



ELMT “GOOD PRACTICE” BIBLIOGRAPHY

PROSOPIS CONTROL AND/OR UTILISATION

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A. INTRODUCTION¹

Prosopis spp. are thorny evergreen leguminous trees. Reaching a height of between 12 – 20 ms depending on soil and water conditions they grow easily in low rainfall areas (annual precipitation of less than 250mm) with a well-developed tap-root which can extend up to 53ms. Seeds can remain dormant in the soil for 2-10 years until they find favorable conditions for germination. “A single 3.5 m tall *Prosopis* can produce up to 15 kg of pods. The pods are 10% seeds so that is 1.5 kg of seeds, which at 35,000 seeds per kg is more than 50,000 seeds...Only...10 viable seeds [are needed] to colonize a new hectare”.²

Prosopis was introduced to the Horn of Africa and neighbouring countries in the 1970s for soil conservation purposes. Today it grows out of control and covers approximately 500,000 hectares in Kenya³ and 800,000 hectares in Ethiopia⁴. It is suggested that it is spreading at an alarming rate of 18% p.a.²

Prosopis spp. have a number of very beneficial properties. Not only can they prove to be a barrier against soil loss through wind and water erosion, but they also can improve soil fertility, be used to reclaim saline land (having good nitrogen-fixing qualities and providing phosphorous), ‘cool’ the environment and provide shade and wind-breaks. Additionally some *Prosopis* spp. have been used in South and North America as a human food source for centuries whilst 5-10kg of dry pods can sustain a cow of 400 kg/day (eaten on occasional basis). Honey from the flowers is of high quality, the gum is similar to gum arabic, bark and roots are rich in tannin, and leaves can be used as mulch, reducing pests and weeds.

Prosopis also can be used for fuelwood and charcoal; fencing, poles and other timber needs⁵. Indeed some compare the wood to the finest hardwoods, and it can be used for

¹ Much of this section has been taken from the article on prosopis in the 2008 ELMT Newsletter

² Peter Felker, personal communication 2008

³ Arne Witt, CABI, Africa personal communication 2008

⁴ Dubale Admasu (2008) “*Prosopis* Management in Afar National Regional State (ANRS)” in Pastoral Lessons Bazaar Newsletter, Special Issue, October 2008, Addis Ababa.

⁵ Choge, S., N. Pasiecznik, M. Harvey, J. Wright, S. Awan and P. Harris (2007) “*Prosopis* pods as human food, with special reference to Kenya” in Water SA, Vol. 33, No. 3.



making high quality furniture and flooring, rich in colour, hard and durable (though the right processing and sawing equipment is required to cope with its heavy density).⁶

However, *Prosopis* comes in different forms and sizes, depending on the particular species, the local environmental features and its management.^{7 8} In Africa, it is generally accepted that the “wrong species” was introduced: *Prosopis juliflora* (though *Prosopis pallida* does occur in a few places). “The person who brought *Prosopis* to Africa got the wrong thorny, non erect *Prosopis* whose pods have very low human palatability”⁹ and forms dense impenetrable thickets particularly along water courses. It coppices at a very early stage and does not form the large single-stemmed trees which one sees in other parts of the world – in dense infestations trees are spindly and tall and produce fewer flowers and pods than single standing trees.¹⁰ Indeed, in Afar region of Ethiopia it is possible to find areas with 6000 stems per hectare: though this is said to be a result of heavy ruminant foraging and excretion, not natural growth.¹¹

Indeed, in Africa the spread of *Prosopis* causes a number of problems including: the loss of important resources: access to riverine areas; pasture and ‘cultivable’ land; loss of indigenous trees and plants that have a range of socio-economic and environmental values including biodiversity; as well as having a detrimental impact on groundwater; blocking of roads and access routes with thick thorns; and health problems for both livestock (namely intestinal obstruction when eaten whole) and people (increased incidence of malaria due to changes in the local environment)³.

It negatively impacts on pastoral and agro-pastoral livelihoods in particular challenging mobility, access to natural resources, and causing ill health. In general pastoralists see the plant as a menace, and it is only outsiders who benefit (e.g. from charcoal making). Due to the newness of the plant pastoralists are unsure how to tackle its ‘invasion’ and as such little is done to try and control its spread. Further the plant has ‘invaded’ a number of National Parks in both Kenya and Ethiopia with negative impacts on wildlife and tourism.

Experience from USA and elsewhere suggest that it is virtually impossible for *Prosopis* to be eradicated. However a degree of control can be achieved through intensive utilization of tree products and by improved management including a prevention of the spread of the seeds. Spread of the seed usually occurs by browsing/grazing livestock eating the seeds, moving on and then passing the seeds through their digestive tract without causing harm or being damaged¹².

