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RESEARCH ARTICLE

Factors enabling the participation of women in income sharing among banana (*musa* spp.) producing households in South Imenti, Meru County, Kenya

Violet Nyabaro[a], John Mburu[a] and Margaret Hutchinson[b]

[a]Department of Agricultural Economics, University of Nairobi, Nairobi, Kenya; [b]Department of Plant Science and Crop Protection, University of Nairobi, Nairobi, Kenya

ABSTRACT

The growing demand for banana coupled with the introduction of better planting material in the last decade has led to increased area under banana production and commercialization. Just like most subsistence crops, banana production has been female dominated and controlled. However, commercialization has led to a dynamic shift in production with more men taking up active roles in the value chain. This has led to the displacement of women from the high value chain with men taking up dominant roles. The main objective of this paper was to determine factors that favor the participation of women in sharing of banana income. Data collection was done in March 2017 from 160 households in South Imenti, Meru County, Kenya. A systematic sampling technique was used to draw the respondents. Qualitative data was acquired through the use of key informant interviews and focus group discussions. A fractional logit model was used to determine the effects of independent variables on the participation of women in income sharing. Findings from the regression analysis indicate that the presence of off-farm income within the household increases the probability of a woman taking part in household decision-making.

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Banana; income-sharing; Kenya; women; resource allocation

Introduction

The existence of gender inequalities in resource allocation and income control within the household has led to a lack of inclusiveness of women and youth in agricultural value chains. For decades now, gender bias has pushed women to the periphery of agricultural value chains and in turn reduced their overall effectiveness as chain actors, more so in the high-value horticultural value chains (Mason & King, 2001). These gender disparities are more evident in Sub-Saharan Africa where women are excluded from high-income ventures because of their limited access to productive resources compared to their male counterparts.

CONTACT Violet Nyabaro violetrichards78@yahoo.com Department of Agricultural Economics, University of Nairobi, Nairobi, Kenya

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Banana production is one of the most important semi-subsistence crops in Kenya (Beed, Dubois, & Markham, 2012). The rising demand for the product in urban areas combined with better planting technologies has led to increased output (Mbogoh, Wambugu, & Wakhusama, 2003). This upward shift in banana production has also been engineered by a fall in prices of the traditional cash crop, high input prices and poor management (Government of Kenya, 2002) which has necessitated the move from cash crops production such as coffee and tea in Meru County and resulted in the subsequent commercialization of banana production.

Increase in output with subsequent increased household income generated from banana production has redefined gender roles in banana production with more men being involved in production and women being displaced to lower nodes in a sphere that has previously been under their control (Smale & Tushemereirwe, 2007; Beed et al., 2012). However, commercialization has redefined gender roles along the value chain and brought about opportunities for both men and women while creating challenges at the same time. The dynamics of resource allocation in terms of labor and land has evolved as a result of commercialization (Spring, 2000). Gender is the socially fabricated roles that critically define the position of women and men, girls and boys (Doss, Kim, Njuki, Hillenbrand & Miruka, 2014). Gender roles differ based on country, age, race and region. In Africa for instance, the norm is that men reserve the right of decision making at the household level while women perform both productive and reproductive roles (Blackden & Wodon, 2006). Further, Ul Haque (2004) found that women are disadvantaged because of limited access to education, land, and capital.

At the smallholder level, gender relations influence intra-household interaction, the division of labor, power dynamics and the allocation of productive resources which in turn have an effect on value chains. Gender relations are therefore an important element in analyzing the concentration of men and women at different nodes of the value chain and in the process evaluate the efficiency of a given chain. A study by Doss et al. (2014) highlights instances where men take over the high-value crops such as bananas and tend to divert resources towards the same thereby taking control over resources and benefits accrued from those crops. Male farmers have a tendency to take control of profits generated from bananas by redefining it as a cash crop which falls within their legitimate domain of control (Heyer, 2006).

