

## Review of Conservation of *Prunus africana* and International Trade Opportunities for its bark in Kenya

Joshua K. Cheboiwo<sup>1</sup>, Robert Mugabe<sup>2</sup> and David Langat<sup>3</sup>

<sup>1</sup>Chief Research Officer, Forest Economics, Policy and Governance, Kenya Forestry Research Institute, P. O. Box 20412-00200, Nairobi, Kenya, email:

<sup>2</sup>Visiting researcher,

<sup>3</sup>Principal Research Officer, Kenya Forestry Research Institute, P. O. Box 20412-00200, Nairobi, Kenya.

**Corresponding Author: Joshua K. Cheboiwo**

---

### Abstract

*Prunus africana* is a species widely found in Africa whose bark has been used for traditional healing for hundreds of years. Its exploitation for exports began in 1960s and demand peaked in 1970s. High demand and uncontrolled exploitations led to its listing under CITES in 1995 that restricted exports. Kenya has been an important exporter of *Prunus* bark to Europe until imposition of export ban in 2003. Minimal studies have been undertaken on socioeconomics and conservation impacts of the bark export ban. The study objectives were to identify the production areas, levels of conservation, explore export performance and make some recommendations. The study involved literature reviews and field surveys in key production areas. The findings indicate that the species is found in natural forests and farms in the moist montane zones in the country. The bark is traditionally used to treat various ailments. Kenya annually exported on average 250 tonnes of bark until the ban in 2003 that led to a loss of annual export value \$14million. The study recommends that with appropriate policy framework there are opportunities for sustainable growing, harvesting, processing of *Prunus africana* for biodiversity conservation and diversification of the country's exports.

---

**Keywords:** *prunus africana*, conservation, bark extracts, utilization, international trade

---

### INTRODUCTION

*Prunus africana* is among the many species that belong to the genus *Prunus* that include wild relatives of plums, peaches, almonds and apricots. *Prunus africana* is widespread in Afrotropical forests in mainland Africa, Madagascar and the islands of Grand Comore, Sao-Tome and Fernando Po (Kalkman, 1965; Vivien and Faure, 1985). *Prunus africana* is an important multiple use species throughout its range, mostly for its bark and hard timber. The healing properties of *Prunus africana* bark was discovered hundreds of years by local communities in Africa to treat old age conditions until some 400 years ago when it was documented by early white settlers in South Africa. The powder extracted from its bark provides relief from prostatic hyperplasia and prevents the development of prostate cancer a disease common to men of above 60 years. The curative powers of *Prunus africana* was fully appreciated in 1970s by pharmaceutical companies and large scale exploitation began in earnest. However, the demand for its bark products for commercial and traditional uses that made Kenya in 1994 to propose for its classification under CITES to control exploitation and international trade in its products. This is because International Board for Plant Genetic Resources (IBPGR) had indicated that

the uncontrolled exploitation could have serious consequences on *Prunus* tree populations in its natural habitats and livelihood opportunities for many rural communities.

In the key *Prunus* bark exporting countries of Cameroun, Madagascar and Kenya the demand for the bark by commercial enterprises is reported to have led to increased extractions, excessive debarking and in some cases felling of entire trees that has threatened the species in its natural habitats.

### Global Trade in *Prunus* Bark

The globally the traded *Prunus* bark is mostly sourced from Cameroon and Madagascar, Kenya, Tanzania and Congo. The annual bark export trade from Africa by 1998 was estimated at between 3,200 to 4,900 metric tonnes as compared to 10 metric tonnes in 1976 (Schippmann, 2001). The demand was projected to grow to between 7,000-11,000 tonnes by 2018 as the populations of the North the major market ages. The over the counter *Prunus africana* values of products by 1998 were estimated at US\$220 million (Cunningham et al, 1997). The largest buyers of *Prunus africana* bark were French Company Groupe Fournier, Inverni della Beffa of Italy and

Indena Spa of Spain that were among the top 14 western pharmaceutical companies that use ingredients from Prunus bark to make several traded medical brands (HerbalGram, 1998). The only legal protection afforded to the species in major producing countries has been temporary restriction on harvesting and exports in Cameroon, Kenya and Madagascar. In Cameroon the major tools used to manage exploitation rates were harvesting permits, restrictive quotas and harvesting guidelines. However, since 1995 international trade in *Prunus africana* bark has been regulated by Convention on Trade in Endangered Species (CITES) when its trade in its products was included in Appendix II that stipulate that exports and imports have to be regulated through declarations. The exporting country is required to demonstrate that their quotas have been set at levels that do not adversely affect the species.