In ELMT/ELSE intervention areas a number of strategies based on control through utilization are being carried out. These include the clearing of the plant from ‘invaded’

⁶ Peter Felker, personal communication 2008

⁷ Peter Felker, personal communication 2008

⁸ Schwennesen, E. personal communication 2008

⁹ Peter Felker, personal communication 2008

¹⁰ Peter Felker, personal communication 2008

¹¹ Schwennesen, E. personal communication 2008

¹² Choge et al 2007; Dubale Admassu 2008

land with the wood being used for charcoal and the land being reconverted to agriculture; crushing of the pods/seeds for animal feed and flour; and the removal of larger trees for lumber. Many of these are being carried out on a pilot/experimental manner with nutritional testing and livestock feeding trials being carried out side by side to assess the total positive/negative benefits of using the plant. Further community groups have been mobilized to control the spread of the plant, introduce management strategies and to develop ways to use *Prosopis* for positive gain. NGOs have been supporting these processes including the lobbying of governments to allow the development of a supporting positive policy environment to allow such utilization to take place e.g. creating by-laws to control charcoal production.

However others argue that an approach based on the utilization of *Prosopis* will never control its spread, and in fact can encourage the further spread of *Prosopis* and its negative consequences – when people are receiving financial gain from a resource then they will try to encourage the growth of the resource, not destroy it.¹³

Such critics suggest that rather, an integrated approach is needed that includes biological and/or heavy mechanical control (such as that carried out in Sudan where large areas of *Prosopis* were removed by heavy machinery and burnt). Biological control involves the introduction of natural known and tested enemies of *Prosopis*, which will destroy the necessary parts of the plant at a certain stage in its reproduction. For example a beetle such as *Coelocephalapion gandolfoi* can attack the seeds early on in their development and before the pods drop to the ground, or a gall midge of the genus *Asphondylia* which galls the flower bud so preventing reproduction.²

Whatever the approach taken to control and/or use *Prosopis*, it is important that affected communities are at the centre of decision making processes. In order for this to be achieved it is vital that communities fully understand the potential negative and positive impacts of *Prosopis* so that they can make informed decisions about what to do with it and/or what support they require.

B. USEFUL DOCUMENTS

Pasiecznik, N., P. Harris and S. Smith (2004) *Identifying Tropical Prosopis Species: A Field Guide*. HDRA, Coventry, UK. Internet:
http://www.gardenorganic.org.uk/international_programme/ip_publications.php#Prosopis

A simple guide to the different *Prosopis* species, their identification and their characteristics illustrated by drawings and photographs.

Managing *Prosopis juliflora*. A Technical Manual. HDRA, UK. Internet:
http://www.gardenorganic.org.uk/pdfs/international_programme/ManagingProsopisManual.pdf

Based on experiences in India and elsewhere this is a detailed guide and manual to *Prosopis juliflora*, its physiology and its management. The document focuses on the growing and utilization of *Prosopis* and does not discuss the challenges of its spread and its removal.

Pasiecznik, N. with contributions from P. Felker, P. Harris, L. Harsh, G. Cruz, J. Tewari, K. Cadoret and L. Maldonado (2001) *The Prosopis juliflora – Prosopis pallida Complex: A Monograph*. HDRA, Coventry, UK. Internet: www.gardenorganic.org.uk/pdfs/.../ProsopisMonographComplete.pdf

This volume focuses on *Prosopis juliflora* (the species found most commonly in East and the Horn of Africa) and *Prosopis pallida* providing a synthesis of published and non-published information from approximately 650 documents. The book is divided into four chapters, each intended to be free-standing. The first chapter opens by stating the importance of the two species and why they justify such special attention. Chapter two describes the taxonomy of *Prosopis*, as well as species descriptions, biology and ecology giving a clearer understanding of what the species are, where they are found and how they function and interact with the environment. Chapter three describes in detail the *P. juliflora* and *P. pallida* complex as a human resource, the composition, roles and production of tree products. The final chapter then covers the management of the trees as resources, including nursery production, establishment, managing native stands and weedy invasions and processing tree products. A concluding section identifies areas for future research and development.

***Prosopis juliflora*, Opportunities and Challenges: Global Perspective and a Case Study in Afar Region. (2007) GL-CRSP PARIMA, Addis Ababa. Please contact fionaflintan@yahoo.co.uk**

The paper summarises the findings of a study conducted on current status, management and utilization of *P. juliflora* in Afar National Regional State, Ethiopia and suggests management options for its best use. Experiences are given of other areas where communities managed and benefited from *P. juliflora* either in the form of wood and non-wood products. Successful examples of managing *Prosopis* and utilizing it are given. This study has begun with the assumption that the invasion can be turned into a significant opportunity for communities who live in *Prosopis* invade areas.

