

Large-scale land acquisitions aggravate the feminization of poverty: findings from a case study in Mozambique

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Abstract The local implications of large-scale land acquisitions (LSLAs), commonly referred to as land grabs, are at the center of an exponential production of scientific literature that only seldom focuses on gender. Our case study aims to contribute to filling this analytical gap. Based on structured interviews and focus groups, we investigate local experiences in the lower Limpopo valley in Mozambique, where a Chinese investor was granted 20,000 hectares in 2012. Our findings show that land access in the affected area varied prior to land seizure due to historical land use differences and after land seizure mainly due to non-universal compensation. Furthermore, we show that as farming conditions deteriorate, a trend toward both the feminization of smallholder farming and the feminization of poverty is consolidated. Succinctly, as available land becomes increasingly constricted, labor is allocated differently to alternative activities. This process is by no means random or uniform among households, particularly in a context in which women prevail in farm activities and men prevail in off-farm work. As men disengage further from smallholder farming, women remain directly dependent on fields that are smaller and of

worse quality or reliant on precarious day labor in the remaining farms. We contend that the categories female-headed and male-headed households, although not inviolable, are useful in explaining the different implications of LSLAs in areas in which gender strongly substantiates individuals' livelihood alternatives.

Keywords Female-headed households · Feminization of poverty · Gender · Land grabbing · Large-scale land acquisition · Mozambique's Limpopo valley

Introduction

The last decade has seen a renewed wave of large-scale land acquisitions (LSLAs) in developing countries, termed “land grabbing” by critical researchers and non-governmental organizations (Borras and Franco 2010; FIAN 2010). Although driven by recent crises (i.e., financial, food, and energy crises), the current trend follows long-standing development efforts to increase the efficiency of agricultural systems (Brookfield 2006; Holt-Giménez 2008). International agencies and host governments along with researchers grounded on neoclassical and neoliberal premises hold that LSLAs generate opportunities that, when harnessed correctly, can strengthen local

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livelihoods (World Bank 2008a; FAO 2009; von Braun and Meizen-Dick 2009; Janvry 2010). The creation of formal jobs is one central benefit expected from such synergy (Deininger and Byerlee 2011). However, the question of who profits from these jobs, along with other envisioned opportunities, and who bears the risks engendered by LSLAs remains due to very little understanding of the local implications of LSLAs.

The bulk of literature on LSLAs has focused on their scale, drivers, and actors to the detriment of local case studies that could shed light on projects' implications (De Schutter 2011; Edelman et al. 2013). Furthermore, the analysis of specific cases often relies on secondary data. When primary data are utilized, local impacts are not scrutinized in relation to specific groups defined for example in terms of gender, age or socio-economic class (Daley 2011). The few existing case studies concur that LSLAs constitute drivers of land scarcity that affect women more than men due to women's weaker rights to land and women's usual position as providers of food to the household (i.e., Daley 2011; Daley and Pallas 2014; Doss et al. 2014; Tsikata and Yaro 2014; Fonjong et al. 2016). Accordingly, this study aims to further investigate LSLAs' gendered implications for local livelihoods. We make use of a case study of a Chinese LSLA in the Limpopo valley in southern Mozambique, a country that has experienced a substantial amount of land concessions in recent years (FIAN 2010; Deininger and Byerlee 2011).

This article builds on two previous studies that analyzed the overall local implementation of LSLAs in Mozambique and the main local development goals vis-à-vis the immediate achievements of this specific Chinese project (Porsani et al. 2017; Porsani and Lalander 2018). Porsani and Lalander (2018) showed that the legalization of customary rights to land along with the legal stipulation of community consultations prior to LSLAs substantiate expectations of win-win scenarios that simultaneously benefit investors and communities. However, as the experience provided by the Chinese case shows, the lack of enforcement of legal requirements can cause top-down, large-scale land dispossession to be accompanied by meager "take-it-or-leave-it" opportunities available to a minority (Porsani et al. 2017).

The present article focuses on both the process of land seizure and the livelihoods affected by it, and

sheds light on differences within and between affected sites. Gender shapes livelihood and access to resources and is therefore used here as an analytical parameter. Another important aspect that we incorporate in our analysis is marital status. By making use of group categories, namely female-headed households and male-headed households, our study emphasizes the diverse (and by no means random) local livelihood implications of increasing land scarcity and worsening farming conditions.

This article is structured as follows. First, we provide the historical background of the gender division of labor in southern Mozambique. Next, the presentation of the study area and methods is followed by the conceptual rendering of the "feminization of poverty". Our findings depicting land access prior to and after land seizure between and within affected sites are followed by a discussion underscoring worsening farming conditions and a consequential aggravation of the feminization of poverty in the study area. We conclude by arguing for the enforcement of inclusive processes, such as local consultations, that take into account the heterogeneity of affected communities. We contend that processes that safeguard inclusion are instrumental in precluding LSLAs from unfolding in an exclusive, gender-blind fashion that irremediably impairs local livelihoods, particularly those with fewer off-farm alternatives.

Gender division of labor in rural southern Mozambique: a historical overview

In Mozambique, women have long been responsible for the bulk of small-scale agricultural work. In southern Mozambique, where the Tsonga are the largest ethnic group, women were traditionally ascribed the maintenance of the "organized" spaces of the community and the cultivated fields, whereas men were in charge of opening new lands, hunting, fishing and herding (Feliciano 1998: 189). Although this roughly depicted gender division of labor has never been completely exclusive (men are oftentimes responsible for clearing land and preparing fields, usually with cattle-driven plows), in general, farming is regarded as women's activity, and most agricultural chores are performed by women (Covane 1996; World Bank 2008b).

Women's prevalence in farming has been historically reinforced by men's circular migration that, in southern Mozambique, began to take shape in the 1850s (Covane 1996: 64). Household taxation,¹ introduced in the late 1800s, and the monetarization of the "lobolo" (the payment made by the groom or his family to the bride's family) amplified people's need for cash (CEA 1977; Covane 1996; Lubkemann 2009). Concomitantly, the low salaries and overall poor working conditions within Mozambique, combined with the imminent risk of being drafted into "Chibalo" (forced labor), led to the invigoration of the male migrant flow from colonial Mozambique toward wage employment, particularly in neighboring South Africa (Covane 1996; Isaacman 1996; O'Laughlin 2002; Lubkemann 2009). The destinations were principally the mines but also included sugar cane fields and, from the middle of the twentieth century, the manufacturing, construction and service sectors within urban areas (CEA 1977; Roesch 1991; Covane 1996; Isaacman 1996; Lubkemann 2009). To the extent that men's migration allowed them to achieve some level of financial independence, it also corroborated their masculinity in a context in which the fulfillment of household needs was increasingly dependent on cash (Covane 1996; Raiumundo 2008).

Data show that between 1902 and 1977, 25–30% of Mozambique's labor was exported (CEA 1977: 3). Considering that most Mozambican miners were men from the southern provinces (Maputo, Inhambane and Gaza), the deprivation of male labor constituted an important feature in these areas (CEA 1977). Some areas were constantly deprived of more than 50% of able-bodied males (Raikes 1984: 90). Although cash obtained in South Africa contributed to the production and reproduction of migrants' households through the purchase of basic items (e.g., food, medicine, clothes, soap, and blankets), production means (e.g., hoes, plows, and oxen), and the hiring of extra labor (CEA 1977; Roesch 1991; Covane 1996), it also consolidated "gendered power" to the extent that "men's gendered monopoly on (migration-based) sources of cash [...] [fostered] female dependency on men (for cash)" (Lubkemann 2009: 72).

Migration created new forms of social differentiation within communities. Households with members

employed in the mining sector formed the local "wage elite", particularly after 1973 when mining salaries rose substantially (Covane 1996: 289; De Vetter 2006: 18). In areas such as the lower Limpopo, where a colonial settlement was established in the 1950s and further expanded in the 1960s, individuals (particularly women without husbands or without migrating husbands) could ensure some access to cash by cultivating cash-crops in parallel to their family production. In the lower Limpopo, 87% of the cash-crop producers were women; of these, 70% either did not have husbands or their husbands did not migrate (Covane 1996: 268).

Independence in 1975 and the socialist strategy that followed in parallel to a 15-year-long civil war between the oppositional movement Renamo (Mozambican National Resistance) and the communist ruling party Frelimo (Mozambique Liberation Front) profoundly affected Mozambican communities. As rural–urban migration within Mozambique was de-regulated, increasing numbers of economic migrants were joined by war refugees (i.e., individuals looking for safer areas to stay) in urban zones. There is evidence that these wartime movements were also gendered because women were more likely to remain in rural areas than men (Lubkemann 2009). This was partly because economic reasoning did not cease to orient migration in a context in which alternatives to gain a living in rural settings were substantially hampered (Covane 1996), and partly because men also migrated as a means to avoid involuntary recruitment into either the Renamo or the Frelimo army (Lubkemann 2009).

