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GENDER AND SOCIAL ECONOMIC FACTORS AFFECTING IPM KNOWLEDGE ACQUISITION AND APPLICATION: A CASE STUDY OF COFFEE FARMER GROUP MEMBERS IN BUGISU, UGANDA

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Abstract

The paper presents findings from a study conducted to determine men and women farmers' knowledge of the coffee Stem Borer IPM practices and socio-economic factors influencing the level of farmers' knowledge in Bugisu sub region, Uganda. A post training cross sectional survey of 71 men and 55 women members of coffee IPM groups who had participated in training on coffee stem borer IPM was conducted. The knowledge of training participants was computed using a knowledge index and difference between knowledge levels of men and women farmers compared using independent t test. It was found that men had a significantly higher mean score on the IPM knowledge index compared to women. In addition, there was a significant correlation between knowledge of CSB IPM with gender, educational level, marital status, household labor, coffee acreage, years in the coffee group and women's mobility. The results imply that greater competence is achieved when group training methods were complemented with more personal extension methods such as on farm visits. In addition, targeting various social groups including women, youth, and those who are not members of social and economic groups with the intention of addressing their unique needs would boost their IPM knowledge level. For women, knowledge acquisition is enhanced when gender based barriers to their participation in learning groups are addressed.

1. INTRODUCTION

Integrated pest management (IPM), promising techniques for cost effective environmentally friendly control of agricultural pests (Arnoud & Deborah, 2008; Waddington *et al.*, 2014) is knowledge intensive. Farmer field schools (FFSs) that requires collection learning and action is an approach often used for imparting IPM knowledge to farmers (Diqui *et al.*, 2012). FFSs were intended to reach out to marginalized groups who might not have access to training, knowledge and inputs (Erbaugh *et al.*, 2010). Further, gender, a socio-cultural construct which determines the

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identity, roles and responsibilities, and entitlements of women and men in society has been found to intersect with and influence IPM technology use in various countries. This is because differences between men and women arising from their socio-cultural backgrounds and status, responsibilities and expectations (Rubin *et al.*, 2009; Tau & Hassen, 2007) often manifest when it comes to agricultural technology promotion activities that require collective participation and group involvement. The extent of involvement of men and women in group activities is bound to affect what they learn and how they use what they are involved with. Gender relations may affect men and women's participation in IPM groups and eventually levels of uptake of IPM practices. Women and youth in various locations face several constraints (social, economic, cultural, political and enabling environment) in participating and benefiting from farmer groups (Gyau *et al.*, 2016; Kaaria *et al.*, 2016; Temesgen *et al.*, 2015; Tanwir & Safdar, 2013; Gotschi *et al.*, 2009; Rubin *et al.*, 2009; Agarwal, 2001; FAO, 2011, 2015 & 2016; Benin *et al.*, 2008; Subedi, 2008 and Sabates-Wheeler 2006). All the above variables have been found to have a gender dimension in various localities. For instance, women's knowledge is often undervalued and their labour occurs within the domestic realm (Gururani, 2002 and Organo, 2013). Women are also culturally constrained in terms of mobility, time, and communication hence preventing them from accessing information and sharing what they know (Subedi, 2008). More to that, women even though aware of the benefits of new technologies, may not be able to adopt due inadequate time to work. They are often overwhelmed by agricultural demands for subsistence and surplus production (Fortmann, 2009).

Despite its apparent advantages, IPM has not been widely adopted by small scale farmers in Africa. One of the possible explanations could be inadequate understanding of gender based constraints to knowledge acquisition particularly within group processes that form the core of IPM technology development and promotion. Given the critical role of women particularly at implementation of agricultural technologies, differences in IPM knowledge of men and women can bring about differences in participation and use of such practices. In a bid to design appropriate IPM practices by scientists to achieve an equal impact on both women and men requires that individuals, institutions or governments are guided by such knowledge.

