

Gendered Roles in Bambara Production Activities: A Case of Butere and Mumias Districts, Kenya

M. A. Oyugi^{1*}, D. M. Amudavi², J. O. M. Nandi³, J. M. Ombati¹

1. Department of Agricultural Education & Extension, Egerton University, P.O. Box 536-20115, Egerton, Kenya
2. Biovision Farmer Communication Programme (FCP); International Centre of Insect Physiology and Ecology (icipe), Kenya
3. Social Science Education Department Masinde Muliro University of Science and Technology, P.O. Box 190 Kakamega, Kenya

*Corresponding author email: millakia@yahoo.com

ABSTRACT: Bambara groundnut is an underutilized leguminous crop grown in Western Kenya. In parts of the world the crop is often given less priority in allocation of land, produced traditionally and generally left to women despite its potential in food and economic security of farmers. This study investigated participation of farmers by gender on production activities of the groundnut in Butere and Mumias Districts in Kenya. Production aspects included; land preparation, planting, weeding, pest control, harvesting, drying, threshing and winnowing. The study employed a snowball sampling technique and a questionnaire to collect data from the farmers. Farmers' involvement in to production by gender was analyzed using ANOVA to confirm if a significant difference existed in the means of the computed indices that were a measure of the levels of involvement of men and women. The results indicate a significant difference in the means of Production Activity Index. In Butere (p-value= 0.013) and Mumias (P-value =0.000) implying a highly significant difference in farmers' participation in production by gender in both districts. This scenario could be due to the fact that production activities of food security crops are generally dominated by women in an attempt to ensure household food security and continue their cultivation; while men as being majorly involved in sugarcane production which is the main cash crop in the area based on the qualitative data. The findings revealed that bambara was produced mainly for household consumption and women being the active/ main participants; confirms the general argument that women play a vital role in ensuring household food security. The study clearly reveals women as the main actors in bambara production even though men also participated but at minimal levels; this is of value to agricultural extension officers and other development agencies to help them channel their effort in the right direction if they need to boost the production of the crop and to ensure food security of the area.

Key Words: Agricultural productivity, Food Security, Gender roles, Gender sensitive Information.

INTRODUCTION

Bambara groundnut is a leguminous crop grown by small scale farmers in some parts of Sub-Saharan Africa. It is also widely grown in parts of Asia, Northern Australia, and South and Central America. The Bambara groundnut is the third most important leguminous crop after common groundnuts and cowpeas, and is usually consumed by the rural farmers themselves where about 40% of the harvest is commercialized citation. It is assumed to be traditionally cultivated by women and is often given less priority in the allocation of land compared to cereals and other vegetables (Hammer *et al.*, 2001) but a more current citation is due check for the FAO cereals report 2011 . The crop is underutilized and until lately, an under-researched crop (Berchie *et al.*, 2013).

The International Centre for Underutilized Crops (ICUC), 2000 and Berchie *et al.*, (2013) noted that production of the crop is minimal due to limited research focus on the crop and extension agents' preference on promoting conventional food crops. Consequently, there is limited supportive information from extension agents for farmers for the development of underutilized crops (Brookfield *et al.*, 2002; Bioversity International, 2013). This has further delayed genetic improvement in the superior varieties of underutilized crops. Bambara groundnut is produced and consumed in Western Province of Kenya. The local environment in the region is much suitable for its

cultivation though previous studies indicates that its production has always remained low due to prohibitive cost of the seed among other factors (Ngugi, 1995). Azam-Ali and Mathews (2005) also noted that production remained low due to established shift in the focus of conventional staple foods and cash crops.

To address the gap of guaranteeing food security, the Government of Kenya (GoK) has invested resources to revitalize underutilized native crops with qualities of drought resistance and adaptability to the local environment through the “Njaa Marufuku Kenya” programme (NMK) under the National Agricultural Livestock Extension Program (NALEP). This programme was developed by the Ministry of Agriculture with support from the Food and Agriculture Organization of the United Nations (FAO) and Millennium Development Goals (MDG) Centre to operate within the context of Millennium Development Goal 1 and the Strategy for Revitalization of Agriculture (SRA), and the Agricultural Sector ministries, to provide an overall strategic framework for a 10-year action plan (2005-2015) towards addressing MDG No.1 of reducing by half the number of extremely hungry and poor Kenyans by the year 2015 (GoK, 2005).

Bambara groundnut is one of the underutilized native crops adapted to the environment of Western Province of Kenya (Ngugi, 1995). Strategies are being laid to revive its production due to its potential in alleviating malnutrition. The revival of Bambara groundnut was suggested to improve food production and economic security of farmers (Hammer *et al.*, 2001). The versatility of this crop may also open up changes of income from diverse outlets, a fact that may benefit farmers. For instance, Export Processing Zones Authority (2005) considered Bambara groundnut among the vegetable oil crops that may benefit from FAO’s initiated farmer-based support in oil growing areas in Western Kenya.