According to Rubin and Manfre (2014), value chains are socially embedded where cultural norms dictate intra household resource allocation, gender labor division of household and farm activities, the differences in control over income and decision making and bargaining power of individuals within the household. Gendered value chain participation is conditioned by the ability to have access to and control over productive resources such as land, labor, and capital. Gendered patterns of resource allocation often imply differences in participation, and in the sharing of benefits from participation for men and women. According to Sebstad and Manfre (2011), gender-defined roles in value chains and within households affect access to financial services, control over income, access to and use of new technologies, inputs and social services.

In Kenya and Africa in general, women are given control over income accrued from food crops (Njuki, Kaaria, Chamunorwa, & Chiuri, 2011). However, with commercialized production, the role of women declines as some of the enterprises are redefined as

cash crops and fall into the male domain. The resulting loss of control has implications on household food security and overall wellbeing of the household. Given their role as household custodians, income under the control of women has great economic and development outcomes particularly on household nutrition and food security. However, despite the role bestowed upon them women have little access to resources critical in agricultural production such as land, labor, and capital (Ibnouf, 2011).

Empirical evidence highlighting intra-household inequalities is vast. Further, empirical evidence on the presence and extent of intra-household benefit sharing is contradictory depending on the region. According to Kennedy and Cogill (1987) intra-household power dynamics and gendered allocations dictate how income accrued from the sale of crops is shared and in what proportions. For instance, in French bean production in Meru County, Kenya, women provide 72% of the production labor required, yet they receive 38% of the income obtained from the sale (Dolan, 2001). These findings are consistent with Mitchell and Coles (2011) who argue that participation in the value chain nodes whether in cash crops or food crops does not automatically result in benefits for the participants.

In his study in Malawi, Kerr (2005) argues that the allocation of resources within the household and the division of benefits is highly dynamic with some households practicing egalitarian income while in the northern part of Malawi women have little access to resources and limited control over income from crop sales. In addition to that, Kerr (2005) points out that despite the presence of egalitarian income sharing, the role of the husband as the household head and the sole decision-maker within the household still remains undisputed. Although women have control over income generated from the sale of food crops and other minor enterprises, men are the final decision-makers on how income from the larger enterprise is to be shared, used and invested. Access to and control over income is not only critical for determining who participates in a value chain but also how the benefits accrued from the chain is distributed within the household. Findings from the pigeon pea value chain in Malawi indicate that not only do power relations determine how income is invested, but also that men are the key decision-makers on income to invest in what crop, and since men are more engaged in maize production a high percentage of household income is diverted towards the maize enterprise (Me-Nsope & Larkins, 2016). This points out the impact that intra-household income sharing has on productivity and household food security.

Against this background, this study seeks to investigate factors favoring women's participation in income sharing among banana farmers in Meru County, Kenya. More specifically, this paper will unearth the internal and external factors that place women at an advantaged or a disadvantaged position when issues of income sharing arise within the household.

The study hypothesizes that there are no significant factors that favor women's participation in income sharing among banana-growing households in Meru County. Findings from this study will argument already existing information that is necessary for sound policy decision making and interventions targeting gender equity and women empowerment.

Theoretical background

A household is both a producer and a consumer, and thus decision making on production, resource allocation, and consumption are intertwined and dependent on each other.

Under the agricultural household model, a household is a group of people living together for a specific period of time, cooking from the same kitchen, while jointly undertaking agricultural production activities (Bardhan & Udry, 1999). The role played by traditions in household decision making on production and consumption activities and patterns is dictated by the prevailing societal gender roles. In the traditional African society, women have the role of food production (Ahearn & Tempelman, 2010). For instance, in Kenya, women account for about 70% of the total labor force in agriculture (ibid). Being the household custodians, the gender division of labor between agricultural production activities and household chores has implications on the role played by women in household decision making (Arora & Rada, 2014). Further, findings from the study indicate that in Ethiopia, on average a woman spends not less than 10 hours on providing labor compared to 8.5 hours for men (ibid). These findings are consistent with Arora (2013) who found that in Cameroon women spend an estimated 50 hours per week on food production compared to their male counterparts who spend an estimated 9 hours on food production and household related activities. Intra-household dynamics including the division of labor play a significant role in women's ability to make decisions on income accrued from agricultural activities. In Columbia, it is evidenced that despite the fact that women devote a large share of their labor to coffee production, they often have little say in agricultural decision making (Lyon, Bezaury, & Mutersbaugh, 2010). Previous findings point out that men are the major decision makers on labor hired for agricultural production thus they dictate the units and cost used in labor (Dolan, 2001).

