Gender analysis of households' decision-making to reduce post-harvest losses of cassava in Ghana, Nigeria, and Vietnam

P.B. ABDULSALAM-SAGHIR, BEN BENNETT, W. QUAYE, VIET PHU TU, L.O. SANNI, and A.M. MARTIN

This study analysed gender dimensions of decision-making at the household level in cassava enterprise in Ghana, Nigeria, and Vietnam in the context of risks and benefits to food security to ensure value addition to reduce post-harvest losses from cassava. Rapid participatory rural appraisal was used to select a total of 501 households in the countries chosen for this study. Focus and group discussions (F and GD) and semi-structured questionnaires were used to collect primary data. Data were analysed descriptively. Twenty cassava-based activities linked to gender activities in cassava processing households in the selected countries were identified. In all three countries, final decisions to allocate and use resources were taken by men – although women are commonly responsible for post-harvest management. Ownership of production and processing assets is positively skewed to men across the sample with women having rights of use only. Household decision-making objectives for generating peels and attitudes towards cassava peels vary by country and by lineage/descent, largely influenced by culture, level of education, religion, formal employment opportunities, and income levels. Household cassava peels utilization has low value and is therefore not a focus of male interest in Ghana and Nigeria but if value is added, this dynamic may change. This was different in Vietnam where peels are processed generationally for additional household income. This study proposes the design of empowerment/development strategies such as group dynamics and skill acquisition to increase women's bargaining and decision-making capacities and reduce male/elite capture of interventions.

Keywords: cassava, decision-making, gender, peels, post-harvest management, value addition

P. Abdulsalam-Saghir (petrajib@yahoo.com) is Senior Lecturer in the Department of Agricultural Extension and Rural Development, Federal University of Agriculture, Abeokuta, Nigeria; Ben Bennett is Professor of International Trade and Marketing, Natural Resources Institute, University of Greenwich, Chatham, UK; W. Quaye is Principal Research Scientist at the Council for Scientific and Industrial Research (CSIR), Accra, Ghana; Viet Phu Tu is a Sensorial Analyst, School of Biotechnology and Food Technology, Hanoi University of Science and Technology, Hanoi, Vietnam; L. Sanni is Professor of Food Science and Technology, Federal University of Agriculture, Abeokuta, Nigeria; and A.M. Martin is at the Natural Resources Institute, University of Greenwich, Chatham, UK.

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HOUSEHOLDS PROVIDE THE CONTEXT in which important market and non-market decisions between men and women take place in all societies. Households contribute over 80 per cent of all hours spent in agricultural production and processing and also undertake 60–90 per cent of the rural agricultural product marketing, thus providing more than two-thirds of the workforce in agriculture (Forsythe et al., 2009; Abdulsalam-Saghir, 2011). The contributions and decisions that men and women make in a joint family enterprise determine, to a large extent, the material well-being of the household, and are the principal source of distinct economic gender roles. Cassava-producing and processing households make decisions on the options for producing and processing with the aim of maximizing profit, managing risks and food security for the household, and other social benefits around the crops. Household decision-making affects many choices with important consequences including the distribution of income, allocation of resources, allocation of responsibility, allocation of time, and option for value addition, without which interventions may be misinterpreted and/or attract rebuke for certain members of households in the community where such projects are in operation.

Overview of the utilization of cassava and cassava waste in Ghana, Nigeria, and Vietnam

In absolute terms, Ghana is the country that incurs the highest physical losses (over 1.7 million tonnes of cassava roots). This is because high proportion of root is transported and distributed and stored in the fresh form along the entire value chain until final consumption. In the case of Nigeria, being the largest cassava producer among the three countries in this study, the survey focused only in the South Western part of Nigeria. Hence, South West Nigeria ranks second in terms of extent of physical losses with almost half a million tonnes of fresh roots that spoil among the three countries. Unlike Ghana, most root spoil at the processing stage of the value chain at processing sites.

According to Bennett et al., (2013) estimations, Vietnam is the country that incurs the lowest physical losses in absolute terms. It is estimated that just 300,000 tonnes of fresh roots equivalent are lost in the chain (almost exclusively in the fresh form and spoilage of wet starch when stored in the underground pits for long periods). These losses have significant implication on the total volume of fresh and processed cassava affected (either physical or economic) by losses and on the quantity of wastes produced during processing. As such, in the framework of this study, Ghana is the largest producer (~14 million tonnes), Vietnam (~10 million tonnes) and South West Nigeria (~7.5 million tonnes). In relative terms, Ghana is the country incurring the highest losses (over 12% of roots are lost), South Western Nigeria ranks second (7%) and Vietnam (3%) respectively.

