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Land Restoration Amid Male Outmigration: The Cases of Burkina Faso and Kenya

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ABSTRACT

Within the global literature on ecological restoration, a subset of literature examines the relationship between smallholder land restoration and rural outmigration. However, intrahousehold dynamics surrounding the outmigration of one or more household members and the capacity of the household to undertake land restoration activities are often overlooked. With analyses rooted in Burkina Faso and Kenya, we explore the relationships between restoration, household labor, and rural outmigration, which is a prominent livelihood strategy in the two contexts. Our case studies draw on data from interviews, focus group discussions, and small-n household surveys in Burkina Faso and Kenya. Our analysis substantiates the need to consider migration in understanding and promoting smallholder land restoration. Our multi-sited approach further reveals that the contextually-specific characteristics of the migration event (i.e., type of migration [permanent or temporary], position of the migrant within the household, timing and duration of migration) play an important role in shaping restoration and gender outcomes. As male heads of households or their sons outmigrate periodically in Kenya compared to young men leaving seasonally in Burkina Faso, the impacts of migration on intrahousehold gender relations are more transformative in the Kenyan case study, with women garnering greater decision-making power on the family farm and in land restoration activities, whereas entrenched gender norms in the Burkina Faso case remain unchallenged by migration.

Keywords: Burkina Faso, gender, Kenya, land restoration, migration

Restoration Recap

- Rural outmigration is a widespread rural livelihood strategy that needs to be considered when promoting smallholder restoration.
- A multi-sited approach to evaluating the relationship between migration and restoration in two settings with high rural outmigration (Burkina Faso and Kenya) demonstrates the importance of understanding local context in restoration projects.
- The relationship between migration and smallholder restoration is contextually specific, and shaped by the type, timing, and duration of migration as well as the characteristics of specific restorative activities and their labor and seasonal requirements.
- Restoration projects and programs must consider gendered migration and labor patterns and intrahousehold decision-making when targeting households and their members with technologies or skills development opportunities to avoid further entrenching gender inequities.

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Given severe environmental degradation worldwide, ecological restoration is an area of critical concern (Suding 2011, Chazdon and Guariguata 2016, Wolff et al. 2018). Land restoration, referring to activities that aim to avoid, reduce, or reverse degradation processes and increase ecosystem service provision, are considered essential for myriad social and ecological goals, from climate change mitigation and reducing the impacts of global environmental change to food security and poverty alleviation (Cowie et al. 2018, IPBES 2018). When restoration efforts

are undertaken by rural households, understanding gendered livelihoods and intrahousehold division of labor is an essential but nascent area of concern (Broeckhoven and Cliquet 2015, Collantes et al. 2018, Crossland et al. 2021a).

In many contexts, smallholder land restoration efforts are occurring amid rapid rural transformations. In particular, growing rates of rural outmigration, predominantly among young men, are leading to aging and ‘feminized’ farming populations (Huang 2012, Radel et al. 2012, Kaag et al. 2019, Rigg et al. 2020). Shifting demographics are redefining human-environment relationships, divisions of on-farm and off-farm labor, and the organization of smallholder production (Jokisch 2002, Pattnaik et al. 2018, Jokisch et al. 2019, Spangler and Christie 2020).

The connections between migration and environmental degradation have garnered attention in the literature. Such research has explored the complementarity between migration and agrarian-based livelihoods, as well as the complex relationships between land degradation and rural outmigration, land use systems in migrant-sending and migrant-receiving destinations, and remittances and land use, among others (Warren et al. 2001, McLeman 2017, Radel et al. 2019). However, the link between migration and household capacities to restore land has received little attention.

As such, in this article, we examine smallholder land restoration activities in two sub-Saharan African countries, Burkina Faso and Kenya, each of which has committed to restoring five million hectares of degraded land by 2030 (AFR100 2019). We explore the relationships between restoration, gendered household labor, and rural outmigration, which is a prominent livelihood strategy in the two study contexts.

We hypothesize that smallholder restoration activities are strongly affected by rural outmigration due to the drop in household labor availability, and that additional labor burdens of restoration activities are placed on the household members who remain at the homestead, particularly women and elders. In testing our hypothesis, we explore themes relating to type of rural outmigration (permanent and temporary), intrahousehold dynamics surrounding migration and labor distribution, and contextual differences in how these trends play out in the Burkina Faso and Kenya cases. We focus on households with one or more migrating members to better tease apart the relationship between smallholder land restoration and migration.

We first introduce the study sites in Burkina Faso and Kenya and the restoration activities of focus in each country, before presenting our study methodology. In our subsequent results section, we describe the study populations and their migration patterns in rural Burkina Faso and Kenya. We then explore the land restoration activities conducted in each study country, reported limitations to smallholder agriculture, connections between migration and household land restoration practices, and the gendered

household labor patterns that characterize these tasks. In the discussion, we bring the country cases together and propose a framework for understanding the relationship between migration, gendered household dynamics, and a household’s capacity to restore its lands. In conclusion, we highlight the contributions of our results to the field and practice of restoration.

Contextualizing the Study

Study Sites

This article draws on data from Burkina Faso and Kenya (Figure 1). The **Burkina Faso** case focuses on Oubritenga Province, a semi-arid region in the country’s Central Plateau (Figure 1). Among the area’s predominantly ethnic Mossi households, polygamy and composite households are common (Skinner 1964, Guirkinger et al. 2021). Gendered power inequities are prevalent within and beyond the household, with men tending to occupy household headship and decision-making positions (Nanama and Frongillo 2012, Langill et al. 2023).

Livelihoods in the Central Plateau are primarily focused on smallholder agriculture and livestock rearing (Wouterse 2008). However, environmental change is a growing obstacle to agrarian activities due to insufficient and unpredictable rainfall and land degradation, leading to declining agricultural yields (Reij et al. 2005, de Longueville et al. 2020, Ilboudo Nébié and West 2019). Hence, numerous soil and water conservation initiatives have been implemented across the region (Zampaligré et al. 2014, Schuler et al. 2016, Nyamekye et al. 2018, Vinceti et al. 2020).

Amidst this backdrop, rural dwellers are pursuing new off-farm income-generating opportunities in neighboring locations, such as gold panning and dry season horticulture. Rural outmigration, particularly among young men, is an important trend in the region, driven by interwoven environmental, social, and economic factors (Wouterse 2008, Sanfo et al. 2017, Kazianga and Wahhaj 2020, Langill et al. 2023).

The **Kenya** case study focuses on the Ukambani region of eastern Kenya (Figure 1). In this region, intrahousehold dynamics are largely shaped by patriarchal norms, with men typically being seen as the household head and women as the caretakers of the home and children (Muok et al. 1998, Ifejika Speranza 2006, Kiptot et al. 2014). Despite equal land ownership rights in Kenya’s constitution, women’s land rights are often restricted by local customs, and men tend to have greater access to and control over land, and authority over agricultural decisions (Musangi 2017).

Livelihoods across this semi-arid region consist mainly of small-scale, rainfed mixed farming (Jaetzold et al. 2006). Maize is the most widely cultivated crop along with legumes such as cowpea, pigeon pea, and beans. Livestock keeping consists largely of raising goats and local cattle breeds.

