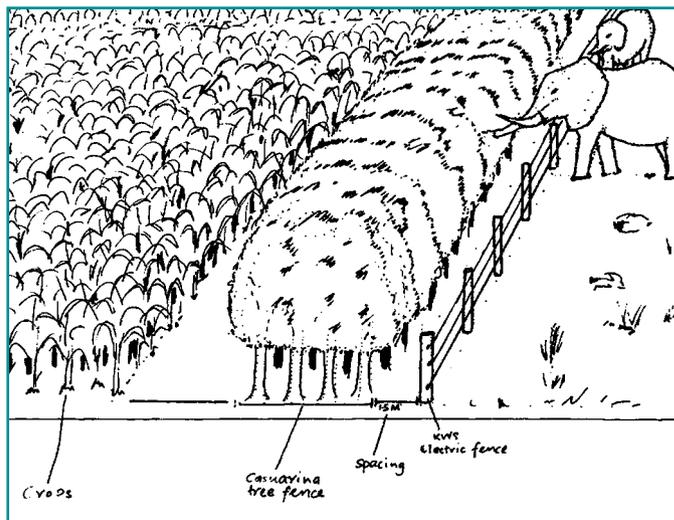
Zuia Ndovu na Casuarina: finding a solution to human wildlife conflict

The Shimba Hills Game Reserve in Kenya's Coast province is an area favoured by tourists who come to see the local wildlife in its natural habitat. However, for many years wild animals have been devastating farms bordering the area. Msulwa sub-location is one of the areas affected. As foraging wild animals continued to destroy farmers' crops, poverty levels and food insecurity in the area steadily increased. Community members had tried to solve the problem but with little success until the *Zuia Ndovu na Casuarina Group* decided to plant *casuarina* trees around their farms and then – on the advice of local elders - went a step further and started beekeeping activities.

Initiating the process

Zuia Ndovu na Casuarina Group was formed in 2001 and is registered with the Kenyan Social Services Department. It is part of the larger *Msulwa Organisation for Tree Nursery Groups (MOTNG)* a community based organization working in Majimboni location, Kwale District on the borders of the Shimba Hills Nature Reserve. It is an area characterized by environmental degradation, poverty and high levels of illiteracy. The original 25 people who formed the *Zuia Ndovu na Casuarina Group* live in close proximity to the reserve fence and they have been working together now for more than seven years.

Being able to keep wild animals away from their gardens and crops has been an important first step to improving the livelihoods of group members. Elephants were a particular problem because they were not as easy to scare away as baboons and wild pigs. They were also able to get through the electric fences around the reserve. *Zuia Ndovu* members decided to plant a screen of *casuarina* trees parallel to the reserve fence so that elephants would no longer be able to see their crops. Villagers also knew that elephants liked *casuarina* leaves and would enjoy this tasty alternative.



Protecting crops with a fence of casuarina

A tree nursery was set up to propagate *casuarina* as well as eucalyptus, neem and *afzelia quanzensis* (mbambakofi). Group members agreed to contribute to support its development. The number of trees planted at any one time depended on the capacity of the members themselves but the ultimate target for each member was at least 1000 trees. In the meantime some members have managed to plant 1500 trees while others have planted at least 500. In total, some 20,000 *casuarina* have been planted and the average tree takes about two years to reach maturity. *Zuia Ndovu na Casuarina Group* members have planted 4 rows of *casuarina* 1.5 meters from the reserve fence. A distance of 1.5 meters was left between each row and seedlings were planted at intervals of 1 meter. As the *casuarina* mature, they are regularly pruned so leaves and branches continue to flourish at elephant height. The tree canopies have gradually become so dense that elephants can no longer see what lies beyond the *casuarina* fence. In addition to effectively screening farms and gardens from hungry and inquisitive elephants, *casuarina* trees also



Elephants are one of the Big Five tourist attractions in Kenya but their foraging activities have been disastrous for farmers living near the Shimba Hills Reserve

contribute to soil conservation. Planting *casuarina* in combination with terracing has helped bring the problem of soil erosion in the area under control. The Group collaborates with the Ministry of Agriculture and all its members have now been trained in terrace layout. Twelve group members have already dug terraces on their farms and soil erosion has significantly decreased in the vicinity of the reserve fence and on farms where terracing and *casuarina* planting activities have taken place.