The production behavior of smallholder farmers across Sub-Saharan Africa and Asia and the impact of this behavior on their economies can be comprehensively explained using agricultural household models. As a household acts as both a producer and a consumer, it is assumed that utility maximization from available agricultural resources is the goal. The agricultural household model is consistent with utility maximization. The model can also be seen as simply describing the relation of explanatory variables to the outcome of a choice, without reference to exactly how a choice is made. Household models suggest that different preferences between household members have an effect on how the production and consumption decisions are made and the outcome of these decisions.

Research has widely documented two household models that can be used to conceptualize intra-household resource allocation: the unitary model and the collective model (Quisumbing & Maluccio, 2003). The unitary model depicts the household as a single unit of decision making for which there is always consensus on production and consumption issues. There are a number of arguments against the use of the unitary model for household modeling. Alderman, Chiappori, Haddad, Hoddinott, and Kanbur (1995) have pointed out a key failure of the unitary model – its inability to capture and take into account individual preferences, intra-household inequalities and conflicts, and different levels of bargaining power between members of different sex, age, and income within the household. Since the household is assumed to maximize utility from the available resources as a unit (Doss, 1996), the unitary model does not help in understanding the dynamics of intra-household decision making.

Alternatively, the collective model views intra-household resource allocation as an outcome of bargaining processes among the household members. It therefore

recognizes individual preferences and utility functions that exist within a household. With respect to agriculture, collective models of the household recognize that there are differences in ownership, use, and control of production resources between men and women in a household (Browning & Chiappori, 1998). A collective model allows assessment of how resources held and controlled by either men or women are utilized to enhance agricultural productivity and welfare outcomes. The collective model suggests that exogenous factors that affect the maximization of utility have an impact on how individuals are involved in decision making within the household and their level of bargaining power. These factors include an individual's income, access to land, and other resources. For instance, Doss and Morris (2000) have argued that access to, and the ability of a person to effectively use the available technologies, dictate the amount of income obtained by the individual. Ideally suited for the type of analysis we desired in our study is Osmani's (1998) bargaining model because it helps to explain the outcome of gender conflicts and the negotiation process within the household. Bargaining power within the household plays an important role in access to and control over resources as women with higher education levels, more assets, and who are older are favored (Agarwal, 2011). This premise is tested in the current study.

Materials and methods

Study area

This research was conducted in Meru County in eastern Kenya. According to the Kenya National Bureau of Statistics (KNBS 2009), the county had a population of 1.3 million people which was projected to reach 1.6 million by the year 2018 according to the last census conducted in 2009. Further, Imenti South Sub County had a population of 179604 with a projected mark of 216,545 in 2018. The selection of the study area was based on information from empirical studies highlighting the County as one with the highest concentration of banana production and marketing (Mbogoh et al., 2003; Miriti, Wamue, Masiga, Miruka, & Maina, 2014). The area has an altitude ranging from 300m above sea level to 5199 m above sea level and this has influenced the varied agro-ecological climate zones. The average rainfall per annum is 1250mm with temperatures of a low of 8 degrees centigrade to a high of 32 degrees centigrade during the hot season. Household land size is 1.8 ha for small-scale farmers and 18.25 ha for the large farmers (Kimenchu, Mwangi, Kairu, & Macharia, 2014). Further, the commercialization of banana production as a result of the introduction of tissue culture technology by non-governmental organizations (NGO) initiatives (e.g., TechnoServe) and government interventions has put the County at the forefront in production and marketing activities. It is also the area where a hexanal project aimed at reducing post-harvest losses has already been piloted (Yumbya, Hutchinson, Ambuko, Owino, & Subramanian, 2017).