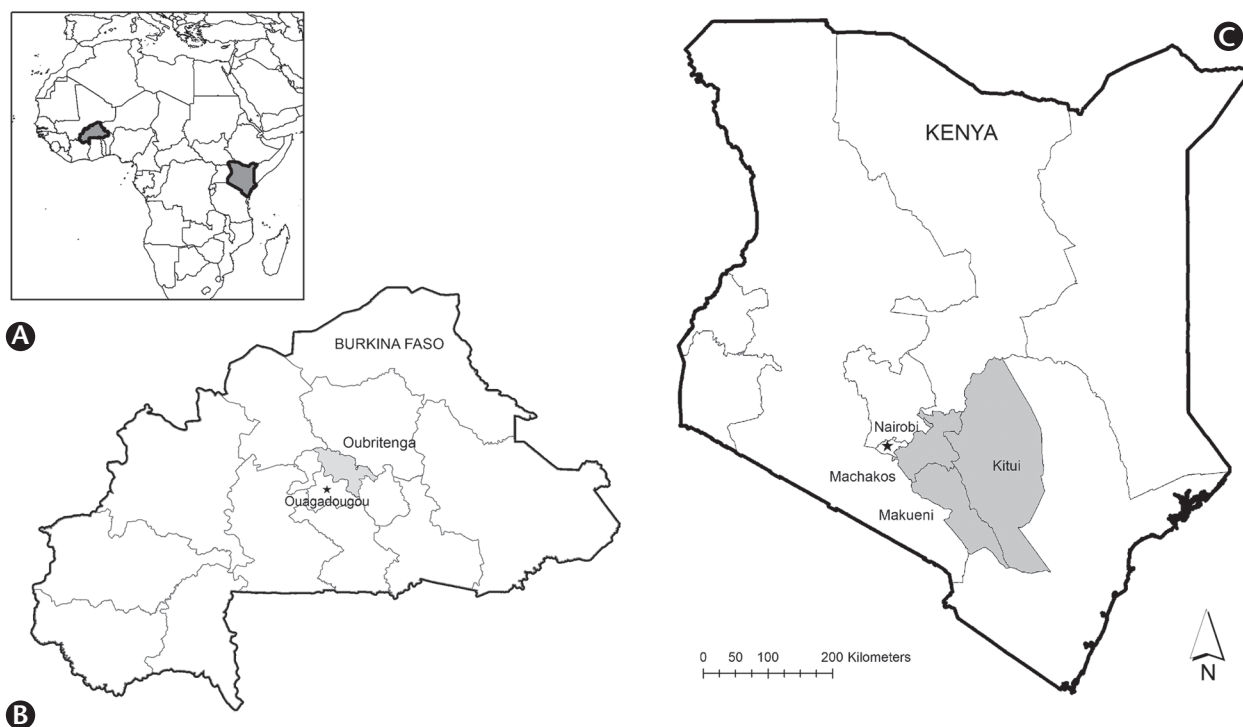


Figure 1. Study sites located in Burkina Faso and Kenya, Africa (A). Specific study site locations in Oubritenga Province, Burkina Faso (B), and Makueni, Kitui and Machakos Counties, Kenya (C).

Agricultural productivity is limited by low and unreliable rainfall, declining soil fertility, extensive land degradation, and small farm sizes. Widespread drought and crop failures are frequent occurrences, and many rural households experience food insecurity and poverty (KFSSG 2019).

Given the unreliable returns from farming and lack of local off-farm employment opportunities, households are increasingly diversifying their income streams through labor migration, where members, primarily young men, leave the household for extended periods of time to earn income in urban areas, such as Nairobi and Mombasa. These migrants typically pursue non-agricultural work, such as working as casual laborers in construction, taxi drivers, and security guards, and return to their rural homestead periodically for only short periods of time (Ifejika Speranza 2006, Crossland et al. 2021c).

Restoration Projects and Practices in the Study Sites

In Burkina Faso, the research was conducted in collaboration with *Association tiipaalga*, a local NGO working on land restoration. In the study site, *Association tiipaalga* was providing community awareness on land degradation, and training in five land restoration techniques (described below). Through this training, participating households were encouraged to undertake restoration activities, and in some cases, tools such as machetes or a *daba* (hoe) were

provided, but no additional compensation was offered. Considering that restoration activities occurred on private land, incentives were related to improved yields and on-farm ecosystem services, rather than direct financial compensation for labor invested in the restoration activity. The impetus for this research stemmed from *Association tiipaalga*'s observation that although men expressed interest in land restoration, they were often absent from training sessions due to migration. As such, *Association tiipaalga* wanted a better understanding of intrahousehold considerations surrounding gender and migration to better inform their restoration initiatives.

In Kenya, the research was embedded in a dryland restoration project (running from 2015–2020) (World Agroforestry 2020) that worked with smallholder farmers to establish trials and monitor the performance of two promising on-farm land restoration practices: tree planting and *zai* planting basins. The project selected these practices based on consultations with communities on the practices that they wished to try on their farms (Sola et al. 2017). The research program provided interested participants with training in these practices and tree seedlings at no financial cost for participants. Program staff noted that, despite land ownership and management being largely governed by patriarchal norms, 67% of program participants were women, many of whom reported increased freedoms over farm management decisions in the absence of their migrant husbands (Crossland et al. 2021a, 2021c). The program

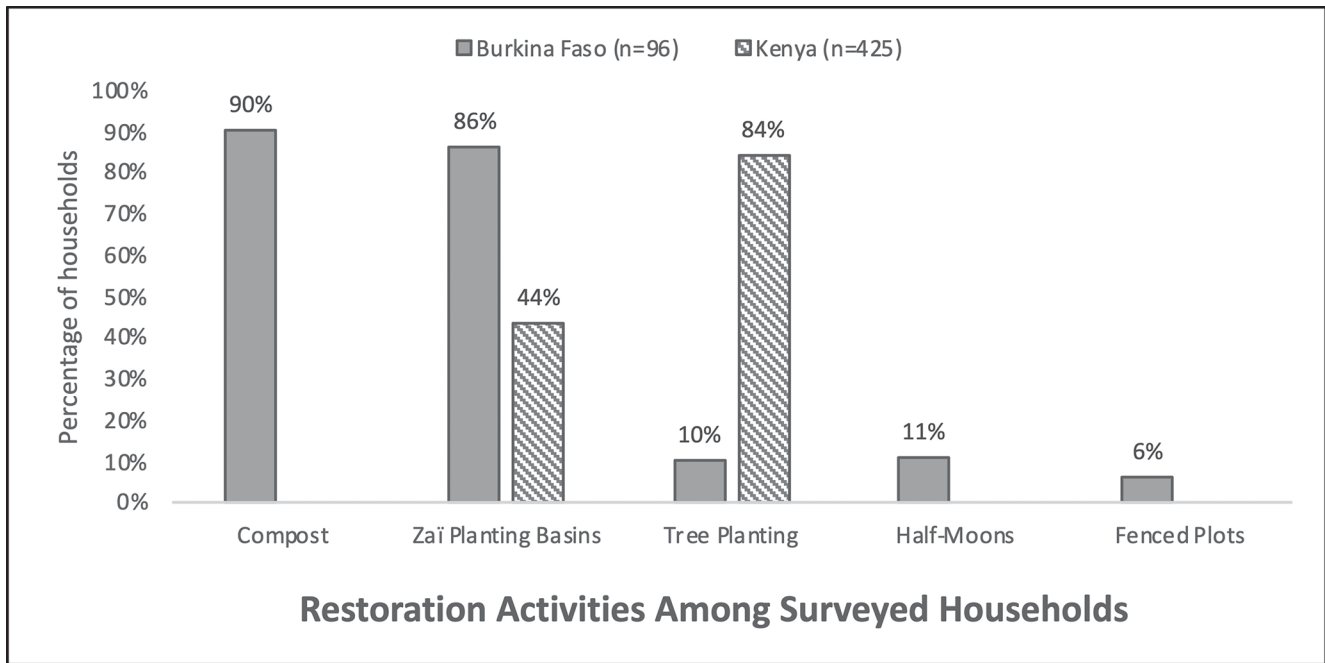


Figure 2. Promoted restoration activities implemented by surveyed households.

thus sought to better understand the connections between intrahousehold gender relations, migration, and the uptake of restoration practices.