The propagation of *casuarina* seedlings and trees provides the Group with a source of income. Seedlings - as well as mature *casuarina* trees - are being sold to a growing local market. While group members can get seedlings from the Group's nursery free of charge, non-members must pay for them but at an affordable price. Money raised in this way is used to maintain the nursery and can be distributed to members.

Casuarine wood is also in demand as building material and when members are hard pressed for charcoal or money they are prepared to fell a tree. Group policy dictates, however, that if a tree is cut down another must be planted.

Bees: an added deterrent

Casuarina has not been the Group's only natural defense against the devastations caused by wild animals. Bees have also played an important role in the human – wildlife conflict. The initial idea to use bees as an elephant – and buffalo – deterrent came from elders in the Msulwa sub-location. Elephants are afraid of bees and while this was an important consideration in the Group's decision to introduce beekeeping there were other advantages as well. Bees protect and help pollinate the crops and they also produce honey.

With support from the *Ministry of Livestock Development* and the *East African Wildlife Society* some *Zuia Ndovu na Casuarine Group* members came together to start beekeeping activities. Two members of the group were trained and - in turn – they trained six others. In 2003, these beekeepers received a donation of eight langstroth beehives from a local resident. Two years later - under a cost-sharing agreement with the *East Africa Wildlife Society* – they invested in 20 more hives.

Group members have now organized themselves into five smaller groups of five members each and together they manage 28 beehives. The beekeepers are distributed over an area of about six kilometres parallel to the reserve fence and the edge of the forest and each group takes care of a specified number of hives. At present 14 hives have been colonized and - over the last three years - five have been producing honey. It is not clear, however, why the bees have not colonized the remaining hives even though the area is rich in flowers. Some suggest the bees dislike the timber used to make the hives while others question whether the hives have been built to the right specifications.

Honey is harvested by the eight group members who have been trained in harvesting procedures. They are careful to wear protective clothing when harvesting honey. Their equipment includes overalls, veils, gloves, smokers and a bee brush - all borrowed free of charge from the *Ministry of Livestock Development*. The Group would like to have its own harvesting gear because this would enable member to check the hives more regularly and be in a better position

to take measures that would help improve yields. Honey is harvested twice a year between February and March and again in July and August. At present the Group gets about 5kg of honey per hive. After the honey has been harvested it is taken to the chairman's house where the traditional sieving method is used to extract honey from the comb and remove impurities.

The honey is first stored in a 20 litre container and later it is transferred into 500ml bottles for sale. Local villagers are the main customers and - because demand outstrips supply - there is considerable interest in scaling-up honey production.

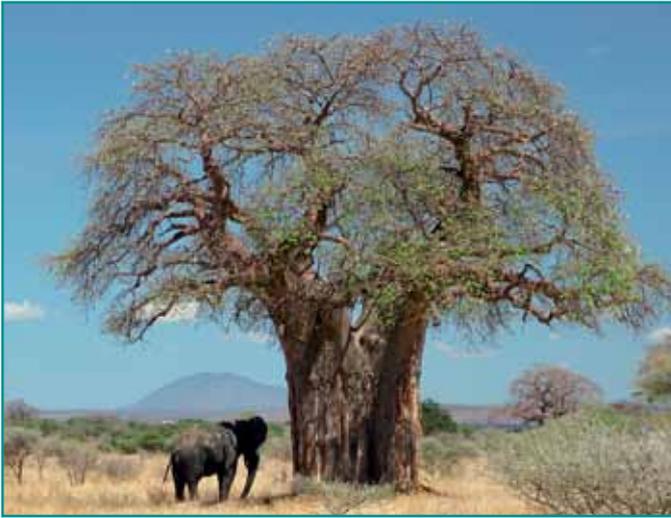
Challenges

The Group has remained stable since it started in 2001. Hives are managed on an individual basis but after the honey has been harvested it is marketed by the Group. Money earned from the sale of honey is deposited in the Group's bank account and at the end of the year it is distributed among Group members according to their contribution. However, incomes are low and this has had an effect on the extent to which members can make regular contributions to the Group. It is also one of the reasons why the Group has been trying to attract more members.

Both the planting of *casuarina* and beekeeping have had a direct effect on the conservation of the local forest environment although the slow rate of hive colonization has meant that the bees are only just beginning to have an impact on elephant behaviour. As the number of trees increase soil erosion has stabilized and - because farmers want to increase the productivity of their hives - they are particularly alert to the destructive consequences of fires. The Group does not allow any kind of fire within the reserve and in this way has helped protect the forest from the activities of illegal charcoal burners.