Sampling and data collection

Data were collected in March 2017. Key informant interviews and focus groups were conducted to better understand the banana sub-sector within the region. The participants were drawn from government institutions, the county government, producers

and traders. Key informant interviews were conducted with producers, traders, government actors such as extension officers and non-governmental organizations representatives. The focus group discussions, on the other hand, were conducted in two gender-differentiated sessions. The first focus group discussion was made up of 10 women drawn from the banana production groups within the sub-county. The second group comprised of 10 male banana producers. Sex disaggregation approach was used to create an enabling environment for both parties to articulate gender issues openly. Being a follow-up study on an initial study conducted by the University of Nairobi in partnership with the International Development Research Center (IDRC), the criterion for selecting respondents for this study was based on individuals interviewed in the previous study.

In addition, a survey was conducted with banana farmers. To generate a sampling frame of potential study households[1], a list of an estimated 1800 banana producing households was generated from banana producing groups and cooperatives. Following on Cochran (2007), the formula for calculating a sample, size from a known population is as outlined below:

Given that the population from which the households were sampled from was known, Cochran (2007) formula for the known population was applied.

$$\frac{n_0}{1+\frac{n_0-1}{N}} = n \tag{1}$$

The resulting sample size for this study is:

$$\frac{384}{1+\frac{384-1}{1800}} = 317 \tag{2}$$

For this study, the ideal sample size was 317 respondents. However, due cost and time constraints it was reduced to 180. Systematic random sampling was used to draw every 10th farmer on the list to arrive at a representative sample size of 180 households. Systematic random sampling ensures that each household has an equal chance of being selected thus eliminating biases. Due to dropouts during the follow up interviews only 160 households were included in the analysis (47% [75] of the respondents were female and 53% [85] were male). The two locations for the study are geographically similar and therefore there was no need for stratification. The household interviews were only conducted with one respondent in the household, either the household head or the spouse, and in most cases both of them. In households where heads or spouses were absent, the interview was terminated and substitution was systematically done using the household list. One key challenge encountered while conducting the study was the unavailability of respondents. Given that households were strictly selected from the banana production groups, replacement in case of absent members was made using the identified members and this led to a reduced sample size than the originally anticipated one. Secondly, the tough terrain in Imenti South made it difficult to reach some households in some cases; this led to increased operational costs.

The semi-structured questionnaire was used to gather information on household demographic characteristics, as well as physical, institutional, and socio-economic attributes related to gendered banana production and resource allocation within

Table 1. Names and measurements of variables included in the model.

Explanatory variables	Measurement
Sex of the household head	Dummy (1 = male, 0 = female)
Age of husband	Years
Age of wife	Years
Household size	Total number of people in the household in the last 12 months
Level of education of husband	Years of formal schooling
Level of education of wife	Years of formal schooling
Farming experience	Number of years the household has been practicing farming
Group membership	Dummy (1 = yes, 0 = no)
Access to extension	Dummy (1 = yes, 0 = no)
Livestock value	Current value in KES of livestock owned
Off-farm income	Amount of money earned in KES from off-farm activities per year
Access to credit	Dummy (1 = yes, 0 = no)
Nonagricultural assets value	Current total value in KES of all non-agricultural household assets
Total land	Farm land owned in acres
Total cost of inputs	Total cost of inputs used in production of bananas in KES

KES: Kenyan shillings.

households. Information on the type of resources available in a household was also collected taking into account issues such as who owns a certain resource, the quantity owned, and the current value in Kenyan shillings. Also, data on kinds of services (e.g., extension, credit) sought from the governments and other value chain supporters were collected. Data on gender issues and on access to productive resources, as well as credit were gathered and documented too. Names and measurements used to describe the dependent and explanatory (or independent) variables used in the land allocation and capital assets regression analyses are shown in Table 1. Enumerators who could speak the local language administered the questionnaire. Data entry was done using Statistical Package for the Social Sciences (SPSS) (Version 22) while analyses were done with STATA (Version 14). While the former statistical package is easy to use for data entry and manipulation, the latter gives more robust econometric results.

