



## Intersecting and dynamic gender rights to néré, a food tree species in Burkina Faso



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### ABSTRACT

This study examines women's bundles of rights to exploit the pods of a valuable food-tree species in Burkina Faso, *Parkia biglobosa*, locally known as néré. In West Africa, néré pods have traditionally been collected and processed by women and sold as *soumbala*, a highly-valued condiment. Given its value to local livelihoods, néré is a prized tree that is subject to a particular tenure regime. This study investigates the social factors that define women's harvesting rights to néré pods in the centre-west region of Burkina Faso through the lens of intersectionality. Whereas customary land tenure in Burkina Faso grants men primary ownership and use rights to land, different groups of women are entitled to harvest food-tree products such as néré pods, in defined spaces. This study shows how women, who are usually presented as a homogeneous group in terms of rights, are socially differentiated on the basis of several factors, such as residence status, ethnicity and seniority within their lineage. This differentiation shapes the nested bundles of rights held by different groups of women on different land types. Amid broad-ranging demographic, market, and environmental changes, rights to exploit néré pods are shifting and contested, and insecurity of rights challenges the sustainability and equitability of néré harvesting.

### 1. Introduction

A common feature of rural African landscapes is a spatial distribution of land uses and plant species that reflects gender relations. Landscapes like the agroforestry parklands in West Africa reflect not only natural tree regeneration patterns, but also the management practices of both female and male farmers (Elias, 2015). Furthermore, some areas are characterized by agricultural production systems strongly associated with either women or men (Howard and Nabanoga, 2007; Sachs, 2018) and gender norms shape which crops or phases of the cropping cycle are under men's or women's responsibility. In fact, in several African cultures, certain crops are linguistically classified as 'feminine' or 'masculine' (Alesina et al., 2013; Sillitoe, 2003).

Access to, and use of, natural resources typically reveal gender differences (Bandiaky and Tian, 2010; Brown and Lapuyade, 2001a; Gurung and Quesada, 2009; Mwangi et al., 2011). In West Africa, under customary tenure arrangements, women have the right to cultivate land, but this land remains under the control of male elders (McAuslan, 2003; Stevenson, 2005). Rights to land, and the resources it bears, typically depend on a woman's marital status. According to Kevane and Gray (1999), such rights often cease in instances of divorce, widowhood

or failure to produce a male heir. Women's rights to land are all the more challenged when resources become scarce, or in a context of expanding markets for useable land (Rao, 2007; Yoda, 2009).

Rights to trees on those lands may follow altogether different patterns. Some scholars argue that women generally do not plant trees or tree crops because this is understood to confer long-term and secure rights to land, which are not granted to women. In Burkina Faso, where this study has been undertaken, local customs deny women across ethnic groups direct access to land, but women often have considerable 'indirect' land rights, in particular through marriage (Amadiume, 2015; Kevane and Gray, 1999; Paré, 2010; Weideler, 1973).

Although several studies address gender inequalities in customary tenure regimes, further analytical refinements are needed to improve our understanding of such systems. For one, the tenure issue is often framed in binary terms: as a contestation between men and women, or a dichotomy between formal and customary rights (Krishnaraj and Kay, 2002). Moreover, few authors have delved into the social dynamics underpinning tree tenure, although these represent an inextricable part of the broader issue of land tenure; and when analyzing rights to trees, few studies consider differences among women and their negotiation around resource access.

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The case study we present explores these aspects with a particular focus on the African locust bean tree (*Parkia biglobosa*), called *néré* in Burkina Faso. For rural and urban populations in the Sudanian and Sahelian regions of Burkina Faso and across West Africa, *néré* plays a significant role in the diet. The most valuable part of the tree is its pod, whose pulp and seeds are used to prepare a nutritious condiment (*soumbala*) used as a flavoring agent in grain-based recipes. Women are the main harvesters of *néré* pods, from which they derive income (through the sale of *soumbala*) and a nutritious ingredient to feed their families (Andersen et al., 2013; Kronborg et al., 2013; Sabiiti and Cobbina, 1992).

*Néré* also plays an important role in women's income-generation activities. According to FAO (2012), the market for *néré* products is booming and very lucrative. This is a function of increased demand for, and lower production of *néré*. In Burkina Faso, the sale of *néré* products annually generates US\$270 for a rural household, representing the price of seeds from 20 trees (Bonkougou, 2002), while the *soumbala* business generates an average of US\$8.3 million for the national economy (Nikiema et al., 2005). Rural women derive one third of their income from the sale of *néré* products (Lamien and Vognan, 2001). *Soumbala* retains a strong market share due to its key role in traditional dishes, although competing products are consumed as substitutes. In the late 1990s, Boffa (1999) reported a very high consumption of fermented *néré* seeds in Benin, Togo and Burkina Faso, with 50–100% of the population consuming *soumbala* on a daily basis. More recent investigations indicate that edible *néré* products are consumed by approximately 70% of rural households during the lean season in Burkina Faso (Vinceti et al., 2018) and that *néré* is sold less than other NTFPs during periods of food shortage, when it is kept for home consumption (Koffi et al., 2017).

Concurrently, however, the occurrence of *néré*, like other food tree species, is declining in some parts of the country, and the species' populations are ageing. Natural regeneration of *néré* is very low in West African parklands, where crops and trees grow together on cultivated fields. For instance, in Northern Ghana, Poudyal (2011) noted that only 5% of households have more than two young *néré* trees per hectare in their fields. Several studies attribute such a lack of regeneration of food trees to disincentives to plant trees created by ambiguities in tenure regimes (McDermott and Schreckenber, 2009; Otsuka and Place, 2014). Others, however, call for a more differentiated analysis of farmers' decisions and conservation practices, and more generally of the complex linkages between tree density, agricultural intensification, and evolving local institutions (Brottem, 2011; Binam et al., 2017; Gray and Kevane, 2001; Moreda, 2018). The selective protection or planting of particular tree species in farmed parklands is driven not only by economic concerns but also by context-specific institutional and socio-political factors (Poudyal, 2011).