Shortly after independence, the number of men with contracts in South African mines decreased substantially. Whereas in 1975 128,361 men were recruited, the number in 1976 was 43,488 (CEA 1977: 203). This decline was derived from the mining sector's fear of over-dependence on Mozambique and from the newly formed government's inexperience with the official due processes surrounding recruitment (De Vetter 1998). Throughout the 1980s, an average of approximately 40,000 Mozambican men had mining contracts in South Africa at any one time (Covane 1996: 288). Although the intensity of mining-driven migration fell, having relatively secure employment became an even more crucial determinant of households' means in a period marked by multiple crises.

¹ In Portuguese, "imposto da palhota".

The exodus of Portuguese with important skills and resources in combination with escalating Renamo attacks and territorial mining practices contributed to the collapse of the marketing, transport, and supply systems (Raikes 1984). In addition, the lack of governmental support to the smallholder sector—a consequence of Frelimo’s predilection to large-scale state farms that proved ineffective and unwieldy to manage (Dinerman 2001)—led to the starving of rural areas of resources and the consequential collapse of agriculture by the early 1980s (Mosca 2011).

From the late 1980s, the opening of Mozambique’s economy and the structural adjustment to which it was subjected under the auspices of the World Bank and the International Monetary Fund, along with the end of the civil war in 1992, led to renewed trends in livelihood alternatives. As masses of refugees returned home, the increase of freedom to circulate facilitated more flexible domestic and international labor flows to the formal and the increasingly important informal sector (Mercandalli and Anseeuw 2017). Currently, Mozambican migrants are oriented toward large Mozambican and South African cities where many of them work in the construction sector or as street vendors or hawkers (Vidal 2010). In addition, the mining industry has continued to absorb a substantial part of the Mozambican male workforce. A recent study noted that “Mozambicans now make up 25% of the goldmine workforce (up from 10% in 1990)” (De Vettler 2006: 1). In migrants’ households, income is almost entirely derived from men’s wages (De Vettler 1998).

In summary, particularly in southern Mozambique where communities tend to be organized under patrilineal and patrilocal customs, the archetype of masculinity includes the ability of men to meet their family’s needs through the provision of cash-income, for which migration has been a means of assurance (Raiumundo 2008). Despite changing gender archetypes illustrated by women’s increasing mobility and engagement in wage or self-employment (e.g., as house-maids, civil servants, or in the growing informal markets of urban centers) (Sender et al. 2006; Raiumundo 2008), the prevailing trend has been that “men have dominated the movement of adults out of agriculture into wage and self-employment in non-agricultural sectors” (World Bank 2008b: 50).

The lack of support to smallholder agriculture (and the consequential low yield that continues to

characterize the sector) along with the shortage of secure livelihood alternatives and the widespread opinion, particularly in rural areas, that it is inappropriate for women to pursue wage employment (see Sender et al. 2006) have created strong gender differences regarding access to cash. Accordingly, rural women have considerably less cash earnings than rural men have (World Bank 2008b). Consequently, although men’s stronger participation in changing markets has contributed to their household’s welfare, it has also led to the intensification of gender roles in the production and reproduction of households.

Study site

The case study is located in the province of Gaza and district of Xai-Xai, which is 215 km north of the capital Maputo (Fig. 1). In the district of Xai-Xai, which has approximately 190,000 inhabitants (45% male and 55% female) and a demographic density of approximately 100 persons per km², approximately 70% of the population is engaged in agriculture (Mozambican Republic 2010a). The area is also known as the lower Limpopo valley, where a colonial agrarian strategy was followed by a socialist plan to upgrade the agricultural system through the promotion of large-scale farming (Porsani et al. 2017). Since the early 1990s, Mozambique has undergone a transition from a socialist to a market-based economy. Accordingly, land concessions to private investors have become one of the pillars of Mozambique’s rural development plans and have contributed to making land a disputed resource (Pitcher 1996). To operationalize land concessions in the lower Limpopo, in 2010 the government created a public company called Irrigated Zone of the Lower Limpopo (in Portuguese, “Regadio do Baixo Limpopo”), hereafter RBL.

The Chinese presence in the valley started in 2007 when the province of Hubei in China was granted 300 ha to test varieties of rice and maize. In 2012, what was known as a demonstration farm was expanded under a renewed scope when a private investor, Wanbao Africa Agriculture Development LLC (Wanbao), was granted 20,000 ha to cultivate rice. Shortly after project approval on December 2012, areas on both the east and west sides of the river north of the national road EN1 were plowed by Wanbao’s tractors. The company also opened new roads in the

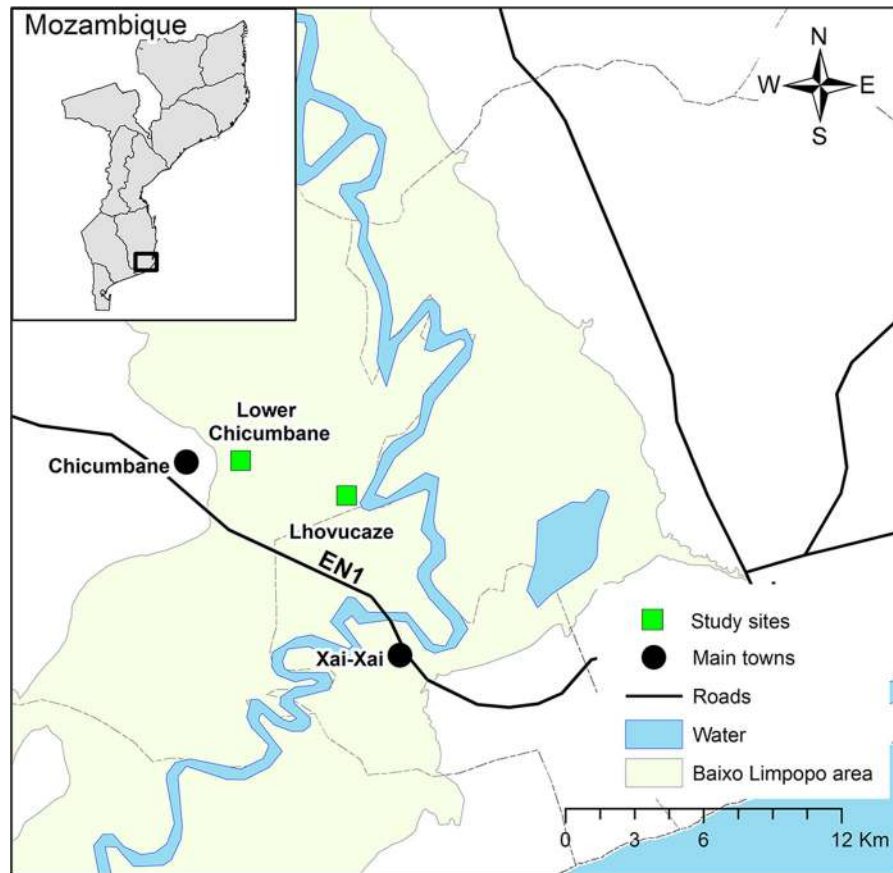


Fig. 1 Map of research area (map source: GADM and digital chart of the World databases, drawn by Mona Petersson, Södertörn University)

valley and constructed pumping stations, drainage and irrigation channels.

Since 2013, rice has been cultivated on the east side of the river on a yearly basis by Wanbao and by contract workers trained by them. On the west side of the river, however, the Chinese-led cultivation was put on hold shortly after the initial harvest was hit by floods that same year. Consequently, during the last 4 years (from 2013 to 2017), this west-side area, which was used by smallholders for farming and livestock rearing until Wanbao's occupation, has been temporarily used as an extensive grazing field by local cattle owners awaiting the restart of Wanbao's production.

In this article, we focus on two adjacent sites located on the west side of the river, Baixa de Chicumbane² and Lhovucaze (Fig. 1), to examine the

processes of land loss and their gendered implications for households who lost farming land in these sites.³

Methods

The total concession comprised 20,000 ha, but until August 2017, only approximately 9300 ha had been occupied by the investor. Almost all land occupation (approximately 8300 ha) occurred during the first half of 2013. The initial fieldwork occurred from July to October 2013 and was followed by additional fieldwork 4 years later, in July and August 2017. This study builds partly on two articles written with material from the initial fieldwork (Porsani et al. 2017; Porsani and Lalander 2018). However, we

² Baixa literally means “lower” and alludes to the area located near the town of Chicumbane but at a lower altitude zone.

