PRODUCTION AND CONSUMPTION OF UNDERUTILISED INDIGENOUS VEGETABLES (UIVs) AMONG MEN AND WOMEN FARMERS: EVIDENCE FROM SOUTHWEST NIGERIA

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ABSTRACT

The study determined the variables influencing involvement of selected Nigeria-Canada Vegetable (NiCanVeg) project farmers in the production, processing and consumption of underutilised indigenous vegetables (UIVs) in Southwest Nigeria. Gender Equality Framework was used to draw a clear distinction and demonstrate inter-relationships among men and women farmers under the project. Seventy eight participating farmers in four purposively-selected sites (54 women and 24 men) under the Nigeria's Obafemi Awolowo University coordinating team were interviewed for the study using a well structured interview schedule. The mean age of the male and female farmers were 41.9±1.39 and 37.17±11.03 years, respectively. The farmers were dominated by Christians; 74.4% of the total men population and 63.37% of the total women population, with mean annual income of ₦7,000 and ₦ 5,800 from vegetable production for men and women farmers, respectively. Consumption of the various UIVs is high as majority (67.5% men and 85.7% women) of the farmers indicated that NiCanVeg project has increased awareness on the agronomic practices as well as the nutritional compositions of the various UIVs under study through the numerous expository programs of the project. Among the ten UIVs investigated, Igbagba/garden egg (Solanum macrocarpon) was the major vegetable grown by male farmers while Apiroko/Fluted pumpkin (Telfairia occidentalis) was the major vegetable grown by female farmers. Results of Pearson's Correlation showed that farm size ($r = 0.528$; $P \leq 0.002$) and previous experience($r = 0.671$; $P \leq 0.000$) were established as the correlates of the level of involvement in production and consumption of UIVs among men while farm size ($r = 0.081$; $P \leq 0.006$); age ($r = 0.813$; $P \leq 0.048$) and years of formal education ($r = 0.053$; $P \leq 0.05$) correlated significantly with women's level of involvement in production and consumption of UIVs. This is expected to increase the food security base of the people, in conformation with some studies that established that women play significant role in fighting hunger and food insecurity in developing countries as they are the 'heart' of agricultural activities in the region. It was therefore suggested that NiCanVeg should target more women involvement in production and encourage equal distribution of assets between gender with a view to increasing food production and reducing hunger in Nigeria.

Keywords: Underutilised vegetables, NiCanVeg project, production and consumption, involvement

INTRODUCTION

The number of hungry people in Nigeria is over 53 million (approximately 30% of total population) and 52% live under the poverty line of 1 US Dollar per day (Andohol, 2012). Kana *et al.* (2012) also posited that many Nigerians are still trapped in the spiral of hardship that hunger imposed and that this figure rises even amidst the riches through oil and other mineral resources that were recently discovered in Nigeria. The above scenario gave rise to a quote by a popular Agriculturist, "Nigeria, blessed as it is, with abundant agro-ecological resources and diversity, has become one of the largest food importers in sub-Saharan Africa" (Idachaba, 2009). This summarised the level of food insecurity status in Nigeria despite the huge resources that the country is blessed with, hunger and malnutrition are seen among the populace, most especially in rural areas where over 70 per cent of the food consumed in the country is produced. Hunger is a serious problem in most developing countries and it is inextricably linked with poverty. However, Nigeria has the capacity and capability to eliminate hunger through the distribution of foods, seeds and knowledge.

In Nigeria as well as other parts of the world, the need for food has become a policy issue. This need has taken all important dimensions because the basic nutrients in diet are necessary for proper functioning of the body. Poverty and hunger result from trade and economic policy decisions that lead to increasing inequalities in distribution of income and food. Hunger persists because there is a lack of political will to address these problems. Ten million hunger-related death occurring every year in developing countries of the world (children accounting for about 50%) testify to the nations' failure to achieve global food security. Over 105 million people remain trapped in the spiral of hardship that hunger imposed a figure which continues to rise even amidst the riches of the 21st century (Anon, 2008).

