

Candlelight for Health, Education & Environment (CLHE)

# **PROLIFERATION OF HONEY MESQUITE(Prosopis juliflora) in Somaliland:**

## **OPPORTUNITIES AND CHALLENGES CASE STUDY**



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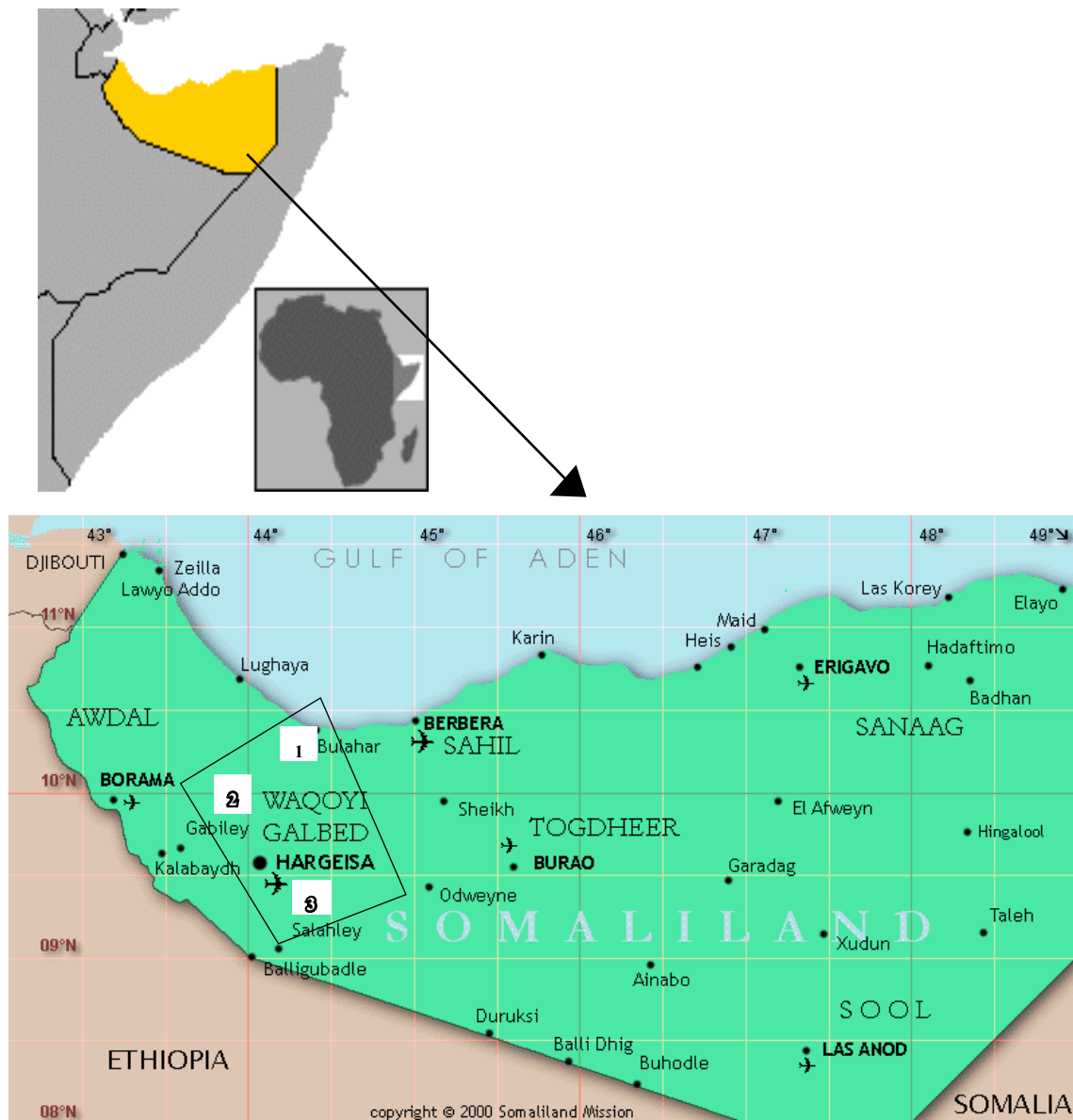


Fig. 1: The study area marked in white circles:(1) Bulahar, (2) Agabar (3) Biyo-xidheenka

## 1. INTRODUCTION

One major issue whereby Candlelight for Health, Education & Environment has been closely monitoring over the past few years is the proliferation of mesquite (*Prosopis juliflora*), an invasive plant and vast spreading weed which establishes itself fast almost everywhere, even in low rainfall areas and in problematic soils.

Interestingly, whilst the indigenous trees are dying fast in the wake of over-exploitation in Somaliland for fuel wood, charcoal, thorn enclosure fencing and for building materials, mesquite (*Prosopis juliflora*) has been aggressively establishing itself everywhere. The Somali name 'Garanwaa', literally meaning *the Unknown*, was coined by Somali returnees from refugee camps in eastern Ethiopia during early 1990s, thereby unexpectedly coming into contact, upon their return, with this 'unknown', quick-spreading plant which annexed large areas within the towns and farmlands only during span of time not more than three years (1988-1991).

