

Identifying women farmers: Informal gender norms as institutional barriers to recognizing women's contributions to agriculture

Jennifer Twyman, Juliana Muriel and María Alejandra García
International Center for Tropical Agriculture (CIAT), Cali, Colombia

Abstract

Sex-disaggregated data collection is an important step toward understanding women's contributions to agriculture and including a gender perspective in agricultural research for development. However, social norms both in farming communities and research organizations often limit the amount of data collected from women and, in so doing, reinforce the notion that women are not farmers or producers. This is especially true for male-dominated crops, such as rice in Latin America. This study draws on experiences collecting sex-disaggregated data about rice production in three Latin American countries: Peru, Bolivia, and Ecuador. We find that it is difficult to collect information from women in rice producing households within the framework of typical agricultural household surveys. Filter questions in the surveys ask for the principal farmer or landholder, the person most knowledgeable about production, or the manager or primary decision-maker. Women often do not consider themselves the primary rice producer or farmer in the household; they see their role as being in the home and helping with rice production when needed. Furthermore, researchers, field staff, and community leaders often assume that women are not farmers; thus, women are not interviewed. For these reasons, most researchers determine that there are few women rice producers, further reinforcing the notion that women are not farmers. However, the data that does exist, collected mostly from men, indicates that women play significant roles in rice production. Hence, it is important to collect data from women as well as men to better understand their roles, perspectives, and knowledge about rice production activities.

Keywords: Agriculture, gender, institutions, norms, rice, sex-disaggregated data collection

Introduction

In recent years there has been an increased push to include gender in agricultural research for development projects. A first step toward achieving a gender focus is often to collect and analyze sex-disaggregated data. However, there is an implicit bias in surveys to collect information from men—who are most often recognized as the appropriate respondents since they are perceived as the main farmers, producers, landholders, or household heads. This is especially true in male-dominated, cash crop sectors, such as rice in Latin America. In such sectors, women are not typically considered farmers or producers and are often thought un-knowledgeable about production activities. Such a lack of recognition of women's knowledge and contributions is reinforced by the social norms of the multiple actors involved in agricultural work, research, and development (household members, community leaders, extension agents, ministry of agriculture employees, and researchers). This makes it difficult to collect and analyze sex-disaggregated data in a meaningful way. Often there is not a large enough sample of women to do statistically valid analyses of gender differences. This leads to an underestimation of women's contribution to agricultural production, which in turn reinforces the notion that they are not farmers and know little to nothing about production

and therefore should not be interviewed. However, the data that does exist, mostly collected from men, suggests that women play important roles in agricultural production.

In this paper we document our own observations and reflections during and after fieldwork as a means of discussing the difficulties gender researchers face in collecting and analyzing sex-disaggregated data. Collecting sex-disaggregated data entails collecting information about the sex of the respondent, as well as collecting information about both men and women; for example, asking who performs various activities, who makes various decisions, who owns which assets, and who has access to which resources. In short, it means collecting information *about* and *from* both men and women. Information *about* men and women contributes to an understanding of their differentiated contributions to certain agricultural activities, their unequal position in power relations, differences in access to and control over resources and the gender gaps in the social and economic arenas. Collecting sex-disaggregated data *from* men and women means interviewing both men and women.

Drawing on research experiences in collecting sex-disaggregated data in three Latin American countries—Peru, Bolivia, and Ecuador—we explore the social norms that reinforce the idea that women are not rice farmers despite the reality that they play significant roles in rice production. We argue that gender norms restrict our understanding of women’s roles in agriculture and that, in order to move beyond these restrictions, transformations in knowledge and understandings of gender are needed within social organizations at various scales (from households to community groups to national and international research organizations).

In the next section we discuss previous studies’ insights about women’s contributions to agricultural production. We then present our conceptual framework and a description of our methods. This is followed by our findings and a concluding discussion, both of which highlight how gender norms themselves become barriers to fully understanding gender issues in rice production.

Women’s contributions to agricultural production

Several studies have examined women’s contributions to agricultural production using various measures. Such measures include women’s labour contribution to production activities (Deere and León, 1982; Doss, 2011; Palacios-Lopez, Christiaensen, and Kilic, 2015). Other studies focus on gender differences in agricultural productivity, often finding that female-headed households and women’s plots are less productive than men’s due to the fact that women have access to fewer resources, though such differences all but disappear once inputs are accounted for (FAO, 2011; Peterman *et al.*, 2011; Holden *et al.*, 2011; Aly and Shields, 2010; Gilbert *et al.*, 2002; Horrel and Krishnan, 2007; Tiruneh *et al.*, 2001; Doss and Morris, 2001). Other studies have focused on allocative efficiency, showing that overall farm production could be increased by re-allocating inputs from men’s plots to women’s plots (Udry, 1996; Quisumbing, 1996).

These studies typically use headship or plot manager (or landholder) to distinguish between men’s and women’s productivity. However, as noted by Doss and Morris (2001), each conceptualization of men’s and women’s plots generates different results; they found no differences between men and women landholders but significant differences between male and female-headed households. Thus, it is important to note how gender is conceptualized in studies. Deere, Alvarado, and Twyman (2012) argue against using headship for conceptualizing gender, as it excludes women in male-headed households and often

underestimates women's assets and participation in farm-household decision-making. Headship analyses provide information about household type rather than directly about gender relations within and across households. Furthermore, as Doss (2011) points out, in most cases it is impossible to fully separate men's and women's contributions to agricultural production, since they almost always produce crops together. They may also own land together and make agricultural production decisions together (Twyman, Useche, and Deere, 2015).

