

Agricultural Extension Services and Increased Production of Garden Egg (*Solanum Melongena*) among Farmers in North-East Senatorial District of Akwa Ibom State

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Abstract

The main purpose of the study was to determine the extent to which agriculture extension services enhance increase in production of garden egg (*Solanum melongena*) among farmers in Akwa Ibom North-East Senatorial District. Two specific purposes, two research questions and two null hypotheses guided the study. Descriptive survey design was adopted for the study. Sample size of 149 was selected for the study. The sample size comprised of 40% of Agricultural Development Programme (ADP) extension agents and garden egg farmers from each of the Local Government Area in Etinan and Uyo AKADEP Zone of Akwa Ibom North-East Senatorial District. The sample size was selected from the population of 133 extension agents and 225 garden egg farmers using proportionate sampling technique. A researcher-made instrument was used in generating data for the study. The survey instruments were titled "Agricultural Extension Service and Increase in Garden Egg Production Questionnaire" (AESIGEPQ). The instrument was responded to by extension agents and garden egg farmers. Using Cronbach Alpha statistics, the instrument yielded the overall reliability coefficient of 0.81. Data collected was analyzed using mean and standard deviation to answer the research questions while independent t-test was employed to test the hypotheses. Findings indicated that to a high extent, agricultural marketing services and ICT services enhanced and increased garden egg production among farmers in Akwa Ibom North-East Senatorial District. More so, extension agents and garden egg farmers do not differ in their responses on the extent to which agricultural marketing and ICT services enhance increase in garden egg production. On the basis of the findings, it was recommended among others that farmers should form agricultural cooperatives as an avenue for teaching and utilization of discussion method to aid the acquisition of skills

Keywords: Extension, Marketing, ICT, Services, Increased Production, Garden Egg

Introduction

Garden egg (*Solanum melongena*) is a leafy vegetable widely grown either in mixed or monocropping system in most parts of the sub-Saharan Africa, especially, in the urban agricultural areas. Garden eggplant is a vegetable with increasing popularity and it originated from Tropical Africa (Horna and Gruere, 2006). In Akwa Ibom State, *Solanum melongena* is a very important vegetable crop grown on a very large commercial scale in some parts of the state. However, Ozobia, Precious, Raimot and Napoleon (2013) noted that the small-scale growers account for at least 86% of the total production. Garden-egg production in Akwa Ibom State which involves the combination and conversion of input resources such as garden

egg seeds, improved land, labour, fertilizers, and so on into the output (fruits), is a lucrative venture for the peasant farmers. Although production of garden egg given a favourable condition, has been through-out the year, it is insufficient to meet the market demand of the products.

The final phase in garden egg production is marketing of the end product. Okongwu (2011) noted that the excess crop produce from the farm must be disposed of in order to earn some income with which the farmers can purchase other goods and services not produced by them. More so, it is an efficient marketing that makes this possible; because it is an efficient marketing that will locate where there are surplus of produce and bring them to where there are shortages. Marketing creates utility of form by processing, for example, processing of garden egg to paste, utility of place by transportation for example, and transportation of garden egg fruits from the farms to the market place. It creates utility of time by storage for example the storage of garden egg fruits until the time of need and utility of possession by the exchange of ownership of the product. Furthermore, efficient marketing ensures that farmers supply those products that are seasonal throughout the year with little variation in prices that can be attributed to the cost of the shortage so that consumers are sure of getting what they want throughout the year (Okongwu, 2011).

Marketing services guarantee the quality standard and nutritional value required for both local and international consumption. USAID (2013) asserted that there are marketing services that are essential and must be carried out effectively, these include: transportation, storage, grading, processing and packaging. Extension services expose farmer to different avenues for marketing their agricultural produce such as farmer to farmer marketing channel (where both the buyer and the seller are farmers and they know themselves); farmers' cooperative to farmers; farmers' cooperative to farmers' cooperative and traders to farmers.

On the average, Horna and Gruere (2006), in their work "marketing underutilized crops" the farmers they interviewed faced 30% chances of having negative returns. Producer activities with a positive return have a large net income to cover all cash costs plus an opportunity charge for unpaid producer, labour and management. A production glut occurs in the rainy season when market prices are lowest during the year. Farmers with access to irrigation facilities can produce during the dry season and obtain higher total returns. However, garden egg production is an income generating activity for small holder farmers (Ozobia, Precious, Raimot & Napoleon, 2013).