There is a dearth of data on how the *néré* market affects collection patterns in Burkina Faso, yet findings for similar locally valued NTFPs, such as shea (*Vitellaria paradoxa*) butter and nuts (Elias and Carney, 2007), as well as observational data (authors' data, unpublished), suggest that rising market demand increases competition among women collectors. This competition is accentuated by the low current availability of *néré*, which causes collectors increasing difficulties in obtaining seeds for consumption or sale throughout the year (Leßmeister et al., 2015; Tomomatsu, 2014). As a result, *néré* pods are often harvested before they are fully mature (Tomomatsu, 2014), despite the known negative consequences this practice carries for the quality of fermented seeds (Mette Kronborg et al., 2014). In addition, due to the scarcity of *néré* seeds, *soumbala* is being substituted by other, less appreciated, condiments in local diets (Leßmeister et al., 2015; Tomomatsu, 2014). Moreover, changing market demand and the growing pressure on *néré* resources are changing consumption patterns. A survey conducted in Burkina Faso shows that, as noted above, women are substituting *néré* seeds primarily with smoked fish, and 'Maggi cubes' (28% and 21% of respondents, respectively; Heubach et al.,

2016). In other studies in the region, farmers were growing soybeans, as a substitute for the increasingly rare *néré* seeds (Cooper and West, 2017).

Focusing on this high-value tree species, this study demonstrates how social factors interact to shape women's differentiated rights to tree resources. We begin by reviewing gendered access to land and trees in Burkina Faso, before presenting the methodology used in this study. We highlight the spatial dynamics of women's access rights to *néré*, and illustrate how women's access to land and *néré* trees is influenced by residence status, ethnicity, seniority and marital status within the lineage. We show that women with limited rights to *néré* do not passively accept this status, but pursue several strategies to overcome this exclusion. Finally, we argue that spatially overlapping land rights, linked to emerging markets for land and the erosion of traditional tenure regimes, expose certain groups of women to insecure rights to harvest *néré*, and have impacts on the sustainability and management of *néré* trees in the region. In this way, we expand upon the scarce literature examining the link between land and tree security and sustainable management of agroforestry parklands in West Africa (Etongo et al., 2018a).

## 2. Conceptualizing gendered access to land and trees in Burkina Faso

Significant international efforts to address women's rights in development policies are reflected in treaties addressing human and women's rights (e.g. the Convention on the Elimination of All Forms of Discrimination against Women) and in a number of environmental and sustainable development instruments (e.g. the United Nations Convention to Combat Desertification, the United Nations Convention on Biological Diversity). Since 2005, Burkina Faso, which is a signatory to these treaties and conventions, has been engaged in progressively defining more secure land tenure for its rural populations generally, and for rural women specifically. The Law on Agrarian and Land Reorganization (RAF) of 1996 indicated that the land belongs to the State, which regulates its access. The subsequent National Rural Land Tenure Security Policy (PNSFMR), adopted in 2007, among other things stipulated equal right of men and women to access land. In 2009, a Rural Land Law (Loi N°034-2009/AN Portant Régime Foncier Rural) to ensure equitable access to land for all actors in the rural world including families, individuals and agribusiness men has been adopted. This law further promotes more secure land tenure for poor small-holders and favors women's access to land. In particular, Articles 75 and 76 allow for the transfer of state-owned and community land to vulnerable groups, such as women and young people. In addition, it gives women rights to plots in irrigation schemes.

Despite this progress in land tenure policies, women's land rights remain strongly constrained. The Rural Land Law 034-2009 is little known by local actors, and its implementation does not always meet the needs of specific groups, such as migrants, pastoralists and women. Moreover, the procedures for obtaining Rural Land Ownership Certificates (Attestation de Possession Foncière Rurale (APFR) are unaffordable to vulnerable groups (Karambiri, 2018; Koala, 2017; Nana, 2018). There have been very few attempts to put the Rural Land Law 034-2009 into practice, and these remain in an experimental phase within development programs (Koala, 2017; Koudougou et al., 2017) that depend mainly on increasingly scarce donor funding (Delville and Thiéba, 2015). Pilot experiences of issuing Rural Land Ownership Certificates (APFR) were carried out in 47 communes by the Millennium Challenge Account (MCA), however, out of 202 APFRs, only 11 were granted to women (WorldBank, 2014). In practice, customary tenure systems are therefore still the main institutions regulating women's rights to land and trees; but they pose critical constraints on women's access to land and livelihoods (Razavi, 2007). In patrilineal customary regimes, which dominate in Burkina Faso and elsewhere in Africa, women's land rights are mediated by the male head of the

household (i.e. husband, father if unmarried, or uncle) or by male elders in their lineage (Chikoko, 2002; Kiptot and Franzel, 2011). As such, rural Burkinabè women generally do not own land and cannot inherit land belonging to their native family or husband, and they continue to exploit much smaller land plots than their male counterparts (1 ha versus 3 ha on average, respectively) (Ouédraogo et al., 2005).

Access to land and its transmission depend on the region and on diverse and shifting cultural norms. For example, among Burkinabè ethnic groups where decisions are made by lineage elders (such as the Bwa and Gourounsi), ancestral land used to be transmitted according to an adelphic mode of succession (i.e. from one elder to another in the lineage). This tendency has now changed, with transmission occurring from father to son. However, land inheritance rights for women have not changed substantially over time, and most women do not inherit land.

In rural West Africa, it is common to find a separate tenure regime for land and trees. According to Kiptot and Franzel (2011), tree tenure concerns the right to own and use trees. Modern formal, legislative frameworks do not include explicit reference to tree tenure, which is usually assumed to be comprised in statutory land rights (Ouoba, 2010). Likewise, customary rights to trees are little studied given the frequent assumption that tree tenure coincides with land tenure (Howard and Nabanoga, 2007; Oguamanam, 2003; Sikor, 2006).

Like land tenure, access to and control over trees are extremely complex. Gender influences rights to plant, harvest and fell a tree (Gray and Kevane, 1999). Tree tenure can vary across tree species, especially when these have a high value, as in the case of *néré*. For a given tree species, tenure rights may vary across time, space and among ethnic groups. Native species, which often grow spontaneously, are treated differently than planted trees. Various parts of a tree and the benefits from their harvest, sale or utilization may entail different ownership and use rights between men and women and between different other social groups (Butterworth et al., 2005; Fischer and Vasseur, 2002).

