Women in Agriculture

THE IMPACT OF MALE OUT-MIGRATION ON WOMEN'S AGENCY, HOUSEHOLD WELFARE, AND AGRICULTURAL PRODUCTIVITY

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A mother carries her child in a crop field in Chimaltenango, Guatemala. Photo: Maria Fleischmann / World Bank

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Foreword

This study explores the little studied phenomenon of the impact of male out-migration on the women and farms left behind, which is transforming rural economies, landscapes, and potentially, gender relations. The objective of the study was to investigate the implications of male out-migration for women's agency, household welfare, and agricultural productivity. Of fundamental interest is what decisions a woman is able to take, in agriculture, the household, and the community in the absence of her male partner.

The World Bank Group takes as its starting point that no country, community, or economy can achieve its potential or meet the challenges of the 21st century without the full and equal participation of women and men. Failure to fully unleash women's productive potential meanwhile represents a major missed opportunity with significant consequences for individuals, families, and economies.

Agriculture accounts for one-third of gross-domestic product (GDP) globally and women's participation is crucial if the world is going to be able to feed its growing population. According to the Food and Agriculture Organization (FAO), if rural women in developing countries had the same access to productive resources as men, they could increase yields on their farms by 20-30 percent. Yet, very little data have been collected at the micro-economic level to analyze the impact on women left alone on farms after their partners' migration or the impact this has on agricultural yields, planting decisions and other factors.

The study focuses on Guatemala due to the relative importance of rural male out-migration there in recent decades and the significance of the Bank's current and future engagement in rural development. A detailed survey questionnaire was developed and piloted focused on migration, agricultural decision making and measures of agency. The results yield important findings for policy makers, researchers, and others interested in the impact of male out-migration on the agriculture sector and on the women and families they leave behind.

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Abbreviations and Acronyms

FAO
Food and Agriculture Organization (of the United Nations)

GDP
Gross domestic product

NGO
Nongovernmental organization

WDR
World Development Report

WFP
World Food Programme

Women in Agriculture

The Impact of Male Out-Migration on Women's Agency, Household Welfare, and Agricultural Productivity[1]

1. Study Overview

Migration is transforming rural economies, landscapes, and, potentially, gender relations. Migration is one of the drivers of the so-called "feminization of agriculture" in Latin America (Deere and León de Leal 2001). This feminization has relevance for everyone given agriculture's role in regional food security, national shared prosperity, and household resilience to shocks.

This little studied phenomenon is not yet well understood and new evidence is needed. To fill this gap, financing was secured from the Umbrella Facility for Gender Equality and household surveys were conducted in two departments in southeastern Guatemala. **The objective of this study is to investigate the "feminization" of agriculture as well as its implications for women's agency, household welfare, and agricultural productivity**. Of fundamental interest is what forms of engagement a woman *wants* to take and is *able* to take in agriculture, the household, and the community in the absence of her male partner. In particular, this analysis seeks: (i) to understand how male out-migration is influencing women's agency in agriculture; (ii) to understand if, when women are in control of farms, it changes the types of decisions they make and thus the results that they obtain; and (iii) to get a better sense of how differences in agency (if any) lead to better or worse outcomes for the farm household.

Five key findings of interest from the study are as follows:

- Contrary to the popular belief held by local officials, policy makers, and researchers alike, the vast majority of households remain in agriculture even when the male head of household migrates.
- The continuation of agriculture as a household livelihood strategy is characterized by the transformation and expansion of the role of married women in agricultural production. As men in southeastern Guatemala now migrate for years at a time, their partners face greater responsibilities in agricultural production, both in decision making and in production itself.
- These households, where the male partner has migrated, are more likely than other types of households to employ non-household members or paid workers for agricultural labor. This gap persists even when controlling for the dependency ratio[2] and household size.
- As agriculture is still seen as a traditionally male endeavor, women reported having not only to take on farming, but also to *learn how* to farm once their husbands migrated. But extension services and technical assistance generally fail to reach women in rural areas.
- Households with a male partner who has migrated have the highest levels of food security and food diversity relative to other groups. Given the higher level of remittances received by these households and the fact that remittances tend to go directly to women, this result is in line with literature showing that money controlled by women is allocated at greater rates toward family nutrition than money controlled by men (Thomas 1990).

1 Unless otherwise noted, all tables and figures appearing in this study derive from the original survey research described herein.

2 The dependency ratio refers to the ratio of the number of household members under age 15 and over age 64 to the number of working-age household members.

2. Introduction

This section provides an introduction to the role of women in agriculture, lays out the study methodology, and provides background information on migration, women, and agriculture in Guatemala.

Women have a central role at the nexus of rural development, food security, and agriculture (FAO 2011b; World Bank 2011). According to the Food and Agriculture Organization (FAO), if rural women in developing countries had the same access to productive resources as men, they could increase yields on their farms by 20-30 percent. This could raise total agricultural output in developing countries by 2.5-4 percent, which could in turn reduce the number of hungry people in the world by 12-17 percent (FAO 2011b; IFPRI 2003). According to a recent World Bank (2014) study, this access to inputs has to include access to labor, technology, and knowledge and may need to be tailored for women farmers.

Women's role in agriculture is particularly crucial in Guatemala, which suffers from the double burden of chronic malnutrition and obesity. The country has a competitive agro-food sector, while at the same time the rate of chronic malnutrition in its rural areas is one of the highest in the world. The agriculture sector represent 11 percent of gross domestic product (GDP), with food exports representing more than 44 percent of total exports (World Bank 2015). Despite this, Guatemala's chronic undernutrition rate is currently at 49.8 percent among children under five (WFP 2015).

Very little data have been collected at the microeconomic level to analyze the impact on women left alone on farms after their partners' migration (FAO 2011b; World Bank 2012; etc., among many others). Women seem to be large but statistically invisible contributors to rural life through paid and unpaid employment. According to FAOSTAT (2013), women in Guatemala represent almost 10 percent of the labor force in agriculture, while the International Labour Organization reports that 12.6 percent of female employment in Guatemala is in the agriculture sector.[3]

3 Data come from the World Bank's (2015) World Development Indicators.

Methodology

This analysis seeks to investigate the impact of male migration on agriculture and its implications for women's agency and agricultural productivity, as mediated by factors such as land tenure and access to agricultural extension services. In particular, this analysis seeks: (i) to better understand how male out-migration is influencing women's agency in agriculture; (ii) to understand if, when women are in control of their farms, it changes the types of decisions they make and thus the results they obtain; and (iii) to get a better sense of how differences in agency (if any) lead to better or worse livelihood outcomes for farm households. Table 1 outlines the framework used for the analysis, based on the analytical framework used for the 2012 World Development Report (WDR) on Gender and Development (World Bank 2011). The WDR recognized the importance of access to and use of endowments such as land, labor, and knowledge but also raised the profile of women's agency as a key to economic development. Finally, data on household income and food security are analyzed to understand the impact of migration and women's agency on household well-being.

This study is based on a quantitative field survey conducted in August 2014, as well as qualitative focus groups and interviews conducted in May 2014 to test the questionnaire. The study was performed in two southeastern departments of Guatemala, Jutiapa and Chiquimula (see Map 1), on a sample of 572 agricultural households.[4] The sampling process ensured that the results presented here are representative of these two departments, which are near the border with Honduras and El Salvador.

The households interviewed are classified into three groups:

- **Type 1**: Women whose male partners are currently migrants.
- **Type 2**: Women in households where both the male and female heads are present (independent of possible migration history).
- **Type 3**: Single female-headed households.

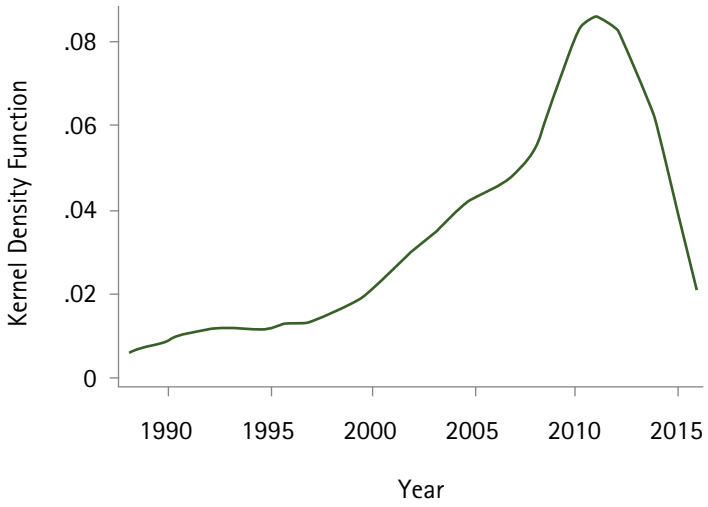
4 See Appendix A for additional details.

Table 1: Analytical Framework

Access to/Use of Endowments	Women's Agency	Livelihood Outcomes
Land Labor Knowledge	Soft Agency Agricultural Non-Agricultural	Food Security Income

Map 1: Departments of Guatemala

Figure 1: Year of Departure for Current Migration



Note: Figure based on data from Type 1 households only.

The use of three groups (one treatment and two control groups) allows the analysis to parse out the effects of having a migrant partner versus being a single head of household and gives an opportunity to see general social norms across households in a given community. For simplicity, from this point forward, women/households are referred to by their "type," as classified above.

Background on Guatemala

In Central America and particularly in Guatemala, male out-migration is accelerating; more than 70 percent of migrants are young males and almost 90 percent of these migrants are in the United States. (Cohn, Gonzalez-Barrera, and Cuddington 2013). This report draws on data collected in Chiquimula and Jutiapa, as this region did not suffer as much displacement relative to other parts of the country due to the civil war (1960-1996). Thus little evidence of migration is seen in previous generations here (only six of the women interviewed said that either one of their grandparents or their spouse's grandparents had ever lived abroad). Nonetheless, as many as 10 percent of women said that their father had lived in the United States, and those women are more likely to be currently married to migrant husbands.

These days, migration episodes tend to occur only a few times in a person's life, though they are relatively long. While only 16 percent of partners in dual-headed households ever lived in the United States, those who did spent 50 months away on average. The sample confirms that out-migration is largely a male phenomenon in rural southeastern Guatemala, as over the last 10 years only 15 percent of women with migrant husbands have lived outside the *locality* in which they were interviewed, with most living elsewhere in the country rather than abroad.

The decision to migrate appears to fall mostly within men's domain. In speaking of their partner's most recent or current migration episode, 81 percent of women with migrant partners and 77 percent of women currently in dual-headed households said that the decision to migrate was made by their partner alone. Only 15 percent and 18 percent, respectively, said that their partner's migration was a joint decision.

In southeastern Guatemala, agriculture is traditionally a male endeavor; although women participate in several areas of the production process, men are the primary decision makers. In 85 percent of Type 2 households in the sample, for instance, women do not participate in the *decision* of what to plant. Similarly, 88 percent do not take part in deciding what inputs to use. Nevertheless, about half of Type 2 women participate in some part of the agricultural production *process*,

with 27 percent purchasing inputs and 30 percent taking part of the crop harvest. Further, qualitative interviews revealed that women play a critical supporting role on a daily basis: as some of the land used is hours away from the house by foot, men may spend the day there, while women walk back and forth to bring food and supplies as needed.