#### 1.2 Justification for the study

*Prunus africana* is one of the 18 top priority tree species identified for conservation actions in Africa by FAO. However, the reporting and monitoring of trade in Prunus bark has been inadequate because it is traded in various forms such as dried bark, bark extracts, herbal concoctions, capsules and tonics that make it difficult to measure in comparable official figures (Schippmann, 2001). However, the listing by CITES has created awareness on the challenges and opportunities on trade in Prunus bark in Africa. The CITES requirements has encouraged various stakeholders' including international, governmental and NGOs to initiate programmes to conserve, promote cultivation and monitoring of trade in its products. Most producer countries including Kenya are yet to make concrete efforts to enact policies and legal structures to promote planting, sustainable harvesting procedures, appropriate extraction technologies and legal trade in its bark. Successful plantations in Africa include 628 hectares in Kenya mostly trial plantations dotted in various forests and 250 ha in the rest of the Prunus bark producing countries mostly in Cameroon (Dawson et al 2000).

In Kenya *Prunus africana* is one of the widely retained or planted indigenous species on farms in Kenya for various reasons by Gachie et al (2014). Therefore the recognition of its potential importance for trade and conservation is likely to motivate various land owners to plant more trees for commercial purposes to diversify their revenue base and spread farming risks. Therefore the current study was aimed at gauging the trade opportunities, conservations and planting efforts to compliment the declining natural populations. This is because clear policy direction and robust markets is assumed will enhance future planting of *Prunus africana* beyond the protected areas reserves into farms and plantations.

#### STUDY LIMITATIONS

The study relied on some information derived from studies on Prunus in Cameroon that may not reflect the true condition in Kenya. Additionally, inadequate studies have been undertaken on the inventory and ecological dynamics of Prunus in the country that limited the scope of the study to information from rapid surveys that may not reflect the true picture of the resource status in the country. Since the harvesting and export in the country was handled by one licensed firm the socioeconomic and resource conservation implications on entry of small scale operators into the business could not be adequately evaluated.

#### STUDY METHODS

The study involved desk top reviews of available literature, internet searches, interviews with Kenya Forestry Services, (KFS) and Kenya Wildlife Service (KWS) officers and farmers around Kakamega, Mau, Ndondori, Marmanet and Kabarnet forests that were the major production areas for traded Prunus bark. The information collected was mostly on conservation extraction, processing and trade in Prunus bark. The data collected were presented using tables and graphics.

#### RESULTS OF THE STUDY

##### Kenya experience conservation and utilization

##### *Spread of Prunus africana*

In Kenya *Prunus africana* grows on the major forest blocks including the Aberdares, Mt Kenya, Mt Elgon, Cherangani Hills, Timboroa, Nandi Forests, Taita Hills, Chyulu Hills, Tugen and Nyiro (Marsabit) hills, Kakamega Forests and the Mau ranges. There are limited studies on ecological distribution, reproductive capacity and utilization of *P. Africana* in Kenya. However studies done in Cameroon indicate that *Prunus africana* is characterized by a limited number of lower size-class individuals due to high mortality rates of samplings under forest canopy and as a result of bark harvesting pressure (Ndam, 1998). Studies have also established that there are significant differences in population structure between exploited and unexploited populations of *Prunus africana* probably because of high intensity debarking that adversely affects the health of the remaining population and its future reproductive resilience. Similarly, it was found that the stem distribution was highly influenced by accessibility with stands nearer to motorable roads and urban centres being less due to exploitation by village-based harvesters and commercial firms. Since *Prunus africana* is high light demanding species therefore more abundant in disturbed sites and forest margins mostly on the upper slopes where average density of trees >20cm DBH can be as low as 5.5 trees ha<sup>-1</sup> (Eben Ebai *et al.*, 1992). The findings above are likely to apply in Kenyan given the similarity in biological and ecological conditions.

Recent study by Gachie et al (2014) on smallholder farms in two counties in western Kenya showed that there was widespread presence of *Prunus Africana* on farms. The report indicated that mean density was 0.8 trees per hectare and 0.7 trees per household. The retained *P. africana* trees on farms were relatively old in age as compared to planted trees that were below 20 years. Most farmers planted them for conservation or ornamental purposes as most were not aware of their medicinal values or potential markets for the bark. The surveys confirmed that there were no widespread commercial planting of *P. africana* for bark production in the country. However, the emergence of vibrant herbal based medications that have Prunus bark as key ingredients is feared may likely result in increased harvesting of the *P. africana* bark from the wild and on farms in the future.