The purpose of this study was to determine men and women farmers' knowledge of CSB IPM practices in Bugisu sub region, Uganda. The research was guided by the following research questions: (1) Do farmers' know CSB pest and the symptoms of attack?(2) Can they list the IPM tactics for CSB control being promoted and any harmful effects from using pesticides.(3) What is the level of men and women's level of awareness, knowledge and utilization of IPM tactics. (4) Are farmers aware of constraints and opportunities in the IPM knowledge in coffee IPM groups? If so, what are the constraints and opportunities for women and men? Are these different for men and women? (5) Is there any relationship between knowledge of CSB IPM practices and qualitative and quantitative Socio-Economic Characteristics?

2. RESEARCH METHODS

2.1. Study site

Members of coffee IPM farmer groups from two districts of Sironko and Manafwa in eastern Uganda were studied. The Sironko Manafwa zone are characterized as banana-Coffee farming system where mixed farming is predominant. Beans, groundnuts, sorghum, maize, millet, cassava, potatoes and sweet potatoes are traditionally grown by women while men dominate in coffee and cotton which are the main cash crops. The main source of cash income is sale of crops and livestock. A number of risks, such as crop pests and diseases, livestock diseases, fluctuating crop prices, soil erosion and landslides in high areas, degradation, and high population density are experienced. Increased land pressure and fluctuating market prices are attributed to high population. These study sites were purposively selected because the scope of the study was restricted to IPM CRSP sites where coffee is being grown and IPM being promoted to control

CSB pest through group approach. The Coffee Stem Borer (CSB) (*Monochamus leuconotus*) with an incidence of 28.3% (Kyamanywa *et al.,* 2011) is one of the major constraints for the livelihoods of coffee households.

2.2. Research design

The study adopted a cross sectional survey study research design and utilized both quantitative and qualitative data. Phase one was exploratory and focused on the qualitative aspects of the study while phase two focused on both, but with more emphasis on the quantitative aspects. In the first phase, key informant interviews were conducted face to face using key informant checklists generated by the researcher in Sironko and Manafwa districts. Qualitative methods generated information on gendered aspects pointed out in table 1. The interview yielded qualitative data that informed development of the follow up survey and guided selection of sites for in depth study. Phase two consisted of a survey to achieve deeper understanding of the aspects under investigation. Table 1 gives a summary of the research design showing the logical linkages between the research components including study objectives, data required and collection methods, and data analysis procedures.

Table 1: Description/measurement of the knowledge variables

Objective	Data collected and Statistical Analysis methods used
Men and women farmers' Knowledge of the CSB IPM practices	• Percentages were used to identify farmer knowledge of the pest, observations, extent of damage on their garden and list of pest attack symptoms. Chi-square test was used to establish whether a relationship existed between gender and the listed variables. • Percentages were used to tell the CSB control measures. • Percentages were also used to analyze awareness, training attendance, knowledge and practices of the CSB IPM package. Rating of the CSB IPM practices and reason for not using the package was also analyzed using percentages. • Percentages were used to determine the level of gendered knowledge of the CSB IPM package and relationship between genders was by chi-square tests. • Knowledge was categorized in to three levels i.e. low (0-7), average (8-14) and high (15-21). Correlation was used to establish whether any relationship existed between knowledge and socio-economic factors not participation in group processes. • Percentages were used to determine the gendered knowledge of the chemicals, their use, and awareness. Chi-square test was used for non-continuous relationships while mean, standard deviations and t-tests were used for continuous variables.

The target population comprised of men and women in coffee IPM farmer groups. A purposive sampling procedure was used to select the study sample in three stages. The first step involved locating relevant key informants and literature to determine which coffee stem borer IPM packages was promoted in a group setting. These key informants were picked because of their rich knowledge of the subject and the study site. The starting point was the IPM IL regional office-Makerere University, the research scientists at the regional office directed the researcher to COREC research scientist who in turn directed the researcher to the research scientist at their field station/on farm (Sironko). The research scientist at the on farm station gave a link to another scientist in Manafwa. The two research scientists linked the researcher to their respective project extension workers. The extension workers in turn guided the researcher on the groups to pick respondents from. A total of 15 key informants (4 research scientists, two extension workers, 6 farmer group leaders and three farmer group members) were picked.