The vast majority of households remain in agriculture even when the male head of household migrates, contrary to the popular belief held by local officials, policy makers, and researchers alike. Households' persistence in agriculture has been defined by the transformation and expansion of the role of married women in agricultural production. As men in southeastern Guatemala now migrate for years at a time, their partners face greater responsibilities in agricultural production, both in decision making and in production itself. In contrast to Type 2 households, half of women in Type 1 households participate in the *decision* of what to plant and what inputs to use (and the majority of these make the decision alone). Even more dramatically, 73 percent of women in Type 1 households actually participate in some part of agricultural production, 60 percent purchase inputs, 50 percent harvest, 42 percent said they participate in planting, and 44 percent participate in cleaning the land.

Migration and Women's Agency

The literature on the effects of male migration on women's agency and empowerment reveals a mixed picture (Menjivar and Agadjanian 2007). First, agency is variable depending on the domain; undoubtedly, migration of a male partner does not increase agency across all domains – nor does it decrease agency across the board. In some cases, women see an expansion of their traditional roles. Some studies find that out-migration increases women's participation in the labor force, often even in traditionally masculine activities (Mummert 1988).

The increase in responsibility is often not by choice but out of necessity, when remittances are insufficient or erratic (Pessar 2005). These new roles may represent an excessive time burden with the loss of male labor, or represent obligations that are not always accompanied by social approval or access to the same economic support systems. **Other researchers find that traditional gender divisions of labor can be reinforced by male migration.** Given few labor opportunities outside of agriculture, some studies show that it is rare for women to join the labor force in agriculture or otherwise. Pessar (2005) notes that there are instances in which "women (commonly from more economically secure households) are forbidden by migrant husbands to work outside the home."

But migration has the potential to change social norms within a community that prescribe how women participate in agriculture, community groups, household decision making, and so on. The experience of heading the farm and household in the absence of her partner may earn a woman more trust and authority from her partner, peers, and community – and possibly increase her own sense of self-efficacy, or the internal component of agency. Certainly, bargaining within the household is affected by structural conditions and institutions in which the household is embedded (Agarwal 1997). Furthermore, women in communities with high levels of out-migration, even if they themselves do not have a partner who has migrated, may experience changes in gender roles over time.

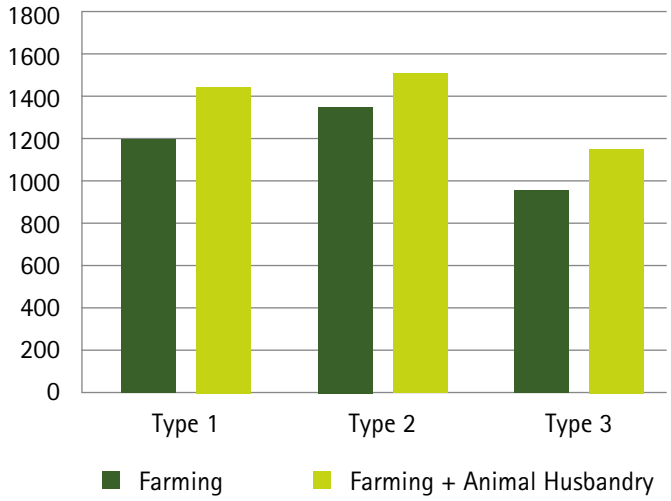
3. Access to and Use of Endowments

This section looks at women's access to and use of endowments such as land, labor, and knowledge and the differences between household types. **The study finds that women's access to both labor and knowledge impacts their ability to farm all of the land they own or have access to.** Interestingly, women's access to land does not appear to be the primary constraint and women are just as likely to have documents to their land as men.

Access to and Use of Endowments: Land

Land productivity is similar across all three groups. Overall, Type 2 households' annual farming incomes (US$776) are almost twice as large as

Figure 2: Average Annual Agricultural Earnings per Hectare by Household Type (US$/ha)



Note: Income reported here represents annual income.

those of households in the other two types: US$415 and US$365 for Type 1 and Type 3 households, respectively. The former also use more land than the other two groups, so when considering agricultural income *per hectare*, most of this difference disappears. Type 2 households produce on average US$1,527 per year per hectare (including household consumption), but Type 1 households are not far behind, at an annual rate of US$1,435 per hectare. Type 2 households are 16 percent more likely to sell at least some agricultural production. The lack of economies of scale for Type 2 households may signal labor and input constraints in rural Guatemala.[5]

For Type 1 households, with one fewer male member and a shift of the purpose of agriculture towards subsistence or consumption smoothing during periods of lower remittances, agricultural production is lower than for Type 2 households. This is a function of land use, not productivity. Type 2 households tend to *use* more agricultural land than the other two groups. Nonetheless, there is no statistically **significant difference in the likelihood of *owning* agricultural land across groups** (see Appendix A, Table A2). Two in five households in the sample own agricultural land (three in four own some land, including their household plot), though in all three groups it is common to use both land owned and land from others. Very few plots of land (less than 10 percent) are rented for money or used for sharecropping.

Though women participate in agricultural production, their levels of land ownership are relatively low and show evidence of male preference in inheritance. Over half of the land owned by households in the sample was acquired through inheritance, and was much more likely to come through male lineage than female lineage. Furthermore, in only 58 percent of cases in which a plot was inherited through the woman's side of the family (from her parents or relatives) was she listed as an owner of that plot.[6]

Other important differences in women's ownership exist across groups, with more than 30 percent of women from Type 1 households owning at least one plot (jointly or as sole owner), in contrast to 21 percent of women from Type 2 households, and the difference is statistically significant. Notably, 20 percent of women from Type 1 households are the sole owner of at least one plot

5 Note that land quality is not taken into account.

6 In the survey, women were asked to list the owners of each plot of land used or owned by the household. As such, it favors "perceived" ownership over legal ownership. Nonetheless, the results indicate that in 42 percent of cases in which the plot of land was inherited from the woman's side of the family, the respondent did not consider the land to be hers.

of land, in contrast to 13 percent of women in Type 2 households.

Importantly, 80 percent of agricultural land owned by households in the sample has documentation (51 percent have a deed; 32 percent are also registered). No differences were found in the likelihood of documentation between female-owned and non-female-owned land, indicating that in this context the documentation process is no more inclusive of women than men. No differences were found in the likelihood of documentation across household groups.

Access to and Use of Endowments: Labor

Type 2 households are less likely than the other two household types to employ non-household members or paid workers for agricultural labor. This gap persists even when controlling for the dependency ratio and household size, suggesting that in Type 2 households the male head of household may undertake a significant portion of the agricultural tasks that cannot be easily done by women. **Instead, Type 1 and Type 3 households rely on outside help (paid or unpaid) to replace this source of labor.**

During the qualitative interviews, women explained that one of the reasons they cannot cultivate all their land is the lack of available labor. Women also explained other difficulties with hiring laborers – weak negotiating power, inability to monitor the quality of work, and women not being considered as a "real" farmer. Most women cope with these constraints by asking for help from another male in the household or community to manage the hiring and supervision of workers.

Households that can employ outside workers have significantly higher agricultural income. After the total amount of land is incorporated, this is the second most important factor in the explanation of agricultural income. It seems to reinforce the idea that households in rural areas have a higher income – between US$160-200 higher – when they are able to hire an external worker to help them accomplish some of the agricultural tasks.

The possibility of hiring outside workers was consistently mentioned by women across all types during the qualitative interviews, and seems to be a very important constraint for women in Type 1 households. Women in Type 1 households have one less adult than do Type 2 households, but also a higher dependency ratio. The latter also explains why even though Type 2 households tend to use more agricultural land than the other two household groups, no statistically significant difference is found in the likelihood of *owning* agricultural land across groups.

Access to and Use of Endowments: Knowledge

As agriculture is a traditionally male endeavor, women reported having to not only take on farming but also to *learn how* to farm once their husbands migrated. In focus groups, several women said they did not know how to farm when their husbands decided to migrate, learning just before they left or, once their partners left, from male relatives or from their partners over the phone.

Male relatives are an important source of information and advice on agriculture for women. The quantitative study found that the majority of women who know to farm first learned from their fathers (70 percent). Partners are also a principal teaching source, especially for women with migrant partners: 24 percent of Type 1 women first learned how to farm from their partners, in contrast to 18 percent of Type 2 women.

Extension services and technical assistance generally fail to reach women in rural areas. Only 13 women in the entire dataset said they received technical assistance in the last 12 months. Two-thirds of women noted that they do not currently learn about agriculture from anyone, including extension services or neighbors, parents, etc. About 25 percent of women learn from family members or neighbors. The scarcity of extension services is corroborated by the fact that only six extension agents serve the entirety of the two departments in the study – with only three agents per department – two generally serving male groups and one serving women. The focus groups and consultations revealed that, with a few exceptions,

Table 2: Agency Index Summary

Agency Index	Component Variables		
Soft	Autonomy	Self-Determination/ Self-perception	Self-esteem/Aspiration
Non-Agricultural	Decision in the household	Participation in the community	Access to financial services
Agricultural	Agriculture decisions	Agriculture actions	Agriculture ownership

the extension services offered to women focus on nutrition and food preparation. These efforts stand in stark contrast with women's preferences and the role they play in agriculture, as 7 in 10 women in the sample stated that they would like to receive extension services or training in agricultural production. The highest demand is for training on selecting seeds (42 percent of all women in the sample), animal immunizations (41 percent), and pest control (36 percent).

The lack of technical assistance for women in agriculture is alarming, as households in which women reported that they do not learn about agriculture from anyone have lower agricultural and *total* incomes relative to other groups. Specifically, households in which women reported that they learned how to farm alone have agricultural incomes that are US$371 lower than those of other households; after controlling for other variables such as household type and size, this difference decreases to US$240-260, but is still significant. Similarly, total household income is US$1,084-1,216 lower for those women who learned how to farm on their own, even when controlling for covariates. This result highlights the high cost of the lack of extension services, borne not only by women and their households but also by the agriculture sector as a whole.

