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# Barriers to women's Participation in Coffee Pest Management Learning Groups in Mt Elgon Region, Uganda

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## ABSTRACT

There is insufficient empirical research on barriers to women's participation in mixed sexed coffee Integrated Pest Management learning groups. Previous studies focused on socio economic factors with less emphasis on gender in a male dominated crop in Elgon Sub region of Uganda. The study used a cross sectional survey research design and a total 126 (71 men and 55 women) coffee IPM group members by census. A participation index was computed as a measure of level of participation in coffee IPM group processes while cross tabulations were used to analyze determinants for participation. Findings revealed that about 46% of the men compared to 25% women rated high on the group participation index with a significant chi-square difference ( $p < 0.05$ ). Age, ability to read and write English and lumasaba, organizational goals set, membership criteria, access to credit, marital status, mobility constraints, access to and control over coffee management inputs and benefits were significantly correlated to group participation. Study concluded that research and development approaches that utilize groups should identify and address barriers to women's participation and benefits from mixed sex group processes for better targeting of interventions.

**Key words:** Agriculture, Integrated Pest Management, Coffee Stem Borer, IPM CRSP, Level of participation, Gender and Uganda

## Introduction

Producer organizations or farmer groups are useful mechanisms for reducing poverty and improving small producer livelihoods by governments and development partners (Oxfam 2013). Producer organizations and rural institutions can among others improve access to information and knowledge (Herbel *et al.*, 2012). Depending on the context, researchers use farmer groups to promote participatory technology testing, learning and dissemination of agricultural technologies such as integrated pest management (IPM) practices (Erbaugh *et al.*, 2010). The farmer field school (FFS) approach is one classic example of the use of groups to promote IPM (Danielsen *et al.*, 2011). FFSs were intended to reach out to marginalized groups who might not have access to training, knowledge and inputs (Erbaugh *et al.*, 2010). Central in these group processes is member participation. Participation may be defined as an act of taking part in an activity usually with others (Farid *et al.*, 2009). In other words, it refers to involvement of individuals and groups in development processes with an objective of ensuring self-reliance and improved standard of living (Mellouli, 2003; Nxumalo & Oladele, 2013). Equitable participation in producer groups by women and men is of great benefit to members and their families. For equity to be achieved then, both men and women are empowered to participate in meetings, activities and decision-making (Agarwal, 2001). For this study, participation refers to individual involvement in coffee IPM group activities in Mt Elgon region.

Interventions in Mt Elgon, commenced after a baseline Survey of Arabica Coffee (*Coffea arabica L.*) producers in the districts of Sironko, Manafwa and Mbale that found that pesticide use was the main control method for stem borers (Erbaugh *et al.*, 2006). National Agricultural Research Organization (NARO) Coffee Research Program-Coffee Research (COREC) in collaboration with Integrated Pest Management Collaborative Research Support (IPM CRSP) under United States Agency for International Development (USAID) funding carried out studies in 2008 to compare the conventional method of pest control in coffee, which involved chemical pesticide application with IPM management tactics (stem smoothening and stem wrapping), and the later were found to be effective. Therefore, between 2009 and 2010, the IPM options were evaluated on farm (Kyamanywa *et al.*, 2011). The results from the on-farm trial were positive, and so the IPM packages were up-scaled in 2009 through coffee IPM groups in two sub counties of Manafwa District. One sub county in Sironko district was added in 2010 (Kyamanywa *et al.*, 2011). Coffee IPM group members would meet twice a month at a coffee demonstration field at a farmer's home. Learning methods were experiential, participatory and learner-centered. Men and women farmers followed the coffee IPM management activities listed on a coffee management calendar covering the entire year. IPM CRSP noted that attendance to groups meetings, sharing views/ideas between men and women during routine demonstration sessions was skewed towards men. The men were specifically more engaged in stem smoothening which women and the elderly shunned due to heavy labor demand.

According to Christie (2010), “USAID recognizes that the advancement and empowerment of women worldwide is necessary for economic development and is committed to providing development assistance that improves the lives of women, men and children around the world (USAID-WID). Its Automated Directive Systems (ADS) requires all projects to promote gender equity and take gender into account in planning, implementation and evaluation”. One of Gender Global Theme (GGT)'s mandates is to carry out research so as to produce and disseminate knowledge of gender issues in IPM. Against this background therefore, the project commissioned a gender analysis using the Gender Dimensions Framework to establish constraints and opportunities of men and men in relation to participation in IPM practices (Christie, 2010) for coffee stem borer. To tease out these constraints and opportunities can lead to equity and inclusion of men and women as key stakeholders in IPM research (*ibid*) and widen the knowledge base required for designing appropriate IPM packages.

Empirical studies elsewhere found that, participation in group processes together with the attendant benefits is not uniform across different categories of members. The variation in participation is affected by a number of factors. For instance, in various contexts, gender has been found to influence participation in group processes. Women and youth are often excluded from participation, leadership and decision-making processes in various developing countries including Mozambique and South Asia (Tanwir and Safdar, 2013; Gotschi *et al.*, 2009 and Agarwal, 2001). Participation for women is further influenced by age, educational level, time, status, and previous membership in organizations, access to assets and resources, organizations' rules of entry, socio-cultural norms and enabling environment (Kaaria *et al.*, 2016). In fact, Gotschi *et al.* (2009) found that men control and manage most producer organizations, cooperatives, workers' unions and out grower schemes in Mozambique. According to Gyau *et al.* (2016) gender, influenced the decision to participate in group activities by farmers in Kenya. Other studies identified gender as one among many factors that would influence individuals to participate in farmer groups in Uganda, Tanzania, Romania and Kyrgyz Republic (Davis *et al.*, 2010; Benin *et al.*, 2008; Sabates-Wheeler, 2006; Towo, 2004).