In this article, we analyze five restoration activities that were being promoted by one or both of the restoration NGOs in the study countries: zaï planting basins, tree planting, composting, half-moons, and fenced plots where assisted natural regeneration was practiced. All five activities were adopted by at least some of the participating households in Burkina Faso, whereas only the first two were promoted among participating households in Kenya.

Zaï planting basins are a soil and water conservation technique involving digging shallow pits that catch water runoff, reduce soil erosion, and improve crop yields. The basins are filled with manure or compost before crops are planted therein (Mazvimavi and Twomlow 2009, Schuler et al. 2016, Muli et al. 2017). Tree planting to increase tree cover on farms is a key approach to dryland restoration, with both ecological and socio-economic benefits. It helps to control erosion, enhance soil fertility, and support local livelihoods through the provision of goods and products such as food, fuel, and timber (Brancalion et al. 2019, Lohbeck et al. 2020, Vinceti et al. 2020). Composting refers to the preparation and use of organic fertilizer, whereas half-moons are semicircular basins for planting crops and trees that play similar ecological roles as zaï pits. Last, fenced plots in this study refer to creating a metal fence around a smallholder household’s agricultural plot of approximately three hectares to prevent grazing and encroachment in order to protect planted or spontaneously regenerating species. In these plots and beyond, farmers practice assisted natural regeneration (or specifically,

farmer-managed natural regeneration when the goal is to restore trees to agricultural land), which consists of selectively protecting and managing tree seedlings, and removing barriers to natural regeneration of trees on farms or in forests (Conservation International 2022). This more ‘passive’ restoration method is less resource- and labor-intensive than the others described above, but still requires labor to prune and coppice resprouting stems.

The proportion of households in each study context that undertakes these practices is shown in Figure 2 to contextualize the results. These data, however, are not necessarily representative of regional restoration patterns, since they reflect the selective targeting and involvement of participants in the activities of the restoration NGO in each study site. Some households in the study areas also practice these or other restoration activities (e.g., assisted natural regeneration, stone bunds, and terrace bunds) without the support of restoration NGOs.

Methods

Data Collection

In Burkina Faso, data were collected in 12 study villages between September 2019 and August 2020 in Dapelogo Commune (five villages) and Zitenga Commune (seven villages) of Ouhritenga Province. In Kenya, data collection occurred between January 2018 and November 2019 in 70 villages from Makueni, Kitui, and Machakos counties (Figure 1).

Although we did not use exactly the same instruments across countries, we adopted similar methodologies to

allow for cross-case analysis. Themes explored in each country focused on outmigration, household dynamics, and restoration practices. The two cases were brought together iteratively, sharing preliminary results and observations across research teams, which helped to identify key themes in our findings and further questions to consider. In both cases, we defined permanent migrants as those who have left the homestead over the preceding five years and who no longer eat or live in the household, excluding women who have left for marriage. In turn, we defined temporary migrants as those who leave the homestead for multiple weeks or months of the year, after which they return to the household. The data presented below stem from a larger research project exploring these themes (see [Supplementary Materials A-I](#) for data collection instruments; for further methodological information and datasets for Burkina Faso, see Elias et al. [2021], Langill et al. [2023]; for Kenya, see World Agroforestry [2020], Crossland et al. [2021b]). For the purpose of this article, we present only the subset of data from households with migrants from each dataset.

The methodology comprised a mix of qualitative and quantitative data collection methods. In Burkina Faso, key informant interviews (n=55) were held with local women and men resource persons to develop community profiles of the socio-economic and environmental contexts of the study communities. A household survey was then conducted in both countries (n=96 in Burkina Faso, n=425 in Kenya) to collect household-level data on migration and the family farm (mainly administered with heads of households or their spouse). The survey addressed household characteristics, existing farming practices, decisions over the restoration practices promoted by the projects, and labor contributions of household members. Participating households were randomly selected from those working with partner NGOs.

We subsequently conducted a survey with migrants from a subset of the above-mentioned households in Burkina Faso (n=14) and Kenya (n=9) to capture the migrants' own experiences of migration, restoration, and the relationships they maintain with their household and family farm. To explore the effects of migration on the household and farm production from the perspectives of women who remain on the farm, namely the wives and mothers of migrants, we additionally conducted a survey with women from households with migrants (n=79 in Burkina Faso; n=47 in Kenya).

Finally, in Burkina Faso, five focus group discussions (FGDs) were held with members of households with migrants, whereas in Kenya, seven FGDs were held with individuals from households with and without migrants. All focus groups were run with men or women separately, except for one in Burkina Faso that had both men and women present. FGDs took a deeper dive on all study themes, from land degradation and restoration to

livelihoods, migration, and gender. Specific discussion topics included patterns of migration within the communities and impacts of migration on sending households and their agricultural systems.

Data Analysis

To understand the gendered processes and dynamics surrounding migration and restoration, we conducted an integrated, mixed-method analysis of the data for each country according to the same pre-determined themes across countries (i.e., deductive thematic analysis). We interpreted the quantitative patterns from the survey data with the help of qualitative data gleaned from the interviews and FGDs. We then brought our country cases together to garner insights from exploring these themes across different socio-cultural and migration contexts. Bringing the two cases together allowed us to better examine the strength of the patterns observed, and the role of different contextual factors in influencing migration processes and their outcomes. Based on this analysis, we propose a conceptual framework highlighting the key factors shaping household capacities for restoration in a context of outmigration, which we present in the discussion below.

Results

Characterizing Outmigration from the Study Sites in Burkina Faso and Kenya

Based on survey data, we find that households in the Burkina Faso case study have on average more than twice as many household members as in the Kenya case, as well as larger cultivated land sizes (Table 1). Relatedly, polygyny is prevalent among surveyed Burkinabè households (observed in 61% of households) but was not reported among any household in Kenya. In both study contexts, the analysis of survey data reveals that temporary migration is more prevalent than permanent, and households with migrants tend to have either temporary or permanent migrants, rarely both. In both settings, migration is male-dominated (92% and 77% of migrants are men in the Burkina Faso and Kenya samples, respectively), but there are notable differences in migration patterns across these two contexts.

In the Burkina Faso case, migration is a growing trend among male youth, with the average age of migrants from surveyed households being 28 and 26 years old for permanent and temporary migrants, respectively. Migrants are typically the son of the household head (62%), followed by the brother of the household head (19%), but rarely the household head himself (11%). Seasonal, temporary migration to domestic locations (whether urban or rural) is increasingly prevalent (55%) compared to the previously dominant international permanent migration (19%), with temporary migration offering more flexibility to return

Table 1. Characteristics of households with migrating members.

	Burkina Faso (n=96)	Kenya (n=425)
Household Size*		
Total household members	12.68 (3-30)	5.68 (1-36)
Adult household members	6.14 (2-14)	3.27 (1-10)
Household Cultivated Land Size (hectares)*	3.34 ha (0.5-25)	2.00 ha (0.05-15)
Migration Status		
Permanent migrants only	27% (26)	17% (71)
Temporary migrants only	64% (61)	69% (295)
Both permanent and temporary migrants	9% (9)	14% (59)

*Presented as mean (range).