At present *Zuia Ndovu na Casuarina* is trying to attract new members and sensitize local communities to the advantages of planting *casuarina*. Progress is slow because not all villagers are keen to plant *casuarina* even though it is clear that elephants no longer cross over to farms and gardens in those areas that have been planted and colo-

nized by bees. The successes and set backs experienced by *Zuia Ndovu na Casuarina* shows that communities need technical training and support as well as information and access to credit if their initiatives are to be developed and sustained effectively.



Elephants wander freely in the Mwalunganje Elephant Sanctuary delighting tourists

Mwalunganje Elephant Sanctuary

The Mwalunganje Elephant Sanctuary-Kwale is located in an area of the Coast province where poverty and environmental degradation were particularly severe and local NTFP initiatives have strongly emphasize the importance of conservation. The Sanctuary was once populated by small-scale farmers but as deforestation, soil erosion and conflicts between humans and wildlife increased, *Kenya Wildlife Service* and local communities came together to work out a plan that would enable farmers rebuild their livelihoods and allow wildlife, soils and vegetation to come into a better balance.

An elephant sanctuary was proposed. This would provide the animals with the territory they needed and enable farmers to re-establish their livelihoods in locations protected from animal intrusions.

Funds for the creation of a sanctuary were provided by *East Africa Wildlife* and the project involved both the relocation of farms and the opening up of new livelihood opportunities. Today, community members derive an income from the shares they received for participating in the development of the reserve – one share per acre of land – and



Visitors are shown how paper is made from elephant dung

from providing services and products to the tourists who visit the area.

Guided tours through the Sanctuary and a souvenir gift shop selling items made from materials found in the reserve are amongst the projects that have been set up in the Sanctuary to make it attractive to tourists. Amongst the gifts offered for sale in the small shop attached to the reserve, for example, are notebooks, picture frames and calendars made from paper produced from elephant dung collected in the Sanctuary. There are also facilities for providing visitors with information about the reserve and demonstrating how some of the products available for sale have been made.

Challenges

One of the principal challenges facing the project is attracting sufficient numbers of tourists to the area to ensure the Sanctuary continues to be economically viable. Plans to deal with this problem include increasing tourist facilities by setting up tented camps within the reserve and establishing closer contacts with tour operators and travel agents so the Sanctuary becomes better known. More attention is also being paid to market research in order to get a better impression of consumers needs.

Millennium woodcarvers: creative conservation

The *Millennium Woodcarvers Cooperative* is located at Ukunda showground along Ukunda- Beach road. They specialise in making handicraft out of wood and non wood materials such as reeds. The Cooperative makes innovative use of many domesticated wood sorts as well as fallen timber from hardwood trees. The cooperative has established itself away from the highly competitive and oversaturated market in souvenirs and carvings that characterises the main centres along the Kenyan coast. Their target customers are tourists visiting places of interest in the vicinity or who are just passing through en route to other destinations.

With 85 members, the cooperative has a well-appointed show room and when a carving is sold 30% of the proceeds goes to the cooperative and 70% to the carver. For their wood requirements, they rely on fast growing tree species such as neem, jacaranda, coconut and mango. This they buy from local farmers. Sometimes – when it is available - they use fallen indigenous hardwood trees for their carving work. The cooperative encourages members to shift from using slow growing indigenous trees to fast growing exotic trees and in this way help conserve endangered and valuable species. The cooperative's long-term plan is ensure a steady supply of wood from their own plantations or to partner with local farmers who will grow the trees they need.

The carvers are proud of the fact that they are able to transform any piece of wood into an object of interest. In this way no wood is wasted and left-over wood shavings are used by local people as fuel.

Marketing is essential given the strong competition from well-organised groups of carvers in popular tourist resorts such as Mombasa. Therefore, the cooperative advertises extensively in local hotels, guest houses and other tourist destinations.