³ Logistical and time constraints underlie our choice to limit the study area to the west side of the river.

present here new material obtained through structured interviews with closed and open-ended questions conducted in 2017. These interviews aimed to assess changes in land access (i.e., the amount of land and forms of access) and the gendered implications of these changes to local livelihoods.⁴

Interviewees were persons who had undergone land loss in the valley, specifically on the west side of the Limpopo. During the initial fieldwork (2013), we learned that regulation of land access in this area varied. The land closer to the river and the national road EN1 belonged to the nearby village named Lhovucaze. Most households cultivating there had a house in the village, but it was not uncommon for them to also have houses in the nearby towns located in the higher zones.⁵ As we learned the administrative limits of Lhovucaze, we became interested in the occupation of the remaining area outside the village stretching to the western limit of the valley, an area known as “Baixa de Chicumbane”, hereafter, Baixa. We soon learned from local informants that most people cultivating in Baixa lived in the nearest inhabited high zones of the town of Chicumbane adjacent to the valley.

In the village of Lhovucaze and in neighborhoods adjacent to the valley in the town of Chicumbane, we sought to interview adults in households who had lost land in the study sites—in particular the household member mainly engaged in farming, which led to a sample mainly comprised of women.⁶ Men were usually interviewed if their spouses were absent. Of 144 interviews conducted in 2017, 115 were with women and 29 were with men. Since single men were a small group in our sample (3 out of 144 persons), we

do not address this category in our analysis. Approximately half of the interviewed women were married (51% or 59 out of 115), whereas the other half (49% or 56 out of 115) were divorced/separated, widowed or single (the latter with own children under their care). This large proportion of women head of households is common in the region (INE 2007). The age of our interviewees ranged from 20 to 81 years old.⁷ Table 1 shows the main demographic divisions of the sample.

This article uses quantitative data, analyzed with linear models and generalized linear models, and qualitative information derived from answers to open-ended questions or from respondents’ spontaneous reflections or explanations. The statistical methods are described in Appendices.

Feminization of poverty

The concept of the “feminization of poverty” was coined by Diane Pearce in 1978. Coming from the discipline of social work and conducting an analysis of the worsening conditions of women’s welfare in the US, she argued that black women and divorced women were increasingly part of the economically disadvantaged. This phenomenon, according to Pearce, was evident in the growing number of female-headed households among the poor households. Moreover, she contended that the welfare system had to be readjusted to women’s needs given that women mostly worked part-time, low-paid jobs due to their reproductive responsibilities and hence needed more assistance (Pearce 1978). Pearce analyzed the economic condition of a group among the poor and showed that poverty was gendered. Subsequent studies building on, and expanding, her contribution compared the evolution of women’s poverty in relation to men’s poverty, ultimately arguing that the idea of feminization does not necessarily imply an absolute worsening in poverty among women but a relative worsening of their conditions in relation to that of men (see Medeiros and Costa 2008: 116).

This concept was incorporated in the development jargon in the 1990s with the assertion that “of the 1.3

⁴ The interviews were conducted in Portuguese by the main author with the help of local assistants. Given the sensitivity of the issues, interviewees were assured the anonymity of their answers. Responses and notes were recorded via written record.

⁵ After the major floods of 1977 and 2000, most households inhabiting the valley were granted small land parcels in the higher zones that are safer from floods. In 1977, the process was also meant to group households in communal villages where Frelimo’s government planned to organize production in socialist lines.

⁶ Our sampling cannot be classified as strictly random. Instead, we relied on local informants about the main living location of those who lost land in the study area. Subsequently, through transect walks along the roads and group meetings, we identified and interviewed individuals who had lost land and were willing to answer to questions for a study with no direct practical implications to their future land access.

⁷ Age, mean \pm SD (N): Chicumbane women 48 ± 15 years (N = 62), Chicumbane men 69 ± 10 years (N = 8), Lhovucaze women 54 ± 15 years (N = 53), Lhovucaze men 55 ± 11 years (N = 18).

Table 1 Sample sizes of structured interviews—2017

	Male-headed (married)	Female-headed	Sum
Lhovucaze	68%, N = 48	32%, N = 23	N = 71
Chicumbane	53%, N = 37	47%, N = 33	N = 70
Total	N = 85	N = 56	N = 141

billion people living in poverty, more than 70% are female” (UNDP 1995: 36). According to UNDP (1995) feminization of poverty is experienced in all regions—industrial and developing countries included—as women are more often unemployed and women’s wages are considerably lower than men’s.

Since then, several critiques have emerged, particularly of conceptual and methodological characters. It has been claimed that the 70% finding could not be proved because sex-disaggregated data were mostly lacking and, where data existed, were ridden with inaccuracies (Marcoux 1998; Chant 2006, 2007). In addition, it has been questioned whether female-headed households are the poorest of the poor, and thus whether household headship is an appropriate analytical parameter (Chant 1997; Pressman 2003). Critique of the excessive focus on income also emerged as problematic in the definition of the feminization of poverty (Mutua 2001). The concept was thereby expanded to encompass gender disadvantage that leads not only to women’s worse economic condition vis-à-vis men, but also to women’s limited agency due to unequal power dynamics (Fukuda-Parr 1999; Razavi 1999; Chant 2006, 2007). For instance, participation in decision making and unequal opportunities in schooling and work were considered indications of gendered differentiated poverty (Fukuda-Parr 1999). In this regard, a study on Ghana showed that education level was crucial for alleviating women’s poverty in relation to men’s poverty because women who had completed only primary school were still more economically disadvantaged than men were (Owusu-Afriyie and Nketiah-Amponsah 2014). In addition, studies showed that women’s work burden derived from reproductive chores (e.g., caring for children and the elder, fetching water and firewood, cooking) can create disadvantageous trade-offs that limit women’s engagement in economic and in organizational activities (Blackden and Wodon 2006; Lyon et al. 2017).

As our brief conceptual overview shows, feminization of poverty has been widely applied in different

contexts. Taking stock of its critiques, we apply this term in the context of LSLAs as a pertinent descriptive concept in relation to worsening farming conditions.

Site-specific processes of land loss

Despite the adjacency of the field study sites, land was seized in different manners in each of them. In Baixa, approximately half of the interviewees reported that in December 2012, they were informed by the local authorities of the government’s decision to cede their fields to the Chinese investor, Wanbao. Those who had not sown were advised to wait. The authorities also explained to affected farmers that they would be compensated with plots in a location still to be decided. Very few houses existed in the area (only 3 out of 70 persons reported having houses, and no one reported having family graves in the lost fields). Compensation would consist of agricultural land whose size was not discussed. This news preoccupied farmers, who reportedly felt impotent in the face of a process that they could not control because neither the company nor the authorities had asked for their consent. Between January and February 2013, the Chinese tractors entered the fields and evened out the terrain, erasing any pre-existing delimitation marks that could allow for the identification of the location or the size of specific plots. Nonetheless, according to interviewees, throughout the first half of 2013, local authorities compiled registers with names of farmers who had lost land that were meant to enable a posteriori land compensation. By the middle of 2013, the local leader, accompanied by officials from the public company RBL, indicated the location of the new fields in an area in the valley known as “Mutropa”. Chinese tractors plowed the new fields, and farmers were provided with free seeds for the following season. Although 53% (37 out of 70) of respondents who lost land in Baixa reported that they had received information about the process, only 17%

(12 out of 70) reported having received compensatory land in Mutropa (“Appendix 1”).⁸

Simultaneously, in Lhovucaze, Chinese tractors entered the fields without previous notice to farmers. No one in Lhovucaze—in fact, not even the local communitarian authorities—was informed (by governmental officials, RBL officials or Wanbao) about the land concession. Likewise, no one in Lhovucaze received compensation for land loss. Based on our sampling, 23% (16 out of 71) of the households cultivating in Lhovucaze lost either houses and/or family graves that were in the affected area. As the Lhovucaze leadership addressed Wanbao officials, they were dismissed with the words, “Go speak to your government; they gave us the land” (Porsani and Lalander 2018).