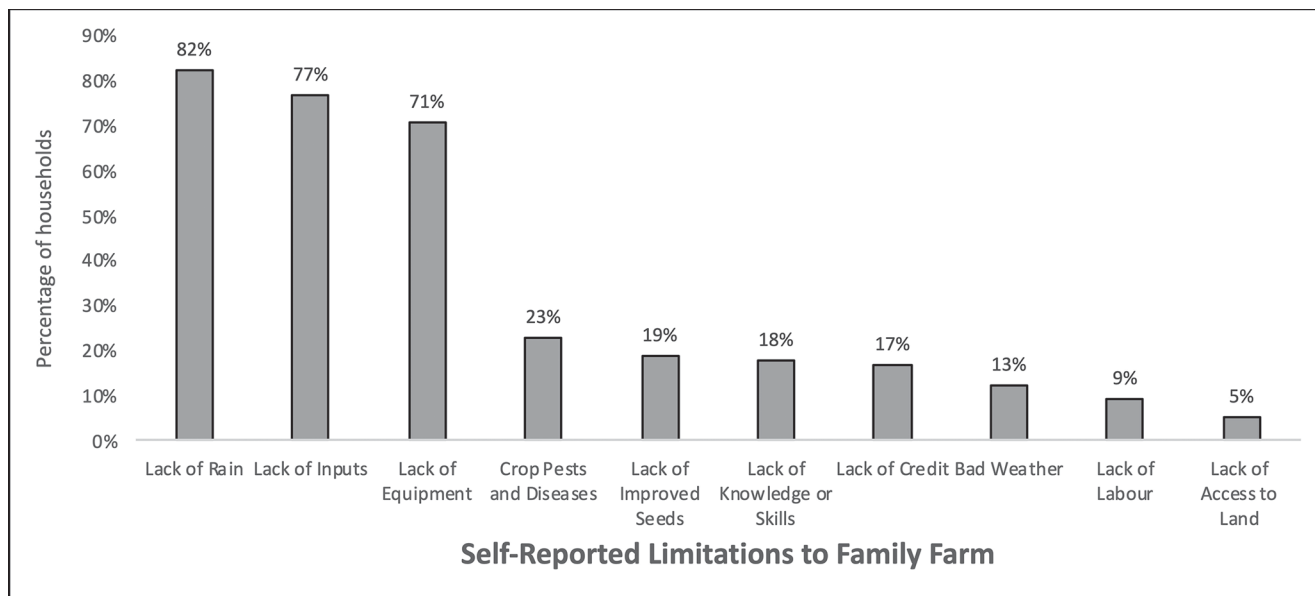


Figure 3. Limitations to family farming among migrant-sending households in Burkina Faso (n=96).

home to contribute labor to the family farm during the peak of the agricultural period. Across our dataset, we found that rural outmigration in this context is driven by environmental degradation, poverty and a lack of local income-generating opportunities, as well as socio-cultural expectations (see Langill et al. [2023] for further discussion). According to our survey data, approximately 60% of migrants send remittances to household members at the homestead.

Among surveyed households in the Kenya case, migrants are also most often the son of the household head (47%); however, in contrast to Burkina Faso, migrants are also commonly the male household head (30%), particularly for temporary migrants, or the daughter of the household head (18%). Migrants are on average slightly older (35 and 36 years old for permanent and temporary migrants, respectively) than in the Burkina Faso case. The majority of migration is to urban centers (78%), followed by rural domestic locations (22%), and international migration is rare (<1%). While temporary migration is also more common than permanent migration in our Kenya case,

unlike in Burkina Faso, migrants rarely return to work on the family farm during the agricultural season.

Outmigration in Kenya is similarly driven by multiple interrelated factors, such as irregular rainfall, the need to earn income to pay for food and tuition fees, and a strategy of household livelihood diversification (see Crossland et al. [2021c] for further discussion). Remittances were much more common in the Kenya case, with 78% and 96% of households with permanent and temporary migrants, respectively, receiving remittances from migrating members. Amid these trends, participants in both Burkina Faso and Kenya reported that migration has increased in recent years and that they anticipate it to continue to grow as a livelihood activity in future years.

Restorative Activities

Restorative Activities in Burkina Faso

All of the households surveyed reported that their family farm is limited in one or more ways. Lack of rain, inputs, and equipment were the most commonly reported limitations, each experienced by over 70% of surveyed

households (Figure 3). FGD participants and interviewees across all study sites also repeatedly raised the concern of erratic and insufficient rainfall. Key informants additionally shared that local environmental changes, such as land degradation and reduced tree coverage, are of growing concern: “If it continues like this, future generations will have serious problems.” (Man key informant, Bagatenga).

Rural outmigration is one key strategy that households in Oubritenga Province adopt to address these limitations—with implications for the family farm. As FGD participants explain, while migrants may be able to contribute to some activities, smallholder households lose some of their labor contributions for labor-intensive activities, including some of the restoration activities described above.

We often wait for [migrants] to perform certain activities, especially activities or techniques that require more labor. However, these activities are often dropped and the cultivated area is simply reduced, taking into account the fact that [the migrants] are not there. In this case, we have to focus on subsistence crops and give up on cash crops. We sometimes have to abandon some of the assisted natural regeneration techniques (Men’s FGD, Zitenga).

Migrants have no influence over decisions about which agricultural activities will be performed because they usually leave before the start of activities. They often leave even before zaï activities begin. If they leave, you who stayed, you do your zaï according to your abilities and then you plough with the plough and donkey (Women’s FGD, Zitenga).

The absence of migrants thus has implications for the labor requirements of those who remain at the homestead:

[Migration] makes some activities difficult, especially at harvest time when they [migrants] cultivate and then go away leaving the rest of the work to non-migrants. Also, as they are not there at the beginning of the work to build stone bunds, those who stay suffer a lot because it is very physically-demanding work and it is very tiring. We know that if those who left were here, it would reduce our fatigue (Men’s FGD, Komnogo).

As young men are the main migrants in our study context, these additional labor burdens are placed on the women and older men who less commonly migrate.

Surveyed households with temporary migrants adopt significantly more of the restoration activities introduced above than households with permanent migrants (T-test, $p < 0.01$). For example, of households with temporary migrants, 94% undertook composting and 90% adopted zaï planting basins, whereas 86% and 76% of households with permanent migrants adopted the same techniques, respectively.

Most of the households that practice any of the five restorative activities of focus reported in the survey that despite the labor adjustments elucidated above, outmigration did not altogether interrupt their restoration practices. Impacts could still be felt among some, however. Twice as many respondents (25% versus 12%) considered that establishing zaï pits was negatively affected by outmigration of a household member compared to composting. This is consistent with our qualitative findings that zaï is a much more labor-intensive and seasonal restorative activity than composting.

Figure 4 shows who within the households surveyed is involved in deciding to adopt a restorative practice (4A), who contributes to the implementation and maintenance of the practice (4B), who has skills related to the practice (4C), and who is involved in capacity strengthening activities related to the practice (4D). We focus on four categories of active household members: the household head (male in the Burkina Faso context, as defined by respondents), wife of the household head, other working-age men, and other working-age women. Participation by household elders, other community members, or hired labor was rarely reported in the household survey, and is therefore excluded from this figure.

We find that the male household head tends to be involved in all aspects shown in Figure 4, regardless of the specific restoration practice. In turn, his spouse(s) tend(s) to provide a high labor contribution to restoration, but participate(s) less in decision-making, and is/are largely perceived to lack the skills needed to carry out restoration activities and to have low participation in capacity building activities. Similar patterns are observed for other working-age men and women in the household, though their levels of participation are considered much lower overall than for the spouse(s) of the household head, and lower still for other working-age women than for other working-age men. Overall, despite their labor contributions, these other household members are perceived as contributing little to decision-making, having few of the skills required, and participating little in capacity building opportunities related to restoration.

