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A review of the effects of migration on the feminization of agrarian dryland economies

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Intensifying outmigration in dryland areas affects women's roles in agriculture and related activities, with broader implications for productivity and gender equity. Using a systematic review of literature, we examine the effects of migration on the "feminization of agriculture" in dryland areas. The findings reveal that women are performing more farm labor in agrarian societies due to the increasing outmigration of men. In addition, female agricultural labor is becoming more visible because of growing research on the feminization of agricultural labor in dry areas. The findings also show that migration-related agricultural feminization in drylands is influenced by gendered, generational, socioeconomic, and sociocultural factors, as well as economic and social remittances – with ongoing negotiations of these processes happening at different levels. Despite the tensions and (re)negotiations that accompany these changes, particularly regarding return migration, social and economic policy interventions could leverage the increasing participation of women in dryland agriculture to improve women's livelihoods.

Keywords: Feminization of Agriculture, Outmigration, Gender, Dryland Agriculture, Policies, Livelihoods.

Introduction

This paper examines the patterns of gendered effects of migration on women's involvement in local agriculture in the dry areas of the world. Dryland communities are often characterized by rural transformations related to agricultural intensification, particularly as a result of irrigation provisions. They also experience high levels of outmigration, exacerbated by increased resource degradation – with implications for wage work, unpaid work, agricultural management, and related decision-making (Abdelali-Martini et al. 2003; Okpara et al. 2016; Stringer et al. 2017; Byakagaba et al. 2018; Najjar et al. 2018). Exploring how outmigration influences the feminization of agriculture in drylands is important because the types and duration of, and reasons for, migration have significant implications for the economic, psychosocial, and cultural outcomes of agrarian women's livelihoods in the dry areas. Furthermore, the return migration of dryland inhabitants, particularly men, has been shown to cause tensions at the household and communal levels.

This paper focuses on dryland regions of the world because, according to existing studies and a report compiled at the International Conference on Food Security in Dry Lands held in Qatar, two-thirds of the world's population live in deserts and dry areas. Drylands are also most affected by ongoing agrarian femi-

nization trends due to accelerated outmigration from these areas caused by climate change effects and agricultural intensification (Abdelali-Martini and Hamza 2014; Gaurtala et al. 2010; Pattnaik et al. 2018; Pedrick et al. 2012). Although drylands span all continents, in this review, we focus only on drylands in the Middle Eastern, North African, East and West Asian, sub-Saharan African, and Latin American regions. Although undoubtedly diverse in many aspects, these regions were selected due to similarities in the economic and sociocultural backgrounds of their agricultural areas, such as their low-and middle-income status, agrarian characteristics of heavy reliance on subsistence agriculture (including pastoralism), deeply entrenched cultural norms, and high rates of outmigration. We chose to work with literature from such diverse agrarian dryland regions in order to capture the nuances of migration-related labor feminization in these dry areas of the world.

Paying attention to the effects of outmigration on women's farm labor roles in dryland areas is critical for several reasons. First, drylands comprise over 40 percent of the world's total land surface and are also the most affected by climate change, agricultural intensification, and globalization, among others. Second, over 2.5 billion people are resident in dryland regions. Third, despite being home to a substantial proportion of the world's population, dryland areas have access to less than 8 percent of the world's renewable water, which has implications for (irrigation)

agriculture. Fourth, extreme weather events such as fluctuating temperatures, declining and erratic rainfall patterns, land degradation, desertification, and frequent droughts are leading to decreasing food production (Pedrick et al. 2012). This is worrying, as it is becoming difficult to meet the food security needs of the rapidly growing population of dryland countries such as Egypt, Morocco, and Syria, as well as many parts of SSA (Pedrick et al. 2012).

In drylands, including the Middle East and North Africa (MENA), sub-Saharan Africa (SSA), West Asia, and Latin America, climate change effects (such as reduced rainfall, declining soil fertility, and droughts), land scarcity due to population growth, and agricultural intensification have increased push factors of migration, particularly in rural areas. (Radel et al. 2012; Kristensen and Birch-Thomsen 2013; Abdelali-Martini and Hamza 2014; Afifi et al. 2016; Baada et al. 2019). Furthermore, growing economic opportunities and improved transportation services have not only increased the “pull” factors of migration to urban areas, but also made population movement easier (Resurreccion and Van Khanh 2007; de Haas and van Rooij 2010). Push factors refer to undesirable conditions that motivate people to move out of their communities of residence, whereas pull factors are favorable conditions that make a community attractive to migrants. Extensive scholarly and practitioner literature identifies (predominantly male) outmigration as a major cause of the feminization of agriculture in dryland societies (de Brauw et al. 2008; de Haas and Fokkema 2010; Ye et al. 2016; Pattnaik et al. 2018).

The “feminization of agriculture” can be understood in different ways. Najjar et al. (2018, 527) understand it as “women representing a majority share of agricultural labor, but typically at lower wages and more precarious working conditions than men”. Mukhamedova and Wegerich (2018, 129) define feminization as “the increased participation or greater roles of women in decision-making processes within the community or household”. Mukhamedova and Wegerich (2018) add that feminization of agricultural labor is often driven by factors like male outmigration, a growing share of female-headed households, and expansion in labor-intensive agriculture. Abdelali-Martini et al. (2003) define feminization of agricultural labor as the growing involvement of women in agricultural labor. The authors caution that, the “feminization of agricultural labor” must be distinguished from the “feminization of agriculture” as the latter goes beyond female labor expansion to include increases in women’s decision-making and management of resources. This is supported by de Brauw et al. (2008) who state that the feminization of agricultural labor (or labor feminization) happens when women perform a growing proportion of on-farm work within the household either by women’s increasing participation rates in farm work, or when women’s share of agricultural labor shifts from less than half to more than half due to a decrease in men’s participation.

In this paper, we explain the concept of “feminization of agriculture”, explore the role of migration on the feminization of agriculture in dryland areas, and outline some advantages and disadvantages of the feminization of agrarian labor for women and communities in the dry areas. Next, we discuss some tensions

that arise from male return or outmigration and the consequent feminization of agriculture in dryland areas. Importantly, we also explore cases of women as migrants, as studies often focus on men as migrants and seldom on women. Furthermore, we highlight the importance of policy attention to migration-related agricultural feminization in dryland areas and provide policy recommendations. We conclude by identifying key gaps in the literature and recommend directions for future research.