Some interesting aspects regarding local views are worth emphasizing. Firstly, the processes of land seizure and compensation disregarded the local perception on the legitimacy of land access. In Lhovucaze, where no one was informed or compensated, most of the land occupied was family land accessed throughout generations by patrilocal inheritance customs (Fig. 2). Patrilocal customs mean that men inherit land from their fathers and women acquire land access mainly through marriage as they move into their husband’s family (Waterhouse 2001; Waterhouse and Vijfhuizen 2001). In contrast, in Baixa, where a share of the households received information and partial compensation, most land belonged to former colonial farms and had been spontaneously occupied by farmers after independence (Fig. 2, “Appendix 2”).⁹ Even though, according to national legislation, those who use a parcel of land for more than 10 years automatically secure the legal right to it (equal to those who acquire land through customary inheritance or through a formal land title) (Mozambican Republic 1997), there was an overarching view among respondents that the right to family land should prevail over the right to land acquired through other forms. Succinctly, the right to family land was perceived as the most legitimate right from a local perspective. Thus, it is even more problematic from a

local point of view that information and compensation sidestepped land users who lost family land.

Secondly, respondents from both sites were largely unacquainted with the legal precepts on LSLAs and were convinced that since “land belongs to the State”, the government had the ultimate right to seize it (Porsani and Lalander 2018). Although the latest Mozambican Land Law maintained all land under ultimate State property, it also established clauses to secure individuals’ and communities’ land rights (Mozambican Republic 1997, 1998, 2000, 2010b, 2011). Our interviewees were largely unaware of these clauses, such as the legal necessity of community consultations and of fair compensation (i.e., allowing land users to reestablish their previous living standards). As expressed by one of the interviewees, “[it was not the Chinese], it was our Government who took the land. They do not care for us. They simply take what they want” (middle-aged woman head of household, Chicumbane, August 2017).

Changes in land access

In both sites, prior to land loss, households headed by elder individuals tended to have access to more land than households headed by younger individuals, and male-headed households had access to more land than did female-headed households (“Appendix 3”). In total, 56% (79 out of 141) of households also had access to fields in other areas of the valley.¹⁰ This means that 44% (62 out of 141) of the households temporarily lost all the land to which they had access in the valley. Whereas in Baixa the majority of these households (75%, 21 out of 28) managed to acquire new fields in the valley, in Lhovucaze, only 47% (16 out of 34) of these households later acquired new valley land (“Appendix 4”).¹¹

⁸ Our data show no significant differences between male- and female-headed households with regard to access to information or compensation (“Appendix 1”).

⁹ Differences in forms of land access between sites were statistically significant (“Appendix 2”).

¹⁰ There was no difference between having had access to other fields and gender of household headship: 53% of male-headed households (45 out of 85) and 61% of female-headed households (34 out of 56) had access to other fields in the valley. Site or age of head of household did not affect access to other fields (gender of head of household $P = 0.859$, site $P = 0.272$, age of head of household $P = 0.114$; generalized linear models, quasibinomial distribution).

¹¹ There was no association between gender of the head of household and ability to acquire new land (by households in general or by households that lost all land) (Appendices 3 and 4).

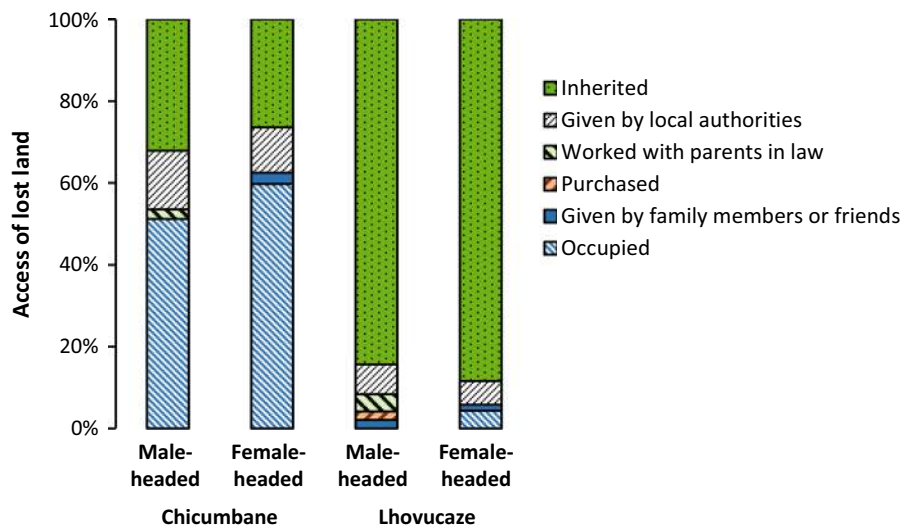


Fig. 2 Forms of earlier access to land that was lost by male-headed and female-headed households in Baixa and Lhovucaze, lower Limpopo valley, Mozambique

In Baixa, male-headed households reported having had in the affected area, and thus having lost, fields averaging 1.9 ha ($N = 37$), whereas female-headed households' fields averaged 0.9 ha ($N = 33$) ("Appendix 3"). In total, 36% (25 out of 70) of households that lost land in Baixa managed to acquire new land in the valley either through compensation (17%, 12 out of 70) or in other ways (19%, 13 out of 70; Fig. 3).¹² Compensatory plots in Mutropa were 0.25 ha regardless of the size of the field lost, whereas land acquired by other means averaged 0.53 ha.¹³ Of the households that managed to acquire new land in ways other than compensation, occupation of empty areas was the prevalent form, followed by borrowing or loaning from acquaintances.¹⁴ Less common but also feasible in Baixa were purchasing and receiving land as a gift from family members or friends (Fig. 3, "Appendix 2").

¹² Of these 25 households, 14 were male-headed and 11 were female-headed. There was no association between particular forms of land access and gender of the head of household ("Appendix 2").

¹³ Male- and female-headed households did not differ in the amount of acquired land ("Appendix 3").

¹⁴ According to interviews conducted in 2013, borrowing or loaning of land already existed in the area. The fact that this type of land access is not captured in Fig. 2 (access type of lost land) is likely due to the way we posed one of the initial and screening questions of our survey ("has your household lost land in the valley?"), which likely led those who rented/loaned land to answer "no" and thus not to enter our sample.

Four years after land loss, 10% of the interviewed households (7 out of 70) that had lost land in Baixa had no access to farming land in the valley.¹⁵ On average, households that still had access to valley land had approximately 0.8 ha ("Appendix 3"). In addition, most of the households (70%, 49 out of 70) had complementary fields in the high zones of approximately 0.6 ha (see Table 2 for changes in land access).

In Lhovucaze, male-headed households reported to have lost approximately 3.1 ha ($N = 48$), whereas female-headed households reported to have lost, on average, 2.4 ha ($N = 23$) ("Appendix 3"). In total, 27% (19 out of 71) of households that lost land in Lhovucaze managed to acquire new land in the valley either through borrowing or loaning fields from acquaintances, or receiving land as a gift from family members or friends (Fig. 3, "Appendix 2").¹⁶ Those households that acquired land obtained an average of 0.7 ha.¹⁷ Four years after land loss, 25% (18 out of 71) of the interviewees who lost land in Lhovucaze had no

¹⁵ Of these, 3 households were male-headed and 4 were female-headed households.

¹⁶ Of the 19 households, 14 were male-headed and 5 were female-headed households. There was no association between particular forms of land access and gender of the head of household ("Appendix 2").

¹⁷ Male- and female-headed households did not differ in the amount of acquired land ("Appendix 3").

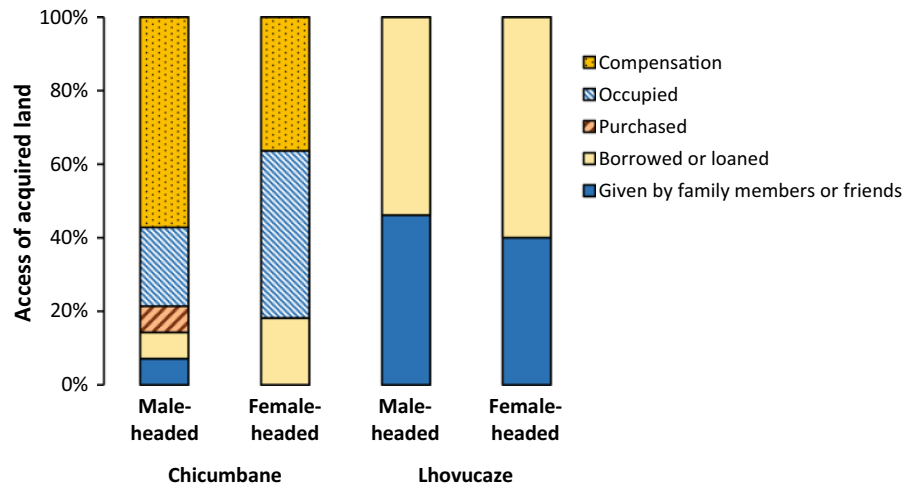


Fig. 3 Forms of access to land acquired by male-headed and female-headed households after LSLA in Baixa and Lhovucaze, lower Limpopo valley, Mozambique

Table 2 Average amount of land (ha) accessed in the valley before and after project (male-headed/female-headed households)

	Pre-project	Post-project
Chicumbane (N = 71)	2.4/1.5	0.7/0.7
Lhovucaze (N = 70)	3.6/2.8	0.7/0.5

access to farming land in the valley.¹⁸ On average, households that still had access to valley land had approximately 0.8 ha (“Appendix 3”). In addition, 27% of the households (19 out of 71) had complementary fields in the high zones of approximately 0.5 ha. Table 2 presents the total changes in land access prior to and after the project.

