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Full Length Research Paper

# A gender and decent work analysis of cassava production and on-farm processing, in Kuria west subcounty, Kenya

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In Kenya, cassava (Manihot esculenta) is one of the strategic crops with the ability to withstand adverse climatic conditions. It thrives well in areas with little rainfall such as Kuria west sub-county. It is an important food security crop for resource poor households and has a high potential for value addition. With limited range of crop and livestock farm enterprises that can be raised, cassava production engages all gender and age groups within the household. However, the level of men and women involvement in cassava production and on-farm processes and whether this constitutes decent work as defined by International Labour Organization (ILO) has not been evaluated. Data was collected from 224 systematically selected farmers drawn from four wards where cassava farming and processing activities are evenly distributed. A sampling frame was established from the sub-county farmers' list. The first farmer was selected using lottery method and then the subsequent respondent was selected using a calculated sampling interval until the sample size was reached. Descriptive statistics and ordinary least square (OLS) econometric analysis were used to analyze the data. Likert results showed that women were more involved than men in the production and on-farm processing with means of 2.6 and 1.4 respectively on a 4 point scale. OLS results showed that age, extension contacts, credit access and experience significantly affected the level of involvement of both women and men at 95% confidence level. Some 68 and 92% were not aware of National Social Security Fund (NSSF) and National Hospital Insurance Fund (NHIF) respectively. About 65% used protective gear during work and the hourly wage earned was 44% higher than the minimum set by the government of Kenya. More civic education needs to be done to improve the participation by men and the decent work status in the Kuria west sub county.

Key words: Cassava, involvement, decent work, processing, production, men, women.

# INTRODUCTION

Commercialization of agricultural activities among smallholder households has been touted as a crucial means of achieving food security. It increases income for households, and promotes efficient use of scarce resources in rural areas leading to faster development (Dannson et al., 2004). Food losses due to low levels of

value addition have also exacerbated the levels of food insecurity. In recent times, however, agriculturists and extension workers in Kenya have incorporated the development of entrepreneurial capabilities among rural farm households and the commercialization of traditional crops production such as cassava into their agenda.

Cassava, one of the traditional crops that have been identified for promotion as it has the ability to withstand adverse climatic conditions and is also has a high potential for value addition (GoK, 2005). Cassava is ideal for production and provision of carbohydrates in the marginal and drought-prone areas, which comprise about 80% of Kenya. However, its potential utilization as a food security crop remains low in these areas. A major constraint to cassava production is lack of adequate disease and pest-free planting materials greatly exacerbated by its low multiplication rate (Githunguri et al., 2014).

Cassava is therefore a crop of primary importance for food security of farmers living in fragile ecosystems and socially unstable environments. Once harvested, it can be transformed into an industrial raw material in the manufacture of starch, baked products, paper, alcohol and animal feeds among others (FAO, 1999)

In Kenya cassava is the third most important food security crop from maize and Irish potatoes, (GOK, Utilization of cassava in Kenya is varied 2010). depending on the locality. For instance Abong et al. cassava (2016) revealed that processing is predominantly (58%) a woman affair, males accounting for 42% with modal processors age being 32 years. Flour was the most common processed cassava product on Coast region (33%) while dried chips was highly produced in Migori and Busia (western region) in equal proportion of 43%. Other important products included cassava crisps and composite flour. Coast region had a greater diversity of products which are nonexistent in other regions. Most of processing across the regions are small scale with workers mostly being the owners and activities take place in open yards with majority of these being in Busia (85%) followed by Migori (67%) and coast region (57%). Constraints during cassava processing were ranked in the following order: Irregular and inadequate supply coupled with low seasonal demand for cassava and cassava products; high perishability of the tubers, lack of value addition and processing tools, poor group dynamics, cohesion and management structure; lack of capacity building in production and processing technologies. There is very limited value addition to cassava in the study regions and hence the need to develop innovative technologies as well as new domestic and industrial products.