While decision-making tends to remain in the hands of the male household head, some FGDs offered examples of how women who have received training on restoration have been able to convince their husbands to participate in restoration activities:

Yes, there are women who listen to the advice of agricultural technical officers and who manage to convince their husbands to adopt [restoration practices] by putting them into practice in their own fields. Some women have adopted the methods by applying them in the small plots of land that their husbands have given them. When the husband sees that the method is right and his wife wins,

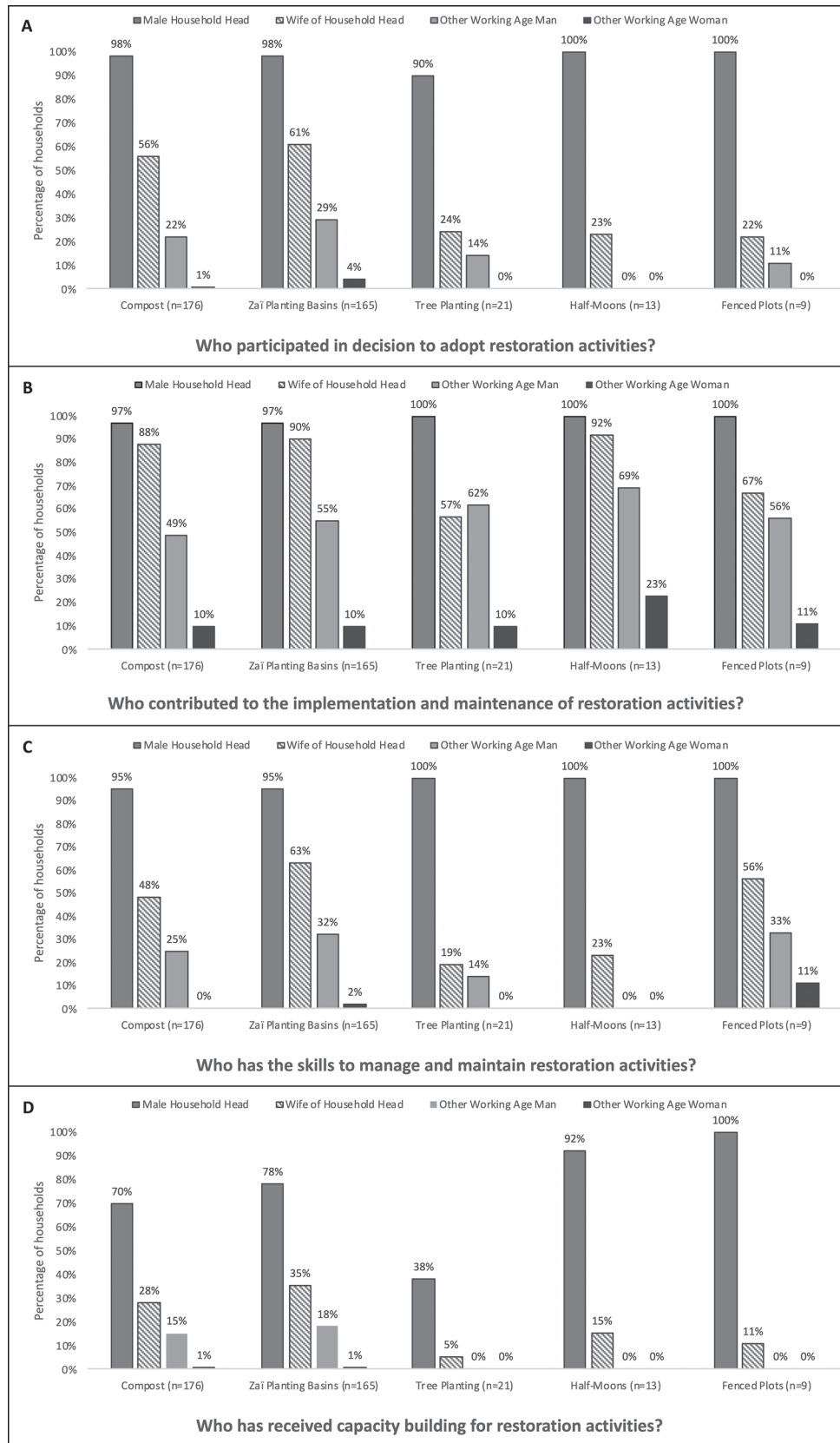


Figure 4. Household member participation in land restoration activities—Burkina Faso. Who participated in decision to adopt restoration activities (A), who contributed to the implementation and maintenance of restoration activities (B), who has the skills to manage and maintain restoration activities (C), and who has received capacity building for restoration activities (D).

he ends up accepting it in his field even if at first he was reluctant. (Men's FGD, Komnogo)

We used to cut [all the trees] to clear because we thought that shading would harm our crops, but now we prune trees and let them regenerate. With the knowledge we have gained on assisted natural regeneration, we influence our husbands a lot and encourage them to do as we do. Before we made zai pits without respecting the appropriate specifications; but with the different trainings we received, now when we dig the holes, we put dead leaves in them and this contributes to the enrichment of the soil. (Women's FGD, Zitenga)

Most FGD participants expect greater participation in restoration activities in their villages in the future. Women's as well as men's focus group participants explained that these practices enable higher yields from smaller cultivated areas, and that local knowledge of land restoration activities is increasing with time. Some FGD and survey respondents intended to participate in training on restorative activities in the future.

Restorative Activities in Kenya

As in Burkina Faso, all of the Kenyan households surveyed reported one or more limitations to their family farm. Erratic rainfall was again the most commonly reported limitation; however, this was even starker for the Kenyan respondents (Figure 5). As one woman interviewee noted, an increase in land restoration activities has accompanied the growing unreliability of rainfall:

Agriculture is not doing as well because rain sometimes fails us. Ten years ago, there was no training [on restoration] but there was rain. Now, there are more training opportunities, but there are no rains. (Woman interviewee, Kibwezi East, Makueni)

Soil quality is a pressing concern in the Kenyan study (Table 2), with only 13% of surveyed households reporting high quality soils, 71% experiencing soil erosion, and 22% crusted soil surface. Of those who have erosion control measures (294 households), terraces were by far the most common, followed by terrace bunds (locally known as *fanya juu*). One woman interviewee explained how, even with less rain than before, maintaining soil moisture through these various measures has helped to increase yields. However, others explained how smallholders face constraints in their attempts to minimize erosion and maximize farm productivity, such as accessing farm inputs and tools.

In contrast to the results from Burkina Faso, survey results from Kenya show that both decision-making and labor contributions in tree planting and zai planting basins are most common among women, specifically the

household head's wife or the female head of the household,¹ followed by the male head of the household or husband (Figure 6). Women interviewees explained their autonomy in deciding to participate in the restoration project:

I am the one who decided to join [the project]. If I had asked [my husband], he would have said no . . . but I decided to do it on my own. (Woman interviewee, Mwingi East, Kitui)

Moreover, unlike in the Burkina Faso case, FGDs revealed that women's participation in farming decision-making increases in the absence of their migrant husbands. Yet, migrants are often still consulted on certain larger decisions, such as selling livestock, hiring labor, and digging terraces and basins. Men migrant interviewees explained that this is because they are the ones providing the capital through their remittances to the household.

Women interviewees also spoke of how their participation in the land restoration project had increased their involvement in farming decision-making given the knowledge they had gained, a shift not observed in the Burkina Faso case:

There was a large increase in her involvement in farming decisions after joining the project and due to the new knowledge she had gained from the trainings. She was able to make decisions about the basins. She didn't discuss them with her husband, he came home and found them dug. She had gained new knowledge and skills and had to put them into practice. She couldn't wait for her husband to come back to discuss it. (Researcher notes from interview with woman with migrant husband, Mwingi East, Kitui)

The primary woman (household head or his spouse) in the household also tends to contribute the most labor to restoration activities, followed by the primary man (household head or her spouse) in the household. This pattern is more pronounced for digging zai planting basins than tree planting, and greater for watering trees specifically than for planting trees (Figure 6B). Like the situation in Burkina Faso, the decision-making and labor contributions of other household members tend to be much lower, and survey results show even more drastic differences between

1. Although only in a minority of surveyed households, in the Kenya case, there are instances where participants referred to female household heads even when these women were married with a male spouse (in the survey, household head was defined as the household member primarily responsible for decision making, both social and economic). We thus use the terms "Male head / husband" and "Female head / wife" to distinguish between male and female spouses. In contrast, in Burkina Faso, there were no cases reported of female household heads when a male spouse was present. In Kenya, migration is less seasonal, and husbands spend longer periods away from the household; thus, women may be more likely to report themselves as de facto heads in their husbands' absence. These observed differences are also occurring in different gendered socio-cultural contexts.