The second step involved obtaining IPM IL farmer group lists of members from their leaders and stratifying by sex. This allowed the capturing of varied perspectives between the sexes. 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. A purposive sample of 71 men and 55 women were drawn from the three groups to bring the total to 126 respondents.

2.3. Instrumentation and data collection

Three types of data collection tools were used: key informant interview and Focus group checklists and house hold survey questionnaire. The three tools were developed by the researcher and reviewed by a panel of experts for content validity. The individual survey instrument was further pre-tested for suitability on a comparable population in an area that was not participating in the study. The field test was carried out in Bumasaba parish in Sironko district. The field testing exercise helped to test for clarity and the logical flow of the questions and duration of the interview. Final changes were made on the tools before data collection. 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.

In Buwalasi -Sironko and Bumbo-Manafwa districts, 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 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 gendered participation in coffee group processes. For each coffee group, two FGDs of 1.5-2 hours were conducted. Quantitative survey data was collected from all respondents at individual level.

2.4. Data summary and analysis

Data were entered in the Statistical Package for Social Scientists (SPSS) version 16 and analyzed in both SPSS and STATA 9. To determine the level of men and women farmers' knowledge in coffee IPM group processes, a descriptive analysis was carried out to generate percentages, means and standard deviation. T-statistics and chi-square tests were used to test for differences in means and proportions respectively.

2.5. Variable measurement-knowledge measurement

Knowledge of IPM practices is defined as farmers' ability to recognize and name CSB pest; identify its symptoms, list the IPM tactics for CSB control being promoted, any harmful effects from using pesticides. It also includes farmers rating their level of awareness, knowledge and utilization of IPM tactics.

Since IPM is a multi-dimensional concept, a summated ratings scale consisting of nine attributes, with a score range of 0-21, was used to measure farmers' knowledge of IPM practices (table 2). Farmers ability to name the pest, observed the pest and aware of the dangers of using pesticides was considered as one attribute. The rating has been successfully used by previous IPM CRSP studies (Erbaugh *et al.*, 2010).

Table 2: Description/measurement of the Knowledge Variables

Attribute	Rating	Description
Farmers ability to name CSB pest	0-1	0, an inability to name the pest; 1, an ability to correctly name the pest
observed the CSB pest in any coffee field	0-1	0, has never observed the pest; 1, has ever observed the pest
list it's symptoms,	0-3	0, an inability to list symptoms; 1-3, an ability to list one or more symptoms
Awareness of IPM tactics for CSB control being promoted	0-3	0, if they were unaware; and 1-3, aware of one or more of the IPM tactics for CSB control being promoted
Knowledge IPM tactics for CSB control being promoted	0-3	0, don't know; 1-3, know one or more of the IPM tactics for CSB control being promoted
Utilization IPM tactics for CSB control being promoted	0-3	0, don't utilize; utilize methods coded 1-3.
Farmers' awareness of harmful effects from using pesticides.	0-1	0, if they were unaware; and 1, aware of potential harmful impacts from using pesticides.
list of harmful effects from using pesticides	0-3	0, inability to list; and 1-3, ability to one or more of the potential harmful impacts from using pesticides.
Awareness of the pesticide danger reduction measures	0-3	0, if they were unaware; and 1-3, ability to list one or more pesticide danger remedies

2.6. Estimation of knowledge measure for CSB IPM practices

The total score was calculated by adding individual scores that each respondent obtained for all statements. Knowledge Measure was calculated as follows:

$$KM = \sum_{i=1}^{7} KFS \qquad \text{..... (i)}$$

Where: KM = Knowledge Measure, KFS = Knowledge frequency score

$$KM = \sum_{i=1}^{7} NOAP + \sum_{i=1}^{7} LSY + \sum_{i=1}^{7} LIPMT + \sum_{i=1}^{7} KIPMT + \sum_{i=1}^{7} UIPMT + \sum_{i=1}^{7} LPD + \sum_{i=1}^{7} APDR \qquad \text{..... (ii)}$$

