



# Good news on a dreaded tree

Prosopis (popularly known as mathenge) has many uses, and it can be commercialised

*Prosopis fuel wood cut into pieces for making charcoal. The wood is of excellent quality to make charcoal (density 0.828 g/cm<sup>3</sup>). (Photo: KEFRI)*

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**P**rosopis was introduced into Kenya in the late 1940s as a fodder and shade plant. The plant enjoyed widespread cultivation in the 1970s and 1980s and its weed problem came into the limelight for the first time during and immediately after the wet years of 1997 and 1998 (El Niño phenomenon).

The widespread complaints by pastoral communities from many places across the country triggered the first initiatives by the Government of Kenya to define status and impact of the species in the country between 1999 and 2002. This was followed by a national workshop on management of prosopis that led to the initiation of a pilot project in Baringo District (now Baringo County) aimed at developing the technologies towards management, control and utilisation of the invasions with support from FAO (2004 – 2007).

Out-scaling of the developed technologies to other selected areas with similar invasion problems is now being attempted in Garissa, Tana River, Turkana and Taita Taveta counties, with encouraging results.

In an effort to have an impact through reduction of further spread of invasions and

to ensure active participation of the local communities in each of the target areas, the government lifted the ban on making and transportation of prosopis-based charcoal and other wood products on a pilot basis from 2007 to date.

Besides getting charcoal and poles from prosopis and using the pods for livestock feed, other uses such as producing electricity have emerged and are being considered for implementation by the government.

This article looks at the current status on commercialisation of prosopis resources in Kenya in terms of setting up of community structures, products being processed, traded and their corresponding benefits to the communities and to the government in the form of revenues.

## Management approach for prosopis invasions in Kenya

### 1. Establishment of community structures

It is increasingly becoming clear that the problems associated with prosopis are purely management, aggravated by the lack of technologies and proper community structures required for its effective handling, processing, marketing and utilisation as a resource.

The Kenya government has therefore

embraced the concept of management and control of prosopis through utilisation. This is in line with the current thinking among many developing countries around the world where imbalances on wood supply and demand are severe.

Ideally, this approach involves selective removal (thinning) of invasions using hand tools or other appropriate machinery and the processing of the resultant waste to offset the felling costs, and make profits through commercialisation of products. Treated areas are placed under active land use and regular follow-up activities to maintain the prosopis densities at manageable levels.

In addition, ripe fruits/pods – the main source and cause of reproduction and spread of the species - are collected and processed, by milling, and used as a raw material for manufacture of livestock feeds and occasionally, human food.

The pilot project in Baringo provided the first examples for involving local communities in the management and utilisation of prosopis invasions through formation of local farmers field schools (FFS). Formation of similar community based groups/associations around the country has been encouraged.

The main activities of these groups revolve around prosopis management, processing and



trading. Each group has received some initial minimum levels of facilitation through capacity building and empowerment by the government and development partners to enable them to begin the activities successfully.

## 2. Commercialisation activities

### Charcoal production

Charcoal production has been the most popular, widely accepted and most profitable activity carried out by nearly all the communities in Kenya. The low initial capital outlay, use of traditional production methods, ready market and lifting of the ban on production and movement of prosopis-based charcoal have helped to make the production extremely attractive. A recent appraisal survey on the production of charcoal and other prosopis management activities in Baringo, Garissa and Tana River counties was done and the results are described below.

#### Baringo County

With the benefit of hosting the first pilot project in Kenya, Baringo residents have received the greatest sensitisation, awareness and training in comparison with other counties with similar invasions of prosopis. This is reflected in the highest level of annual outputs of prosopis charcoal in any given year, estimated at twice

the amount produced in Tana River and about ten times that from Garissa counties respectively.

For Baringo, the production outputs have been rising gradually from 2007 with outputs of 41,090 bags, peaking in 2009 with 358,425 bags. The production reduced to 265,855 in 2010 and 128,855 in 2011. The levels of recorded annual income accruing to the participating communities associated with these outputs are significant. A minimum of Ksh 10 million or Ksh 1.5 million per month (2007 and 2012) and a maximum of Ksh 107 million or Ksh 9 million per month (2009) have been reported.

However, owing to poor supervision, under-reporting of quantities and leakages within the entire charcoal production chain, the actual quantities produced are estimated at twice those reported.