Although most of the literature reviewed focused on agricultural feminization, we found that, in addition to women’s growing participation in agricultural labor, in some areas they were increasingly engaging in rural off-farm work as well (Wang et al. 2016). Our findings also show that the increasing feminization of agrarian labor reduces women’s income and worsens the economic dispositions of households, thereby making rural women more vulnerable to economic, social, and cultural marginalization (Binzel and Assaad 2011; Pattnaik et al. 2018). Importantly, our findings identify return migration as a potential site of conflict, as agricultural labor roles must be renegotiated when migrants return to their places of origin, with women tending to be disadvantaged in this process (Brink 1991; Resurreccion and Van Khanh 2007; de Haas and van Rooij 2010; Ge, Resurreccion and Elmhirst 2011). Yet, despite this increasing vulnerability, non-migrant women in migration origins are not considered a special group deserving of specific policy interventions (Ye et al. 2016).

The findings from this review highlight the need for more studies in dryland areas on the effects of a migration-related feminization of rural labor on women’s economic and psychosocial wellbeing. They speak to the importance of developing interventions specially tailored to mitigate the negative and leverage the positive effects of agricultural labor feminization on women in dryland areas. Our findings also speak to the crucial need for development interventions targeted at structural changes, as initiatives which only focus on micro scales, such as the individual and household level, might lead to limited change in the wellbeing of women workers in agrarian migrant-sending societies (Baruah 2007; Najjar et al. 2018). Our findings are timely, as worsening climate change effects and increasing intensification and globalization make migration the most viable option for livelihood improvement, particularly in the dry areas of the world. It is thus likely that outmigration, and with it feminization of agricultural labor, will only increase further in the years to come.

Gendered relations, processes and outcomes of drylands agriculture

Drylands are defined as regions with a ratio of precipitation to potential evaporation of less than 0.65 ($P/PET < 0.65$) (Li et al. 2019). The dryland regions examined in this review tend to be characterized by several factors, including a reliance on rainfed and irrigation agriculture, agricultural intensification, vulnerability to climate change, rangelands, and high rates of (mostly male) outmigration. Several authors emphasize the interconnectedness of gender, climate change, rainfed and irrigation agriculture, agricultural intensification, and sociocultural norms in agricultural

feminization in dryland regions (Abdelali-Martini et al. 2003; Caretta and Börjeson 2015; Najjar et al. 2017).

Regarding rainfed and irrigation farming, van der Geest (2011), Afifi et al. (2016), Kuuire et al. (2016), Najjar et al. (2017), and Khatri-Chhetri et al. (2020) stress the importance of rainfall and irrigation for the farming, food security and livelihood needs of communities in dryland areas, and the important roles women play in meeting these needs. Similarly, Caretta and Börjeson (2015), Najjar (2015), Antwi-Agyei et al. (2018), and Najjar et al. (2019) outline the gendered negotiations that guide irrigation systems in dryland communities. For instance, in Egypt, Najjar et al. (2019) found that the introduction of irrigation equipment better adapted to local sociocultural norms has led to the involvement of more women in irrigation activities, despite assumptions to the contrary both inside the community and at the policy level. Such irrigation methods include *tatweer* (which allows more control over scheduling and employs a simple on/off switch), sprinklers, and drips, as using these does not require bending and reduces the chances of wet clothing, both of which are considered inappropriate for women. In Kenya, Caretta and Börjeson (2015) found that despite patriarchal customs, which still discouraged the participation of women in irrigation, more women were venturing into it – particularly women who had no men in their households.

In respect to agricultural intensification, Abdelali-Martini et al. (2003) state that structural changes, a growing population, introduction of new technologies, and developments in irrigation agriculture have transformed agriculture in Syria. These transformations in Syria and other drylands result in an increased demand for agricultural products, with farmers resorting to the use of more external inputs and labor to increase farm returns (Abdelali-Martini et al. 2003; Caretta and Börjeson 2015). The increase in women's farm labor is one of the significant outcomes of this intensification and higher labor demand. Women whose farm labor increases tend to be from poorer and small landholding or landless households and typically perform manual, lower-paying operations (Abdelali-Martini et al. 2003; Najjar et al. 2018). Abdelali-Martini et al. (2003) add that, although increasing, women in drylands still have limited opportunities outside of farming compared to men, with a stark difference of 1.5 percent versus 64.2 percent of women and men, respectively, engaging in off-farm work – findings supported by Najjar et al. (2017).

In addition to increasing intensification, dryland areas are also severely affected by ongoing climate change effects. Li et al. (2019) attribute this to the fragile ecological environment, poor soil fertility, and scanty precipitation which make drylands particularly susceptible to anthropogenic activities and global climate changes. These climate change effects are felt at different levels within drylands, with smallholder farmers being some of the worst hit. Additionally, Caretta and Börjeson (2015) and Najjar (2015) argue that the environmental impacts of climate change are gendered, which results in gendered differences in adaptive strategies to climate change as well. For example, in Kenya, women often resort to intercropping as an adaptive strategy to climate variability, whereas men adopt cash cropping (Caretta and Börjeson 2015). In Egypt, women took up

cactus farming as an innovative and climate-friendly solution to maintaining lands allocated to them through the Mubarak Resettlement Scheme (MRS). This was, however, frowned upon by men in the region, as they believed growing cactus is shameful, being “a lazy farmer crop”, and was not perceived as a priority crop by the local extension system (Najjar 2015).

