

The challenges of eradicating *Prosopis* in Kenya

The problem of Prosopis trees as invasive weeds is a widespread issue in Kenya. This policy brief is of interest to many individuals and organisations, especially those making decisions concerning land use directly or the use of resources from the land.

Kenya is not alone in having invasive *Prosopis* weeds, and a global consensus of opinion is now emerging on how to deal with this problem. The people's voices on the ground in Kenya most strongly advocate legalising commercial utilisation through unrestricted access as the first step towards control and management. Laws must then change. Education and training, grants and loans will all help too. In some countries, *Prosopis* has often been called the 'tree of the poor', but it could, with a little help, become the tree which helps lift the poor to a better and sustainable life.

Prosopis tree species, commonly known as 'Mathenge', can be found in most arid and semi-arid lands of Kenya. These areas account for about 80% of the country's land area. The *Prosopis* weed problem has had a dramatic impact on the environment and livelihoods of pastoral communities, and borders on being considered a national disaster. Pastoralists whose livelihoods are mainly centred around livestock, and least on tree products, inhabit most of the areas where *Prosopis* occurs.



Prosopis encroaching onto homesteads

The impenetrable thickets that characterise most *Prosopis* infestations have mostly out-competed grass and related rangeland forage – making its threats far outweigh any current benefits. The negative effects

of *Prosopis* in Kenya have dominated the national and regional press in recent years. Some affected communities have even threatened to demand compensation for the loss of productive land from those responsible for sanctioning the introduction of this 'dryland demon'.

Who introduced *Prosopis* and why?

Over 500 million, or two thirds of the African population, live in Arid and Semi-Arid Lands (ASALs). These drylands are undergoing a crisis of unprecedented proportions brought about by rapid increases in human and animal population pressure. This crisis has manifested itself in massive resource depletion, declining productivity, a sharp rise in demand for food, fibre, wood and other raw materials, and with deleterious consequences on both the natural environment and human poverty conditions (Darkoh, 1993).

In the ASALs, vegetation is a fundamental and valuable resource that directly and indirectly sustains the lives of people and livestock, besides protecting and stabilising the ground surface.

Prosopis trees have been found to be some of the most ecologically and economically important trees in the ASALs of the world. They are extraordinarily drought resistant, and hence have been suitable species for rehabilitation of deserts, and of saline land, for shelterbelts and for sand dune stabilisation (Geesing *et al.*, 2004). In the process, they have provided many of the basic needs of the populations living in these zones. *Prosopis* is often the only source of carbohydrates, sugars and proteins for livestock and human populations, as well as fuel and timber, environmental rehabilitation, medicines and shade.

Prosopis trees were first introduced into Africa from the Americas in 1822, into Senegal. Later introductions took place in South Africa (1880), Egypt (1900) and Sudan (1917) (Pasiecznik *et al.*, 2001). The common *Prosopis juliflora* in Kenya is native to South and Central America, although exactly when and how it first arrived is not known. It was reported being grown in the 1930s for fodder, shade and as an ornamental plant (Choge *et al.*, 2002). By this time, *Prosopis* was already present in many other parts of the world where it had been introduced by the then colonial administrations for dryland fuel and fodder.

In the 1970s and owing to drought, there was increased planting of *Prosopis* to rehabilitate degraded areas and mitigate recurrent famines and massive losses of human and livestock populations. The first records of propagation of *Prosopis* spp in Kenya (presumably *Prosopis pallida* and/or its related hybrids) can be traced to tree species trials carried out in 1973 on the Kenyan coast (Mombasa District) and Menengai (near Njoro in Nakuru District). These trials were undertaken to establish the trees and shrubs that are likely to thrive in marginal areas and have the potential to produce honey, fodder or high value cash crops.

As the popularity of *Prosopis* grew, many NGOs, conservation agencies, Government departments, institutions and individuals made seed orders from various sources, both locally and abroad. The lack of information sharing on the potential dangers of *Prosopis* and the poor phytosanitary regulations and enforcement policies in the 1960s to 1980s led to the passage of undesirable *Prosopis juliflora* and its related hybrids into the country. Further plantings stopped only in early 1990s when the weedy characteristics of the trees were noticed (Choge *et al.*, 2002).

***Prosopis* in Kenya today**

Although both *Prosopis pallida* and *P. juliflora* were widely planted from the initial seed orders across the country, these two species have hybridised to the extent that the current varieties have lost most of their valuable woody attributes and have become very invasive.

Livestock and wild animals eat the pods, leaving seeds wherever they go, and pods are also taken downstream by rivers and floodwaters. The combined lack of local knowledge on how people could best manage and use these trees, and their presence on communal lands where people have little or no responsibility to control its spread, have helped this rather invasive *Prosopis* species to first get a foothold, and then invade.



