



Evaluation of Vegetable Based Production Technology Adoption by Women Farmers in Delta State, Nigeria

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ABSTRACT

This paper examines the adoption of vegetable based production technologies by women farmers in Delta State Nigeria. A three stage random sampling technique was used to select respondents for the study using a structured questionnaire. Data on socioeconomic attributes of the women farmers indicate that majority of them had no formal education with farm size below 0.5ha. Vegetable production was observed to contribute to about 20-40% of the farmers' annual household income. The findings indicate that most of the farmers had preference for pumpkin, okra and African spinach. In terms of crop nutrition and protection, farmers indicated preference for vegetable production practices that are organic based. Agricultural policies that will make more land available to the women farmers are recommended.

Keywords: vegetables, farmers, women, technology, adoption, household, agrochemicals, organic inputs

INTRODUCTION

Regardless of the level of development achieved by the respective economies, women play a pivotal role in agriculture and in rural development in the Sub-Sahara Africa. It is now widely demonstrated that rural women throughout the world are engaged in a range of productive activities essential to household welfare, agricultural productivity, and economic growth. Yet women's substantial contribution continues to be systematically marginalized and undervalued in conventional agricultural and economic analyses and policies, while men's contribution remains the central, often the sole focus of attention.

Ironically, women are known to be more involved in agricultural activities than men in sub-Saharan African (SSA) countries, Nigeria inclusive. As much as 73 % were involved in cash crops, arable and vegetable gardening, while post-harvest activities had 16 % and agroforestry, 15% (Ogunlela & Mukhtar, 2009). Their involvement in agriculture in Nigeria has attracted greater attention in recent years. Reasons for their involvement are as many as are diverse. In some states rural women have virtually taken over the production and processing of arable crops (Afolabi, 2008), being responsible for as much as 80 % of the staple food items. Estimates of women's contribution to the production of food crops range from 30% in the Sudan to 80% in the Congo (FAO,1995); contributing substantially to national agricultural production and food security, while being primarily responsible for the food crops

Despite the importance of agriculture for economic development, agriculture has yet to perform as an engine of growth in many developing countries – especially sub-Saharan Africa (Byerlee, de Janvry & Sadoulet 2009). Agricultural yields have only shown slight increases in sub-Saharan Africa and Latin America since the 1960s, despite the development of important agricultural

innovations during that time. Yet data on adoption of improved agricultural technologies paint a picture of low levels of adoption in developing countries, particularly sub-Saharan Africa. Broadly speaking, technology is the relationship between inputs and outputs. In this context, therefore, technology adoption is defined as the use of new tools or techniques that relate inputs to outputs and the allocation of inputs (Foster & Rosenzweig 2010).

The need to adopt improved vegetable production technologies in order to make their task easier, ensure a sustained and efficient production of vegetables, enhance economic development and as well boost agricultural production becomes imperative for women farmers.

It is against this background therefore, that this study is focused on the dominant work force in Nigerian's agriculture, 'women', to verify their adoption of improved vegetable production technologies in Delta South Agricultural Zone, Delta State. The specific objectives of the study were therefore to:

- describe the socio-economic characteristics of the rural women vegetable farmers;
- determine the vegetable production preference of the rural women farmers;
- determine the levels of adoption of improved vegetable production technologies introduced by extension agents
- ascertain impediments to adoption of improved vegetable production technologies

RESEARCH METHODOLOGY

A three-stage random sampling technique was used to select respondents for the study. Delta South Senatorial District was purposively selected from the three Senatorial Districts in Delta State – due to its predominant rural vegetable farming population. Five local government areas (LGAs) were randomly selected out of the eight LGAs in the senatorial district. The selected LGAs were Isoko North, Isoko South, Bomadi, Patani and Warri North LGAs. In each LGA, four villages were selected from a list of villages. The selection of the villages was based on presence of vegetable farmers. Cluster random sampling was used to select 10 women vegetable farmers from each village. Thus, 40 farmers were selected from each village giving a total sample size of 200 vegetable farmers. Structured questionnaire was used to collect primary data on the perspectives of respondents (women vegetable farmers) on the extent to which they have adopted improved vegetable production technologies. The level of adoption was measured on a three-point scale of fully adopted (2), partially adopted (1), and not adopted (0). The face and content validity of the instrument was established. A decision level of 1.00 was used. Acceptance level is any value from 1.00 and above, while rejection level is any value below 1.00.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the women vegetable farmers