In order to fully revive Bambara groundnut in Western Kenya, there has to be a realization by development agents that agricultural production aimed at achieving food and economic security depends on economic and social conditions beyond farming systems (Meinzen-Dick, Lauren, Stephan, & Jessica, 2005). The gender aspect for instance, is very important because women are the custodians of seeds which greatly contribute to agro diversity conservation and consequently to food security (Momsem, 2007). Rural women in particular are responsible for half of the world’s food production and produce between 60 and 80% of the food in most developing countries (Finda, 2009). Yet, despite their contribution to global food security, women farmers are frequently underestimated and overlooked in development strategies (Finda, 2009). This has led to global concern, which in turn has led to a special focus on women in development issues.

Agricultural extension services play a key role in enhancing the empowerment of farmers by strengthening their capacity to participate in agricultural activities and demand for extension services from agencies external to their community (Government of Kenya, 2005). The area of “gender” however, requires special attention, because one-half of the rural labour force in developing countries consists of women (Meinzen-Dick *et al.*, 2005, Finda, 2009; Arongi, 2009). Extension agencies however, have often failed to get information to women due to time schedules that are not appropriate to them, illiteracy, and because extension personnel do not cater for men and women as separate clientele with different needs in agricultural labour force (Upadhyay, 2005). The lack of adequate agricultural information to female farmers constrains their ability to produce enough food and earn adequate income or maintain their household members (Saito & Weidman, 1990; Arongi, 2009). Hence this study focused on the relationship between gender and farmer involvement in agricultural activities because information on involvement of male and female farmers on production of Bambara groundnut; may have an implication on the strategies that extension agents use in advocating for its continued cultivation and its increased productivity in Butere and Mumias Districts

MATERIALS AND METHODS

The study covered Butere and Mumias Districts of Western Kenya in order to obtain adequate number of Bambara farmers from which the sample was drawn. Bambara groundnut was originally grown in this area in the 1950’s and 1960’s but was ignored after the introduction of market-oriented crops, specifically maize, beans and later sugarcane. Over time, sugarcane production has predominated rendering the study area food deficient (Ajani *et al.*, 2008). The Ministry of Agriculture (MOA) Strategy to emphasize orphaned crops has seen the revival of Bambara in the area thus giving hope for a safety option against food shortage (Njaa Marufuku Kenya (NMK), 2006).

Design and data collection: The study used a cross-sectional ex-post facto survey design to collect data from the study population. Snowball sampling was also employed to reach populations that are inaccessible or hard to find. From the sampling frame, the researcher proportionately selected a representative sample of 120 respondents in the study area. An interview schedule was administered in the study area to help collect primary data from the respondents to achieve the set objectives

RESULTS AND DISCUSSIONS

Gender involvement in production of bambara was analyzed using analysis of variance (ANOVA) and regression equation. The ANOVA was used to check whether there exists a significant difference in the means of the computed indices between the males and females. The indices computed acted as a measure of the level of involvement. On the other hand, the multiple regression equation was used to assess relationship of gender and selected socio-economic variables on farmer's level of involvement in production.

Gendered involvement in production was measured by farmers' level involvement in production activities: land Preparation (L.P), Planting (PL), weeding (WE), pest control (P.C), harvesting (HA), drying (DR), Threshing (TH) and winnowing (WI). Each activity was then coded using a 3 point Likert type scale with 3=Involved, 2=occasionally involved and 1=Not involved. A production activities index (P.A.I) was thus computed by summing up all the scores of all the activities to derive the mean score as shown on table 2. The higher PAI implied the higher level of the farmer involvement.

Table 1. Gender Involvement in Production Activities Index

District	Gender of respondent	Production activities index			Total
		Not involved	Occasionally involved	Involved	
Mumias	Male	7	14	2	23
		30.4%	60.9%	8.7%	100.0%
	Female	0	3	29	32
		.0%	9.4%	90.6%	100.0%
Total		7	17	31	55
		12.7%	30.9%	56.4%	100.0%
Ch-square = 37.227		df = 1	p-val= 0.000		
Butere	Male	5	15	15	35
		14.3%	42.9%	42.9%	100.0%
	Female	4	2	24	30
		13.3%	6.7%	80.0%	100.0%
Total		9	17	39	65
		13.8%	26.2%	60.0%	100.0%
Chi-square = 26.864		df = 2	p-val= 0.000		

The results in Table 1 indicate that gender was a significant factor in Bambara production activities in the two Districts with females exhibiting a higher level of involvement in the activities than male farmers. The finding concurred with Sangir *et al.*, (2005) who established more involvement of female farmers in the production activities of food crops.