Most of the aforementioned gender studies focus on smallholder crop production, mainly in Africa. We found a lack of household level gender studies that focus on male-dominated, often cash crop systems such as rice in Latin America, despite the fact that labor statistics in this region suggest that women play significant roles in agriculture (as farmers and/or laborers). For example, more than 50 percent of rural women who are economically active in Bolivia, Peru, Ecuador, and Paraguay report agriculture as their primary activity (FAO and CEPAL, 2009). Furthermore, women in Latin America often work as family and hired labor in most agricultural production activities (Quisumbing, 1994; Deere, 2005) and their participation may vary depending on whether production is for own consumption or for market. In the first case, women often participate in all agricultural tasks; but, when the production is destined for the market, women participate primarily in manual activities. Although there are few studies that focus on women's roles in rice production in Latin America, there is some evidence of women's participation in rice production activities in the region. In general, this data shows that women do not manage many rice plots, but do play an important role in smallholder rice production. They participate in family labor, hired labor, and decision-making. Muriel (2013) found that while women in Peru managed only 9 percent of the rice parcels, they provided over 12 percent of family labor and about 31 percent of hired labor for rice production. In the case of Bolivia, women participated in the husk removal and seed selection when the production was manual and for own consumption, and they played an important role in negotiations and buyer selection when the product is destined for the market (Ortíz and Soliz, 2007).

Taken together, these studies focus on the two dimensions of collecting sex-disaggregated data. Some focus on issues of collecting data *from* both men and women by addressing the methodological and conceptual issues regarding the use of headship as a gender variable. Others focus primarily on collecting data *about* men's and women's contributions to agriculture. These studies recognize that women's participation in agricultural production may be underestimated due to the fact that women's tasks are often designated as family labor and domestic responsibilities (including animal care and management of home gardens), which are not typically taken into account as productive activities. However, problems with measuring women's contributions to agriculture are rarely addressed at the stage of data collection, and this paper seeks to address how informal gender norms explain these lacunae in our understanding of women's roles in agriculture.

Conceptual framework

Our conceptual framework is oriented by the understanding that social norms are institutions that guide behavior. There are two main ways to conceive of such institutions. First, from a sociocultural perspective, institutions are defined as a set of values, norms, and/or patterns of behavior that guide, restrict, and/or allow actions. Second, from a sociological and political science approach, the idea is defined as political institutions (e.g. state organizations, laws, etc.). North (1990) discusses institutions in both senses: informal rules such as norms that

guide and/or constrain behavior, and formal rules such as laws and legal regimes that define property rights. As North (1990) discusses, the two types are related and complement each other; not only do policies and laws impact informal norms and customs, but informal norms and customs can also impact formal policies and laws. However, the dichotomy of formal vs. informal still exists. For this paper, our focus is on informal institutions, specifically those social gender norms that guide the behavior of different actors in an agricultural survey setting.

There is a long tradition of research and discussion about institutions and norms by sociologists and anthropologists. In the classical tradition, institutions are viewed as unchanging, long-term, external structures that control human actions (Dubet, 2010); and, as such, are positive constructs without which we would not know how to behave. The modern view of institutions focuses on aspects such as change, power, and individual actions (Berger and Luckman, 1968; Martin, 2004). More contemporary approaches link aspects of the classical and modern approaches by conceptualizing institutions as a set of values that change, are heterogeneous, and can be contradictory (Clemens and Cook, 1999). Furthermore, one set of values should not be perceived as the superior structure that determines the actions of individuals, but rather as an available toolbox from which individuals can choose and will guide them as they strategize their actions (Swidler, 1986).

Feminist researchers and gender specialists have also debated the conceptualization of institutions, criticizing how the above theories neglect gender (Waller and Jennings, 1990). Furthermore, these theories are faulted for failing to discuss how institutions can be asymmetric and unequal for different groups of people (Van Staveren and Odebode, 2007). As such, gender norms are an influential institution that has differentiated effects for men and women in the public and private spheres, with men typically benefiting the most.

Martin (2004) reviews the history of institutions as a concept from a sociological perspective in order to propose “gender as a social institution.” According to Martin, “all institutions are embodied [...]. People with bodies do things, physically and narratively” (Martin, 2004: 1263). As such, norms and institutions are not abstract ideas, but have concrete realities for individuals. Martin identifies characteristics of social institutions that synthesize the positions established along the sociological discussion of institutions and characterizes gender along these dimensions. She takes into account the social essence of institutions and merges the various dimensions—historically viewed as contradictory—into one concept. These dimensions include: actors/structure, ideas-rules/practices, permits actions/controls behaviors, and endurance/change.

Considering this discussion, how does the concept of institutions contribute to the analysis of our experiences in gender research? In this paper, using perspectives from Martin (2004) and Van Staveren and Odebode (2007), we understand institutions to be the set of values or norms that constrain and facilitate behavior/actions, persist over the long term, and are internalized by concrete actors who experience them as unquestionable knowledge, as well as a set of expectations and the essence of identities and selves. In an operative way, institutions are a set of gender norms or values in a specific context that are embodied by various actors. These values seem unquestionable to the actors and form part of their identities. In this case we focus on the gender norms held by actors, such as agricultural researchers, field staff, community leaders, and farmers, in the rice sector in South America. In the remainder of the paper, we reflect on the research process as a means of understanding how institutional

gender norms shape the kind of data collected—and hence the kind of analysis that is possible.