According to Nasiri et al. (2013), cassava is one of the most important (second after maize) food staples in Ghana. Cassava production and processing constitute a major source of income and rural livelihood contributing about 22 per cent of national agricultural GDP. These authors also reported that more than 4 million

tonnes of cassava incur some loss, either physical or economic. These losses, worth over US$500 m per year, represented around 22 per cent of the current retail value. Also, a total of 3.6 million tonnes of cassava peels and discharged parts during the peeling process are generated annually.

Nigeria is by far the world's leading producer of cassava. Bennett et al. (2013) reported that, according to the most recent estimate, cassava produced in south-west Nigeria (from 2000 to 2002) has been consistently around 20 per cent of the total national production in the country. From their findings, they estimated the current production in this zone at around 7.5 million tonnes, with average yield of around 11–15 tonnes/ha. Concerning losses, Bennett et al. (2013) also reported that almost 1.5 million tonnes of cassava incur some losses. These losses are worth over US$50 m per year, representing around 7 per cent of the current retail value (Bennett et al., 2013). The total quantity of cassava peels generated from the total annual production is estimated at approximately 3.75 million tonnes annually (taking annual average production for 2010 of 37.5 million tonnes; i.e. peel is 10 per cent of the cassava root).

Cassava is among the four most important food crops in Vietnam. Nasiri et al. (2013) reported that the country recorded an increase in yield from 8.3 tonnes/ha in 2000 to 17.6 tonnes/ha in 2011 combined with a larger planted area (560,000 ha in 2011). This has determined a tremendous increase in production over the past 10 years (from 2.1 to 9.9 million tonnes). They reported that in Vietnam, almost 3 million tonnes of cassava incur some loss, either physical or economic. This loss is worth over US$36 m per year, representing around 4 per cent of the current retail value (Nasiri et al., 2013). With the huge losses recorded in post-harvest handling of cassava, individuals in households may not be well equipped to make decisions on production and processing of such wastes and convert them to economic gains. Reducing losses and adding value to cassava could translate to improved food security and increased income of rural households. Therefore, this study seeks to understand gender dimensions of decision-making at the household level in cassava enterprise in Ghana, Nigeria, and Vietnam in allocation of roles and responsibilities. The study examines attitudes of households to cassava peels and how decisions to use, sell, store, or process cassava and their peels are taken in the context of risks and benefits to food security to ensure value addition to reduce cassava post-harvest losses.

Analytical framework for the study

A gender analysis framework developed by the UK Department for International Development (DFID) was adopted to identify activities, roles, decision-making, ownership, and acquisition of resources. This analytical framework draws on several theoretical and conceptual frameworks around gender, empowerment, and household dynamics. The framework recognizes that gender norms are complex and dynamic. They change, gradually, in response to shifting economic, political, and cultural forces that can create new constraints and opportunities for women.

Challenging cultural gender norms, which is addressing a strategic gender need, especially in decision-making, requires negotiations and caution and has potential for trade-offs and backlashes (Aasen, 2006). Challenging gender norms, therefore, requires caution so as not to leave the women intended for empowerment less empowered (Quisumbing and Pandolfelli, 2010; Aasen, 2006).

The gender dimension of decision-making is crucial for economic and efficiency reasons; this is especially true in the agricultural sector where gender inequalities in access to and control over resources are persistent, and undermine local sustainable development of the agricultural sector. The cassava value chain reflects different gender roles for men and women in production and processing activities arising from socially constructed relationships, affects the distribution of resources among farm families, and causes disparities in household decision-making over assets. It is important to attain a clear understanding of how household decision-making over cassava will affect its value chains in terms of decision-making on income, roles, and responsibilities at the household level. It is, therefore, necessary to analyse the interplay of decision-making processes at the household level in relation to gender. This is with the aim of identifying points/nodes in the value chain where individuals in the household can benefit maximally from project interventions to ensure concomitant improvement in the lives of farm families.

Objectives of the study

This study seeks to understand gender dimensions of decision-making at the household level in cassava enterprises in Ghana, Nigeria, and Vietnam in terms of allocation of roles and responsibilities and examines resource ownership and acquisition. The study also examines attitudes of households to cassava peels and how decisions to use, sell, store, or process cassava and their peels are taken in the context of risks and benefits to food security and value addition to reduce post-harvest losses of cassava.

Methodology

Study locations and site characteristics

Ghana, Nigeria, and Vietnam were purposively selected for this study because they are the world's leading cassava-producing countries. These countries were three out of the four project target countries selected for the Gratitude project, and where cassava waste and losses occur at farm, household, and industrial levels. Vietnam is included in this study to draw South–South comparisons and encourage interactions to enhance stakeholders' integration and diverse learning opportunities that shed light on the examination of waste and losses at the global level. The communities selected within the countries were among

those chosen for the value chain analysis (VCA) (Deliverable 1.1) survey of the Gratitude project.