The shop where members of the *Millennium Woodcarvers Cooperative* sell their work

Not just for export

Wealth from Africa's aloes: aloe promotion and utilization

Aloe vera potential yet to be exploited in Dida

Butterfly farming: habitat development strengthens biodiversity

A question of marketing

Getting to grips with the challenge



Wealth from Africa's aloes: aloe promotion and utilization

There are over 450 groups of aloe species worldwide. Three-quarters of them are found along the Eastern and Southern coasts of Africa and Madagascar. About eight species are traded internationally for gels, aloe bitter gum and other derived products. Most of the commercial aloes are traded under CITES Appendix II, with the exception of *Aloe vera*. Trade in *Aloe vera* gel has an annual value of about US\$123.5 million and derived products are worth US\$110 billion.

Aloes are highly adapted to dry lands. Promoting the commercialization of aloe in these areas will improve livelihoods, the environment and rangeland rehabilitation. Already aloe gum processing involves thousands of poor inhabitants in the drier parts of Kenya and the Eastern Cape of South Africa.

Research undertaken by *Kenya Forest Research Institute (KEFRI)* shows that aloes have been exploited in Kenya since the early 1950s in both the coastal region and the interior. Traders were mainly Arabs and Somalis and the trade was largely unregulated until CITES came into force in 1978 making it illegal. The gum trade has continued disguised under different trade names and it is this illegal trade that is mainly responsible for poor prices and unsustainable exploitation.

Studies show that there is a significant illegal trade in aloe gum. This illegal smuggling threatens wild stocks and especially wild population that have a small and specific habitat. Illegal gum is sold internationally at lower prices than gums of similar quality coming from South Africa. The pastoralists who harvest the sap illegally are poorly paid and the Government loses revenue because export taxes are avoided.

There is a need to establish quotas for sustainable harvesting based on resource assessment and the monitoring of trade volumes. Support for and the establishment of plantations that comply with CITES guidelines is an important first step towards conservation. Regulations based on

the conditions for harvesting and export defined by CITES must also be drawn up.

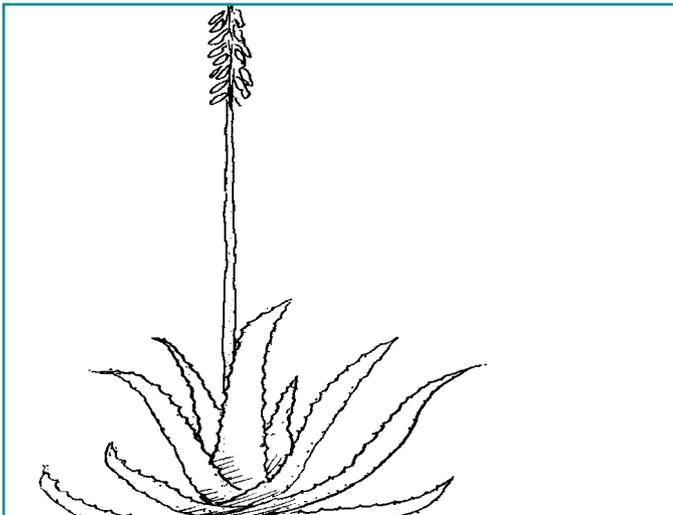
In this context, *KEFRI* and its partners initiated a collaborative research programme on community-based, participatory Aloe promotion. The programme focused on the identification and ethno-botanical description of indigenous aloes in Kenya, establishing the current status of Aloe products and identifying markets trends and potential. A resource inventory and quantification of commercial and indigenous aloes was drawn up and this is now being used to guide the development of commercial aloe cultivation in Kenya's dry-land areas. Market and product development initiatives have also been undertaken. One of the community groups that has benefited from this programme is the *Baringo Aloe Bio-enterprise*.

In a recently released state of the environment report, Baringo was identified as one of the poorest districts in Kenya. It is also an area of important dryland biodiversity conservation. The district is occupied by agro-pastoral Tugen, Njemps and Pokot communities whose main livelihood is their livestock, beekeeping and small-scale agriculture along the more fertile slopes. However, population pressure has led to the cultivation of less fertile slopes, the destruction of fragile vegetation and - as desertification spreads - rising silt levels in Lake Baringo.

Aloes are being harvested commercially in several parts of the district but until now East Baringo has been the most important source of supply. Exploitation, however, has been uncoordinated with no facilities for processing the raw product. Women and children spend many days harvesting the sap and there is always the danger that the whole plant will be cut down in the process.

Baringo Aloe Bio-enterprise - a partnership project between Government - represented by *KEFRI* - a private investor *Landmawe* and the community represented by *KOKISA* was a twelve-month project funded by the European Union through the development trust fund for biodiversity conservation. The project was expected to end in November 2005, but due to technicalities that delayed its implementation an extension has been requested.