Methodology

This study is based on our experiences as gender and agricultural researchers at an international agricultural research center. We draw primarily on our experiences with collecting quantitative data in three studies conducted since 2012 by the International Center for Tropical Agriculture (CIAT) in association with two CGIAR Research Programs: the Global Rice Science Partnership (GRiSP) and Climate Change, Agriculture, and Food Security (CCAFS). The main objective of these studies was to understand the adoption and yields of improved rice varieties in Peru (2012), Bolivia (2013), and Ecuador (2014-2015). Secondary objectives included collecting data on perceptions of climate change and the role of women in rice production.

Peru, Bolivia, and Ecuador were chosen because they represent different types of production systems, use of agricultural technology, and productivity levels. Furthermore, rice is an important crop in terms of both production and consumption in all three countries. According to FAOSTAT (2013), Peru has one of the highest average rice yields in Latin America (7,711 kg/ha), Bolivia has one of the lowest (2,349 kg/ha), and in Ecuador it is not as high as expected (3,821 kg/ha) despite efforts by the National Agricultural Research Organizations (NARO), research centers, and the state to introduce improved technologies (e.g. improved varieties). In terms of production systems, in Peru 93 percent of rice is produced under irrigation, in Bolivia 99 percent of rice producing households cultivate rain-fed rice, and in Ecuador most rice is produced as an irrigated monoculture crop (however, in some regions, such as Los Rios, the rain-fed system is significant).

As gender researchers, we set out to identify the proportion of female rice farmers; the constraints they faced compared to their male counterparts; the differences in adoption and productivity between male and female producers; and women's roles in rice production. We planned to collect such data *from* and *about* women as well as men. First, knowing that women in male-headed—or dual-headed—households are often overlooked because of implicit bias in agricultural surveys, we explicitly sought to interview women who were identified as rice farmers and those living in rice producing households. Second, we included questions about the roles of both men and women in rice producing households (regardless of who responded to the questionnaire).

Ideally we would have conducted intra-household surveys, which interview both a man and a woman in the sampled households. However, since the main objective of the three studies was to determine adoption rates of improved rice varieties (understanding gender differences and women's roles in rice production was a secondary objective) the process was oriented around the methods of typical adoption studies. The unit of analysis was the household-farm, with a focus on rice plots and minimal questions about other farming activities. Scarce financial and human resources limited us to interviewing only one person per household. Therefore, we decided to interview a woman in as many sampled households as possible, with a target of interviewing women in at least 20 to 30 percent of the sampled households.

While the questionnaires were designed to collect information about the adoption of improved rice varieties, we also included as many questions about gender roles and inequalities as possible. This included questions about who owned land and other assets,

management of rice plots, family and hired labor in rice production, decision-making over income from rice and other sources, group membership, extension services, and credit. Such data provides some information about women's and men's roles in rice production. However, there were also limits on the number of questions we could add to the questionnaire, since each question extends the length, time, and cost of implementing the survey. Thus, the questionnaires did not include as many questions to help us understand gender roles and inequalities as we would have liked. For example, adding more specific decision-making questions for specific productive activities would have provided better estimates of women's contributions to the management of rice production.

In all three countries, we intended to interview a large enough proportion of women to allow for sex-disaggregated analyses of adoption and yields. We had hoped to identify whether there were gender differences in production and adoption and, if so, why. Simple t-statistics indicate that there are slight differences in yields; women produce about 4.5 percent less than men in Peru (Muriel, 2013). However, regression analyses to identify the potential causes of such differences were not possible, given the low number of women in the sample. Thus, we examine how gender norms themselves become barriers to fully understanding gender issues in rice production.

Research experiences of gender and rice production in South America

In this section we examine how dimensions of institutions relate to the difficulties of collecting sex-disaggregated data about a typically male-dominated crop (rice) in Latin America. More specifically, we consider the problems associated with collecting data from women as well as men. Overall, we find that actors involved in the research process are guided by gender norms that limit the recognition of women as farmers, which is a barrier to collecting data from them. However, the data that was collected primarily from men indicates that women play significant roles in rice production.

Constraints to collecting data from women

The design and implementation stages of the research project greatly impact data collection efforts. During the design phase, gender norms held by researchers influence the development of survey questionnaires and the sampling design, determining who is included as potential survey respondents. Then, during implementation, the gender norms of research partners, field staff, community leaders, and women themselves further impact who is interviewed during the survey. Generally, the actors in these rice studies did not think women were rice farmers, limiting the data collected *from* women.

In the three countries the actors involved in the studies were researchers from international agriculture research centers, National Agriculture Research Organizations (NARO) staff, field supervisors, enumerators, and community leaders. Most of the researchers were social scientists who received input from agronomists and rice breeders for information about different varieties and management practices. The social scientists designed the sample, constructed the questionnaire, trained supervisors and enumerators, prepared logistics for fieldwork, supervised data collection, and carried out quality control of the information. Our involvement, as gender specialists, differed in the three locations. In Peru and Ecuador, we participated in both the design and data collection processes, while in Bolivia we were involved in the design of the questionnaire, but not in the implementation.