Where:
NOAP = Name pest, Observed the pest and Aware of pesticides used in CSB control
LSY = List CSB pest symptoms
LIPMT = Awareness of IPM tactics for CSB control being promoted
KIPMT = Knowledge IPM tactics for CSB control being promoted
UIPMT = Utilization IPM tactics for CSB control being promoted
LPD = list of harmful effects from using pesticides
APDR = Awareness of the pesticide danger reduction measures

3. RESULTS

3.1. Farmers' knowledge and practices of the CSB IPM

Knowledge is one of the key benefits of coffee IPM group participation. This section presents results on level of knowledge acquired by men and women participants. Respondents were asked whether they could name the CSB pest, and its symptoms (Table 3); list (3) and use the IPM

package promoted and name the dangers of pesticides (Table 7). These key questions each attracted varied responses from which individual scores were calculated.

3.2. Farmers' knowledge of the CSB pest

Table 3: Knowledge of CSB pest (n=126)

		Gender of the respondent (%)Men	(%)Women	Total	X^2	p-value
Know the name of the pest		46.7	31.7	78.3	15.908[a]	0.000
Observed the pest in a coffee garden/field in the community		45.8	36.7	82.5	6.984[a]	0.008
Symptoms of the pest attack	Yellowing and chlorosis of the leaves	47.0	42.6	89.6	3.500[a]	0.174
	die-back	1.7	3.5	5.2		
	saw dust at the base of leaves	4.3	0.9	5.2		

Results in Table 3, show that majority of respondents (about 78%) were able to correctly name the coffee stem borer pest though skewed in favor of men (about 47%) compared to women(about 32%) with a significant chi-square difference of $p< 0.01$. On further analysis, it came out clearly that more men (about 46%) than women (about 37%) had observed this pest in either their field or the neighboring fields in the community. In addition, more men (about 47%) than women (about 43%) reported yellowing/chlorosis as the major coffee stem borer symptom. Rutherford and Phiri (2006) and Erbaugh *et al.* (2006 & 2010) confirm that yellowing, die back and saw dust at the bases of stems as the correct signs and symptoms of CSB. Findings from focus group discussions revealed that, men's ability to correctly name the pest is due to their expose to a range of training meetings on the pest and its management as opposed to women who had a mobility constraint. Also since more men made all the decisions on coffee income allocation and utilization and decision implementation it came out that, they had more interest in the crop for its benefits while women mostly concentrated on food crops such as bean, vegetables which were rarely sold.

3.3. Farmers knowledge of the CSB IPM practices

The respondents were also asked whether they had ever heard of the CSB IPM practices, had trainings in the said practices and know how to use them. The CSB IPM practices investigated were; stem smoothing, stem wrapping, pruning and stumping. Results are presented in Table 4.

Table 4: Recommended practices for controlling CSB pest (n=126)

CSB IPM practices	(%) Ever heard of: Men	Women	Total	(%)Ever had training on: Men	Women	Total	(%)Know how to use: Women	Men	Total
Stem smoothing	45.0	43.3	88.3	35.0	35.8	70.8	42.5	40.0	82.5
Stem wrapping	40.0	35.0	75.0	33.1	26.3	59.3	36.7	32.5	69.2
Pruning	50.3	46.3	96.7	40.0	37.5	77.5	48.3	47.5	95.8
Stumping	47.5	42.5	90.0	39.2	30.8	70.0	44.5	41.2	85.7

Though results show that both men and women were aware of, had trainings and knew how to use all the four IPM practices, it was skewed in favor of men. Taking an example of pruning, more men had heard of pruning (about 50%), had trainings (about 40%) and knew how to prune (about 49%) than women with 46%, 38% and 47% respectively. The differences in the farmers' awareness, attendance at trainings, and knowledge on how to use the coffee stem borer IPM practices could be attributed to women's low attendance to trainings meeting, immobility and the

labor intensiveness of the practices (Table 7). Overall men's awareness of the CSB IPM practices, trainings on the package components attendance and knowledge of their use was average (50%) whereas women were below average. The fact that a good number of women had heard about the practices and knew how to use them, implying that women have other informal ways of accessing information besides participation in trainings.