Econometric estimation

The dependent variable on the participation of women in benefit sharing was bound between 0 and 1 where 0 is when a woman does not take part in benefit sharing and 1 implies that she is the sole decision-maker on income accrued from the banana enterprise. Benefit sharing in this study was exclusively defined as the income from banana production that a woman has access to and control over within the household.

Use of Ordinary Least Squares (OLS) for analysis was not applicable due to the following drawbacks. Firstly, it might not consider the bounded nature of the fractions appropriately. In the analysis at hand, the dependent variable was a share; hence, the variable's empirical values can never be below zero or above one. However, they possibly lie outside those thresholds if predicted with Ordinary Least Squares (OLS) (Baum, 2008; Ramalho, Ramalho, & Murteira, 2011). Secondly, the OLS assumes a linear effect from the explanatory variable to the dependent variable. Yet, in the present analysis, the effects are most likely not linear, making the OLS model a questionable choice for the current data. In addition to this, the use of OLS could have produced biased results for the extreme values 0 and 1 (Brown & Dunn, 2011).

Another popular method to estimate fractions is the Tobit model (Sevilla-Sanz, Gimenez-Nadal, & Fernándes, 2010). One problem with its application is that it does not correctly interpret the appearance of zeros. Tobit models assume that the zeros represent censored values of an underlying normally distributed latent variable that theoretically includes negative values (Brown & Dunn, 2011). However, in the analysis at hand, zeros were not the outcome of censoring (Papke & Wooldridge, 1996).

Based on the above conceptualization, the fractional logit model initially proposed by Papke and Wooldridge (1996) was chosen for estimating the participation of women in income sharing. It is capable of taking into account the fractional nature of the explained variable and it works for both discrete and continuous variables (Papke & Wooldridge, 1996), and it is also capable of handling the extreme values of 0 and 1 without having to manipulate the data (Baum, 2008; Mullahy, 2010).

The fractional logit ensures that the expected income share lies between 0 and 1 and the sum should add up to 1 (Papke & Wooldridge, 1996). It utilizes the quasi-maximum likelihood estimator to estimate the proportional outcomes in a simplified form of the log-likelihood function (Ye & Pendyala, 2005).

In the fractional logit applied, the dependent variable (y) is operationalized as a fraction $0 \leq y \leq 1$ bounded between 0 and 1.

$$Y = \frac{G}{X} \tag{3}$$

where Y was the dependent variable, G was the value of the income share from banana allocated by the women and X is the total household income in the household. According to Papke and Wooldridge (1996), a fractional logit can take the following form:

$$E(Y|X) = G(\beta Xi) \tag{4}$$

where G (·) denotes the link-function satisfying $0 \leq G(\cdot) \geq 1$ and Xi represents a set of explanatory variables. The link function ensures that the predicted values lie in the interval (0,1). It can be written as follows (Wooldridge, 2009):

$$G(\cdot) = \frac{\exp(\cdot)}{[1 + \exp(\cdot)]} \tag{5}$$

The fractional logit is presented in a general form below:

$$y = \beta_0 + \beta_1 x_1 + \beta_{2x2} \ldots \ldots \ldots \ldots \ldots \ldots + \beta_n x_n + \varepsilon_i \ldots \tag{6}$$

where y is fractional dependent variable, x the explanatory variables and ε_i the error term.