In Peru and Bolivia, the participation of NARO staff was for logistical support. For example, in Peru, they provided lists of irrigation cooperative members to identify rice farmers and selected enumerators with knowledge of rice production. In Bolivia, they supported fieldwork logistics (e.g. transportation and links with community leaders) and feedback during the questionnaire design. Although the NARO supported us in fieldwork, they were not involved in the design of the questionnaire or the sample. On the other hand, in Ecuador most of the study activities were conducted in conjunction with the NARO, which was a co-participant and co-funder. This actor played an important role in nearly all the decision-making processes of the study: design of the questionnaire, pre-testing, training enumerators, supervision of fieldwork, and contacting the community leaders and producers. During the research process, staff members repeatedly argued that rice was a male crop in Ecuador, so gender should be included in the study in a minimal way.

In each country, between 8 and 12 enumerators (men and women) were hired. Many of the enumerators were students in agricultural disciplines, technicians at local universities, or NARO staff. They collected the data by contacting producers, explaining the study, obtaining consent, and conducting the interviews. During training and fieldwork, they constantly asserted that women were obviously housewives so there was no need to ask them about their participation in different household and agricultural activities. Furthermore, community leaders led us to rice producers to be interviewed also often affirmed that women were not rice producers so in the community there were no women to be interviewed.

In each country the sample design differed slightly; but in all three cases we sought to reach a minimum number of women interviewed, aiming for 20 to 30 percent of the sample. In Peru, we identified rice farmers by working from a list provided by irrigation cooperatives, which allowed for a random stratified sample with proportional allocation by irrigation cooperative and cultivated area. A sample of 497 rice farms was selected for a nationally representative sample of small- and medium-sized rice producers with irrigation. About 22 percent of the farmers in the original cooperative lists were women and the initial random sample included a similar proportion of women.

Producer lists were not available in Bolivia or Ecuador, so the sample was designed using secondary data for the country. In Bolivia, a nationally representative sample of 940 households in the main production areas of the country (Santa Cruz, Beni, and Cochabamba) was selected. After eliminating a group of large farmers, there were 823 cases for the analysis. In Ecuador, we had 1,028 rice farm-households—approximately 12 households in each of 84 communities—located in the provinces of Guayas, Los Ríos, Manabí, and El Oro. Since lists with producer names and sex were not available, we decided to interview as many female rice producers as possible by explicitly telling field researchers and partners to make an extra effort to interview women whenever possible (with the expectation that at least 20 percent of the interviews would be conducted with women).

Nevertheless, we faced difficulties in conducting interviews with the target number of women during the surveys' implementation. In Peru, we had expected that about 22 percent of the interviews would be with female rice producers; however, in the end, only 15 percent of the interviews were conducted with women (and most of these in female-headed households). Overall, using other potential definitions of a rice farmer (in terms of landowners and/or managers), we found that women in 23 percent of households have land rights over rice plots, and women are participating in the management of at least one rice plot in 19 percent of

households (Table 1). Both findings suggest that 15 percent is an underestimation of the proportion of female rice farmers in Peru.

Table 1: Percentage of households by form of women's participation in survey research and household rice production.

Women's participation	Peru	Bolivia	Ecuador
Interviewed	15.1 (n=497)	10.3 (n=823)	9.5 (n=1,028)
Household head	11.9 (n=497)	3.5 (n=817)	7.7 (n=1,024)
Land owner of rice plots	23.2 (n=341)	9.4 (n=597)	21.2 (n=718)
Rice plot manager	19.2 (n=495)	14.2 (n=675)	10.6 (n=970)
Family labor in rice plots	55.4 (n=484)	44.4 (n=631)	-

Source: Author's calculations

In Bolivia, only 10.3 percent of the respondents were women, although women participate in the management of at least one rice plot in 14.2 percent of households (Table 1). In this country, the women interviewed were not necessarily female heads of households. Of 84 cases in which women responded to the survey, only 26.2 percent were recognized as female heads of households, implying that the other women are women in male- (or dual-) headed households. This might be explained by the fact that 50 percent of these households produce rice just for own consumption or seed. If we go beyond the headship concept, we find that in 9.4 percent of land-owning households women are owners (either individually or jointly); and in 44.4 percent of the households that use family labor in production and postproduction activities, women participate as family labor (Table 1).

In Ecuador, upon completion of fieldwork, although it had been stipulated that 25 percent of respondents should be women, they only represented about 9.5 percent of the 1,028 households included in the survey (Table 1). However, women are landowners (either individually or jointly) of rice plots in 21.2 percent of households; and in 10.6 percent they are recognized as rice plot managers. In Ecuador, as in the other cases, women were not recognized as rice farmers by community leaders and field staff, and therefore they were not interviewed.

Overall, three main problems were encountered in efforts to reach the expected number of women interviewed or in identifying women managers of rice plots. First, community leaders (identified by the NARO staff) guided us in their communities and made decisions about who must be surveyed; few women were recognized as rice producers, especially in Bolivia and Ecuador. They claimed that getting women who produced rice was difficult because it is a crop that demands heavy work and sun exposure, so it is mainly done by men. In some cases they were surprised because we asked for women producers to be interviewed. The story was

repeated constantly: "Women do not produce rice." Even when talking to women themselves, although they performed some production tasks, they did not recognize themselves as rice producers.

Second, during fieldwork, the responsibility of making on-the-spot decisions fell to the field supervisors. Enumerators and supervisors constantly claimed that it was very difficult to find women to interview since they were not producers; in other cases, they noticed that when they reached the agricultural management questions, some women did not have specific knowledge of the subject. This finding was affirmed by field supervisors who believed that in Ecuador rice production is mainly driven by men and women take care of household activities. As such, enumerators and supervisors determined that women should not be interviewed and replaced women in the sample with men. It is difficult to know whether the women replaced by men in the sample were really not participating and knowledgeable about rice production or if this was the preconceived notion of enumerators, field supervisors, and community leaders driven by the social norms and institutions that made "women are not rice producers" an unquestionable fact.