The main forms of land access thus varied between and within the sites not only prior to (due to historical land use differences) but also after land seizure, partly due to differences in compensation. Compensation completely sidestepped Lhovucaze, but it also sidestepped 83% of the farmers from Chicumbane for no obvious reason. It is not clear why compensation was not universal since the local government, RBL, and Wanbao officials were reluctant to answer questions on this topic. Nonetheless, it is likely that the lack of available land in the valley implied limited possibility to provide farmers with what they considered

¹⁸ Of these, 14 households were male-headed and 4 were female-headed households.

appropriate compensation and thus contribute to explain official authorities’ unwillingness to enforce consultations with affected communities (Porsani and Lalander 2018).¹⁹

Despite widespread land loss, 4 years later, most households either still had or had regained access to fields in the valley, although of significantly smaller sizes (Tables 2, 3). The main means employed by farmers from Lhovucaze to access new fields were to borrow or loan land or to receive land as a gift from family members (Fig. 3). In contrast, compensation and spontaneous occupation prevailed as the most important new forms of land access among farmers from Chicumbane (Fig. 3, “Appendix 2”). These inter-site differences are likely because there was virtually no land still empty or available for farming around Lhovucaze (land was either under constant cultivation or used as grazing area), which forced farmers to rely on their network of people with whom they had trust-based relationships to regain access to land. According to respondents, one of three forms of costs is usually associated with borrowing or loaning land depending on what is accorded by the parts: direct

¹⁹ In fact, even the land in Mutropa that was given to farmers who lost land in Baixa was not empty land. According to the interviewees, all the land in Mutropa had been used by farmers from Chicumbane living south of the EN1 road. Thus, for farmers cultivating in Baixa to be compensated, other farmers who previously cultivated in Mutropa were forced to cede their land (see Porsani et al. 2017: 1190).

Table 3 Current access to land of population affected by LSLA (male-headed/female-headed households)

	Land in the valley (%)	Land in the high zones (%)	No land (%)
Chicumbane (N = 70)	92/88	73/67	3/3
Lhovucaze (N = 71)	71/83	25/30	15/0

cash payments, a posteriori payments with produce, or payment through work. These costs imply that borrowing or loaning land can be a stringent form of land access, particularly for households that are already lacking resources such as cash, agricultural produce and/or labor.

However, even if there are no costs associated with occupying “empty” land (the most common strategy utilized by farmers who lost land in Baixa), the areas that were “free” for occupation were usually not appropriate for cultivation (which is why they had remained empty). Most of the new fields occupied by Chicumbane farmers were in areas that remain inundated for most part of the year and where cultivation can be done, optimistically, once a year.²⁰ In addition, respondents from Chicumbane who received compensatory land perceived the production in Mutropa to be more intensively affected by beetles²¹ and the land to be more saline and prone to inundations. Similarly, although cultivating in the higher sandy zones can be an important coping strategy employed by farmers during periods of floods, the rain-fed farming in these areas is generally much less productive than in the valley. Factors such as the soil’s nutrients, salinity levels, and water saturation as well as the incidence of pests were brought up by our respondents as decisive factors for harvest viability. Thus, to the extent that the location of fields affects production, it also affects farmers’ perceptions of the worthiness in farming a specific site.

In summary, although most farmers were able to keep or access new land in the valley, farming was constricted in two ways. First, the fields under the control of the affected households were significantly smaller than the seized fields. Second, obtained fields were either regarded by farmers as being of lower quality (specifically fields accessed through occupation and compensation) or their access was conditional

on payments through cash, produce or work (specifically borrowed or loaned fields).

Gendered livelihood implications

Households that had more land—in general, those headed by men, but also those headed by elders—also lost more land (Table 2, “Appendix 3”). Furthermore, households in Lhovucaze had more land than households in Baixa before the project but lost all they had in the affected site. Thus, widespread land loss meant that 4 years later, there was virtually no difference in relation to the average amount of hectares held by male- and female-headed households within or between the sites (Table 2, “Appendix 3”). Accordingly, it can be stated that this land concession led to the decrease of intra- and inter-site differences in terms of the amount of land under the control of households. There are multiple reasons why households headed by women tended to control less land in comparison to households headed by men: female-headed households comprise not only widows who may or may not be able to retain the totality of the land after the death of their husband, but also separated/divorced women who customarily return to their parents’ home and acquire small plots from their family.²² Women’s weaker control over land, despite formal legislation that affirms gender equality in land rights, is a well-noted fact, particularly in southern Mozambique (Tanner 2010; Porsani and Lalander 2018). Furthermore, since female-headed households are usually less endowed (Marule et al. 1999; O’Laughlin 2001; Waterhouse 2001; Sender et al. 2006; World Bank 2008b), when they hold large tracts of land, they are more likely not to have sufficient resources to cultivate it all and thus to leave part of the

²⁰ In most other areas of the valley, farmers can produce twice a year (principally in the warmer and wetter summer, but also in the drier and colder winter).

²¹ In Portuguese, “*escaravelho preto*”, locally known as “*Xifutsuani*”.

²² The relatives providing land are oftentimes the parents, grandparents or uncles of these women. The women can use the ceded land as it were their own. Nonetheless, if these women marry again, they are expected to return the land to their family and begin using the land from their new husbands.

land idle. Idle land may be confiscated by local authorities and allocated to newcomers or individuals with the capacity to cultivate.²³

The inter- and intra-site convergence in the amount of land held by households may spontaneously be interpreted as a step toward the shaping of more homogeneous, although poorer, livelihoods in the study area. Such an inference would be a misinterpretation since it largely reduces livelihoods to farming and neglects individuals' different abilities to react in the face of worsening farming conditions. In other words, as smallholder farming becomes harsher, household labor is increasingly allocated to other activities with different returns. This labor re-allocation process is by no means random or uniform among groups, particularly in a context where, not only due to traditional gender roles but also due to historical and economic reasons, women are more often engaged in farming and men are more often found in off-farm wage work (Raïumundo 2008; World Bank 2008b).

According to our data, farming was still conducted by most households (Table 3) and principally by women. When men were engaged, they were usually responsible for plowing the hard soils of the valley with cattle-driven plows, whereas women were often-times solely responsible for fields located in the high sandy zones and for all other farming chores in the valley (i.e., sowing, weeding, and harvesting).

Respondents from both locations asserted that having access to less land had an impact on the family's nutrition and cash. In larger plots in the valley, maize, beans, sweet potato, pumpkin and a variety of vegetables were cultivated. Smaller plots implied reduced harvests. Respondents described a critical change in food access as they became dependent on purchasing a large proportion of foodstuff. In turn, less land implied less cash since petty trading from their own production had to be drastically reduced or discontinued.

²³ On this matter, individuals who had faced challenges cultivating the totality of their land explained the dilemma they had confronted: leaving land idle for long periods was risky since it could be confiscated by the local leadership, but lending or renting it to people they did not trust was also dangerous since the tenant could end up not paying or, worse, not returning the land. The solution was to find trustworthy people. As a matter of rule, households strive to keep their fields (even if they may not cultivate them in some periods) as a means to ensure their children's future land access.

To compensate for the reduced access to food and cash, women reported working more on other fields in exchange for food or cash, a practice locally referred to as “biscato”. “Biscato”, in some regions called “ganho-ganho” and originally known as “kurimela”, which means “work for something”, has been a long-standing practice in the region that is engaged in by those in need of immediate return to work (Covane 1996; Sender et al. 2006). The increased importance of on-farm “biscato” reported by our female respondents in combination with the reduction in the number and size of smallholder farms implied that women had started to search for opportunities to “biscatar” in more distant areas. In addition to “biscato”, women from both sites reported petty trading to be relatively more important to their livelihoods (Fig. 4). All women reported having completely stopped petty trading of maize and beans (important items sold prior to land loss) or selling so little of these staples and so sporadically that it was not worth noting. Since their own production had become insufficient to feed their families, selling part of it was no longer an option. Only vegetables (mainly pumpkin leaves) from their own produce were still sold along with purchased items (e.g., a variety of vegetables, used garments, mobile phone credits, traditional drinks, breads, bouillon cubes, sugar, and kerosene). Although men were also engaged in petty trading and daily “biscato” labor for cash (mainly working in construction), they were more prominent in long-term wage-employment in the area,²⁴ migration, and cattle rearing. According to our respondents, men also strived to intensify these activities by, for example, staying in migration for longer periods.