Rangelands are also a defining feature of drylands. Rangelands typically consist of desert, shrubland and woodland vegetation, and a heavy reliance on pastoral agriculture. These agro-pastoral societies are known to be dynamic, with access to water, grazing, and other resources determined by pastoralist institutions (Flintan et al. 2019). Similar to the other characteristics discussed above, rangeland societies are highly gendered and structured around sociocultural norms. Consequently, women and men perform different (but not mutually exclusive) and complementary roles (Ridgewell et al. 2007). In areas such as Ethiopia, south and central Tunisia, and Jordan, although women and men engage in grazing cattle, women tend to graze animals closer to home and do not participate in overnight grazing, whereas men graze cattle over longer distances and overnight. Moreover, decision-making and control of pastoral resources were also very gendered, with men often owning the rights to, and making decisions about, livestock (Ridgewell et al. 2007; Flintan et al. 2019). Lastly, studies have found that changes in the environment and the need to find feed for livestock usually necessitate men migrating with livestock to different rangelands. This relocation tends to affect women's ability to milk livestock for household use and sale (Ridgewell et al. 2007; Flintan et al. 2019).

Finally, another marked characteristic of drylands is intensive migration – both locally and internationally – necessitated by all of the factors discussed above. Within drylands, people might move from areas experiencing environmental degradation to ones with better rainfall and soil conditions. Furthermore, the absence or presence of irrigation facilities serve as push or pull factors of migration, respectively. Additionally, increasing agricultural intensification and accompanying consequences necessitate some inhabitants of drylands seeking alternative livelihoods in areas outside their communities. Lastly, climate variability in dryland areas has been identified as a major cause of outmigration, as these climate impacts further magnify the push and pull factors of migration outlined above (Abdelali-Martini et al. 2003; Najjar et al. 2018; Najjar et al. 2019). As we will show throughout this review, migration patterns in drylands are very gendered. Thus, although more women in dryland regions have begun migrating independently, male outmigration still dominates.

As most of these gendered processes (rooted in sociocultural customs) in drylands are patriarchally oriented, agricultural norms, tasks, and roles tend to reflect patriarchal customs and often result in or exacerbate gender inequalities (Abdelali-Martini et al. 2003; Caretta and Börjeson 2015; Najjar et al. 2017). For instance, male roles in drylands typically consist of tasks such as ploughing, pruning, weeding (with a hoe), planting (peanuts), irrigation, pesticide spraying, and spreading fertilizers, among others. These “male” tasks, which tend to be higher-paying compared to those performed by women, are considered “difficult”, laborious, and skill-intensive (Abdelali-

Martini et al. 2003; Caretta and Börjeson 2015). Women on the other hand are over-represented in relatively lower-paying and time-intensive jobs such as fruit, vegetable and cotton harvesting, drying produce, and transplanting rice. These female roles are considered “easy”, and requiring patience and “nimble fingers” (Abdelali-Martini et al. 2003; Caretta and Börjeson 2015; Najjar et al. 2017). According to Najjar et al. (2017), these gendered ascriptions essentialize both genders and reinforce existing inequalities.

Furthermore, agricultural roles in drylands tend to reflect gender norms and expectations within families and communities. For instance, intercropping as an adaptive strategy to climate change – done by women in Kenyan drylands – is a response to women’s roles as homemakers and caregivers and to their responsibilities of meeting household food security needs. Whereas men choosing to divert into cash cropping as an adaptation to climate variability reflects their role as breadwinners and their responsibility of paying bills, undertaking building projects, and securing family investments (de Haas and van Rooij 2010; Caretta and Börjeson 2015). These role categorizations ultimately determine who can access and control productive resources, with women in drylands being severely disadvantaged.

Another gendered dimension of dryland agriculture is the composition and activities of local formal and informal institutions such as extension services, farmers’/workers’ cooperatives, and water/irrigation councils, among others. Despite women’s increasing participation in agricultural labor and studies which highlight the importance of formal and informal institutions for women’s economic, social and political empowerment (Baruah 2009; Najjar et al. 2017 2018), women’s participation in local institutions remains low in drylands (Caretta and Börjeson 2015; Najjar 2015; Najjar et al. 2017). In illustration, studies in Egypt, Morocco, Syria, and Kenya show that female farmers have limited access to credit and land rights and are often excluded from agricultural extension services, training programs, and producer organizations – as these are tailored to suit the needs of men (Abdelali-Martini et al. 2003; Caretta and Börjeson 2015; Najjar et al. 2018). Thus, apart from overt sociocultural norms which forbid women from attending furrow management meetings (Caretta and Börjeson 2015), subtle deterrents such as an overwhelming overrepresentation of men in these groups/institutions, and holding meetings at night-time, which is not conducive for women, serve as barriers to women’s involvement in these groups as well (Najjar et al. 2017).

It is important to note, however, that these roles, norms and expectations are not static, as they are constantly evolving in response to larger structural changes. Thus, women are starting to perform traditionally male roles and gain more control over resources, and men are engaging in “female” roles as well. These changes in role performances may be attributable to several factors including globalization, intensification, men’s preference for off-farm work, and male outmigration (Abdelali-Martini et al. 2003; Caretta and Börjeson 2015; Najjar et al. 2017).

The feminization of local agricultural labor in the dry areas of the world: the role of migration

The MENA region, one of the driest places in the world, is witnessing rapid growth in women’s participation in farming activities (Pedrick et al. 2012; Khatri-Chhetri et al. 2020). Abdelali-Martini and Dey de Pryck (2015) report that over a period of 30 years all countries in the MENA region – except for Tunisia – recorded increases in women’s participation in agricultural activities ranging from 32.8 percent to 34.4 percent. These increases exceeded 60 percent in Jordan, Libya, and Syria, with the Occupied Palestinian Territory recording a staggering 72.5 percent increase in its female labor in agriculture. Studies suggest that these figures might be due to an actual increase in women’s agricultural activities as well as a growing visibility (from scholarly and practitioner attention) of women’s engagement in subsistence livelihoods (de Brauw et al. 2008; Gaurtala et al. 2010; Abdelali-Martini and Dey de Pryck 2015).

The feminization of agriculture may be measured by a number of factors including: women working more hours on the farm, a participation in agriculture by women who previously were not in farming, and an increase in the proportion of female farmers in relation to men (de Brauw et al. 2008). In their study on the myths around women’s participation in farming in China, de Brauw et al. (2008) identify two types of feminization: labor feminization and managerial feminization. The authors define labor feminization as the situation where women in a household perform an increasing share of on-farm work, whereas managerial feminization refers to the increasing participation of women in agricultural decision-making along with greater access to agricultural resources. Both de Brauw et al. (2008) and Abdelali-Martini and Dey de Pryck (2015) assert that labor feminization is more common than managerial feminization.