The alarming rate of expansion of the weed, its encroachment into farmlands and rangelands, its prolific characteristic of annexing large areas which result in limiting the free movement of people and livestock and the resulting impact on their socio-economic conditions is a subject of heated discussions and debates.

Candlelight has done some experimentation on the possibility of preparing charcoal from mesquite. The results were very encouraging and the light-weighted charcoal can be graded second or third to *Galool* (*Acacia Bussei*), the best charcoal tree around in Somaliland.

Candlelight's interest in this plant lies within the argument: *'if you can not win the war against mesquite, reconcile with it and make optimum use of it as resource'*.

On the basis of the predominant negative community perception about the weed, and the repeated calls for its eradication, Candlelight may be regarded as a devil's advocate. Coincidentally, in many countries the plant is dubbed as the Devil's Tree.

This study will focus on the following aspects of the plant:

- General information of the plant and its origin
- Its history and introduction to Somaliland
- People's perception about the plant
- Current utilization of the plant
- Further opportunities for its utilization
- Conclusions and recommendations

The Case Study Team has relied on the following sources of information and methodology to complete this case study:

- Published information from the internet
- Group and individual interviews with local people
- Transect walks
- observations

This is probably the first study of its kind carried out in Somaliland (if not Somalia as whole), and it hoped that it will be a basis of similar works on the plant.

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Mesquite (Prosopis  
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## 2. OBJECTIVES

The primary objectives of the present study are to:

- Gain an insight into the nature of *Prosopis* plant growth, its management and its limitations.
- Understand and analyze the socio-economic impacts of the plant on the communities
- Identify its current uses and explore further opportunities for its utilization for the purpose of managing and controlling its spread.

## 3. STUDY AREA

This study was carried out in the areas whereby *Prosopis juliflora* was introduced for different reasons starting from as early as 1950 in Bulahar and in the middle of '80s in the ex-Ethiopian refugee camps. These areas are Biyo-Xidheenka (6km east of Hargeysa city), Agabar (53 km towards north of Hargeysa), Bulahar town at the southern coast of the Gulf of Aden (135 km north of Hargeysa). The study team also visited the denuded site of the former Bataalaale *Concarpus lancifolius* ('Damas') forest site in Berbera, now being annexed by *P. juliflora*.

The first two locations (Biyo-xidheenka and Agabar) had hosted refugees from Ethiopia who had fled the Ethio-Somali war of 1977. These two sites are in the *Ogo* ecological zone and occur over 1000 m above sea level with average rainfall ranging 250-400mm annually. .

In the coastal ecological zone, the two areas visited are the former date plantation site of Bulahar District and the former *Conocarpus lancifolius* forest of Bataalaale in Berbera which is now a bare ground but in the process of being annexed by *P. juliflora*. Both plantation sites are located at the seashore, and receive annual rainfall ranging from 55-100mm.

## 4. ORIGIN AND CHARACTERISTICS OF PROSOPIS JULIFLORA (Mesquite)

*Prosopis juliflora* is a perennial deciduous thorny shrub or small tree that can grow up to the height of 5 m. It is an evergreen plant native to northern South America, Central America and the Caribbean. It is fast growing, nitrogen-fixing and tolerant of arid conditions and saline soils (Anderson, 2005). This tree is recognized for its aggressive growth almost in every part of the world. It is believed to be an invader and noxious plant which encroaches on all available land. It draws water to itself and its canopy does not allow other plants to grow nearby. It has a massive root system which can grow down as far as 15 m deep and occasionally more than double that depth. A near relative, *Prosopis cineraria* (native to India) has been shown to reach a depth of 60m in the Oman desert (Le Hourrou) to reach the water table. In Somaliland, the plant is known as 'Garanwaa' literally meaning 'the unknown' which can be translated as an exotic, fast growing species to an extent that it not allow local communities a chance to give it a fitting name! It is a tough plant, well adapted to the harsh conditions of desert habitat. Mesquite is a member of the legume, or *Fabaceae* family. Like most legumes they restore nitrogen to the soil and can reclaim saline soils. Nitrogen-fixing bacteria in the soil form a mutualistic relationship with nodules on the mesquite's roots, which free nitrogen for plant consumption.

Native Americans still use mesquite pods as a staple food. They make tea, syrup, and ground meal called *pinole* from various parts of the tree. It is so useful to them that it can be compared in terms of utilization

to *Galool (Acacia bussei)* in Somaliland. Mesquite bark is used for making baskets, fabrics and medicine. The wood of the mesquite tree burns slowly but very hot and is used as firewood, and to make an aromatic charcoal for barbecuing (mesquite flavor).