The generalizations above notwithstanding, there were important inter-site differences as well as differences between women who were married and women who headed their households. With regard to inter-site differences, a larger proportion of men from Chicumbane had fixed wage-employment in the region,²⁵ whereas a larger proportion of men from

²⁴ These included guard, police, soldier, and construction worker.

²⁵ Fixed wage-employment of men: Chicumbane 30% (11 out of 37), Lhovucaze 4% (2 out of 48). The difference is statistically significant (site $\chi^2_1 = 11.8$, $P < 0.001$; age of head of household $\chi^2_1 = 0.879$; $P = 0.348$; logistic regression).

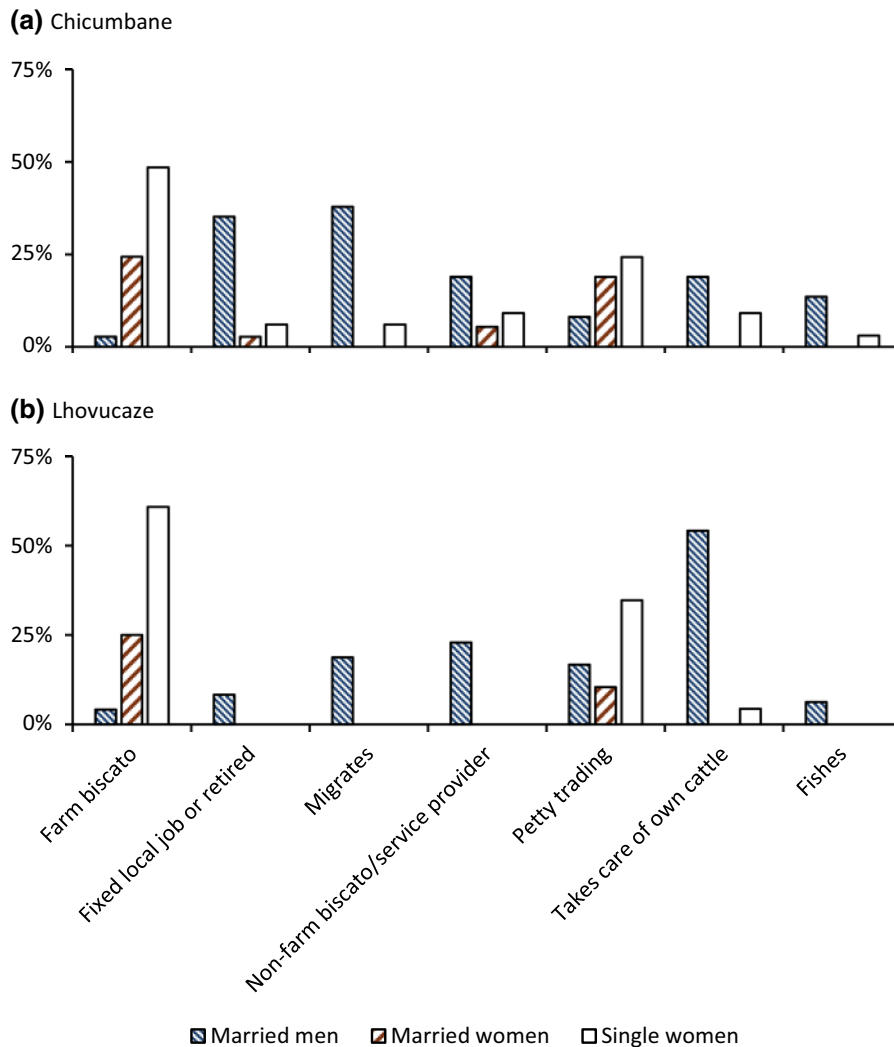


Fig. 4 Livelihood activities other than farming conducted by individuals from households affected by land loss in Baixa and Lhovucaze, lower Limpopo valley, Mozambique

Lhovucaze had cattle (Fig. 4).²⁶ Keeping cattle is not only a measure of long-term security for their households, since the animals can be sold at difficult times, but also a production means that both saves and generates cash since bull-driven plows are used to work the hard soils in the valley. Since Wanbao was inoperative in Lhovucaze and Baixa, the local cattle

grazed on the area, and cattle rearing had so far (as of August 2017) not been affected by this LSLA.

With regard to differences among women, it is important to note that although a share of the women from both sites relied on petty trading, what they were able to sell varied considerably according to different investment capacities. Among all our respondents, only one woman reported that she had to completely discontinue her business. This woman (69-year-old head of household, Lhovucaze, August 2017) explained that after land loss, she had to stop petty trading since the selling of field production was an

²⁶ Cattle ownership of men: Chicumbane 19% (7 out of 37), Lhovucaze 54% (26 out of 48). The difference is statistically significant (site $\chi^2_1 = 9.3$, $P = 0.002$; age head of household $\chi^2_1 = 1.7$, $P = 0.195$; logistic regression).

important financial source for her business. Lately she had relied on doing “biscatos” in other farms, the production of a remaining field of 0.25 ha, and the help of her adult children. “Biscatar” in other farms was women’s most widely used livelihood alternative, particularly women heading their households (Fig. 4).²⁷ As one of our respondents explained, “Now we depend on finding ‘biscatos’ in other farms to survive. Without ‘biscatos’, we cannot eat” (28-year-old woman head of household, Chicumbane, August 2017). Another woman reported, “We went back to zero when we lost all our land. The land we lost was very productive and allowed me to even sell part of the production. Now all that is left for me to do is to ‘biscatar’ in other ‘machambas’ [fields]” (55-year-old head of household, Lhovucaze, August 2017). This finding is in line with other studies that show that on-farm “biscato” is an important source of income for poor women (Sender et al. 2006). Finally, a larger proportion of female heads of households reported that their sustenance depended more on other members of their extended family (usually adult children and grandchildren).²⁸ Similarly, married women reported having to rely more on their husbands to access both food and cash.

In summary, as both the size and quality of available fields are reduced, individuals allocate labor to the activities that are viable to them. Individuals who are able to do so engage in off-farm activities that are not directly affected by LSLAs, whereas those who are not able to do so continue to be significantly dependent on farming. This dependence affects women to a larger extent than men, and refers both to direct dependence on fields that are smaller, of worse quality, or whose access is conditional on payments, or indirect dependence through engagement in daily “biscatos”.

²⁷ The difference is statistically significant (single vs. married women $F_{1,137} = 11$, $P = 0.001$; site $F_{1,137} = 0.78$, $P = 0.379$; age of head of household $F_{1,137} = 0.18$, $P = 0.670$; generalized linear models with quasibinomial distribution).

²⁸ Forty-three percent (24 out of 56) of female heads of households and 9% (8 out of 85) of married women reported that their sustenance depended more on other members of their extended family. The difference is statistically significant, and older women received more help than younger women (single vs. married women $\chi^2_1 = 9.6$, $P = 0.002$; site $\chi^2_1 = 1.8$, $P = 0.177$; age of head of household $\chi^2_1 = 18$, $P < 0.001$; logistic regression).

Gender-blind LSLAs aggravate the feminization of poverty in Mozambique

In Mozambique, due to a combination of historical, economic and cultural conditions, a gender division of labor has prevailed and implied that women have predominated in smallholder farming (Fox et al. 2005; Raiumundo 2008; World Bank 2008b; Van Klaveren et al. 2009). This tendency is not new: data from the lower Limpopo in 1968 show that approximately 90% of the individuals engaged in farming in the valley were women (and of these, 42% were women who did not have husbands, i.e., widows, separated or single) (Covane 1996: 266).

These gendered occupational differences matter to the extent that households without off-farm income are found to be the poorest ones (Waterhouse 2001). Women’s relative poverty vis-à-vis men—an underlying condition for the feminization of poverty to occur (Fukuda-Parr 1999)—is noticeable in Mozambique where “the poverty of households varies significantly by the gender of the head of the household” with female-headed households being the most economically deprived ones (World Bank 2008b: 4).