Researches had showed that the major cause of this malnutrition and hunger is food insecurity (Juma *et al.*, 2013) and one of the ways to tackle food insecurity is to revisit the neglected and underutilised crops. Underutilised crops are found in numerous agricultural ecosystems and often survive mainly in marginal areas. They are species with under -exploited potential for contributing to food security and nutrition by combating 'hidden hunger' caused by micronutrient deficiencies; they often have medicinal properties and other multiple uses; they provide options for use as industrial raw materials. The consumption of these crops, especially vegetables, is low in developing countries compared to the developed ones (Anon, 2008).

Underutilised vegetables are crucial in eliminating hunger due to their short gestation period and their ability to generate quick income to the farmers. Thus, they make a significant contribution to household income. These vegetables have the potential to assume a more important role globally in the sustainable supply of diverse and nutritious food if given appropriate attention by the government and other developmental stakeholders. Pandy (2008) described

underutilised/neglected vegetables as indigenous vegetables that are rich sources of phyto-chemicals and possess significant medicinal attributes which are useful for human health. He further observed that the occurrence of negleting some of these vegetabels is a worldwide phenomenon. Farmers' involvement in the production of these under-utilised species can improve their income, health and even their nutritional levels. It could also make them to spend less on their health as vitamins, minerals and phyto-protein which are good for body maintenance and repairing of worn-out tissues are derived from these vegetables if consummed in adequate proportions.

Indigenous vegetables and fruits are an integral part of agricultural systems in Africa but unfortunately the government of most African countries have not given them priority in crop development. Most times, indigenous leafy vegetables are not mentioned when listing arable crops in Nigeria (Adebooye and Opabode, 2004). Most studies on leafy and fruit vegetables in Research Institutes and Universities have focused on the conventionally cultivated species where chemicals and other articially manufactured products are being used in producing the vegetables (Aina, 2005).

Nizamuddin *et al*. (2009) reported that vegetables are remunerative crops and that farmers, particularly men, tend to turn towards its production as it is known to generate quick income for sustenance. Okunlola (2009) further identified farm size, age, income and years of farming experience as variables that influenced the involvement of fadama farmers in vegetable production in Ondo State. In a study conducted in Ondo State, Deji *et al.* (2012) identified non-availabilty of land, inadequate inputs, lack of extension contact, transportation, storage and high cost of input as constraints facing men and women vegetable farmers but at differrent degrees; which was attributed to the differences in roles and responsibilities of each gender along the vegetable production chain. In addition, Agboola (2001) identified availability of credit source, high cost of inputs, irregular fuel supply, irregularity in water pump operation and frequent breakdown of water pump as contraints facing vegetable farmers in Remo Local Government Area of Ogun State. In the same vein, Adebisi *et al.* (2011) opined that credit facilities and inputs were the major challenges of vegetable farmers in Oyo State, Nigeria. Sabo and Dia (2009) identified the use of crude implements, non-availability of inputs, illiteracy as well as expensive and complex technologies as constraints facing vegetable farmers in Nigeria.

The importance of indigenous leafy vegetables and fruits to human nutrition, medicine and nature in southwestern Nigeria is expected to be realized through the intervention of NiCanVeg project. The project, since its inception, has created awareness on the usefulness of ten (10) under-utilized indigenous vegetables (UIVs) commonly consumed in southwestern Nigeria. This is achieved through a Nigeria and Canada under-utilized vegetable project initiated in 2010 and funded by the Government of Canada and International Development Research Council.