Mesquite is becoming well established along the banks of seasonal water courses (*Togga*) replacing palatable local species and forming dense thickets of woodlands, simply because the local species are being over-utilized. Mesquite is also becoming the preferred urban tree species for shade. Its 'virtues' were summed up by an old woman living in one of the returnee resettlement areas of Hargeysa who one day approached Candlelight's natural resource management (NRM) team during one of their tree distribution trips in order to receive a tree seedling. To the surprise of the team members, she requested a *Garanwaa (P. juliflora)* seedling, instead of the other species that are popular among the community such as tamarind (*tamarindas indica*), neem, *Gob (Zizyphus spina Christi)* etc, whereupon the surprised team members wanted to hear more about her preference of the plant over the others. They asked themselves: 'why should everybody else treat mesquite as an accursed plant (*Geed jinni or devil's tree*) while this woman takes it as her first choice?'. Her response was "Mesquite gives good shade, one doesn't need to worry about watering it or guarding it from goats or even humans for toothbrush sticks (*cadey*), it even does not need fencing. It is fast growing and long lasting as well!"

## 5. HISTORY OF PROSOPIS JULIFLORA IN SOMALILAND

*Prosopis juliflora* and *Prosopis chilensis* were first introduced in Somaliland as early as 1950 at Bulahar town on the Gulf of Aden coast by a British forester called Mr. Dawson for use as a shelterbelt/windbreak for a date palm plantation project – also introduced to that location during the same year<sup>1</sup>. It is well noted that *P. juliflora* adapted into the harsh coastal climate, while its sister *P. chilensis* had shown a very poor growth result under these conditions. However, closer observation, the existing thicket showed decadence and was less vigorous-looking compared to those in the cooler Ogo ecozone, and thus shorter life span. This could probably be related to water logging in the low lying area and salt deposits in the root zone.

Three decades later, the plant became a prime choice for some development organizations involved in the support of the refugees displaced by the 1977 Ethio-Somali war – better known as the Ogaden War, for re-afforestation programmes. The impressive growth of the plant was a major incentive for its introduction. The Food and Agricultural Organization (FAO) was instrumental in introducing *Prosopis* to the refugee camp areas for use as shade and fuel wood. In late 1980s, the *Prosopis juliflora* was also extensively propagated in the permanent and temporary tree nurseries in the Regions of Togdheer, Sahil, Hargeisa and Awdal; however, the civil war had interrupted the distribution of seedlings. Therefore, in those days, with the exception of the above mentioned refugee camps, the plant was unheard of in the rest of the country. It is worth noting that there were few 'pioneer' trees found in Hargeisa city, which were planted in the late 1960s whose origin can be traced to the Bulahar plant community. These few 'pioneer' trees still have luxuriant shade and are still sturdy and healthy.

From 1985 to 1987, the Overseas Education Fund (OEF), an American NGO in collaboration with the National Range Agency (NRA) extensively distributed and supervised the planting of *Prosopis* in the refugee camps of Agabar and Laas Dhuure. The German GTZ carried out the same activity in Biyo-xidheenka (near Hargeysa), Saba-cad (near Dacar Budhuq) and Daray-Macaan in Awdal Region in 1987 and 1988.

The natural characteristics of the plant in terms of propagation, absence of natural enemies (pests or

<sup>1</sup> This information came from an interview with some community elders in Bulahar

diseases), its rapid growth and limited usage has caused the dramatic spread of *P. Juliflora* within most of the areas it was introduced – particularly, in and around large towns, refugees camps, and has been creeping further into open rangelands.

## 6. FINDINGS

With the exception of Bulahar area – the first site where *Prosopis juliflora* was introduced – the plant is heavily concentrated in the ex-refugee camps established for Ethiopian refugees aftermath the Ogaden War (1977). It is also encroaching on large areas within the towns, their surroundings and farmlands. As reported by some residents at Bio-xidheenka ex-refugee camp at the eastern periphery of Hargeisa, the seeds stored in the temporary nurseries within those camps were emptied from their sacks and unintentionally dispersed in the camps where the seeds germinated extensively thus resulting in the high concentration of *Prosopis* in those locations. It also aggressively established itself in most of the areas into which it was introduced compared to its sister species (*P. chilensis*) which showed slow progress.

The fast spreading characteristic and dissemination of seeds into new and distant areas is assisted by the movement and migratory patterns of livestock through droppings. Smaller animals such as rats and squirrels are also reported to take part in the dispersal of seeds.

The study team observed concentration of mesquite seeds in cattle dropping in Agabar village. Mesquite seeds that pass through the intestines of animals grow faster as the endocarp is removed through the digestion process.

The team noticed an exceptionally awful odor originating from the fresh droppings of animals that browsed mesquite pods; thus the local belief that seeds will remain unspoiled for a long period of time without being damaged by pests.

Rainwater run-off plays an important role in the relocation and transportation of mesquite seeds to lower areas as evidenced along the banks of *Waaheen* watercourse. Seeds that have probably originated from Hargeysa or Aw Barkhadle areas were abundantly deposited along the sandy banks of Waaheen just north of Faruur area and have germinated in large numbers. Those young seedlings will probably result in the annexation of the banks of the watercourse and competing with many coastal bushes most notably the *Moroh* bushes (*Leptadenia spartium*) – a very useful plant for making traditional milk containers. Moreover, the limited utilization of mesquite compared to most of indigenous species, coupled with its fast spreading characteristic, makes it to become the dominant species in any given area.