However, recent advances have seen cassava value addition in Rachuonyo, Nyanza region, at three levels: Level 1- Post-harvest level/primary processing: Proper cleaning, grading and packaging sweet potato tuber roots for sales which is the most common type practiced by most farmers. Level 2 - Secondary/ basic processing, packaging and branding: Such as grinding sweet potatoes into flour and packing the flour into different respective sizes. Level 3 - High end processing: Such as actual cooking to get potato chips, noodles. candy, desserts, mandazi, chapatti, buns, biscuits, bread and Karukaru, making potato juice or actual packaging of processed foods, branding, and marketing (Oluoch et al., 2016). Apart from these, processed flour is bought by poultry farmers as animal feed, also by bakeries and other food service providers. To ensure nothing goes to waste, the plant leaves and stems are used for animal feed (Muturi, 2015).

Studies have shown that cassava is mainly grown by smallholders in mixed cropping with many other crops, and lately in sole crop stands (National Policy on Cassava Industry, 2005). The crop has higher farm returns compared to maize in Kuria West Sub County and is the main staple food. However, the average production per hectare is 6.8 tonnes (GOK, 2010). This performance could be explained by many factors among them gender aspects and decent work attributes. Commercialization of cassava sector necessarily brings with it a 'demand pull' that leads to an increase in domestic production with greater demand for the crop, farmers can be encouraged to grow high yielding varieties and the use of improved agronomic and other post-harvest practices (Adebayo et al., 2013).

Effective application of agricultural technologies in production has strategic gender implications. According to Odii (1996), rural development policies directed at the household may not have their intended effects or produce unintended negative outcomes, unless the role and position of gender in rural households are explicitly taken into account. Ignoring gender roles in agricultural interventions comes at a great cost to people's well-being and countries' ability to reduce food insecurity and poverty. In Kenya, for example, giving the same attention to men and women in an agricultural progamme or project results to an increase in output by 20% (World Bank, 2005).

The decent work agenda is also a critical component in enhancing agricultural production and food security as envisaged in the International Labour Organization report (ILO) (2003). Cassava offers many employment (including self - employment) opportunities along the production and on-farm processing. The production and

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Figure 1. Conceptual framework.

processing activities include, land and planting material planting, weeding, harvesting ,peeling, preparation, slicing to chips, drying, and grinding into flour (AIC, 2002). Due to the influence they have on the quality of life, the employment opportunities during production and processing of cassava can have higher expected results if carried out within the decent work concept. The criteria for decent work defined by ILO are: Productive work, health and safety, social security and social dialogue to both employees and the self - employed (Somavia, 1999). ILO has developed indicators for decent work for the four pillars including, minimum wage, safe and risk free working environment, access to an insurance fund and pension scheme, and collective bargaining (Anker et al., 2002).

Consequently, in Kuria west sub-county, since the crop is labour intensive, the gender roles in the different activities along the production and on-farm processing have not been established. Further, it has not been evaluated whether all the activities in the production and on-farm processing constitute decent and productive employment. Gainful employment can enhance enterprise production thus improving food security in the household. These were achieved through the following objectives: To analyze the socioeconomic characteristics of farmers involved in cassava production and on-farm processing; to determine the level of involvement by men in cassava production and on-farm and women processing activities; to determine the factors that affect involvement in cassava production and on-farm processing; to compare the working conditions of cassava farmers with the ILO standards of decent work.

# MATERIALS AND METHODS

# The study area

This study was conducted in Kuria west Sub-county of Migori County. It is the southern-most sub county bordering Tanzania to the South-West (Figure 1). To the East it shares its borders with Kuria East and to North is Migori. The sub-county covers an area of 394.7 Km<sup>2</sup> of which 94.8% is arable and 75.6% is cultivated. It is unique in that it is agriculturally endowed with two distinct agroclimatic zones; the Upper Midlands (UM) and Lower Midlands (LM) compared to the other sub-counties of Migori at the lower altitude ranges. Food crops grown including maize, cassava, sweet potatoes, millet and sorghum. Cassava is traditionally the main food crop. It forms part of the daily ration for almost all the households in the sub county. Livestock reared are local cattle, goats, sheep and poultry.

### Sampling procedure and data collection

Data was collected from 224 systematically selected farmers drawn from four wards where cassava farming and processing activities are evenly distributed. A sampling frame was established from the sub-county farmers' list using the formula K=N/n, where, K is the sampling interval; N is the population size and n is the sample size. The first farmer was selected using lottery method but the subsequent respondents were selected by taking every K<sup>th</sup> farmer from the list.

The sample size was determined by using (Kothari, 1990):

 Table 1. Sampling distribution and size.