The project aims at revamping the underutilised indigenous vegetables grown in southwestern Nigeria with a view to increasing farmers' income and alleviates poverty. The project has empowered farmers through the provision of production inputs and training on the production of these under-utilized vegetables especially among women farmers as they were the target. However, no systematic study had been conducted to assess the production level of these vegetables with gender consideration. Hence, the study was conducted to assess the extent of involvement of men and women in the production of UIVs and determine the variables that influence farmers' involvement in the production and consumption of these vegetables. Harvard Analytical Framework also known as the Gender Roles Framework was used to perform gender analysis. The Framework was developed by researchers at the Harvard Institute of International Development (HIID) in collaboration with USAID's Office of Women in Development. It represents one of the earliest efforts to systematize attention to both women and men and their different positions in society. It is based upon the position that allocating resources to women as well as men in development efforts makes economic sense and will make development itself more efficient. Key to the Harvard Analytical Framework is adequate data collection at the individual and household level, and adapts well to agricultural and other rural production systems. Data were collected on men's and women's activities and then considered according to how those activities reflect access to and control over income and resources, thereby "highlighting the incentives and constraints under which men and women work in order to anticipate how projects will impact their productive and reproductive activities as well as the responsibilities of other household members (Overholt, *et al.,* 1985) too long a sentence.

Methodology

The study was carried out in the NiCanVeg project area. This is a collaborative project between Obafemi Awolowo University and Osun State University in Nigeria; and Cape Breton University and University of Manitoba in Canada. The project was sponsored by the International Development Research Council (IDRC) and Canadian International Development Agency (CIDA), Some of these details are not needed in Methodology. The project started in 2010 with the inception workshop held at Obafemi Awolowo University Conference Centre, Ile-Ife, Nigeria. Please ensure that sentences in this paragraph are better knitted together for a more interesting read

The population for the study consists of all the farmers' groups within the project, who are involved in the cultivation of the under-utilised indegenuous vegetables (UIVs) in the project area. Multi-stage sampling procedure was adopted for site selection. At the first stage, savannah (Ekiti, Oyo and Ondo States) and rain forest (Osun States) zones were purposively selected in line with the project stipulation. At the second stage, two UIV farmers' groups comprising of average of 10 farmers were established in each State based on the zonal arrangement. In all, eight UIV farmers' groups were purposively selected for the

study. Lastly, all the available initial 78 UIV group members were samples?? and used for the study as shown in Figure 1.