4. Impacts on Women's Agency

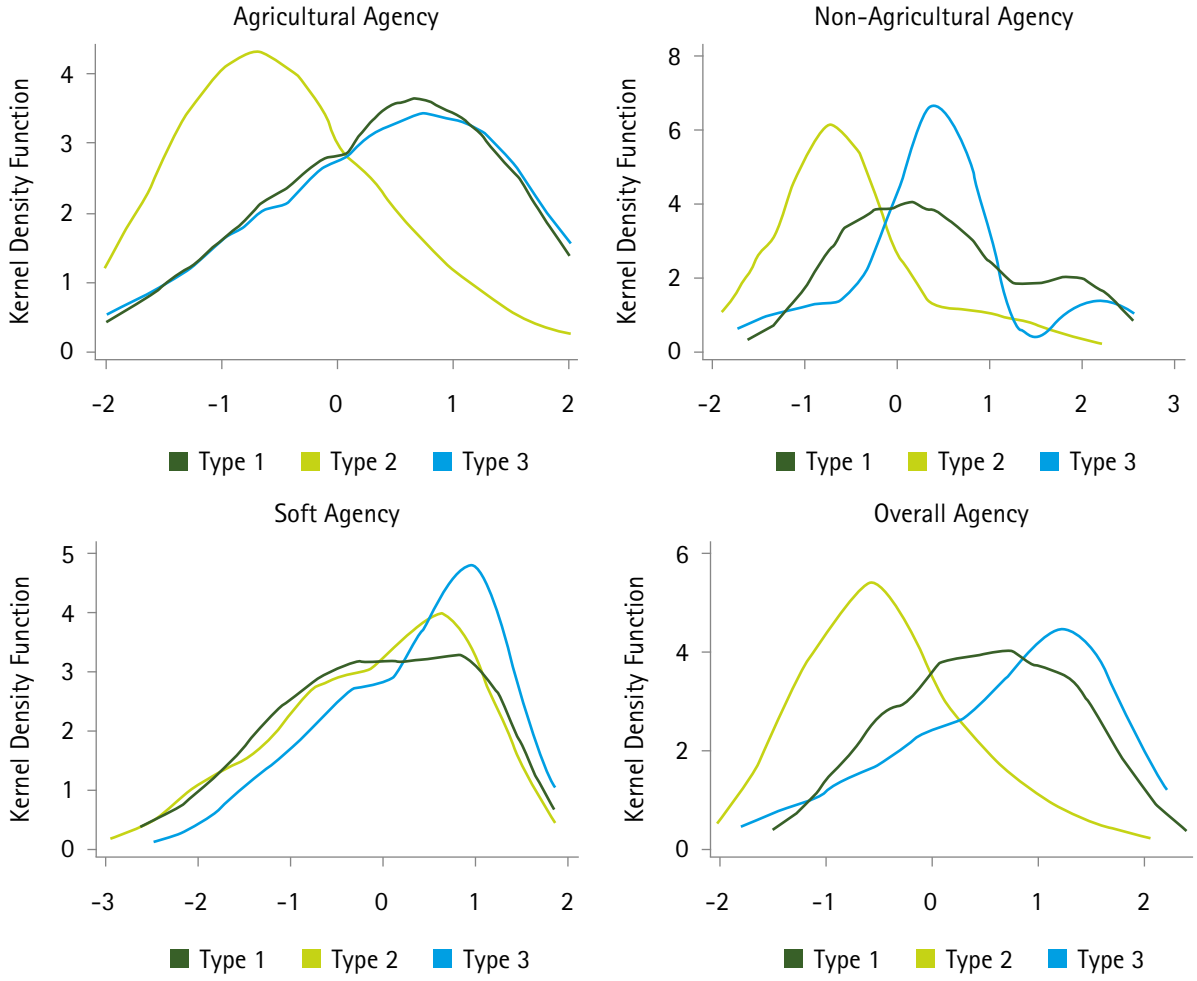
The second realm of impact of male out-migration in Guatemala studied here is women's agency. When men leave their farms to migrate internationally, to what extent, and in what way, are women able to exercise their agency? Women living in the context of male out-migration represent an opportunity to empirically test two important research questions that remain to be answered to better understand agency: (i) how women's self-evaluated agency and agency outcomes are associated; and (ii) how agency in different domains potentially relate to one another.

As seen above, **male out-migration has transformed agricultural roles, increasing women's participation in agricultural production.** The large influx of remittances also changes the distribution of money over which women have control, or are at least responsible for managing. Together, these shifts may influence women's choices, self-perception, sense of empowerment, and ability to act. This section looks specifically at women's agency in agricultural decision making, non-agricultural decision making, and "soft agency" (see Box 1).

What emerges is that women in Type 1 households tend to have more agency – both agricultural and non-agricultural – than Type 2 households, meaning that they are more involved in decision making for both the farm and the household. **Soft agency measures, however, reveal that women in Type 1 households do not necessarily see themselves as freer or more autonomous than other household types.**

The distribution of agency measurements varies by household type and by the agency measurement used. Nonetheless, in all four agency indices, women in Type 3 households have a higher level of agency on average, as shown in Figure 3. Women in Type 1 households have a higher agency level in agricultural and non-agricultural dimensions of agency relative to those in Type 2 households, but the distribution of the soft

Figure 3: Distribution of Agency Indexes by Household Type



agency measurement is similar for all three groups. With respect to overall agency measurement, Type 2 women have the lowest level of agency, followed by Type 1 and then Type 3 women.

Agricultural Agency Index

Women in Type 1 and Type 3 households have significantly more decision-making agency in agriculture. Women in Type 1 households are also more likely to participate in agricultural decision making, with 64 percent of women in Type 1 versus 20 percent of women in Type 2 households participating in the decision of what crops to plant. Only 2 percent of women in Type 2 households report being the sole decision maker on that issue, while 50 percent of women in the other two groups report being the sole decision maker. Even when several dimensions are combined, including how women participate in the decision on what to plant, the decision on inputs, and more generally on agricultural production, the results show a similar trend of women in Type 2 households participating less in these decisions.

Among households with small animals, women tend to be responsible for them, though at a lower rate among Type 3 households. The latter might be due to women's responsibilities for everything else. The survey included questions about large animals, but very few households own them (16 percent), and when they do, women are usually not responsible for them. Thus, the index does not cover this dimension of animal ownership.

Box 1: What is Agency?

This study draws upon the concept of agency to enrich the understanding of female empowerment in agriculture. The questionnaire used in this study built upon the Women's Empowerment in Agriculture Index (WEAI) (Alkire et al. 2013), and was designed specifically to focus on trends in the feminization of agriculture due to male out-migration. Agency, then, is a quality or capacity exercised when a person is able to capitalize on endowments and economic opportunities to lead to desired actions. Sen (1989) defines agency as an individual's ability to act on behalf of what the individual values and has reason to value.

Agency is not "global" but rather multidimensional in the sense that an individual can exercise different levels of agency in pursuit of multiple aims (Alkire 2005). These aims can be very diverse and someone may have variation in her level of agency with respect to different aims (Alkire 2008). A woman may have significant say in decision making over what kinds of food to buy, but no control over the amount of income she is allocated by her husband out of their earnings.

Consequently, the measure of agency used captures three different dimensions of rural women's agency related to agricultural and non-agricultural variables: (i) soft agency; (ii) non-agricultural agency; and (iii) agricultural agency. Each of these measurements is built using three components, as described in Table 2. A description of each variable is included in Appendix C, along with a brief explanation of the methodology used to construct the agency measurements (principal components score). This study also includes a broader agency index that combines all nine variables into a single index.

One important part of the survey instrument was the deeper exploration of "soft agency." Based on qualitative work, the survey questionnaire was developed with several modified psychosocial scales to measure women's self-determination and self-esteem. This section included questions on women's self-perception on specific qualities of agency in contrast to other women like her and her perception of cultural norms to contextualize what kinds of choice and behavior are perceived as possible in a community. This soft agency section serves to test some of the psychosocial scales in a new context amongst rural women and to test links between soft agency and other factors of agency, like decision making and access to endowments and economic opportunities.

Non-Agricultural Agency

The non-agricultural agency index comprises three dimensions: the distribution of household decision making, participation in the community, and access to financial services. Household decision making comprises various realms, some of which may be traditionally within women's domains (e.g., food) and others that are not (e.g., the household's overall budget). The extent to which women participate in local groups, both as a member and in leadership positions, as well as their access to banking are also considered.

The roles played by individuals in decisions vary by household type, and married women are less likely to make decisions regarding their own time and employment. Among women who stated they were not employed, for example, 45 percent of those in Type 1 households and 35 percent of those in Type 2 households stated that their partners were the ones who decided that the women would not work outside the home. In contrast, 61 percent of single/widowed women who do not work made that decision themselves. The latter group is also much more likely to decide alone on any other activities they do outside the household: 89 percent of them decide in which activities to participate, in contrast to 47 percent of women from Type 1 households and 34 percent of women from Type 2 households. Notably, however, over half of the women who said they played no role in deciding on their activities outside the house also stated that they did not wish they had more decision-making power.

Women in Type 1 and Type 3 households have a greater say in the household budget than do women in Type 2 households. As many as 57 percent of women in Type 1 households and 77 percent of women in Type 3 households say they decide and manage the household budget alone, while only 13 percent of women in Type 2 households do so. Another 36 percent of women in Type 1 households share this responsibility, but 30 percent of women in Type 2 households have no say in the household budget. This pattern also holds true for household food decisions: in 39 percent of Type 2 households the male partner decides alone how much to spend on food, while 75 percent and 83 percent of women are the sole decision makers in Type 1 and Type 3 households, respectively.

The participation of women in any type of productive group, other than church and sports activities, is very low, at around 22 percent. These results are somewhat surprising, particularly considering the extremely low stated participation in productive groups (less than 10 percent). It is possible, however, that the question on "belonging to a group" may not have been well understood or interpreted by the respondent as envisioned in the survey design, as the qualitative work in several communities showed higher levels of women's participation in groups organized by local NGOs.

Very few women have a leadership position in their community. As expected, Type 3 women are slightly more likely to be leaders (23 percent) on average than Type 1 and Type 2 women, at 18 percent and 17 percent, respectively.

The use of credit and insurance is low in this region of Guatemala. Less than 10 percent of households in the sample have any credit and fewer than 7 percent have formal credit (with a bank or NGO). Around 7 percent of households also carry some form of life insurance.

However, 33 percent of women in Type 1 households have an independent bank account. This is significantly more than women in Type 2 (11 percent) and Type 3 (14 percent) households. Women in Type 1 households might enjoy a secondary effect due to their higher familiarity with financial institutions provided by the necessary management and receipt of remittances. In fact, receiving remittances increases the likelihood that a woman has a bank account by 9 percentage points.

Having a bank account is associated with higher incomes. Households in which women have a bank account have earnings that are US$898 more than households in which they do not; this amount reaches US$1,023 for Type 1 households. Given the overall low rates of credit use in this context, only access to a bank account is used as a proxy for access to financial services.

It should be noted that **the level of agency measured for agricultural and non-agricultural decisions is higher for women in Type 1 households than those in Type 2 households**.

Soft Agency

The soft agency measurement designed through the survey comprises three variables. Specifically, it considers self-efficacy (sense of freedom and choice), aspirations (abilities and goals), and autonomy. Figure 4 shows average scores in each of the three dimensions by household type. More detail on the questions used to elicit these psychosocial measurements is included in Appendix C.

A greater share of Type 3 women relative to women in other groups perceive themselves as very autonomous. In the "autonomy" question, women were asked to position themselves on a ladder with 10 rungs, with the first rung representing someone without any freedom and the top rung (i.e., the tenth) representing someone who is completely free. Figure 5 shows that women in Type 3 households tend to perceive themselves as more free than others.

It is interesting to note that women in Type 1 households are more likely to give themselves the same rating of freedom as they assign to the rest of the women in their community. A follow-up to the autonomy question asked women to state the rung on which they thought most of the women in their community would be. Figure 6 shows the distribution of the *difference* between the woman's own rung and the rung she assigned to women in her community, so that zero indicates she placed both of them on the same rung; a positive number indicates that the woman thinks she

Figure 4: Soft Agency Index by Household Type

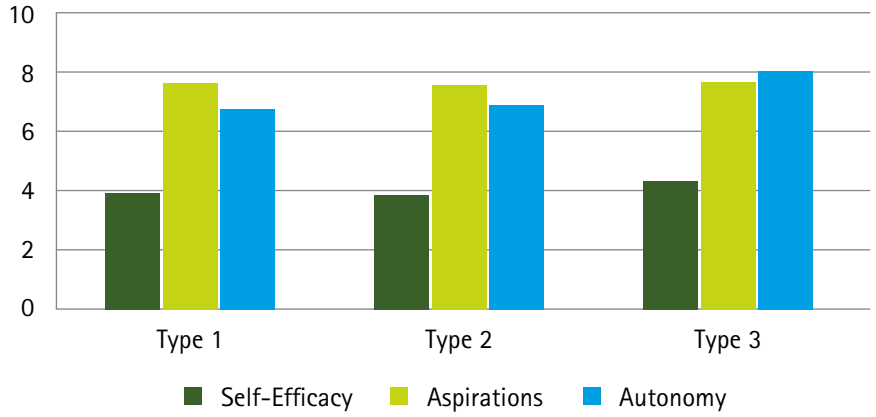
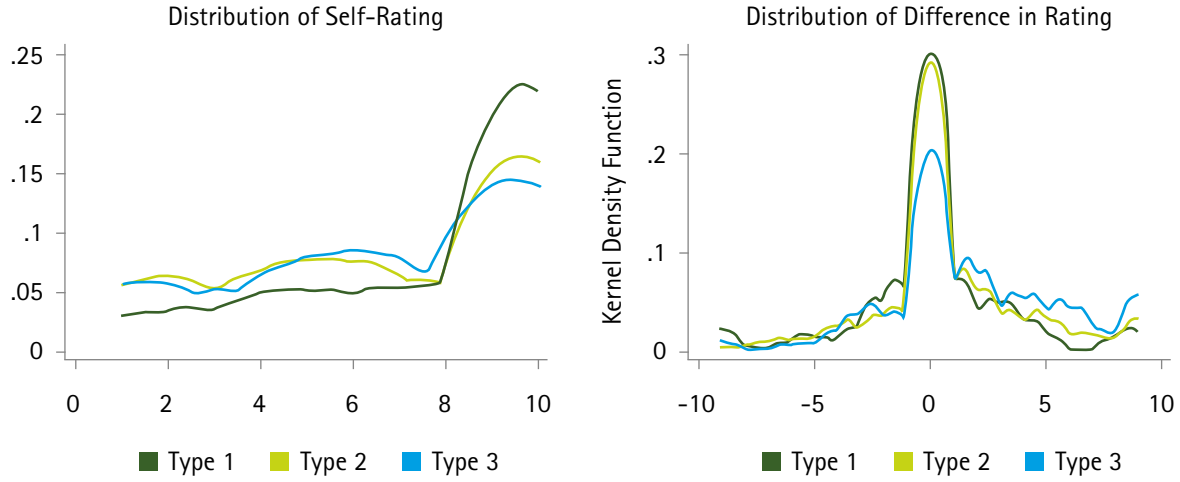


Figure 5: Distribution of Autonomy Self-Rating (left panel) and Difference in Rating (right panel) by Household Type



Note: The difference reported in the right panel represents respondents' self-rating minus their rating of other women.

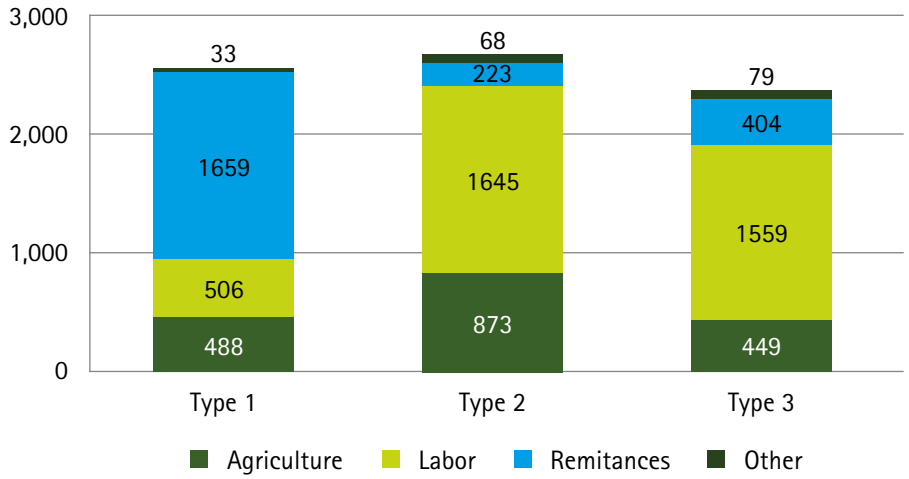
has more freedom than the rest of the women in her community, while a negative number indicates less freedom.

The survey finds **that women in Type 3 households are more likely not only to place themselves high, but also to consider themselves to be freer *relative* to the rest of women in the community**. The high concentration of Type 1 women at zero is inconsistent with higher levels of agency in agricultural and non-agricultural measures, and raises the possibility that their responses to the autonomy question were biased in an attempt to "fit in."

5. Impacts on Household Welfare

In the context of the high levels of malnutrition found in Guatemala, two principal measurements of family welfare are household food security and food diversity. This section explores the differences in income sources across the three groups, and the differences in food security and food diversity between them. Type 1 households have higher levels of food security and food diversity compared to the other household types.

Figure 6: Distribution of Annual Income Sources by Household Type (US$)



Income: Amounts and Sources

Contradicting common belief in Guatemala, migrant households are not richer than the rest. Some of the new social programs being designed at the time of fieldwork excluded migrant households, assuming that they were always better off than other types of households, given that they had a supplementary income source in the form of remittances. Instead, this study finds that households in the three groups have, on average, the same amount of total income (Figure 6). The average annual income for Type 1 households is US$2,715; for Type 2 households, US$2,769; and for Type 3 households, US$2,437.[7]

Not surprisingly, women from Type 1 households have a higher share of income from remittances. On average, Type 1 households receive US$1,659 in remittances per year, in contrast to US$223 for Type 2 households and US$404 for Type 3 households. While total income across the three groups varies little, the composition differs, as Type 1 households use remittances to make up for losses in agricultural and wage income.

Notably, **among households in the latter two groups that *do* receive remittances, the transfers are also fairly large**: on average, Type 2 remittance-recipient households receive US$1,023 per year; Type 3 households receive an average of US$1,158. Nonetheless, these are around half the amount received by Type 1 households that receive remittances (79 percent), for which the average annual amount is US$2,192. Interestingly, no difference exists across households in women's participation rate in deciding what to do with remittances.

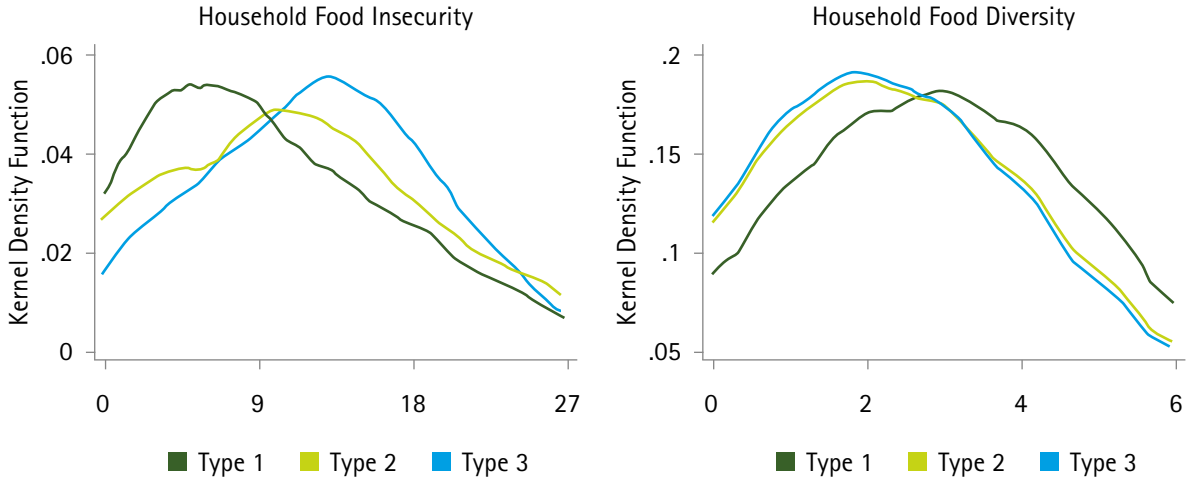
Type 2 households that receive remittances are 21.6 percentage points less likely than Type 1 households to use remittances for food. Type 3 households are 9 percentage points less likely to do so. No difference exists in the likelihood of spending remittances on education, even when accounting for the number of children. Type 1 and Type 2 households are just as likely to use remittances for agriculture (13–15 percent), but Type 3 households are less likely to do so.

Type 2 households are more likely to be engaged in wage/salaried work. About two in three (67 percent) Type 2 households have income from non-agricultural work, along with 55 percent of Type 3 households but only 26 percent of Type 1 households.

Government transfers represent a very small amount of total income (i.e., other income).

7 Migrants earn more income than what they remit, and the total amount was not taken into account in computing "household income," including only the amount received in remittances. (It was not possible to collect data on migrants' total earnings, as interviews were carried out with their spouses, many of whom may not know or want to report their partner's earnings abroad.) In this sense, for economic purposes a "household" is considered as the family members and other individuals living in the same house and sharing meals, with remittances an additional source of income.

Figure 7: Distribution of Food Insecurity (left panel) and Food Diversity (right panel) by Household Type



Note: In the left panel, higher values on the x-axis indicate more food *insecurity*. In the right panel, higher values on the x-axis indicate more food *diversity*.

Three in ten (30 percent) households receive government cash transfers, but, as corroborated by the qualitative interviews conducted and the explicit exclusion of households with migrants from social programs, Type 1 households have much lower rates of transfers (16 percent) compared to Type 2 (32 percent) and Type 3 (42 percent) households. The amount of the transfer is quite small, however, so Type 1 households receive on average US$13 per year, compared to US$30 among Type 2 households, and US$49 among Type 3 households. The most common type of in-kind transfer in rural Guatemala is fertilizer: 45 percent of Type 1 households on average receive fertilizer, compared to 65 percent of Type 2 households.

Household Food Security and Diversity

Type 1 households have the highest levels of food security and food diversity compared to the other groups, as indicated in Figure 7. Given the higher level of remittances received by these households and the fact that remittances tend to go directly to women, this result is in line with literature showing that money controlled by women is allocated at greater rates towards family nutrition than money controlled by men (Thomas 1990). A surprising and perhaps alarming result, however, is that Type 3 households (female-headed households) have the most precarious nutritional status, particularly with respect to their levels of food insecurity.

Households with a higher share of agricultural income to total income are slightly less likely to be food insecure but also less likely to have food diversity. That is, while agricultural production stabilizes access to food so that households are less likely to go days without eating or with little food, for instance, they are also less likely to experience diversity in their food, as they rely on their own production for food and that production is limited in diversity. Households that rely on remittances or other sources of income may buy a wider range of foods. As expected, higher income is correlated with lower food insecurity and higher food diversity.

Households that receive remittances have higher levels of food diversity, though not necessarily food security. For households that receive remittances, the *amount* of remittances has a small but significantly positive effect on food security and diversity. Interestingly, and perhaps contrary to the literature on women's allocation of resources, the study does not find evidence that

women's participation in the decision of how remittances are allocated affects food security or diversity. This may be due to sample size limitations, or may be attributed to the fact that the majority of households (79 percent) allocate some of their remittances towards food anyway, regardless of whether the woman participates in the decision-making process.

6. Conclusions

The research yields important findings for policy makers, researchers, and others interested in the impact of male out-migration on the agriculture sector and on the women and families they leave behind. **Contrary to popular belief, the vast majority of households remain in agriculture after the migration of the male head of household**. However, they tend to shift the purpose of agriculture towards subsistence and consumption smoothing during periods of lower remittances.

When men out-migrate, women report having more agricultural agency and become more involved in agricultural and household decision making. However, improved household welfare reported among migrant households arises primarily due to remittance flows and decisions about income allocation, rather than to improvements in productivity. At the same time, these women may not see themselves as freer or may feel burdened by the need to make more decisions alone.

While land productivity is similar across all three groups of households, farming income varies across households, with households in which a male head is present reporting the highest farm income. But **when considering agricultural income *per hectare*, most of this productivity difference disappears.**

The lack of economies of scale for migrant households may signal labor, input, and knowledge constraints in rural Guatemala. The lower farm income reported by these agricultural households appears to have less to do with decision making and more to do with the high informational and labor barriers faced by women. While women may wish to stay in agriculture, their lack of knowledge and access to labor and other inputs hampers them from becoming more productive.

Diversifying risk in the household by diversifying agricultural production is an important factor of higher agricultural income. **Remittances should not impact households' access to social transfers, as remittances do not contribute to higher overall family income.** Food security and food diversity could be achieved at a faster pace if women had not only more economic empowerment but also more "soft agency."

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Appendix A: Data Tables

Table A1: Descriptive Statistics by Household Type

	Household Type		
	Migrant Husband	Dual-Headed	Single-Female-Headed
Marital Status of Woman (interviewee)[8]			
Single (%)	0	0	23.40
Married (%)	64.85	75.56	0
Common-law married (%)	35.15	24.44	0
Divorced (%)	0	0	1.42
Separated (%)	0	0	21.99
Widowed (%)	0	0	53.19
Woman's Age (mean)	35.4	40.4	43.8
Partner's Age (mean)	38.6	44.8	-
Woman's Literacy			
Can read and write (%)	68.48	60.15	39.01
Can read or write with difficulty (%)	15.76	13.16	17.73
Not literate	15.76	26.69	43.26
Partner's Literacy			
Can read and write (%)	86.06	69.17	-
Can read or write with difficulty (%)	3.03	8.27	-
Not literate	10.91	22.56	-
Woman's Schooling[9]			
None/Less than primary (%)	11.52	23.31	36.88
Some primary (%)	51.52	43.98	43.97
Completed primary (%)	28.48	24.44	13.48
Secondary or more (%)	7.87	6.77	5.67
Partner's Schooling			
None/Less than primary (%)	10.30	24.44	-
Some primary (%)	36.36	39.47	-
Completed primary (%)	36.97	26.32	-
Secondary or more (%)	8.48	9.03	-

8 Note that the survey did not make a distinction between *de jure* and *de facto* marital status, and instead simply asked women to select an option as they felt fit.

9 May not add up to 100 percent because of "do not know" answers. The same applies to "Partner's Schooling" below.

Table A1: Descriptive Statistics by Household Type

	Household Type		
	Migrant Husband	Dual-Headed	Single-Female-Headed
Household Size	4.5	5.6	5.0
Number of Children (age<=12) in Household	1.6	1.8	1.5
Number of Woman's Children[10]	2.9	4.1	3.7
Dependency Ratio[11]	1.18	0.75	0.86

Table A2: Descriptive Statistics on Agricultural Land

	Household Type		
	Migrant Husband	Dual-Headed	Single-Female-Headed
Number of plots used, managed, or rented out by the household	2.29	2.42 **	2.04 ***
Average plot size (per plot), m^2	4,716	7,060 ***	4,702
Total land (across all plots), m^2	9,403	15,316 ***	8,603
Share of plots used that are owned by household members	57.14%	46.10% ***	50.00% *
Households that own at least one plot	76.36%	74.06%	76.60%
Total land owned by household (across all plots), m^2	6,507	7,087	4,664
Share of plots owned by woman	19.15%	11.27% ***	32.17% ***
Women that own at least one plot	30.30%	21.80% **	49.65% ***
Total land owned by woman (across all plots), m^2	4,334	5,451	4,939

10 Includes all living children of all ages, whether living in the household or elsewhere.

11 The dependency ratio refers to the ratio of the number of household members under age 15 and over age 64 to the number of working-age household members.

Appendix B: Additional Agency Information and Results

Measuring Agency

It is worthwhile to measure agency since it is an intrinsically valuable expression of freedom and choice, and a pathway to gender equality. Because of the complex nature of agency, approaches for measuring it are varied. In the literature, three general proxies exist for measuring agency, though each has shortcomings:

1. **Endowments.** The amount or share of goods owned by the woman.

   This traditional method considers proxies such as the amount of land owned by the woman or the land received by the couple as a dowry. But agency is not only a matter of a woman's endowments and economic opportunities, despite the influence they have on her capacity to exercise agency. Two individuals with the same endowments and economic opportunities do not necessarily have the same goals or equal ability to advance the goals they value and have reason to value (Alkire 2008).

2. **Actions.** The woman's behavior, with assumptions about what one's behavior might be if free to choose.

   Here, the proxies used include participation in the labor force or a having a lower number of children. The difficulty with this measurement is that agency is not equivalent to action and should not be measured by a list of actions that a third party deems as expressing agency. A woman who does not participate in agricultural labor, for example, may be exercising her agency in the decision *not* to work and divide her labor strategically with her spouse.

3. **Decision-making responsibilities.** The share or number of decisions pertaining to the household in which the woman participates or is the sole decision maker.

   Proxies in this approach include whether the woman participates in/is the sole decision maker in the household's expenditure decisions, schooling decisions, etc. or, more comprehensively, is based on her share of participation in various decisions. Nonetheless, sole decision making alone is not a perfect measurement of agency, as female heads of households and other women may actually prefer to share decision-making duties with another person.

4. **Elicited psychosocial measurements**. This method uses questions to elicit women's perceptions of their own level of agency or a similar notion.

   A survey question asking a woman how she rates her level of freedom relative to other people in her household or village, for instance, can be a proxy for a woman's degree of agency in this context. Similarly, women may be asked whether they think their opinions are heard or whether they feel capable to do what they set out to do. These newer measurements rely on the assumption that complex questions are adequately understood. However, individuals may have incorrect perceptions, such that a woman who says she has more freedom relative to another may not in reality; her low level of agency may have led her to *expect and accept* a lower level of freedom.

In this report, all four approaches are taken into consideration, building indices that combine more than one of them. This offers more holistic measurements of agency and mitigates the shortcomings of each measurement by supplementing each with others. Reassuringly, however, positive correlations are found between all of the measurements used.

Further Agency Results

Using the calculated agency indices, regressions were estimated to understand the relationship between agency and other outcomes of interest. Some of these results are included in Appendix D, but this subsection highlights some interesting and/or policy-relevant findings.

Perhaps not surprisingly – but reassuring for the validity of the measurements – higher levels in the soft agency index and in the non-agricultural agency index are associated with higher income. For Type 1 women, higher levels of agency and **particularly aspiration levels** are associated with higher incomes**.**

When including each measurement of agency separately, the soft agency index is positively correlated with better agricultural income. For Type 1 women, a higher autonomy rating is very strongly associated with higher agricultural earnings. In contrast, for Type 3 women, a higher autonomy rating may be associated with lower agricultural earnings. This might be explained by the fact that when these women are more autonomous than the average, they may invest more effort in trying to increase other sources of income, rather than just agricultural income. This is corroborated by the fact that among Type 3 women, greater levels of autonomy are associated with more time spent on productive activities other than agriculture.

A surprising result is the negative correlation between the agricultural agency index and total agricultural income. This might be a sign that women experience significantly less access to inputs, or that higher agricultural incomes are associated with larger production, with more labor and a lower participation level from women in both decisions and actions.

Having a high level of soft agency is correlated with higher levels of food security and food diversity in the household. Higher autonomy seems to explain higher levels of food security, whereas higher self-determination is associated with higher levels of food diversity. This is again consistent with the literature on the greater tendency of women to allocate money towards food; women with higher levels of agency, who thus feel more capable to take control of and allocate resources, may be more successful at channeling income towards food expenditures for their household.

Figure B1: Soft Agency Index by Household Type

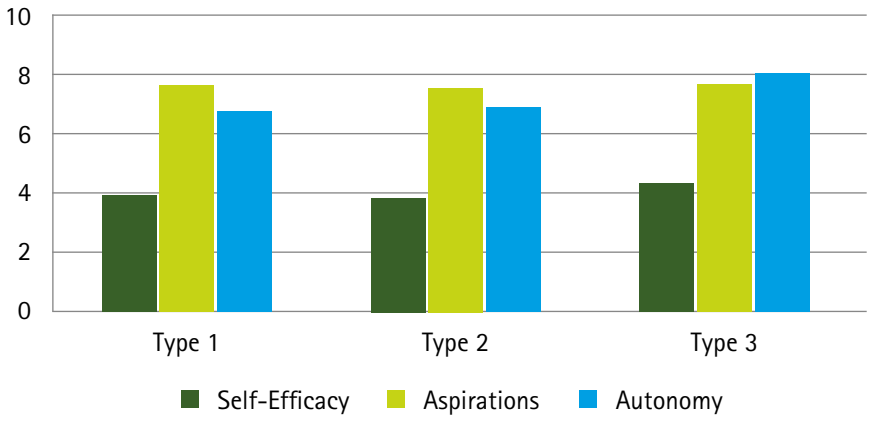


Figure B2: Decide on Activities Outside the House

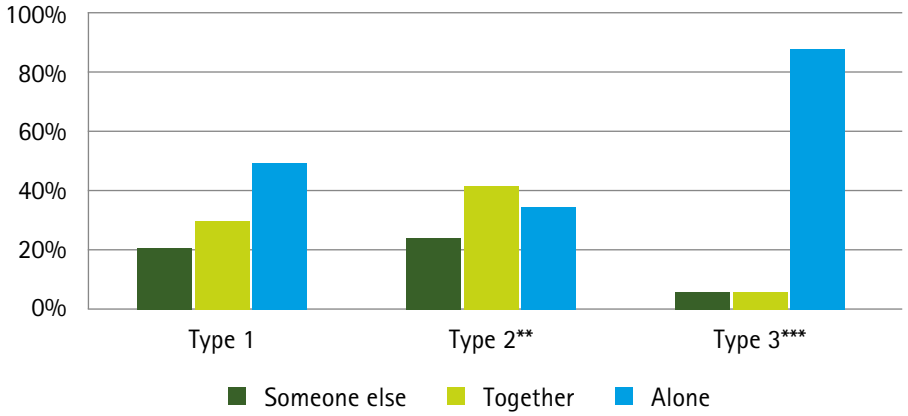


Figure B3: Decide on Household Budget

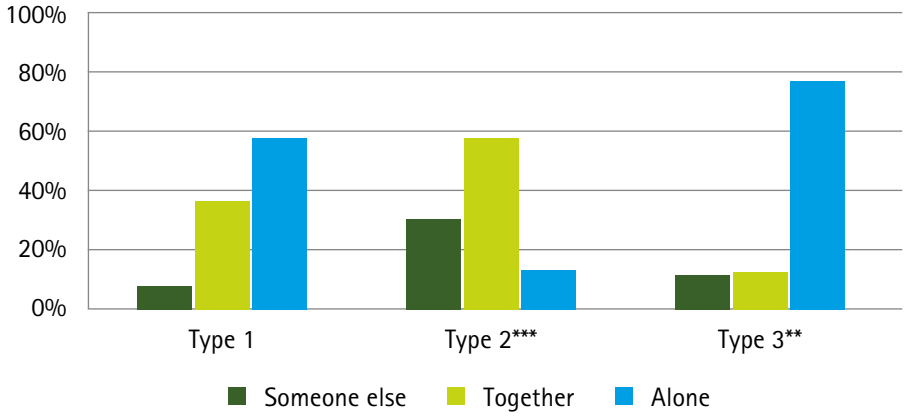


Figure B4: Decide on Food

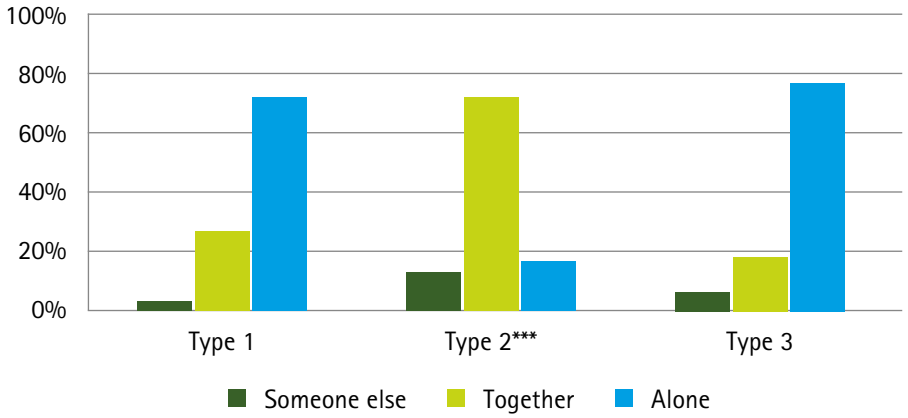


Figure B5: Decide on Own Medical Attention

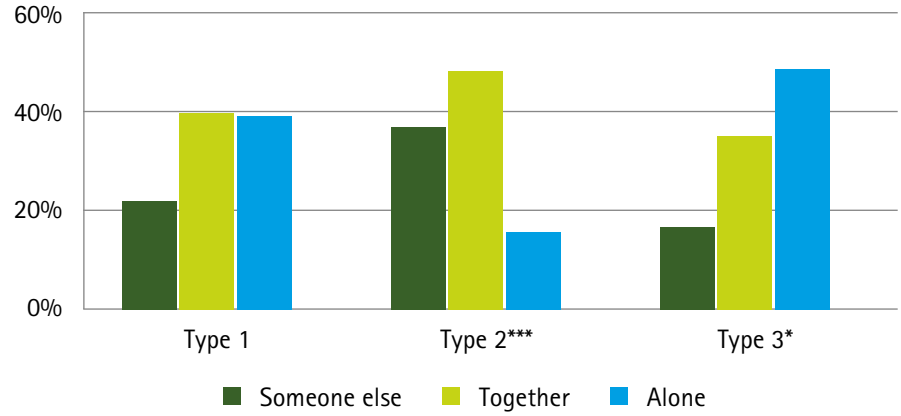


Figure B6: Belong to a Social Group (Excluding Church and Sports)

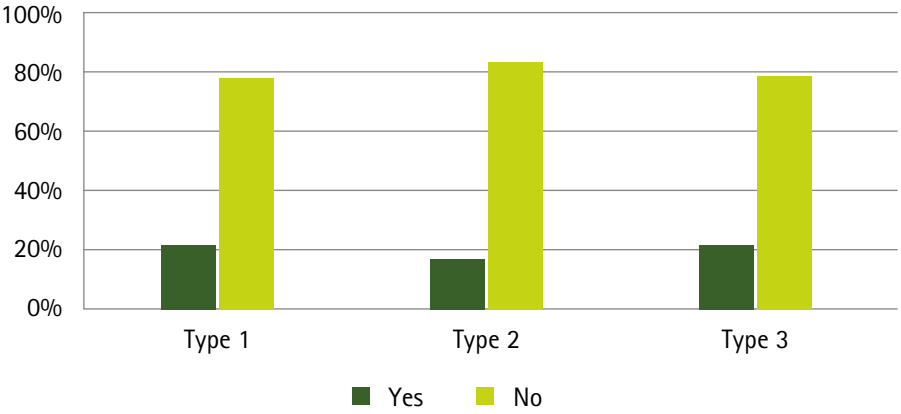


Figure B7: Woman has a Leadership Role in a Social Group

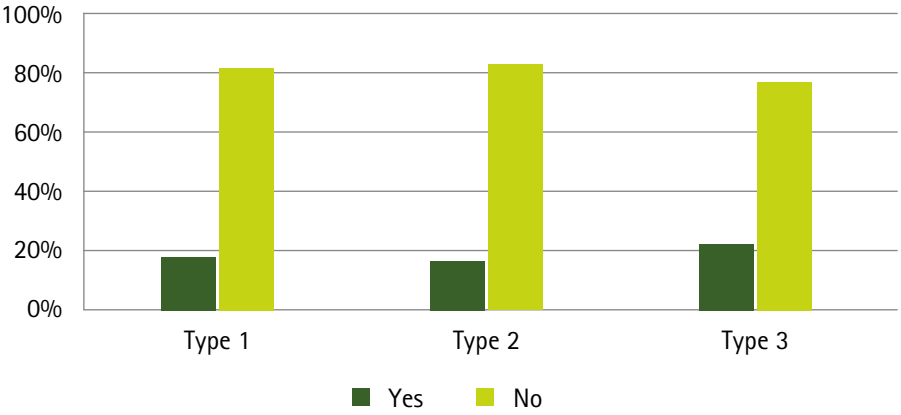
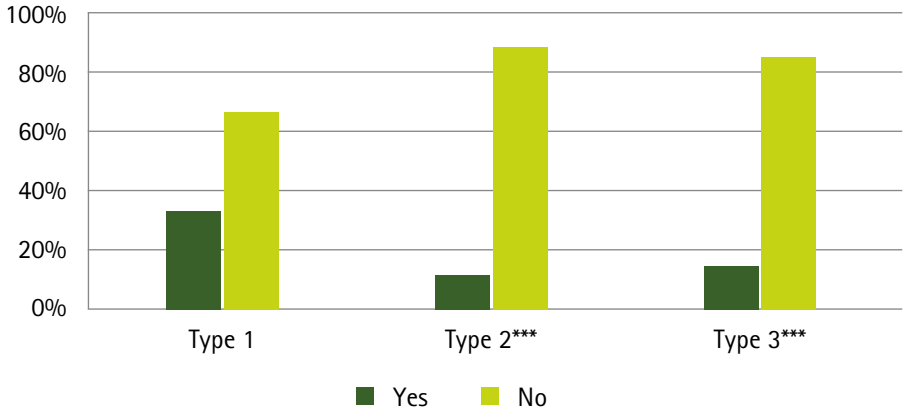


Figure B8: Woman has a Bank Account Alone



Agricultural Decision Making

Figure B9: Woman Participates in Decisions on Plantation (*Sembrar*)

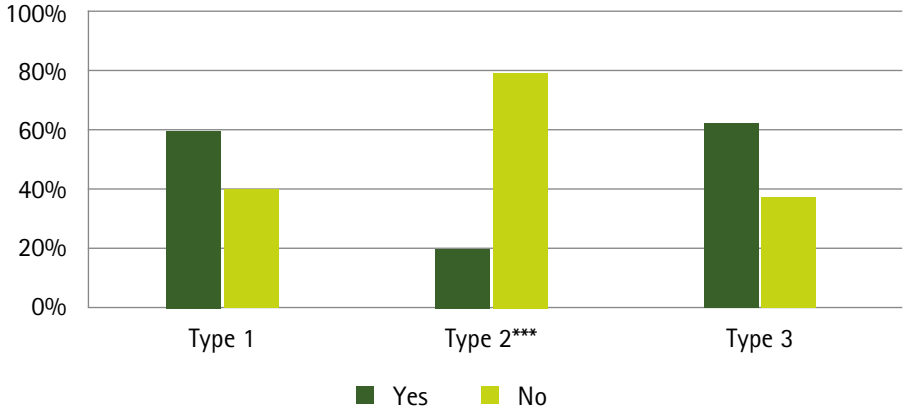


Figure B10: Woman Participates in Decisions on Inputs (*Insumos*)