Most studies which examine the feminization of agriculture have observed that an increase in women’s engagement in farm-related activities tends to be associated with either the decrease or absence of men in farming. This decrease in male participation in farm labor results from male off-farm employment, economic globalization and industrialization, growing numbers of female-headed households, the mechanization of agriculture, and outmigration (Gaurtala et al. 2010; Abdelali-Martini and Dey de Pryck 2015). In addition, factors such as age, socioeconomic status, family structure, and societal norms determine women’s participation in traditional male agricultural roles in the MENA, SSA, and parts of West Asia and Latin America (Archambault 2010; de Haas and Fokkema 2010; de Haas and van Rooij 2010; Ge et al. 2011; Kristensen and Birch-Thomsen 2013; Mollett and Faria 2013; Warner and Afifi 2014).

Dryland areas prone to outmigration-related agricultural labor feminization include many rural and poor communities in MENA and SSA (Pedrick et al. 2012). Reasons for the high rates of outmigration of male labor from these regions include adverse climatic conditions, such as extreme weather temperatures, droughts, flooding, and consequent food insecurity; water scarcity; and high rates of poverty. Pull factors include the higher availability of off-farm employment and better educational

opportunities in urban centers and neighboring higher-income countries (Abdelali-Martini and Dey de Pryck 2015; Saha et al. 2018). Although women are increasingly partaking in economic labor migration (Resurreccion and Van Khanh 2007; Baada et al. 2019), outmigration from rural communities in many dry areas of the world such as the MENA and SSA still tends to be male-dominated (de Haas and Fokkema 2010; Tacoli and Mabala 2010; Warner and Afifi 2014; Mukhamedova and Wegerich 2018). However, the dynamics of migration-related agricultural feminization are influenced by the purpose (economic or environmental), opportunities (more jobs for women/men), type (circular), and duration (temporary or permanent) of the migration process (Resurreccion and Van Khanh 2007; de Haas and Fokkema 2010; de Haas and van Rooij 2010; Warner and Afifi 2014).

As most migration in the dry areas of the world tends to be circular and temporary, concerns arise as to whether taking over male farming roles has long-term benefits for women in migration origins (de Haas and van Rooij 2010). Although the outmigration of men and consequent feminization of rural economic activities (particularly agriculture) has been found in Morocco and Mexico to improve women's autonomy, this new-found autonomy might be temporary, with tensions arising from the renegotiation of gender roles upon men's return (de Haas and van Rooij 2010; Radel et al. 2012). Moreover, the increased feminization of farming has been associated with low agricultural productivity, which raises concerns about the sustainability of these emerging feminized labor trends for food security and smallholder agriculture in dryland societies (Radel et al. 2012; Khatri-Chhetri et al. 2020).

Migration dynamics and the feminization of dryland agricultural labor

As mentioned earlier, environmental and socioeconomic factors are major drivers of migration and the consequent feminization of labor in rural dryland regions of the world. Several authors discuss the growing importance of migration as a means of livelihood improvement in dryland areas (de Haas 2006; van der Geest 2011; Afifi et al. 2016). In a study by Afifi et al. (2016), conducted in dryland areas of eight countries – Thailand, Peru, Tanzania, Guatemala, Bangladesh, India, Vietnam and Ghana – the authors found that agrarian societies in areas prone to environmental degradation, reduced and erratic rainfalls, and droughts rely heavily on migration as an adaptation strategy to the negative consequences of climate change. Hence, as climate variability worsens in many developing world regions, migration is likely to increase.

Similarly, de Haas (2006) found that in Morocco migration to urban centers and higher-income countries is an important avenue for economic improvement at the household, societal and national level. This, the author asserts, is mainly due to the influx of economic (in-cash and in-kind resources) and social remittances (defined as ideas, behaviors, social capital, and culture transmitted back to migration origins by migrants). Although social remittances are mostly the result of return migration, in some cases they are transmitted via telephone calls, letters, and

virtual mediums (Resurreccion and Van Khanh 2007; de Haas and Fokkema 2010; Ge et al. 2011). Over time, extensive out-migration leads to a culture of migration – where migration becomes a rite of passage – among youth in sending societies (Abdul-Korah 2008; de Haas and van Rooij 2010). Interestingly, a study in Tanzania, Vietnam, Mali, and Nigeria found that while daughters may be criticized for moving out of their communities, sons are ridiculed for not moving (Tacoli and Mabala 2010). This gradual movement of men out of agrarian societies subsequently leads to a restructuring of rural labor, with the feminization of agricultural labor being a major outcome.

Although decisions to migrate are often arrived at as a household, these migration decisions tend to be *gendered* and might be accompanied by intrahousehold conflict (de Haas and Fokkema 2010). Resurreccion and Van Khanh (2007) found that in the rural Vietnamese communes of Xuan Phong and Xuan Vinh women were more likely to migrate to Hanoi for economic livelihoods compared to men. Although the authors cite improved transportation and employment opportunities that favor women as the reasons for these migration patterns, it is also likely that men in rural Vietnam did not find the jobs in Hanoi desirable or remunerative enough to engage in, as most available jobs were in itinerant junk buying, scavenging, and street vending. Thus, what could be misinterpreted as a feminization of migration in Xuan Phong and Xuan Vinh might in actual fact denote a feminization of poverty and the willingness of rural women to engage in menial and underpaid jobs (Najjar et al. 2018; Pattnaik et al. 2018).

Additionally, studies show that although decisions to migrate are usually arrived at through individual, household and societal negotiation, the outcomes tend to favor the outmigration of men (de Haas and Fokkema 2010). These outcomes ultimately affect agricultural patterns in rural sending societies, as non-migrant women must take up the farm labor that men performed prior to migrating (De Jong 2000; Mukhamedova and Wegerich 2018). Moreover, Wang et al. (2016) found that rural women were more likely to engage in farm labor, as men preferred to either migrate or to undertake off-farm work even if they remained in their rural communities.