From the results presented in Table 1, majority (66.5%) of the women vegetable farmers were between 30 and 50 years of age, while 24% were above the age of 50 years. The remaining 19% were below 30 years. It is also clear from the data that majority (91%) of the women vegetable farmers were married, while 4% and 5% were single and widowed respectively. The results are consistent with earlier reports by Igben (1988) and Nwalieji & Ajayi (2009), who noted that the farm labour required by the married vegetable farmers could be supplied by their households, thereby reducing cost of production. A greater proportion of the women farmers had 10-15 years farming experience while 49% of the farmers had no formal education. It is evident from the results that a larger proportion of the farmers (48%) had size with less than 0.5ha, while 70% hired or rented the farm plots annually from landowners. Majority (69%) of the women farmers had personal/savings as main source of credit/finance for take off while 21% and 19% had their source of credit/finance from *Isusu* clubs and friends/relatives respectively. Majority (57.8.0%) of the women were of the opinion that vegetable production had been contributing 20-40% to their

total annual income, while 8.5% agreed that vegetable production had been contributing above 40% to their total annual income.

Tables 1. Percentage distribution of the women farmers by socioeconomic characteristics

	N=200	%
Age (years)		
Less than 30	19	9.5
30-50	133	66.5
Above 50	48	24
Marital status		
Single	8	4
Married	182	91
Widow	10	5
Household size		
Less than 5	30	15
5-10	139	69.5
Above 10	31	15.5
Educational level		
No formal education	98	49
Primary	65	32.5
Secondary	26	13
Tertiary	11	5.5
Farming experience (years)		
Less than 10	69	34.5
10-15	118	59
Above 10	13	6.5
Vegetable farm size (hectares)		
Less than 0.5	96	48
0.5-1.0	85	42.5
Above 1.0	19	9.5
Source of vegetable farmland		
Family land	54	27
Rented/hired	140	70
Inherited land	6	3
Source of finance/credit		
Friends/relative	20	10
Personal savings	138	69
<i>Isusu</i> club	42	21
Vegetable production contribution to annual income		
Below 20%	68	34
20-40%	115	57.5
Above 40%	17	8.5

Vegetable Production Preference

Information from the data in Table 2 shows that during the dry season, pumpkin was the most preferred vegetable by the farmers (75.0%). This was followed by African spinach (60%), okra (55%), and bitter leaf (38%) while lettuce (7%) was the least preferred by farmers. In the same vein, the most preferred vegetable by the farmers during the rainy season was okra (68%). This was closely followed by bitter leaf (63%), pumpkin (51.5), and water leaf (48.0 %). Garden egg (9.5%) was the least preferred during the rainy (wet) season. This may not be unconnected with the high level of larval infestation in the fruits of the egg plant during the wet season. Generally,

it appears from these findings that most of the farmers had preference for pumpkin, okra and African spinach. As earlier noted by Ojo, Connaughton, Kintomo, Olajide-Taiwo & Afolayan (2011), the increase in cultivation of leafy vegetables over fruit vegetables suggests that they should be the target of research effort to improve the system. They have shorter life cycle, thereby enabling the farmers to have more (2 - 4) crop cycles before the rainy season. It also defrays costs of field establishment at the beginning of each cropping season.

Tables 2. Percentage distribution of women farmers by their vegetable production preference

Type of vegetable grown	Production preference (%)*	
	Dry season	Wet season
Pumpkin (<i>Telferia occidentalis</i>)	75	51.5
African spinach (<i>Amaranthus hybridus</i>)	60	50
Sokoyokoto (<i>Celosia argentea</i>)	30.5	46
Bitter leaf (<i>Vernonia amygdalina</i>)	38	63
Cabbage (<i>Brassica oleracea</i>)	15	25
Cucumber (<i>Cucumis sativus</i>)	17.5	34.5
Lettuce (<i>Lactuca sativa</i>)	7	20
Water leaf (<i>Talinum triangulare</i>)	23	48
Tomato (<i>Lycopersicum esculentum</i>)	10	18.5
Bush okra (<i>Corchorus olitorus</i>)	18	25
Okra (<i>Abelmoschus esculentus</i>)	55	68
Garden egg (<i>Solanum melongena</i>)	26	9.5
Pepper (<i>Capsicum annum</i>)	30	45

*More than one vegetable was preferred.