Moreover, several individuals may hold use rights to the same tree, producing a 'stratification of rights' (Mansourian and Vallauri, 2005; Osborn, 1989). Access to a tree and its products usually depends on the relationship between the user and the owner of the resource, and it is negotiated among them (Bruce, 1990; Plummer and Fitzgibbon, 2004). These relationships are dynamic and subject to change, for example as a result of the adoption of "survival" strategies in response to drastic social-political changes. They are also evolving in response to both external and internal changes (Tomomatsu, 2014).

Coulibaly-Lingani et al. (2009) demonstrate that gender differences in access to forest tree resources may depend on the nature of the resource utilized, which influences, for example, the physical strength required to extract a given product (e.g., wood cutting for fuel wood sale). Due to their limited access to land to grow cash crops, rural women in West Africa are heavily dependent on non-timber forest products (NTFPs) as an income source and as a form of social security (Brown and Lapuyade, 2001b; Dayamba et al., 2016; Lemenih et al., 2003; Rousseau et al., 2015; Schreckenberget al., 2006; Shackleton et al., 2008). Labor constraints further contribute to women's reliance on harvesting NTFPs that are 'spontaneously' occurring rather than cultivated, and which require less labor to acquire.

In Africa, the collection and use of NTFPs for food, fuel, and other purposes are primarily a woman's responsibility (Neumann and Hirsch, 2000; Shackleton et al., 2011; Sunderland et al., 2014), although African men also collect NTFPs (Sunderland et al., 2004). The high demand for NTFPs in general, and for *néré* and shea tree products in particular, increases pressures on the species' populations (Thiombiano et al., 2013; Wezel and Lykke, 2006). This has an influence on women's harvesting behavior, and can lead to men's interest in entering lucrative sectors previously dominated by women (Chalfin, 2004; Cunningham, 2014). Nevertheless, women remain the ones predominantly involved in harvesting, processing, and selling the products of the *néré* tree, as

well as the shea tree (*Vitellaria paradoxa*), whose nuts they transform into butter for consumption or sale. They represent more than 70% of the sellers in the urban markets and 90% in the rural markets (Nikiema et al., 2005). In the West African savanna, the two 'sister' species are found in forest, bush, fields, and fallows, providing food directly in the form of fruit, pulp, seeds and other edible parts (Teklehaimanot, 2004).

Negotiations based on unequal power relations within a household shape access to and distribution of resources at the household level (Kevane and Gray, 1999) as well as the time women and men dedicate to collecting tree resources relative to conducting other farm duties (Leach et al., 1999). Those gendered arrangements are constantly renegotiated in rural areas that experience rapid political-economic transformations (Ravera et al., 2016).

Within gender groups, too, social differentiation on the basis of ethnicity, generation, status of residence and other factors shape women's access rights and capacity to use a resource and take management decisions (Ang, 2003; Brockhaus et al., 2013; Djoudi and Brockhaus, 2011). Hence, as we demonstrate below, conceptualizing women as a single and homogeneous group leads to neglecting the specific constraints that different groups of women face in accessing and using tree resources.

### 3. Study sites and methodological approach

#### 3.1. Study sites

This study was carried out in three villages in the centre-west region of Burkina Faso: Kassolo and Pien (Ziro province) and Nebou (Sissili province) (Fig. 1). The villages are characterized by a high level of immigration and differ with regard to remoteness of their location and proportional representation of different ethnic groups among their inhabitants. The main ethnic groups in the study sites are Nouni, Mossé and Fulani. The Nouni (also called Gourounsi) are considered the original inhabitants of the region (Lankoande, 2004). They are custodians of the land and responsible for related customs and rituals, whose practice rests with the village chief (Nouni: *Pio*) and the land chief or earth priest (Nouni: *Tiatu*).<sup>1</sup> The village chief represents the supreme authority in charge of political issues, whereas the earth priest is related to the first occupant of the area, being his eldest living male descendant, and maintains links to the spirits of the earth and the ancestors. He is responsible for religious matters (rituals and sacrifices) and provides authorization to new settlers to begin farming a piece of land. He may delegate decisions about the land to the village chief.

Despite their status as autochthones, in 2010 the Nouni constituted less than 50% of the population in the study area (Direction Générale de l'aménagement du territoire du Burkina Faso, 2010). Mossé and Fulani migrants moved into the area in successive waves over the past four decades, such that by 2010, these groups represented 50–90% of the population, depending on the village, with a predominance of Mossé inhabitants. Whereas the Nouni and Mossé are farmers who harvest *néré* products, the Fulani are traditionally nomadic and semi-nomadic herders who have become sedentarized and now cultivate the land and harvest *néré* products in addition to their livestock raising activities.

We refer to residence status in this paper as the status a household acquires at local level in relation to its migration history. On this basis, we recognize different types of households: 1) Nouni descendants of the founding lineage (autochthones), 2) first-wave Mossé or Fulani migrants, who arrived in the area before 1980<sup>2</sup> and their descendants, and

<sup>1</sup> Nouni is the language spoken by the Nouni, whereas Mooré is the language of the Mossé.

<sup>2</sup> This wave of migration is related to two events: a) the Sahel drought (1970s–1980), with farmers leaving the dry northern areas to the less affected South (Ouedraogo et al., 2010), b) state policy to promote the cotton sector (Bonnassieux, 2002).