Participation in coffee IPM groups in Eastern Uganda may manifest a unique pattern of determinants given the dynamic and contextual nature of social processes differ (Rubin *et al.*, 2009; Tau & Hassen, 2007). A knowledge gap exists on the factors influencing gendered participation in coffee IPM group processes. Comprehension of gender's contribution in group processes of a male-controlled enterprise like coffee is critical to coming up with ways in which to enhance the participation and benefit by women from IPM packages. A study was therefore conducted to identify the barriers to women's participation in IPM control of the coffee stem borer in Mt Elgon, Uganda.

## **2. Theoretical framework**

The study conceptualization is informed by gender theory. Garcia (2001) defines gender as a social construct linking sex, a biological variable, to expected characteristics and behavior. Essentially, gender is a construct that defines how society is organized and functions. Each society therefore because of its inherent perceptions, values, and cultural norms has conceived and structured what it means to be masculine and feminine. Gender determines the roles, responsibilities, obligations, entitlements, and restrictions within the various spheres of life at household and community level (Manyire and Apekey 2013). It shapes how adult males and females; youth and children relate in the various contexts including the development arena. Consequently, participation in group activities which are situated within socio-cultural contexts are significantly influenced by the same societal power dynamics that shape gender relations and often pose limitations and support the decision to participation in any collective activity.

According to gender theory, the ability of women to make autonomous decisions to mobilize networks or get engaged in collective activity is an indicator of empowerment (Sraboni *et al.* 2013). The concept of empowerment can be defined as the expansion of freedom of women to take charge of their lives by making choices, taking actions, and exercising authority and control over the resources and decisions that affect their life (World Bank 2001). Decisions to participate in public domains is not any different. Chambers (2005), raises issues about who participates, where, when, with whom and with what equality. Many gender responsive empirical collective action or participation studies have found there are different levels of participation by women and men. These differences are shaped by socio cultural, personal/demographic and institutional factors. In a survey on factors influencing Human Immune Virus

(HIV) positive farmers' level of participation in support groups in Nigeria, Jummai (2012) found that women farmers' level of participation in the study area was low. A relationship between gender and farmer groups participation study in Tanzania, found that women participated less in farmer groups than men. This was explained by the lack of a gender mainstreaming strategy for the groups and lack of sensitization on gender issues. Heavy domestic workloads affected women's attendance of group meetings. Emphasis on export crops also limited women's involvement in groups as they lacked control over land necessary to engage in such crops (Towo, 2004). However, Sanginga *et al.*, 2001, found that women in East African groups had dominant community roles and responsibilities in relation to activities implemented by the groups making them more likely to participate than men. Beard (2005) found that in Indonesian communities, women participated less in groups due to cultural limitations on their level of public engagement. The traditional gender roles in many cultures dictate that men participate in public spheres, take on husbandry roles-productive activities and income generating activities (FAO 2010-11; Agarwal, 2001; Pandolfelli *et al.*, 2007; Westermann *et al.*, 2005; Tanwir and Safdar, 2013), while women concentrate within the domestic sphere. Regardless of the mixed results, the implication is that, fewer women are likely to participate in the public sphere and consequently in producer organizations (Massolo, 2007; Meinzen-Dick and Zwartveen, 1998).

Research conducted by Subedi (2008) in Nepal found that, in mixed groups women are more constrained in terms of access to all forms of information including extension services, farming inputs, and mobility. This is often due to heavy workloads at home as per the time-use surveys across a wide range of countries (FAO 2011, 2015&2016). Women spent between 85–90 percent on domestic chores and other care activities (FAO 2011; FAO 2015). This has great implications on their ability to participate in activities outside the home stead including attending producer organization meetings or related training/extension opportunities due to time challenges (Tanwir and Safdar, 2013).

### ***Personal/demographic factors***

Women and men have different interests that can influence their willingness to participate in producer organizations (Pandolfelli *et al.*, 2007; FAO, 2011). Women for example might opt to join producer organizations that emphasize food self-sufficiency and not cash crops (IFAD, 2010). Men by virtue of their gender roles and interests on income generating crops can be motivated to join producer organizations to access markets (Kariuki and Place, 2005). This finding is in agreement with Agarwal's (2000 and 2001) work on forest user groups who demonstrated that men might be motivated by income and may promote strict controls on forest areas mainly for sell.

Studies by Oxfam, 2013; Agarwal, 2001; Warner *et al.*, 1997, found that older women from wealthier households tended to participate more in producer organizations as opposed to the younger ones from poorer households. This perhaps is due to better access to assets and resources by the former. Coleman & Mwangi (2013) found that education significantly affects women's participation in producer organizations of Bolivia, Kenya, Mexico and Uganda. The probability to participate in producer organizations and attend meetings increased with years of schooling. In other words, women face significant constraints participating in and benefiting from farmer field schools and other training and extension opportunities as compared to their male counterparts (Jiggins *et al.*, 2000; Gründel, 2009).

