

Chagga homegardens

a threatened
ecosystem *Page 3*

Tamarind growth in Tharaka

Government
intervention
needed *Page 10*

IN THIS ISSUE

viewpoint

- 2 Remarks from the
Regional Coordinator

research

- 6 *Prosopis juliflora* – an update of
ICRAF activities in Lake Baringo
- 7 Calliandra: looming danger for
a popular fodder tree in eastern
Kenya

Interventions

- 8 Giant bamboo: a grass becomes a
multipurpose tree

10 strengthening institutions

11 newsfocus

15 readers' speak



Tribute to
**Christophe
Zaongo**
Page 14

Remarks from the Regional Coordinator

Welcome to the second issue of Prunus Tribune – the regional newsletter for World Agroforestry Centre's Eastern and Central Africa Regional Programme (ICRAF-ECA). We were established in 1987 as a regional agroforestry research network that aims at improving the livelihoods of smallholder farmers and other users of tree products and providing strength to national programmes through collaborative research, education and development interventions. The central focus is to address the internationally agreed targets to halve the proportion of people living in extreme poverty by 2015.

Towards this, we centre our research and development activities on so called problem domains, which are broad problem categories within the region, guiding where we place our efforts. Our five priority problem domains are:

- High potential highlands
- Lake Victoria basin and other major watersheds in the regions
- Major water towers and watersheds of national and regional significance
- Arid and semi-arid lands
- Urban and peri-urban agriculture

ICRAF-ECA aims to deliver agroforestry innovations as an integral part of development activities, to enhance impact and sustainability. The programme is now operational in Kenya, Uganda, northern Tanzania, Rwanda and Ethiopia. We also have plans to get activities going in Burundi and southern Sudan.

This issue of the newsletter provides a glimpse of ongoing regional work across the problem domains. Every article will give you a special feature looking at how some of our interventions have helped solve both economic and environmental problems, but also some of the challenges we encounter in bringing in new innovations.

The article on the Chagga homegardens presents a traditional agroforestry system on the slopes of Mt. Kilimanjaro in

Tanzania. Although noted for its diversity and complexity, the sustainability of the system is now threatened by the rapidly growing population and decreasing water availability. Agroforestry and other interventions for improving the systems productivity and sustainability are discussed.

Even though not exactly a tree, the Giant Bamboo from China could contribute to wood supply and reduce encroachment on remaining forests. It is more environment-friendly than eucalyptus, another fast growing species widely planted in region. The giant bamboo is now a sensation in the region and requests for planting materials come in from everywhere.

Our highly appreciated senior scientist, Dr. Christophe Zaongo passed away suddenly in April this year. One of his key achievements concerned the neem tree (*Azadirachta indica*). Neem is a medicinal tree that is much sought after. Originally it is a low and dryland species, but through Christophe's innovative research, it is now possible to grow neem also in the highlands.

The Regional Land Management Unit (RELMA) has from January this year joined ICRAF. The purpose is to strengthen the regional programme's ability to facilitate and support development. In one of the articles, RELMA's background and its way forward within ICRAF is described.

I hope you will enjoy reading this issue of the newsletter. Electronic copies can be obtained from our website: <http://www.worldagroforestrycentre.org/eca/>. I also welcome any comments that you may have on our newsletter.

Bashir Jama
Regional Coordinator
ICRAF-ECA

ICRAF-ECA aims to deliver agroforestry innovations as an integral part of development activities, to enhance impact and sustainability.

Chagga homegardens —a threatened ecosystem: Potential development options to reverse the trend



Picture: Aichi Kitalyi

A woman farmer carrying home Napier grass for animals as she work within the homegardens.

The Chagga homegardens are a multi-storeyed traditional agroforestry system on the slopes of Mt. Kilimanjaro, Tanzania. The farming system has evolved over more than four centuries and has often been described as a model sustainable land use system.

AICHI KITALYI & EIJA SOINI

The Chagga homegardens are a multi-storeyed traditional agroforestry system on the slopes of Mt. Kilimanjaro, Tanzania. The farming system has evolved over more than four centuries and has often been described as a model sustainable land use system. However, these homegardens are now threatened by high population growth against diminishing land and water resources, decreasing land productivity, growing urbanisation and the HIV/AIDS scourge.

The natural resource base is eroding at a high rate and this have been reflected in the adjacent ecosystems, the montane cloud forests, riverine vegetation, the lowland bush land and agricultural land on the lower slopes and the lowland plains. Recently a detailed review, which included an aerial photo interpretation between 1961 and 2000 and a socio-economic analysis of the livelihood changes, was undertaken as part of an ICRAF project "Socio-ecologic dynamics of land use change on East African highlands." These and numerous other studies, in addition to over 40 years of personal observations have formed the basis for this presentation on the main

causes of the changes in the farming system and suggestions of possible solutions and alternative options.

The Chagga homegardens cover about 1200 km² on the southern and eastern slopes of Mt. Kilimanjaro in the northern Tanzania. The farmers typically have a highland coffee-banana farm with many other food crops and trees intercropped, and a lowland maize, millet and bean field. Livestock in the highlands is kept under stall-feeding. In the lowland area where there is still plenty of land, free-range livestock keeping is practiced.

Many farmers keep between 3-5 traditional beehives. Amidst these different food crops are a variety of multipurpose tree species. Over a hundred different plant species can be found in one farm (average size 0.2 - 1.2 ha), making this farming system highly integrated and a unique agroforestry system in the east and central Africa. Trees are used to provide shade for coffee, as live fences, for fodder and mulch, for bee forage, for anti-pest properties and for timber and firewood.

The family resides on the highland ho-

megardens and daily trips are made, at least during cultivation time, to attend a lowland plot. Nutrient flow between the highland and the low land plots is not adequately understood. Declining soil fertility in the lowland plots is attributed to the flow of nutrients through grains, crop residues and fodder, up the hill to the homegardens. Animal manure produced in the system is all used in the coffee-banana plots and the use of either organic or in-organic fertiliser in the low land plots is negligible. The flow of nutrients to the lowland plots is probably through run-off.