Another interesting characteristic of the plants is that it could thrive well in badly degraded areas in and around towns, villages and water points.

## 7. DISTRIBUTION AND VEGETATION COMMUNITIES

Over the past 10 years *P. juliflora* has widely invading vast areas in Somaliland, replacing species already displaced by overuse. No wonder, its vast spreading characteristic has made some communities brand it as ‘the Devil’s Tree’ as well as attributing it to ‘*Zaquum Tree*’, the *Accursed Tree* mentioned in the Holy Quran<sup>2</sup>. It is difficult to control to an extent that communities in southern Somalia (Marka area in particular) call it

<sup>2</sup> Holy Quran: Ad-Dukhaan, Ayat 43



'Rambo' tree, an attribution to the popular American action film, for its resilient nature. Also the fact that the plant is unpalatable and fast growing made many communities believe that it is aggressively replacing local species. This is particularly true in some coastal areas where the concentration of livestock has increased, not giving the indigenous species a chance for regeneration. A living example is the former Batalaale *Conocarpus* forest which was uprooted by returnees after the end of civil war for use as a shelter and browse matter for livestock. Now mesquite competes with the other salt tolerant species, particularly blue bushes and saltwort.



*Photo. 1: Prosopis juliflora bushes crowding Bulahar coastline*

The plant is found to be more prolific in the higher altitude areas of Golis Range, spreading from the former refugee camp sites where it was introduced in early 80's to nearby farmlands and along seasonal watercourses.

Agabar Village has the highest concentration of mesquite thickets. The community informed the study team that it has encroached over 12 Km<sup>2</sup> of the village area - particularly along the banks of the seasonal watercourse. It is important to note that the team came across large concentration of mesquite pods strewn along the banks of Waaheen seasonal flood river, just 10 km north of Faruur village.

Along seasonal water courses, particularly in the higher altitude wetter zones, mesquite plant is medium to large deciduous tree that has heavy branches, a wide crown and strong stem reaching up to 7 m tall with diameter of about 60 cm.

Mesquite gradually changes in form and density as one move farther from the riparian habitats along the seasonal water courses to drier areas where it appears to be stunted and dwarfish.

In some locations along seasonal water courses, Agabar Village in particular, *P. juliflora* forms thick impenetrable stands without understory vegetation. However, in open canopy stands it was seen interspersed with some native plant species including; *Zisypus spina Christi*, *Acacia tortilis* and so forth. Understory growth is a function of availability of light; all native species were found where mesquite canopy was open.

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## 8. COMMUNITY PRECEPTIONS ABOUT MESQUITE

Throughout the areas covered by the study, the overall perception of the communities was negative. They regard it a useless and dangerous weed. The general emphasis of local people had shown a great desire for its eradication in their respective areas. Responses given by community members in the areas visited during the study as to why they have taken such radical position against the presence of the plant in their localities are summarized here:

- *P. juliflora* is an extremely weedy plant which encroaches and invades large tracts of their productive lands and is difficult to check and control it. It is becoming the dominant species along seasonal watercourses (Togga) drawing a lot of water at the expense of the irrigated farms water requirements.
- There is an overwhelming perception among communities that no other vegetation can grow under its canopy. They also believe that it exhausts the moisture.
- Dense thick stands of *P. juliflora* when they dominate large areas can restrict the free movement of pastoralists and their livestock.
- Thick bushes provide good hiding ground for carnivores, hyena in particular. Thus a rise in the number of livestock killed by hyenas as reported in Bulahar and Agabar areas while in Biyo-xidheenka area an increase in the presence of monkey was reported.
- The extent that the plant constrained the productive capacities of farm areas was another concern. Farmers in *P. juliflora* infested areas spend ample time on clearing young trees from their farms, busying them from other important farm activities.
- Another concern constantly cited was the death of many livestock which some people attributed it to browsing green leaves and pods, due to scarcity of indigenous palatable plant species in some areas. According to information collected from different areas donkeys are the most affected whereas goats are vulnerable due to their browsing habits and preference of mesquite pods. In Agabar area the community reported that they frequently experience deaths of donkeys probably resulting from eating green leaves. As a proof to this, the community showed the Team a dying donkey lying in the village.

Many reference textbooks discuss potential toxicity of mesquite, mostly linked to overeating by animals, but also to timing of use. Fresh, green material can be toxic; dry material is high-quality feed, as is the case with most leguminous plants. (Ref. Morrisons, Feeds and Feeding.) In a report about locust infestation in the Afar areas of Ethiopia in 2005, locusts were reported not feeding on *P. juliflora*. Although no explanation for this was given, one could still link this with the toxicity issue of the plant.

- Mesquite thorns hurt far worse than other thorns would whereby communities visited compared it to a rusty nail. The thorns of mesquite are stronger and longer than acacia thorns. Injuries from the thorns are far worse than the injuries that a normal thorn would cause because of their size and the wound's tendency to become infected more easily.