### ***Institutional factors***

A range of institutional factors including organizational goals, membership criteria, group leadership, access to extension services, infrastructure have been found to influence farmers' participation in groups. Datta (2007) recognized that successful community groups in Bangladesh had strong leadership, were transparent in information-sharing and decision making, had trustworthy and competent leaders and a specific quota for women elected as leaders. At an individual level, mutual trust and respect among the members as well served as important factors for effective participation. Marriage as an institution is another great contributor to women's restricted mobility in some contexts (Oxfam 2013; Manfre and Rubin 2012, Gotchi *et al.*, 2009). In Mozambique, married women may not participate in groups without the permission of their husbands (Gotschi *et al.*, 2009). Group leadership has an influence on participation in groups. Leadership depends on the styles with democratic leadership styles leading to better participation as opposed to exclusionary and autocratic styles (Sseguya, 2009). Access to infrastructure such as a tarmac road may influence participation in farmer groups. Davis *et al.* (2010) found that distance to tarmac roads was negatively related with participation in a FFS in Kenya, Tanzania and Uganda, suggesting that farmers in remote areas are less likely to take part in the FFS. Women are specifically, contained to access extension services, farming inputs due to limited access to transport means coupled with long distance to training venues.

### ***Access to assets and resources, rules of entry and requirements***

There is evidence that, women as compared to men in many developing countries have less control over land, use fewer agro-inputs and have less access to extension services (FAO, 2011). This limited access to productive assets may decrease women's bargaining power in and outside the household consequently, limiting their ability to join producer organizations that require ownership of assets such as land (Agarwal, 2001; Wiig, 2013; Pandolfelli *et al.*, 2007). According to Ouattara *et al.*, 2010, lack of income and economic empowerment can affect women's self-confidence and prevent them from obtaining leadership positions in producer organizations (Ouattara *et al.*, 2010). In Ghana's mango out-grower scheme group entry requirement was a bag of maize, a man's cash crop and a woman's food crop. This limited women's ability to register with the company as out-growers (FAO, 2013a). In Mozambique, when only one member per household was allowed to participate in a producer organization, the husband was more likely to participate than the wife, limiting women's participation (Gotschi *et al.*, 2009).

From the above theoretical and empirical evidence, there is insufficient empirical sex disaggregated data on the level of participation of men vis-a-vis women in farmer groups in relation to the coffee and integrated Pest management package in particular. Previous studies have shortcomings in terms of type crop (cash/food crop), the pest and related control methods used, and other socio economic and institutional variables considered. Most recent existing studies concentrated on other commercial crops other than coffee (Ahuja, *et al.*; Allahyari, *et al.*; Muriithi, *et al.*; Mangan, *et al.*; Isabirye, *et al.*; Farrar, *et al.*; Rousan, *et al.*; Trapero, *et al.*; Prasad & Malathi; Slone & Burrack, 2016; Lefebvre, *et al.*; Mohamed, *et al.*; Mohammadrezaei & Hayati; Korir, *et al.*; Alyokhin *et al.*; Xu & Khachatryan, 2015; Kabir & Rainis; Borkhani, *et al.*, 2013). Even though some studies looked at tree crops, these differ in terms of pests and Integrate Pest Management(IPM) methods employed. In terms of socio economic and institutional variables considered, there is a heavy focus on demographics and other economic attributes with limited focus on gender. In many cases, gender is modelled or mentioned as one of the demographic characteristics without a clear gender analysis of the IPM package use. Studies that carried out a gender

analysis (Christie et al., 2015, Mwangi, 2015) didn't focus on coffee IPM specifically while those that did (for example Erbaugh *et al.*, 2010; Erbaugh, 2011 and Kyamanywa *et al.*, 2011) have limited gender scope.

Generalizing findings from these studies is not a good idea given the dynamism and context specific nature of gender related variables. There is therefore need for more research to understand the barriers to women's participation in mixed sex groups that promote agricultural technologies such as IPM in diverse contexts. The purpose of this study therefore was to analyze the factors which influence the ability of women to participate in group activities in the target districts in Uganda. The study compared small holder male and female coffee farmers who were members of coffee stem borer IPM groups so as to understand implications for Coffee Stem Borer IPM package uptake. In the next section, we highlight the conceptual framework based on the relevant literature on gender and group participation so as to provide a basis for our empirical model and variable selection.

The concept of this study therefore, is based on group organization. Organizing diverse gender categories into groups should ideally enhance participation. This is because various people come in with creative ideas based on invaluable expertise to solve of more complex farm challenges. On the contrary, bringing such people together in a typical patriarchal society re-enforces imbalances with the minority groups such as women benefiting less from such efforts. Specifically, the questions of who is able participate, where, when, with whom and with what equality goes without mention (Chamber, 2005; Subedi, 2008). Empirical studies in various locations and contexts show Women face significant constraints participating in and benefiting from farmer training and extension opportunities compared to men (Jiggins et al., 2000; Gründel, 2009). On this basis therefore, the level of gendered participation in mixed sex coffee IPM group processes could be influenced by a range of socio cultural norms, Personal/demographic and institutional factors.

### **3. Research Methods**

The study was carried out in the Mt Elgon region of Uganda in the districts of Sironko (Buwalasi Sub County) and Manafwa (Bumbo and Bupoto sub counties). These study sites were purposively selected because due to the high incidence of coffee stem borer (23%), IPM was being promoted there to control the pest through group approach (Kyamanywa *et al.*, 2011). Sironko district has a total area of 1,091 square kilometers (421 sq mi). The district lies between approximately 1,299 meters (4,262 ft) and 1,524 meters (5,000 ft) above sea level. Manafwa district on the other hand has a total area of 451 square kilometers (174 sq mi). Manafwa has low land, upland and mountain climatic zonation. The coordinates of the Sironko and Manafwa districts are: 01 14N, 34 15E and 00 54N, 34 20E respectively (Google Earth, 2013).