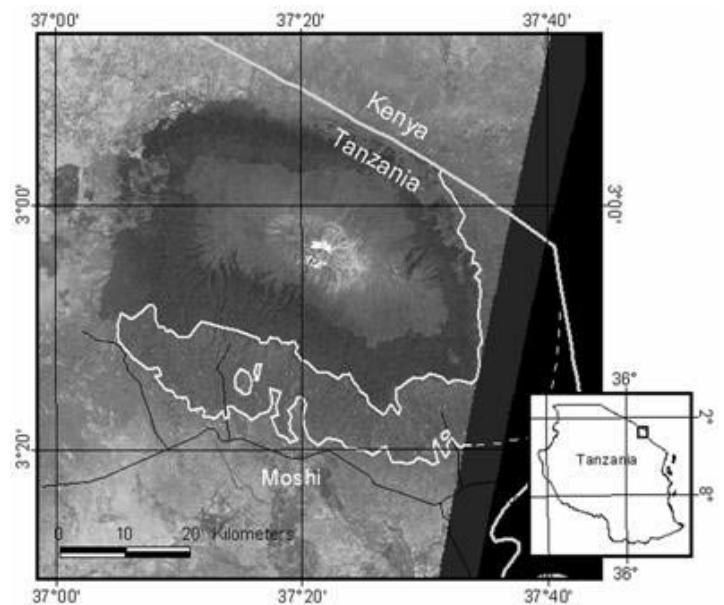
Much of the ecological stability of this ecosystem in the past has been attributed to a favourable biophysical environment - reliable rainfall, fertile volcanic soils, good vegetation cover - coupled with a well managed agroforestry system. This system flourished and showed positive growth for nearly two and half centuries, with coffee being the base of the economy though highly complemented by the other components of the farming system (Fernandes et. al. 1984). A more recent study on the socio-ecologic dynamics of land use in this area has shown that the farming system has not adapted to local and global changes efficiently (Soini, 2003).

The system is facing several challenges that affect people's livelihoods. Five closely related issues have arisen that expose the vulnerability of the Chagga homegardens and are leading to changes. The population quadrupled between 1920

and 1960. The growth rate of the Chagga population in the 1970's was estimated at 3.7 % per annum. Today the area has one of the highest rural population densities in East Africa, about 650 people per km². The favourable biophysical environment with a valuable cash crop is most probably the main factor behind this dramatic population growth. This was supported by good infrastructure such as good health centres, clean water and schools. This level of higher development compared to surrounding areas can be attributed to the early settlers and missionaries who settled in this cool weather, malaria free-areas.

The high population growth and the customary land inheritance system in which the farm is sub-divided among sons, has led to miniaturisation of the farms. This has dramatically reduced the economic viability of the homegardens. According to our land use analysis, even though the

The high population growth and the customary land inheritance system in which the farm is sub-divided among sons, has led to miniaturisation of the farms. This has dramatically reduced the economic viability of the homegardens.



A satellite image showing the Chagga homegardens which cover the southern and eastern slopes of Mt Kilimanjaro between 900-1800 metres altitude.

homegardens area has become very crowded, homegardens have not expanded down the slope since the 1960s. Due to population growth, however, lowland cultivation has expanded to more marginal land.

Natural bushland areas have either disappeared completely or become extremely fragmented. New lowland settlements have appeared and existing ones have considerably expanded. Although expansion into the forest reserve for permanent settlements is not evident, encroachment and overexploitation of the forest reserve has been observed by a recent aerial survey. This encroachment and overexploitation has been suggested as a major threat to the montane cloud forest.

Although Kilimanjaro region has the highest rural

population with access to safe water in Tanzania (75% compared to 46% national average to the inhabitants), diminishing water resources is probably the most dramatic change in the Chagga area. Farmers have noticed the reduced water supply. This could be due to a number of factors. Climate change has had an impact in the area with disappearance of 75% of glaciers on the mountain since 1912. Change of indigenous vegetation to exotic species in the homegarden area, and cultivation of the immediate riverbanks is believed to have contributed to the drying up of rivers and springs. Up to the late 1960's the Chagga homegardens had a well functioning community-managed network of irrigation furrows.

The traditional irrigation system and its management have now partly collapsed. With diminishing water

supply, more efficient irrigation systems are required and major renovation of the irrigation systems is needed. In addition, drying streams has greatly affected the riverine vegetation, though most of the damage is done by humans exploiting the riverines for firewood and timber. A number of traditional crops such as *Dioscorea alata* - shia, *Colocasia esculenta* - maduma, *Dioscorea bulbifera* - nduu and *Telfaria pedata* - makungu, or makweme are disappearing.

The slump in the world coffee prices has contributed significantly to the increasing poverty levels in the area. Due to the continuous decline of coffee prices on the world market and the rise of production costs, farmers have started to devote their attention to other income generating activities like horticultural crops, groundnuts and milk. Most of these options suffer from lack of big enough markets. Hence these activities do not generate the sort of income for purchase of inputs that the coffee did in earlier days.

With the current farm input levels the homegardens are losing their productivity. One third of the plots are cultivated without using any fertilisers at all, organic or inorganic. Farmers are not unaware of the problem. According to farmers, lack of capital to purchase and apply fertilisers is considered the biggest problem in farming in the area. Poor extension services and drastic policy changes on availability and distri-

bution of farm inputs has exacerbated the problem.

Lack of incentive to maintain the youth on-farm has resulted to migration of a huge proportion of the labour force to urban areas. This has disrupted the trans-

Lack of incentive to maintain the youth on-farm has resulted to migration of a huge proportion of the labour force to urban areas. This has disrupted the transfer of accumulated knowledge and experience in managing this complex bio-diverse system.

fer of accumulated knowledge and experience in managing this complex bio-diverse system. In fact this well-managed agroforestry system, refined and tested over the ages and handed down from one generation to the next is endangered. Very few youths are ready to get to farm work, yet there is no much opportunity for off-farm work. This scenario has been reflected in the poverty assessment reports, which show that 20.5% of adults between 15 to 60 years old are not active. The darker side of this change is increasing loitering and indulgence in abusive drinking thus removing the youths from farm work and more re-

cently increase the spread and risks of HIV/AIDS infection.

There are great opportunities for intensification and diversification in the Chagga homegardens. The local knowledge on agroforestry and the diverse gene pool provide a fertile ground for introduction of alternative sustainable livelihood options. Technological on-farm options should be supported by institutional and policy aspects, which will provide enabling environment.