In Ghana the Volta Region, Brong-Ahafo Region, and Greater Accra Region were selected for this study. The regions were selected because of their high levels of cassava-processing activities. Using rapid participatory rural appraisal (PRA) methods, a total of 177 people were interviewed, consisting of 88 women and 89 men.

In Nigeria four out of the six states that make up south-west Nigeria, namely Oyo, Ogun, Ekiti, and Ondo, were purposively selected for this study because the selected states are classified as moderate (suboptimal and optimal) regions for root and tuber crops production (Ezedinma et al., 2007). A total of 224 participants were interviewed, consisting of 134 males and 90 females.

In Vietnam, the survey was conducted in Duong Lieu, Minh Khai, and Cat Que community, HoaiDuc district, in the outskirts of Hanoi. This is one of the core areas where traditional processors or so-called 'craft villages' of wet and dry cassava starch are concentrated in the Red River Delta region. A total of 100 participants, consisting of 53 women and 47 men, were selected for the study.

Data collection techniques and methods of analysis

Rapid PRA was used to select a total of 501 households in the countries chosen. PRA methods of data collection used included checklists administered during focus groups (FGs) to individuals of 2–7 persons in households and group discussions (GDs) for households that consisted of more than 7 members living in clusters in the selected communities. Two focus group discussions (FGDs) of men only, women only, and mixed group were conducted in each selected location making a total of 18 FGDs per country. A semi-structured questionnaire was also used to solicit responses on the socio-economic characteristics of the individuals interviewed. The Harvard Analytical Framework (HAF) (March et al., 2005) was used to analyse the gender roles in the households. The HAF consists of the activity profile chart, the productive resource access and control chart, and factors influencing household decision-making disaggregated by gender. Data collected were analysed using simple descriptive statistics with presentation made in tables, percentages, and figures. Verbal quotes of discussants were also used to lay more emphasis on discussants' perceptions of the study objectives.

For Figures 1–3, each circle represented each social institution. The size of the circles signified their magnitude and importance. Overlapping circles indicated close-knit and interlocking relationships. Double-headed arrows indicated two-way communication of information on resources, and single-headed arrows indicated one-way communication. A circle with bold words written in it indicated strength and importance of the social institution. The square enclosing all the circles is the community. Any circle found out of the square indicated external institutions. The various colours of the circles and arrows show different stakeholders (Saghir et al., 2012).

Results and discussion

Socio-economic characteristics of study participants in Ghana, Nigeria, and Vietnam

Of the 177 participants in Ghana, 89 were males and 88 were females. Their age range was from 20 to above 60 years old. Males (33 per cent had secondary and tertiary education) were more educated than females. Ninety per cent of female participants had no formal education. Also, 88 per cent of males were married and about 6 per cent of the females were widowed. The majority (88 per cent) of the male participants were heads of households compared to only 12 per cent of females.

Similarly in Nigeria, a total of 224 farmers were interviewed. Of these, 134 were males and 90 were females. Males were more educated than females with 28.6 per cent of female farmers having no formal education compared to 10.3 per cent of males. More notable differences were seen in secondary and tertiary education: males were more educated than female participants. Morrison and Jutting (2005) submitted that education signifies economic empowerment, implying that male farmers in the study area were economically more advantaged than the female farmers.

In Vietnam however, a total of 100 participants consisting of 53 females and 47 males participated in FGDs and interviews. Participants' age range was from 20 to above 51 years old. All participants had completed secondary school. No difference in terms of education between males and females was observed. Eighty-six per cent of participants were married. Sixty-three per cent of the male participants were heads of households compared to 29 per cent of females.

Decision-making and allocation of roles, responsibilities, and workloads

Key findings on decisions of roles and allocation of responsibilities

During the FGDs conducted at the study locations, a list of roles and responsibilities was generated and classified into six categories consisting of 20 different major and minor roles as shown in Table 1. Women had more roles than other members of the family in Ghana and Nigeria. Women's major roles were more in processing and production. Their minor roles were in the community/social inclusion category. The majority of male roles in both countries were in production and community/social inclusion and leadership roles. Summarily, in all the activities, women accounted for 90 per cent of the roles in Ghana and Nigeria compared with 70 per cent and 65 per cent for men in both countries, respectively, as indicated in Table 2. The reverse is the case in Vietnam where men accounted for 95 per cent of all the roles compared with 65 per cent of the roles accounted for by women (Table 2).