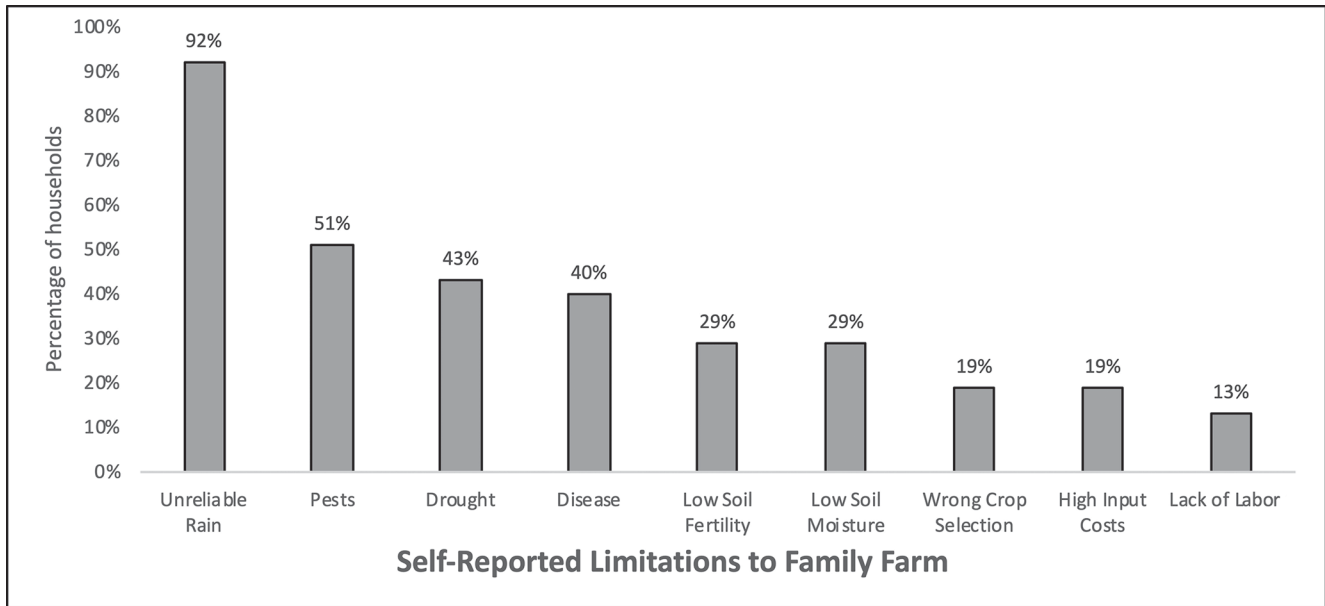


Figure 5. Limitations to family farming among migrant-sending households in Kenya (n=425).

Table 2. Self-reported family farm soil characteristics in Kenya.

	Households with Permanent Migrants Only (n=71)	Households with Temporary Migrants Only (n=295)	Households with Both Migrant Types (n=59)
Soil Quality			
High	13% (9)	13% (37)	19% (11)
Medium	56% (40)	66% (194)	63% (37)
Low	31% (22)	22% (64)	19% (11)
Soil Erosion	76% (54)	68% (201)	78% (46)
Soil Surface Crusted	28% (20)	22% (65)	15% (9)
Erosion Control Measures Implemented	76% (53)	67% (196)	78% (45)

Note: Data from household survey. All presented as percent (number) of households.

decision-making and labor contributions in the Kenyan case (Figure 6).

Importantly, our interviews with women identified that women’s labor inputs in restoration activities result in increased overall workloads for women. As one woman interviewee explained: “In the past the rains would carry away the topsoil but when I joined [the restoration project], I dug terraces to prevent that erosion. I also learned how to dig [zai planting basins], so the work on the farm was a lot.” (Mwingi East, Kitui) Another stated, “There was an increase [in my workload] because digging the basins and maintaining them was additional work I did not have before.” (Kibwezi East, Makueni) Nevertheless, despite the additional labor burden, digging basins was perceived to be worthwhile given the increased crop yields. Digging basins also occurs during the dry season when the labor demand for other farming activities is low. The interviews with women and FGDs indicate that women’s workloads typically increase following the migration of their husband

or a son or daughter, with women taking on additional responsibility, including for typically male-dominated farming activities, such as ploughing, grazing livestock, digging terraces and basins, fencing, and tree planting, which are all physically demanding.

Men usually take care of cattle but if they’re away women have to do it. Same with the ploughing and spraying. This is not good because it’s a lot of work. Sometimes [women] have to plough even carrying a baby on their backs. (Women’s FGD, Yatta, Machakos)

While migrants were generally said to be very supportive of women’s farming efforts and activities, four women interviewees spoke of having been discouraged from digging zai planting basins by their husband or son out of concern that the activity is too strenuous. As one woman recounted, “[my son] told me that [digging basins] was too much work and I would get tired . . . he was not happy