The main objective of the project was to develop the



CITES Appendix II: regulating the trade in aloes

Trade in aloe products are regulated by CITES Appendix II where it states that: trade in species in Appendix II shall require the prior grant and presentation of an export permit. Conditions for an export permit include proof that the export will not be detrimental to the survival of the species and that the specimen has not been obtained in contravention to the laws that protect fauna and flora. Scientific authority will be responsible for monitoring export permits granted by the State for specimens in Appendix II and establishing the impact of these exports on sustainability.

The aloe plant: a source of income for Kenya's dryland communities



Aloe plantations in Baringo District

sustainable utilization of Aloe resources in Baringo and neighbouring districts to improve livelihoods and stimulate biodiversity conservation. The strengthening of KOKISA as a CBO made it possible to manage the on-farm cultivation, production and marketing of aloe products.

The *Baringo Aloe Bio-enterprise* focuses on the indigenous aloes found in the Baringo district. Indigenous aloes – if cultivated – are less likely to have a detrimental effect than alien species. The main commercial species found in Baringo are *Aloe secundiflora* and *Aloe turkanensis*.

A recent survey revealed that in addition to East Baringo, Central and North Baringo and Koibatek districts also have production capacity. Together they could support an annual export of between 22 and 50 tonnes of aloe gum.

Baringo Aloe Bio-enterprise has brought the unrestricted collection of sap under control. Certification and environmental mechanisms have been put in place and in future aloes will be harvested from *Aloe Management Units* to be set up by *Kenya Wildlife Services*. These units will be monitored and supervised by the village elders involved in the *Baringo Aloe Bio-enterprise*. *Kenya Wildlife Services* and other partners have also developed guidelines for the export and import of aloe raw materials and other derived products. A working framework for benefit sharing has been agreed upon between the communities, government and the private investor.

A factory to process aloes has been established in the Kerio Valley. Initially, this processing plant will produce crude aloe gum but later it will be used for the production of other aloe products as well. Currently, two main aloe products are being traded globally: aloe gel and aloe bitter gum and its derivatives. Potential products include aloe dyes and live aloe plants. In this context marketing channels that ensure fair prices and equitable benefit sharing between partners are being explored. Community aloe nurseries have also been set up to conserve aloe diversity and ensure the Baringo enterprise has a secure and sustainable resource base.

Challenges

One of the most significant challenges in setting up an enterprise that involves changes in production practices is to ensure that ownership is defined at an early stage. The different levels of partnership need to be handled with care and in an atmosphere of mutual trust, understanding and respect. A well-established community structure and incentives are important when introducing this type of change especially if the adjustment involves not only product development but also conservation.

In Baringo, the development of strong community institutions, the establishment of aloe management units and extensive education and awareness activities combined with research and development have been of key importance in introducing a new approach to aloe-based economic activities and resource conservation.

The promotion of aloe species can provide cash incomes in communities living in unfavourable arid condition and this is particularly important for young people. For this reason the experience of the *Baringo Aloe Bio-enterprise* is being closely monitored. Up-scaling and replication are important options and various exchange programmes have been arranged between dry-land communities and more community-based processing plants are being established.



Preparing aloes for processing



Aloes processing

Aloe Vera potential yet to be exploited in Dida

Dida Forest Adjacent Area Forest Association (DIFAAFA) - a CBO - was founded in 1997 and has 398 members drawn from the Giriama, Kikuyu, Kamba and Luhya communities. It registered itself as a Community Forest Association in 2003. Each member pays a standard registration fee of Ksh100 and the Association is piloting Participatory Forest Management (PFM) in Dida.

The Dida forest is located 32km from Kilifi town and has a population of about 6000 people living in 780 households. It is part of the Arabuko Sokoke Forest – the largest remaining block of an indigenous lowland forest that once stretched along the East African Coast. The forest is managed by Kilifi and Malindi district forestry offices.

Initiating the process

The cosmetic and medicinal potential of *Aloe vera* for the production of herbal soaps, shampoos, lotion, creams, disinfectants and detergents had been highlighted during

collaborative meetings held between the communities, Government and other development institutions including *Kenya Forest Research Institute (KEFRI)*, *Kenya Wildlife Services (KWS)*, *NMK* and *Nature Kenya*.