During the FGDs, participants in all the groups in Ghana and Nigeria indicated that decision-making in roles and allocation of responsibilities at the household

Table 1 Distribution by gender and countries of major and minor roles in cassava production and processing systems

	Activities	*Ghana*					*Nigeria*					*Vietnam*				
		OM	*M*	*W*	*B*	*G*	*OM*	*M*	*W*	*B*	*G*	*OM*	*M*	*W*	*B*	*G*
	Production roles in cassava															
1	Land clearing		O				X	O	O	X	X	O	O	X		
2	Ploughing		O	X	O	X	X	O	X	O			O	X		
3	Planting		O	X				O	O				O	X		
4	Weeding		X	O	X	X		X	O	X	X		O			
5	Agrochemical application		O	X				O		X			O			
6	Harvesting		X	O	X	X		X	O	X	X		O	X		
7	Haulage		X	O	X	O			O		O		O	X		
8	Transport		O					O	X				O			
9	Marketing		O	O				O	O			O	X	O		
	Processing roles															
10	Peeling			O		X			O	X	X	X	X	O	X	X
11	Haulage			O		X			O	X	X		O	X		
12	Drying			O		X			O		O		O	O		
13	Packaging			O		X			O		X			O		
14	Transporting			O					O				O			
15	Marketing			O					O							
	Community/social inclusion roles															
16	Allocation of farmland	O	O	X			O	O	X							
17	Adoption of innovation	O	O				O	O				O	O			
18	Representation for formal and informal gathering	O	O				O	O	X				O	X		
19	Group formation/collectiveness	O	O	X			O	O	X				O	X		
20	Conflict resolution/management	O	O				O	O					O			

Key: O = major role; X = minor role; OM = older men; M = men; W = women; B = boy; G = girl

Source: Abdulsalam-Saghir et al. (2014)

Table 2 Summary of major and minor roles by gender in households' cassava production and processing systems

Roles/gender*	*Ghana*					*Nigeria*					*Vietnam*				
	OM	*M*	*W*	*B*	*G*	*OM*	*M*	*W*	*B*	*G*	*OM*	*M*	*W*	*B*	*G*
Total of major roles	5 (25%)	10 (50%)	12 (60%)	2 (10%)	5 (25%)	5 (25%)	11 (55%)	12 (60%)	2 (10%)	4 (20%)	8 (40%)	16 (80%)	4 (20%)	1 (5%)	1 (5%)
Total of minor roles	2 (10%)	3 (15%)	6 (30%)	3 (15%)	7 (35%)	2 (10%)	3 (15%)	6 (30%)	6 (30%)	7 (35%)	0 (0)	3 (15%)	9 (45%)	1 (5%)	1 (5%)
Grand total	**7 (35%)**	**13 (65%)**	**18 (90%)**	**5 (25%)**	**12 (60%)**	**7 (35%)**	**14 (70%)**	**18 (90%)**	**8 (40%)**	**11 (55%)**	**8 (40%)**	**19 (95%)**	**13 (65%)**	**2 (10%)**	**2 (10%)**

Note: Total number of roles = 20; multiple involvements in roles taken into account

Key: O = major role; X = minor role; OM = older men; M = men; W = women; B = boy; G = girl

Source: Abdulsalam-Saghir et al. (2014)

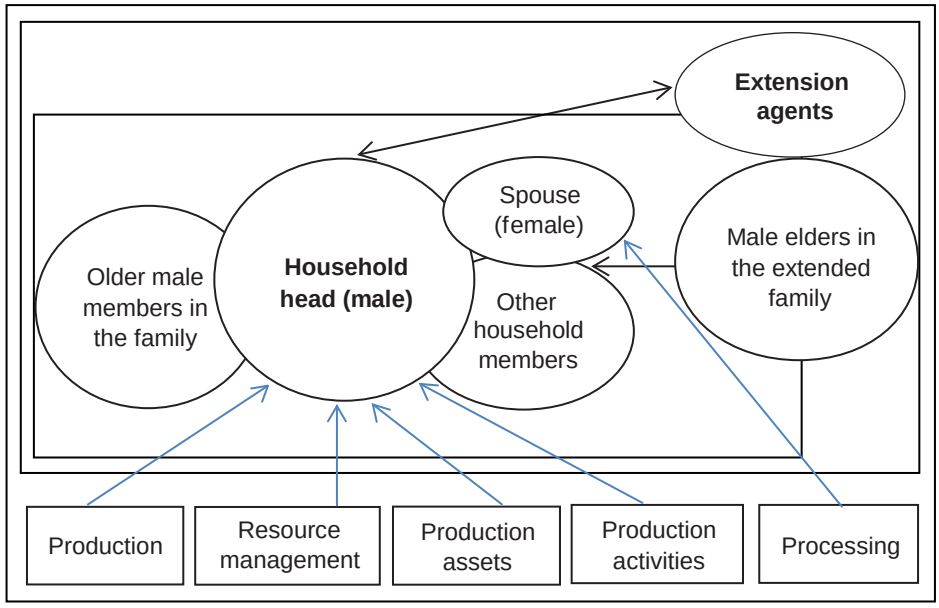

Figure 1 Household decision-making patterns in Ghana
Source: Abdulsalam-Saghir et al. (2014)