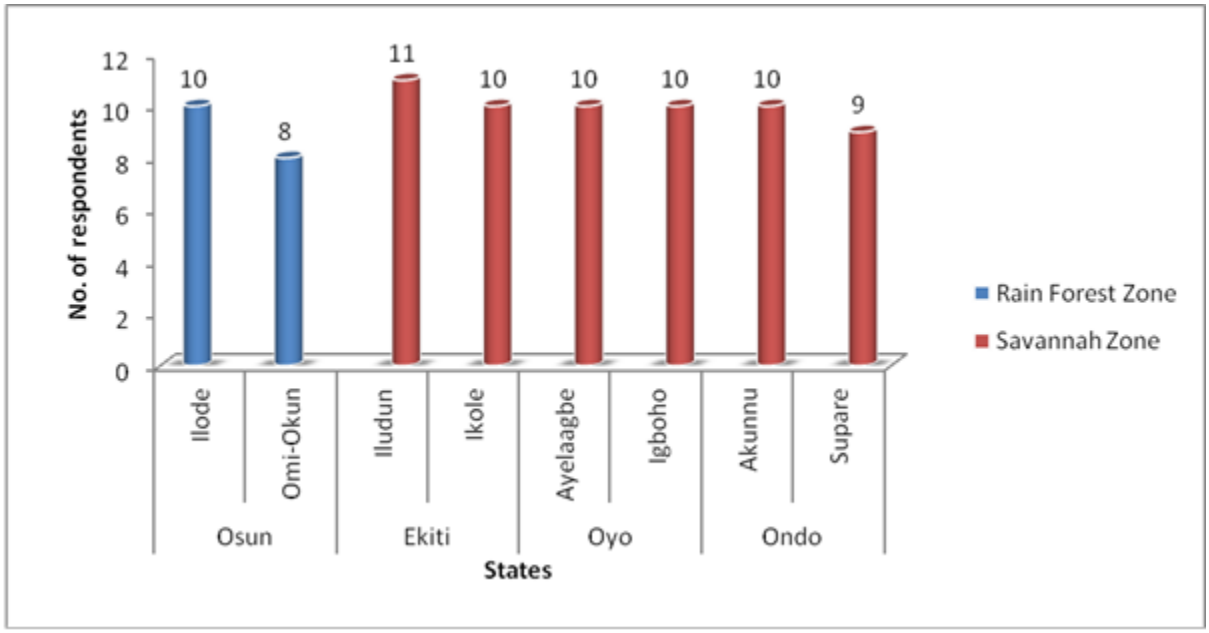

Figure 1: Distribution of UIV farmers across agro-ecological zones
Source: Field survey, 2013

Results and Discussion

Socio-economic characteristics

Results in Table 1 showed that the mean ages of the male and female farmers were 42±1.39 and 38±3.03 years, respectively. This implies that older men were involved in the production of UIVs compared to their female counterparts. The high standard deviation among the female further implied that the age ranges of female that are involved in UIVs production is widely spread unlike that of the male where they are of close age range. The findings also revealed that majority of male (79.2%) and female (90.7%) respondents were married while only 12.5% and 9.3%of male and female respondents respectively were single. However, 8.3% of the male respondents were separated. Results also revealed that about 37.5 per cent and 70.3 per cent of male and female UIV farmers had no formal education, 33.3 per cent and 16.7 per cent had primary education while 25.0 per cent and 13.0 per cent of male and female respondents, respectively had secondary education. In addition, only 4.2 per cent of male farmers had tertiary education while no female participating farmers had tertiary education, (and) the mean years of formal education among male and female farmers were 8.6±0.37 and 4.8±0.91 years, respectively. The findings revealed that UIVs farmers had low level of education, although male had relatively higher educational status than their female counterparts. The findings conformed to

Aina (2012) and the Ministry of Education Digest Statistics (2010) position that more male enrolled in Nigerian secondary schools than female; an indication that parents may likely support male education than the female education in the study area. Analysis further revealed that the mean annual income from UIVs were ₦7, 000 and ₦5, 800 for male and female farmers, respectively. The findings revealed income generated by the farmers from the sale of UIVs is low. This might not reflect their real income as low level of literacy may come to play in farmers knowing their actual annual income because most of them do not keep record of their activities, thus, they give out any figure that comes their mind. In another development, women tend to put themselves under men due to their cultural background and the societal norms that prevailed in most rural areas. As such, they allow men responses to determine theirs in most cases, especially in any project or programme that does not separate them.

Table 1: Selected socio-economic characteristics of UIVs farmers

Variable	**Male**			**Female**		
	F	**%**	**Mean ± Std. Dev.**	**F**	**%**	**Mean ± Std. Dev.**
Age			41.9±1.39			37.17±11.03
Religion						
Christianity	18	74.4		34	63.4	
Islam	5	20.8		20	36.6	
Traditional	1	4.8		-	-	
Marital status						
Single	3	12.5		5	9.3	
Married	19	79.2		49	90.7	
Separated	2	8.3		-	-	
Level of education						
No formal education	9	37.5		38	70.3	
Primary	8	33.3		9	16.7	
Secondary	6	25.0		7	13.0	
Tertiary	1	4.2		-	-	
Years of formal education			**8.6±0.37**			**4.8±0.91**

Source: Field survey, 2013.

Farmers' involvement in the production and consumption of under-utilised indigenous vegetables