Anticipating real and tangible benefits from *Aloe vera* farming the *DIFAAFA* group was set up to utilize the existing natural resources of the Dida Forest and to manage the equitable distribution of benefits among adjacent communities.

Initially plans were made to plant and cultivate some 200 acres of *Aloe vera* so it would not be necessary to harvest wild forest stocks. In collaboration with the *KEFRI*, *KWS*, *Nature Kenya* and *NMK* the group has gradually diversified its activities and while some of its members continued to cultivate *Aloe vera* on their individual farms, others have branched out into other NTFP activities such as butterfly rearing, beekeeping and agro-forestry activities including selling seedlings on the local market.

Over the last four years *DIFAAFA* has managed to plant a total of 50 acres with *Aloe vera* suckers. *KEFRI* provided suckers to a few members who then multiplied them and sold them to other group members. Members who could



Aloes factory Baringo

extraction is done using hand tools and as a result only small amounts of sap can be extracted. This is sold to local customers who use it to make cosmetic products and herbal remedies.

One promising development, however, is that the Government of Kenya has recently passed a law that recognizes the important role herbal medicine can play in therapeutic treatment. This has not only created a potential market for producers of plants such as *Aloe vera* but could also lead to the creation of new employment opportunities for herbal practitioners.

not afford to buy suckers were given them free so all community members could benefit from *Aloe vera* cultivation. DIFAAFA has developed area forest management guidelines and an operational management plan. This has contributed to the success of their PFM activities and the group now boasts 10 years experience in the creation of zones, village social mapping, and forest resource assessment. It has also produced a 30 minute video to promote its activities. The Group is working towards cultivating the entire 200 acres originally allocated to their project so that they can increase production and attract international buyers.

Challenges

Although the Group is anxious to increase the area under cultivation, the prevalence of pests and diseases as well as problems of poor drainage and water logging creates difficulties.

Another challenge facing members is raising enough money to hire or buy tractors and machines capable of extracting and processing the gel. Currently cultivation and



Propagating butterflies on species-specific indigenous trees and shrubs planted around the homestead



Both the farmer and his wife are involved in the consuming and delicate job of feeding the butterflies.

Butterfly farming: habitat development strengthens biodiversity

Conservation and livelihood improvement are strongly linked in many butterfly farming initiatives. These two elements are clearly present in the Shallom Butterfly Farm situated in the Shimba Hills in Kenya's Coast province. Here a small-holder farmer and his wife breed rare butterflies that are indigenous to the hills and sell them to American and European customers. Before he became a butterfly farmer, the initiator of this project had spent many years working as an assistant to butterfly researchers in the area. In this way he learned to understand the habitats and habits of the different species.

Today, he works with ten other small-holder butterfly farmers and as a group they are able to supply regular consignments of chrysalises to overseas buyers. The butterflies they capture in the forest are used for breeding more butterflies on their farms. Many of the plants and shrubs on which specific types of butterfly depend have almost disappeared because of deforestation and the effects of



Chrysalises packed and ready for market

environmental degradation. By reintroducing these plants into their small-holdings as part of creating a butterfly habitat, they are contributing to re-establishing and conserving biodiversity.

The question of marketing

As the title of this chapter suggests marketing local NTFP is not an easy business. Finding a market for the products of NTFP enterprises has been identified as one of the most complex challenge facing community groups. Experience shows that the success, continuity and replicability of the innovative use of forest resources is heavily dependent on accurately identifying and meeting customer demand. Initially many non-timber forest products – especially foods and medicines - are consumed within the local community. But as expertise grows, producers become increasingly motivated to enter more regional and even international marketing chains. Here limited experience in assessing consumer tastes and needs and restricted access to market information are critical and constraining factors. This not only makes it difficult to coordinate supply and demand, it also makes it difficult to plan product development. Human and physical resources are wasted when commodities are overproduced or presented in ways that are unacceptable to the consumer. At another level, small-scale producers often encounter problems in ensuring regular supplies of goods of consistent quantity and quality. When supplies are irregular and quality uncertain this has a negative effect on consumer demand and consumer loyalty to a particular product. Seasonal factors also play an important role here as many NTFPs are only available at certain times of the year. Many NTFP producers struggle with problems of harvesting, storage and a saturated market when periods of abundance alternate with periods of scarcity. In targeting unexploited markets - including urban markets – experience shows that much needs to be done to overcome consumer concerns about the safety, quality and suitability of products. Product promotion is an important first step. Ensuring that consumers have information about the products available and their benefits and that they are appropriately packed and clearly labelled can play a significant part in opening up potential markets. Policy frameworks at different levels also affect the extent

to which NTFPs can be developed and efficiently and safely marketed. Pharmaceutical standards and certification procedure are amongst the formal procedures that NTFP producers often experience as barriers to the further development of their activities.