***Invasion of Prosopis juliflora and local livelihoods: Case study from the Lake Baringo area of Kenya* by Esther Mwangi and Brent Swallow (2005) World Agroforestry Centre, ICRAF, Kenya. Please contact fionaflintan@yahoo.co.uk**

This paper provides an assessment of the livelihood effects, costs of control and local perceptions of the invasive tree, *Prosopis juliflora*, on rural residents in the Lake Baringo area of Kenya. The invasion has recently attracted national attention and contradictory responses from responsible agencies. Unlike some other parts of the world where it has been introduced, *Prosopis juliflora* potential benefits have not been captured and few people in the Lake Baringo area realize net benefits from the widespread presence of the tree. Strong local support for eradication and replacement appears to be well



Save the Children



justified. Sustainable utilization may require investment in the development of new commercial enterprises.

Experiences on Prosopis Management: Case of Afar Region by Getachew Gebru. 2008. FARM Africa, Ethiopia.

[http://www.farmafrica.org.uk/resources/FARM%20Africa Experiences%20on %20Prosopis%20Management%20Afar%20\(2008\).pdf](http://www.farmafrica.org.uk/resources/FARM%20Africa%20Experiences%20on%20Prosopis%20Management%20Afar%20(2008).pdf)

This is desk study on the experiences of *Prosopis juliflora* in Afar regional state. It gives an indication of current management programmes including the use of prosopis as animal feed (after crushing) and for charcoal making plus strategies and regulations that are being developed by the regional government. In particular it highlights the work of FARM Africa in this regard.

Proceedings Expert Consultation: Increased Food Security. Control and management of Prosopis. Report of a meeting held in Awash, Ethiopia, 15-19 October 2007. FAO, Ethiopia. Please contact fionafintan@yahoo.co.uk

This report describes the outcome of a meeting held over four days in October 2007 in Ethiopia which was an opportunity for discussion regional experience on *Prosopis*. Considered highly successful by delegates, the meeting led to the preparation of a conceptual framework for developing model strategies that will apply for control, management and utilization of *Prosopis* spp. in the region in the future. There was consensus that priority effort should shift to control and improved use of productive lands that were cleared, and that this should be done on the basis of appropriate eradication technologies that could be used by local communities. Where possible this should be linked to the exploitation of *Prosopis* products by communities who should take 'ownership' of the many opportunities that prevail. Both short and long term strategies were developed together with a proposal for a regional programme of *Prosopis* control, management and utilisation that is currently awaiting approval by the Ethiopian government.

Mesquite (*Prosopis* species). Strategic Plan. (2000) Commonwealth of Australia and the National Weeds Strategy Executive Committee. Internet: <http://www.weeds.org.au/WoNS/mesquite/>

Mesquite (*Prosopis* species) are considered as one of northern Australia's worst weeds. Most impacts are in the pastoral and extensive grazing regions however it poses a threat to much of Australia. The major challenges for control are to build on the existing achievements of landholders, researchers and States in controlling infestations, to remove the current and prevent the potential impacts on the country. This document presents a strategy for doing so with four main objectives: i) Mesquite management is coordinated and maintained at national level; ii) All core infestations are confined and subject to long-term management, leading to ultimate eradication; iii) All isolated and scattered infestations are eradicated; and iv) Mesquite species are prevented from spreading. Though this document is dealing with the problem of *Prosopis* on another continent it provides an example of how a country that views *Prosopis* as a national threat is trying to deal with it. A review of progress against the plan is provided on:



http://www.weeds.org.au/WoNS/mesquite/docs/Mesquite_Strategic_Plan_Review_2006-07.pdf

Mesquite Best Practice Manual. Principal author and compiler - Rachele Osmond (2003), State of Queensland, Australia.

<http://www.weeds.org.au/WoNS/mesquite/>

Again though this document comes from outside Africa, it is highly relevant to the work in Kenya, Ethiopia, Somalia and elsewhere. The manual and the control/management options presented are based on the combined results of years of trials carried out by researchers, landowners, herbicide companies, government officers, landcare groups and others. The manual has 5 main sections:

- Mesquite – ecology and threat;
- Managing mesquite;
- The mesquite control toolbox;
- Case studies; and
- Further information.

Also forthcoming from Kenya Forestry Research Institute (KEFRI) is a set of guidelines for managing prosopis invasions in Kenya: practical steps for foresters and extension agents. The document is currently under review and should be available from November onwards. **Please contact fionafintan@yahoo.co.uk**