The aforementioned negative community concerns about the plant, is the main reason why the majority of the people are in conflict with the plant. However, considering the gradual increase in the utilization of mesquite for different purposes such as firewood, sticks for construction, fodder (pods), shade, natural fencing, charcoal, it is envisaged that the plant will not continue to be regarded as the 'accursed tree' or the *Unknown*, as more people are beginning to reconcile with it. Evidence from different areas shows that the tree appears to concentrate itself fast anywhere, even in low rainfall area and in problematic soils. In such circumstances, it can be a good potential for charcoal making which could generate gainful employment for the rural poor. Nowadays, in the urban areas, mesquite has become one of the most preferred tree for its luxuriant and all year round shade.

## THE TALE OF TWO COMMUNITIES

This following case study attempts to show how community perceptions about the *P. juliflora* differ as a result of the utilization and limited utilization of the plant.

The basis of the following information came two workshops on *P. juliflora* conducted in Haleeya and Agabar villages. The rationale behind selecting the two communities was to compare how the geographical proximity and the distance from a major urban center could enhance or discourage the optimum utilization of the plant for different purposes. On the basis of this rationale, a certain community may either appreciate or disapprove the presence of *P. juliflora* in their locality.

### Community A: Halaya village

Haleeya is situated approximately 7 km to the east of Hargeysa, the capital of Somaliland. It is also neighboring the ex-Bio-xidheenka refugee camp and one of the sites where *P. juliflora* was introduced in 1978.

In a two-day workshop held in for 40 community members (50% women), the positive aspects of the plant outweighed its negative aspects. In one brainstorming session, just before the end of the workshop, the participants were challenged to give a fitting name to the plant rather than its current name "Garanwaa" which means the 'unknown tree'. Over fifteen names, all of them describing its different characteristics and benefits were listed by participants. Interestingly almost all of the fifteen names (12 out the 15) exemplified its virtues, benefits and positive characteristics.

The seemingly liking of the community of Halaya to mesquite was attributed to the following benefits which they derive directly or indirectly from the plant:

- a) Increases of milk production from livestock resulting from browsing of *prosopis* pods which are nutritive.
- b) The availability of the pods all the year round has reduced the seasonal movement of agropastoralists in the area. This was of particular importance to the women from the community who used to travel some distances in order to collect mesquite pods for their weaker animals during the dry season when all the other trees are barren.
- c) Cutting and sale of *prosopis* wood as a construction material
- d) Charcoal production.

It is important to note here that the short distance of Haleya from Hargeysa, the biggest urban centre in Somaliland, and market accessibility was the main reason for the establishment of some positive mesquite-related businesses.

### Community B: Agabar Village

Agabar is situated 53 km to the north of Hargeysa. It was one of the ex-refugee camps whereby mesquite was introduced in the late 1980's. The site was chosen for a refugee camp site because of its seasonal watercourse which has abundant water. Almost 20 years since this plant was introduced, the village and its farmlands are completely engulfed by the tree. During this period, the production capacity of their farms has been falling year after year due to a number of factors, most notably the decrease in the quantity of water and encroachment of mesquite on their farms.

As reported by the community, people suffering from malaria have been on the rise. They also reported some deaths of their animals which they related to *Prosopis*.

In a nutshell, the community of Agabar do not see any good in *Prosopis* and still attribute their woes to the presence of the plant.

Unlike their community of Halaya, they do not derive any benefit from the plant as the comparatively longer distance from Hargeysa, the poor road condition and the infrequent transport services has a discouraging effect on the community to establish income-generating activities based on *prosopis* products.

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## 9. LOCAL MANAGEMENT STRATEGIES OF P. JULIFLORA

With the existence of favorable environmental conditions combined with its natural capabilities to multiply rapidly, as well as its aggressive and opportunistic characteristic, it has been spreading faster than any other plant in the country.

The plant has great ability of re-sprouting and fast coppice growth from stumped/damaged trees ('crown-sprouting'). Therefore, any effort in the management control or elimination which does not take these biological characteristics into account is bound to fail. Stumping trees at 10cm below the ground eliminates the chance of re-sprouting of *P. juliflora* and, hence, might offer a viable option for controlling and even eliminating the plants from areas where they are undesirable. The fact that *Prosopis* has great ecological and socio-economical importance makes its control through utilization a very attractive, purposeful and viable option.<sup>3</sup>

Some of the communities visited use several management techniques to control the spreading of mesquite, where the plant is undesirable, these include:

### 9.1 Uprooting young seedlings

This technique is effective in eliminating the plant in its early growth stage. This is usually practiced by farmers who are expected to be vigilant to destroy new plants. The study team noted that this technique is widely practiced in Agabar area. Farmers said that, even though it is a backbreaking job, they still succeeded in preventing their farms from being crowded by the tree. The technique has to some extent proved good results, however, there appear little possibility of a large scale eradication.

### 9.2. Control with fire

This technique is common among agro-pastoralist communities as a means of controlling the proliferation of the plant while at the same time utilizing it for fuel wood..

The stems, at ground level, of the plants to be destroyed are encircled uniformly with animal dung/droppings which are then fired. The slow burning dung generates heat to shrivel up the stem and damage the stem, which ultimately result in the death of the plant. The study team came across Biyo-Xidheenkka area near Hargeysa a number of dead trees as a result of this process.