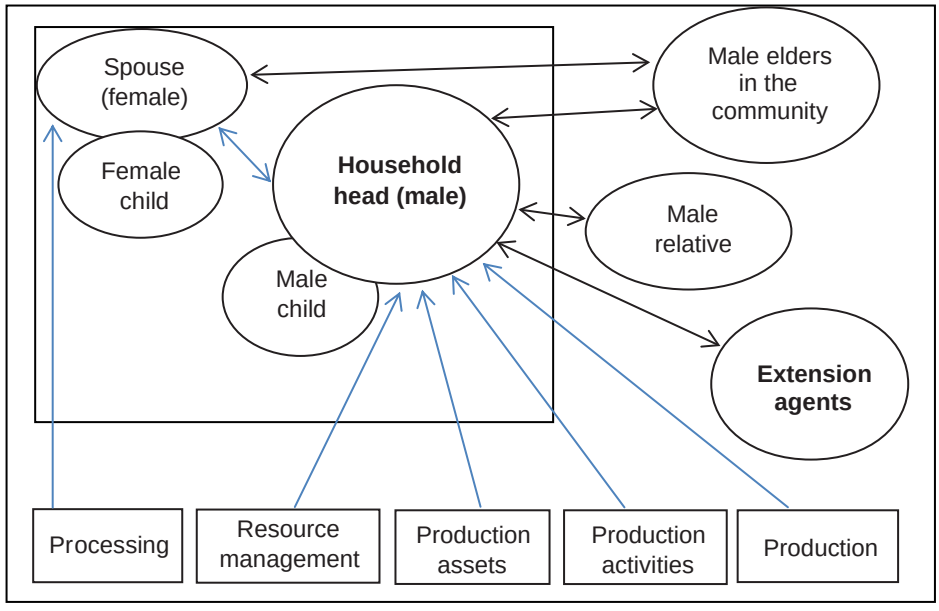

Figure 2 Household decision-making patterns over production and processing of cassava in Nigeria
Source: Abdulsalam-Saghir et al. (2014)

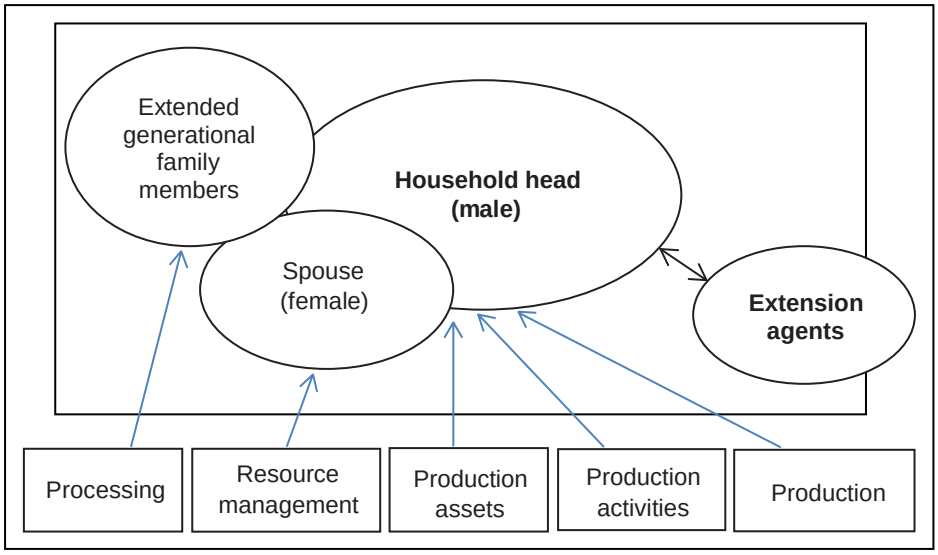

Figure 3 Intra-household decision-making patterns over production and processing of cassava in Vietnam

Source: Abdulsalam-Saghir et al. (2014)

level was largely influenced by culture, level of education possessed by women, religion, and other socio-economic factors such as position in the household, formal employment opportunities, and income levels. Women in the mixed group in Ghana commented that: 'The Dagomba women in this community have no formal education, lacked confidence in discussing public issues and very timid. The women will usually not speak at public/community meetings when the men are present' (comment by the Assemblyman in Primukyeae). They explained that culture and religion encouraged behaviours that were associated with subservience from women, dependence, and respect for decisions made by men who were often the household heads.

In most cases, decisions on farm responsibilities were largely taken and influenced by men and other male members of the extended family, with women and children helping on the husbands' farms without being remunerated in all the countries as depicted in Figures 1, 2 and 3.