Awareness of the IPM practices is not sufficient in itself to tell the farmers knowledge. The study therefore sought to understand whether these IPM practices were being used or not. Results in table 5 show that much as both gender used all the IPM practices, men took lead. More men controlled the CSB pest by smoothing the coffee stems (about 75%) wrapping coffee stems (about 74%), pruning (about 74%) and stumping (81%) compared to women at less than 16% for all practices.

Table 5: Use of the CSB IPM package components (n=126)

Type of CSB IPM package component	Who performs the work of CSB control		
	(%)Man	(%)Man and woman equally	(%)woman
Stem smoothing	75.3	15.5	9.3
Stem wrapping	74.1	12.3	13.6
Pruning	73.9	14.8	11.3
Stumping	81.0	11.4	7.6

The probable explanation of variation in the utilization of the CSB IPM practices could be due to advantages or disadvantages associated with the practices. An analysis of the main reason for not using the CSB IPM practices revealed that, these practices are labor intensive as well as time demanding (about 35%) to men while for women lacked materials to use in the control of this pest (about 27%)-Table 6. Women majorly lack CSB IPM control inputs especially banana leaf sheath during school days when children who provide labor are at school. Lack of pangas and pruning saws was as a result of limited income often allocated to domestic care and not meant for inputs. These results are in agreement with FAO (2011) that reported, women time and again having less access to agricultural assets, inputs and services than men in the majority of countries and contexts.

Table 6: Reasons for not using the CSB IPM package (n=126)

Reasons	Gender of the respondent		Total
	% of Men	% of Women	
Labor intensive or time consuming	34.6	19.2	43.8
Had no materials to use	15.4	26.9	42.3
Others e.g. Banana leaves eaten by termites, banana leaves and polythene bags can be unwrapped by wind and can be a fire hazard, damages to equipment, costly and need skilled labor	10	3.9	13.9

Table 7: Reasons for not using individual CSB IPM practices (n=126)

IPM Practice	Reason for not using	(%) Gender of the respondent		Total
		Men	Women	
Stem smoothening	Limited to smaller plots due to labor intensiveness and time consuming attribute	34.2	23.3	57.5
	Tree destruction and or some trees can dry up and some tree break	5	14.2	19.2
	Raises dust	11.7	11.5	23.2
Stem	Pests hide inside the wrapping material	30	34.2	64.2

wrapping	It's risky and or damages the plant vessels	11.7	10	20
	Polythene bags and banana leaves can be unwrapped by the wind	9	7	16
Pruning	Labor intensive and time consuming	33.4	29.2	62.5
	Costly because tree damage the equipment	7.5	12.5	20
	Need experienced/skilled people to carry out this method	9.2	8.2	17.5
Stumping	Takes time to gain the next harvest	34	34.2	68.2
	Time consuming and labor intensive	11.7	8.5	20.2
	Costly in terms of labor and equipment	7.5	4.1	11.6

3.4. Awareness of the dangers associated with pesticide use

Results in Table 8 show that, more men were aware of pesticide dangers (about 37%) compared to women (34%), could list them correctly and knew how to reduce such dangers. To men, the major dangers associated with pesticide use were itching (about 21%), vomiting (about 19%) due to the bad smell when inhaled (about 2 %). Results are consistent with findings by (Lekei *et al.*, 2014, Timprasert *et al.*, 2014, Lund *et al.*, 2010 and Ngowi *et al*., 2007). Wearing protective gear (about 37% for men and 32 % for women) while handling pesticides would protect them from such dangers. Waskom and Yergert (1994) give the following as pesticide use instructions; Careful reading of the labels on pesticides, wearing proper clothing, applying pesticides on a calm and less windy day and immediate cleaning of the equipment coupled with thorough washing of hands with soap and water. The literature cited confirms those farmers are aware of pesticide use dangers.