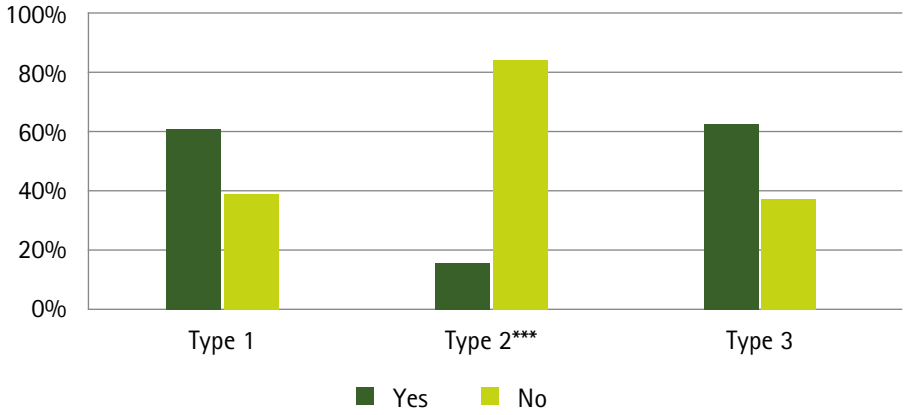


Figure B11: Woman Participates in Decisions Regarding Agricultural Production

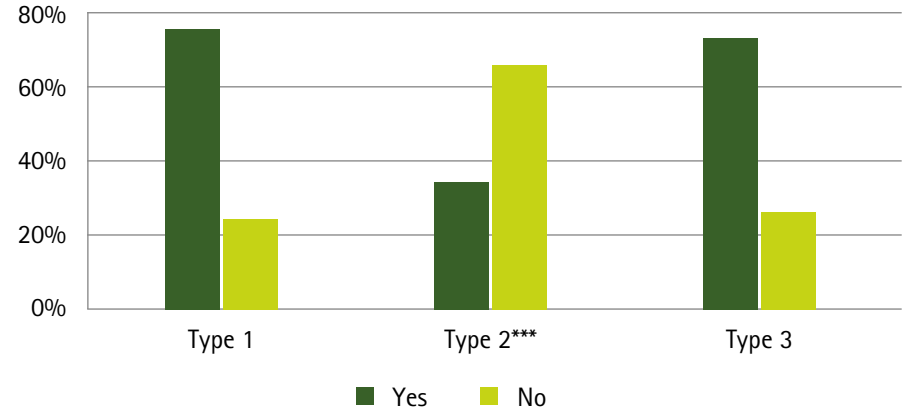
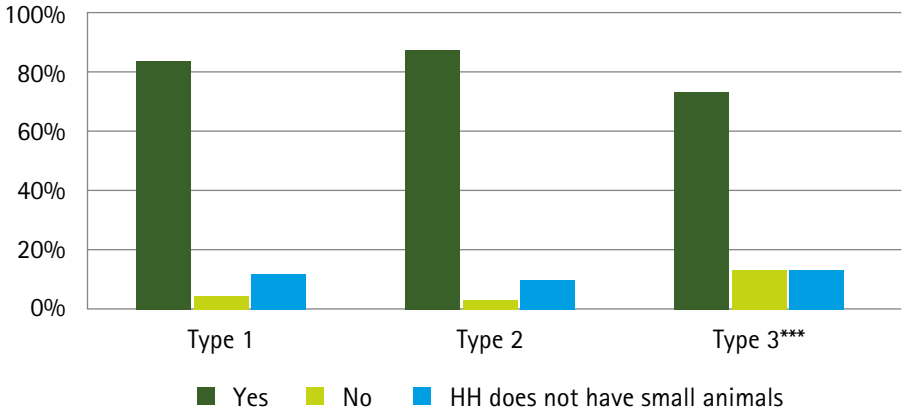


Figure B12: Woman is Responsible for Small Animals



Agricultural Actions

Figure B13: Woman Participates in Cultivation

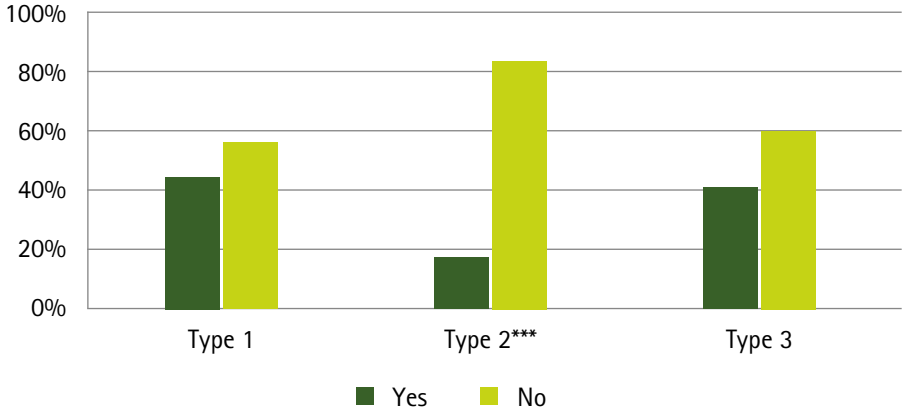


Figure B14: Woman Participates in Agricultural Production

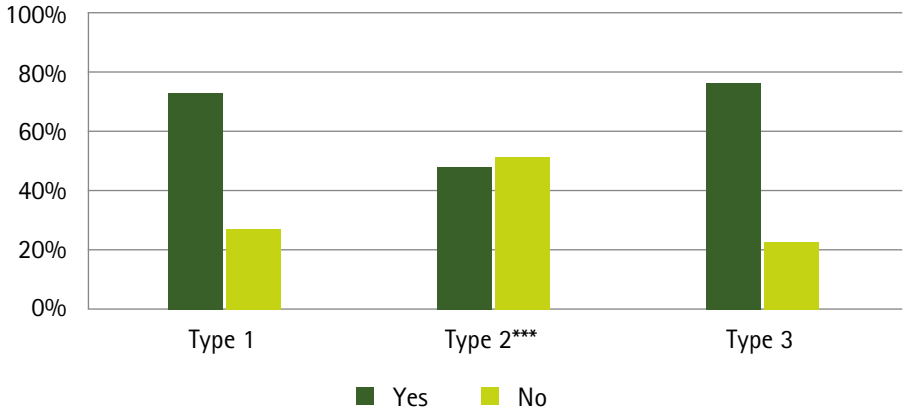


Figure B15: Woman Was the Respondent for the Agriculture Module

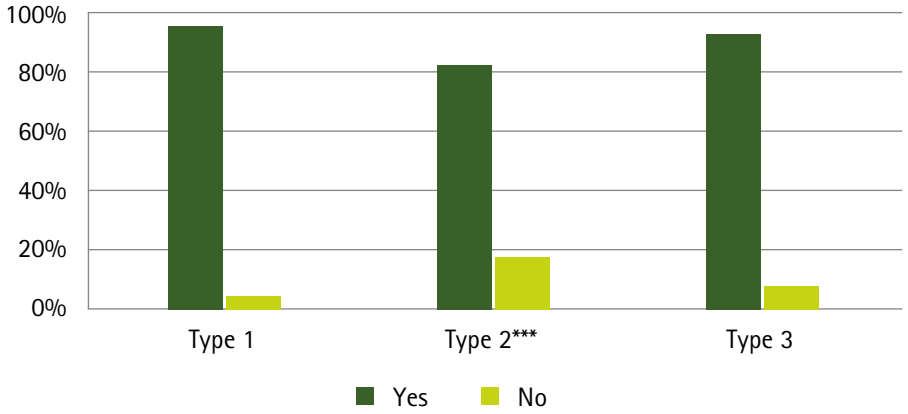
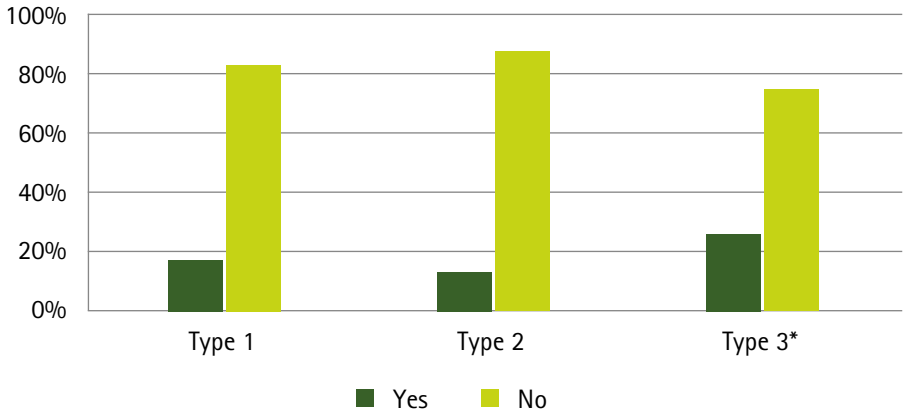


Figure B16: Woman Owns Agricultural Land



Appendix C: Explanation of Variables

Agency Variables

Soft Agency Variables

Self-efficacy: A composite of answers to two questions regarding self-efficacy. The first asks the respondent to choose from four sentences the one that most describes her situation (e.g., On one extreme, "I always feel free to do whatever I decide to do," and on the other, "Almost always what I do is not what I would have chosen to do"). The second question offers an alternative set of four sentences (e.g., "I always choose the way in which I do things," and at the other end of the spectrum, "I never choose for myself the way in which I do things"). The answer to each of the two questions is given a score from 0 to 3 that are added, for a self-efficacy score ranging from 0 (least self-efficacy) to 6 (most).

Aspirations/Self-esteem: A composite of answers to four questions regarding aspirations, all of which ask whether the respondent completely disagrees, disagrees, agrees, or completely agrees with the description of herself. The statements are: "Sometimes I think I am not good at anything," "I am capable of doing things just as well as most people," "I generally do not dare share my ideas," and "I think I am capable of fulfilling some of my dreams." The answer to each of the questions is given a score from 0 to 3 that are added together, for an aspirations score ranging from 0 (fewest aspirations) to 12 (most).

Autonomy: This variable comes directly from a question asking respondents to imagine a ladder with 10 rungs, "where people with the least amount of freedom are at the bottom rung and people with the most freedom are at the top rung," and to state which rung they believe they are on. This question was aided by a visual representation of a ladder. Answers range from 0 (lowest rung) to 10 (highest).

Non-Agricultural Agency Variables

Participation in budget: Measure of woman's participation in two facets of the household budget: deciding on the overall budget and managing the budget. It is coded as done alone (2), together with someone else (1), or by someone else/no participation (2).

Participation in food expenditures: Measure of woman's participation in three facets of food expenditures: deciding on the overall amount allocated towards food, deciding on what food to buy, and making the purchase. It is coded as done alone (2), together with someone else (1), or by someone else/no participation (2).

Participation in decisions on own activities outside the household: Measure of woman's participation in deciding the activities she carries out outside the household. It is coded as done alone (2), together with someone else (1), or by someone else/no participation (2).

Participation in decisions regarding own health care: Measure of woman's participation in two facets of her own health care: when feeling ill, whether to get care and where to get care. It is coded as done alone (2), together with someone else (1), or by someone else/no participation (2).

Participation in non-agricultural decisions: The sum of the previous four variables, ranging from 0 to 8.

Social participation: A composite of two indicators: whether a woman participates in a group in her community (excluding church and sports groups, due to high participation in the latter), and whether she holds a leadership position in any group (including church and sports groups). This variable ranges from 0 (no participation or leadership) to 2 (participation and leadership in at least one group).

Woman has a bank account alone: Single variable based on answers to whether anyone in the

household has a bank account, and who owns that account. Coded as "no" (0) or "yes" (1).

Agricultural Agency Variables

Participation in decisions on what to plant: Single variable based on the listing of household members who participate in the decision of what to plant for agricultural production. Coded as "no" (0) if the woman is not listed among the participants or "yes" (1) otherwise.

Participation in the decisions on inputs: Single variable based on the listing of household members who participate in the decision of which inputs to use in agricultural production. Coded as "no" (0) if the woman is not listed among the participants or "yes" (1) otherwise.

Participation in decisions on agricultural production: Women were asked whether they participate in the household's agricultural production decisions or not. Coded as "no" (0) or "yes" (1).