**Bark Harvesting and Collection**

Surveys done in major forest ecosystems in western Kenya Mau Forest complex, Cherangany Hills, Tugen Hills, Tindiret and Mt Elgon show that most *P. africana* trees found in the forests were very old and widely scattered in the margins of the forests and open areas. There was evidence of debarking though minimal as only few trees had parts of their barks removed. That contrasted with *Z. gilettii* and *Warbugia ugandensis* species associated with *P. africana* in the montane forests that were heavily debarked an indication of the high demand for their bark for herbal medication by local people and herbalists. Interviews with local forest officials and farmers did not indicate significant illegal harvesting of *P. africana* bark on public forests and farms as anticipated. The observation may be attributed to the fact that most of the current harvests were by local people and herbalists for own use. According to farmers and forest officials there was no evidence that *P. africana* was being threatened by over harvesting activities but more by anthropogenic forest degrading forces affecting all indigenous species in natural forests both in public forests and farms.

On legal harvesting the country had only one licensed operator allowed to harvest and export Prunus bark in the country's forests. The licensed operators routinely deployed a team of bark harvesters equipped with debarking tools to areas where forest clearing was being undertaken by licensed firms in public forests or private landowners. The harvested bark was transported to collection point in Kambi Mawe the licensed exporter's premises for drying and packaging. Due to the stringent CITES procedures the licensed operator undertook debarking in approved areas that by design excluded Prunus tree owners on private lands that were not likely to meet the requirements for harvesting approvals. Therefore access to legal bark markets by farmers and people living adjacent to forests were not feasible and hence

were not aware that Prunus bark was an important export commodity.

However, in recent forums on potential trade in tree products in western Kenya many farmers indicated that they could not find markets for dried *P. africana* bark harvested from their farms despite assurances on huge market potentials in the country and overseas. The interactions attested to the fact that despite the potential market opportunities from increasing popularity of herbal medication and high demand in overseas markets local producers are yet to benefit from such opportunities. For lack of access to overseas markets can be attributed to the prevailing stringent stipulated in the CITES that include approved management plans and non detrimental certification by accredited authority that most artisanal producers cannot meet under current operational conditions.

**Sources for Traded Bark**

The record available on trade on *P. africana* bark in Kenya are from records kept by Kenya Wildlife Service (KWS) the accredited local regulating agency reports and CITES website. The KWS and CITES reports show that most of the *Prunus africana* bark exported from Kenya were collected from natural forest areas that were being cleared for settlements and tea estate expansions. However, some bark were harvested from some public forests undergoing selective harvesting such as Kakamega forest in Kakamega County and Katimok forest in Baringo County. Table 1 lists forests that KWS and CITES reported were the major sources of exported bark from Kenya.

Table 1: Forest areas where Prunus bark were collected

Forest Bock/Estate	Specific Areas
Kabarnet forest	From die-offs in the forest & community land adjacent to the forest
Mau Forest	Kericho, Keringet, Olenguruoni & Elburgon areas
Ndondori forest	On community land adjacent to the forest
Marmanet forest	Around Nyandarua area
Nandi forest	Both North and South Nandi forests
Kakamega forest	Where tea estates are being extended & excised areas
Bahati forest	Excised forest areas
Timboroa forests	Excised forest areas
Mt. Elgon forest	Slopes and excised areas
Mt. Kenya forests	On the slopes
Loita forest	

Source: CITES office at KWS Hqs, Nairobi

**Processing and Value Addition**

Prunus bark exports from Kenya was purely unprocessed but in the international market, *P.*

*Africana* is sold in various forms such as air-dried unprocessed bark, bark extract, and finished herbal product. This implies that the only value addition done in Kenya was air-drying and transportation. However, with appropriate investment in bark processing there are potential opportunities to add value to the *Prunus* bark before being exported. Value addition processing will provide employment opportunities and enhance the value export products thus generating better foreign exchange earnings.