Vegetable Production Technology Adoption

Table 3. Vegetable production technologies adopted by women vegetable farmers

Improved vegetable production technologies	FA	PA	NA	Mean	Remarks
Cropping system					
Intercropping	142(71)	40(20)	8 (9)	1.62	Adopted
Sole cropping	128(64)	43(21.5)	29(14.5)	1.50	Adopted
Rotation	136(68)	39(19.5)	25(12.5)	1.56	Adopted
Seed/planting management					
Improved vegetable varieties	139(69.5)	42(21)	19(9.5)	1.60	Adopted
Seed storage	132(66)	48(24)	20(10)	1.56	Adopted
Seed dressing	124(62)	56(28)	20(10)	1.52	Adopted
Timely planting	136(68)	45(22.5)	19(9.5)	1.59	Adopted
Adequate crop spacing	145(72.5)	38(19)	17(8.5)	1.64	Adopted
Optimum planting density	140(70)	48(24)	12(6)	1.64	Adopted
Soil fertility and conservation management					
Mulching	151(75.5)	40(20)	9(4.5)	1.71	Adopted
Conservation tillage	50(25)	42(21)	108(54)	0.71	Partially adopted
Use of chemical fertilizers	88(44)	107(53.5)	5(2.5)	1.42	Adopted
Use of organic manures	158(79)	38(19)	4(2)	1.77	Adopted
Weed and pest control					
Use of chemical insecticides	54(27)	46(23)	100(50)	0.77	Partially adopted
Use of biopesticides	142(71)	42(21)	16(8)	1.63	Adopted
Use of chemical herbicides	26(13)	88(44)	86(43)	0.70	Partially adopted
Regular manual weeding	148(74)	47(23.5)	5(2.5)	1.72	Adopted
Vegetable processing method					
Drying	90(45)	66(33)	44(22)	1.23	Adopted
Chopping and drying	93(46.5)	68(34)	39(19.5)	1.27	Adopted
Drying and grinding	88(44)	60(30)	52(26)	1.18	Adopted
Packaging	38(19)	64(32)	98(49)	0.70	Partially adopted

Values in parentheses are percentage. The mid point of this table is 1.00. As a decision rule, any mean score that is ≤ 1.00 = partially adopted and any that is > 1.00 = adopted.

Table 3 shows the responses on adoption of selected improved vegetable production technologies by the rural women of Delta Central Senatorial District. The adoption of the improved vegetable production practices by the rural women was varied. The mean score of the three cropping systems; intercropping (1.62), sole cropping (1.50) and rotation (1.56) indicated adoption by the women vegetable farmers. Intercropping vegetables had a higher percentage of respondents (71%) who fully adopted the cropping system. Intercropping of two or more vegetables is known to be a common cropping system among resource poor farmers in the developing world, especially in sub-Sahara Africa as an insurance against crop failure and diversification of income. A higher proportion of the women vegetable farmers fully adopted seed and planting management practices, with mean scores within the range of 1.64 (adequate crop spacing and optimum density) to 1.52 (for seed dressing). The use of mulching and organic manures was fully adopted by 75.5% and 79% respectively by the respondents. Weed and pest control methods

associated with agrochemicals (use of chemical pesticides and herbicides) were partially adopted by the women farmers with mean scores of 0.77 (chemical pesticides) and 0.70 (chemical herbicides). However, control methods which were not based on use of agrochemicals were fully adopted. This can be seen from the mean scores of 1.63 (use of biopesticides) and 1.72 (regular manual weeding). The preference by the women farmers for non-agrochemical methods may not be unconnected to fear of poisoning of plants and humans, high cost of agrochemicals and poor knowledge of application methods. These results are supported by USAID (2009), which noted that smallholder farmers with averagely 5 hectares or fewer may have less training, use more diverse cropping systems, and be less familiar with pesticide use. Moreover, their goals often differ from those of larger-holder farmers since they may be producing for subsistence as well as for limited local market sales to generate income, and they may have less money to buy pesticides.

Table 4. Impediments to adoption of vegetable production technologies

Impediments to adoption	Respondents	
	N	%
Lack of adequate information	13	6.5
Lack of technical advice	19	9.5
Low level of income	37	18.5
Lack of access to land	28	14
Lack of access to credit facilities	78	39
Lack of access to water supply	25	12.5
Total	N=200	100%

From the data in Table 4, 78 (39%) of the women vegetable farmers considered poor access to credit facilities as the major impediment to adoption of most of the vegetable production technologies, with about 37 (18.5%) and 28 (14%) of them attributing it to low income and lack of access to land respectively. Matthews-Njoku, Adesope & Iruba (2009) had earlier reported low income level, poor access to credit facilities and lack of access to sufficient land as serious problems associated with adoption of improved technologies by small holder farmers.

CONCLUSIONS

Socioeconomic characteristics of the vegetable farmers indicated that a large proportion of the women are farming on plots below 0.5ha, with most of them hiring the plots. This indicates the need for policies that will make farm lands easily available for the women. Rural women should be equipped with adequate agricultural inputs needed for efficient vegetable production and improved food security of their households. The best vegetable production technologies are those that have the greatest chance to work and help small holder farmers' move to a substantially higher productivity and income while managing their farm independently. It is therefore recommended that regular visit by extension agents to vegetable farmers should be encouraged to further improve their awareness and make more improved practices available. Extension agents should also lay more emphasis on production technologies that are organic based with low cost since the women farmers are most likely to adopt such faster.

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