Ward	Population	Sample size
Isibania	3414	57
Masaba	3041	52
Tagare	3270	55
Nyamosense	3847	63
Total	13572	226

$$n = \frac{pqZ^2}{E^2}$$

Where *n* is the sample size, *Z* is the desired level of confidence, *p* is the proportion of the population producing and processing cassava is known (MoA, 2015) and *E* is the absolute size of the error in estimating the value of *p* that the researcher is willing to permit; q = 1-p. A 95% level of confidence (Z= 1.96), with an allowable error of 0.055.With these values; p = 0.82, q = 1-0.82 = 0.18, Z= 1.96 and E = 0.055 then the sample size was  $0.82 \times 0.18 \times 1.96^2 / 0.055^2 \equiv 226$  Therefore, this resulted in

a sample size of 226 respondents who were divided proportionally to the ratio of the total number farmers in the sampled wards as shown in Table 1.

### METHOD OF DATA ANALYSIS

### **Conceptual framework**

The conceptual framework of the study is given in Figure 2.

### Data analysis

To describe the socio-economic characteristics descriptive statistics such as percentages and means were used. The base for comparing the earnings from cassava activities was the minimum wage as set by the government of Kenya, while the other decent work variables were compared with the ILO standards.

The level of participation in cassava production and processing activities was analyzed using a participation index. The index was constructed using a 4 point Likert scale after Ayoade et al. (2009). The participation was measured on scale 1 to 4 in order of involvement from; never involved = 1; rarely involved = 1.1 - 1.9; sufficiently involved = 2 - 2.9; always involved = 3 to 3.9. The mean score for each of the activities was calculated and the grand mean score of all the practices was divided by the number of activities to determine the level of participation of each gender in cassava production and on-farm processing in the area.

The factors that affect participation in cassava production and processing were analyzed using Ordinary Least Square regression model where the mean participation index was used as the endogenous variable in the regression model:

$$Y_i = \alpha + \beta \chi_i + \varepsilon$$

Where Yi is the participation index calculated as a mean of the activities the respondent participated in,  $\chi$  is a vector of the

individual's characteristics and eta is a vector of parameters.

The explicit form, of the model was specified as:

$$Y = \beta 1 + \beta 2 \chi 2 + \beta 3 \chi 3 + \beta 4 \chi 4 + \beta 5 \chi 5 + \beta 6 \chi 6 + \beta 7 \chi 7 + \beta 8 \chi 8 + \varepsilon$$

Where, Yi = Participation index of the respondents; $\chi 2$  = Age of the respondents (years);  $\chi 3$  = Experience in cassava (years);  $\chi 4$  = Number of years in school;  $\chi 5$  = Extension contact (number of visits in a year);  $\chi 6$  = Access to credit (Dummy: 1 = yes; 0 = otherwise);  $\chi 7$  = Farm income (KES);  $\chi 8$  = Group participation (Dummy: 1 = yes; 0 = otherwise);  $\beta 1$  = The intercept;  $\beta 2 - \beta 8$  = Regression coefficients;  $\varepsilon$  = Error term.

### **RESULTS AND DISCUSSION**

### Socio-economic characteristics

Table 2 presents t-test results (95% confidence level) for equality of means for age, household size, farm size, education farm incomes cassava experience, credit access and group participation between men and women involved in cassava production and on-farm processing. The results show that there was a significant difference between means of men and women in house hold sizes, farm sizes and education. However there was no significant difference between them in the other variables.

The larger house hold sizes of men headed over women headed are explained by the polygamous nature of the Kuria community emanating from early marriages of teenage girls (Magangi, 2013). On average, men were more educated than women due to the retrogressive culture of female genital mutilation which signifies passage from childhood to womanhood at an early age (Ondiek, 2010). This effectively terminates girls' education and compels them to engage in household and farm activities such as cassava production

Further analysis was done on the socio-economic characteristics to demonstrate their distribution among the households. Results presented in Table 3 show that the modal class of cassava farmers was between 31 and 44 years for both men and women. This represents about 49.1 and 38.8% of men and women respectively indicating that majority of the farmers in the sub county were in their middle and active age of life. This is supportive to cassava production and processing. Similar findings by Onuebunwa and Adesope (2006) and



Figure 2. Map of Kuria West Sub County. Source: World Resources Institute, Egerton University.

Table 2. Test for equality of means of socio-economic characteristics of men and women cassava farmers.

Variable	Т	Df	p-value	Mean difference	Std. error difference
Age	-0.78	222	0.43	1.24	1.59
Household size	-2.19	222	0.02**	-0.54	0.24
Farm size	-3.29	222	0.00***	1.18	0.36
Education	-2.98	222	0.00***	1.39	0.46
Farm incomes	-0.53	222	0.59	0.09	0.16
Cassava experience	0.66	222	0.50	0.71	1.06

\*\*\*, \*\*, \*: significant at 1, 5 and 10%.

Demonster		N	Gender		<b>T</b> . ( . )
Parameter		N	Women	Men	lotai
	12-18	224	.86		.44
	19-30	224	24.13	14.81	19.64
Age	31-44	224	38.79	49.07	43.75
	45-60	224	30.17	31.48	30.80
	>60	224	6.03	4.63	5.35
Total			100	100	100

Table 3. Age distribution of cassava farmers by gender in percentage.

 Table 4. Marital status of cassava farmers by gender in percentage.

Parameter		-	Ger	Tatal	
		n	Women	Men	Total
	Single	224	3.4	.92	2.23
Age	Married	224	73.27	98.14	85.26
	Widow/er	224	23.27	.92	12.50
Total			100	100	100

 Table 5. House hold size of cassava farmers by gender in percentage.

		N	Gender		
		IN	Women	Men	Total
	2-4	224	18.96	14.81	16.96
Household	5-7	224	67.24	56.48	62.05
size	8-10	224	12.93	28.70	20.53
	>10	224	.86		.44
Total			100	100	100

Onyemauwa et al. (2007) have revealed that men and women between early 30's to early 50's take active part in food crop production. It is instructive in that the younger generation has a lower level of involvement since cassava is regarded as a poor man's crop (Nyamwange, 1995).The marital status is shown on Table 4 and gives the evidence that 73.3% of women and 98.1% of men were in marriage while 23.3% of women were widows and only 3.4% were single. This means that majority of cassava farmers in the sub county are in a family setup where roles are defined by the culture. This has an influence on the overall management in terms of resource allocation, production techniques as well as processing and marketing.

The modal class of the house hold sizes was that of between 5 and 7 people per household at 67.2 and 56.5% for women and men, respectively as shown in Table 5. The results are consistent with GoK (2013) that the average household size in Kenya is 5.1 persons. It is important to note that the category of 8 to 10 persons was more prevalent in men headed households (28.7%) due to polygamy. The importance of family size is that cassava production is labour intensive and larger households signify more land being put under the crop (Tana, 2011).

The income accruing from production and processing of cassava is somewhat the same for both women (KES 3292) and men (3383) as shown in Table 6. Such low incomes are because they live in the same environment and face the same markets with little linkage with external markets. Indeed, Mumbi et al. (2008) revealed that farmers mainly supply to local trading centers where the wholesale or retail cassava are dried or sliced. Their participation along the distribution channel is mostly active at farm gate level, local trading centers, and market retail systems. Other findings have shown that farmers who were in farming and marketing groups were more involved in value addition. This is because they could benefit from collective marketing due to a stronger bargaining power compared to those who did not belong 
 Table 6. Income and experience in cassava activities by gender.

Gender	Ν	Cassava income (KES '000)	Experience in years
Women	116	3.292	17.767
Men	108	3.383	17.056
Total	224	3.336	17.424

Table 7. Level of involvement of cassava farmers in production and on-farm processing by gender.

A - (1-1)(	Gen	der
Activity	Women	Men
Land preparation	1.776	2.583
Gathering planting materials	2.474	1.685
Cuttings preparation	2.638	1.333
Planting	2.742	1.517
Weeding	2.250	1.722
Harvesting	2.466	1.222
Peeling	3.147	.852
Grating	3.144	.7870
Milling	2.716	.676
Level of involvement	2.595***	1.377

to any marketing group. The ready markets for value added products were a motivation for most of them to be involved in value addition at all levels (Oluoch et al., 2016).

Experience in cassava production was s not distinctly different for both men and women suggesting that it was introduced to the area at the same time though women had a slightly early lead in its uptake.

# Level of involvement of men and women in cassava production and on-farm processing

Table 7 presents results of the level of involvement per gender in the nine cassava production and on-farm processing activities. The findings show that women were involved more in peeling and grating as well as sufficiently involved in planting, milling, cuttings preparation, and gathering of planting materials. However they were rarely involved in land preparation as shown by a low mean participation index of 1.7

Men on the other hand were sufficiently involved in land preparation with a high mean index of 2.6 while they would rarely engage in peeling grating and milling indicated by an index of less than 1. The mean level of involvement in all the activities per gender was 2.6 for women and 1.4 for men, indicating that women were about twice sufficiently involved in cassava production and on-farm processing activities as compared to men. This result is significantly different at 1%. The findings match those of Okolo (1986) that cassava is women's crop. However, increased productivity through GM material could alter the power relations between men and women, as more output might encourage men to sell the crops in markets, giving them, rather than women access to much-needed cash (James et al., 2014).

Other findings such as UNDP (2012) found that of those involved in cassava production in Uganda 65% were women. However, Nweke (2005) in a review of cassava in Africa revealed that both men and women made significant contributions of their labour to the cassava industry in most of the COSCA countries though they distinctly specialized in different tasks. Whereas men worked predominantly on land clearing, ploughing and planting, women specialized in weeding, harvesting, transporting and processing.

# Factors affecting level of involvement of men and women in cassava production and on-farm processing

# Women involvement

The result of ordinary least squares multiple regression for women involvement are presented in Table 8. Though the coefficients of multiple determinations ( $R^2$ ) is not high (0.48), the model was statistically significant and had low standard errors at 95% confidence level.

The results show that there was significant (p<0.05)

Variable	Coef	Standard error	Т	P> t
Age	-0.019	0.004	-5.06	0.000***
Education	-0.007	0.012	-0.57	0.572
Farm Income	-0.010	0.026	-0.38	0.706
Ext contacts	0.149	0.035	4.23	0.000***
Cred access	0.159	0.070	2.26	0.026**
Cass exper	0.015	0.005	2.68	0.009**
Grp part	0.085	0.090	0.95	0.345
Cons	2.700	0.218	12.38	0.000***
Source	SS	df	MS	
Model	11.627	7	1.661	
Residual	12.477	108	.116	
Total	24.104	115	.210	
Number of obs	116			
F(7, 108)	14.38			
Prob > F	0.000			
R <sup>2</sup>	0.482			
Adj R <sup>2</sup>	0.449			
Root MSE	0.340			

Table 8. Factors affecting women level of involvement in cassava production and on-farm processing.

\*\*\*, \*\*, \*: significant at 1, 5 and 10%.

and positive relationship between women level of involvement in cassava production and on-farm processing and age, number of extension visits, credit access, and experience in cassava production and processing.

Age had a significant (p<0.05) but negative relationship with women involvement in cassava production and processing. This implies that as women grow older their level of involvement in cassava activities reduces. This is contrary to *a priori* expectation. The reason for this is that as age increases the productivity of their labour goes down since cassava is a labour intensive crop. It can also be adduced that since they live in an extended family set up, the younger women in the family assist the older ones more so because cassava is grown as a food crop.

As women got more contact with extension agents, they became more involved in cassava production and on-farm processing suggesting that they received positive information on the enterprise. Access to credit increased the involvement by women in the cassava activities. This is plausible since production and processing activities require finances. The results concur with Damisa et al. (2007).

# Men involvement

Table 9 shows that there was significant (p<0.05) and positive relationship between level of involvement in cassava production and on-farm processing by men and number of extension visits, credit access, experience in

production and processing and group participation.

More extension contacts serve as a source of varied information as relates to cassava in totality. Kessy and Temu (2010) noted that training shapes human motivation factors necessary for engagement in the practice being promoted. Farm activities require funding and credit is one source of funds. Access to credit was positive and significant at 1% suggesting that an additional unit of credit will increase the level of men involvement in cassava activities by about 9%. Findings by Nzomo and Muturi (2014) showed that agricultural credit has the capacity to enhance the income of farmers who utilize it by more than 100%. The positive coefficient for experience suggests that the longer men participate in cassava enterprise, the more they appreciate the benefits and hence increase their involvement in its production and processing. Farmers with more years of experience acquire knowledge and skills necessary for choosing appropriate farming technologies (Faturoti et al., 2006).

The benefits inherent in group membership include access to inputs at reduced price due to bulk purchase, subsidized transport and improved credit access as they guarantee each other. Expectedly, group membership increased men's involvement in cassava production and on-farm processing activities.

# **Decent work activities**

The decent work issues addressed in this section include hourly payments, access to social security, hospital

Variable	Coef	Standard error	Т	P> t
Age	-0.001	0.003	-0.37	0.709
Education	-0.001	0.008	-0.14	0.888
Farm Income	-0.020	0.025	-0.79	0.429
Ext contacts	0.216	0.026	8.33	0.000***
Cred access	0.819	0.057	3.35	0.001***
Cass exper	0.010	0.004	2.76	0.007**
Grp part	0.210	0.072	2.94	0.004***
Cons	0.571	0.178	3.21	0.002***
Source	SS	df	MS	
Model	9.750	7	1.393	
Residual	6.764	100	0.0676	
Total	16.514	107	0.154	
Prob > F	0.000			
$R^2$	0.590			
Root MSE	0.260			
Adj R <sup>2</sup>	0.562			
Number of obs	108			
F(7, 100)	20.59			

Table 9. Factors affecting men level of involvement in cassava production and on-farm processing.

\*\*\*, \*\*, \*: significant at 1, 5 and 10%.

Table 10. Hourly payments of cassava farmers for cassava activities on average in Kenya shillings.

Variable	Ν	Mean	Std. Dev.
Hourly pay (women)	116	78.741	10.342
Hourly pay (men)	108	77.315	8.586
Total	224	74.054***	9.544

\*\*\*: significant at 1%.

insurance fund, and safety measures.

# Hourly payments

Productive work is one that generates enough income to an individual that will take care of the basic needs for a decent lifestyle. According to the Kenya Gazette (2015), KES 54.7 is the minimum hourly pay set for gardeners as per the schedule for other areas where Kuria west subcounty falls.

However, results in Table 10 show the average hourly pay for carrying out cassava production and on-farm processing activities was KES 78.054. This is 44.4% higher than the set minimum by the government of Kenya and is significantly different with a p-value of 0.000 at 95% confidence level. There was no significant difference (p<0.05) between men and women earnings per hour. It can be adduced that cassava activities generate productive income to the farmers involved in the production and on-farm processing.

# Social security fund

From Table 11 the farmers who were not aware of National Social Security Fund (NSSF) services or any other social security fund were 68%. While 32% were aware, only 15.6% of the farmers were contributing to the National social security fund. The proportion (15.6%) of those contributing is not significantly different from the Kenya national target of 20% of eligible persons to be members of a social security fund at 95% confidence level with a p-value of 0.0733. However it was significantly different at 90% level. The main reason given by the other half (16.5 percent) that was aware but not contributing was that the services were not accessible to them

Further, 13.4% of cassava farmers financed their NSSF contributions from other sources while only 2.2% financed from cassava production and on- farm processing activities. The low level of contributions from cassava activities is in line with ILO (2010) report on social security scheme which reported a less than 1%

Table 11. NSSF	status of c	cassava	farmers	in	percentage.
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Awareness level	Percent	Standard error	N
Not aware	67.857	3.127	224
Aware	32.143	3.127	224
NSSF status			
Implementing	15.625 *	2.431	224
Not aware	67.857	3.127	224
Not available	16.518	2.487	224
Source of NSSF funds			
Other sources	13.393	2.281	224
Cassava	2.232	1.000	224
Not contributing	84.375	2.431	224

\*: Significant at 10%.

 Table 12. NHIF status of cassava farmers in percentage.

Awareness level	Percent	Standard error	Ν
Not aware	8.036	1.820	224
Aware	91.964	1.820	224
NHIF status			
Contributing	65.625*	3.181	224
Not aware	8.036	1.820	224
Not available	4.911	1.447	224
High rates	21.429	2.748	224
Source of NHIF funds			
Other sources	37.946	3.249	224
Cassava	27.679	2.996	224
Not contributing	34.375	3.180	224

\*Significant at 10%.

membership to the NSSF by members from the informal sector.

# National hospital insurance fund

Results showed that the level of awareness of NHIF services among the cassava farmers was high at almost 92% as shown in Table 12. The results revealed that 65.6% of the farmers involved in cassava production and on-farm processing were contributing to the NHIF scheme. This is not significant (P<0.05) from the current national coverage of 59.9% (Jamah, 2015). However, 5% of the farmers could not access the services while 21.4% could not afford the amount required for the NHIF contributions.

On sources of funds to the scheme, 37.9% of the cassava farmers used money from other sources to finance the scheme while 27.6% used money generated from cassava production and on-farm processing activities.

### Safety measures

Table 13 shows the safety measures undertaken by the farmers involved in cassava production and on-farm processing. The results disclosed that 64.7% of the farmers involved in cassava production and on-farm processing used some level of protective gear for safety during the operations. Gumboots are the most commonly used protective gear with 62% of the farmers confirming their use. Only 24.5% used hand gloves while 11.6 and 2% used dust masks and aprons respectively. Some of the farmers combined the protective gears used during the operations.

# Conclusions

There was no comparative advantage to either gender in cassava production and on-farm processing because socio-economic characteristics of both were not significant. The participation index showed that the level

Protective gear	Percent	Standard error	Ν
No	35.268	3.199	224
Yes	64.732	3.199	224
Gumboots used			
No	37.946	3.249	224
Yes	62.054	3.249	224
Gloves used			
No	75.446	2.882	224
Yes	24.554	2.882	224
Dust mask used			
No	88.393	2.145	224
Yes	11.607	2.145	224
Apron used			
No	97.768	0.989	224
Yes	2.232	0.989	224

Table 13. Safety measure undertaken for protection by cassava farmers in percentage.

of involvement in cassava production and on-farm processing was significantly different with women almost twice (2.6) involved than men (1.38). This clearly suggests that cassava is a women's crop in Kuria West Sub County though men play a critical role at the beginning of the production process.

Age had negative effect on the level of women involvement showing that younger women farmers undertook much of the production and processing activities of cassava. Extension contacts, credit access, experience in cassava activities, and group participation had significant and positive influence to the level of men involvement in cassava production and on - farm processing. It is recommended that tailored training by the ministry of agriculture extension staff on aspects of cassava production that improve productivity would expand quantity supplied. Farmers would benefit from a multi-faceted training on taking advantage of social capital to finance the cassava enterprise. One effective way of financing activities that has worked in rural areas of Kenya are savings and credit cooperatives (SACCOS) but it must be supported by intensive training on modalities of cooperative solutions.

Along with that, the agroecological conditions in the sub-county favour cassava production as the only food crop, the possibilities of fully fledged commercialization of cassava through processing are open and capable of attracting different investors. High-end processing to get commercial sweet potato flour, potato chips, noodles, candy, desserts, buns, biscuits, bread. These can be package, branded, and marketed domestically and in neighbouring countries within east Africa. Local utilization involves porridge preparation, *ugali*, and light alcoholic beverages. In decent work pillars, cassava activities generated income that was 44.4% higher than the minimum hour payments set by the Kenya government indicating decent earnings in line with the decent work

agenda. Social security is embraced by only 15.6% of the cassava farmers. Though cassava farmers were aware of the hospital insurance fund scheme 65.6% of them were contributing to the scheme.

The pillars of ILO framework on decent work can be enhanced through civic education on social security. The national government can hasten access to social security services by establishing an office in the area. Areas for further studies include studies on cassava productivity, collective action, and processing.

Suggestions for further research should explore institutions, behavioural factors and entrepreneurship.

# **CONFLICTS OF INTERESTS**

The authors have not declared any conflict of interests.

# Abbreviations

CGIAR, Consultative Group on international Agricultural Research; FAO, Food and Agriculture Organization of the United Nations; GoK, Government of Kenya; ICRISAT, International Crops Research Institute for Semi-Arid Tropics; IFPRI, International Food Policy Research Institute; KARI, Kenya Agricultural Research Institute (now KALRO); MoA, Ministry of Agriculture; SSA, Sub Saharan Africa; RIGA, Rural Income Generating Activities; ILO, International Labour Organization; UN, United Nations; NALEP, National Agriculture and Livestock Extension Programme; COSCA, Collaborative Study of Cassava in Africa; NSSF, National Social Security Fund; NHIF, National Hospital Insurance Fund.

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