**Bark Movement and Exports Procedures**

The KWS administered CITES procedures for trade and export of *Prunus* bark stipulates that licensed agents must undertake approved harvesting procedures, harvested quantities that meet sustainable criteria and must seek authorization to operate such business. The licensed exporter was regularly issued

with authorization letter to fell and debark the trees in specified forest areas. The movement permit was obtained from the nearest forestry office to enable movement of the product within the country or to Mombasa for shipment to Prosynthese, France. At the port of Mombasa the export exit KWS officers together with customs officials inspect the consignment and issue CITE’s export permit and payment of customs duty. According to KWS each permit was applied for 50 tonnes consignment and four to five consignments were authorized every year before the ban in 2003. The market value chain of *Prunus* bark was short because the harvesting, assembling and exporting was done by the agents of the licensed exporter with no participation of other players possibly due to licensing procedures on source of origin documentation (Figure 1).



Figure 1: Constructed market value chain for *Prunus* bark from production to Mombasa Port

**Pricing of Bark**

There is scanty of information on pricing of bark at local level but in Cameroon farmers were reported to receive on average US\$ 2 per kg of dry bark (Cunningham and Mbenkum, 1993). Additionally, Dawson et al, (2000) and Cunningham and Mbenkum, (1993) provide some information on conversions for various forms of *Prunus* bark extracts that indicate that dried bark weight is 50% of the wet weight and 1,000kg of dried bark is needed to make 5kg of extract. The reports indicate that on average a mature tree yields 55-75 kg of wet weight.

In Kenya, the licensed operators performed all the tasks of harvesting and processing through its agents hence there was no price negotiations and discovery process. In cases where limited harvesting was undertaken on farms and private estates the licensed operator provided free felling and cross cutting of the *Prunus* trees in exchange for the bark harvested. The only indication of payments was reported by KFS official in Mau area that showed that some farmers were paid US\$2 per of bark delivered to the licensed exporter agents in 1999.

**Trends in Bark Exports**

In Kenya, export of *Prunus africana* bark has being active for many years until 2003 when it was banned. By then the country was one of the main suppliers to the French company, Prosynthese, a subsidiary of the

Fournier Group, manufacturers of the ‘Tadenan’ tablets supplying 60% of their bark demand (Table 2). The extraction and export business was handled by the only licensed exporter in the country. Records from KWS and CITES show that on average Kenya exported between 200 and 250 tonnes of dried bark annually between 1995 and 2003. KWS estimate that on average the unit price for dried barks during the period was \$60 per kg that translate to between \$14-17 million annually over the 20-year period. Some of the bark exported to France was re-exported to other countries mostly China and USA probably at higher prices indicating potential for better prices at alternative markets. Table 2 shows the quantities of bark exported to France between 1995 and 2003. However, the license of the exporter was cancelled by Kenya Wild Life Service (KWS) in 2003 on instructions from the Minister for Environment and Natural Resources on grounds of monopolistic exploitation of the resource at the expense of the society and no legal export have been recorded since then.

Table 2: Prunus bark export trends from Kenya 1995-2003

Year	Importer	Exporter	Quantity (Kg)	Import Part	Purpose	Source	Re-Export Quantity (Kg)
1995	France	Kenya	100,000	Bark	T	Wild	150,000
1996	France	Kenya	300,000	Bark	T	Wild	
1997	France	Kenya	300,000	Bark	T	Wild	350,000
1998	China	Kenya					800
1998	France	Kenya	450,000	Bark	T	Wild	504,002
1999	France	Kenya	450,000	Bark	T	Wild	450,000
2000	France	Kenya	50,150	Bark	T	Wild	300,000
2001	China	Kenya					200
2001	France	Kenya	200,000	Bark	T	Wild	100,000
2001	USA	Kenya					5,000
2002	China	Kenya					170,000
2002	France	Kenya	50,000	Bark	T	Wild	50,000
2003	France	Kenya	100,000	Bark	T	Wild	

Adapted from [www.unep-wcmc.org](http://www.unep-wcmc.org) 2008

## DISCUSSIONS

Since Kenya imposed a ban on export of *P. Africana* bark in 2003 there has not been studies to review the status of the resource and impacts of harvesting on their populations dynamics of in the wild and plantations (Cheboiwo 2010). Therefore the socioeconomic and environmental impacts of the Prunus bark export ban in the country and tree growers have been forgotten. However, some policy makers and lobby groups have been expressing the need lift the ban on export trade to motivate commercial development of the Prunus based enterprises in the country. This is because many players in the forestry sector indicate that the country have appreciable quantities of *Prunus africana* trees in the major forest blocks and farms. The fact that Kenya is the leading country in ex-situ conservation of *P. africana* with 628 hectares under various forms of plantation ranging from enrichment planting done 80 years ago to young progeny trials done in 1990s mostly in public forests. Additionally, there are thousands of trees of different ages on farmlands, compounds and avenues scattered in the highlands areas of the country. Studies have shown that *P. africana* can be easily established under various forms on commercial plantations and farms because it readily seeds, and its seeds germinate easily (Cheboiwo, 2010).