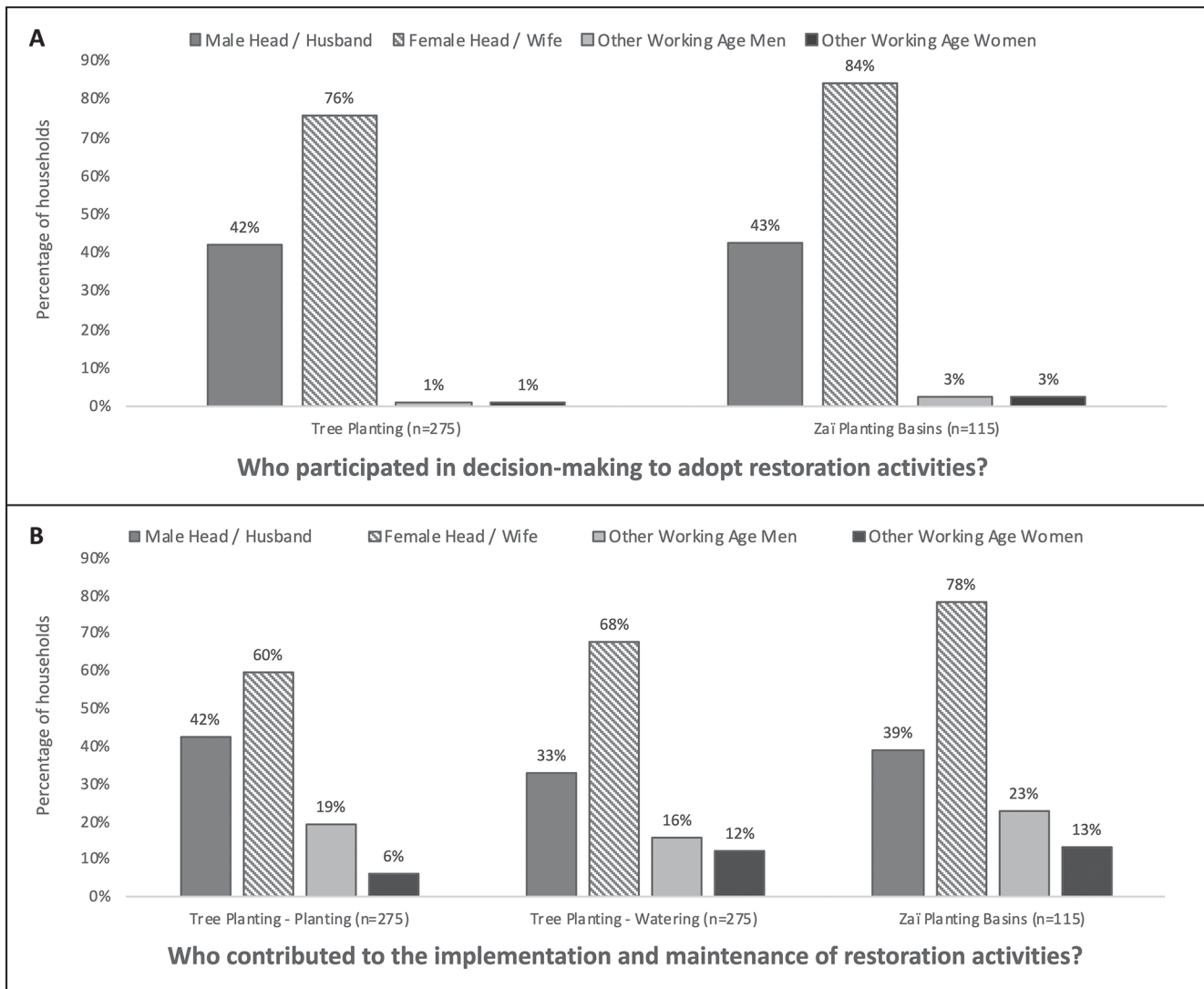


Figure 6. Household member participation in land restoration activities—Kenya. Who participated in decision-making to adopt restoration activities (A) and who contributed to the implementation and maintenance of restoration activities (B).

at all, but I told him I will do it because I was trained.” (Kibwezi East, Makueni)

Indeed, the high labor input required for restoration activities was a commonly cited concern by our respondents. Some surveyed households have drawn on hired labor and cooperative labor to help with digging zai pits. Between the two restoration practices, using hired labor or labor exchange groups is more common for digging zai planting basins than for tree planting. However, a household’s ability to hire labor was typically tied to the receipt of migrant remittances: “[farm labor] is a problem when children leave and when a husband leaves, especially if he doesn’t send money. If the husband sends money, it’s not a problem that he’s away.” (Women’s FGD, Yatta, Machakos). Interviewees also reported using migrant remittances to hire labor specifically for restoration activities: “If I need a terrace or planting basins dug, I hire people using

the money that my sons send me.” (Woman interviewee, Mwingi East, Kitui)

FGD participants generally concurred that learning opportunities related to farming in the region had increased due to trainings on land restoration, soil and water conservation, and knowledge in such practices. Similarly, women interviewees spoke of improved opportunities given increased training:

[Opportunities] have increased as compared to before when there were no platforms where people could get educated or trained on better farming practices. Nowadays there are so many platforms where the people get educated about agriculture and how to improve their farming practices. Yes, I have learnt how to improve my farming and harvesting through the various practices such as digging zai pits and applying pesticides to my crops and how to

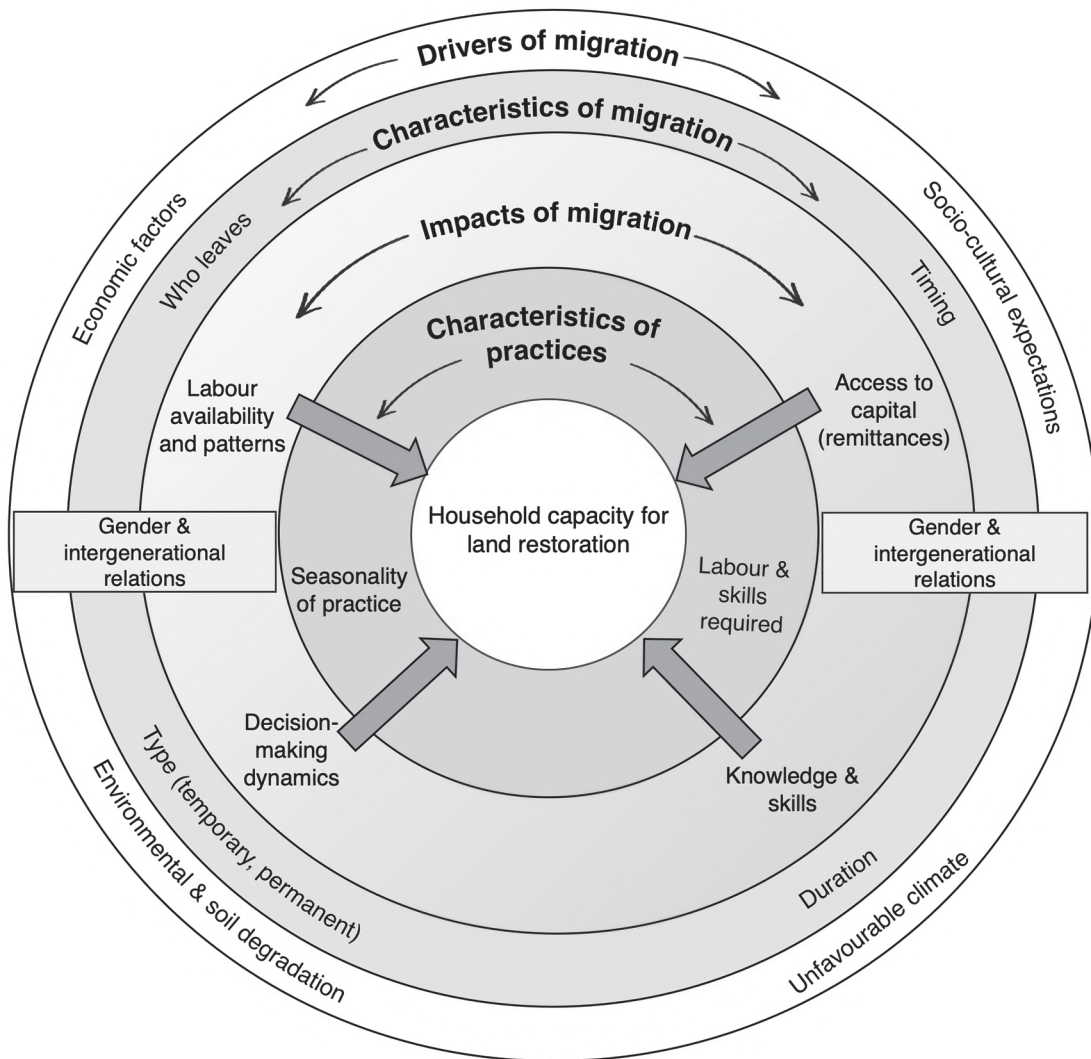


Figure 7. Conceptualization of household's capacity for land restoration amid outmigration.

conserve water on the farm. (Woman interviewee, Kibwezi East, Makueni)

we can; if men joined, we would do better. (Woman interviewee, Kibwezi East, Makueni)

As with the restoration activities themselves, we find an important gendered component to these transitions. Women interviewees reported that due to gendered migration patterns, “The opportunities are mainly for women as they are the ones who stay while their husbands go look for work.” (Mwingi East, Kitui) However, there are tensions surrounding this gender distinction and overall farm participation:

Most men don't have time for the farm as compared to women. Women spend a lot of time on the farm. Men don't like working on the farm unless it is the last option. (Woman interviewee, Yatta, Machakos)

If men were interested in farming, we would work together and do larger-scale farming. We currently do only what

Discussion

In our study of two different contexts with high rates of rural male outmigration, we hypothesized that migration affects smallholder restoration activities, particularly resulting in reduced household labor availability and additional labor burdens placed on non-migrating women. Indeed, our results demonstrate that the role of migration in shaping smallholder restoration practices is contextually-specific and cannot be overlooked in restoration policy and programming. In particular, our analyses uncover four key findings related to smallholder restoration amid (predominantly) male outmigration. Based on these findings, we propose a conceptual framework to support understanding of the capacity of households to practice restoration in a context of outmigration (Figure 7).