Against this backdrop, the implications of gender-blind LSLAs are critical to women, particularly to those without complementary, and typically male, income sources. This is because as women are deprived of a central resource, they still face a multitude of extra barriers to access alternative livelihood sources. Comparative data illustrate some of these barriers: 48.8% of the women in the province of Gaza are illiterate in comparison to 23.5% of men (INE 2007), and in Mozambique, approximately 7.1% of all women who work receive a wage, in comparison to 23.4% of men who work (Fox et al. 2005). Furthermore, particularly in rural areas, cultural views on the inappropriateness of women working for wages tend to prevail, and it is common that husbands do not allow their wives to work for wages (Sender et al. 2006).

In light of the need to foster the formal wage market, indirect compensation for land loss in the form of jobs is commonly hailed by host governments (Hallam 2009). However, as is also the case in the lower Limpopo,²⁹

²⁹ During the project’s initial year, Wanbao employed 76 Mozambican men and 11 women under permanent contracts and 400 Mozambican men under temporary contracts. In addition, 446 Chinese nationals held permanent contracts. In 2017, the

created jobs are usually meager and occupy mainly male workers (Tsikata and Yaro 2014). Women noted difficulties in obtaining a secure job and explained that working from dawn to dusk in a single place was not ideal or feasible because they had caring and reproductive duties to fulfill during the day (Porsani et al. 2017: 1193). In an analysis of LSLAs in Rwanda, wage employment was seen as unattractive to farmers mainly because they lacked the time to work for third parties for full days (Ansoms 2013). Removing reproductive barriers through, for example, the public provision of daycare facilities and the improvement of infrastructure that can alleviate time and labor-intensive chores has the potential to minimize gender-based poverty and facilitate women's transition between smallholder farming and the wage sector (World Bank 2008b; Ferrant et al. 2014). Although such measures can be effective, it is important to note that steps that neglect context and culture are likely to fall short of expectations. Accordingly, although the interviewed women strived to conduct parallel cash-generating activities (i.e., “biscato” and petty trading), they emphasized their desire to maintain farming fields due to the long-term security provided by land as well as to the fact that their identity was strongly tied to being a farmer (i.e., women described themselves as the “suppliers of food” to their family and wanted their daughters and daughters-in-law to continue with their farming tradition).

Thus, LSLAs that follow an exclusive and gender-blind fashion, such as the one analyzed here, are responsible for eroding an important basis of women's livelihoods and thus impairing families' direct access to food and women's autonomy. Even though this process is generally graver for female-headed households, which generally have less productive resources and livelihood portfolios that are more dependent on land (see also Marule et al. 1999; O'Laughlin 2001; Waterhouse 2001; World Bank 2008b), it does not fully spare male-headed households that have also

experienced land loss without due compensation (see also Daley 2011).

Out of 141 households in our sample, one individual (male) was employed by Wanbao in only one household, and in no households did members participate in the contract-working scheme that Wanbao and RBL had established (see Porsani et al. 2017 for information on this scheme). Hence, in our study area, the feminization of poverty was not accompanied by an absolute masculinization of wealth. Instead, reduced access to agricultural produce and the cash derived from it led to the absolute worsening of men's and women's conditions. Nonetheless, since men were better able to engage in activities that were not directly affected by the LSLA, the process drove the increase in the relative importance of male-dominated activities and thus male-derived income. Accordingly, in male-headed households, wives stated that they had become more dependent on their husbands to obtain food and cash since land loss. This dependence would not be problematic if households were harmonious units of consumption. However, we know that there is tendency for male- or female-derived income to lead to considerably different livelihood outcomes due to intra-household power dynamics (Agarwal 1997; Doss 2011). In light of these different outcomes, land has been reasserted as a critical productive resource that strengthens women's agency and leads to, among other things, improved well-being for children (World Bank 2009). Thus, a focus solely on cash deprivation falls short of explaining women's worsening conditions vis-à-vis those of men (Fukuda-Parr 1999; Mutua 2001; Chant 2006).

In summary, differences between women's and men's capacities to access alternative livelihood sources mediate the implications of a waning smallholder farming sector and imply the need for gender-attentive analyses of LSLAs. The creation of male jobs, although important, will likely not suffice to counter the impairment of women's livelihoods. Compensation that is attentive to the everyday gender roles in productive and reproductive activities is critical to prevent the aggravation of pernicious poverty trends. This case underscores the vital need for governments to address structural barriers that hinder farmers, particularly women, from establishing themselves in occupations with higher returns and, not least, the centrality of transparent and inclusive community consultations, as a forum for

Footnote 29 continued

company did not reveal the numbers, but, according to informal conversations with our contact persons at the local government, these numbers were significantly reduced since a large part of the initial positions were to construct new infrastructure. Furthermore, in 2013, there were 23 “progressive” farmers, and in 2017, there were 170 who were part of a contract-working scheme established by Wanbao and RBL (for more information on this scheme, see Porsani et al. 2017).

the expression of different local standpoints, prior to LSLAs.

A note on the categories of female- and male-headed households

Based on the main findings of our study, we contend that, particularly in a context where livelihoods and poverty are gendered, attention to gender and marital status is critical to the understanding of the implications of land loss to individuals and their households. Nonetheless, it is important to underscore that categories such as female- or male-headed households, although useful analytical parameters in the context in question, in some cases can be deceiving and can never be deemed non-inviolable.

For example, among all male-headed households ($N = 85$), in three of these households, husbands did not work at all (were blind, could not walk, or were described as sick) and depended solely on their wives and/or on other family members. Often the woman/mother (with or without the help of her daughters and/or daughters-in-law) provided agricultural produce to their households and to the households of their adult children and received material support from the latter in the form of cash or products. In the face of worsening farming conditions, women heads of households reported to be more dependent on help from other family members. This dependence on family members as a livelihood alternative in difficult times is not new. For example, a study conducted in the 1990s showed that as an 80-year-old woman became unable to feed herself through agriculture, she became dependent on the income from her migrating nephew (Covane 1996). Among the interviewees, two elder women heads of households who did not have living children or grandchildren seemed particularly worse off. In one of the cases, the woman reported that her sole income source was a monthly poverty pension that she received from the government³⁰; in the other case, the woman had not managed to receive the

governmental benefit and reported that her sole source of nutrition was manioc cultivated in the sandy zones by her neighbors. Our data also indicate that age is an important analytical factor since households headed by elders possessed more farmland prior to land loss.

Finally, and in addition to the above parameters, it is important to note that belonging to a certain category, such as a male-headed household, is not a fixed feature. The instability of positions is particularly critical in regions where HIV is endemic and women are likely to remain widowed after their husband's death—the HIV prevalence in the province of Gaza is approximately 24% (INE and ICF International 2015). This instability is illustrated by the experience of one middle-aged woman from Lhovucaze who reported that the implications of land loss were aggravated by the sudden death of her husband, who had provided their household with income from “biscatos” as a construction worker.

In this study, we have used gender and marital status as the central analytical parameters. Nonetheless, our findings indicate that the incorporation of other factors (such as the health and age of household members and the strength of their support network) would represent a step forward to reveal not only the heterogeneity of households but also individuals' relative livelihood alternatives in the face of worsening smallholder farming conditions.

Conclusion

Mozambique is one of the countries often portrayed as containing large tracts of available land. As such, it has been targeted by a substantial number of LSLAs (FIAN 2010; Deininger and Byerlee 2011). The local consequences of these deals are under increasing scrutiny, and the results of these analyses will contribute to revealing the potential of LSLAs to foster or undermine the livelihoods of some of the most disenfranchised communities and groups. The promotion of these investments epitomizes the expectations of a market-led model of economic and social development through which large-scale commercial agriculture can benefit smallholder farmers (World Bank 2008b). However, as exemplified by our case, these acquisitions can have dire consequences, particularly for women.

³⁰ In our sample, out of 141 individuals, 3 (two elder women heads of their household and one man with a disability) received monthly governmental assistance (in Portuguese, “pensão de pobreza”).

In Mozambique, women's predominance in farming and worse economic conditions vis-à-vis men are neither new nor born from recent LSLAs (Covane 1996; Feliciano 1998; Raiumundo 2008; World Bank 2008b). Nonetheless, our findings indicate that non-inclusive and gender-blind LSLAs contribute to further impairing smallholder agriculture in multiple ways without providing appropriate livelihood alternatives to the affected farmers. On this matter, it is worth stressing once again that LSLAs that exclude communities and bypass consultation requisites are illegal according to Mozambican law (Porsani and Lalander 2018). Hence, attention should be devoted to the processes by which large tracts of land change hands in Mozambique and other developing countries. As this study has shown, levels of inclusion/exclusion and compensation can vary even within the same project.