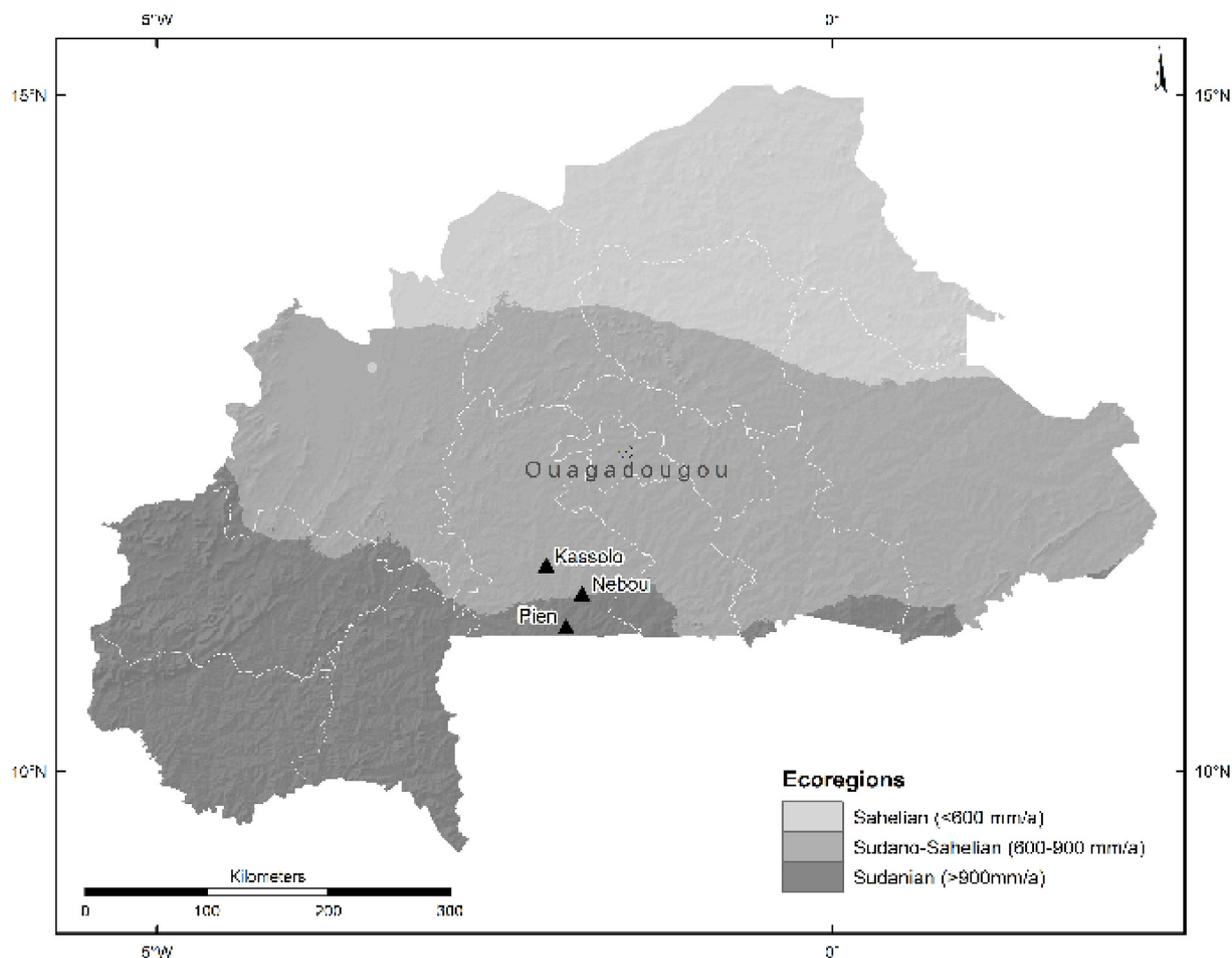


Fig. 1. Location of the study sites. Source: adapted from Fischer et al. (2011) and Somé et al. (2013).

3) recent Mossé or Fulani migrants, who mainly arrived in the area in the late 1990s,<sup>3</sup> and their descendants. The village of Kassolo has a very strong presence of Mossé and Fulani inhabitants, who are mainly descendants from the first wave of migrants. These migrants are well integrated among the Nouni; they are members of local councils and have relatively secure land ownership. Some have also inter-married with co-resident ethnic groups. The village of Pien has a large migrant population, which arrived more recently in the area, with second-wave migrants. The level of integration in the village is low, and secure rights to land are reserved to the Nouni. Nebou is inhabited by several generations of migrants. The latest arrivals (late 1990s) have rented their land from the Nouni and some have progressively managed to purchase it under the above mentioned law (Law 034-2009).

The study sites are located in the Sudanian ecoregion and in the transition zone to the Sahelian ecoregion, with annual rainfall between 800 mm and 1100 mm (from June to September) (Fig. 1). The vegetation is characterized by savannah with scattered trees growing in traditional agroforestry systems (parklands). Néré is found in cultivated fields and fallow lands, together with other important agroforestry species such as *Vitellaria paradoxa* (shea tree), *Lannea microcarpa* (wild grape) and *Tamarindus indica* (tamarind).

Néré occurs in a range of natural and semi-natural ecosystems, from

<sup>3</sup> This second wave of migration was induced through: a) state policy promoting “new actors” in the agricultural sector by inciting agricultural migration and agribusiness (Zongo, 2010), b) the political crisis in Côte d’Ivoire in the 2000s that amplified migration to Sissili and Ziro provinces among Burkinabè returnees who had been working in Ivorian plantations (Ouedraogo et al., 2010).

5°N to 15°N and 16°W to 32°E (Hopkins and White, 1984). Its density is higher in the southern part of Burkina Faso and diminishes with increasing latitude. Although the species can withstand drought due to its deep root system and its capacity to limit transpiration, its optimal growth conditions are in areas with annual rainfall of 600–1200 mm. Its presence is greater in anthropic environments, such as fallows and farmlands, where cultivation is semi-permanent and scattered trees form an open upper layer.

Néré trees begin producing pods annually starting at 5–7 years of age, between the months of March and July. Based on the assessment of village elders, néré individuals are considered ageing when they reach 50–60 years. In the study sites, the species’ average population density is around 5–10 individuals per hectare (Ouedraogo, 1995), with individuals between adult and ageing stages.

### 3.2. Conceptual approach

Intersectionality refers to how different axes of social differentiation, such as gender, seniority and residence status, intersect to create overlapping and interdependent systems of disadvantage (or conversely, advantage) (Crenshaw, 1989). In our study, we adopt an intersectional approach (Djouidi et al., 2016) and draw on Rocheleau and Edmunds (1997) nested rights and gendered spaces framework to analyze the ways gender, residence status, marital status, ethnicity and social seniority interact to shape rights over néré trees in Burkina Faso. We examine the bundle of rights to néré in a context where rights to harvest products from trees are not systematically attributed and user groups are not stable. Distinctions exist between rights to the land on which trees grow, rights to a tree (néré) and to its harvestable products

(pods).

Based on existing frameworks in the tenure literature (Meinzen-Dick et al., 2017; Schlager and Ostrom, 1992), we refer to access rights to land, which are regulated to varying degrees by customary and formal rules, as the rights to enter a defined physical property. *Harvesting* rights refer to the right to remove and gather products (e.g. *nééré* pods) from the property, whereas *management* rights refer to the rights to change the structure and composition of the property (cutting, planting, etc.), *exclusion* rights refer to the authority to keep others off the property, and *alienation* rights refer to the authority to transfer property rights to others through sale, bequest, or gift.