First, our findings substantiate that smallholder restoration is affected by outmigration in rural Burkina Faso and Kenya. As we had anticipated, the absence of migrating household members shifts intrahousehold labor burdens. This strong pattern, noted by respondents in both countries who reported reduced labor availability as a direct result of outmigration, is shown in Figure 7 as one of four important migration-induced outcomes that affect household capacities to restore their lands. In the Burkina Faso case, while there were instances of increased labor burdens on women and non-migrating men, more commonly the household adjusted to reduced labor availability by limiting cultivation areas and restorative practices. In contrast, in the Kenya case, increased labor burdens placed on non-migrating women were much more prevalent, with women also taking on more organizational labor and oftentimes hiring additional labor with remittances, which were more common from Kenyan migrants. While the migration literature highlights shifting labor burdens amid migration of one or more household members (e.g., Radel et al. 2012, Spangler and Christie 2020), the extension of these lines of inquiry to restoration activities specifically remains under-examined (Broeckhoven and Cliquet 2015, Collantes et al. 2018, Crossland et al. 2021a).

Second, the particularities of migration in the local context and for the household are integral to understanding the relationship of migration with restoration. As shown in the 'Characteristics of migration' ring of Figure 7, land restoration projects must understand *who migrates* from the household, as well as the *type, timing, and duration of migration*. In terms of *who migrates*, we found that whether the household head leaves (more common in the Kenya case) or remains on the family farm (as in most Burkina Faso households surveyed) critically influenced the extent to which migration affected the organization of smallholder agriculture. In the Burkina Faso case, the male household head remained on the farm and participated in all stages of land restoration despite the migrant's absence. The departure of other household members, such as sons, may have required labor adjustments, but did not undermine the household's capacity to undertake restoration activities. Alternatively, in Kenya, the outmigration of the male household head in one third of households implied a greater redistribution of labor with additional burdens, such as digging zai pits or building terraces—strenuous activities previously seen as 'men's work'—typically falling on the women who remained on the farm. This redistribution of labor was accompanied by women's higher involvement in training programs and farm management and decision-making (Crossland et al. 2021a, 2021c).

As noted above and in Figure 7, the specific *type, timing, and duration of migration* are also important. For example, in Burkina Faso, households with temporary migrants reported greater participation in land restoration activities than households with permanent migrants. Most

temporary migrants depart seasonally, returning to the family farm to contribute to certain agricultural and restoration tasks, which limits the impacts of their departure on restoration. However, key land restoration practices that are labor-intensive during the dry season, when most migrants are absent, such as zai pits and stone bunds, are difficult to perform with outmigrating male household members. Alternatively, in Kenya, most migration does not involve a seasonal return to the farm. As such, migrants in the Kenyan study rarely contribute to the family farm. Remittances were therefore critical in determining whether the household could pay for hired labor to replace the lost labor contributions of the migrant, or if these additional labor burdens were predominantly placed on women (see 'Impacts of migration' ring in Figure 7). Remittances for hiring labor are particularly essential for restoration activities that are labor intensive, such as digging zai planting basins and terraces. By bringing the Burkina Faso and Kenya cases together, we were able to observe the consistent influence of migration on household labor availability, as well as different strategies households adopt to address resultant labor concerns.

Third, in addition to the particularities of migration, the characteristics of specific restoration activities further affect how migration affects smallholder restoration (see Figure 7, 'Characteristics of practices' ring). For example, in the Burkina Faso case, of the two most commonly adopted restoration activities, zai was more negatively affected by outmigration than composting. This can be attributed to the greater labor input needed for zai pits, and the seasonal requirements of this labor, which corresponds with the period when migrants are away. Similarly, in the Kenya case, we found that in the absence of migrating household members, zai requires more hired or cooperative labor than tree planting. Therefore, attention is needed to the specificities of restoration activities, how they are implemented in different settings, and their labor and seasonal requirements in order to understand how they may be affected by outmigration. These specificities, illuminated through our cross-case analysis, shape how households adjust to the migration of their members, such as by abandoning the zai technique more commonly in the Burkina Faso case study, or by hiring additional laborers as in the Kenya case, where remittances allow.

Fourth, our results highlight the importance of examining not only the labor impacts of migration, but also how migration affects decision-making and other intrahousehold gender dynamics related to restoration (included on the 'Impacts of migration' ring in Figure 7). As discussed above, there were instances of women's increased labor burdens in both cases; however, migration has had different impacts on gender dynamics in each setting. In participating Mossi households in Burkina Faso, male outmigration has not influenced gendered decision-making power within the household. According to study participants, given the

characteristics of migration (i.e., the dry-season departure of young men), the male household head remained the primary decision-maker and the main target of training on restoration despite women's important labor contributions to restoration activities. Other male and female household members are similarly excluded from decision-making and skills development in these areas despite their labor contributions. In this socio-cultural setting where older men act as household heads, often of large composite households, gendered and intergenerational intrahousehold power structures have endured through high rates of male outmigration.

In contrast, in the Kenyan case, where the primary man (household head or her spouse) in the household commonly migrated, he was often still consulted about larger decisions. This is likely linked to the financial contribution of male migrants needed to operationalize such decisions and to deep-seated socio-cultural norms surrounding male headship and land ownership in the Ukambani region (Muok et al. 1998, Ifejika Speranza 2006, Kiptot et al. 2014). In his absence, however, the primary woman (household head or his spouse) in the household gained influence over the family farm and participated in land restoration training and projects. Crossland et al. (2021a) report a trade-off for women, whose increased autonomy in managing the farm comes with greater overall workloads, as noted above. Instances of women implementing restoration practices on their own land plots and encouraging their husbands to undertake these activities were much more common in Kenya than in Burkina Faso. In both settings, this was more likely to occur after women received technical training on restoration and capacity-building; an important consideration for future restoration programmes.

In sum, as demonstrated through our cross-case analysis and depicted in Figure 7, a household's capacity to practice restoration in a context of outmigration is related to the (contextually specific) characteristics of migration, as well as those of restoration practices. Gender and intergenerational relations shape migration processes and their impacts, including on household labor, capital, knowledge and skills, and decision-making related to restoration. Restoration initiatives should be attentive to these processes to identify entry points for effectively supporting household restoration capacities in high migration contexts. For instance, attention to gendered labor patterns and intrahousehold decision-making is critical in the design of projects and programmes and when targeting households and their members with technologies or skills development opportunities, to avoid further entrenching gender inequities. Participants in both country contexts predict that rates of outmigration and restoration activities will continue to increase. Hence, understanding the synergies and tensions of households pursuing migration and restoration activities in tandem is of vital importance.

Conclusion

Migration patterns, including who leaves and the type, timing, and duration of migration, influence gender and intrahousehold dynamics related to on-farm restoration, including labor patterns and decision-making. Restoration initiatives in regions experiencing high rates of male outmigration must be carefully developed to avoid placing the burden of restoration disproportionately on women and household members who remain on the family farm. When invested in hired labor, remittances can support smallholder restoration by overcoming some of the labor constraints associated with the outmigration of household members. Shifts in labor burdens may or may not be accompanied by an increase in women's decision-making power and by greater opportunities to strengthen women's capacities related to restoration.

Our analysis uncovers broader processes underpinning these relationships, as well as the need to understand contextually specific gender and intrahousehold relations, and how these considerations shape differentiated outcomes of migration on land restoration practices. Restoration projects and programmes should consider these patterns when targeting households—and specific members within them—for trainings and participation. The impacts of (male youth) outmigration on the capacity of rural households to restore degraded lands is an important issue meriting further research.

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