Both of these issues were accentuated by a third fact: the study had established the rice producer—and thus the respondent—as being the person who primarily manages the household's rice plots and has knowledge of management decisions. At the beginning of the questionnaire, the following two filter questions were used to identify this person: 1) "Are you the person in charge of the management of the rice plots?" and 2) "Do you have knowledge about the management of the rice plots?"¹ This definition does not take into account the fact that management of rice plots might involve more than one person. For example, one person could decide which variety/varieties to plant and where while another person is in charge of controlling pests and diseases. Additionally, this concept omits the fact that a rice producer does not necessarily have specific knowledge of all the agronomic activities taking place on the plot; sometimes they hire people to be in charge of some or all such activities. These aspects limited the inclusion of women as managers or decision-makers and as respondents.

In Ecuador, in one of the communities surveyed we had the opportunity to conduct qualitative focus group discussions and semi-structured interviews over a period of about five days after applying the questionnaire. When we arrived for the first time to apply the survey, the leader said, "There are not many women managing rice plots," (Interview with community leader, Ecuador, November 2014) and only three women were interviewed. Later, during qualitative research in the same community, it was initially difficult to identify women involved in agriculture; but over time, via networking we were able to identify over ten female rice producers and were able to conduct a focus group with women. In part, this shows us that the identification of women producers in a crop perceived as masculine is not easy, especially when you depend on a community leader who guides you to survey participants and holds the perception that men are farmers and women housewives.

Even though in some cases (Peru and Ecuador) there was a gender researcher present intermittently in the fieldwork, this was not enough. Social and cultural aspects interfered via the means of gaining entry into the community, and via the perceptions of both field staff,

¹ These were the questions used in Bolivia and Ecuador. In Peru, the question used was: "Do you have knowledge about the crop and the management of the crop?"

who were responsible for applying and supervising the questionnaire, and of community members (both men and women).

Women's roles in rice production (as reported by men)

Since women are not perceived to be rice producers, most of the data was collected from men. This data reveals that women play significant roles in rice production. However, due to the low proportion of women identified as rice producers, we could not make statistical analyses or econometric regressions to determine differences in productivity between male and female producers. Furthermore, the data suggests that only 10 to 15 percent of rice producers in these three Latin American countries are women. Without more data about gender roles and women's contributions to rice production, one might infer that rice is a male crop and that studies, programs, and policies regarding rice do not need to include women. This exemplifies how collecting data only from the person identified as the manager without collecting additional information *about* roles of various family members may limit our understanding of women's contributions and reinforce notions that women are not rice farmers. However, a more thorough examination of the data (collected primarily from men) shows that women play significant roles in rice production, especially in terms of labor (and in some cases plot management).

Table 2. Average number of hired labor per hectare by activity in Peru

Activity	Hired labor				
	Men		Women		Total Person-day
	Person-day	%	Person-day	%	
Watering	3	75	1	25	4
Preparation and sowing of seeds	2	40	3	60	5
Land preparation	2	100	0	0	2
Seedling removal	4	66.7	2	33.3	6
Transplantation	9	69.2	4	30.8	13
Sowing of seeds	2	66.7	1	33.3	3
Early weed control (chemical)	2	66.7	1	33.3	3
Late weed control (chemical)	1	50	1	50	2
Weed control by hand	4	63.7	2	36.3	6
Apply chemical fertilization	2	66.7	1	33.3	3
Apply organic fertilization	2	66.7	1	33.3	3
Pest and disease control	3	60	2	40	5
Harvesting	4	66.7	2	33.3	6
Transporting the product	2	100	0	0	2
Drying the product	3	100	0	0	3
Husk removal	2	100	0	0	2
Total	47	68.9	21	31.1	68

Source: Author's calculations

In Peru, of the 97 percent of households that use family labor, 55 percent use female labor, a much higher percentage than the households that recognize women as producers. Women also represent approximately 31 percent of hired labor. Similar to findings from other studies about the participation of women in rice production (Quisumbing, 1994; Chizari *et al.*, 1997), we found that women provide more labor than men in seedling removal, transplanting, and pest and disease control, and that they are less involved in irrigation and fertilization. For

example, in land preparation and post-harvest activities—such as transport, drying, and milling—women were not reported to be involved, while in weed control—both chemical and manual—they have similar participation rates as men: 57.6 percent of hired labor for chemical weed control is male and the remaining 42.4 percent is female. In the case of manual weed control, women represent 43.2 percent of total hired labor (Table 2).

In Bolivia, 631 of 823 households reported using family labor. In 44.4 percent of these, women provided at least some of that labor. Women participated specifically in activities related to land preparation (28.4 percent), sowing (21.2 percent), weed control (25.1 percent), harvest (42.6 percent), and postproduction activities (49.9 percent), especially when they are done manually (Table 3).

Table 3. Households using family labor by activity in Bolivia

Activity	Households using family labor	Households using female family labor		Households using male family labor	
	N	Freq.	%	Freq.	%
Land preparation	468	133	28.4	450	96.1
Mechanized	154	14	9.0	147	95.4
Land clearing (manual)	282	93	32.9	277	98.9
Burning (manual)	312	78	25.0	299	95.8
Chafreado (manual)	267	89	33.3	261	97.7
Seeding	466	99	21.2	442	94.8
Mechanized	109	10	9.2	102	93.6
Manual	357	89	24.9	340	95.2
Fertilization	82	7	8.5	77	93.9
Weed control	517	130	25.1	501	96.9
Chemical	227	20	8.8	223	98.2
Manual	337	114	34.9	314	96.0
Pest and disease control	293	25	8.53	287	97.9
Harvesting	404	172	42.6	391	96.8
Mechanized	54	5	9.3	52	96.3
Manual	349	167	47.8	338	96.8
Post-production	361	180	49.9	353	97.8
Drying the product	328	151	46.0	317	96.5
Threshing	304	157	51.6	292	96.0
Transporting the product	328	116	35.4	319	97.3

Source: Author's calculations

Regarding decision-making, in 41 and 52 percent of households in Peru and Bolivia respectively, women participate in decisions about how to use rice income, either individually or jointly with their spouse. However, we only asked about decisions related to the spending of income; a better measure would consider the various decisions throughout the production process, such as those relating to land preparation, selection of seed varieties, use of inputs, harvesting, and marketing. When such management decisions are disaggregated, it is possible to see how women are participating as farm managers. So even if they are not identified as the principal farmer or landholder, they may have a significant role in managing agricultural production.

In the case of Ecuador, qualitative data reveals that women participate in activities such as supervising hired labor, buying agricultural inputs, and in some cases transplanting seedlings,

transporting supplies (e.g. gas for the water pump, hose for irrigation, etc.), or working as plot managers. Yet women recognize themselves as housewives (a non-agricultural identity) rather than as producers. For example, when we asked a female producer in a semi-structured interview for her principal occupation, she answered, “My main occupations are the domestic chores.” Then, when we asked her to describe her daily activities she said,

My husband cannot [work in the fields]. I'm the one who goes to [work in the rice field]. I usually get up at 6am because I have my child. I give him food. Sometimes I have to go to the plot to go to supervise people when we are preparing the land by removing soil, watering, and things like that. For that I must look for machines [...] I have to rent the machine.

And when we asked her who makes the decision over the rice plot, she said, “I do,” (Interview, Ecuador, November 2014). At first she recognized herself only as a housewife but then, as we delved more deeply into her daily life, she revealed how she participates in and makes decisions about rice production.

Rice production is seen as a masculine activity in these communities; we heard expressions such as “widow’s plot” used to describe a rice plot that is plagued by weeds and diseases, the name deriving from the perception that women (“widows”) do not know how to manage a rice plot. The term “machona” was an expression used to describe women who dislike or do not do “women’s activities”. These phrases express how women are not culturally recognized as rice farmers.

As we can see, despite the fact that community leaders, enumerators, and even women themselves insisted that women are not rice producers, men are reporting that women participate in productive activities and the management of the rice production.

Discussion and conclusions

Overall, the traditional perception of men as rice farmers was one of the main barriers preventing us from collecting sufficient data from women. It is generally thought that men are in charge of rice production, they are household heads, and the principal farmers. The confusion between head of household and principal farmer is a constraint present in most of the literature, because “most of the data available on female farmers derives from household surveys and pertains to the activities of female-headed households, who comprise a minority of females in most countries” (FAO, 2011: 24).

This patriarchal perception of gender identities is related to the public-private dichotomy. Historically this dichotomy is an important dimension of social reality (Van Staveren and Odebode, 2007). This is a norm held by many researchers, enumerators, community leaders, and male and female farmers, all of whom claim unequivocally that, “women are not rice producers”. While this norm can facilitate and constrain behavior, it is also internalized in the actors as identities i.e. men are farmers and women are housewives. We noticed that most women identified as housewives regardless of their contributions to rice production; those who are recognized as rice producers (by themselves and others) are often called “machona.”

Table 4 summarizes the barriers we encountered (stemming from traditional gender norms that imply men are farmers and women are housewives and helpers); our efforts to overcome these barriers; and the lessons learned.

Table 4. Reflective summary of research experience

Barrier presented	What was done?	Lessons learned
Community leaders, enumerators, and fieldwork supervisors claim that women are not producers.	<p>In Peru, women to be interviewed were replaced by male producers.</p> <p>In Bolivia and Ecuador, women were not even considered for interviews since they were not perceived as producers.</p>	<p>Explain to enumerators the importance of interviewing women as well as men, so in case they find some women who are not rice farmers, they will look for others who are.</p> <p>Train enumerators to question their own normative assumptions.</p> <p>Ask separately for each decision regarding rice production. It will help identify managers in a household.</p> <p>A gender researcher should be part of the training and fieldwork.</p>
Problem with defining survey respondent as person who makes the general decisions for crop production and has knowledge of management.	This definition was used by enumerators to identify respondents of the questionnaire and was used to justify the exclusion of women.	<p>Revise the concept of producer at a theoretical and operational level.</p> <p>Include capacity building efforts with research partners and ensure that enumerator training includes important dimensions of collecting sex-disaggregated data. Specifically, efforts must be made to highlight the operational definition of “producer” to clearly distinguish it from traditional concepts of household head, landholder, and principal farmer. Furthermore, training efforts should build awareness of social norms held by field staff and community members and how they may unintentionally impact data collection efforts.</p>
Gender is not included as a main variable for stratification in the sampling.	Set a minimum of women surveyed prior to fieldwork.	Incorporate gender variable in the sample.
Researchers, interviewers, field supervisors, leaders, residents, and women believe that rice is a male crop and women are not involved in its production.	In Ecuador, a gender researcher participated in the fieldwork part of the time; she searched for women to interview and insisted on having a minimum number of female respondents. She also implemented qualitative methodologies after the quantitative fieldwork. This included community and in-depth individual questionnaires with qualitative and open questions, which asked about the activities of women in rice production.	<p>Generate sufficient spaces for reflection that allow us to de-stabilize perceptions of sex and gender of the participants (and enumerators).</p> <p>Having both male and female community leaders guide enumerators in the community.</p> <p>Adopt both qualitative and quantitative research methods in order to understand gender relations and adapt the survey to local contexts.</p>

The barriers to collecting sex-disaggregated data— especially in terms of collecting data *from* women—were identified in both the design and implementation stages of research. First, gender norms guide researchers in the design of the survey questionnaire and in the sample

design. Second, during the implementation of survey research, gender norms guide the behavior of key research partners (including enumerators, field supervisors, and community members). These actors do not perceive many women to be farmers and therefore do not interview them. Furthermore, women themselves do not often identify as farmers and are not captured by filter questions as valid respondents, which further reinforces the notion that women are not farmers.

Several lessons and recommendations emerge. During the research design phase, we have the following three suggestions. First, questionnaire filter questions to identify appropriate respondents should be re-formulated (or at least reconsidered) in a more inclusive manner so that women are likelier to be recognized as valid respondents. Second, ensure that sufficient questions are asked about gender differences, especially in terms of the gender division of labor, decision-making for all relevant decisions, and access to and control of resources. In this way, even if few women are interviewed, there is still data about women's roles and gender inequalities in agriculture. Third, consider gender during sample design and selection. While many researchers are interested in sex-disaggregated data collection and analysis, few have the knowledge and resources to include it appropriately during the sample selection process.

We constantly encountered barriers to including women in the sample. This shows how institutions are embodied (or cannot be separated from actors), as discussed by Van Staveren and Odebode (2007) and Martin (2004). Researchers may want to collect sex-disaggregated data only if both men and women can be identified through the traditional filter questions; better efforts and resources are needed to conceptualize the research differently and make changes to the questionnaire and sampling design accordingly. Intra-household surveys are likely the best option for collecting sex-disaggregated data *from* and *about* women. However, if this option is not possible, consider other alternatives, such as 1) over-sampling women producers (however they are defined); 2) including a minimum number of women in the sample in a way that can be enforced during implementation; 3) doing follow-up interviews with women in a selection of households; and/or 4) jointly interviewing men and women. Each of these options has trade-offs, but should be considered for collecting sex-disaggregated data *from* women as well as men. Important considerations for choosing among the alternatives are the research objectives and whether the sampling procedure allows for statistically valid analyses of comparisons between men and women.

Two recommendations are specific to the implementation phase. First, it is important to build awareness and the capacity of research partners—especially enumerators and field supervisors—in the collection and analysis of sex-disaggregated data. Awareness-raising can help prevent unintentionally excluding women as respondents by shedding light on otherwise unrecognized gender norms that may be guiding behavior. Further capacity development can ensure an understanding of the operational definition of producer chosen for the study and how to effectively apply the filter questions in an inclusive manner. Second, field staff and researchers can challenge the seemingly unquestionable knowledge of community leaders who often guide implementation efforts in the field. By understanding the importance and ways in which sex-disaggregated data is collected, field staff can explain the methodology and need for including women in the study. Another consideration would be to include male and female community leaders to guide field staff or ask various community members/leaders, rather than relying solely on one person.

Adopting both quantitative and qualitative methods as well as including gender researchers who are aware of these barriers and capable of overcoming them are other recommendations that are valid for both the research design and implementation phases. While well-designed quantitative studies can provide representative data and statistical analyses about gender and agricultural production, qualitative research can aid the effective design of survey instruments and can also add context to results. Including gender researchers in all phases of the research can ensure that women are included in meaningful ways, and can also ensure that barriers to collecting and analyzing gender data are considered.

Our experiences with collecting sex-disaggregated data about rice production in Latin America reveal that women are not typically identified as rice producers. However, the data collected (mostly from men) suggests that women play significant roles in rice production. For gender and agricultural research, it is thus important to recognize how gender-norms-as-institutions impact what data is collected from whom and how this can limit our knowledge of women's contributions to agricultural production and gender differences in agriculture. These observations and reflections exemplify how gender norms are institutions that are embodied in concrete actors and constrain our understanding of women's roles in agriculture. They limit the number of women identified as agricultural producers and thus our understanding of women's roles in agriculture. For gender researchers, a positive aspect of institutions is that they change (Martin, 2004), even if such change is slow and occurs as an iterative process. Important steps toward positive change include awareness- and capacity-building of the various research actors regarding these underlying gender norms, which will in turn facilitate sex-disaggregated data collection and analysis that can be fed into agricultural development projects in ways that benefit both women and men.

Acknowledgements

The three studies presented in this paper were implemented by the International Center for Tropical Agriculture (CIAT) as part of the CGIAR Research Program on Rice, known as the Global Rice Science Partnership (GRiSP), and the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). The views expressed in this document cannot be taken to reflect the official opinions of CGIAR or Future Earth. The authors would like to thank the leaders and participants of the PIM writeshop in Berlin, Germany, for their comments on an earlier version of this paper.