#### Tana River County

Just like in Baringo, the use of prosopis in charcoal making in Tana River County began in 2007 with a total annual output of 1,797 bags, rising gradually to 2,425 bags in 2008 and a peak output of 128,051 bags in 2010. In the last three years (2010, 2011 and 2012), the recorded mean monthly income accruing to the communities in the county is between Ksh 2.1 and 3.2 million,

but the actual amounts are estimated as being twice these figures (Ksh 4.2 and 6.4 million).

#### Garissa County

The levels of charcoal outputs in Garissa County are fairly modest in comparison to Baringo and Tana River, perhaps due to the limited distribution of prosopis biomass in the county in communal areas.

The last three years have shown an output of 11,710 bags in 2010, 8,911 in 2011 and 5,143 in the first two months of 2012. The recorded monthly income to communities is Ksh 501,850 in 2010, Ksh 519,808 in 2011 and Ksh 900,025 in 2012. Like the other counties, the actual outputs are twice these figures as shown on Table 1.

#### Collection, processing and utilisation of prosopis pods/fruits

Commercial utilisation of prosopis pods in Kenya began in early 2007 as an output of the second National Workshop on Integrated Management of Prosopis Species in Kenya. The workshop was supported by the International Livestock Research Institute (ILRI) in collaboration with KEFRI, KFS, KARI, University of Nairobi, the Ministry of Livestock Development (ALLPRO/ADB), Henry Doubleday Research Association (HDRA/UK) and the Department for International Development (DFID/UK).

The workshop theme was to link the livestock feeds industry to the prosopis resource in Kenya. Its objectives were to bring together representatives of the livestock feeds industry, researchers, developers, communities, local administration and other stakeholders to share local and international experience on the use of prosopis as a feed resource and generate novel initiatives to catalyse the interest of feed companies on the use of prosopis pods as a cost effective ingredient in the formulation of livestock feeds.

Besides commercialisation of prosopis pods, focus was also placed on self sufficiency in local supply of feed resources by communities in arid and semi-arid lands (ASAL) where feed scarcity is a major constraint to livestock production during times of drought. The major output of the workshop was the appointment of a taskforce on the use of prosopis pods in Kenya hosted by ILRI and co-chaired by Sigma Feeds Company and KEFRI. In July/August 2007, the taskforce appointed pod collection agents in four districts of Turkana, Baringo, Garissa and Taita Taveta. These agents were taken through a brief induction course on field pod collection procedures, their role and their contractual duties. The course also introduced to the agents the concept of standards for prosopis pods and

Table 1: Prosopis based charcoal production statistics for the three counties

County	Year					
	2007	2008	2009	2010	2011	2012
<b>Charcoal production (bags of 25-30kg)</b>						
Baringo	41,090	75,845	358,425	265,855	128,855	29,265
Tana River	1,797	2,425	10,200	128,051	74,824	12,160
Garissa	1,500	7,500	3,400	11,710	8,911	5,143
TOTAL	44,387	85,770	372,025	405,616	212,590	46,568
<b>GoK revenue (Ksh)</b>						
Baringo	821,800	1,516,900	7,168,500	5,317,100	2,577,100	585,300
Tana River	35,940	48,500	204,000	2,561,020	1,496,480	243,200
Garissa	30,000	150,000	68,000	234,200	178,220	102,860
TOTAL	887,740	1,715,400	7,440,500	8,112,320	4,251,800	931,360
<b>Recorded community income (Ksh)</b>						
Baringo	10,272,500	18,961,250	107,527,500	79,756,500	45,099,250	10,242,750
Tana River	449,250	606,250	3,060,000	38,415,300	26,188,400	4,256,000
Garissa	375,000	1,875,000	1,020,000	3,513,000	3,118,850	1,800,050
TOTAL	11,096,750	21,442,500	111,607,500	121,684,800	74,406,500	16,298,800
<b>Estimated community income (Ksh)</b>						
Baringo	20,545,000	37,922,500	215,055,000	159,513,000	90,198,500	20,485,500
Tana River	898,500	1,212,500	6,120,000	76,830,600	52,376,800	8,512,000
Garissa	750,000	3,750,000	2,040,000	7,026,000	6,237,700	3,600,100
TOTAL	22,193,500	42,885,000	223,215,000	243,369,600	148,813,000	32,597,600
<b>Estimated monthly community income (Ksh)</b>						
Baringo	2,935,000	3,160,208	17,921,250	13,292,750	10,022,056	10,242,750
Tana River	99,833	151,563	612,000	6,402,550	6,547,100	4,256,000
Garissa	187,500	535,714	340,000	1,003,714	1,039,617	1,800,050