CGIAR (2005) characterizes the zone as banana-Coffee farming system where mixed farming is predominant. The zone has the following characteristics: deep fertile soils-volcanic alluvial, well drained loam to black loams over red sandy clay loams, well distributed rainfall, relatively high altitude and areas with large tree vegetation coverage. Food crops include beans, groundnuts, sorghum, maize, millet, cassava, potatoes and sweet potatoes. Coffee and cotton are the main cash crops. Fruits and vegetables grown in the district include passion fruit, tomatoes, onions and cabbage. Livestock reared in this zone

include cattle, goat, and sheep. This zone has a variety of other activities, such as timber cutting and sales, trade, and formal employment. The main source of cash income is sale of crops and livestock. Agricultural inputs and farm produce are obtained and sold within the districts as well as in the city of Mbale. A host of risks are associated with this zone, such as crop pests and diseases, livestock diseases, fluctuating crop prices, soil erosion and landslides in high areas, degradation, and high population density. As a result, there is increased land pressure and fluctuating market prices. According to 2016 population estimates, UBOS puts Sironko district's population at about 251,600 and Manafwa at 369,100 people. The majority of the people belong to the Bagisu ethnic group and lugisu is the most widely spoken language.

### **Research design**

The study adopted a cross sectional survey research approach and data was collected in two phases between May and July 2012. In the first phase, key informant interviews were conducted to gain in-depth understanding of the group processes and gender issues affecting men and women's participation. Phase two consisted of a cross-sectional survey aimed at obtaining data on the extent of participation in the Coffee IPM groups by both men and women members, and to determine the factors influencing participation.

### **Population and sampling**

The target population comprised men and women in coffee IPM farmer groups in the target districts. The Integrated Pest Management Collaborative Research Support Program (IPM CRSP) project had worked with 3 groups and all were included in the study. The list of IPM CRSP farmer group members which served as sampling frame were obtained from group leaders. These groups consisted of a total membership of 42 (22 men, 20 women) for Kibowa, 45 (24 men, 21 women) for Kesemulira and 54 (30 men, 24 women) for Sosyo. The study sought to include all group members in the study. However, the available sample included 71 men and 55 women drawn from the three groups to bring the total to 126 respondents. All the three farmer groups formerly farmer field schools had been graduated by the IPM CRSP project and preliminary studies sighted unavailability of some members. Researchers therefore had to interview as many people available for proper representation.

### **Instrumentation and data collection**

A structured interview schedule that had been subjected to content validation with a panel of experts, and suitability tests through pretesting was used to collect data from the sample. The survey tool was pre-tested in Bumasaba parish in Sironko district, which was comparable population that was not participating in the study. The field testing exercise helped to test for clarity and the logical flow of the questions and duration of the interview. Data quality was ensured through thorough training of enumerators and using enumerators who are proficient in the local dialects. Team debriefs were also held every day after the data collection exercise to share lessons and challenges so as to ensure a uniform interpretation of the household survey questions.



Key informants were interviewed individually in their homes or offices for one to two hours on average. A voice recorder was used to capture the interview/discussion and the recordings were later played to enhance accuracy of the field notes. Survey data was collected by the researchers with the help of the research assistants. Appointments to visit the selected farmers were made and consent was sought prior to the interview. The purpose of the study was clearly explained to the respondents as part of the process of securing informed consent.

Focus group discussion, were also held in Buwalasi and Bumbo sub Counties of Sironko and Manafwa districts respectively. A total of two FGDs were conducted together with the farmer group members stratified by sex to triangulate findings collected from key informant interviews. With the help of two field enumerators, the separate male and female sub-groups were assigned tasks to generate their responses about the coffee stem borer, damage, spread, management, groups' activities and what limits or enhances women's participation in coffee group processes. For each coffee group, two FGDs of 1.5-2 hours were conducted. Notes were captured for a deeper analysis of the conversations at a later time.

The major challenge faced by researchers during data collection is the fact that, the farmer group members interviewed were graduated farmer field schools by IPM CRSP. This therefore made tracing of the members difficult. Some members had resorted to invest in other enterprises other than coffee to coffee pest and diseases including coffee stem borer and farming challenges such limited market. Bugisu Cooperative union, Gumutindo and Coffee A cup were main buyers who at times offered low prices.

**Data analysis**

To determine the barriers to women farmers' participation in coffee IPM group processes, a descriptive analysis was carried out to generate percentages, means and standard deviation. Independent t tests and chi-square were used to test for differences in means and proportions respectively between the men and the women as separate groups. Cross tabulations were used to estimate the factors influencing women's participation in coffee IPM group processes using cross sectional data.

**Estimation of Participation Index for group processes adopted and modified after Borkhani et al., 2011**

Participation was defined as the involvement of men and women farmers in IPM group processes measured using a participation index (PI). The Participation index was computed based on (i) the number of meetings attended, (ii) the number of ideas contributed, and (iii) the number of ideas taken, and (iv) the rating of the level of satisfaction with the benefits obtained from Coffee IPM group trainings in the last 6 months. For questions i-iii the scale used was: 0 = 'Never', 1 = 'Seldom', 2 = 'Frequent' and 3 = 'Very Frequent'; for question iv) 0= minimal; 1= fairly satisfied; 2= average or moderately satisfied; 3= highly satisfied. The total score was calculated by adding individual scores that each respondent obtained for all statements. Participation Index was calculated as follows:

$$PI = \sum_{i=1}^4 CGPFS_i$$

(i)