References

- Aly, H. and Shields, M. (2010) 'Gender and agricultural productivity in a surplus labor, traditional economy: Empirical evidence from Nepal', *The Journal of Developing Areas*, 43, pp. 111-124.
- Berger, P. and Luckman, T. (1968) *La construcción social de la realidad*. Buenos Aires: Amorrortu editores.
- Chizari, M., Linder, J. and Bashardoost, R (1997) 'Participation of rural women in rice production activities and extension education programs in the Gilan Province, Iran', *Journal of International Agricultural and Extension Education*, Fall, pp. 19-26.

- Clemens, E. and Cook, J. (1999) 'Politics and institutionalism: Explaining durability and change', *Annual Sociological Review*, 25, pp. 441-466.
- Deere, C. (2005) 'The feminization of agriculture? Economic restructuring in rural Latin America', *UNRISD Occasional Paper*. Geneva: UNRISD
- Deere, C. and León, M. (1982) *Women in Andean agriculture: Peasant production and rural wage employment in Colombia and Peru*. Geneva: International Labour Organization.
- Deere, C., Alvarado, G. and Twyman, J. (2012) 'Gender inequality in asset ownership in Latin America: Female owners vs households heads', *Development and Change*, 43, pp. 505-530.
- Doss, C. (2011) 'If women hold up half the sky, how much of the world's food do they produce?', *ESA working paper 11-04*. Rome: Food and Agriculture Organization of the United Nations.
- Doss, C. and Morris, M. (2001) 'How does gender affect the adoption of agricultural innovations? The case of improved maize technology in Ghana', *Agricultural Economics*, 25, pp. 27-39.
- Dubet, F. (2010) 'Crisis de la transmisión y declive de la institución', *Política y sociedad*, 47, pp. 15-25.
- Food and Agriculture Organization of the United Nations (FAO) (2011) *The state of food and agriculture: Women in agriculture, closing the gender gap*. Rome: Food and Agriculture Organization of the United Nations.
- Food and Agriculture Organization of the United Nations (FAO) and Comisión Económica para América Latina y el Caribe (CEPAL) (2009) *El empleo de las mujeres rurales: Lo que dicen las cifras*. Rome: Food and Agriculture Organization of the United Nations.
- Gilbert, R., Sakala W. and Benson, T. (2002) 'Gender analysis of a nationwide cropping system trial survey in Malawi', *African Studies Quarterly*, 6, pp. 223-243.
- Holden, S., Deininger, K. and Ghebru, H. (2011) 'Tenure insecurity, gender, low-cost land certification and land rental market participation in Ethiopia', *Journal of Development Studies*, 47, pp. 31-47.
- Horrel, S. and Krishnan, P. (2007) 'Poverty and productivity in female-headed households in Zimbabwe', *Journal of Development Studies*, 43, pp. 1351-1380.
- FAOSTAT (2013). Food and Agriculture Organization of the United Nations. Available at: <http://faostat3.fao.org/home/E> [Accessed on 17 September 2015].
- Martin, P. (2004) 'Gender as social institution', *Social Forces*, 82, pp. 1249-1273.
- Muriel, J. (2013) *Diferencias en el rendimiento de la producción de arroz en el norte de Perú bajo la variable género*. Tesis de pregrado en Economía. Colombia, Departamento de Ciencias Sociales y Económicas, Universidad del Valle-Cali.

- North, D. (1990) 'Institutions', *Journal of Economic Perspectives*, 5, pp. 97-112.
- Ortíz, A. and Soliz, L. (2007) *El arroz en Bolivia*. Santa Cruz: Centro de Investigación y Promoción del Campesinado (CIPCA).
- Palacios, A, Christiaensen, L and Kilic, T (2015). 'How much of the labor in African agriculture is provided by women?', *Policy Research Working Paper WPS 7282*. Washington, DC: World Bank Group.
- Peterman et al. (2011) 'Understanding the complexities surrounding gender differences in agricultural productivity in Nigeria and Uganda', *Journal of Development Studies*, 47, pp. 1482-1509.
- Quisumbing, A. (1994) 'Improving women's agricultural productivity as farmers and workers' *ESP Discussion Paper Series 37*. Washington DC: World Bank.
- Quisumbing, A. (1996) 'Male-female differences in agricultural productivity: Methodological issues and empirical evidence', *World Development*, 24, pp. 1579-1595.
- Swidler, A. (1986) 'Culture in action: Symbols and strategies', *American Sociological Review*, 51, pp. 273-286.
- Tiruneh, A., Tesfaye, T., Mwangi, W. and Verkuijl, H. . (2001) "Gender differentials in agricultural production and decision-making among smallholders in Ada, Lume, and Gimbichu Woredas of the Central Highlands of Ethiopia. Mexico, DF: International Maize and Wheat Improvement Center (CIMMYT) and Ethiopian Agricultural Research Organization (EARO).
- Twyman, J., Useche, P. and Deere, C. (2015) 'Gendered perceptions of land ownership and agricultural decision-making in Ecuador: Who are the farm managers?', *Land Economics*, 91, pp. 479-500.
- Udry, C. (1996) 'Gender, agricultural production, and the theory of the household', *The Journal of Political Economy*, 104, pp. 1010-1046.
- Van Staveren, I. and Odebode, O. (2007) 'Gender norms as asymmetric institutions: A case study of Yoruba women in Nigeria', *Journal of Economics Issues*, 41, pp. 903-925.
- Waller, W. and Jennings, A. (1990) 'On the possibility of a feminist economics: The convergence of institutional and feminist methodology', *Journal of Economics Issues*, 24, pp. 613-622.