Table 2: Quantities of prosopis pods collected at various sources in Kenya in 2007

County	Quantity collected (Tonnes)	Prices/kg (Ksh)
Baringo	3.5	4.50
Turkana	7.5	3.00
Garissa	-	3.50
Taita Taveta	4.5	3.50
Tana River	6.0	4.00
Total	21.2	

its importance as well as the storage procedures required to ensure quality of pods.

Facilitation of the agents to collect the prosopis pods was done by ILRI shortly after the training. By the end of November 2007, a total of 21.5 tonnes of pods had been delivered to Sigma Feeds Company for processing (Table 2).

The pods were processed and mixed with other ingredients at 10 per cent level of initial inclusion on a trial basis for dairy meal and successfully circulated in the country by Sigma Feeds Company. A total of 210 tonnes of prosopis based feeds were sold out.

However, funding of the activities of the taskforce was disrupted, leading to its disbanding in mid 2008. Since then, the Ministry of Forestry and Wildlife (through KEFRI and KFS) has successfully lobbied for continuation of the activities on the use of prosopis pods through several projects, namely, the ASALs Based Livelihoods Support Project (ALLPRO/Ministry of Livestock Development), ASARECA, NALEP and Arid Lands Resource Management Project, among others. These projects have helped to equip most of the existing groups through the purchase of pods milling equipment, training and other related capacity building activities.

The objective is to make the groups self-reliant in meeting the local demand for prosopis-based livestock feeds for the various species of livestock through competitive processing and value addition. Any excess products can be sold to the commercial feed manufacturers. At the moment, most of the groups are still undergoing intensive training on machine handling, servicing and collection, storage, processing of pods and market search.

The most active groups in the processing of pods are in Tana River and Garissa counties where they have made substantial progress in collecting and processing prosopis-based feeds. For example, the Watajir Group in Garissa collected seven tonnes of pods in late 2011, milled and made both feed blocks and feed flour that are now being marketed within the county.

In Tana River County, one group (Biskidera Jabesa) has collected four tonnes and processed them into feed flour by mixing with maize stovers and other local agricultural residues. Generally, there is an increasing use of processed prosopis pods by many communities for feeding livestock



Most people do not believe prosopis can grow beyond a shrub. Here is proof to the contrary - a big prosopis tree in Baringo. (Photo: KEFRI)



Milling of prosopis pods for livestock fodder. (Photo: KEFRI)

as a positive impact of the awareness and training programmes in recent years by the government and other development partners.

#### Trading in poles and other prosopis-based products

Other prosopis-based products being traded in many parts of the country include poles, firewood, sawn timber and honey production from nectar. The trade in these products is rarely captured in a formal way and therefore it is difficult to provide an estimate of the size in economic terms at the moment.

However, Garissa County remains the best example where the Dadaab refugee camp has continued to provide a huge market for prosopis poles and withies for construction of huts and manyattas. The size of the trade is estimated at over Ksh 500,000 per month, and continues to rise with expansion of the camps.

It is difficult to estimate the quantities of honey produced primarily from prosopis flowers due to the absence of reliable research data. Given the nearly continuous flowering of prosopis throughout the year, the proportion of the honey

attributed to the species is significant. Studies to estimate the production are recommended.

#### 3. Potential for green energy production

The rapid expansion of the Kenyan economy urgently requires more energy to power its growth from the current installed capacity of about 1,300 MW to about 2,000 MW to meet peak demand in the next four years. Private sector players are being encouraged, through policy re-orientation, to participate actively in green energy generation in Kenya. Prosopis has been identified as a potential source of biomass for electricity production in Kenya<sup>1</sup>. This arises from similar experiences in India where about five prosopis-based electricity production plants are in operation.

The writers are researchers at KEFRI, KFS and MOA respectively.

<sup>1</sup> Note of the Technical Editor: See an earlier article in Miti no 12 (Oct-Dec 2011), p18-19: "Electricity from a dreaded tree".