Another major determinant of migration-related labor feminization in rural dryland areas is the *generational* factor. Tacoli and Mabala (2010) argue that age and generational relations are key elements shaping changing migration and agricultural labor feminization patterns in SSA and Southeast Asia. Thus, as most societies in dryland areas practice a paternalistic culture, older people might wield more power in these decision-making processes than younger people (Tacoli and Mabala 2010; Ge et al. 2011).

Similarly, in their study on return migration and the reiteration of gender norms in water management politics in China, Ge et al. (2011) found that generation and birth order were huge determinants of decision-making and sociopolitical participation in Litao. Specifically, the authors found that younger return migrants connected better with water tank project staff than older community members. This was mostly due to younger return migrants' newly acquired social and management skills,

new ideas for development, increased awareness of water rights and social capital, and confidence to undertake leadership roles in the community. This new positioning of younger return migrants generated some tensions within the community, as older people feared that their authority was being usurped. Wang et al. (2016), however, found an increased participation of middle-aged women in rural farm labor in dry areas. This is because middle-aged women tend to focus on running households whereas younger women (who often possess higher levels of education) prefer to either migrate or engage in off-farm work (de Brauw et al. 2008).

Migration-related feminization of farm labor in dry areas of the world is also greatly influenced by *socioeconomic* factors. These socioeconomic factors determine migration trends among households and societies, employment patterns of migrants in destination areas, remittance outcomes, and non-migrants' (particularly women's) employment options in sending societies. According to de Haas and van Rooij (2010), the nature of migration affects remittance trends and the wellbeing of non-migrant households, as most remittances are invested in housing, businesses, and agricultural projects. In their study on the impact of internal and international migration on non-migrant women in rural Morocco, de Haas and van Rooij (2010) found that international migrant households received more remittances than local migrant households. As a result, international migrant households fared better in terms of their children's education, food security, and lower housework and farm burdens. Internal migrant households on the other hand used migration as a means of risk spreading. Thus, migration and associated remittances served more as a coping mechanism for these households and did not significantly improve their socioeconomic status or women's farm loads. Notwithstanding this, internal migrant households reported better socioeconomic outcomes than households which did not engage in migration.

Interestingly, de Haas and van Rooij (2010) found that while wives of international migrants had the lowest workloads, women in local migrant households had heavier workloads than those in non-migrant households. This could be explained by the fact that remittances from international migrants were usually enough to invest in household upkeep and hire of farm labor from within the community to undertake labor tasks that male outmigration created. However, as internal migration was more about risk spreading, it was not remunerative enough to invest in the services of hired farm labor to perform the labor created by men's absence in these local migrant households. Hence, women in internal migrant households had to perform "double shifts" of household chores and farm labor themselves.

Similarly, Afifi et al. (2016) found in their study of dryland communities of eight countries that poorer households were less likely to send migrants and when they did, they were more likely to migrate for farming purposes. This subsequently affected the amount of remittances that these agrarian migrants could send back to their families. Further, poorer households and rural dryland communities which lacked infrastructure such as roads were more likely to maintain farming activities even if they engaged in migration as well (Kristensen and Birch-Thomsen 2013). There is, however, consensus among studies of drylands

in rural Morocco and many parts of SSA that women in non-migrant and internal migrant households were more likely to engage in agricultural labor in the absence of men, than women in international migrant households (de Haas and van Rooij 2010; Kristensen and Birch-Thomsen 2013; Afifi et al. 2016).

Finally, *sociocultural* norms influence migration-related labor feminization in dry areas of the world. In heavily patriarchal cultures, women were less likely to undertake agriculture-related managerial and labor tasks. These outcomes, however, differed based on country. For instance, in Tajikistan women were increasingly performing traditional male labor roles, including farming (Mukhamedova and Wegerich 2018). Similarly, in China women's participation in farm labor was becoming more visible, although fewer women took up managerial agricultural roles (de Brauw et al. 2008). On the other hand, women in Mexico were more likely to engage in managerial agriculture than farm labor (Radel et al. 2012).

The influence of sociocultural norms on migration and the feminization of agriculture could, however, be regarded as a paradox. On one hand, women were expected to fill in the agricultural vacancies created by men's outmigration to ensure family subsistence; on the other hand, most sociocultural norms in migration origins frowned upon women's participation in traditionally male activities. This led to a reluctance in assuming "male" roles by women in sending societies of Kenya, Vietnam, Morocco, and Mexico (Resurreccion and Van Khanh 2007; de Haas and van Rooij 2010; Radel et al. 2012; Caretta and Börjeson 2015).

Migration-induced feminization of agriculture in dryland areas: emancipation or looming crisis?

Researchers on the feminization of agriculture resulting from outmigration in the dry areas of the world are of divergent views. While some studies posit that women taking over male migrants' labor roles could have short- and long-term benefits for women in dryland regions, others predict that this feminization presents more negative than positive outcomes (de Brauw et al. 2008; Pattnaik et al. 2018; Rana et al. 2018; Saha et al. 2018). De Brauw et al. (2008) assert that although it is happening on a lower scale, managerial feminization could empower women and provide them with more autonomy, as the feminization of managerial labor implies that more women become primary decision-makers about household farms and have greater access to income accrued from these farms. This is supported by Abdelali-Martini and Dey de Pryck (2015) in Syria, who found that women who worked as contractors in the agricultural sector had more access to financial resources. Farnworth et al. (2019) posit that, in Nepal, assuming managerial positions in agriculture could enable women to receive better recognition within their families and communities and to report better health and nutritional outcomes from being able to control economic resources.

Further, Mukhamedova and Wegerich (2018) found that women in Tajikistan derive some benefits from the feminization of agriculture resulting from men's outmigration. These benefits include flexibility in women's schedules and the ability to com-

bine economic activities and family obligations more easily, and a greater participation in social, economic and political events by women. These findings support an earlier study by Brink (1991) that found that women in Egypt experienced increased mobility and household decision-making from the emigration of their husbands. Pattnaik et al. (2018) also assert that a persistent change in rural women's (farming) roles, influenced by social remittances, could cause a re-evaluation of women's status over time. Importantly, Gaurtala et al. (2010) found that in Nepal husbands' absences and women's new roles in farming increased the chances of registering agricultural land in women's names. This is a significant outcome considering the importance of land ownership in women's empowerment and the low numbers of women who own land in drylands (Baruah 2007; Najjar et al. 2017).

Apart from highlighting the strong link between men's outmigration and the feminization of agricultural labor in sending societies of dryland areas, these findings also raise questions about whether the benefits of the feminization of agriculture for women are rather benefits of men's outmigration. Moreover, as asserted by Gaurtala et al. (2010), women's perceived empowerment from performing male farming roles might in fact be the result of larger social processes such as industrialization, migration, and social and economic remittances, and not necessarily of women working on the farm more.

Gaurtala et al. (2010) caution that as more men in Nepal migrate, women's work burden increases. For instance, due to intensifying outmigration, women in Nepal are performing more manual duties, such as sowing, weeding, and harvesting, in addition to tasks such as ploughing, hoeing, and threshing, which men previously performed (Gaurtala et al. 2010; World Bank and FAO 2018). Pattnaik et al. (2018) in India similarly observed increased drudgery for women. In Morocco, agricultural labor feminization is associated with a reduction in women's leisure and time set aside for socialization, as well as increased socioeconomic, health (physical and mental) and cultural challenges (de Haas and van Rooij 2010).

The combination of male outmigration and feminization of agricultural labor also has negative consequences on women's socioeconomic status. As mentioned earlier, studies on agricultural feminization in dryland areas of Mali, Tanzania, Vietnam and Nigeria show that poorer households are more likely to undergo labor feminization as these households cannot hire external male labor to take over farming activities in the absence of male household members (Tacoli and Mabala 2010). Moreover, the findings in Syria show that although most women prefer off-farm work, women with low or no education have a harder time securing diversified employment and thus have to settle for farm work (Abdelali-Martini and Hamza 2014). Additionally, de Brauw et al. (2008) assert that labor feminization and an increase in output from female-led farming in China does not necessarily translate into more income or control of these resources for agrarian women. Instead, it could result in distress and the feminization of poverty – particularly in the absence of familial, societal and state support (Pattnaik et al. 2018). This supports findings by Binzel and Assaad (2011) in Egypt, who report that shifting agricultural roles come at a cost, as women in rural dry-

land areas sometimes have to forego their wage work for non-wage work to supplement the lost labor of male outmigration.

Numerous studies also highlight cultural challenges resulting from the feminization of agriculture in dryland areas. Even though some authors argue that women's increasing participation in farm labor signifies a breaking away from the patriarchal culture (Mukhamedova and Wegerich 2018), other studies show that rural women in drylands are usually reluctant to take over roles traditionally performed by men. For instance, women in Calakmul, Mexico, were reluctant to perform traditional male roles, as women's participation in these roles was considered immoral. Consequently, even when women's involvement in agriculture increased, there were still assumptions among many in Calakmul that women's roles and responsibilities centered around the household (Radel et al. 2012).

Similarly, de Haas and van Rooij (2010) report that women in rural Morocco did not approve of temporarily taking over men's responsibilities as they considered such role reversals unnatural and were scared to be criticized by society for their "manly" behavior. Saha et al. (2018) also report moral propriety and social policing in India as factors that deter women from embracing male-related agricultural economic activities. Lastly, Resurreccion and Van Khanh (2007) in Vietnam found that even when migration and labor roles were reversed, with women emigrating while men stayed behind to look after the family, migrant women still performed and maintained very gendered roles, such as returning home whenever their services were needed or assigning other women within the family to perform care work in their absence. Moreover, it was very important for migrant wives to emphasize that they recognized care work as their rightful role and responsibility, to reassure non-migrant men their masculinities were not threatened.

These examples highlight the discomfort that some women experience with role reversals. Consequently, in order not to displease their households and communities, women in agricultural areas of countries such as India, Vietnam, and China may prefer to work in subordinate positions and behind the scenes and to stress the temporary nature of their work in "men's domain" to avoid being labeled threats to patriarchal control (Resurreccion and Van Khanh 2007; Ge, et al. 2011; Saha et al. 2018). It is however important to add that some women, albeit few, defy these sociocultural norms to pursue their economic interests, as shown in Nepal (Rana et al. 2018).

Although some authors argue that women's participation in rural economic activities increases their autonomy and better places them in positions of decision-making and resource control (Mukhamedova and Wegerich 2018, writing about Tajikistan), these gains may be short-lived due to the return of migrant men, as shown in Morocco and Mexico (de Haas and van Rooij 2010; Radel et al. 2012). Moreover, given that changes in gender roles here stem from the need to address the low supply of labor in agricultural economies and women's willingness to work for relatively lower wages (Najjar et al. 2018), it is important to question whether men's outmigration for better paid jobs and women's ensuing assumption of men's farming activities is indeed empowering for women.

Furthermore, women's success in their new-found labor roles due to male outmigration depends (to a large extent) on their ability to build trust with male employers and employees, as found in Syria and Tajikistan (Abdelali-Martini and Dey de Pryck 2015; Mukhamedova and Wegerich 2018). This raises doubts as to whether women's increased participation indeed signifies a breaking away from the patriarchy (Mukhamedova and Wegerich 2018) and translates into more autonomy on their part. Moreover, as most of the literature emphasize that women's empowerment from farm-related work is the result of the (often temporary) outmigration of men, this implies that agrarian women's empowerment and resulting autonomy may also be temporary and unsustainable. This further means that gender roles must be renegotiated upon the return of men, which could result in intrahousehold and community conflicts (Brink 1991; de Haas and Fokkema 2010; Ge, Resurreccion and Elmhirst 2011).

Finally, the feminization of agriculture resulting from men's outmigration in dry areas of the world has been associated with low agricultural productivity, low earnings, poor job security, and growing food insecurity for women and dryland communities in general (Pattnaik et al. 2018; Saha et al. 2018). This declining production has been linked to women's low levels of education, lack of capital to invest in rural agriculture, limited knowledge of the operation of mechanized farm technologies and machinery, few agricultural and extension programs which specifically target women, and constraints around women's land ownership and rights as shown in many parts of the worlds including Tajikistan and India (Mukhamedova and Wegerich 2018; Pattnaik et al. 2018; Saha et al. 2018; Diaz and Najjar 2019).

Although this low productivity and growing food insecurity has been attributed to the above-mentioned factors and women's inability to engage in intensive farming and fully utilize agricultural lands (Tamang et al. 2014), it is also likely a result of women having to work degraded lands, which influenced men's decision to migrate or move to off-farm work in the first place (Kuuire et al. 2016; Najjar et al. 2017). Nonetheless, it is still important to pay attention to this decreasing agricultural production in order to mitigate the negative effects of agricultural feminization on women.

Tensions that arise: remittances, (return) migration, agency and women's labor roles in dryland agrarian societies

From the literature reviewed, some key findings emerge. First, outmigration (of predominantly men) in agrarian societies is a major factor influencing the feminization of agricultural labor in dryland areas. Second, most purported benefits of the feminization of agriculture could, in fact, be benefits of migration outcomes, for example remittances and increased freedom/autonomy for non-migrant women. Hence, it is likely that although the outmigration of men might have some positive effects on women's wellbeing in dryland areas, agricultural feminization itself (devoid of targeted interventions) may come with few benefits.

Another noteworthy finding is that various scenarios tend to play out in dryland communities that might be witnessing intensification and growing employment diversification without significant male outmigration. First is the competition between women and men for agricultural jobs, with men sometimes agreeing to perform non-traditional, "female" farm roles such as those outlined earlier. In this case, women often have to accept lower wages to be competitive (Abdelali-Martini et al. 2003; Najjar et al. 2017). Second, most men in drylands who do not migrate prefer off-farm work (which tends to be better paid), leaving women to perform agricultural roles (for lower wages) created by men's absence (Abdelali-Martini et al. 2003; Najjar et al. 2017). Third, some men may engage in seasonal wage work related to, for example, harvesting and planting and more "masculine" year-long tasks such as irrigation and cleaning of drainage canals, thereby earning two incomes (Najjar et al. 2017). Consequently, the presence of men in dryland communities experiencing agricultural feminization implies, in all three scenarios, that while women may end up performing more farm labor, this is not always reflected in their earnings. Hence, women still exercise limited autonomy in decision-making and control of income and resources accruing from their tasks (Abdelali-Martini et al. 2003; Caretta and Börjeson 2015; Najjar et al. 2017).

Another key theme that emerged during the literature review was the different ways women in dryland areas expressed their agency. While some women in Nepal and Vietnam defied socio-cultural norms to engage in male-dominated work, including migration and agriculture (Resurreccion and Van Khanh 2007; Rana et al. 2018), others chose to work with the patriarchy (here, deferring authority to male figures and maintaining ascribed gender roles/norms) within their households and societies in order to promote community values, as found in China (Ge et al. 2011; Ye et al. 2016). Although Resurreccion and Van Khanh (2007), Ge et al. (2011), and Ye et al. (2016) posit that, in China and Vietnam, maintaining or reproducing gender roles is actually women's way of expressing their agency through the subversion of patriarchal cultures, it is still important to be cognizant of the ways in which structure limits the choices available to agrarian women and, consequently, how constrained their agency, even when expressed, will be (Rana et al. 2018).

What is worrying, however, is the fact that some aspects of the empowerment of agrarian women in drylands are associated with the absence of men in household, economic and societal spheres. Although this absence of male figures has some positive effects – such as more remittances from male migration, which are invested into smallholder farms to boost yields, and placing women in decision-making positions, which ultimately gives them more access to economic resources – most outmigrations are temporary and cyclical, as found in countries such as Ghana, Tanzania, and Vietnam (Warner and Afifi 2014). Hence, as mentioned earlier, authors such as de Haas and Fokkema (2010) found that household tensions arise when migrant men return to sending areas and roles and responsibilities must be renegotiated. This supports an earlier assertion by Brink (1991) that spousal conflicts arise from men's return migration, as both partners might have a difficult time readjusting to their old roles. Finally, Radel et al. (2012) in their study on Mexico stress the

temporary status that women ascribe to stepping into traditional male roles.

Return migration and the feminization of agriculture can, however, not be viewed in black or white terms, as some women in sending societies like Morocco welcomed the return of male migrants since this meant reverting to their old roles and responsibilities (de Haas and van Rooij 2010). Apart from highlighting the diversity of experiences regarding migration-induced labor feminization, these findings also speak to the importance of understanding the trends and outcomes of the feminization of agriculture in the dry areas through a migration lens, as the two are intertwined and therefore cannot be examined independently.

Why attention must be paid to outmigration and resulting labor feminization in the dry areas of the world

While outmigration from rural dry areas remains male-dominated and temporary or cyclical, studies show that more women in countries such as Ghana, Tanzania, Morocco, and Mexico are engaging in migration as well, with some of these migrations becoming permanent (de Haas and Fokkema 2010; Warner and Afifi 2014; Radel et al. 2018; Baada et al. 2019).

As migration is projected to increase in many parts of the world (Afifi et al. 2016), so will female agricultural labor and the vulnerability of women farmers – if efforts are not made to leverage the positive benefits of agricultural feminization. Agrarian women in dry areas are particularly vulnerable as they engage in more lower-paid, time-intensive tasks than men, earn less income even when they perform the same tasks as men, and have poor job security (Najjar et al. 2018; Pattnaik et al. 2018; Radel et al. 2018). While de Brauw et al. (2008) argue that an increase in women's participation in farming poses no problems for the Chinese agricultural industry, most of the supportive interventions and resources available to women in China, such as equal access to lands and credit (de Brauw et al. 2008), are not accessible to women in other developing economies. Hence, their data and observations are specific to China and the benefits of feminization of agricultural labor for women in rural China might not accrue to other women in dryland societies in MENA, SSA, West Asia, and Latin America, which lack these support systems.

It is alarming to note that despite these constraints, communities and government officials do not consider non-migrant women engaged in agriculture a vulnerable group and therefore make no attempts to institute interventions to improve their wellbeing (Ye et al. 2016). This speaks to the urgency of promoting awareness of new forms of vulnerabilities resulting from migration-induced feminization of farm labor but also of the positive benefits that could accrue from other forms of feminization. It also highlights the need to implement interventions that address the challenges associated with the feminization of agricultural labor, as non-migrant women take on the drudgery of agricultural work previously performed by men. Moreover, given the concerns around the feminization of agriculture in dryland areas, it is important to direct more scholarly and practitioner

attention to the growing trend of migration-induced feminization of agricultural labor and the experiences of non-migrant women. This will help to develop policy recommendations for addressing the growing marginalization of rural women in dryland regions and agricultural occupations, as well as for leveraging the desirable benefits of the feminization of agriculture.

Conclusions and directions for future research

Given that outmigration from rural dryland regions is a major cause of women's growing participation in farm-related activities, as highlighted in our review, we suggest some policy recommendations on ways of maximizing the benefits of migration-induced feminization of agricultural labor. These measures would go a long way to improving agrarian women's wellbeing in the face of growing migration in the dry areas.

First, as climate variability and agricultural intensification are main factors influencing the outmigration of people from agrarian drylands, it is important to design in-situ interventions that mitigate the effects of climate change (e.g., good agricultural technologies, improved crop varieties, and livestock breeds best suited to dryland areas), train dryland populations on the efficient use of scarce water resources, and diversify employment for dryland smallholder populations (Pedrick et al. 2012; Najjar et al. 2017). While this intervention should not be regarded solely as a way of reducing (male) outmigration, it may provide livelihood options for people who would otherwise have none. This will ensure that dryland dwellers who would otherwise not remain in their communities, can do so.

Other solutions include helping smallholder populations diversify their cropping systems and intensifying sustainable agricultural production in dryland areas which experience relatively good rainfall. These measures along with reducing the drudgery and increasing the desirable outcomes of the feminization of agriculture will ultimately help subsistence communities in the dry areas of the world build resilient and sustainable agricultural livelihoods (Morton 2007; Pedrick et al. 2012; de Brauw et al. 2014; Warner and Afifi 2014).

The findings also reveal that migration-related remittances are an important source of revenue for subsistence agriculture and agrarian economies in the dry areas. This suggests, as pointed out by Abdelali-Martini and Hamza (2014) and de Haas and van Rooij (2010), that outmigration is not necessarily detrimental to food security. As a result, it is important to maximize the economic benefits of migration for migrants from the dry areas of the world. Ways of achieving this include facilitating a safe migration process for women and men from these areas, improving their access to secure, well-paying jobs in receiving societies, reducing the costs of remittance transfers, and implementing social protection policies that aid with their integration into destination societies (de Haas 2006; Abdelali-Martini and Hamza 2014; Radel et al. 2018). These measures would ensure that they reap enough economic gains to send remittances to their households in migration origins.

As our findings show that agricultural feminization comes with some benefits, it is important to leverage these desirable

benefits such as women's access to secure independent or joint land titles; gender equality in wages; increased social and political participation in agricultural and community groups and institutions; and better autonomy in decision-making regarding the use of accrued income and resources, to improve women's wellbeing. Importantly, as women in dryland areas are compelled to take up the agricultural roles of migrant men in their absence amid deteriorating agricultural conditions, providing women with improved agricultural training and inputs would help reduce the drudgery of farm labor, lessen the time invested on the farm, and improve agricultural productivity.

Some ways of achieving this include validating women in their (paid and unpaid) farming roles and designing gender-sensitive agricultural interventions which train women in the use of new agricultural technologies. Another way is providing women with improved, resistant crop varieties and plant breeds best suited to the dry areas. There also needs to be a revalorization of agriculture to ensure that the growing representation of women in agricultural labor is adequately remunerated (Abdelali-Martini and Dey de Pryck 2015; Pedrick et al. 2012; Najjar et al. 2018). As evidenced by de Brauw et al.'s (2008) study on agricultural feminization in rural China, interventions that promote the economic and security needs of women ultimately maximize female-led agricultural production. In addition, making cooperatives, extension services, water councils, and other dryland community services, including rangeland community groups, more female-friendly would encourage increased participation of women. Lastly, there is the need for social protection in lean seasons, skill training for women in higher-paying agricultural tasks, unionization, and the validation of women in perceived masculine roles (e.g., irrigation, rangeland use).

Finally, given the challenges that arise from the return of migrant men and women's relinquishment of their newfound agricultural autonomy, it is important to put in place alternative gender equity interventions that do not rely on men's outmigration to empower women, as might currently be the case. These gender equity initiatives could be achieved through increasing women's access to diversified forms of employment, improving women's access to and control over land rights, and cultural sensitization to the need for agricultural (particularly managerial) programs to be more inclusive of women (Agarwal 1994; Warner and Affi 2014; Najjar et al. 2018). There also needs to be better mainstreaming, implementation, monitoring, and evaluation of gender-sensitive agricultural programs in the dry areas of the world (Baruah 2009; Wang et al. 2016; Najjar et al. 2018; Pattnaik et al. 2018). Instituting these measures could reduce the conflicts associated with renegotiating roles when migrant men return and ultimately lead to better outcomes in the feminization of agricultural labor and farm management for women in the dry areas.

A limitation of our study is that in aiming for an exhaustive review of the literature regarding specifically migration-induced agricultural feminization and related consequences, an in-depth review of other interesting and emerging themes – such as food security, women's off-farm work, and the influence of cooperatives on agricultural feminization – was beyond the scope of this paper.

Based on this limitation, and the gaps identified in our review, we offer some suggestions for future research.

First, the link between migration-related feminization of agriculture and its impact on food security remains underexplored, and the few studies that engage with this topic fail to capture the complexity of the relationship between the two. Likewise, the links between agricultural feminization and low productivity. It is therefore important to design mixed-methods studies that engage with migration-induced agricultural feminization and food security in drylands, as well as agricultural productivity, in a nuanced manner (World Bank and FAO 2018). Second, as most studies on economic feminization in dryland areas tend to focus on agricultural activities, it would be interesting to have more multi-method studies that examine feminization related to non-farm activities and its effects on dryland communities, particularly women. Finally, there is the need for more policy-oriented grassroots studies that examine the ways in which local formal and informal institutions might be better leveraged to improve the specific needs of women in dryland societies experiencing migration-related agricultural feminization.

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