Potential development interventions for the Chagga homegardens include:

- Improved technologies in growing the existing crops, by adopting a more diverse set of food crops and higher value crops for example, spices like cardamom and black pepper, and growing high value fruit both temperate and tropical and timber trees.
- Soil fertility management innovations based on a sound diagnosis of the nutrient limitations;
- Propagation techniques for promising local tree species,
- A new opportunity worth investigating would be organic, eco-friendly and fair-trade coffee markets. Despite the cover yield, average sales growth of organic coffee has been five times superior to that of coffee produced along conventional methods.
- Processing of farm produce suffering from seasonal overproduction would be a key factor to be looked at and

- Having small credits available would be another entry point.

Establishment of small scale enterprise seems like a lucrative option to many farmers on the slopes of Kilimanjaro, but very few have the capital to get started. Seventh, there should be a way to build social, physical and financial capital together by creating collective action that would appear attractive enough for the farmers to participate and finally, making a variety of new opportunities and innovations available to farmers by efficient extension service should go hand in hand with creation of markets for the new products.

Reference:

Fernandes, E.C.M., Oktingati, A. and Maghembe J. 1984: *The Chagga homegardens: a multi-storeyed agroforestry cropping system on Mt. Kilimanjaro (Northern Tanzania). Agroforestry systems 2: 73-86.*

Soini, E. 2003: *Livelihoods on the southern slopes of Mt. Kilimanjaro, Tanzania: Challenges and opportunities in the Chagga homegarden system.* ICRAF Programme One, Working Paper Series 2002-3

For more information contact: Aichi Kitalyi, A.Kitalyi@cgiar.org and Eija Soini, E.Soini@cgiar.org

Prosopis juliflora: an update on ICRAF activities in the Lake Baringo area of Kenya

BY ESTHER MWANGI AND STEFAN ANDERSSON

The previous issue of the *Prunus Tribune* (Jan-March, 2004) contained an article on the properties of *Prosopis juliflora* hereafter referred to as prosopis, an introduced, deciduous thorny shrub, which appears to be rapidly expanding in the drylands of eastern Africa. Many communities affected by its prolific expansion are demanding its eradication, despite its value as a source of fuelwood and building materials.

The article mentioned that ICRAF and its national collaborators were designing preliminary inquiries into the factors that shape local communities' perceptions of prosopis. This brief note is an update on ICRAF's recent activities in the Lake Baringo area in the Rift Valley of central Kenya.

What are the questions which we seek to address? First, we want to establish the current distribution of prosopis, its rate of spread and its effects on woody species diversity in the areas it has colonized. Second, we want to establish how prosopis affects the livelihoods of individuals and how these effects are distributed across different categories of individuals in society such as men, women, the poor and the wealthy. Third, we also want to establish the kinds of interventions local communities envision for its control/management and what their role would be in such interventions. The general point of asking these questions is to establish the nature and intensity of livelihood effects and the threat to biodiversity in order to gain a better understanding of which policy options might be available for addressing community needs while

conserving biological diversity. The area around Lake Baringo, where prosopis was introduced under a joint Forest Department/FAO range rehabilitation program in the early 1980s was selected as the first study site. Here, a survey of its distribution and its effects on woody species and insect diversity indicates that three locations in Loruk, Eldume and Ng'ambo to the North and South of Lake Baringo were the critical initial planting sites. *P. juliflora* in Loruk shows no signs of spread from the initial planting site. In Eldume, there has been some spread from the initial planting site, but with no discernible pattern. But the Ng'ambo area has shown a strong rate of spread from the initial planting sites, with a gradual decrease in tree density with distance from initial planting sites. The reasons for this varied outcome are still being explored. Preliminary analyses suggest minimal effects of Prosopis on tree and shrub diversity, possibly because there was little else growing around the initial planting sites. Insect abundance was low due to the timing of the survey, while there was very little difference between insect species resident in *P. juliflora* and other native trees such as *Acacia albida*, *A. tortilis*, and *A. mellifera*.

Interviews have been conducted with individuals, local leaders and other key informants in the Ng'ambo area and in the Lobo area to the North of Lake Bogoria, where the species has spread. Lobo is at the edge of the Lake Bogoria National Reserve, which is a Ramsar site of special conservation importance. Preliminary findings indicate that the desirable properties of prosopis such

as fuelwood provision, provision of fencing, construction posts, fodder production and honey production are heavily outweighed by its negative impacts. Survey respondents highlighted the following negative impacts: invasion into croplands; poisonous thorns causing harm to people and livestock; obstruction of roads, footpaths and cattle tracks; and damage to the teeth of goats. Overall there is an overwhelming demand for eradication of prosopis. Nonetheless, many individuals have expressed interest in commercializing the species by adopting potentially new uses such as charcoal production, furniture making, and expanding the market for prosopis products, such as honey and construction posts, to areas where demands for such products likely exist. The distribution of these benefits and costs of prosopis among the rural population are still being considered, as are the necessary institutional structures that would support local communities' objectives with regard to prosopis.

In the previous article on prosopis in the *Prunus Tribune*, it was erroneously mentioned that prosopis meets more than 70% of the energy needs of India. We would like to correct this error and instead note that prosopis contributes approximately 75% of energy needs of rural populations in the arid and semi-arid regions of India.

For more information contact, Esther Mwangi E.mwangi@cgiar.org and Stefan Andersson gryxbo@hotmail.com

Looming danger on a popular fodder tree in eastern Kenya: Research solving farmers problem on Calliandra

BY ERASTUS KIRUIRU

The world Agroforestry Centre (ICRAF), Kenya Agroforestry Research Institute (KARI) and Kenya Forestry Research Institute (KEFRI) have been actively promoting *Calliandra calothyrsus*, has a fodder shrub that increases milk production.

The performance of calliandra on-farm, since its introduction in the late 1980's has been good until recently (2001) when an attack by scale-like insects was observed on some farms in Embu and Murang'a Districts (Kenya).

The observation has caused considerable worry to farmers and researchers, given the importance of the fodder tree. The damage to the trees varies but in severe cases trees have been found to dry up. There could, however, be looming danger if the pests are not investigated.

The National Agroforestry Research Project at Embu has had a lot



Picture: Ecomedia

of interest in investigating what these insects are, their spread on the farms and potential dangers they might cause to the livestock production in terms of reducing feed availability. A field survey involving its scientists and the those from Kenya Agroforestry Research Institute (KARI) Muguga, was carried out within the farms in Embu, Meru and Murang'a Districts to assess how the pests have affected calliandra, particularly the extent of damage and how the problem has spread but more importantly to isolate the insect(s) causing the damage for identification.