While NTFP producers need up-to-date market information that reflects current demand as well as the potential for growth and diversification within their sector, this information has to be sufficiently comprehensive to support effective planning and decision making. It must also be packaged and disseminated in a way that makes it accessible to those most closely involved in managing production and marketing.

Getting to grips with the challenge

Natural and geographical conditions determine the extent to which NTFPs can be developed for the benefit of communities in Kenya. Uncultivated forest and savannah areas are relatively scarce and very scarce indeed in high potential, high rainfall areas. It is in this context that the replicability of documented experiences drawn from the NTFP sector should be assessed. Case studies seem to suggest that - in some cases - the future of many NTFPs may lie in on-farm cultivation.

In forested areas experience shows that motivated CBOs and CFAs whose members are willing to invest time in “enriching” the forest with useful species or replanting much sought-after shrubs and trees can have a strong and positive impact on NTFP activity and conservation. It appears that it is possible to generate wide support for protecting forest resources even amongst poor households once they realise they have a “unique inheritance” at hand. CFAs and CBOs can play an important role in ensuring that gatherers and producers are well organised and adopt harvesting intensities and techniques that protect biodiversity and forest resources.

Political and legislative factors also have an impact on NTFP activity. Positive state-sponsored regulations that offer clear rights to people are essential. Kenya’s new Forest Act is an example of legislation that tries to encourage and regulate community involvement in forest management. However, forest access and use regulations continue to be quite strict and tend to be implemented firmly. This is an asset as far as biodiversity conservation, wildlife and tourism is concerned. But the way these regulations are sometimes implemented can create serious difficulties for communities who depend on collecting and harvesting forest products for their NTFP enterprises. This highlights the importance of participative forest management.

The success of NTFP activities is, of course, closely related to the status of the economy. Consumer demand, the development of transport and communication infrastructures and the capacity to conduct both botanical as well

as market research are strongly influenced by government policy and economic conditions. Market opportunities and the demand for NTFPs depend heavily on consumer spending power. When NTFP producers are assured of reliable and accessible markets, they will be more prepared to invest in new technologies and equipment. Weak markets and poor returns, however, often result in irregular supplies of inferior quality products produced with the minimum of effort and often in ways that damage the natural resource involved. An accurate assessment of the most appropriate market and consumer group is an essential first step for those considering NTFP activities.

Many NTFP producers are confronted by extremely non-transparent market conditions. Producers often do not know the end value of their product especially if it is being processed and marketed by middlemen. This lack of knowledge also makes it difficult for NTFP producers to deliver products that conform to the hygiene, storage, packaging and presentation standards that would enable them to ask a higher price.

When NTFP producers extend market activities beyond their own locality, external support is essential. Establishing reliable market relationships can be difficult. Coordination is needed to ensure that products of sufficient quantity and appropriate quality enter the market on time. This is especially the case where the export market is concerned. The quantities required for this type of market are usually more than small-scale producers and small, community-based organisations can produce unless they are well organised in producer associations.

What needs to be done?

The list of challenges facing the development of NTFP to enhance livelihoods and strengthen biodiversity in Kenya is a long one. Most of the difficulties currently facing the sector require considerable work at the local, national and – in some case - international level.

At the local level many of the problems faced by NTFP

Suggested ways in which marketing difficulties and challenges might be overcome include the following:

- **Market surveys to identify customer demand and preference as well as the size and location of niche markets;**
- **Collective marketing to ensure adequate and consistent supplies;**
- **Collaboration and networking to share information about market opportunities;**
- **Fair and transparent marketing contracts to provide motivation and a degree of security. Supermarkets are amongst the outlets that can be targeted here;**
- **Broad stakeholder cooperation to effect policy change.**

producers have the same cause: isolation. Producers are isolated from training facilities that could enable them improve their production, managerial and trading skills; from information about market processes and conditions and from the technical help they need to reduce harvesting losses and improve output levels and quality.

Efforts to support and strengthen the CFAs and CBOs involved in NTFP production could have a direct and positive effect on the organisation and coordination of NTFP activities at household level. Community organisations provide a formal structure through which technical, educational and market information can be channelled. As recognised community representatives, they can also play an important role in resolving conflicts that may arise over access to resources or between community members and external organisations and entrepreneurs.

Questions of land ownership, tenure, access and use are primarily matters of national concern although customary and traditional rights also have to be taken into account. National organisations such as *Kenya Forest Services* and the *Kenya Wildlife Service* are directly responsible for implementing policy in forested areas and are responsible for ensuring that their personnel are fully informed and able to implement and deal with local problems relating to the use and harvesting of forest products.

More attention should be given to research that directly benefits NTFP producers. This includes yield and regeneration studies, harvesting assessments and the study of plant species with valuable properties. Efforts should be made to ensure that when research results of value to NTFP producers become available – whether these are agronomic or market related – they are disseminated via appropriate and accessible media and agencies so they reach the communities concerned.

At the level of financial policy much can be done at government level to ensure that small-scale producers have access to appropriate credit facilities. This will enable them to invest in the equipment and training they need to enhance their activities and ensure these do not damage the natural and vegetative resources on which they depend.

At the international level the procedures surrounding standards and certification are amongst the issues that cause NTFP producers the greatest difficulty. Also issues relating to the protection of indigenous knowledge and cultural and traditional rights raise problems for some NTFP producers. The process involved in patenting and claiming Intellectual Property Rights (IPR) is often complex and expensive and they do not necessarily provide the security needed to ensure that communities can continue to benefit economically from their unique knowledge and skills.

Many NTFPs enter the international market as niche products. As such they move through channels designed to ensure that specific standards are met. Examples include the certification procedures surrounding organic, fair trade and so-called green products. Certification is expensive and if these certifying organisations increased their efforts to train local inspectors it would benefit the producers of export-orientated NTFP considerably.

Despite the challenges facing them, the experiences described here reflect a motivated and optimistic attitude to the future and a determination to ensure that NTFP activities continue to contribute to livelihood improvement and biodiversity conservation in Kenya.

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AGROMISA

Agromisa was established in 1934, and is linked to Wageningen University and Research Centre. Our aim is to exchange knowledge information on small-scale sustainable agriculture and related topics. Our target group is the underprivileged population in rural areas worldwide, but with a focus on Africa Agromisa's main objective is to strengthen the self-reliance of the target group and to improve their livelihood by sharing experience and knowledge.

Agromisa's role in this is a supportive one: we are not a donor organisation, nor do we finance projects directly. It is Agromisa's belief that the gap between formal (scientific) knowledge and informal (farmers') knowledge should be bridged. To achieve this, Agromisa collaborates with intermediary organisations. For more specific information about Agromisa's services, see the inside of the back cover. You can also write for more information to Agromisa.



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CTA

The Technical Centre for Agricultural and Rural Cooperation (CTA) was established in 1983 under the Lomé Convention between the ACP (African, Caribbean and Pacific) Group of States and the European Union Member States. Since 2000, it has operated within the framework of the ACP-EU Cotonou Agreement. CTA's tasks are to develop and provide products and services that improve access to information for agricultural and rural development, and to strengthen the capacity of ACP countries to acquire, process, produce and disseminate information in this area. CTA is financed by the European Union.



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PELUM (KENYA)

Participatory Ecological Land Use Management (PELUM) Kenya is a network of 37 Civil Society Organizations working with grass-root communities in Kenya. It is part of the greater PELUM Association which was started in 1995 and operates in 10 Countries in Eastern, Central and Southern Africa. PELUM Kenya promotes participatory ecological land use management in Kenya by building the capacity of members and partners to respond appropriately towards the empowerment of communities and promoting the use of indigenous knowledge and local innovations. In order to strengthen linkages and collaboration, action learning among partners and members is used. PELUM Kenya is also active in campaigning, advocating and lobbying for change of policies in favor of small-scale farmers, in order to increase the visibility of small-scale farmers. All this is dovetailed in three activity based programmes namely; the Campaign, Advocacy and Lobbying (CAL) Programme; the Research and Information Management (RIM) Programme and the Capacity Enhancement (CEP) Programme.



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