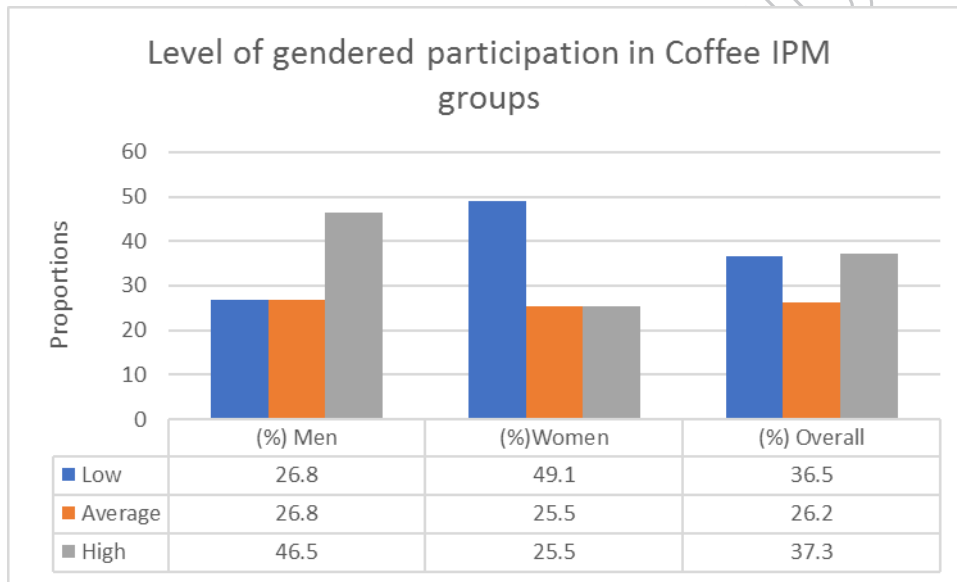
Where: PI = Participation Index, CGPFS<sub>i</sub> = Coffee group process frequency score (0=never, 1=seldom, 2=frequent and 3=very frequent; 0= minimal; 1= fair; 2= average; 3= high) and i = number of Coffee IPM group activities ranging from 1 to 4.

$$PI = \sum_{i=1}^4 ATTEND + \sum_{i=1}^4 CONT\_IDEA + \sum_{i=1}^4 IDEA\_TAKEN + \sum_{i=1}^4 BEN\_RATING \dots\dots (ii)$$

#### 4. Results and Discussion

##### Women’s participation in coffee IPM group processes

Analysis of level of participation reveals that women participate less in group processes compared to men (Figure 1). Gender analysis of the scores on the composite participation index revealed significant gender gaps. Among the high-level participants, about 47% were men as compared to women (about 26%). This had significant difference as per the Pearson chi-square tests at  $p < 0.05$  implying a significant difference between men and women’s level of participation. In terms of specific parameters, men 58% contributed ideas frequently in group meetings compared to 37% of the women. When it came to implementation, men’s ideas were more frequently adopted (about 58%) compared to 40% for women. This like all the above parameters had a significant Pearson chi-square difference of  $p < 0.05$ . Finally, the majority of group members had benefited from coffee IPM groups (about 81%) but slightly under a half (about 49%) were men. The major benefit was knowledge/skills (about 98%) with more men benefiting.



Pearson chi2 (2) = 7.9258; P = 0.019

Figure 1: Level of gendered participation in Coffee IPM group processes

Generally, the study found that men's capacity to attend group meeting, contribute accepted ideas and benefit from group processes than women could be associated with differences in power and status (Narayan, 1999) in the society. This has a potential of leading to discontentment as some members such as women are excluded from active participation in group activities. The lower participation of women in group activities is consistent with results from other studies. For instance, level of women farmers' participation in support groups in Nigeria was low (Jummai, 2012). In Mozambique, more husbands than wives participated in a producer organization (Gotschi *et al.*, 2009). The level of participation could be explained by a number of factors, for example in the relationship between gender and farmer groups in Tanzania, Towo's (2004) study found that women participated less in farmer groups than men due to most groups putting emphasis on export crops which often have less women's involvement because they lack control over key production inputs like land. Other factors responsible for such variation is demographic, institutional factors and access to and control over production inputs.

### **Demographic factors**

The was positively and significantly correlated between the age of a farmer and participation in coffee IPM group process at  $P < 0.05$ . Much as this variable didn't have much variation by sex, it could be attributed to the nature of the coffee enterprise which is a long-term perennial crop that tends to attract older people who have more access to and control over factors of production such as land compared to the younger people. There are mixed results about the above variable with some previous studies agreeing and other disagreeing. Studies in Uganda, Tanzania, Romania and Kyrgyz Republic on the relationship between age and farmer participation in groups found significant results (Davis *et al.*, 2010; Benin *et al.*, 2008; Towo 2004 and Sabates-Wheeler 2006). In addition, Fonjng and Fongkimeh (2007) demonstrated that farmers are highly involved in agricultural production in their late reproductive and productive (ages) life compared to relatively young farmers. On the contrary, study results by Davis *et al.*, (2010) who found that, in East Africa (Tanzania, Kenya and Uganda), younger farmers were more likely to participate in farmer field school groups than the older farmers possibly because of the attractive nature of enterprises promoted in the FFSs were not in agreement. The variations could be explained the nature of the enterprise and other contextual factors.