The pests collected from the affected calliandra plants underwent tests at the National Museum, Nairobi. It was found that several types of insects were attacking calliandra but the majority were scale insects. The main scale insects found included those scientifically called *Parasaissetia nigra*, *Planococcus citri* and *Icerya purchasi*. Scientists in Zambia and Uganda, through the assistance by The Insect Information Service at the National History Museum, London, have also identified another form of the scale insect, referred to as *Pulvinaria jacksoni* (Newstead).

Apart from scale insects, weevils such as *Oreorhinus* and *Nematocercus* also appeared to cause some damage to the calliandra. Based on the results obtained so far, our local scientists are now planning to develop a most practical method for the control of these insects by smallholder farmers to avoid further damage to the calliandra. It was noted that farmers have developed their own methods to "control" the pests through the application of detergents, which to some extent have helped to clear off the suspected pests in affected plants. The attack mainly occurs during the dry season.

Another solution to the problem is to introduce other species of fodder shrubs, says ICRAF scientist, Steve Franzel. "KARI, KEFRI and ICRAF have been active in this area and the recent introductions include *Leucaena trichandra* and mulberry (*Morus alba*) and more are expected in the near future, adds Franzel.

For more information contact; Erastus Kiruiru, Manager, National Agroforestry Research Project, KARI-EMBU, (Kariembu@yahoo.com or Kariembu@alpha.org) or Steve Franzel (s.franzel@cgiar.org), World Agroforestry Centre, Nairobi Kenya



Picture: Erastus Kiruiru

Whitish spots on the trees infested by the insects

Giant bamboo: a grass becomes a multipurpose tree

BY CHIN ONG



Picture: Kimunya Mugo

Growth of giant bamboo, *Dendrocalamus giganteus*, in Thika, Kenya.

Bamboo is regarded as a multipurpose in Asia, where it has a thousand uses ranging from food to house construction, mainly to replace many of the timber products traditionally derived from trees. (insert photo 2). Recently, there is a huge increase in the global trade in modern bamboo products, estimated at 20 billion US dollars annually. Bamboo is used in several parts of the world for cleaning sewage. The plant is known to absorb heavy metals and pollutants faster than most other plant species. This is a potential solution to the heavily polluted lakes in Africa, notably Lake Victoria. The pollution occurs especially around the Winam gulf, an entry point into the lake. Planting bamboo trees on landscapes and riverbanks is just one way of achieving the above objectives. Bamboo rhizomes are very effective at holding topsoil on both steep slopes and riverbanks, hence the importance of planting them on the highlands to prevent soil erosion and the riverbanks.

No other woody plant rivals the bamboo's wide use in environmental conservation and commerce. It is the world's strongest and fastest growing woody plant, offering ecological and economic benefits to smallholders. In Europe and North America, bamboo floorboard sells for between \$80 and \$100 per m², it is a viable replacement for both softwoods and hardwoods. Bamboo 'culms' (poles) are also known to make the strongest, lightest, natural material available to man.

Dr Chin Ong of RELMA in ICRAF posh next to a giant bamboo hump, *Dendrocalamus giganteus*, in Thika, Kenya

According to the New Collins dictionary a tree is defined as 'any perennial plant with a distinct trunk giving rise to branches'. Therefore, can a bamboo with a trunk of 20-40 m be called a tree? Recently, ICRAF scientists in East Africa became interested in using bamboo for ecological restoration and income

generation. Despite its numerous uses, the bamboo remains an unexploited resource in Africa. But the World Agroforestry Centre (ICRAF) is working on reversing this through its work on giant bamboo (*Dendrocalamus giganteus*) with a private entrepreneur, Liam Omera, and the Jomo Kenyatta Agricultural University in Thika (insert photo 1).

The bamboo grows three times faster than eucalyptus. According to Chin Ong, an agroforestry advisor attached with ICRAF, "commercially important bamboo species usually mature in only three years, after which multiple harvests are possible every second year for up to 120 years."

Why is bamboo unexploited in Africa? In East Africa, native bamboos are usually much smaller in size than their Asian relatives and are often found in protected water catchments and river banks therefore it is considered 'illegal' to harvest. For example, bamboo forests of *Arundinaria alpina*, the species native to Kenya, are found in Mt. Kenya, Aberdares and Mt. Elgon, may yield as many as twenty thousand 15-20 m high culms per hectare annually. These are occasionally used for fencing and making baskets. Another reason is the general lack of awareness of its huge income generation and employment potential.

In contrast, bamboo is widely used for reinforcing

concrete, and as scaffolding on skyscrapers in South and East Asia. India alone reportedly has some 20 million acres of commercial bamboo that account for 60 per cent of the country's paper requirements and much of the country's economic timber requirements. In China, the commercial trade in bamboo is even greater.

Kenya has very few privately owned large commercial timber plantations. Most of the timber is produced by the Forest Department; unfortunately government forests have been over-exploited and very few have been replanted.

Kenya's Raiply has reportedly begun importing timber from the Congo and Tanzania to manufacture hardboard and soft board, while Panpaper Mills in Webuye, which manufactures much of the country's paper, uses plantation softwoods to fuel its boilers and make paper pulp. ICRAF believes that bamboo can solve both problems owing to its fast maturing nature and biomass.



Native bamboo forest, Arundinaria alpina, in Kijabe, Kenya 1927

The bamboo is a valuable source of firewood and/or charcoal; it produces more than 7,000 kilocalories per kilogram, half the value obtained from raw petroleum. Its high biomass production makes it effective as a fuel source.

Studies in South East Asia have shown that natural bamboo forests have a neutral effect on soil. The bamboo leaves, sheaves and old culms that die fall to the ground, decompose and create a thick humus layer and enrich the nutrient content of the soil.

"Kenya was once covered in bamboo, e.g. Kericho and Kijabe, however these forests were cleared and bamboo forests are hard to come by," according to Chin Ong.

Bamboo is a critical element in the balance of oxygen and carbon dioxide in the atmosphere. It is effective in reducing the carbon gases blamed for global warming. Some species are known to sequester up to 12 tons of carbon dioxide from the air per hectare.