The farms owned and run by husbands have more priority and enjoy preferential treatment from the wives' and children's non-remunerated labour than on the wives' farms in Ghana and Nigeria. Women do not have reciprocal claims on their husbands' labour for their own farms. Women hire and pay for labour on their own farms. Comparatively, men and women have equal farming responsibility and most decisions on farm management are taken by both men and women in Vietnam. Decisions on allocation of responsibilities were generational and more flexible than in Ghana and Nigeria with husbands and wives making more joint decisions on roles in Vietnam. Comparatively, some of the surveyed communities in

Ghana are matrilineal communities and as such women's decision-making capacity was enhanced, though final decisions were taken by men on some issues in the household. Nigeria is a patriarchal society. As such, men and any other male members of the extended family take final decisions on most issues in the household. In the three countries surveyed, men were better resourced and economically empowered than women. This also influenced decision-making and allocation of responsibilities in the households.

Key findings on gender and resources ownership and acquisition

In the three countries surveyed, men claim ownership of production assets and their spouse and children did not refute this. Women are traditionally considered as 'owned' and an economic asset by their spouses and society in Ghana and Nigeria. As such, any assets owned by women belong to their spouse, including the wife herself (who is considered as his possession). Women only have right of use and negotiation privileges over most assets and give most authority to the household heads (men). Ownership and control of assets is positively skewed to men who make the final decisions on assets owned by women and those jointly owned as summarized in Table 3. Men and women did not have equal access to productive assets. Women were constrained from owning productive assets such

Table 3 Key findings on access to productive assets

Productive assets	*Ghana*	*Nigeria*	*Vietnam*
Decision-making on assets	Ownership and control of assets is positively skewed to men. Women hire/rent assets from men	Men make final decisions on assets jointly owned and women have right of use	Joint decisions are often made. Men and women have equal ownership of productive assets
Land	Men have means to own and make final decisions on land	Men have means to own and make final decisions on land	Equal ownership and joint decisions are often made
Types of crops cultivated	Men make final decisions on crops	Men make final decisions on crops	Joint decisions are often made
Farm implements	Men owned mechanized farm implements and women owned simple and local implements such as hoes and machetes	Men owned mechanized farm implements and processing units while women owned simple and local implements	Men owned mechanized farm implements and women owned simple and local implements
Extension services	Men have more access to extension agents for cultural reasons	Men have access to extension services on crops that have economic and commercial importance and women have access to information on domestic issues	Men are used as entry point for technology adoption and as such, have more access to technologies

as land because of lack of money to access assets such as non-family land. Men made decisions on the allocation of types of land and types of crops to grow and could easily reclaim land given to spouses especially if such land is seen to be very fertile.

In Vietnam, men jointly owned most assets but final decisions on such assets are also made by men. Extension services were accessed by men mainly and men were most often used as entry points for technology adoption. In all the countries surveyed, men had more access to assets influenced by the social milieu and culture. In Ghana and Nigeria, men owned modern equipment for production and processing; women formed themselves into groups and clustered around male processors who had processing units and machines to hire/rent and pay in cash and/or in kind.

The findings have implications for the power balance in the household. Men owning more of the livelihood resources command authority; have total control of such resources; and are formally and informally recognized when collateral is needed to secure loans at banks and in the community. It was gathered from the FGDs that a woman admitting and ceding ownership and control of resources to her spouse is securing the future of her children (male) who will later inherit the assets.

With the attendant constraints such as finance, lack of other assets for women and non-women friendly technologies will mean that expensive technologies that will not save time or cannot be operated easily by women may not be adopted by them. This has implications for adoption of technologies. Women would adopt technologies that would benefit them irrespective of the addition to their workload. This will only occur if such technologies include a guaranteed income source to ensure that household needs are met.

Women participants explained the meaning of joint decision-making over productive assets:

> If men and women jointly owned assets and have control over it, that means we can both make decisions on such assets and our decisions are jointly respected and held. That means we have equal access, control and power to decide on actions to be taken on such assets (comment by women in women-only group in Nigeria).

Men on the other hand explained that joint decision-making on assets was not possible because the culture does not permit it. As explained by a man in Nigeria: 'If women own assets, they will start disrespecting and may no longer obey their husbands and think that they can be independent and do as they wish' (comment by men in mixed group discussion in Nigeria).

In Vietnam, men usually adopt technologies but they consulted with their spouses on adoption. The main constraint for women adopting new technologies is that both productive and reproductive roles compete for women's time. Therefore, this leaves little or no time for other activities. It was observed that if training workshops are organized in Vietnam, participants are mainly men.

However, participants at the FGDs explained that:

> as a characteristic of a craft village, people learn from one another very quickly. If they see someone having a success in a new technology and new product,

and the procedure is not difficult to follow, they would learn and adapt immediately.