### **Education level**

Educational level was another variable hypothesized to be a barrier to women's participation in group processes. The average number of years in school ranged between 6-7 years which seemed low and didn't have a significant relation with participation. On the contrary, thought, ability to read and understand both English (34.1% of men and 26.2% of women) and lumasaba/lugisu (42.1% of men and 32.5% of women) by both men and women were a little different, was correlated to participation at  $P < 0.05$ . The findings agree with Borkhani *et al.*, 2011; found that educational level was positively and significantly correlated with the extent of IPM practices application. Chowdhury and Ray (2010); Truong Thi (2008); Maraddi *et al.*, 2007 and Atreya (2007) agree with the previous author. Since the ability to read and write English and Lumasaba was skewed in favor of men, the low capacity of women's is thus a great hindrance towards participation. It's not surprising therefore to note that, Coleman & Mwangi (2013) found that **education** significantly affects women's participation in producer organizations of Bolivia,

Kenya, Mexico and Uganda. On the contrary, Bonabana-Wabbi (2002) found that educational level was not correlated with the extent of IPM practices application.

**Institutional factors** including organizational goals, membership criteria, leadership, access to credit, marital status, access to and control over coffee management inputs and benefits, mobility constraints and Rules of entry and requirements by the group

### **Organizational goals**

Results from both key informants and other groups members indicate that, the coffee IPM groups were established to upscale up-scaled the Coffee IPM packages through a group approach. This is because the farmers were challenged by the coffee stem borer and yet use pesticides as the only remedy. Pesticides are harmful to the environment and human health. Coffee being a commercial crop attracted more of men than women. This is because, women and men have different interests that can influence their willingness to participate in producer organizations (Pandolfelli *et al.*, 2007; FAO, 2011). Men by virtue of their gender roles and interests on income generating crops can be motivated to join producer organizations to access markets (Kariuki and Place, 2005) while women opt to join producer organizations that emphasize food self-sufficiency and not cash crops (IFAD, 2010). In Tanzania, women participated less in farmer groups, than men due to most groups putting emphasis on export crops which often have less women's involvement because they lack control over key production inputs like land (Towo's, 2004).

### **Membership criteria**

Data from unstructured interviews revealed that, stringent requirements such as, payment of membership fee, maintaining financial penalties for failure to attend meetings, single member per household and having a coffee garden hindered women's participation in farmer groups. In Ghana's mango out-grower scheme, the entry requirement was a bag of maize, a man's cash crop and a woman's food crop. This limited women's ability to register with the company as out-growers (FAO, 2013a) because women could let their families starve in the pretext of securing entry to a group. In Mozambique, when only one member per household was allowed to participate in a producer organization, the husband was more likely to participate than the wife, limiting women's participation (Gotschi *et al.*, 2009).

### **Leadership**

Another variable that was anticipated to influence women's participation in coffee IPM groups was leaderships. Women held lower positions in the committee such as committee members as compared to men who held the four-top group leadership positions i.e. Chairperson, Vice, General Secretary and treasurer. There was no special arrangement like the case for Bangladesh community groups to allocate specific quotas for women to be elected as leaders (Datta, 2007). This was thus a great demotivate participation by women's in groups activities. More over leadership positions come with some privileges such as being a signatory, access to incentives

such as agro-inputs and contributing ideas that are most likely taken up. According to Ouattara *et al.*, 2010, lack of income and economic empowerment can affect women's self-confidence and prevent them from obtaining leadership positions in producer organizations (Ouattara *et al.*, 2010).

### **Access to credit,**

With respect to access to credit, slightly more women (about 42%) sourced credit to finance coffee production from the bank (about 18%) as well as friend/relatives (14%) compared to men (about 28%) with the same sources, while those who did not borrow cited fear of debts as a major obstacle to credit acquisition especially by men (about 16% men and 11% women). Also, more women (14%) compared to men (about 9%) borrowed from friends, bank and neighbors/relatives to finance coffee IPM activities. Access to credit was negatively significantly correlated to coffee IPM group processes at  $P < 0.05$ . This implies that, the more women accessed credit, the more they invested and allocated their time to other enterprises and income generating activities than coffee. Which control of coffee stem borer using IPM techniques was the reason to participate in coffee IPM group process.

### **Marital status**

Marriage as an institution is another great contributor to women's immobility in some contexts (Oxfam 2013; Manfre and Rubin 2012, Gotchi *et al.*, 2009). Results indicated that, a woman's marital status was significantly and negatively correlated to participation in Coffee IPM group processes at  $P < 0.05$ . The plausible explanation could be attributed to restrictions associated with mobility and other household gender associated obligations. For example, in Mozambique, married women may not participate in groups without the permission of their husbands (Gotschi *et al.*, 2009).

### **Access to and control over coffee stem borer management inputs**

Access to and control over coffee management inputs influenced participation in group activities. The inputs include; labor, land, wheel barrow, water, pesticides, spray pump, pangas, dry banana fibers, polythene bags, hand bow saw and pruning scissors. These have details discussed below;

Results show that, both family and hired labor (about 34% men, 33% women) is used though perceived to be limited (about 40%) in terms of adequacy (about 40%) especially women who needed it most at production, drying and sorting coffee. Access to labor is often more constrained in both female headed households and for women in male headed households (FAO, 2011; IFAD, 2010; Baluku *et al.*, 2009) due to less access to resources for hiring non-family labor. The time burden due to domestic tasks is also a major constraint for women's labor (Quisumbing and Pandolfelli, 2009). This labor is often mediated by their relationships with men through marriage and kinship, and they are further constrained in hiring labor by their relatively low incomes (Rubin, Manfre *et al.*, 2009). Decisions on labor deployment further perpetuated the inequality in that, decisions on coffee labor deployment were significant different at  $p < 0.001$  and who to purchase CSB control inputs at  $p < 0.05$  meaning though women participated in making of such decisions, men dominated. This implies that, for any CSB strategy introduction through groups, men must be talked into accepting such ideas otherwise it will be waste of time and resources.