The world, mostly Asia, consumes over 2 million tonnes of edible bamboo shoots every year. The shoots are high in vitamins and low in carbohydrates, fat and protein. The Kenya Forestry Research Institute (KEFRI) grows several high quality edible shoots. Bamboo shoots can be eaten raw or cooked and are usually described as mild and very crunchy.

Bamboo can be propagated from seeds, however most species flower only once in 15 – 120 years. Other options are tissue culture, rhizome cuttings and vegetative cuttings.

ICRAF is set to popularise this plant in Africa through a pilot work in Kenya and other riparian countries of Lake Victoria Basin. Our aims are to create awareness on the effectiveness of giant bamboos for sewage treatment from large towns along the Lake Victoria Basin, its income and employment generating potential and protection of fragile ecosystems such as wetlands and steep slopes, which are contributing to the sedimentation of the lake ecosystems.

Picture: Chin Ong



Bamboo can be used for a wide range of products such as edible shoots, mats, roof and floor tiles

Agroforestry research report calls for government intervention on Tamarind growth in Tharaka

BY PRISCILLA NYADOI AND ABDALLAH KASSIM



Picture: Wim Boyse

In order to identify intervention strategies that may be needed to enhance utility and ensure conservation, between January, 2004 and April 2004, a study to assess abundance, productivity, niches, management regimes, tree products and services and explore the potential for income and intensification in land use systems on farm in Tharaka was done.

Ecological population sampling and socio economic survey methods to generate data were used and analysis done in Genstat and statistical package for social scientists (SPSS). The results show; Tamarind is ecologically, socio-culturally suitable for Tharaka, fruit productivity is high and trade in fruits alone contributes significantly to the annual income of majority of the farmers,

4 to 6 times higher for the fruit traders and contributes to 100% of farmers' household nutrition critically in the chronic annual food shortage period which coincides with peak fruit harvest.

The disparity in income between the farmers and fruit traders is due to lack of organization in the market and lack of technical know on management due to absence of extension services to farmers

and has encouraged inappropriate management regimes that have and will continue to reduce tamarind tree abundance in habitats and drastic decline is expected in the forests habitats though there is demonstrated economic benefits and potential for higher income to farmers and even potential benefits to the national economy from tamarind.

The study suggest that some measures are to be taken to exploit full potential benefits from tamarinds for improving livelihood of people in Tharaka, including legal government intervention in organizing the tamarind farmers into producer cooperatives, the fruit traders into buyer cooperatives, and linking them to exporters or identify or set up if non-existent a tamarind processing industry and export value added products to increase incomes and reduce economic disincentives. The government need to step up tree planting and management extension service specifically promoting tamarind as tree components in temporal scale tree – crop arrangements in farming systems to grass root farmers at village levels and in policy use the presidential decree to declare tamarind a tree cash crop in Tharaka and other districts in arid and semi arid environments.

*For further information contact:
Prof August B. Temu, Theme
Leader, Strengthening Institutions,
E- mail: A.temu@cgiar.org or Dr
Obua Joseph, Head of Department,
Forest biology and Ecosystem
Management, Makerere University,
E-mail: obua@forest.mak.ac.ug*

The Tamarind fruit collection store in Marimanti Market in Tharaka.

The majority of local community in Tharaka depends widely on *Tamarindus indica* for their annual income. The fruit is needed for domestic and industrial purposes which has created a markets demand both locally and internationally.

Tamarind was identified in Tharaka as a tree with potential to contribute to income and livelihood for the people in semi arid to arid districts according to Brown and Emerton.

RELMA joins the ECA team

BY CHIN ONG

Picture: Alex Odior



The Regional Advisory Committee (RAC) meeting in March 2004 to advise on RELMA in ICRAF

In January 2004 the Sida's Regional Land Management Unit (RELMA) formally joined World Agroforestry Centre's East and Central Africa Programme (ICRAF-ECA). Sida's intention is that RELMA's rich experience on development and land management issues would be used to influence ICRAF's desire to mainstream development in its research and development agenda. Sida has approved a three year budget (2004-2006) of 64 million krona (approximately 8.5million US dollars) for this new project, called RELMA in ICRAF.

The project will continue to focus on the traditional strength of RELMA in three main areas: land management of small-scale farmers, capacity building, and information and documentation. These three areas are interlinked, and should be looked upon in a holistic manner so that capacity building and information and documentation will support the activities in small-scale farm management.

First, a few words about the long and notable history of RELMA, which dates back to 1974, when Sida joined forces with

Kenyan Ministry of Agriculture to establish the National Soil and Water Conservation Programme (NSWCP) to promote soil and water management in Kenya. In 1982, Sida created the Regional Soil Conservation Unit (RSCU) in order to take the experience of NSWCP to other countries in the region. In 1998, the mandate was broadened to include a range of interventions beyond soil and water management and the unit was renamed Regional Land Management Unit (RELMA). Since 1992 RELMA has been located at ICRAF campus, and today it is fully integrated into ICRAF-ECA. RELMA's new mandate is to contribute towards improved livelihoods of small-scale land users and enhanced food security for all households.

So what is new in this project? First, the RELMA information and documentation unit is with ICRAF-ECA's information and communication unit in order to increase the efficiency of the overall level of

information services as well as providing cross sharing of regional and global experiences. Second, ICRAF's training unit and the Strengthening Institution theme will participate in the planning of capacity building activities in the project. Thirdly, the planning of the small-scale land management activities will be undertaken jointly with ICRAF's land and people, trees & markets, and environmental services themes.

In terms of staffing and management structure, there will be little changes in both international and national staff. Although RELMA in ICRAF staff are integrated into ICRAF-ECA, it will still remain as a rather intact unit. However, the role of a fulltime director is no longer needed and that position is replaced by a part-time project manager. At this point it is important to recognize the outstanding contribution of the out-going director, Åke Barklund, who has steered RELMA through this uncertain period and still maintain the spirit and cohesion of the team throughout. In 2003, we also witnessed the retirement of both Kimaru Gathiru and Rolf Winberg, who have served RELMA

RELMA's range of publications.