Table 8: Pesticides use and knowledge of the dangers (n=126)

Knowledge parameter		Gender of the respondent		Total
		% Men	%Women	
Aware of the dangers associated with pesticide		36.7	33.3	70.0
list these dangers	Itching of the body	20.5	8.4	28.9
	Has a bad smell, and one can vomit	18.5	16.4	34.9
	Can inhale the pesticide while spraying or suffocate	2.4	3.6	6
	Scotched leaves due to large application	6.0	2.4	8.4
	Affects the eyes and lungs, and cause diseases	9.6	10.8	20.4
	Causes headache	1.2	0	1.2
What can be done to reduce the dangers	Putting on protective gears	36.5	31.8	68.3
	Read instructions before using it	11.8	4.7	16.5
	Wash hands with soap after touching or using the pesticide	1.2	1.2	2.4
	Proper trainings	1.2	2.4	3.6
	Keep containers far from the children reach and or store in safe place	3.5	2.4	5.9
	Apply using a spray pump	1.2	0	1.2
	Avoid spraying when it's windy	2.4	0	2.4

In order to measure the level of knowledge of IPM practices, the total score was calculated by adding individual scores that each respondent obtained for all statements to obtain a knowledge measure (KM). Knowledge levels were computed on a scale of one to three. The KM of zero to seven was marked as a low level of knowledge, higher than seven but less than or equal to 14 were marked as an average knowledge and higher than 14 was marked as a high level of knowledge. Results in Table 9 reveal that, though majority (about 59%) of the respondents had knowledgeable

about CSB IPM practices men (33%) took lead. The key finding is that men are more knowledgeable in the CSB IPM practices than women. This result further confirms the earlier finding which ranked men as the highest beneficiaries in coffee IPM groups.

Table 9: Level of farmers' knowledge of CSB IPM practices (n=126)

Knowledge level	Gender of the respondent		Total
	%Men	%Women	
Low level of Knowledge	3.3	2.5	5.8
Average Knowledge	20.8	14.2	35.0
High level of knowledge	33.3	25.8	59.2
Total	50.0	50.0	100.0

Pearson's χ^2 (2) = 2.808, P = 0. 246

The findings seem to suggest that men acquire more coffee IPM knowledge than women. More men were knowledgeable about the coffee stem borer IPM practices due to attendance to coffee group training meetings. Men's knowledge of IPM is an opportunity to pest control in the farm households but a constraint to women. These results are in agreement with report by (IFAD, 2010) which found that in the tea and coffee value chains of Rwanda, men usually have greater access to extension advice and have a higher level of skills. On the contrary, Erbaugh *et al.* (2003) in a survey on the Role of Women in Pest Management Decision Making in Eastern Uganda found that women were significantly more knowledgeable about possible negative effects from pesticide use, and had more knowledge of alternative pest control measures than men. This study possibly focused on enterprises with heavy involvement of women.

Much as men seemed to be more knowledgeable about the CSB IPM practices, the level was below average (50%) implying that both women and men need to be reached with IPM information.

On further analysis, the study sought to establish whether there was a relationship between knowledge and other socio-economic factors, results are presented in table 10.