In Bulahar, the first site of *P. juliflora* introduction, a campaign to eradicate the plant was carried in 2002 through food for work programme provided by the World Food Programme (WFP) to the village community. The initiative had originated from the concerned community while the Ministry of Pastoral Development & Environment (MPD&E) was supportive in facilitating the process of acquiring the food for work from WFP. During the civil war years, the plant had encroached on an old date palm plantation in Bulahar and restricted access to the shallow wells in the town for villagers and pastoralists.

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3 Shiferaw, Hailu et.al., Some biological characteristics that foster the invasion of *Prosopis juliflora* (Sw.) DC. At Middle Awah Rift Valley, north-eastern Ethiopia, *Journal of Arid Environments* 58 (2004) 135 154

## 10. CURRENT UTILIZATION OF PROSOPIS JULIFLORA

Mesquite has many uses and can be exploited commercially as proven in its countries of origin. There is clear indication that mesquite utilization and its products are on the increase year after year. But its current under-exploitation might be due to the availability of indigenous species which the local communities are well adapted to their usage on the one hand, and due to lack of community awareness and knowledge on the uses of mesquite on the other.

In the light of the diminishing status of number of indigenous trees it is envisaged that the utilization of mesquite will increase both in rural and urban areas. Some of the main uses are listed here below:

### 10.1. Forage

A significant role of *Prosopis juliflora* and related species is its contribution to a pastoral and agro pastoral economy by providing a nutritive fodder for all classes of livestock during droughts when other forages become scarce. Throughout the areas visited use of dry mesquite pods as animal feed was noted. During the dry season some people maintain giving mesquite meals, particularly for milking and lactating animals in the morning or in the evening as food supplement.

Moreover, it was noted that a growing number of pastoral communities frequent the areas with high concentration of mesquite bushes during the dry season in order to collect dry pods as a feed for their livestock returning with donkey/camel loads.

There was little mention of consumption of green/fresh leaves and pods of *Prosopis* by livestock in all areas that were visited. Browsing of leaves from the new and tender branches of *Prosopis* by goats and donkeys was reported and this is generally experienced in early spring [*Kaliisha*] when most of other trees are dry and bare.

Dry leaves and flowers fallen from *P. Juliflora plants* are also collected by livestock from the ground as evidenced in Agabar and Bio-xidheenka areas. Mesquite trunks de-barked by goats were also seen in Hargeysa.

### 10.2. Building materials

*P. juliflora* wood is becoming an important source of building materials throughout the visited areas. Interviewees met during the study assignment compared *Prosopis* wood to that of *Acacia bussei* in terms of strength and durability.

Poles from mesquite branches are becoming popular in the big urban centers as a cheap and low grade wooden sticks for building shelter for returnees and internally displaced persons (IDPs). In Hargeysa, these are collected from Biyo-Xidheenka area. These are usually tied in bundles consisting of 15-20 long sticks and fetch an average market price of Sl. Shs 20,000, equivalent to USD 3.25 per bundle. Traditional walking sticks [*Bakoorado*] made from mesquite were also available in Hargeisa market.

The increasing utilization of *P. juliflora* wood in many areas may reduce the pressure on native plant species which the local people traditionally depended for their building materials and consequently could contribute to the decrease of dependence on indigenous trees for building materials.

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### 10.3. Fuel wood and charcoal production

It is important to note that mesquite makes an excellent fire wood and is now utilized for that purpose in some of the areas visited by the Study team. The team saw a donkey carrying mesquite fire wood in Agabar village. It is also widely practiced in Bio-xidheenka area near Hargeysa (see below).

According to interviewees, mesquite firewood burns steadily even with freshly cut branches, giving off intense heat with little smoke. Charcoal prepared from mesquite is gaining momentum and popularity in most of areas visited. The team saw charcoal produced from mesquite wood for domestic use but the practice is very limited in scale compared to that of firewood.



*Photo. 2: Small scale charcoal production from mesquite at Biyo-xidheenka*

The viability and effectiveness of mesquite firewood is vividly demonstrated in the Merkka town in Southern Somalia, where it is sold side by side with charcoal. It is estimated that at least 40% of the population of this major coastal town use mesquite firewood for cooking. Likewise, the town's Arabian style buildings are whitewashed with lime prepared with mesquite wood.



*Photo. 3: Children in Merkka, Southern Somalia, carrying mesquite firewood(2005)*

On the other hand in most areas that the Study team visited, people kept on repeatedly telling charcoal produced from mesquite is relatively poor quality, it is lighter in weight than the common acacia spp. It also burns evenly with intensive heat, without much smoke, but turns into ash faster.

However, mesquite wood, particularly the small branches, is susceptible to wood boring insects making the shelf life the fuel wood not more than six months<sup>4</sup>.