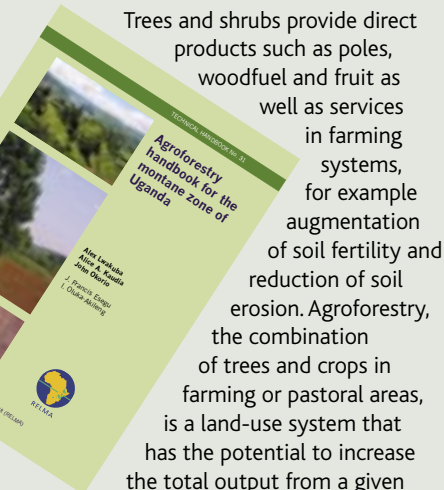


New RELMA publication

Technical report No. 31

Agroforestry for the montane zone of Uganda

By Alex Lwakuba, Alice A. Kaudia,
John Okorio, J. Francis Esegu and I.
Oluka-Akileng
ISBN 9966-896-55-4



Trees and shrubs provide direct products such as poles, woodfuel and fruit as well as services in farming systems, for example augmentation of soil fertility and reduction of soil erosion. Agroforestry, the combination of trees and crops in farming or pastoral areas, is a land-use system that has the potential to increase the total output from a given piece of land. But to realize that potential, trees and crops have to be combined in a wise way and the trees may have to be managed to reduce shade and other competition with the crops.

The woodfuel consumption in Africa amounts already to around 500 million tonnes annually, and it is the only continent where the use is rising sharply. Soil fertility is on the decline in many areas, and low productivity of farmland is one of the main forces driving deforestation in Africa. With low productivity large areas have to be cultivated and the additional areas are often secured by the clearing of forests or woodlands.

There is need for more trees in many parts of Africa, and Uganda is no exception. This book provides ideas on how best trees can be incorporated in the farming systems of montane zones of Uganda. It also offers ideas on measures aimed at enhanced soil fertility and reduced consumption of woodfuel.

Although the book is primarily targeting the montane areas of Uganda, practices and technologies described are also applicable to other areas with similar farming systems, for example in parts of the Kenyan highlands, the highlands with bimodal rainfall in northern Tanzania and humid areas in western Ethiopia.



Picture courtesy of Chin Ong

A RELMA sponsored group in India to see the world's largest milk marketing cooperative, AMUL, in Anand, Gujarat, December 2003.

with distinction over many years, in the areas of soil conservation and water and sanitation respectively. We wish them all success and happiness in their future endeavors.

The RELMA in ICRAF team consists of seven development specialists and six support staff. These development specialists cover the areas such as land use intensification (Dr Aichi Kitalyi), farmer organization and collective action (Dr Millie Abaru), conservation agriculture (Soren Damgaard Larsen), rainwater harvesting (Malesu Maimbo), capacity building (Dr Azene Bekele-Tessemma), publication and documentation (Anna K. Linqvist), and agroforestry (Dr. Chin Ong, project manager).

Another major change is the function of the new Regional Advisory Committee, which will be re-constituted in order to guide both RELMA in ICRAF. The regional advisors were chosen in their personal capacity rather than on country

and institution basis as before. In addition, a Sida representative from the newly established Resource Centre for Rural Development (RCRD) will guide the management of the new project. The composition of RAC will be dynamic and reflect the needs of ICRAF-ECA and the RELMA in ICRAF.

The following examples of RELMA's recent activities will give a good idea of the wide ranging work undertaken. A major approach is to support study tours for African partners across the border to learn about other countries' successful experiences in the region. More recently, this was broadened to cover Asia with visits to Thailand, China and India in order to promote South-South cooperation. Another approach is to empower local communities to organize and to lead their own development process. This has taken place within the Kusa Pilot Project, with a community in Kusa (a fishing village on the shore of Lake Victoria). Kusa community has its own support office and an elected committee,

since 2002, and therefore, RELMA can reduce its direct involvement and give the community a greater ownership over its own activities. RELMA will hand over the responsibilities and management to the community when the project ends in 2004. The community is now being linked to a consortium of research and development partners hosted by ICRAF western Kenya programme. This will enhance sustainability of the community activities. Networking is another key feature of RELMA such as the movement for rain water harvesting in South Asia and East and Southern Africa, which is linked to the Global Water Partnership. The principal objective of the rainwater harvesting network is to create awareness of the potential of rainwater harvesting among policy makers, administrators, NGOs and community groups.

Another important network is the promotion of conservation agriculture in Africa.

The publication of extension manuals is a key hallmark of RELMA. Language, content and design are adopted so that they are easily understood by extension agents, and the publications are distributed widely in the region.

For more information contact: Chin Ong, Project Manager, e-mail: c.ong@cgiar.org RELMA in ICRAF, Nairobi, Kenya

School lunch leads pupils to excel in national exams in western Kenya

BY JENNIFER FREEMAN

Kenyan HIV/AIDS orphans pass national exam with the help of school lunch championed by the UN Hunger Task Force school lunch as one way to fight global poverty

At the Bar Sauri Primary School in Yala division of Siaya District, earlier this year a remarkable thing happened: all the 33 pupils who sat for the national exams passed. "The school took second best position in the district," reported Bashir Jama, Regional Coordinator for the World Agroforestry Center and member of the Hunger Task Force. More remarkable still, nearly half of the winners are HIV/AIDS orphans. The headmistress attributed this remarkable success in part to the school lunch programme she initiated through voluntary contributions of farmers in the community.

As soon as Jama heard this news, he reported it to Dr. Pedro Sanchez, Director of the Tropical Agriculture Program at the Earth Institute at Columbia University, and co-chair of the Hunger Task Force of the United Nations' Millennium Development Project.

"The power of school lunches supported by local farmers is really catching fire," says Sanchez. "The Hunger Task Force strongly supports this great idea" in combination with other feeding programs that target mothers and very young children. It is satisfying, Sanchez added, not only to know that HIV/AIDS orphans



Students from the Bar Sauri Primary School in the village of Yala, Nyanza Province, Kenya. All thirty-three of the students who sat for the national exams passed, with the help of a local school lunch program. Image credit: Lisa Dreier

in Kenya are passing the national exam, but to have further proof of the value of locally supported school lunches.

The school feed program is one of the key recommendations of the hunger Task Force towards meeting the Millennium Development Goal of halving the 800 million hungry worldwide by 2015.

Other strategies championed by the Hunger Task Force to reduce global hunger, according to the Task Force's interim report, include restoring budgetary priority to agriculture as an engine of economic growth, empowering women, and promoting community-based hunger-reduction actions to boost agricultural production, nutrition, rural markets and infrastructure, and environmental sustainability.