**Table 1 Access to and control over CSB IPM inputs**

**Key: OM=only men, BMWE=both men and women equally, and OW=only women  
OFC=Obtained free of charge, P=Purchased**

Inputs	Access to CSB inputs (%)			Control over CSB inputs (%)			Input obtaining status (%)		Distance to the input sources
	OM	BMWE	OW	OM	BMWE	OM	OFC	P	
Dry banana fibers	16.4	69.6	14	24.5	61.3	14.2	96.2	3.8	1
Water	6.9	74.1	19	19.5	58.4	22.1	97.4	2.6	1.5
Land	31.4	62	6.6	51.7	39.8	8.5	48	52	1.9
Pangas	38.5	54.9	6.6	36.8	53.8	9.4	18	82	14.4
Polythene bags	38.8	55.4	5.8	45.5	45.6	8.9	25	75	17.1
Pesticides	64.6	29.7	5.7	62.3	29.8	7.9	10	90	16.6
Spray pump	63.6	30.9	5.5	70.5	22.8	6.7	6	94	16
Wheel barrow	54.8	38.7	6.5	57.3	34.8	7.9	12	88	17
Hand bow saw	72.7	21.2	6.1	67.4	24.2	8.4	9	91	15.5
Pruning scissors	67	26.8	6.2	65.6	25.8	8.6	7	93	15.7

Results in **Table 1** show men having more access to and control over coffee CSB control inputs except water, dry banana leaves which were obtained freely. Polythene bags (about 17%), pesticides (about 17%) and spray pumps (about 14%) were the furthest in terms of distance. No significant differences in the distance to input source between males and females. Meaning encouraging the use of non-host habiting material such banana fibers that are locally available and any other such material would greatly boost CSB IPM use among coffee farmers. Men specifically had more access to hand bow saws (73%) for stumping because according to women men were more energetic to carry out such work. Pesticide access (65%) and control (62%) came second among those dominated by men. This confirmed the role division labor emphasizing that men were responsible for coffee spraying work.

Land is a very crucial coffee stem borer control resource because it is a growth media for coffee. Land in the study site was in small parcels which was accessed majorly accessed (about 31%men) and controlled by men (52%) than women. This input was both inherited and purchased. Women accessed land by virtue of the relationship with men through marriage or any other form of relationship. This is not surprising since many studies including Baluku *et al.*, 2009, Ofuoku *et al.*, 2008 confirm this. There is evidence that, women as compared to men have less control over land, use fewer agro-inputs and have less access to extension services (FAO, 2011). This limited access to productive assets may decrease women's bargaining power in and

outside the household consequently, limiting their ability to join producer organizations that require ownership such as land (Agarwal, 2001; Wiig, 2013; Pandolfelli *et al.*, 2007).

Another useful input in the control of CSB is a wheel barrow. Wheel barrows are used for carrying dry banana fiber to the sites, fertilizers, chemicals, water spray pumps and so on. Fertilizers act as soil amendments to increase the growth vigor of coffee plants so that they can withstand attack from pests and diseases. Wheel barrows were accessed (about 55%) and controlled (57%) by men. This input was also purchased (88%) and not easily accessible to many especially women.

Pangas, hand bow saws and pruning scissors were another set of inputs used in the control of CSB. These are sanitation gargets for coffee plantations. Cutting off dry/dead branches, trim off excess branches, completely cut down very old/nonproductive and infected coffee plants was the common use. These inputs were purchased though in few cases could be obtained from neighbors or projects. They were accessed and controlled by men.

Water, spray pump and pesticides are non-IPM inputs used to control coffee stem borer. Water was accessed (19%) and controlled (about 22%) by women than men as opposed to spray pumps and pesticides. Pesticides were obtained from the nearby trading centers and Mbale town for Sironko and Manafwa for Bupoto and Bumbo sub counties.

Dry banana leaves. These are non-host habiting material obtained freely (96%) from farmers own gardens. They are used by coffee farmers for smoothening and wrapping stems during coffee stem borer control as an IPM package component. Banana fibers though highly a recommended, cheap, locally and easily available had a challenge of being eaten up by termites thus exposing the coffee plant to coffee stem borer. Continuous replacement of banana fibers becomes expensive in a long run. This input was almost equally accessed by both men (16%) and women (14%) equally. The control however varied, by men dominating (about 24%). In the absence of dry banana fibers, polythene bags were used for stem smoothening.

Information pertaining to coffee production was obtained from a number of sources including the Ministry of Agriculture staff (mainly sub-county agriculture/extension assistants), from friends, neighbors, and the media (radio). Other information sources included farmers' organizations, bulletins, newspapers, Makerere University researchers, posters and NGOs. Majority of farmers belonged to a local farmer's organizations which served as the greatest coffee production, market and pest information sources since these were seeking and sharing points. There was, however no established information centers on coffee production and consequently CSB pest and its associated IPM at the sub county level other than mobile phones used by Community Knowledge Workers under the Grameen Foundation. Mobile phones are not an appropriate medium since most farmers' phones cannot support applications that would allow detailed information access. Establishing an internet linkage point dependent on solar of up to three laptops furnished with all coffee production including pest management would partly solve this problem. There was a significant chi-square difference between men and women who sought coffee production information at  $p < 0.05$ . The major source of production (about 37% men, 30% women), pest (about 35% men, 31% women) was coffee group extension agents. Extension access (about 39%

men, 38% women), Knowing the coffee demonstration site (about 48% men, 45% women), number of contacts with coffee IPM group extension (**Table 2**) workers had no significant differences as per chi-square tests except visiting the coffee IPM group site at  $p < 0.05$ . There was also a significant chi-square difference between men and women in general extension at  $t(140) = 1.659, p > 0.05$ . This meant that, much as women and as well as men had contacts with trainers, women had fewer trainings encounters evidenced by limited visit to the demonstration site (learning spot)