### 3.3. Data collection and analysis

Using qualitative and quantitative tools, we gathered primary data regarding the use and the management of *nééré* parklands, including *nééré* trees and their products (*nééré* pods). In total, 180 women across the three study villages participated in the research (60 per village). A list of adult women from each village was stratified based on ethnicity and residence status. Participants from each of the three resident ethnic groups were randomly selected. The number of participants from each ethnic group reflected the relative representation of each group across the villages investigated. Hence, 62 Nouni, 81 Mossé and 37 Fulani women—representing 34%, 45%, and 21% of the total sample, respectively—participated in the study. Each participant came from a different household.

The first author resided in the selected villages during April and May 2013 (*nééré* harvesting season) to observe the harvesting decisions and behavior of women participants. She accompanied each participant on their *nééré* pod collection trips, during which observations and detailed notes on collection patterns were taken. For each tree harvested, specific questions about rights to that tree were posed to construct a granular and precise picture of each woman's 'bundle of rights'.<sup>4</sup>

The information obtained was coupled with data collected from the same sample of women participants, through semi-structured interviews. In a small subset of women participants' households, other women household members, aged 55 and over, participated in life history interviews to describe the evolution of access rights over time and changes in *nééré* collection patterns and practices. Six elder women were thus interviewed. Additionally, semi-structured interviews were carried out with traditional (male) authorities and local representatives of administrative institutions (e.g. local elected officials, the head of the local Development and Environment Committee), as well as technical staff from the State Forest Service.

## 4. Results

### 4.1. Spatial dynamics of access to *nééré*

Our findings reveal a diversity of rights to land, trees and their products in the mosaic landscapes of Burkina Faso's Ziro and Sissili provinces. Women harvest *nééré* pods in three types of spaces: *croplands and parklands* (cultivated fields with scattered trees, mostly *nééré* and shea), *fallows* (former fields temporarily left uncultivated to restore soil fertility), and *woodlands*.

Different authorities and institutions regulate access to these three types of lands and to *nééré* pods. In each type, rights are not well defined and depend on various factors, mainly residence status, which coincides

<sup>4</sup> A pilot testing of traditional survey techniques (using questionnaires) and focus group discussions revealed the difficulties of using these methods to investigate a subject as complex, sensitive, and subtle as tree access rights. This prompted the use of additional qualitative methods, such as observation of dynamics on the ground and informal conversational interviews, to triangulate the information acquired.

with ethnicity. The Nouni are considered autochthonous in the region, while the Mossé and Peuhl are considered migrants even after years of settlement (as detailed in section 3.1 above). Within the same modality of land acquisition, there are temporal differences. Moreover, amid new modes of land acquisition (i.e., purchases), negotiations over tree products take place, with grey zones emerging when novel situations are not properly accounted for in customary rules. We distinguish four land access regimes, each affecting different groups of *nééré* harvesters:

#### a) Land under the authority of the household head or lineage

In our study, this type of land represented 42% of the area where pods were harvested. It includes farmlands belonging to the household, fallows and small plots that women farm, but not woodland. In this land type, rights to *nééré* pods are restricted to Nouni lineages. Multiple lineages occupy this land, which is increasingly assigned to individual households. Women have harvesting rights for *nééré* pods on their husband's fields, but these may be weakened when croplands are converted to fallow, as customary owners retain less control over fallow than over croplands. In addition, Nouni fallow fields can be loaned, rented to another party, or sold; therefore access rights to the land and *nééré* pods for the original holder are limited.

#### b) Land borrowed or rented, under sharecropping arrangements

This type of land is regulated based on arrangement between migrants and autochthones. Migrant Mossé and Fulani borrow land from Nouni heads of households or lineages, causing overlapping rights over the same land and to the trees on it. Access, management, exclusion and alienation rights remain with the lending Nouni head of household. Pod harvesting rights are subject to more complex regulations and shared between Nouni and migrants depending on timing of the harvest and the age of trees. Harvesting rights to trees already present on the land at the time of the loan remain with the wife of the lending Nouni household head, while the borrower acquires harvesting rights over trees that are established on the land after the loan. The wife of the lending Nouni household head can decide whom to invite to harvest and share the pods harvested.

Older Mossé and Fulani women who came with the first wave of migration, as well as their daughters-in-law, share or negotiate harvesting of *nééré* pods with Nouni women from lending households. Mossé women face limitations in exploiting *nééré* pods, however. The harvesting right is held by their husbands, who give them permission to harvest (as explained in the section: 4.2.1). In addition, they are entitled to use only the pulp of *nééré*, while its more valuable seeds belong to their husbands. Fulani women are not subject to the same customary rules as their Mossé counterparts. The Mossé and Fulani negotiate different arrangements with Nouni women to overcome limitations in harvesting rights. During the harvest period, Mossé and Fulani women help Nouni women to harvest trees that were already established on the land the Nouni lend to migrant households. In exchange, Mossé and Fulani women receive part of the pods harvested. They also keep illicit harvesters and birds at bay while working in those fields.

The process of negotiating harvesting rights between autochthonous and migrant women used to occur peacefully, but is increasingly confrontational. According to Mossé women, first-wave migrants used to follow customary rules regarding *nééré* harvesting, but their daughters-in-law now claim the same rights over *nééré* pods as their Nouni counterparts because their husbands, whose parents were migrants, were born in the village. Furthermore, shifts are occurring, as migrants are increasingly purchasing land, and by doing so, expecting to gain full control and rights (access, harvesting, management and alienation) over the land and all the trees it carries. However, the terms on which land is purchased or rented are generally defined only verbally, in negotiations that take place among men. When tree harvesting rights are transferred to buyers, Nouni women blame their husband for poor

negotiations.

c) Land that is returned to its owner after a loan

This type of land is lent by the Nouni to migrant households (Mossé and Fulani) and represents 46% of the area where *nééré* harvests occur. During the loan period, migrants hold management rights, but when the land is returned to its (Nouni) owners, Nouni women exploit both their old trees as well as those established during the loan period. The same rules apply when this land is successively lent to different migrant households over time.