The farmers in Yala who contributed the free lunches had been able to dramatically increase their crop yields by using innovative new agroforestry techniques. By using small trees as fertilizer, the farmers had increased their maize yield by two to four times, thus producing a surplus that could help support local school lunches. The donation of a cow to produce milk for the schoolchildren also helped augment the students' nutrition - and ability to learn. As Jama reported, "Best subject was science and the school's cow contributed!"

Sanchez and a delegation from the Earth Institute and the Millennium Project's Hunger Task Force visited the Bar Sauri Primary School in April as part of the Hunger Task Force's work to produce recommendations on actions that can be taken to greatly reduce global hunger.

In memoriam of Dr Christophe L. Zaongo

BY ABDALLAH KASSIM, KEBADIRE MOGOTSI AND ANNAH NJUI

It was a tragedy at ICRAF in April 2004 when we lost our Senior Scientist in Rwanda, Dr Christophe Zaongo, who until his death was also ICRAF's country representative in Rwanda.

While paying tribute to Christophe, Dr. Bashir Jama, ICRAF-ECA Regional Coordinator described him as a talented and hard working scientist who wanted trees to work for the poor.

During his seven years of service in Rwanda, Christophe Zaongo made enormous contributions to advance the science and practice of agroforestry. Prior to his death he was working on a research project to get high value medicinal trees for farmers in Rwanda through grafting Neem plant (*Azadirachta indica*) on *Melia azaderach* which could be seen growing in the highlands areas in future. The grafting process was successful resulting in *Melia* becoming a rootstock and a host of neem in the highlands. This amazing innovation won Christophe the first prize among the scientific posters presented at this year's annual regional workshop of ICRAF's Eastern and Central Africa Regional Programme, held in Nairobi in March 2004.



The Late Dr Christophe L. Zaongo

Christophe will also be remembered for many accomplishments including progressive terracing using multipurpose hedges and fodder trees for smallholder dairy farmers which won a major World Bank award for ICRAF early in the year. Christophe contributed to capacity building for students both at the universities and secondary schools in Rwanda. His passion to get familiar with the land use systems and to evaluate relevant constraints which show him travel around the country led to the reception of a research and development

agenda, as well as in the identification of various partners.

The work of the late Dr Zaongo in Rwanda pertained to research, and capacity building at all levels and to partnership. He was involved in providing technical leadership for the Agroforestry Network for Eastern and Central Africa (AFRENA-ECA) within Rwanda Agricultural Research Institute (ISAR). He also provided soil science input in agroforestry research in ISAR, in agroforestry education in the National University of Rwanda (NUR) and in the Higher Institute of Agriculture and Animal Resources (ISAE) as well as carrying special studies in evaluating the potential of soils in the semi arid zone of Mutara.

The agroforestry fraternity will remember Christophe for initiating and steering the Rwanda Agroforestry Research and Development Network (RAFNET), which is helping in scaling up the impacts of agroforestry nationwide. The National Research Institute of Rwanda (ISAR) will recall him for his talent in project development, fund raising and a guide to young scientist.

"We have received the shocking news about the untimely death of Dr. Christophe Zaongo. ICRAF has lost a great scientist, Africa has lost a great son, his family has lost a great man. I have known Christophe since the time he joined ICRAF and I had great respect for him. He was a quiet man but very thoughtful and hard working. We join his family, the staff in Rwanda, the ECA team and senior leadership in mourning Christophe. May the almighty God Rest His Soul in Eternal Peace."

Freddie Kwesiga, Regional Coordinator Southern Africa

"Following the sudden death of late Ddr. Christophe Zaongo, please allow me to present you all my heartfelt condolences on behalf of the Managing committee and staff of the Rwandan Agricultural Research Institute (ISAR)

Late Dr Zaongo was a hard working and tireless researcher appointed to Rwandan Research Institute by the former ICRAF to run its joint project AFRENA-ECA since 1998. He played a great role in strengthening ISAR partnership with International Research institutes and Higher Learning Institutions. Moreover, he showed an example of good social relationship and brotherhood to all ISAR staff and Rwandans who worked with him in a way or another. We lost not only a fellow researcher but also a friend and

brother. While mourning for this sudden passing away, we pray so that our Lord strengthens you to carry on what the late fellow initiated. May the Almighty God receive his Soul in ever lasting peace!"

**Hermenegilde Twagiramungu PhD
Director Général, Institute des sciences agronomiques du Rwanda**

"Chris, I shall miss your intellectual guidance and humble nature. Your innovative work on neem tree grafting is a great gift to the farming community by which I shall remember you. Rest in Peace"

Annah Njui, Programme Officer, ICRAF-ECA

Prosopis: A weed threatening the Kenyan drylands

A letter from a concerned scientist on a terror weed

Mention the word "*prosopis*" to people from the arid and semi-arid areas (ASAL) of Kenya and you will create chills down their spine. It creates agony, poverty and curses to anyone who has encountered with the plant.

Prosopis belongs to the family *leguminaseae* (mimosoidae). There are 44 species worldwide, of which many originate in southern and central America. Virtually all species are aggressive, vigorous growers, which can colonize an area in a short period of time. It can be classified as shrubs or trees.

Prosopis was introduced to Kenya in the late 1970s and early 1980s, as a plant to green up the ASAL because of its prolific foliage production and coppicing traits (re-grows when cut). It is purportedly a multipurpose legume plant for fodder, soil amendments, firewood and erosion control.

I have received complaints about the "destructive" nature of *prosopis* and went for a fact-finding mission and in particular to ascertain the plant's environmental, economic and social values to the people it was meant for. I am a crop protection scientist, specialized in Weed Science/ Research and curious on new, invasive and noxious weeds like water hyacinth in Lake Victoria.

I had been briefed on the effect of *prosopis* on humans and animals and decided to take my environmental team to a place called Ng'ambo on the flat, beautiful, fertile Njemps plains of Central Baringo District (Kenya). Residents here are primarily pastoralists but a good number grow maize, beans, cowpeas, onions, pawpaws, and oranges. I witnessed "plantations" of *prosopis* which was mature, thorny and

formed an impassable, impenetrable canopy. The weed is domineering, a colonizer and produces *allelochemicals* and exudates which suppress any other plants around. The "weed" reproduces by seeds and vegetatively and can be dispersed long distances by humans, livestock, birds, wind and water. *Prosopis* has virtually invaded all ASAL areas of Kenya. The hard, strong sturdy thorns have been nicknamed "*msumari ya norad*" and have caused untold sufferings to the people, cows, goats, donkeys and sheep.