Responsible for small animals: Single variable based on the listing of household members who are responsible for the small animals owned by the household, by type of animal (rabbits, chicken, roosters, turkeys, and ducks). Coded as "no" (0) if the woman is not responsible for any of the small animals owned by the household or "yes" (1) if she is responsible for at least one type of small animal.

Participation in agricultural decisions: The sum of the previous four variables, ranging from 0 to 4.

Participation in cultivation: Single variable based on the listing of household members who participate in crop cultivation. Coded as "no" (0) if the woman is not listed among the participants or "yes" (1) otherwise.

Participation in agricultural production: Women were asked whether they participate in the household's agricultural production or not. Coded as "no" (0) or "yes" (1).

Woman answered agriculture module: In the survey implementation, the default protocol was for selected interviewees to answer all of the modules in the questionnaire. However, for the agriculture module, they were first asked if they believed they could answer a module on the household's land use and agricultural production. If not, they could indicate a different respondent for that module. This variable records whether the woman was the respondent for the agriculture module (1) or not (0).

Participation in agricultural actions: The sum of the previous three variables, ranging from 0 to 3.

Woman owns agricultural land: Single variable based on the listing of each plot of land used or owned by the household, and the listing of individuals who own each plot. Coded as "no" (0) if the woman is not listed as an owner for any of the plots listed or "yes" (1) if she owns at least one of the plots listed.

Agency Indices

Soft agency: Principal-component factor using the three variables listed in the soft agency variables category above, each rescaled to range from 0 to 1. Factor analysis considers the correlation between the included variables and creates a composite of them, giving weights according to the correlation matrix. It has a mean of 0 and standard deviation of 1.

Non-agricultural agency: Principal-component factor using the last three variables listed in the non-agricultural agency variables category above, each rescaled to range from 0 to 1. Factor analysis considers the correlation between the included variables and creates a composite of them, giving weights according to the correlation matrix. It has a mean of 0 and standard deviation of 1.

Agricultural agency: Principal-component factor using the variables "participation in agricultural decisions," "participation in agricultural actions," and "woman owns agricultural land" listed in the agricultural agency variables category above, each rescaled to range from 0 to 1. Factor analysis considers the correlation between the included variables and creates a composite of them, giving weights according to the correlation matrix. It has a mean of 0 and standard deviation of 1.

Agency: Principal-component factor using all nine variables included in the three indices above,

each rescaled to range from 0 to 1. Factor analysis considers the correlation between the included variables and creates a composite of them, giving weights according to the correlation matrix. It has a mean of 0 and standard deviation of 1.

Other Variables of Interest

Dependency ratio: The dependency ratio refers to the ratio of the number of household members under age 15 and over age 64 to the number of working-age household members.

Food insecurity: Variable based on a standard set of nine questions measuring household food insecurity (for an example of the questions, see:

http://www.unscn.org/layout/modules/resources/files/Household_food_insecurity_Sp.pdf, p. 6). The scores range from 0 (least food insecurity) to 27 (most food insecurity).

Food diversity: Households were asked whether, over the previous 24 hours, anyone in the household consumed vegetables, fruits, meat (beef, chicken, or pork), fish/seafood, eggs, and milk or milk products. One point was given for each "yes" and zero for "no," such that this composite score ranges from 0 to 6.

Time spent on agriculture: Number of hours the respondent spends working in agriculture "on an average working day."

Time spent on other income-generating activities: Number of hours the respondent spends "on an average working day" on income-generating activities other than agriculture.

Appendix D: Regressions of Interest

Table D1: Determinants of Annual Household Agricultural Income from Farming and Animal Husbandry (US$)

	(1)	(2)	(3)	(4)	(5)
Type 2 Household	125.5*	109.9	70.17	46.38	97.84
	(62.70)	(65.43)	(63.73)	(67.39)	(63.50)
Type 3 Household	-48.95	-21.90	-28.14	-64.43	-16.50
	(60.40)	(59.85)	(58.94)	(60.24)	(59.67)
Soft Agency	56.66*			67.00*	
	(28.34)			(29.52)	
Non-Agricultural Agency		-19.09		-16.18	
		(35.13)		(36.14)	
Agricultural Agency			-70.67*	-75.55*	
			(30.91)	(31.26)	
Agency Index					-33.61
					(33.02)
Land size (1000m^2)	52.52***	53.28***	51.59***	51.00***	52.80***
	(9.443)	(9.400)	(9.330)	(9.509)	(9.295)
Land size (1000m^2) squared	-0.282**	-0.288**	-0.275**	-0.272**	-0.284**
	(0.104)	(0.102)	(0.0993)	(0.101)	(0.101)
Woman learned alone how to farm	-232.6*	-252.7**	-233.4*	-200.9*	-250.6*
	(96.67)	(96.72)	(99.32)	(99.07)	(97.85)
Woman does not know how to farm	4.765	-13.62	-65.45	-57.22	-30.22
	(115.7)	(115.7)	(119.3)	(118.7)	(119.1)
Number of crops cultivated	92.88	87.51	101.2*	105.5*	91.31
	(48.03)	(47.68)	(47.46)	(49.48)	(46.64)
Farm labor includes workers	186.7**	188.2**	196.6**	198.9**	189.9**
from outside the household	(70.16)	(70.75)	(70.32)	(70.36)	(70.92)
Household owns a plot of land	58.02	53.94	57.22	57.15	53.70
	(58.61)	(59.06)	(59.61)	(58.39)	(59.32)
Household size	-25.57*	-27.36*	-29.40*	-27.79*	-28.15*
	(11.80)	(12.17)	(12.36)	(12.08)	(12.31)
N	572	572	572	572	572

Note: Standard errors in parentheses; * p<0.05, ** p<0.01, *** p<0.001. These regressions also include control variables for distance to market, the dependency ratio, respondent age, and respondent literacy. Coefficients have been omitted here to conserve space. Full results are available upon request.

Table D2: Determinants of Total Annual Household Income (US$)					
	(1)	(2)	(3)	(4)	(5)
Type 2 Household	-470.4	-163.2	-247.9	-113.6	-156.9
	(249.4)	(281.4)	(277.7)	(294.8)	(284.2)
Type 3 Household	-563.3	-464.0	-455.8	-515.7	-511.9
	(301.4)	(298.0)	(299.8)	(297.2)	(302.4)
Soft Agency	201.6*			140.6	
	(102.4)			(102.4)	
Non-Agricultural Agency		295.9		214.7	
		(150.9)		(159.4)	
Agricultural Agency			229.7	143.7	
			(132.8)	(136.1)	
Agency Index					303.7*
					(143.3)
Household owns a plot of land	46.49	93.20	53.99	77.36	72.42
	(239.3)	(232.6)	(239.1)	(233.8)	(237.3)
Time spent in other	330.0***	319.1***	349.9***	321.1***	335.6***
productive activities	(75.34)	(73.80)	(74.63)	(74.27)	(74.94)
Household size	210.2***	205.9***	211.9***	212.7***	211.9***
	(45.73)	(45.28)	(45.62)	(45.25)	(45.47)
Dependency ratio	-449.4***	-451.2***	-462.2***	-449.8***	-456.2***
	(125.3)	(122.7)	(125.6)	(123.9)	(125.1)
N	503	503	503	503	503

Note: * p<0.05, ** p<0.01, *** p<0.001. These regressions also include control variables for distance to market, number of crops, size of agricultural land, size of agricultural land squared, respondent age, and respondent literacy. Coefficients have been omitted here to conserve space. Full results are available upon request.

Table D3: Determinants of Food Insecurity					
	(1)	(2)	(3)	(4)	(5)
Type 2 Household	1.228	1.278	2.762**	2.839**	1.981*
	(0.875)	(0.947)	(0.950)	(0.962)	(0.958)
Type 3 Household	2.465**	2.020*	2.256**	2.805**	1.957*
	(0.898)	(0.874)	(0.848)	(0.869)	(0.865)
Soft Agency	-1.016**			-1.190***	
	(0.335)			(0.326)	
Non-Agricultural Agency		0.0759		-0.177	
		(0.365)		(0.372)	
Agricultural Agency			1.587***	1.808***	
			(0.351)	(0.368)	
Agency Index					0.773*
					(0.368)
Number of crops cultivated	0.358	0.436	0.167	0.0329	0.380
	(0.486)	(0.488)	(0.488)	(0.490)	(0.488)
Time spent in other	-0.462*	-0.539**	-0.488**	-0.383*	-0.556**
productive activities	(0.189)	(0.191)	(0.184)	(0.189)	(0.185)
Household receives remittances	-0.933	-0.927	-0.792	-0.766	-0.917
	(0.696)	(0.705)	(0.677)	(0.679)	(0.692)
Household owns a plot of land	-0.336	-0.331	-0.364	-0.383	-0.292
	(0.734)	(0.747)	(0.722)	(0.707)	(0.741)
Household size	0.119	0.146	0.201	0.175	0.169
	(0.139)	(0.137)	(0.135)	(0.138)	(0.136)
N	555	555	555	555	555

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$. These regressions also include control variables for size of agricultural land, size of agricultural land squared, dependency ratio, respondent, and respondent literacy. Coefficients have been omitted here to conserve space. Full results are available upon request. Note that a higher dependent variable indicates higher food *insecurity.*

Table D4: Determinants of Food Diversity					
	(1)	(2)	(3)	(4)	(5)
Type 2 Household	-0.167	-0.130	-0.183	-0.243	-0.0560
	(0.202)	(0.216)	(0.225)	(0.226)	(0.225)
Type 3 Household	-0.365	-0.230	-0.236	-0.380	-0.240
	(0.210)	(0.210)	(0.211)	(0.211)	(0.210)
Soft Agency	0.298***			0.308***	
	(0.0706)			(0.0711)	
Non-Agricultural Agency		0.0343		-0.0156	
		(0.0778)		(0.0768)	
Agricultural Agency			-0.0225	-0.0623	
			(0.0797)	(0.0803)	
Agency Index					0.105
					(0.0855)
Number of crops cultivated	0.0968	0.0785	0.0796	0.107	0.0691
	(0.105)	(0.108)	(0.108)	(0.106)	(0.107)
Time spent in other	0.0307	0.0482	0.0506	0.0296	0.0481
productive activities	(0.0430)	(0.0421)	(0.0419)	(0.0432)	(0.0420)
Household receives remittances	0.601***	0.588***	0.593***	0.600***	0.594***
	(0.157)	(0.161)	(0.160)	(0.159)	(0.159)
Household owns a plot of land	0.0244	0.0287	0.0255	0.0238	0.0315
	(0.162)	(0.166)	(0.166)	(0.162)	(0.166)
Household size	-0.0935**	-0.101***	-0.102***	-0.0956***	-0.0983***
	(0.0285)	(0.0290)	(0.0290)	(0.0285)	(0.0289)
N	555	555	555	555	555

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$. These regressions also include control variables for size of agricultural land, size of agricultural land squared, dependency ratio, respondent age, and respondent literacy. Coefficients have been omitted here to conserve space. Full results are available upon request.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