## RECOMMENDATIONS

The country has long experience in the domestication of *P. africana* and trade in its bark that puts it in a unique position to evaluate the potential viability of the Prunus enterprises. Therefore reviews on the Prunus bark export ban is essential given that country emphasis on the diversification into green economy and increased foreign exchange incomes that makes

Prunus based enterprises an important option. The review will enable the country engage the sector by crafting an enabling policy and legal environment to facilitate vibrant Prunus based enterprises to flourish. From the study the following recommendations can be made:

1. A comprehensive inventory to collect information on planted and naturally growing *Prunus Africana* on farms, plantations and public forests for determination of potential bark yields, regeneration potential, selection of potential sites for harvesting.
2. The drawing up of policy and legal guidelines to guide operations in the private sector and farmlands.
3. A review of the potential impacts of trade and export of *Prunus africana* bark on the species populations in the country and motivation of commercial planting by various stakeholders.
4. A rigorous cost benefits analysis of *P. africana* plantations against competing crops and remedies for BPH in the market place should be done to inform future investment decisions for the sector.
5. Development of strategies to facilitate investment in value addition and manufacturing of Prunus bark based products in Kenya for local consumption and export.

## CONCLUSION

The Prunus bark trade and associated activities can generate incomes in excess of Kshs 3 billion(\$35 million) to the country's economy annually if favourable policies and legal framework is put in place to facilitate emergence of vibrant Prunus based

enterprises in the country. Thus Prunus sector provides another opportunity for the country to fully exploit its diverse environmental and forestry resources in line with its Vision 2030.

#### REFERENCES

Cheboiwo, J.K.; Mugabe, R.O. 2010. Review of Potential trade in *Prunus africana* bark in Kenya : A look at production, market chain players and export opportunities, Proceedings of FOREAIM Conference on forest restoration of Afromontane forests in East and Central Africa and Indian Ocean Islands, Kampala, Uganda, 20-25th April 2010.

Cunningham, A.B; Mbenkum F.T. 1993. Sustainability of harvesting *Prunus africana* bark in Cameroun. African Medicinal Plants in international trade. People and Plants Working Paper, 2. UNESCO, Paris.

Cunningham, M.; Cunningham A.B; Schippmann U. 1997. Trade in *Prunus Africana* and the implementation of CITES. German Federal Agency for Nature Conservation, Bonn, Germany. 52pp

Dawson, I, Were, J and Lengkeek, A.(2000). Conservation of *Prunus africana*, an over exploited African Medicinal Tree. Forest Genetics Resources No. 28

Eben Ebai, S.Ewusi; B.N. Asanga, C.A.;Nkongo, J.B.N. 1992. An Evaluation of the quantity and distribution of *Pygeum africanum* on the slopes of Mt Cameroun. Divisional Service of Forestry, Limbe, Cameroun.

Gachie, P.K., Koech, E.K. Njunge, J.T. Simons, A.J. and Ndalut P.K. 2014. Medicinal Tree Domestication Potentials and Challenges: A case study of *Prunus africana* in western Kenya MSc. Thesis, Moi, University, Eldoret, Kenya.

HerbalGram, 1998. The Journal of the American Botanical Council, Issue: 43 49-53pp

Kalkman, C. 1965. The Old World species of *Prunus* sub-genus *Laurocerasus*. *Blumea*, 13 (1), 33 - 35.

Ndam, N.1998. The regeneration, vegetation dynamics and the maintenance of biodiversity on Mount Cameroon: The relative impacts of the natural and human disturbance. Ph.D. Thesis, University of Wales Bangor, UK.

Schippmann, U. (2001). Medicinal plants significant trade. CITES Project S - 109, Plants

Vivien, J.; Faure, J.J. 1985. Arbes des forets denses d'Afrique in *Pygeum africanum*. Paris, Agency de Cooperat Culturele et Technque.