Table 10: Summary of the Result of the Chi-Square (χ2) Test of Relationship between qualitative and quantitative Socio-Economic Characteristics and the level of CSB IPM Knowledge

Variable	P-value	Explanation
Gender (1= man; 0=woman)	0.03	Correlated
Education level (Number of years)	0.03	Correlated
Marital status(1= Married; 0=not married)	0.02	Correlated
House hold members who provide coffee labor (Number of adults)	0.05	Correlated
Total coffee acreage	0.04	Correlated
Year joined coffee group	0.02	Correlated
Access to coffee benefit-income	0.06	Correlated
Control of coffee benefits-income	-0.00	Correlated
Women visiting trading centers	-0.06	Correlated
Women visiting church/mosques	-0.06	Correlated
Women visit water points	0.08	Correlated
Women visiting other villages	0.09	Correlated
Women attending group meetings	0.06	Correlated

The survey results showed that 56% of the respondents were men as compared to 44% women. The percentage difference could be attributed to the fact that coffee is a man's crop and so slightly more men are involved as opposed to women. The chi-square comparisons revealed a significant association between gender and the knowledge of CSB IPM practices (table 10).Taking an

example of women, they more they attended group meeting, visited water points and other villages the more they acquired knowledge of CSB IPM knowledge. Visiting trading centers, churches/mosques had a negative correlation with knowledge of CBS IPM practices. The educational level was captured as number of year spent in school showed that men spent on average 7.01 years as compared to 6.58 of women. The overall range of years spent at school is between 0 to 16 years with tertiary intuitions being the highest level. The educational level of the respondent was closely associated with their knowledge of CSB IPM practices as per the chi-square comparison at 5%.

Marital status captured as single and married is often used to determine stability of a household in families of African setting since heads of such households tend to be stable in farming and CSB IPM use. This is true since results revealed that, about 73% of the repondents were married with a slight difference between men and women. More men were (about 41%) married than women (about 33%). The marital status of a respondent was significantly associated with the knowledge of CSB IPM practices at 5% implying that one's marital status had a lot to do with their knowledge level.

The average number of people who helped out with coffee production work in the household was four and with a maximum of 12. This number was used as a proxy for coffee IPM labor. Both family and hired labor (about 38% of men and 29% of women) is used by both men and women. Men believed that family labor in their house holds was not enough to cover the coffee production activities (about 21% of men and about 15 % of women), while women felt it was adequate (about16% of men and 16 % of women). Findings seem to suggest that, family labor was more constraining to men than women. The plausible explanation could be because coffee is a cash crop, men are more involved than women and thus serves as a labor constraint. On comparison between knowledge of CSB IPM with number of people who provide labor in the house hold there was a significant relationship meaning the more labor a household has the more members sought and thus knowledgeable about CSB IPM. In addition the knowledge level of CSB IPM practices by farmers was closely associated with the coffee farm size meaning the bigger the farm size, the more farmers sought to control the pest in the most cost effective and environmentally friendly manner possible

The total income from coffee ranged from two to three million shillings per season. Access to coffee income had a positive and significant correlation with knowledge of CSB IPM practices while control of coffee income was significantly negative.

4. CONCLUSION

The level of men knowledge of CSB IPM practices was higher than men. More men could name CSB pest; list its symptoms, aware, listed and used the IPM tactics for CSB control being promoted, were aware and could list harmful effects from using pesticides and pesticide use precautions. Social-cultural beliefs that, women are supposed to carry out domestics work and men's perceptions of exposing and risking their wives being taken aware by other men contributed very much to women's low level of knowledge. The constraints associated with obtaining inputs used for CSB IPM control and the disadvantages associated with the practices discourage women from accumulating such knowledge. Much as the level of men's knowledge of CSB IPM was higher than women, the score of all the seven parameters was less than 50%, the study concludes that their position in the society enables them to acquire coffee IPM knowledge and skills of the IPM use than women in Coffee IPM groups. Men's access to knowledge of IPM as a group training benefit is thus an opportunity to group participation and consequently pest control in the farm households whereas a constraint to women. The hypothesis of Men are more likely than women to name CSB pest; identify its symptoms, list the IPM tactics for CSB control being promoted, harmful effects from using pesticides. They are also more likely to rank highest in their

level of awareness, knowledge and utilization of IPM tactics is supported. Women rarely participate in coffee IPM groups which are main IPM information source and so reaching them with IPM information with specific consideration to their needs would greatly boost their knowledge level. Sensitize and encourage men to share with their spouses what they learn from during coffee IPM training sessions.

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