Therefore, Vietnamese women will equally benefit from group dynamics and time saving technologies that ease their workloads as indicated by women surveyed in Ghana and Nigeria.

Key findings on attitudes towards cassava peels production and processing

Attitudes of women and men towards cassava peel production and processing are similar in Ghana and Nigeria. For instance, most men and women saw cassava peels as a product without economic value even though women are the main processors and generators of peels. Men perceived processing of peels as a waste of time and degrading and as a women's activity. Therefore, women have access to peels generated and most decisions on cassava peels utilization are taken by women except choosing the location of dumpsites for peels. They processed 10 per cent of peels produced to feed animals even though both men and women saw peels as valueless. This attitude may change for both men and women when cassava peels becomes a lucrative venture through value addition. Concern voiced at the household level is that such opportunities may be taken over by men and elite farmers. These are entrepreneurs who are in farming for profit making only, have resources to take up business opportunities, and can adopt such technologies easily without constraints faced by poorly resourced women. This has implications for interventions seeking to increase incomes through market development. The implication is that while household income allocation and decision-making takes longer to influence, increasing women's actual participation and creating more opportunities in selling cassava and peels could allay fears of such ventures being overtaken by men and lead to more balanced allocation of income within the household for men and women. This could translate to more food and nutrition security for the household if income from such ventures is owned and controlled by women who are the major caregivers in the home.

This attitude towards peels is not the same in Vietnam where both men and women are favourably inclined towards processing of cassava peels as an income-generating opportunity for women, the elderly, and children. Cassava wastes produced are seen as beneficial and are processed by all the household members (including the extended family members) for personal and household income. Any decision on wastes including peels is taken by everyone in the family. Potential use of cassava peels as a supplement (and not a complete replacer) in substrates for mushroom cultivation looked promising in Vietnam. At the household level, livestock farmers would be unwilling to purchase peels given alternative options of free range and free supplementary feeding from other agricultural waste in Nigeria and Ghana. Rather, rearing of goats in the urban areas presented a more prospective market for livestock feed, given the relatively difficult access to feed.

In all the countries surveyed, decisions on processing of peels were influenced by: 1) societal perceptions of peels as something of no economic value (by men);

2) availability of sunshine for drying; and 3) markets access for women. Women decided on what to do with peels generated in the households but when they set up as commercial peelers in Ghana and Nigeria, it was usually the producers who owned the cassava that decided on what to do with the peels. A concern voiced by some women in Nigeria during one of the FGDs was that 'any foreseeable increase in income from adding value to cassava peels translating to more income for women might result in the withdrawal of men from household responsibilities'.

Women in a mixed group in Ghana perceived that 'men are more likely to spend the additional income outside the household to service other relationships other than immediate family'. Men envisaged an increase in their income due to the innovative technologies on peels and awaited the arrival of such technologies. Some women in mixed groups in Nigeria explained that the anticipated increase in men's real income could come about either through men accessing women's income, or more commonly, women using income earned from adding value to offset household expenditure and finance children's education (these are expenditures 'traditionally' considered the responsibility of men).

Key findings on household decisions on cassava and peels

In Ghana and Nigeria, household decisions with respect to proportion of cassava produced, consumed, sold, stored, or processed were largely taken in the context of risks and benefits to food security, change in market prices and urgent cash needs (for paying hospital bills, school fees, and social responsibilities such as funerals and naming ceremonies). There were similar findings in Ghana and Nigeria on cassava owned by men and women as shown in Table 4. The majority of the women interviewed insisted that taking decisions unilaterally on a cassava farm they owned was dependent on the magnitude of farm yield, quantity to be sold, and if such produce were roots or processed. Any produce that attracts more economic value would be sold by men with or without the consent of the women (especially if she was not around to make joint transactions) including produce from women's farms. In some instances, when women want to sell in the absence of the husband, they must inform elderly men in the extended family who will follow them to see to such transactions. Inability of women to take key decisions on cassava in the absence of husbands may hamper timely and important decisions on development of good businesses and productivity and can negatively affect food and nutrition security of households. In Vietnam, men produced cassava sold to industries for further processing. Decisions on production, processing, and sale were taken by men. When men sold, the spouse managed the income because men believed that women are prudent when they manage the family purse.