Maximum likelihood estimation was used to eliminate the errors of biased and inconsistent estimates that manifest in the use of ordinary least squares regression estimators. The explanatory variables that exhibited a dispersed distribution, such as current value of livestock, total household income, off-farm income, total production cost, value of non-agricultural assets, and value of inputs used in production were converted into natural logs (base 10).

Results

Socio-economic characteristics of the sampled farmers

Descriptive statistics for household characteristics are shown in Table 2. In our sample, 86% of the households were headed by men. This is an indication of the social setting of African households in which men are always considered to be the household heads even if they are working far away from home. The mean land holding size in the study area was 2.11 acres and this is consistent with small-scale farmers' land size in Meru County (Miriti et al., 2014). The average household size was 4.0 members with the household head having an average age of 58.0 years. The household mean level of education (of adults) was 9.0 years of formal schooling. This means that, on average, most of the householders in the area have not acquired secondary school education.

Only 36% of the study households had access to extension services that provide information on the production and marketing of bananas. This finding concurs with Miriti et al. (2014) who found that 64% of the farmers in the region lacked regular access to extension services despite the region being a major banana producer. The current survey results also reveal that of the 36% of households that had access to extension services, only 27.1% were headed by women.

The gender parity in agricultural extension that we saw could be attributed to the fact that male extension providers tend to pay more attention to male farmers, and the assumption is that the spillover effects of extension will eventually reach women farmers (Mason & King, 2001). However, we did not study the gender aspects of extension service in the area and so the assumption of spillover effects may require further investigations.

Our study found that 37% of the respondents sourced their extension services from government officers while 25% of the extension services were received from farmer groups. The NGOs provided 15% of the extension services. Banana is a perishable crop and the quality attributes after harvesting dictate the price it fetches in the market. Most of the information sought from extension officers was on product handling (71.7%). Post-harvest handling, in light of banana's perishability, is one of the major

Table 2. Mean (standard deviation) of the independent variables from sampled households ($n = 160$) involved in banana production in March 2017 in Meru County, Kenya.

Independent variables	Mean (standard deviation at 95% confidence level)
Household size	4.00 (1.45)
Sex of the household head	0.86 (0.35)
Age of the husband in years	57.52 (14.51)
Age of the wife in years	49.84 (13.85)
Years of schooling of the husband	9.39 (4.44)
Years of schooling of the wife	8.89 (4.60)
Total land size in acres	2.11 (1.66)
Access to credit	0.15 (0.39)
Group membership	0.51 (0.50)
Access to extension	0.36 (0.48)
Total cost (KES)	36,213.35 (51,873.40)
Livestock value (KES)	165,130.8 (143,001.40)
Nonagricultural assets value (KES)	667,080.50 (10,12,110.00)
Total costs of inputs (KES)	50,779.16 (151,182.50)
Off-farm income (KES)	83,121.26 (247,597.70)

KES: Kenyan shillings.

constraints facing the banana value chain actors. Other kinds of information and services sought from the extension officers were on chemical handling (11.3%), soil and water management (9.4%), and pest management (7.6%).

Credit access and financial capital play an important role in agricultural production in the African agriculture setting. Credit access in our study was found to be at 15% which is consistent with Miriti et al. (2014) who found that of all the respondents interviewed in South Imenti, only 10% had access to credit. The low access to credit could be attributed to the demand for collateral by financial institutions in the country. Focus group discussions and key informant interviews attributed this to lack of collateral and guarantors by banks and microfinance institutions. Farmer groups such as banana cooperatives were the leading lender to farmers (29.2%) in our study. These survey findings are consistent with our focus group discussions and key informant interviews wherein the participants stated their preferences for farmer group loans where no collateral security is required. The other relatively minor sources of credit were commercial banks (20.8%) and the Agricultural Finance Cooperation (12.5%). Gender disaggregation analysis showed that 13.3% of those who had access to credit were women. The existing literature on gender and credit access, however, shows mixed results. For instance, Meinzen-Dick et al. (2011) argue that the difference between men and women when it comes to credit access is small and insignificant, and in some instances, men have low credit access compared to their counterparts who are favored by the credit institutions.