In Biyo-xidheenka area, however, it is worth noting that the team came across a man by the name of Bare Muse who produced charcoal from *P. juliflora* woods but at the same time blended it with another prepared from some native species namely, *Acacia tortilis*, *Sisyphus spina christi* and sends it to Hargeisa city for sale. According to this man, a sack of charcoal of about 20 kg in weight is sold at Sl. Shs.12,000 (\$1.88) while the same quantity of charcoal from *Acacia Bussei* is sold at Sl. Shs. 18,000 (\$2.8) in Hargeisa.

On the question of perception among his customers with regards the quality of his charcoal he said that he did not hear any complaints from them.

Again, when asked about the charcoal production potential of *P. Juliflora* he said that a mature 5-7 year old tree, on the average, can yield 3 sacks of 20kg bags of charcoal.

Based on the data and insights elsewhere, one tree is expected to give 40 kg., as a conservative yield; and to obtain one kg. of charcoal, 3.75 kg. of wood was required, i.e. a yield of 27%. Thus to obtain 20kg. of charcoal, 75 kg. of wood was required. On the other hand, yield of fuelwood/tree worked out to be 99.3 kg<sup>5</sup>.

Experience gained from other countries reveals that fuel wood from *P. Juliflora* is highly valued - owing to its heat value, and has been termed "wooden anthracite". This means, it burns slowly, evenly and holds heats well. The State Government of India declared this species a "Royal Plant" in 1940, and exhorted the public to protect it. It also encouraged large scale planting of this species. It proved to be the most versatile plant for afforestation on shifting sand dunes, coastal sands, eroded hills and river beds, saline terrains, dry degraded grasslands and wastelands with scanty and erratic rainfall<sup>6</sup>. The wood is hard, durable and has good fuel wood value (8,050 Btu/lb). Good quality charcoal is obtained from the branches and main stem. It can produce about 100 kg fuel wood per tree in about 10-year rotations on sandy soils, with rainfall ranging from 300 to 400 mm per year. The tree exudes gum from the sapwood, which is used in industries like sizing of paper, calico printing, cosmetics, etc. If suitable utilization of this gum can be found in industries, it will enhance the value of this tree species (Ganguly and Kaul, 1961).

#### 10.4. Other Uses of *P. Juliflora*

*P. juliflora* provides an important habitat and forage for large number of ruminants, small animals and birds. Insect eating birds feed on numerous insects that are attracted to *Prosopis juliflora* flowers while others eat pods and flowers in the spring as well as in winter seasons.

4 Charcoal Production & Marketing in Gujarat, FAO Field Document No. 36, 1993

5 Ibid.

6 K.D. Muthana, *Prosopis juliflora* (Schwartz) DC, a fast growing tree to blossom the desert, [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/DOCREP/006/AD317E/AD317E06.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/006/AD317E/AD317E06.htm)

*Prosopis* flowers are an important source of nectar for producing high quality honey. The plants also exude gums from the trunk and branches of its trees are used in various ways such as food, pharmaceutical, chemical and manufacturing industries. Other uses include live fencing, shade and environmental benefits such as soil stabilization and carbon sequestration.

## 11. COMPARATIVE MERITS AND DEMERITS OF P. JULIFLORA OVER ACACIA. TORTILIS

The following table details the merits and demerits of *P. juliflora* over *A. tortilis*. With the exception that the leaves have no fodder value, *Prosopis juliflora* scores more than *A. tortilis* in many areas.

	<i>Prosopis juliflora</i>	<i>Acacia tortilis</i>
(1)	Fast growing, drought hardy species suitable for arid and semi-arid regions	—Ditto—
(2)	Coppices well	—Ditto—
(3)	Good fuel wood with 8,050 Btu/lb as calorific value	Ditto, having 7,800 Btu/lb as calorific value
(4)	Good quality charcoal	—Ditto—
(5)	Good for raising on field boundary for protection from cattle entry	—Ditto—
(6)	Plantation can be raised by direct sowing/transplanting seedling/pre-sprouted cuttings and stumps	Plantation can be raised by direct sowing and transplanting seedlings
(7)	Leaves have no fodder value	Leaves have good fodder value
(8)	Extraction of seeds is difficult from the pods	Seeds are easily extracted by threshing the dried pods
(9)	Dried pods are pound nicely and used for human consumption during famine	Tender seeds are used as vegetables
(10)	Gum of this species is used for sizing of paper, calico printing, cosmetics, etc.	This species also exudes gum and its utility is yet to be determined

(Source: K.D. Muthana, *Prosopis juliflora* (Schwartz) DC, a fast growing tree to blossom the desert, [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/DOCREP/006/AD317E/AD317E06.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/006/AD317E/AD317E06.htm))

## 12. MANAGEMENT OF PROSOPIS JULIFLORA BY UTILIZATION

For thousands of years, Somalis who are predominantly pastoralists heavily depended on the utilization of the indigenous plants for food shelter, firewood, fencing etc and thus cannot expect to find other viable alternatives if these resources are depleted.

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Mesquite (Prosopis  
juliflora) in Somaliland  
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Nevertheless, there has been indiscriminate cutting of natural woodland for charcoal production, building and fencing materials. This was compounded by overgrazing, accelerated soil and water erosion processes which have had far-reaching effects on the natural resources.