Table 2 shows that the female farmers in the two Districts had a higher PAI than the male farmers. This finding indicates that female farmers had higher level of involvement in the production activities than the male farmers. Despite, some activities, especially land preparation requiring heavy labour generally provided by male farmers, production of Bambara groundnut still remained the domain of female farmers.

Table 2. Descriptive Statistics for Production Activities Index by Districts

District		N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Mumias	Male	23	1.6467	.48945	.10206	1.13	2.75
	Female	32	2.7656	.18716	.03309	2.13	3.00
	Total	55	2.2977	.65418	.08821	1.13	3.00
Butere	Male	35	2.1750	.56653	.09576	1.13	3.00
	Female	30	2.5625	.64973	.11862	1.00	3.00
	Total	65	2.3538	.63221	.07842	1.00	3.00

The analysis of variance was further used to find out whether a significant difference in farmers' involvement existed in the overall production activities by gender. The dependent variable was the production

activities index (PAI) while gender difference was considered to be the independent (factor). The results of the analysis by District are presented in Table 3.

Table 3. ANOVA for Gender and Production Activities Index

District	Source of variation	Sum of Squares	Df	Mean Square	F	p-value
Mumias	Between Groups	16.753	1	16.753	139.687	.000
	Within Groups	6.356	53	.120		
	Total	23.109	54			
Butere	Between Groups	2.426	1	2.426	6.600	.013
	Within Groups	23.155	63	.368		
	Total	25.580	64			

The results indicate a significant difference in the means of PAI by gender across the two Districts under study ($p < 0.05$). This implies that in Butere ($p\text{-val} = 0.013$) and Mumias ($p\text{-val} = 0.000$), gender significantly influences farmers' involvement in Bambara production activities. The findings differed with production of crops traditionally sold for cash (Petermann et al., 2010). In this case male farmers were significantly involved and dominated the production.

Further analysis was done via a regression model to find out the relationship between the various indicator variables' contribution to the PAI. The independent (predictor) variables included gender of the respondents, Education level, land tenure, farm size, and main occupation, accessibility to market and accessibility to extension services. Specifically, the variables for age in years and farm size in acres were used directly while the remaining predictors were transformed into dummy variables. The dummies were then coded using a likert scale. The PAI regression analysis results are presented in Table 4.

Table 4. Regression Analysis for PAI

Variable	Variable/Dummy	Estimate	Std. Error	T	p-value
Constant	(Constant)	1.938	.607	3.191	.002
Gender	Female	.692	.108	6.378	.000
Age	Age (years)	.001	.005	.297	.767
Education Level	Primary level	-.304	.252	-1.207	.230
	Secondary level	-.354	.258	-1.371	.173
	Post secondary level	-.310	.427	-.727	.469
	Diploma level	-.235	.495	-.476	.635
Land Tenure	Owner with title deed	.218	.413	.527	.599
	Owner without title deed	.101	.409	.247	.806
	Communal ownership	.181	.421	.430	.668
Farm size	Farm size(acres)	-.048	.024	-1.970	.047
Main occupation	Full time farmer	.286	.321	.892	.374
	Part time farmer	.248	.326	.760	.449
	Business/trader farmer	.160	.372	.429	.669
Access to Market	Distance to the nearest local market	.019	.024	.792	.430
Access to extension services	Extension Not Easy	-.033	.164	-.204	.839
	Extension Easy	-.108	.165	-.654	.514

Dependent Variable: Production Activities Index, Adjusted R-square = 25.3%, Regression ANOVA F-statistic = 3.503, df = 16, p-val= 0.000

The results indicate a significant relationship of gender on the production activities. The finding concurred with the previous study by Meinze-Dick et al. (2010) and Fakoya et al. (2006). The authors established marked distinction in the role of gender similar to the production of Bambara groundnut. These authors found that the crop was mainly grown for food while Female farmers have greater responsibility in the production of Bambara groundnut more than the male farmers who neglect and associate the crop with women as they pursue crops with greater market potential. These authors identified access to the market as key underlying factor for involvement of the male farmers in the production activities.

The model adequacy was analyzed using the adjusted R-square which was at 25.3% implying that the model only explained 25.3% of the dependent variable (PAI). Further, the regression ANOVA was used to measure the significance of the regression (predictor variables combined) on the dependent variable. The regression

ANOVA is presented in Table 4. The regression was statistically significant at $\alpha = 0.05$ as shown by the regression ANOVA. This implies that the combination of the studied independent variables significantly affects the production index.

CONCLUSION

From empirical results of the study, it is evident that female farmers are more involved than males in cultivation of bambara groundnut in Butere and Mumias districts. Improving male and female access to agricultural research and extension services geared towards revitalizing their participation in cultivation of underutilized crop such as Bambara groundnut is critical and must consider the gender that participates in cultivation of a given crop. This approach helps in targeting the right clientele in terms of gender, age, education level, farm size with appropriate technologies and programmes to enable them revive the crop. This study thus focused on the relationship between gender and farmer involvement in agricultural activities because information on involvement of male and female farmers on production Bambara groundnut; may have an implication on the strategies that extension agents use in advocating for its continued cultivation and its increased productivity in Butere and Mumias Districts.