Smallholder farmers are the foundation of agricultural and food supply chains in most developing countries. Yet, the agricultural practices of smallholder farmers are at times not economically viable and struggle to be sustainable. Small farms produce low yields, adversely affecting farmers' economic conditions. Lack of information about critical inputs and inadequate knowledge about modern and efficient agricultural practices contributes to low farm yields.

Information and Communication Technology (ICT) extension services involve the transfer of practical knowledge and exchange of market information through ICT platforms. These solutions are relevant to agricultural and rural transformation processes, especially for

smallholders. ICT can facilitate wide dissemination of relevant information at the right time in a cost-effective manner. The increasing penetration of mobile phones and internet, more specifically budget friendly smartphones can support a business model that expands information sources and farmers' ability to access the same. Such solutions have significant impact in the rural and remote regions of developing countries with large farmer populations. For instance, in India, the smartphone market is estimated to grow to over 200 million by end of 2016 (USAID, 2013). ICT can be applied to address various aspects of agriculture including identification of farmers' pre-harvest needs, devising solutions to meet those needs, and collection of feedback from farmers regarding a specific service or solution (National Agricultural Sector Extension Policy (NASEP) of Kenya (2012).

World Bank (2015) noted popular information dissemination models using ICT include online platforms, mobile applications, training content through videos, personalized call centers, and radio and television programs. Some of these are interactive and help smallholder farmers solve problems in real time. The quality and type of ICT extension services vary based on telecommunication facilities and nature of demand from farmers. A critical factor for adoption of ICT extension services is the ease of use of information. Enterprises offering these services should address issues such as ICT illiteracy, and the need for relevant and localized content.

ICT extension service providers offer a range of information services to the smallholder farmers, from pre-harvest stage to post-harvest stage. They help the farmers understand and adopt agricultural best practices on crop selection, input management, land selection and preparation, finance, transportation, packaging processing, and marketing of the agricultural produce. Enterprises that provide information services can help improve agricultural yields and guide farmers in procuring and using the right inputs and participating in commercial value chains (World Bank, 2011). Some of the operational costs include cost of acquisition of customers, cost of remuneration of staff members and cost of content enhancement. These costs constitute a smaller component of the total cost, and are also lower compared to that incurred by non-ICT extension service providers. A number of ICT extension enterprises partner with local stakeholders to further lower these costs (National Agricultural Sector Extension Policy (NASEP) of Kenya, 2012).

Strategic application of ICT has led to better information dissemination, and access to best practices in agriculture at reduced costs, increased agricultural production, poverty alleviation and economic development. For instance, a study conducted in Benin, mobile phone usage facilitates transactions and provides producers access to relevant, timely information, allowing them to sell at a higher price improve their income (National Agricultural Sector Extension Policy (NASEP) of Kenya, 2012).

Ogunwale, Ayoade, and Ayansina (2006) conducted a research study to examine the impact of extension services on farmers' production activities in Oyo State with a view to investigating the extension methods used by village extension workers, and determine their impacts on farmers' production activities. Multistage sampling technique was employed in the selection of the 60 farmers while purposive sampling technique was used for selection of

13 extension workers due to their small population. Questionnaire and interview methods were used as instruments for data collection. Both descriptive (frequency counts and percentages) and inferential statistics (regression analysis) were used in data analysis. It also revealed that extension workers actually had impacts on farmers in many important areas of agricultural production activities. 84.6% of the extension workers identified individual method of farm and home visit as the most preferred extension method by farmers. All the farmers sampled indicated that adoption of farm technologies increased yield and productivity.

Garba (2011) carried out a study to investigate the influence of agricultural extension programme on farmers' agricultural production in Kano State. Survey research design was used for the study, where two sets of questionnaires were used as instrument for data collection, one for the farmers, and the other for extension agents. 8,866 farmers (household heads) and 236 extension agents served as population for the study. 370 farmers and 152 extension agents were randomly selected from the population as samples. The data collected were analyzed using percentages and Spearman's Rho Correlation Procedure at 0.05 level of significance. Result revealed that the types of teaching methods used by extension agents in disseminating the improved farm practices to farmers were significantly correlated with the rate of adoption by the farmers. Based on the findings of the study, some recommendations were given, that Kano State Government should encourage more adult literacy classes in rural areas, employ more trained male and female extension agents, and provide agricultural inputs to rural farmers on time and at subsidized prices for more effective agricultural extension programme in the state.

Statement of the Problem

Despite this huge economic significance of garden egg, there has been little available information as per sustainable productivity of the crop. This has resulted in decline in production and consequently intra-state importation of the vegetable with quality being reduced while on transit. Provision of farm inputs and education for farmers on improved crop technologies have been prioritize by government as attempt to diversify the economy. Despite these aids; the crop production margin of crops like garden egg is still low compared to the market demand. The low production may be attributable to high incidence of pests (such as click beetles, cutworms, red spiders, etc) and diseases (like bacterial wilt, fruit rot, powdery mildew), climatic change, poor soil and water management practices as well as market challenges. Also, the researcher has observed that most garden egg farmers are yet to apply recent technologies in the area of marketing and networking in the daily operation of their farm business.

Basically, improving farm efficiency and increasing garden egg production by means of educating farmers is expected to be the total responsibilities of agricultural extension staff/officials and the skilled farmers. Pertinent question that necessitated the study was: does extension marketing services and ICT services enhance increase in garden egg production among farmers in Akwa Ibom North-East Senatorial District? It is upon this background that

the researchers were motivated to investigate the extent to which agricultural extension services enhance increase production of garden egg (*Solanum melongena*) among farmers in Akwa Ibom State North-East Senatorial District.

Objectives of the Study

The main purpose of the study was to determine the extent to which agriculture extension services enhance increase in production of garden egg (*Solanum melongena*) among farmers in Akwa Ibom North-East Senatorial District. Specifically, the study sought to:

1. determine the extent to which extension marketing services enhance increase in garden egg production in Akwa Ibom North-East Senatorial District.
2. determine the extent to which agricultural ICT extension services enhance increase in garden egg production in Akwa Ibom North-East Senatorial District.

Methodology

The descriptive survey design was adopted for the study. This design is deemed suitable for the study since the researcher sought to investigate the extent to which extension services enhance increase production of garden egg from the respondents using questionnaire. This is supported by Ndiyo (2010). The population comprise of 133 extension agents and 225 garden egg farmers of the Local Government Area in Etinan and Uyo AKADEP Zone of Akwa Ibom North-East Senatorial District (AKADEP, 2021). Sample size of 149 was selected for the study. The sample size comprised of 40% of Agricultural Development Programme (ADP) extension agents and garden egg farmers from each of the Local Government Area in Etinan and Uyo AKADEP Zone of Akwa Ibom North-East Senatorial District. The sample size was selected from the population using proportionate sampling technique.

The study was carried out in Akwa Ibom North-East Senatorial District. Akwa Ibom North-East Senatorial District is located in Akwa Ibom State in the South-South geo-political zone of Nigeria with nine local government areas namely: Etinan, Ibesikpo-Asutan, Ibiono, Itu, Nsit Ibom, NsitAtai, NsitUbiom, Uruan, Uyo. Under Akwa Ibom State Agricultural Development Project (AKADEP) zoning Akwa Ibom North-East Senatorial District is subdivided into two agricultural zones namely Etinan zone and Uyo zone. The farmers in the nine local government areas of the district were used for the study because farmers grow garden egg and the vegetable is widely appreciated by the citizens making it possible to generalize the result to other part of Akwa Ibom State and the country at large.

A researcher-made instrument titled "Agricultural Extension Service and Increased Garden Egg Production Questionnaire (AESIGEPQ) was used in generating data for the study. The items in the instruments were structured under four-point rating scale of: Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE). The instrument AESIGEPQ was face validated by three validates. One from the Department of Agricultural Economics and Extension, Faculty of Agriculture and two from the Department of Agricultural Education all in the University of Uyo.

Data collected from the trial tested and analysed using Cronbach Alpha Statistics. The result indicated that the instrument had the overall reliability coefficient of 0.81. This implies that the instrument had high internal consistency thus, were deemed suitable for the study. The questionnaire was administered to the sampled extension agents and garden egg farmers in the study area and retrieved by the researcher with the help of two research assistants who were briefed on how to carry-out the administration of the instrument. Out of the One hundred and forty-nine questionnaire administered, one hundred and forty-three were duly completed questionnaires were retrieved, giving the retrieval rate of 97.95%. Data collect was analyzed using descriptive statistics of mean and standard deviation to answer the research questions while inferential statistics of independent t-test statistics was employed to test the hypotheses.

Results

In this section, result of data analysed were presented on table below:

Research Question 1: To what extent does agricultural marketing services enhance increase in garden egg production among farmers in Akwa Ibom North-East Senatorial District?

Table 1: Mean Responses on the extent to which agricultural marketing services enhance increase in garden egg production among farmers

S/N	Items of Agricultural Marketing Services	Categories	n	\bar{X}	SD	Decision
1.	Marketing link provided by extension agents motivates farmers to increase their garden egg production	EAs	53	3.25	.43	High Extent
		GEFs	90	3.26	.44	High Extent
2	Availability of viable market for garden egg fruits enhances farmers' interest in large scale production of garden egg	EAs	53	3.00	.00	High Extent
		GEFs	90	3.00	.00	High Extent
3	Extension marketing services enhance garden egg farmers communication with buyers	EAs	53	3.30	.57	High Extent
		GEFs	90	3.27	.44	High Extent
4	Extension market services help farmers to acquire scientific measurement skills for increased garden egg production	EAs	53	3.00	.47	High Extent
		GEFs	90	3.00	.00	High Extent
5	Garden egg farmers improves their record keeping skills through extension market services	EAs	53	2.74	.94	High Extent
		GEFs	90	2.71	.96	High Extent
6	Extension market services help farmers to monitor their production to maximize profit	EAs	53	3.21	.69	High Extent
		GEFs	90	3.60	.49	Very High Extent
7	Extension marketing services helps garden egg farmers to reduce high rate of post harvest losses.	EAs	53	2.81	.96	High Extent
		GEFs	90	2.81	.92	High Extent
Cluster Mean		EAs		3.03	.58	High Extent

GEFs	3.09	.46	High Extent
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EAs = Extension Agents, GEFs = Garden Egg Farmers

The result in Table 1 revealed that the mean responses of extension agents and garden egg farmers on all the items on the extent to which agricultural marketing services enhance increase in garden egg production among farmers are greater than 2.50. This implies that, to a high extent agricultural marketing services motivates farmers, enhance farmers’ interest, enhance farmers’ communication with buyers, help farmers acquire scientific measurement skills, improve farmers’ record keeping skills, help farmers monitor production as well as reduce high rate of post-harvest losses. Furthermore, the Table 1 showed the grand mean of 3.03 and 3.09 for extension agents and garden egg farmers implies that, agricultural marketing services to a high extent enhance the increase in garden egg production among farmers in Akwa Ibom North-East Senatorial District.

Research Question 2: To what extent does agricultural ICT extension service enhance increase in garden egg production among farmers in Akwa Ibom North-East Senatorial District?

Table 2: Mean Responses of extension agents on the extent to which agricultural ICT extension service enhance increase in garden egg production among farmers

S/N	Items of Agricultural Marketing Services	Categories	n	\bar{X}	SD	Decision
1.	ICT services help garden egg farmers access ideas that could increase their production	EAs	53	3.49	.91	High Extent
		GEFs	90	3.32	1.05	High Extent
2	ICT services help garden egg farmers to learn technologies use in large garden egg farmers to improve their production	EAs	53	3.47	.77	High Extent
		GEFs	90	3.56	.70	Very High Extent
3	Garden egg farmers who utilize ICT are proficient in communicating with extension agents for increased production	EAs	53	3.21	.63	High Extent
		GEFs	90	3.36	.62	High Extent
4	ICT services equip garden egg farmers with managerial skills through informal education.	EAs	53	3.30	1.12	High Extent
		GEFs	90	3.38	.99	High Extent
5	Best practices in garden egg input management could be acquired through the internet	EAs	53	3.47	.70	High Extent
		GEFs	90	3.40	.76	High Extent
6	Garden egg farmers who are vast in the utilization of ICT tools do participate in commercial chain for increased production	EAs	53	3.62	.79	Very High Extent
		GEFs	90	3.47	.89	High Extent
7	Weather forecast information for increased garden egg production could be acquire through agricultural	EAs	53	3.70	.46	Very High Extent
		GEFs	90	3.71	.46	Very High Extent

extension ICT services				
Cluster Mean	EAs	3.47	.77	High Extent
	GEFs	3.46	.78	High Extent

EAs = Extension Agents, GEFs = Garden Egg Farmers

The result in Table 2 revealed that the mean responses of extension agents and garden egg farmers on all the items on the extent to which extension ICT services enhance increase in garden egg production among farmers are greater than 2.50. This implies that to a high extent extension ICT services help farmers to access new ideas, learn technologies, enhance farmers' communication skills and managerial skills, participation in commercial chain and acquisition of weather information for increase in garden egg production. Furthermore, the Table 2 showed the grand mean of 3.47 and 3.46 for extension agents and garden egg farmers respectively implies that, extension ICT services to a high extent enhances the increase in garden egg production among farmers in Akwa Ibom North-East Senatorial District.

Null Hypothesis 1: There is no significant difference in the mean responses of extension agents and garden egg farmers on the extent to which agricultural marketing service enhance increase in garden egg production among farmers in Akwa Ibom State North-East Senatorial District.

Table 3: Independent t-test Analysis on extent to which agricultural marketing service enhance increase in garden egg production among farmers

Category	n	\bar{X}	SD	Df	t-cal	t-crit	Decision
Extension Agents	53	21.23	1.73	141	1.42	1.96	NS
Garden Egg Farmers	90	21.64	1.69				

$p < 0.05$; NS = Not Significant

The Table 3 also indicated that the calculated t-value 1.42 is less than the critical t-value 1.96 at .05 level of significance and 141 degree of freedom. Therefore, the null hypothesis was retained. This implies that, there is no significant difference in the mean responses of extension agents and garden egg farmers on the extent to which agricultural marketing services enhance increase in garden egg production in Akwa Ibom North-East Senatorial District.

Null Hypothesis 2: There is no significant difference in the mean responses of extension agents and garden egg farmers on the extent to which agricultural ICT extension service enhance increase in garden egg production among farmers in Akwa Ibom State North-East Senatorial District.

Table 4: Independent t-test Analysis on extent to which agricultural ICT extension service enhance increase in garden egg production among farmers

Category	n	\bar{X}	SD	Df	t-cal	t-crit	Decision
Extension Agents	53	24.26	1.70				

				141	.25	1.96	NS
Garden Egg Farmers	90	24.19	1.72				

p<0.05; NS = Not Significant

The Table 4 also indicates that the calculated t-cal .25 is less than the critical t-value 1.96 at .05 level of significance and 141 degree of freedom. Therefore, the null hypothesis was retained. This implies that, there is no significant difference in the mean responses of extension agents and garden egg farmers on the extent to which agricultural ICT extension services enhance increase in garden egg production in Akwa Ibom North-East Senatorial District.

Discussion of Findings

Agricultural Marketing Services and Increased Garden Egg Production

Findings of the study revealed that agricultural marketing services to a high extent enhance the increase in garden egg production among farmers in Akwa Ibom North-East Senatorial District. Furthermore, there is no significant difference in the mean responses of extension agents and garden egg farmers on the extent to which agricultural marketing services enhance increase in garden egg production. The findings may be due to the fact that garden egg farmers would be motivated to increase their production capacity if they have access to constant and stable market where garden fruits could be disposed. Returns in garden egg production becomes profitable when farmers are able to package, advertise and sales their product regularly at a reasonable price. The findings of the study is in agreement with the assertion of USAID (2013) who submitted that extension services expose farmer to different avenues for marketing their agricultural produce such as farmer to farmer marketing channel (where both the buyer and the seller are farmers and they know themselves); farmers' cooperative to farmers; farmers' cooperative to farmers' cooperative and traders to farmers.

Extension ICT Services and Increased Garden Egg Production

Findings of the study also revealed that extension ICT services to a high extent enhance the increase in garden egg production among farmers in Akwa Ibom North-East Senatorial District. Furthermore, there is no significant difference in the mean responses of extension agents and garden egg farmers on the extent to which extension ICT services enhance increase in garden egg production. Agricultural is practiced in a dynamic environment where strong agricultural information communication links is crucial for sustainable agricultural production. Farmers' ability to source for agricultural information, store agricultural information and retrieve it at appropriate time for usage would enhance farmers problem solving skills in garden egg production. The findings commensurate with the view of World Bank (2011) who noted that enterprises that provide information communication services can help improve agricultural yields and guide farmers in procuring and using the right inputs and participating in commercial value chains. The findings is also supported by the furtherance of NASEP (2012) who submitted that ICT can be applied to address various aspects of agriculture including identification of farmers' pre-harvest needs,

devising solutions to meet those needs, and collection of feedback from farmers regarding a specific service or solution.

Conclusion

On the basis of the findings of this study and discussion of same, the following conclusions were drawn: agricultural marketing services and extension ICT services are essential in enhancing the increase in garden egg production. Among other factors that influence increased garden egg production is agricultural information accessible to farmers and market for disposal of garden egg product for profit maximization. Therefore, agricultural extension services to a high extent enhance increased garden egg production among farmers.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Farmers should take advantage of extension services to learn skills that will sustain them in agricultural business in a vast changing environment.
2. State Ministry of Agriculture should conduct regular seminar and workshop for extension agents to equip them with adequate teaching techniques especially on packaging of extension services to facilitate effective extension service delivery to farmers.
3. Farmers should form agricultural cooperatives as an avenue for teaching and utilization of discussion method to aid the acquisition of skills

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