**Table 2 T-Distribution of extension services among coffee farmers**

Variable	Male		Female		<i>t</i>	p-value
	Mean	SD	Mean	SD		
Freq of extension contacts	2.1143	1.479575	1.6944	1.53493	1.659	0.099*
Freq of demo visits	3.2958	2.73284	3.9099	3.33206	-0.028	0.978(NS)

**Key:** NS=Not Significant, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \* $p < 0.1$

### Access to and control over coffee benefits

The main benefit from coffee was income which was often accessed by men (about 47%) and women (about 48%) equally. Men (30%) however had control over the benefits than women (22%) which thus proved as a center of inequality within the households. This is evidenced (**table 3**) by a significant difference in monthly income levels at  $t(100) = 2.171, p < 0.05$  where men had 267,940 Uganda shillings as compared to only 155,960 of females per month. Coffee income was followed the same pattern of men's domination at  $t(142) = 2.338, p < 0.05$ . Household expenses (about 58%), paying schools fees (about 17%) and purchase of other productive assets (about 6%) were among the three financed by coffee income. Women in male headed households could receive but were not responsible for allocation of such incomes.



**Table 3 Coffee households income levels**

Variable	Men		Women		t	p-value
	Mean	SD	Mean	SD		
Average monthly income	267940	330132	155960	175679	2.17	0.032**
Total coffee revenue	3.1347E6	3.61044E6	1.9161E6	2.57660E6	2.338	0.021**

**Key:** SD=Standard deviation; Significance level, \*\*\* p<0.01, \*\* p<0.05, \*p<0.1

### **Mobility constraints**

Women's low attendance to meetings was also attributed to restrictions on women's mobility and membership in mixed sex groups by their husbands. It was reported that the reason for the restrictions was that some men feared that their wives would pick up bad habits from other women and start disobeying their husbands. In addition, some men thought their wives would divulge family secrets in the group and/or engage in extra-marital affairs. Men also feared that women may not be able carry out their home chores if they join such groups. One man's response to the question on why more women did not attend one of the regular group sessions was: *"If they were here then who would be taking care of the homes?"* This shows how women's reproductive roles undermine their participation in group processes.

The above qualitative findings illustrate that the gender gap in group participation is largely explained by women's disempowered status in the household. It also implies that women are viewed by men as having a supporting role to men and thus not accorded priority to attend training sessions. Restrictions on women's mobility is further elaborated from the findings that women could only move freely to water points and trading centers to either sell or purchase items for home consumption. Only a few women could move freely to the trainings venues, attend meetings, visit someone in another village which are major points for IPM information dissemination.

### **Rules of entry and requirements**

The findings from the survey were collaborated by the qualitative findings from field observation and key informant interviews. For virtually all the group meetings attended by the researchers, women were fewer than men. The group meeting times of 9 a.m. to 10 a.m. and 2-3 p.m. East African Time though earlier agreed upon by both men and women, was found not to favor women who were more involved with domestic work. Literature has revealed that 85–90% of African rural women's time is spent on domestic and other care activities such as childcare, water and food collection, cooking (FAO 2011; FAO 2015). Furthermore, lack of sensitization about these gender issues by the IPM program and the domestic workloads hindered women from attending group formation meetings. In addition, the nature of the enterprise affected women participation. Coffee is a commercial crop which often has less women's involvement because they lack control over key production resources like land. Women mostly grew maize (about 30%), beans or soy beans (about 24%) and banana (about 23%), vegetables (about 17%) and coffee (about 7%).

## **5. Conclusion and recommendations**

This study set out to determine barriers to women's participation in coffee IPM group processes. Results revealed that the level of men's participation in mixed sexed coffee IPM group processes was significantly higher than women's. The study concludes that men's position in the society gives them a greater opportunity to attend group meetings, contribute ideas that are taken during such meetings and obtain more knowledge of CSB IPM practices. Age, ability to read and write English and lumasaba, organizational goals set, membership criteria, group entry requirements, mobility constraints access to credit, Marital status, Access to and control over coffee stem borer management inputs and benefits influenced women's participation. The study concluded that research and development approaches that utilize groups should systematically conduct gender analysis aimed at identifying and addressing women's strategic needs and barriers to participation and benefit from commercial enterprises such as coffee and group processes. The approaches should use inclusive methods suited to women, younger farmers and resource constrained and those that face mobility challenges.

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ACCEPTED MANUSCRIPT

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## AUTHOR'S PROFILE



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## **Public Interest statement**

### **Barriers to women's participation in mixed sexed coffee IPM groups**

Coffee production and marketing decision making is generally men farmers' business. In an era that seeks gender equality, there is need to further understand what could be done to secure increased and beneficial women participation in this man controlled crop especially in aspects of pest and disease management. With the increased use of mixed farmers groups to channel integrated pest management methods for coffee pest management, there was need to establish the method's effectiveness in ensuring women farmers participation in these processes. Firstly, the barriers to women's participation in these groups were assessed, and results revealed that age, ability to read and write English and lumasaba, organizational goals set, membership criteria, limited access to credit, marital status, mobility constraints, limited access to and control over coffee management inputs and benefits are key hindrances. The study findings have relevance for research and development practitioners with creative ways to reach vulnerable groups such as women, educators who train extension agents, policy makers and farmers who give feedback.

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