A comparative study of regions that grow cash crop and non-cash crop may also be considered. Considering the need to fully revive production of this crop in the study area, future research should undertake studies to identify incentives and constraints under which men and women work in order to get information that can be used for tailoring planned interventions that eventually lead to overall improved productivity.

REFERENCES

- Arongi M.2009. Enhancing Agricultural Productivity and Livelihood of Rural Women through Information and Communication Technology. In Agricultural Innovations for Sustainable Development. Contributions from the Finalists of the African Women in Science Competition. Volume2 Issue 1. Thechnical Report for CTA/ATPS/AGRA/FARA/NEPAD/RUFORUM.
- assessment and costing report. Ministry of Planning and National Development, Nairobi.
- Azam-Ali S, Mathews R.2005. Modelling variation in the physiology of Bambara groundnut. Unpublished doctoral thesis, Cranfield University, Cranfield, Co.
- Berchie JN, Dapaah HA, Agyemang A, Asare A, Sarkodie-Addo J, Addy S, Donkoh J, Blankeson E. 2013. Effect of sowing date on the performance of Bambara groundnut (*Vigna subterranean* (L.) Verdc.) landraces in the transition and forest agro-ecologies of Ghana. Paper presented during the 3rd International Conference on Neglected and Underutilized Species: For a Food-Secure Africa, Accra Ghana, 25-27 September 2013.
- Bioversity International.2013. Fighting Poverty, Hunger and Malnutrition with Neglected and Underutilized Species: Needs Challenges and the Way Forward. Bioversity International, Rome Italy.
- Cultivation and its contributions to Household Food Security in Ogun State. Research Export Processing Zones Authority.2005. Vegetable Oil Industry report. Retrieved March 27, 2009: <http://www.epzakenya.com>
- Fakoya EO, Adereti FO, Apantaku SO.2006. Gender Involvement in Arable Crop
- Finda B Jenkins.2009. Gender and Social Issues of Rice-Based Farmers in Rokupr, Kamba District, during the 2005/2006 Cropping Season. In Agricultural Innovations for Sustainable Development. Contributions from the Finalists of the African Women in Science Competition. Volume2 Issue 1. Thechnical Report for CTA/ATPS/AGRA/FARA/NEPAD/RUFORUM.
- Genetic Resources and crop evolution (48), 3-5.
- Goldey P, Varma SK.2005. Gender roles in farming systems in Haryana state, India: Implications for food security. Unpublished manuscript. Haryana Agricultural University at Hisar.
- Government of Kenya. 2005. Achieving Millennium Development Goals in Kenya. A needs
- Hammer K, Heller J, Engels J. 2001. Monographs on underutilized and neglected crops. Genetic Resources and Crop Evolution, (48), 3-5.
- Hammer K, Heller J, Engels J. 2001. Monographs on underutilized and neglected crop. <http://www.soton.ac.uk/icuc>
- International Centre for Underutilized Crops. 2000. Global newsletter on underutilized crops. Journal of Social Sciences , 1 (1), 1-4.
- Meinzen-Dick R, Lauren P, Stephan D, Jessica A. 2005. Gender and Collective Action: A Conceptual Framework for Analysis International Research Workshop on 'Gender and Collective Action', 17-21 October 2005, Chiang Mai, Thailand
- Meinzen-Dick R, Quisumbing A, Behrman J, Jenzano PB, Wilde V, Noordeloos M. 2010. March 30). Engendering Agricultural Research. Paper presented at the 2010 Global Conference on Agriculture and Rural Development. Montpellier, France, 28-31 March. From <http://www.slideshare.net/IFPRIGender/engendering-agricultural/>
- Momsem JH.2007. Gender and agro biodiversity: Introduction to the special issue. Singapore Journal of Tropical Geography, 28 (1), 1-6.
- Ngugi WN. 2006. Bambara Production in Kenya. In Heller, J. & Mushonga, J. (Ed.),
- Njaa Marufuku Kenya.2006. A Call for Action to Eradicate Hunger in Kenya: *Operational guidelines for implementation*. Maendeleo House. Nairobi. Kenya.
- Promoting the Conservation and Use of Underutilized and Neglected Crops (pp. 33-45). Nairobi, Kenya: Maendeleo House.
- Retrieved march 27, 2009, from Global centre for underutilized crops:
- Saito KA, Weideman CJ. 1990. Agricultural extension for women farmers in Africa. World Bank.
- Upadhyay B. 2005. Women and natural resource management: Illustrations from India and Nepal. Natural Resources Forum, 29, 224-232.