In the light of the massive scale of depletion of the remaining forests, maximizing the utilization of *Prosopis juliflora* is a matter of paramount importance. The undesirable properties of the plant could be counterbalanced by its current and potential multi-purpose uses.

Somaliland is a country where the biomass resources are dying fast due to the indiscriminate cutting and unsustainable utilization of forest resources for charcoal, timber and thorn enclosure uses to an extent that consumption is surpassing regeneration. The recovery of all important *Acacia spp* species from such extensive exploitation takes very long time due to their slow growth and the fact that they are palatable and are continuously browsed or lopped for animals as a feed during the dry season. All of sudden, this plant comes into the scene, establishing itself in every place – even in most unproductive lands, giving a green cover to areas that have been subjected to denudation. Slowly it is becoming popular for its firewood, charcoal and timber. There are communities who have already begun to reconcile with the plant. A short excursion to the Dabada Cadaadda, a former camp for Ethiopian refugees of Somali origin displaced by the 1977 Ethio-Somali war, just outside the eastern corner of Hargeysa will enable one to witness the conquering characteristic of the plant and how it has almost covered the whole area and the speed at which it is expanding. The agro-pastoral communities in the area narrate some interesting but positive stories about *Garanwaa*. They say it is a main source of nutrition for their animals during winter, thus enabling them to go over the critical dry season (*Geedku wuxuu leeyahay jilaal-bax*). The mesquite forest stand in the said area is also a source of income for many people who earn their income from cutting and collecting *Prosopis* sticks for sale in Hargeisa for use in the construction of huts and kiosks.

In recent years, there has been growing criticism of the tree among local communities and pleas for its eradication. Nevertheless there appears a clear evidence of increasing utilization of the tree in urban areas for its all year round shade and rural areas for firewood and poles for construction purposes. Therefore, this issue merits a much closer look as the natural vegetation of the country is becoming progressively depleted, whereas demand for biomass resources is increasing day after day with the increase of population.

*Prosopis Juliflora* wood can be considered to be the highest potential renewable fuel resource for the ever increasing demand of fuel energy in urban areas and thereby can relieve the heavy pressure on native plants, because it yields higher quantity of wood and can regenerate more rapidly than any other native or exotic species found in the country.

As noted earlier *Prosopis juliflora* wood is the domestic principal fuel in the area visited during this study. Likewise, the utilization of *P. juliflora* for charcoal in Hargeysa is slowly spreading. Candlelight is the first organization to take up the initiative of popularizing Mesquite charcoal realizing that the spread of the plant could be limited through increased use.

*Prosopis juliflora* pods are highly palatable, digestible and nutritious. All kinds of livestock thrive and also can live on it and Mimosine – related toxicity associated with the long use of pods can be delayed or eliminated entirely by supplementing the diet with other forages.

Animals feeding on pods of *Prosopis juliflora* during fodder shortage periods have been on the increase over the recent past. Moreover, *Prosopis juliflora* produces large quantities of pods and can remain viable for feeding animals which can, given appropriate storage conditions, stay healthy for long period because of its protective endocarp.

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Bearing in mind that mesquite pods are potentially a principal fodder material, the storage of the same could be a realistic response to the fodder shortage problem in pastoral areas.

The pods should have to be crushed before-hand to destroy seeds in order to prevent germination of the seeds eaten by livestock. In this way mesquite spread may be controlled.

Collection and sale of mesquite pods can provide an income earning opportunity for households residing in the areas where *Prosopis juliflora* is in plenty.

The flowering of *P. juliflora* lasts all the year-round. The yellowish-gold mesquite flowers produce a fragrant honey which is a favorite of bees and other insects. This will encourage farmers and agro-pastorals to diversify their income base by introducing honey production.

## 14. CONCLUSION

Due to the limited information and knowledge by the local people on *Prosopis juliflora* together with its fast spreading, coppicing and undesirable characteristics, the plant is largely ignored or considered a useless weed. It is still paradoxical that *Prosopis* is advantageous and disadvantageous for the local people. Some groups are in need of it while others are looking for techniques to eradicate it from their surroundings.

*Prosopis juliflora* seems to be a good option for rehabilitation of seriously degraded dry sandy areas, where the spread will not get out of control. It is extremely important to limit the planting areas so that extensive spread cannot occur that has caused difficulties in some irrigated agricultural schemes.

There is a dire need for alternative source of wood and wood products other than the heavily pressured acacia species. With the increase in the use of mesquite, the threat on the native woodland resources could be minimized as the annual increment rate of growth of *Prosopis juliflora* is considerably high compared to the Acacia species. However, even in countries where its utilization is greater, restrictions are now in place on the plant for fear of its overuse!

## 15. RECOMMENDATIONS

1. Maximum utilization of the plant should be encouraged rather than condemning it as a useless plant. This could be achieved through awareness raising and demonstrations on its multipurpose uses.
2. Popularization of Prosopis charcoal, particularly in the areas where it has heavily annexed viz. Bio-xidheenka, Agabar and Sabacad.
3. Commercialization of the other potential uses of Prosopis such as timber, pod flour, gums

## Annex I

### REFERENCES

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