Our results demonstrate that 51% of the households surveyed participated in groups, whether formally or informally. About 29% of the respondents cited ease of market access as one of the major reasons for joining groups. Respondents reported that the banana cooperatives in the region have been used as marketing channels because they are secure and efficient compared to roadside markets. Other reasons for participating in groups included access to production information as well as access to credit.

Intra-household decision making over income in banana producing households

Benefit sharing from any agricultural enterprises is one of the sources of conflicts within the household. Focus group discussions and key informant interviews revealed that both men and women actively participate in the banana value chain though at different stages. It was found that men are likely to participate at the production level of the chain while the women mostly take part in the marketing stage of the chain. Benefit sharing in this study has been defined as decision regarding use and control of the income accrued from the sale of bananas. As shown in Figure 1, 31% of the decisions on how the income is spent were made by the husband while the wife made 28% of the decisions. Joint decision making was estimated at 41%. The study findings are supported by the key informant and focus group discussions which revealed banana as a major source of household income. The women who mostly participate at the marketing level spend the income on household expenditure such as food, while use for the remaining amount is jointly determined.

Factors enabling participation of women in income sharing

A correlation matrix of the variables in the model showed the presence of multi-collinearity between husband age and wife age, husband age and farming experience, wife education and husband education. A total of 11 variables were included in the model and out of the 11, five variables were found to have a significant effect on women's participation in sharing of incomes from the sale of bananas. The variables that were found to favor the participation of women in benefit sharing were: livestock value ($p < 10\%$), off-farm income ($p < 5\%$) and education of the woman ($p < 10\%$). Factors that hindered the participation in benefit sharing were total land owned by the household ($p < 5\%$) and sex of the household head ($p < 5\%$) as shown in Table 3.

Turning to the effect of each variable, off-farm income ($p < 5\%$) was found to have a significant positive correlation with the participation of women in benefit sharing within the household. Unit increase in off-farm income within the household increases the probability of a woman taking part in sharing of revenues by 0.12 units. This is because the

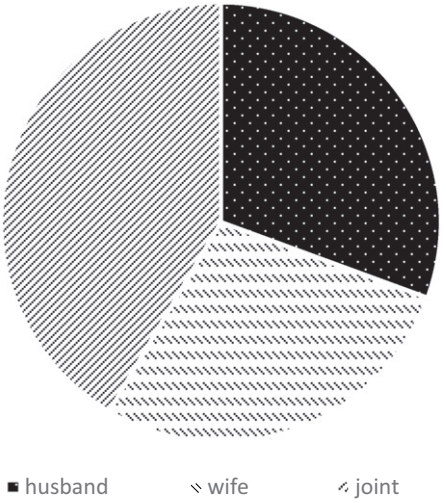

Figure 1. Intra-household decision-making over income. Source: Survey data.

Table 3. Marginal effects, standard error and significance levels of variables enabling the participation of women in income sharing.

Variable	Coefficient	Standard Error	*p* Value
Nonagricultural asset value	−0.2463	0.1645	.134
Off-farm income	0.1210	0.0577	.036**
Production cost	−0.2232	0.1422	.117
Total land	−0.1261	0.056	.024**
Access to extension	−0.0158	0.032	.622
Group membership	−0.0181	0.0322	.573
Sex of the household head	−0.3476	0.1417	.014**
Household size	−0.0876	0.1256	.485
Age of wife	0.1765	0.1622	.277
Years of education of wife	0.1748	0.0929	.060*

Wald chi2(11)=19.48, Prob > chi2 = 0.0346, Pseudo R2 = 0.0982, Log pseudo likelihood= −15.61817.
*$p < .10$; **$p < .05$.
Source: Survey data.

availability of household off-farm income leaves income generated from bananas in the hands of women hence awarding them higher bargaining power within the household. Focus group discussions and key informant interviews revealed that in a household where there is generation of off-farm income by members, the revenue from banana is left under the management and control of the woman for household expenditure. These findings augment a study by Twyman, Useche, and Deere (2015) who found a positive effect of off-farm employment on the participation of women in decision making.