Under these circumstances, customary rules can be ambiguous and lead to conflicts, especially when the end of a loan period coincides with the time *nééré* trees that grew during the loan period have reached maturity and begin to produce pods (at 5–7 years). Some Mossé (3% of the study participants) and Fulani (4%) women from formerly borrowing households continue to harvest these trees, but if they are found doing so, they may have their harvest confiscated by Nouni women from the landholding household.

d) Woodlands under customary leaders' authority

Woodlands include old fallows and pastures that are considered common property. These are generally described as 'bush' or forest. Nouni women rarely harvest *nééré* pods in woodlands because *nééré* trees found in those areas are less productive than those found on other types of land (i.e., fields and fallows). In addition, woodlands can be far away from their homestead, and reaching them can be time consuming. Harvesters with very limited rights to *nééré* pods are the only ones to harvest pods in these areas. This practice was reported by only a small fraction of women from migrant families (5%), as a last resort to acquire pods.

#### 4.2. Access rights at the intersection of gender, residence status, seniority, and marital status

In all the surveyed households, management, exclusion and alienation rights to land are held by men. Native Nouni households have more secure access rights to land than migrants (Mossé and Fulani). In the Nouni customary tenure system, land management, exclusion and alienation rights are under the lineage's authority. With respect to harvesting rights, women have more decision-making rights on tree products (e.g., from *nééré*, shea, baobab, etc.) than men. Each male descendant is entitled to a portion of lineage land. In contrast, according to customary practices, the male head of a migrant household can acquire access and use rights to the land by borrowing it from Nouni residents. However, as noted above, land rights are decoupled from the rights to harvest the products of valuable trees already present on the land at the time land is borrowed.

Tree ownership is in the hands of the male head of the household from the lineage that settled first in the area and is extended to all households from that lineage. The male head of the household from the lineage that settled first in the area retains all rights with respect to trees, including the right to decide to selectively protect, plant or cut individual trees.

Although trees are under the control of men, rights to harvest *nééré* products are mostly held by women. Women are the ones who organize and manage the harvest of *nééré* pods and all other activities related to their transformation and sale. Customary tenure regulations enable married women to access *nééré* trees that belong to their husbands' household or lineage. This right is acquired through marriage and denied to single women. However, the latter adopt strategies to overcome this lack of access, as discussed below (see section 4.3). Hence, women's rights to harvest *nééré* depend on their ethnic affiliation, residence status, and seniority within the village's founding lineage, when applicable. These differences broadly translate into two user rights

profiles: 1) holders of exclusive harvesting rights over *nééré* pods and 2) holders of shared harvesting rights.

##### 4.2.1. Holders of exclusive harvesting rights over *nééré* pods

Women in this group constitute a minority of participants in the study (16%). Two thirds of this group are Nouni women from households or the lineage that first settled in the area. They decide about harvest procedures and practices, and whether to include or exclude women from other groups in the harvest. These Nouni women are autochthonous and can thus make decisions about the first (and best quality) harvest of *nééré* from trees located on the lands under the authority of the household head or lineage. The other third of this group is constituted by: a) first-wave migrant women and their female descendants whose husbands have access to trees that were established in their borrowed fields during the loan period, and b) second-wave migrant women whose husbands have bought the land.

As shown above, among the Nouni, a *nééré* tree belongs either to a specific household or to a lineage. Responsibility for harvesting from these trees rests with the household's or lineage's wives. On lineage land, with its shared ownership status, the oldest wife of the lineage's head exercises *the rights to decide about the harvest* of the *nééré* trees. Lineage land includes both woodlands and household lands, such as croplands and fallows, distributed to descendants. The oldest wife is the "*wife responsible for the lineage's trees*", expected to organize the first harvest of the season among women in her lineage. To do so, she monitors the maturity of the trees and defines the starting date for the harvest with the objective to maximize the number of pods, both ripe and dry, available for collection when the harvest opens. This is done to provide all women in the lineage a chance to gather *nééré* pods. If there is insufficient competent labor available within the lineage, the wife responsible for the lineage's trees may employ the services of Mossé or Fulani harvesters, usually living in the same village, to collect pods for her (see section 3.2). There were no cases recorded in this study of Nouni women offering such services, although we observed that this did occur in Nebou.

The wife responsible for the lineage's trees only participates in the season's first harvest but grants harvesting rights to other women in the lineage for subsequent harvests, in exchange for which she receives part of their harvest (between 10 and 50%). In theory, even when the wife responsible for the lineage trees is no longer physically able to participate in the harvest due to her age, she retains her responsibility in pod management and continues to receive her share of the harvest. In practice, however, elderly women in this position progressively lose their privilege or give it away. As one such elder Nouni woman from Nebou explains: "*At my age, what can I still do with the pods? It's sufficient if my daughters-in-law prepare everything and serve me. They need the income more than I do, to cover schooling and health expenditures for my grand-children*". Where trees are owned and managed by a particular household, because they are growing on its land, the wife of the head of the household is responsible for organizing the harvest. In case of a polygamous household, it is the first wife who takes responsibility for everything related to the household's pods.

On lands belonging to or borrowed by Mossé residents, the ownership of a tree depends on the time of its establishment (see the section b under 4.1; *Land borrowed or rented, under sharecropping arrangements*). If *nééré* trees were established during the loan period, the male household head exercises *management as well as exclusion rights* over them. In these cases, he decides the date of the harvest and its organization. He grants harvesting rights to his wife or wives, and in large compounds, to his daughters-in-law. Unlike Nouni wives, who can exercise their harvesting rights over *nééré* pods without their husband's permission, Mossé women need their husband's explicit authorization to harvest pods from their trees and to extract *nééré* pulp and seeds from the pods. They are expected to give their entire harvest to their husband, who decide how much they can keep to prepare *soumbala*, and how much of this *soumbala* they should keep for home consumption versus sale. The

husband sells the unprocessed seeds, while his spouse processes the pulp and seeds allocated to *soumbala* production for home consumption and sale. Given the relatively limited size of their household land, and the small number of trees on it, Mossé women often harvest *nééré* pods outside these lands to meet the *soumbala* requirements of their family and sell some for income.

In Kassolo, a minority of Fulani herders engaged in farming small plots manage trees growing on lands they borrowed from Nouni farmers. Fulani women in our study indicated that they manage the harvest from those trees independently from their husbands, harvest *nééré* for themselves, keep the pulp for home consumption, and sell the seeds. Unlike Nouni and Mossé women, Fulani women do not produce *soumbala*, but rather sell *nééré* seeds unprocessed and purchase *soumbala* for their household's consumption.