Encounters with its mess

A child is brought to us with a pricked, swollen pussy leg and needs immediate attention; an elderly lady comes to us with a swollen arm having been pricked on the second finger but poisonous effects of the thorn affects the whole arm and she even has a swollen armpit, she can hardly raise her arm; an elderly man shows us a village they had abandoned because of fear of being enclosed in by the aggressive plant. We found children who eat the slightly "tasty" but non-digestible pods, which accumulate in the stomachs and cause constipation. We were told of extreme cases where kids have been operated on to remove the seeds and "gum-like" substances. Note that this is a hunger prone area and school children told us blatantly that they carry pods in the pockets for chewing during hunger "pangs".

Livestock numbers have been reduced tremendously. The *allelopathic* effect of *prosopis* has reduced pasture (grass species) to nought. Once the canopy establishes, no vegetation grows under and locals must vacate the invaded areas!! They migrate in search of pasture. If an animal is

trapped in the weedy enclosure, no one dares rescue it. The animal might starve to death in there, reason, the owner might be pricked and have his limp amputated. No one gets out at night, chances of stepping on a thorn or being scratched are high; no one can go for anybody's help in case of fire or any assistance, they will be pricked. Water channels, rivers and streams have their courses changed by *prosopis*.

Goats, which eat the plant, have had their teeth fall off, their mouth disoriented and their stomachs swollen as there is no regurgating taking place. Loss of cattle and goats is a problem now. In extreme instances the seeds "start germinating" inside the goats' stomachs!! When they die and intestines opened, accumulated sprouting *prosopis* seeds are found inside.

The locals do not use the wood for fuel as they claim that it produces poisonous smoke. It is soft and easily attacked by insects and therefore "unfit" for fuel source and construction of houses. I personally saw several holes of insect damage on tree stems which had been cut and placed outside a house.

My assessment of the "weed" is simple, *prosopis* species, which was intended for biomass production might have been the wrong species, perhaps the thornless ones would have been better as long as it is *non-allelopathic* and produces no root exudates.

The *prosopis* I saw was worse than the dreadful water hyacinth. It must be eradicated by every means possible. It is now a weed whose economic value is totally out-rated by the losses it poses. It has every negative environmental impact to

ECA Headquarters**Kenya**

Bashir Jama
Tel (254)-524000/524230

Rwanda

Steve Franzel
(based in Nairobi)
Tel (254)-524000/524133

Uganda

Jean-Marc Boffa
Tel (256)-41-220594

Ethiopia

Elias Eyasu
Tel. (81)-123-2511463215

Tanzania

Charles Lyamchai
Tel. (257)-272505675

Kenya

Kisumu Office
Qureish Noordin/
Markus Walsh
Tel. (254)- 57-21456/21918

Embu Office (KARI/ICRAF)
Erastus Kiruiru
Tel. (254)-68-20116/20873

Meru Office (KARI/ICRAF)
Jonathan Muriuki/
Sammy Carsan
Tel. (254)-064-31267

Watch out for these exciting stories on our forthcoming issues!

The Prunus Tribune will provide an exclusive coverage of the ICRAF's September drylands workshop

Share the Ethiopian experience on simplified agroclimatic zone identification

Lessons from Israel for the Kenyan drylands —read all about *Acacia angustissima* proving to be a dangerous tree shrub or animal feed for farmers

Prosopis

◀ *Continued from page 15*

Kenya and should not be allowed to spread to our parks! It will be catastrophic to all of us and as a country we shall never afford to control it. It should not be allowed to invade the high potential areas as it will cause untold sufferings.

This is my plea; let us use any weed control method(s) to eradicate the *prosopis* plants, seeds and vegetative rootsticks. We can use chemicals, like *glyphosate* (round up), which is very costly or mechanical removal. Whichever method we employ, it must be *fast* and should be done *now*.

Meanwhile, all people are encouraged to plant many

environmental friendly trees as much as possible. The Authority under the Environmental Management and Coordination Act (EMCA) of 1999, section 42(1)(d) gives the Director General powers to declare any invasive plants, weed etc unwanted. This can be applicable in the case of *proposis*.

For more information contact: Prof. Ratemo W. Michieka, PhD, EBS, Director General National Environmental Management Authority. NEMA.
E-mail: dgnema@swiftkenya.com

The article previously appeared in the East African Standard, Saturday, July 10, 2004

events

ICRAF Arid Lands Workshop in September 2004

World Agroforestry Centre, East and Central Africa Region [ICRAF-ECA] is proud to hold a three-day consultative workshop on drylands research and development issues. The workshop is slated to be held between 1st and 2nd September. The theme of the workshop is "*The Science and Practice of Agroforestry in the Arid and Semiarid Lands of Eastern Africa: Charting the Way Forward.*"

The workshop is taking place against the backdrop of country-level dryland strategies commissioned by ICRAF-ECA for the drylands of Kenya, Uganda, Tanzania and Ethiopia. The strategies which will be discussed are expected to help in focusing ICRAF's re-engagement with the drylands in the region.

The objective of the workshop is to bring together stakeholders in dryland research and development to brainstorm on emerging

issues in dryland agroforestry as well as determine the way forward in the execution of the ICRAF country-level dryland strategies. Participants are drawn from Kenya, Uganda, Tanzania, Rwanda and Ethiopia.

Further information on the workshops can be obtained from, Bashir Jama (b.jama@cgiar.org) Annah Njui, (a.njui@cgiar.org) or Selina Sonon, (s.sonon@cgiar.org), or by calling +254 20 524290/524230

The Prunus Tribune

The Prunus Tribune is a quarterly publication and is published by the Eastern and Central Africa Programme of the World Agroforestry Centre ©2004

Editor: Abdallah Kassim

Editorial assistance: Bashir Jama, Anna Karlsson-Lindqvist, Annah Njui, Abdi Zeila

Art direction, design & layout: Conrad Mudibo (c.mudibo@cgiar.org), EcoMedia Limited



World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES