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## Management of Néré (*Parkia biglobosa*) in farmers' fields in Burkina Faso (West Africa)

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### Introduction

*Parkia biglobosa* (Fabaceae-Mimosoideae) is one of the most important and widespread trees in agroforestry systems from Senegal to Uganda. The National Tree Seed Center (CNSF) of Burkina Faso has developed a breeding and improvement program for this multipurpose tree. To better conserve and promote the best reproductive materials for domestication, it is important to understand how farmers perceive and manage the species in their fields. Farmers appear to have an active role in shaping tree species diversity and richness, affecting also the overall spatial distribution, density, and structure of tree populations. We examined some choices made by farmers with regard to species and individuals to be maintained, and practices used to conserve trees.

### Material and Methods

To understand farmers' tree management practices in their fields, particularly with regards to *P. biglobosa*, a survey was conducted in Neboun and Cassou, two villages located in southern Burkina Faso. A total of 150 people representing a balanced sample categorized by gender, ethnic group and status of residence, were interviewed in the 2 villages (Table 1).

Table 1. Composition of the sample of villagers interviewed

a) Ethnicity	Total
Mossi	66
Nouni	76
Peulh	6
Wala	2
<b>Total</b>	<b>150</b>

b) Gender	Total
F	78
M	72
<b>Total</b>	<b>150</b>

c) Status of residence	Total
Native	77
Migrant	73
<b>Total</b>	<b>150</b>

d)	Cassou	Neboun	Total
Native	52	25	77
Migrant	37	36	73
<b>Total</b>	<b>89</b>	<b>61</b>	<b>150</b>

e)	Mossi	Nouni	Peulh	Wala	Total
Native	2	73	0	2	77
Migrant	64	3	6	0	73
<b>Total</b>	<b>66</b>	<b>76</b>	<b>6</b>	<b>2</b>	<b>150</b>

f)	F	M	Total
Native	41	36	77
Migrant	37	36	73
<b>Total</b>	<b>78</b>	<b>72</b>	<b>150</b>

g)	Native	Migrant	Total
Agropastoralist	0	4	4
Farmers	77	69	146
Pastoralist	0	1	1
<b>Total</b>	<b>77</b>	<b>74</b>	<b>147</b>

Characterization by a) ethnicity, b) gender, c) status of residence, d) status of residence and village, e) status of residence and ethnicity, f) status of residence and gender, g) status of residence and livelihood.

## Results and Discussion

### Trees spared when land is cleared for agriculture

A total of eight tree species were mentioned by at least 5% of the farmers interviewed, as being spared during clearing (Table 2). Between 99% and 100% of farmers left standing *Vitellaria paradoxa* and *P. biglobosa* trees during land clearing for agriculture. These two species are protected by law and cannot be removed when the vegetation is cleared to make space for crops.

Table 2. List of tree species reported by more than 4% of villagers as being spared when they clear the land for agriculture

Tree species	Farmers (%)
<i>V. paradoxa</i>	100
<i>P. biglobosa</i>	99
<i>Bombax costatum</i>	25
<i>Tamarindus indica</i>	25
<i>Azelia africana</i> , <i>Lannea microcarpa</i>	12
<i>Detarium microcarpum</i>	10
<i>Adansonia digitata</i>	6

### Trees most planted by farmers, and their uses

More than 40% of farmers reported planting *P. biglobosa*. It was the most frequently planted of native species, behind only mango and cashew, which were planted by more than half of farmers. Farmers prefer multipurpose species. *P. biglobosa* is used for medicine, commercial purposes, and food (human consumption) (Table 3). The seeds and pulp are the most used parts for commercial purposes either directly or processed into other products. Multiple tree species are commonly combined.

Table 3. Tree species most planted by >5% of the villagers, their main uses and their combinations

Tree species	a	b	c	d	e	f	g	h	Most frequent combinations (% respondents)
<i>Mangifera indica</i>	2	53	91	3	1	0	0	0	b,c (52)
<i>Anacardium occidentale</i>	0	84	86	0	1	0	0	0	b,c (66)
<i>P. biglobosa</i>	43	75	80	0	1	2	0	1	a,b,c (41)
<i>Moringa oleifera</i>	2	27	33	0	0	0	0	0	b,c (27)
<i>A. digitata</i>	0	11	13	0	0	0	0	1	b,c (11)
<i>Eucalyptus camaldulensis</i>	2	12	0	0	0	0	7	1	b,g (5)
<i>Jatropha curcas</i>	0	14	0	0	0	0	0	8	b,h (8)
<i>Carica papaya</i>	1	1	8	0	0	0	0	0	c (6)

a = Medicinal use, b = Commercial use, c= food, human consumption, d = shade, e = conservation, ecological function, f=forage, animal consumption, g= wood, h=ornamental, hedgerow, windbreak, biodiversity.

Migrant villagers were significantly less likely to plant trees in their fields than native villagers, probably due to their different access rights to the land and the trees. Native inherit land and have almost all the rights as migrants who land are generally loaned does not have the right to plant trees. The choice of species planted was also influenced by status of residence.

### Perception of benefits from planting *P. biglobosa*

The most important benefits from planting *P. biglobosa*, according to the villagers, is their consumption of “soubala”, a condiment made from the fermented seeds of *P. biglobosa*, and of the pulp. (Figure 1). The most important products and benefits of tree planting differed by gender. Women named food products, income generation and medicinal uses; male farmers indicated a greater number of expected benefits from tree planting like consumption of “soubala” and pulp, sale of seeds, sale of pulp, sale of “soubala”, forage and shade....

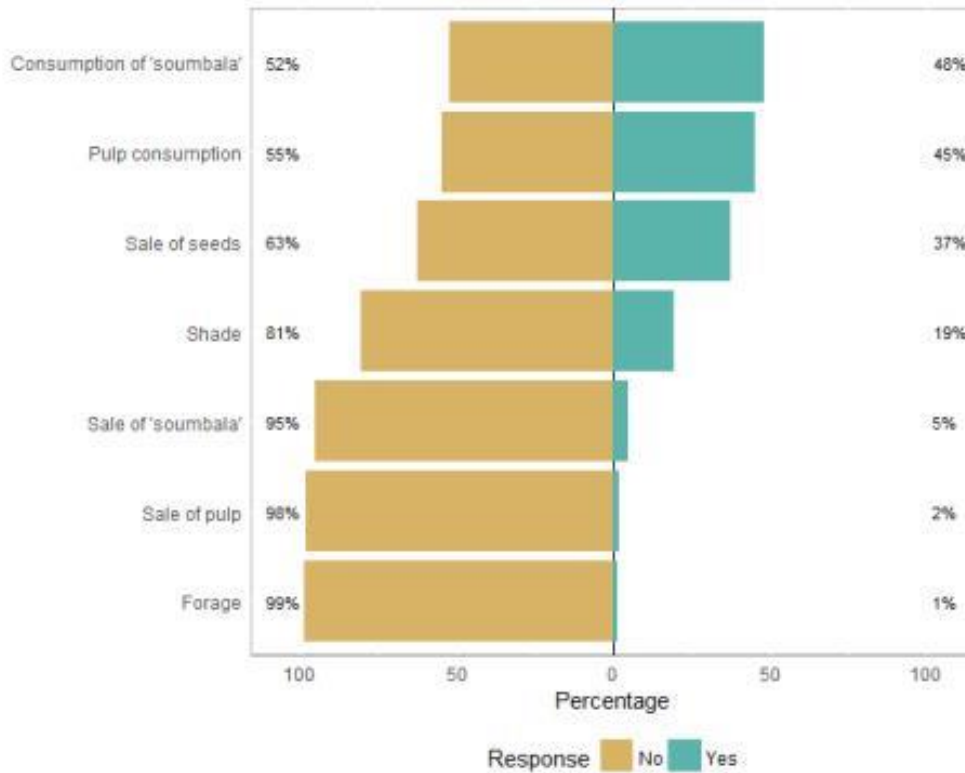


Figure 1. Perception of benefits from planting *P. biglobosa*



Photo 1. "Soubala" a condiment made with *P. biglobosa* seeds (Photo by Guibien Cléophas ZERBO)