#### 4.2.2. Holders of shared harvesting rights

Women in this group – defined as ‘*wives of the compound*’ – share their harvesting rights over pods with other wives in the same lineage or household. These ‘*wives of the compound*’ can only access *nééré* upon authorization of the ‘*holders of exclusive harvesting rights*’, described above, with whom they must share a percentage of their harvest. The ‘*wife responsible for the lineage's trees*’ grants them permission and guidance when harvesting *nééré* pods. This group of harvesters represents nearly one quarter of the women in our study, exclusively from Nouni and Mossé (first-wave migrants) ethnic groups.

#### 4.3. Strategies to overcome the lack of access to *nééré* products

The largest group of *nééré* harvesters (approximately 60% of our sample) is composed mainly by second-wave migrants (ca. two thirds Mossé and the rest Fulani), who settled in the villages more recently, in the late 1990s, and who do not have secure land rights. These more recent settlers have access to less productive and smaller plots than first-wave migrants. This is due to an increasing scarcity of land, and to more stringent conditions imposed by land owners willing to rent their land only to applicants who comply with specific conditions (e.g., willingness to provide them a fraction of their annual cereal harvest). On these borrowed and rented lands, there are only a few *nééré* trees established during the loan period, to which new settlers have very insecure rights. Nouni women from lending households are increasingly claiming access rights to these young trees due to the aging of *nééré* in their own fields and a lack of its regeneration.

There is also a small percentage of Nouni women in this group (11%) who have very limited possibilities to harvest *nééré* products. These women have weak harvesting rights to *nééré* on lands that their household have loaned, sold or rented out, in situations where informal contractual terms maintaining their access to pre-existing *nééré* trees on these lands are not respected. Harvesters in this group find alternative means of obtaining *nééré* pods to satisfy their income, and produce *soumbala* for their consumption, as detailed in the next section.

In our study sites, women who lack the right to harvest *nééré* at a desirable time in any of the contexts described above adopt up to four different strategies to acquire *nééré* pods. First, a large number of women practice precocious or **premature harvesting**, collecting *nééré* pods before those who have customary use rights over the same harvest. Most households with customary rights attempt to block this practice by watching over their trees during the day, usually with help from elders and children in the household. However, in most cases, premature harvesting takes place at night, when vigilance is lower. During the *nééré* harvest season, this is a major cause of conflicts within communities. In addition, as noted earlier, premature harvesting of the pods negatively affects the seed fermentation process and compromises the quality of *soumbala*. Yet, high market demand, even for low quality *nééré* seeds and *soumbala*, provides incentives for premature harvesting. Mature *nééré* seeds harvested later in the season are instead used for household consumption and social uses, because of their high quality

(pers. comm., Nouni participant, Nebou village).

Precocious *nééré* collection is reported across the three villages. When asked about the *nééré* harvesting period, two thirds of the women interviewed considered that, during the five years preceding this study, the harvest had begun on average 15 days earlier than in the past. Harvesters with limited or no use-rights start picking *nééré* pods on average 16 days before the traditional start date of the harvest, for a head start. In comparison, harvesters from the other two groups of rights holders begin their harvest on average 7 days earlier than the traditional harvest start date. Premature harvesting is more pronounced in Nebou (19 days), where settlers' land rights are increasingly acquired through purchase and lease, and in Pien (12 days), where second-wave migrants have more limited rights to land, than in Kassolo (2 days), where first-wave migrants now have relatively secure land rights.

A second strategy adopted is **secondary harvesting of leftover pods**. Harvesting the pods left on trees by those who carry out the first harvest, exposes harvesters to a lower risk of conflict and enables them to harvest mature pods. However, there is a risk of a meagre harvest because the pods left on the tree are out of reach of the traditional poles used for harvesting, and thus difficult to collect. Only skilled tree climbers among our study participants believed they could obtain a reasonable harvest that way.

A third strategy for securing *nééré* pods among harvesters with limited use rights is to **offer harvesting services to others**. Very few women adopt this strategy, offering labor in exchange for 10–25% of the harvest. Mainly elder Nouni women with rights to harvest *nééré* in their compound (*wives of the compound*) engaged external labor. According to elder Nouni women, younger Nouni wives (their daughters-in-law) with shared use rights without control over pods were increasingly losing or lacked the skills to climb *nééré* trees. Women who offer their harvesting services are mainly wives of second-wave Mossé or Fulani migrants from households without access rights to *nééré* trees and pods.

Finally, **harvesting in woodlands** is another common strategy to overcome the lack of harvesting rights in croplands and fallows. Woodlands, which are traditionally under the responsibility of Nouni elders, do not belong to any individual or family, but rather to all members of a village community, who are granted use rights to tree products. According to Nouni customs, *nééré* pods from trees in woodlands belong to the head of the village lineage, but out of generosity, he can grant rights to harvest pods to all Nouni and migrant women residents, without distinction.

A few Fulani and Mossé women harvest pods in woodlands, while it is rare to find Nouni women collecting in these zones, except during years of low *nééré* pod production. The yield and quality of *nééré* pods collected in woodlands tend to be low due to higher tree densities in this type of land use and consequent competition for resources between *nééré* and other tree species. However, the current decline in availability of *nééré* pods, combined with increasing harvesting pressure from a growing number of women, is generating competition among harvesters. In these circumstances, Nouni women are compelled to exploit *nééré* pods in woodlands, competing with their migrant counterparts. In these cases, Nouni women claim priority of access to pods because they are autochthonous.

## 5. Discussion

Among the villages studied, the majority of the land is under the authority of Nouni autochthones. Community forest areas are under the authority of the village chief (*chef de village*), while the rest of the village territory is divided between the various Nouni lineages. The decision of a lineage chief to lend his land to a migrant is made in consultation with the village chief, the land chief, and other lineage chiefs, even if their opinion is only advisory. In theory, no one else can allocate land to a newcomer without respecting these institutional arrangements, and doing so would put the culprit at risk of being banished

(Zongo, 2010). However, these traditional arrangements are increasingly ignored. The arrival of agribusiness entrepreneurs in the region has created new land acquisition modalities based on gift-giving and exchanges of food and money. There is leading to individual decisions about land allocation which favor agribusiness migrant farmers, and to tensions and conflicts with autochthonous groups and within autochthonous themselves.