Table 2 shows the various indigenous under-utilised vegetables that were introduced and consumed by the farmers. Results showed that 58.3% of male and 96.3% of female farmers cultivated fluted pumpkin (*Telfaria occidentalis*) on their farms while 54.2 per cent and 57.4 per cent of male and female farmers, respectively grew Bologi (*Solanecio biaface*). About 70.8 per cent of male and 77.8 per cent of female *Solanum macrocarpon*, 41.7 per cent of male and only 24.1 per cent of female grown *Solanum nigrium*, 20.8 per cent of male and 27.8 per cent of female grown *Cresosocephalum crepidoides*, 29.2 per cent of male and 16.7 per cent of female grown *Trichosanthes cucumerina*. Also, 37.5 per cent of male and 77.8 per cent of female grown *Solanum spp*, 29.2 per cent of male and 70.4 per cent of female grown *vernonia amydalina*, 45.8 per cent of male and 59.3 per cent of female grown *Curcubita pepo* while 50.0 per cent of male and 90.7 per cent of female grown *Amaranthus virides* summarise the results in a more coherent and interesting manner . The findings revealed that Garden egg (*Solanum macrocarpon*) was the major indigenous under-utilised vegetable grown by male farmers while the fluted pumpkin (*Telfaria occidentalis*), Garden egg (*Solanum macrocarpon*), Bitter leaf (*Vernonia amygdalina*) and hackberry (*Solanum* spp) were the major vegetables grown by female farmers. The Fire weed (*Cresosocephalum crepidoides*) was indicated as the least grown by both male and female UIVs farmers. It is, therefore, implied that investment in *Solanum macrocarpon, Solanum spp, Telfaria occidentalis and Amaranthus virides* especially, among women would yield high returns as high proportions of the female farmers cultivated these vegetables than their male counterparts in southwestern Nigeria. In addition, Figure 2 shows the various supports received from NiCanVeg project by the 78 farmers, in which all of them indicated receipt of fertilizer, cash for land preparation, water pump and construction of well for water supply to the vegetable plots among others. In addition, they indicated that they had recieved training on fertilizer application and agronomic practices.

Table 2: Farmers' involvement in the cultivation and consumption of UIVs

	Male n=24		Female n=54	
***Vegetable grown**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Fluted pumpkin (*Telfaria occidentalis)*	14	58.3	52	96.3
Garden egg (*Solanum macrocarpon*)	17	70.8	42	77.8
Glossy nightshade (*Solanum nigrium*)	10	41.7	13	24.1
Fire weed (*Cresocephalum crepidoides*)	5	20.8	15	27.8
Snake tomato (*Trichosanthes cucumerina)*	7	29.2	9	16.7
Huckleberry (*Solanum spp*)	9	37.5	42	77.8
Bitter leaf (*Vernonia amygdalina)*	7	29.2	38	70.4
Field pumpkin (*Curcubita pepo)*	11	45.8	32	59.3
Amaranthus virides (*Amaranthus virides)*	12	50.0	49	90.7
Bologi (Solanecio biaface)	13	54.2	31	57.4

Source: Field survey, 2013. *Multiple responses

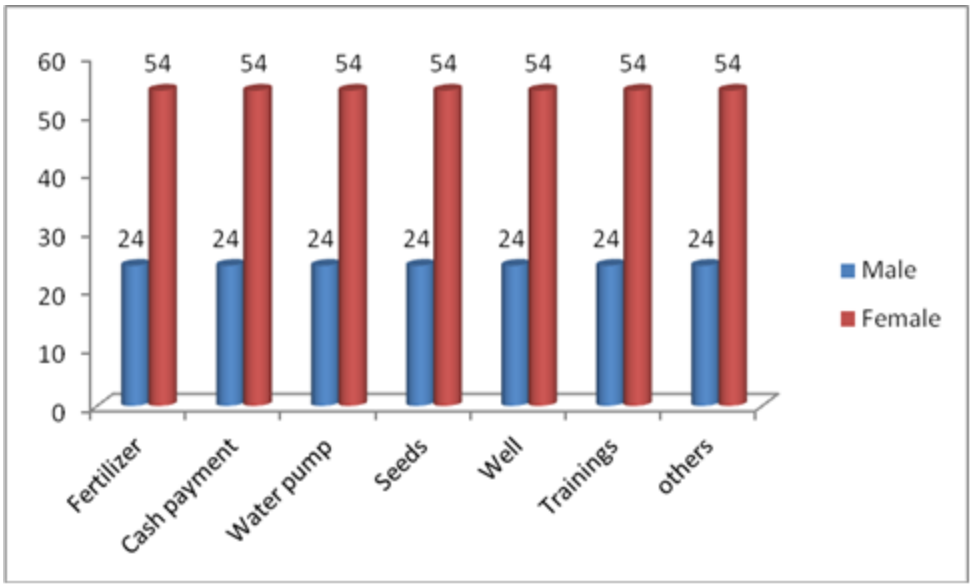

Figure 2: Supports received on the project

Source: Field survey, 2013.