The analyzed LSLA deprived both male- and female-headed households of quantity and quality of land (i.e., available fields were of smaller sizes, the quality of their land tended to be worse, and land access tended to become conditional on the payment of fees) and consequently decreased intra- and inter-site differences in terms of the amount of land under the control of households. Worse farming conditions have a stronger negative effect on the livelihoods of those with less access to off-farm income sources (i.e., generally women). Even though there are differences within and between our two study sites, as farming conditions worsen, men's labor tends to be allocated mainly to migration, fixed-wage employment, cattle rearing, and off-farm "biscato", whereas women's labor tends to be allocated to on-farm "biscato" (i.e., farming others' fields mainly in exchange for cash) and petty trading. In general, women's autonomy is curbed as married women rely more on their husbands to access food and cash, whereas women who head their households rely more on help from other family members. Thus, worsening farming conditions aggravate the feminization of poverty in our study area, a trend that is most vividly experienced by women heading their households. The feminization of poverty as experienced by the affected women comprises not only material deprivations of cash and food but also immaterial deprivations that have broad material consequences. Accordingly, land deprivation hampers women's ability to provide food to their families (and thus to assert themselves as farmers) as well as their

autonomy vis-à-vis their husbands or other family members.

Our findings underscore the need, particularly in areas in which governments wish to promote large-scale mechanized agricultural investments, for decision-makers to recognize the heterogeneity within the smallholder category, particularly the significance of gender in defining the relative weight of farming to different livelihoods. Despite the instability and non-inviolability of female- and male-headed categories, we argue that as analytical prisms, they bring us closer to understanding local realities, specifically the different conditions that mediate the implications of land loss to different households and their members.

Particularly in the context of LSLAs, our study stresses the importance of concerted efforts toward the minimization of occupational gender gaps and toward the expansion of more secure livelihood alternatives that take into consideration gendered standpoints. This latter measure necessarily implies not only official recognition that farm land is still of paramount importance to Mozambican livelihoods but also the fulfillment of the government's legal responsibility to hold investors accountable for 1) negotiating with land users in inclusive consultations and 2) complying with agreements on the creation of livelihood alternatives that are locally deemed appropriate by those whose land access is hampered. Alternatively, LSLAs in Mozambique—and possibly in other places where farming is a typical "women's activity"—will likely continue not only to drive the generalized immediate dispossession and deprivation of land-dependent livelihoods but also to aggravate gendered poverty trends.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Informed consent Informed consent was obtained verbally from all individuals who participated in this study.

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Appendix 1

See Table 4 which shows the data and the statistical tests on the proportion of households that received information and compensation.

Table 4 Proportion of households informed about the project and receiving compensation

Site	Male-headed households	Female-headed households
Informed ^a		
Chicumbane	21 (57%)	16 (48%)
Lhovucaze	0 (0%)	0 (0%)
Compensated ^b		
Chicumbane	8 (22%)	4 (12%)
Lhovucaze	0 (0%)	0 (0%)

^aLogistic regression of gender and age of head of household in Chicumbane: gender $\chi^2 = 0.51$, d.f. = 1, $P = 0.477$; age $\chi^2 = 0.51$, d.f. = 1, $P = 0.474$. In logistic regressions, interactions among gender, site and age were not significant and were dropped from the model. Absence of overdispersion checked. Statistical analyses were conducted in R 3.3.3 (R Core Team 2017)

^bLogistic regression of Chicumbane: gender $\chi^2 = 0.01$, d.f. = 1, $P = 0.925$; age $\chi^2 = 1.4$, d.f. = 1, $P = 0.245$

Appendix 2

Proportions of access types of lost land (Fig. 2) and acquired land (Fig. 3) were tested with multinomial models of Bayesian data analysis.

In Lhovucaze, 93% of lost land had been inherited, 6% of lost land had been given by authorities, and 1% had been occupied (Fig. 2). In Chicumbane, 56% of

lost land had been occupied, 30% had been inherited, and 14% had been given by authorities (Fig. 2). According to the posterior probability intervals, the sites differ from each other for every access type proportion.

For proportions of acquired land, the sites also differed from each other for every tested access type (Fig. 3). In Lhovucaze, borrowing or loaning land and receiving land as a gift from family or friends had, according to the posterior probability intervals, similar proportions (45–55%). No land was acquired by occupation or received as compensation. In Chicumbane, proportions of occupied land and land from compensation were similar (33–50%). Likewise, proportions of borrowed land and land given from family or friends were similar to each other (3–11%) but lower than in Lhovucaze.

JAGS with R package Rjags2 following Su and Yajima (2015) and Spiegelhalter et al. (1996)—multinomial logistic models section and *alli* example. Noninformative priors. Inspection of 95% posterior probability intervals of proportions of access of lost and acquired land. Access types with more than 5% average proportion were included in the analyses (for access of lost land: inherited land, land given by local authorities, and occupied land; for access of acquired land: occupied land, borrowed land, land given by family members or friends, and land from compensation). Gender of head of household did not have a discernible effect on access to lost and acquired land and was dropped from the models comparing the sites.

Appendix 3

See Table 5 which shows the data and the statistical tests of changes in agricultural land area available to affected households.

Table 5 Land area changes due to the project

(a) Area of agricultural fields in the valley (ha, mean ± SD)

Site	Male-headed households	Female-headed households
Land area before land loss		
Chicumbane	2.4 ± 4.2	1.5 ± 1.2
Lhovucaze	3.6 ± 2.6	2.8 ± 1.4
Land loss		
Chicumbane	1.9 ± 3.9	0.9 ± 0.7
Lhovucaze	3.1 ± 2.3	2.4 ± 1.4
Acquired land after land loss (all households)		
Chicumbane	0.2 ± 0.4	0.1 ± 0.2
Lhovucaze	0.2 ± 0.4	0.1 ± 0.3
Acquired land after land loss (only households that acquired land)		
Chicumbane	0.5 ± 0.5	0.3 ± 0.2
Lhovucaze	0.7 ± 0.5	0.6 ± 0.5
Land area after land loss (all households)		
Chicumbane	0.7 ± 0.9	0.7 ± 1.0
Lhovucaze	0.7 ± 0.9	0.5 ± 0.5
Land area after land loss (landless excluded)		
Chicumbane	0.8 ± 0.9	0.8 ± 1.0
Lhovucaze	1.0 ± 0.9	0.6 ± 0.5

^aAnalysis of covariance. For all linear models, interactions among gender, site and age were not significant and were dropped from the model. Log(x + 1) transformation of land area. Normality of random effects and residuals was inspected from Q–Q plots of residuals and homogeneity of variance from plots of fitted values versus residuals

^bPermutation test due to non-normal distribution, gender of head of household tested within each site and site tested within each gender of head of household (R 3.3.3, permTS function in package perm)

(b) Statistical analyses

	Gender of head of household		Site		Age of head of household	
	<i>F</i> _{1,137}	<i>P</i>	<i>F</i> _{1,137}	<i>P</i>	<i>F</i> _{1,137}	<i>P</i>
Land area before land loss ^a	5.1	0.026	32	< 0.001	3.5	0.064
Land loss ^a	7.1	0.009	50	< 0.001	3.5	0.065
Acquired land after land loss (all households) ^b	Chicumbane		Male-headed			
	<i>P</i> = 0.295		<i>P</i> = 0.998			
Acquired land after land loss (only households that acquired land) ^b	Lhovucaze		Female-headed			
	<i>P</i> = 0.073		<i>P</i> = 0.819			
Land area after land loss (all households) ^a	Chicumbane		Male-headed			
	<i>P</i> = 0.276		<i>P</i> = 0.410			
Land area after land loss (landless excluded) ^a	Lhovucaze		Female-headed			
	<i>P</i> = 0.816		<i>P</i> = 0.295			
Land area after land loss (all households) ^a	1.1	0.295	0.55	0.458	1.5	0.222
Land area after land loss (landless excluded) ^a	1.7	0.190	0.95	0.332	0.69	0.409

Appendix 4

See Table 6 which shows the data and the statistical tests of the acquisition of new land by smallholder

households that lost all their agricultural land due to project.

Table 6 Acquisition of new land by households that lost all land

Site	Male-headed households	Female-headed households
Chicumbane	12 out of 15 (80%)	9 out of 13 (69%)
Lhovucaze	11 out of 25 (44%)	5 out of 9 (56%)

Gender of head of household: $F_{1,58} = 0.005$, $P = 0.945$; site $F_{1,58} = 4.7$, $P = 0.035$; age of head of household $F_{1,58} = 0.14$, $P = 0.713$. Generalized linear models, quasibinomial distribution

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