In all countries surveyed, who sells the cassava has implications for the management of income. When women sold, they managed more income compared with when men sold, or when sales were conducted jointly. There was autonomous decision-making with women being able to make more unilateral decisions than men over quantities to keep for household consumption. Men, on the other hand, were able to make more unilateral decisions than women on quantity to sell. In Nigeria and

Table 4 Gender and decision-making in cassava processing households in Ghana, Nigeria, and Vietnam

No.	*Decisions*	*Ghana and Nigeria*					*Vietnam*	
	Decisions on cassava and peels	*Suggestion*	*Decision*	*Approval*	*Informed*	*Implementer*	*Suggestion*	*Implementer*
1.	Cassava production	Men	Men/male members of household	Men	Women	Men/women and other family members	Men	All members of the family
2.	Cassava processing	Men/women	Men/women		Men	Women	Men	All members of the family
3.	Processing of peels	Women	Women			Women	Men	All members of the family
4.	Sale of peels	Women/men	Women		Men	Women	Men	Men
5.	Utilization of peels	Women/men	Men/women	Men	Men	Women	Men	All members of the family
6.	Storage of peels	Women	Women			Women	Men	Men
7.	Income management	Men	Men/women	Men	Men	Women	Men	Women

Source: Abdulsalam-Saghir et al. (2014)

Ghana, men sold at farm gates and regional markets, women sold at door steps and local markets. Selling at local and regional markets attracted less profit for women compared with men. Where the product was sold was another key determinant of women's income share. Sales conducted at farm gate to other farmers and traders led to a large income share under women's management. Women have access to local markets and often sell door-to-door; these markets may have lower prices and may give women less room for negotiation than other markets. Upgrading of markets within a value chains perspective needs to take these issues into account as well as ensure women do not lose out as market efficiencies increase and markets become more formalized. This is necessary so that the best strategies identified will have gender considerations and bring on board household concerns.

Supporting household decision-making

The following suggestions are made on how household members could be supported in their decision-making on value addition technologies to reduce post-harvest losses in cassava.

Direct targeting of women should be conducted by designing empowerment/development strategies in collaboration with potential technology beneficiaries to ensure support given is in line with objectives and assets of women to reduce male/elite capture of interventions. Women and households can be grouped into clusters around small and medium enterprises (SMEs) to act as bulking agents locally and supply peels for industrial processing. This will help women to sell directly to and benefit from existing markets through collective action and group dynamics.

Existing local mixed sex and single sex groups that can build and enhance self-confidence, skills, and competence among women should be strengthened to serve as platforms for dissemination of information on value addition technologies. Using peer-to-peer learning tools to tap and benefit from men's larger networks, resources, and information could foster beneficial partnerships that strengthen women's decision-making capabilities.

Identifying and involving private sector actors is very important and central to value chain development goals and outcomes of the cassava subsector. This will enable formalized mutual support for women on each node of the value chain. This will enable the private sector, implementers, and women to develop and synergize a gender equitable agenda through setting up of memoranda of understanding (MOUs) on finding existing markets where women could access and control proceeds from sales, both in cash and in kind.

Efforts to supports women's empowerment should address their roles and status within their households. Women's voice in determining households' priorities on cassava and spending patterns on income realized should be enhanced by helping them to form family expectations to which all family members contribute, to help the family conceptualize and work towards shared, time-bounds goals and deliverables. This could ensure shared responsibilities and a lower workload for women.

Energy and time saving, cost-effective and women-friendly technologies should be introduced at the household level. This will ensure maximum benefit for the household and increase accessibility and decision-making on technologies for women. Feedback on the lessons learnt should be sought to ensure households fully understand technologies and replicate such on their own. A starting point for addressing these disparities in technology adoption is to put in place a gender-integrated monitoring, learning, and evaluation (MLE) framework for conducting ex post evaluations and impact assessments.

Household training on utilization of technologies should be conducted for men and women to foster sustainability of technologies. Demonstration of results and outcomes should be location specific and local, cheap raw materials should be sourced to meet various household needs for the developed technologies.

There is a need to commission gender-centred and periodic community responsive participatory meetings to generate dialogue and challenge orthodoxies around some socio-economic factors that reduce decision-making ability for women over productive and processing assets. Participants (both males and females) in such meetings should be encouraged to make suggestions on meaningful gender and cultural responsive strategic changes, outcomes and indicators for improvement/change in gender norms at the household and community levels.

Conclusion

The findings from the study show marked differences in decision-making at the household level in Ghana, Nigeria, and Vietnam with respect to allocation of roles and responsibilities in the cassava industry. Gender relations in the study areas, particularly in Ghana and Nigeria, are characterized by strong male decision-making power and a high level of non-formalized subservience by women. Also, ownership of production and processing assets was positively skewed to men with women having rights of use only in all three countries surveyed. Market opportunities for each cassava product are very different, with different transaction costs, different rates of profitability, and different degrees of male and female engagement in each market.

Household decision-making and attitudes towards cassava peels vary by country and were largely influenced by socio-economic factors such as culture, level of education, religion, formal employment opportunities, and income levels. Household cassava peels utilization has low value and is therefore not a focus of male interest in Ghana and Nigeria but if values are added, this dynamic may change as evidenced in Vietnam where peels are processed generationally for additional income to the household.

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