Correlates of level of involvement among male and female UIVs farmers

Results in Table 3 showed that years of farming experience (r=0.671; P≤0.000) and farm size (r=0.528; P≤0.0.002) were the correlates of involvement in UIVs production among male farmers while age (r=0.813; P≤0.048); farm size (r=0.81; P≤0.006) and years spent in formal education (r=0.053; P≤0.05) were the correlates of involvement in UIVs production and consumption among women farmers in the study area. The findings implied that only farm size jointly determined both men and women level of involvement in UIVs production and consumption in Southwest, Nigeria. This means that farmers should be encouraged to expand their farm size if the project intends to raise both men and women level of involvement in the production and consumption of UIVs in the study area. Also, regular training would enhance women involvement as education was established as a correlate of women involvement in the production as well as the consumption of UIVs in the study area. The findings were in line with Okunlola's (2009) assertion that farm size and farming experience in vegetableproduction influenced farmers' level of involvement in production and consumption.

Table 3: Results of Pearson's Correlation showing the correlates of men and women involvement in UIVs production and consumption

	Male		Female	
Correlates	**Coefficient of Correlation (r)**	**Coefficient ofdetermination (r^2)**	**Coefficient of Correlation (r)**	**Coefficient of determination (r^2)**
Age	0.023	0.001	0.813*	0.661
Years of farming experience	0.671**	0.450	0.013	0.001
Farm size	0.528**	0.279	0.081**	0.007
Years of education	0.901	0.811	0.053*	0.0028
Household size	0.033	0.001	0.003	0.000

Source: Field survey, 2013.

*, ** represent significance at 0.05 and 0.01 levels of probability, respectively

Level of involvement of men and women farmers in UIV production and marketing in southwestern Nigeria

Results in Table 4 showed that there was a significant difference in the level of involvement in the production and consumption of UIVs and gender. The higher mean value of women implied that women were more involved in the production and consumption of UIVs in the study area. The findings coincided with the earlier reports of Samantaray *et al.* (2009) which reported that vegetable cultivation involved more woman labour compared to other crops and stressed that housewives entirely manage the vegetable production system up to harvesting and marketing. This was further supported by the study of Adebisi *et al.* (2011) that majority of urban vegetable farmers in Nigeria are females. This is not unexpected as women continue to bear primary responsibility for household sustenance and well-being (Okunlola, 2009).

Table 4: t-test showing significant difference in level of involvement of men and women farmers in UIV production and marketing in southwestern Nigeria

	N	**Mean**	**Std. Dev**	**T-value**	**P-value**
Male	24	11.116	4.57	0.835	0.000
Female	54	11.211	5.72		

Source: Field survey, 2013.

Conclusion

Based on the findings, Garden egg (*Solanum macrocarpon*) was the major indigenous under-utilized vegetable grown and consumed by male farmers while fluted pumpkin (*Telfaria occidentalis*), Garden egg (*Solanum macrocarpon*), Bitter leaf (*Vernomia amydalina*) and hackberry (*Solanum spp*) were the major vegetables grown and consumed by the women farmers and Fire weed (*Cresosocephalum crepidoides*) was the least grown by both male and female UIVs farmers. Years of farming experience and farm size significantly influenced men farmers' involvement while age, farm size and years spent in formal education were the variables that influenced women farmers involvement in the production and consumption of UIVs. The findings established that differences existed in the production as well as the consumption between men and women UIV farmers in Southwest, Nigeria. It is recommended that more women should be targeted if the present food insecurity in southwestern Nigeria is to be tackled through the production and consumption of UIVs.

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