The total land owned ($p < 5\%$) was found to have a negative but significant correlation with women's benefit sharing. This implies that, as household land size increases, the probability of women taking part in income sharing of the banana revenues is reduced by 0.13 units. This may be attributed to the traditional African setting that characterizes land control and access rights as a man's affair. In their finding, Fischer and Qaim (2012) found a negative correlation of farm size on female-controlled income share in the banana value chain in Kenya. This was attributed to the higher degree of centralization and commercialization that is present in larger farm sizes.

Years of education of a woman ($p < 10\%$) was found to have a positive and significant effect on the participation of women in benefit sharing. Unit increase in years of formal education of a woman increases her participation in benefit sharing by 0.17 units. This implies that educated women are likely to participate in income sharing compared to less educated ones. According to Rahji (2007), the role of education in decision making cannot be overlooked. Educated people are expected to use their education to negotiate for higher benefits and they have greater bargaining power compared to their uneducated counterparts.

The current value of livestock ($p < 10\%$) has a positive effect on the participation of women in benefit sharing. Women have access to and control over small livestock such as goat, sheep, and chicken (Njuki et al., 2011). In addition to that, they also have control over by-products from larger animals such as the sale of cow's milk (Kristjanson et al., 2010). This access to and control over small livestock and livestock by-products increase their bargaining power and thus the ability to take part in benefit sharing of banana revenues. These findings are similar with those of Njuki et al. (2011) who found that women's ownership of livestock increased the probability that they would control livestock income and specifically income from the sale of milk, eggs, and cattle.

In male-headed households, women are less likely to allocate income accrued from sale of bananas. The increased participation of men in banana production has rendered the decision making of women in the enterprise void. Women in male-headed households are less likely to take part in decision making given their low bargaining power and in this study, descriptive statistics show that 86% of the households were male-headed hence the negative correlation.

Conclusion and policy recommendations

The purpose of this study was to unearth drivers of participation of women in income sharing in banana production which were estimated using a fractional logit regression. It was found that, the presence of off-farm income within the household equips women with a higher bargaining power enabling them to take part in decisions on

income use. In addition, wealthier households through ownership of livestock have a positive effect on women's decision-making ability. Findings from the study area indicate that increasing the land size holding reduces the ability of women to take part in decisions on income use. Land ownership, use, and control is a contentious issue in the traditional African setting with the right to ownership use and control being reserved for men. Women can only own land through their husbands or male relatives. In conclusion, diversification of household income can be used as a strategy to cement the role of women in controlling income from banana enterprises. In addition to this, if policy invests in the education of the girl child in the study area, there would be more women benefiting from intra-household income shares.

Note

1. In this study, a household was considered to be a unit comprising of one or more people living together in the last six months whilst undertaking production and consumption activities together.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Ms. Violet Nyabaro is an Agricultural Economist who holds a Master of Science in Agricultural and Applied Economics from the University of Nairobi. She has done research in gender and resource allocation in the agriculture sector and worked in a policy research analyst capacity at the African Technology Policy Studies Network.

Prof. John Mburu is an Agricultural and Resource Economist who holds a PhD in Agricultural Economics (2002) from the University of Goettingen, Germany. He has worked extensively, for over 13 years, on the economics of livestock breeding, economic valuation of forests and wildlife, and cost-benefit analysis among others.

Prof. Margaret Jesang Hutchinson is a Horticulturalist and Senior Lecturer at the University of Nairobi with over 30 years' experience in the Agriculture sector. Her research and outreach work cover most areas of Horticulture from policy to programming and the entire value chain of several commodities.

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