Goat grazing *Prosopis*

Infestations often begin along watercourses (rivers, ponds and dams) and increase more rapidly over time by spreading in all directions. Poor forms, mostly bushy, stunted and thorny, characterise individual plants growing away from the wetlands. As their populations increase, particularly on wetlands, they replace grass and other valuable indigenous plants through total colonisation, and may also possibly lower ground water tables although evidence is inconclusive (Pasiecznik, 2001). Their thorns can cause injuries, and hence impede the movement of people, livestock and machinery by puncturing tyres. Given that most riverine areas and wetlands found in the dry parts of Kenya have favourable climatic conditions for the growth of *Prosopis* species, its threat is therefore highly significant. Pockets of *Prosopis* populations can now be found in about 50% of the total land area currently favourable for its growth in the country. Efforts to determine the actual area covered by *Prosopis* in Kenya are underway.

The negative effects are dramatic for some; injured by thorns, their livestock hurt, grazing land invaded and even forced to migrate.

Current initiatives to manage and control the spread of *Prosopis* in Kenya

In 2003, a national workshop attended by over 70 stakeholders was held to deliberate on the status of *Prosopis* invasion and the way forward on its management and control in Kenya. The workshop realised a number of positive outcomes, notably;

- (i) Formation of a National *Prosopis* Task Force to work on the establishment of a national framework for integrated management and control of *Prosopis* in Kenya.
- (ii) Identification of short, medium and long-term measures touching on policy, legislation, management and utilisation issues, and their respective prioritisation.
- (iii) Implementation of a pilot project on the management and control of *Prosopis* in Baringo District. The project seeks to address the knowledge gap on *Prosopis* through capacity building of both the local communities and the government officials, through intensive demonstrations and training.

Is eradication the answer?

Experiences from the Americas, Asia and Australia have shown that eradication of *Prosopis* has proven to be very difficult or sometimes considered impossible. This is largely because the trees re-grow from vegetative buds and from massive underground seed banks, with seed production in dense stands estimated at 60 million per hectare per year (GISP, 2004). Seeds usually lie dormant in the soil for up to 10 years. Mass germination is stimulated when the surrounding vegetation is removed or the soil is disturbed. *Prosopis* management and control programmes therefore need to be sustained for long periods to gain total control of the spread, and are very costly.

Owing to the ecological and socio-economic impact of the species, there is therefore urgent need to develop management strategies that are environmentally friendly and economically viable to bring it under control. As part of the effort to identify solutions for poverty alleviation, utilisation is a crucial strategic option. This will minimise the negative impacts of the species as a necessary step to make the best of the situation that is hardly reversible, particularly in the current poor state of knowledge on its management.

So what can be done?

Many people are benefiting from this unwelcome guest, by using or selling the fuelwood or pods. In a number of areas in Kenya, a bushel of firewood sells for Ksh 54 (US\$ 0.74) and a 90 kg bag of pods for Ksh 100 (US\$ 1.4) (Choge *et al.*, 2002). By collecting pods and so reducing further spread, and clearing weedy trees, something is already being done, and money is being made. This is still only scratching the surface, but two problems, what to do with *Prosopis* and how to boost the rural economy, are addressed simultaneously.

The real value of *Prosopis*

During a preliminary survey, the Kenya Forestry Research Institute and the Forest Department found the value of *Prosopis*-based income in 2002 to be Ksh 154,882 (US\$ 2,122) per household per year (Choge *et al.*, 2002). This trade developed spontaneously even without permits needed for transporting charcoal and with no access to invaded government and communal land. Overcoming these barriers could see a large increase in revenues earned and land cleared, just for fuel and fodder. Businesses and small industries can develop, as they have in other countries, and with such a common and 'free' resource may need no prompting if some restrictions are lifted or other help is offered.



Gathering *Prosopis* firewood

The value of adding value

Prosopis posts and poles, sawn timber, charcoal, gums, honey and human food are also produced and sold in other countries. All make more money than just firewood and animal feed. Wood and pods can be turned into a range of products through home-scale and factory processing – and where they are utilised as such, they are managed and are rarely invasive. Is a plant with value ever considered a weed?

Why aren't the benefits being realised?

It is hard to believe that, if *Prosopis* is worth so much, someone is not already making a fortune from it, especially if everyone wants to eradicate it and some people want to clear it. The challenges to be overcome in order for this to happen are listed as:

- (1) The need for a clear government policy on *Prosopis* management.
- (2) Allowing the cutting of *Prosopis* or collection of pods on government land.
- (3) The end to harassment by forestry and other Government officials when people make *Prosopis* charcoal on communal or private land.
- (4) The permitting of trade and transport in *Prosopis* charcoal but with appropriate procedures for certification in place to minimise abuse of the system.
- (5) Transfer of traditional knowledge on the uses, values and means to manage and process *Prosopis* from where it is native, through training and education.
- (6) Empower the local communities to process, trade and utilise *Prosopis* products.
- (7) Create awareness and develop markets for the potentially huge quantities of *Prosopis* available.
- (8) Develop mechanisms and technologies for utilising all sizes of *Prosopis* products. These include, for example, chipping small diameter stems and branches (to produce wood chips for industrial use and threshed leaves for livestock feed), sawn timber, poles and wood carvings for large diameter stems.
- (9) Develop markets for industrial use of pods to manufacture livestock, poultry and human food.



The potential of *Prosopis* for manufactured products

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