The use of an intersectional gender framework reveals the complexity of rights to *nééré*, a valued food-tree in Burkina Faso and West Africa. Our results underscore the heterogeneity of women who harvest *nééré* pods and the inadequacy of simplistic binary thinking (*viz* men/women) to understand tenure in general and tree tenure in particular. Gender, ethnicity, residence status, and seniority within the lineage all play a role in determining control and use rights to *nééré* pods. Nouni women tend to have privileged rights over *nééré* compared to women from migrant Mossé and Fulani groups. Yet, this generalization conceals important differences among Nouni women, who belong to different lineages, which settled in the area at different times.

Women access tree products in spaces controlled by other, mainly male, members of their community, as illustrated in previous studies on tree rights (Rocheleau and Edmunds, 1997). In addition, women's rights are dynamic and change over time (Ouedraogo et al., 2010). None of the women in our study held management and alienation rights; a small proportion had exclusion rights applied only to *nééré* products and not to the land. Even Nouni women, who appear to be in a more favorable position, do not hold inalienable and unalterable rights over *nééré* pods; they may lose them or need to negotiate them in some circumstances. As highlighted by Agarwal (1994), women benefiting from a privileged social position are equally exposed to insecurity regarding their access to land and trees, and their privilege over other women is only relative. Insecurity emerges especially when land is transferred from one household to another, usually at the start of a fallow period.

Harvesting rights over tree products from land that is subject to overlapping access rights (i.e., borrowed land or land returned to the owner after a loan) are most susceptible to change and their renegotiation can cause conflicts. In particular, the change from cultivated land to fallow, and vice versa, is a sensitive transition for *nééré* harvesters, which often implies changes in access rights. Our findings are in line with other studies that have shown that customary tenure rights over trees are reinforced when land is under more intensive management, and weakened when fields are converted to fallows (Boffa et al., 2000; Gausset et al., 2003; Wiersum and Slingerland, 1997). Thus, intensity and continuity of agricultural production influence the exclusivity of rights to trees growing on cultivated land (Gausset et al., 2003; Lykke et al., 2004).

Our results indicate that when land is transferred via sale, rent or loan, previously existing rights for both sides in the transaction are sometimes unclear. Migrants who borrow land for cultivation can lose their rights over *nééré* trees that are established during the loan period when the land is returned to its original owner. This situation can diminish the willingness of borrowing households to invest in protecting or planting *nééré* trees. The combination of insecurity around land tenure and poorly defined rules over *nééré* exploitation in customary tenure systems can lead to conflicts and fuel competition for resources. This can be further enhanced by the significant in-migration and the associated increasing demand for land, by an emerging land market, by the demand for *nééré* products, which remains high despite the documented cases of substitution with alternative products, by the consequent relatively high price of *nééré* products, and the low level of *nééré* tree regeneration. This situation is leading women with limited access to *nééré* pods to find different strategies to secure their harvest, including reliance on precocious harvesting and collection of all available *nééré* pods, posing further constraints on *nééré* tree regeneration.

Customary tenure regimes are also under pressure. A new category of harvesters, the wives of male descendants of former migrants, are gaining access to *nééré* pods through purchase or rental of the land by

their husband. These wives have a different perception of their rights, and demand access rights to *nééré* that were previously restricted to autochthonous residents. In Uganda, Howard and Nabanoga (2007) have observed that changes in traditional tenure regimes as a result of external interventions increased social differentiation and immigration. In addition, increasing demand for land has modified customary rights over plants. Likewise, our study revealed that the fast-paced, current socio-economic transformations challenge the traditional land and tree tenure system.

A lack of recognition of these complexities and processes of social change can result in misunderstanding the challenges women face in accessing tree resources, as the traditional tenure system is not adapting fast enough to accommodate novel circumstances and may jeopardize the future of significant income sources for women. Similar results were found in Northern Ghana, where shifts in traditional tenure systems have had implications for *nééré* tree populations and sustainable land management. Customary authorities and institutions face new challenges adjusting to social change, particularly with respect to the management of common property rights. Both those who hold customary rights, and those who do not, face insecurity, and this can translate into unsustainable management practices of natural resources. Enhancing the enabling institutional environment, including through appropriate policies and incentives on land and tree tenure, can positively influence the adoption of sustainable land management practices (Etongo et al., 2018b).

## 6. Conclusions

This study reflects the complexity of rights to access *nééré* pods, moving beyond a dichotomy based on gender to examine the nested bundles of women's rights. These rights are shaped by several factors of social differentiation that extend beyond gender, including ethnicity, residence status, marital status, seniority within a lineage. Insecure use rights to *nééré* pods affect mostly women from migrant ethnic groups, but also a minority of Nouni autochthones. Our findings underscore the need to recognize the heterogeneity of women and the stratification of rights along various axes of social differentiation, and across spaces and land use types.

This study illustrates how women's rights to tree products are dynamic and relational. Although to different degrees, all women in the study area remain vulnerable to changes in land use or ownership, which have a direct effect on access rights to *nééré*. Tenure insecurity or lack of *nééré* harvesting rights create patterns of resource use with negative outcomes for the sustainability of (*nééré*) tree resources. Early harvesting of *nééré* pods is one strategy that women with limited use rights draw upon, which may constrain regeneration of *nééré* trees and lead to low quality *soumbala*. The expansion of the *nééré* market, and more generally, changing values and transactions for land on which the species grows, challenge the security of women's access to *nééré*. Our findings underline the need to consider tree rights in land tenure policies, particularly for valuable trees, like *nééré*. Reforms of environmental and land legislation should contribute to mitigating risks to women's livelihoods and to guiding changes in customary tenure regimes to account for new social and land dynamics in rural environments.

## CRedit authorship contribution statement

**Catherine Pehou:** Conceptualization, Formal analysis, Investigation, Methodology, Writing - original draft, Writing - review & editing. **Houria Djoudi:** Conceptualization, Investigation, Methodology, Project administration, Supervision, Validation, Writing - review & editing. **Barbara Vinceti:** Conceptualization, Funding acquisition, Project administration, Validation, Writing - review & editing. **Marlène Elias:** Methodology, Validation, Writing - review & editing.

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