### Management by women and men of trees in farmers' fields

Women are most involved in tending trees that are spared or planted in farmers' fields, mainly by: a) protecting seedlings with mechanical barriers; b) watering and c) weeding. Men are involved less in these tasks, but carry out a wider range of activities to favour the establishment of trees on farms (Figure 2). Men are more likely than women to think that trees on farms have negative effects (primarily through competition with crops).

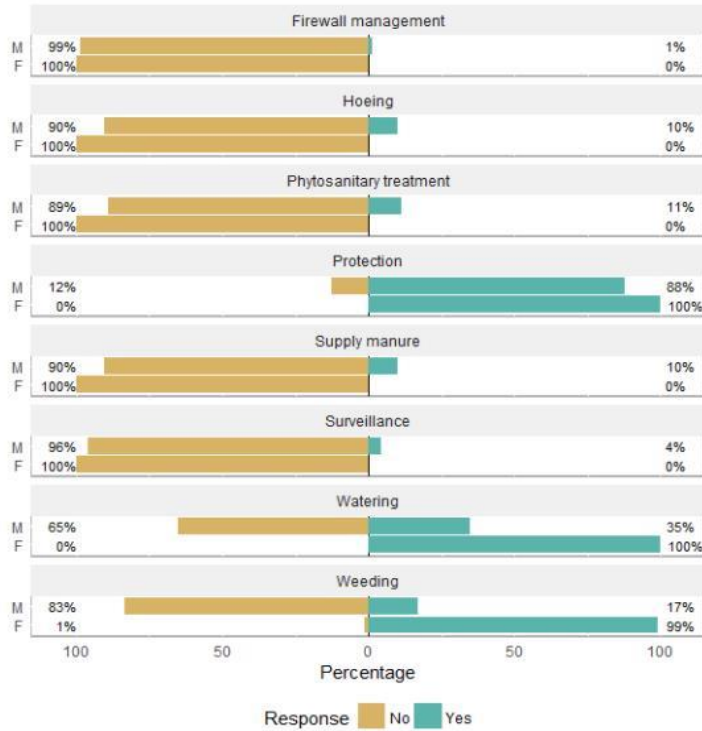


Figure 2. Proportions of female and male farmers implementing each of the tree management practices



Photo 2. A small physical barrier of dead branches has been positioned all around a seedling of *P. biglobosa* to protect it (Photo by Guibien Cléophas ZERBO)

### How do farmers choose a plus tree of *P. biglobosa*?

Farmers identify superior individual trees through a combination of traits, some considered more important than others. In the case of *P. biglobosa*, farmers tend to most value characteristics of the fruit (pods), such as size and timing of fructification, pulp taste and seed size, together with the general health of the plant (Table 4).

Table 4. Criteria used by farmers to identify a plus tree of *P. biglobosa*

Traits	Farmers (%)
High fruit production	90
Pulp taste	81
Large seed size	79
Health status	65
Early fruit production	45

### Conclusions and Outlook

*P. biglobosa* is highly appreciated by farmers. It is retained in farmers' fields when they are cleared for agriculture, mainly because this is required by legislation to favour its conservation; but *P. biglobosa* is also actively planted. It is the indigenous species most desired and planted by farmers in the sites investigated. Seeds (in the form of the fermented sauce 'soubala') and pulp consumption are the primary reasons the species is valued. Farmers have well defined criteria to identify 'plus' trees from which to obtain reproductive material. Status of residence and gender are key variables that affect the management of *P. biglobosa*. Farmers' perceptions should be considered together with morphological and molecular variables while designing a strategy to conserve the genetic resources of this species.