



Review Article

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# Assessment of the Extent of Incorporating Indigenous Knowledge Systems in Extension Programming for Cassava Cultivation in Delta State, Nigeria



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## Abstract

The study assessed the extent of incorporating indigenous technologies in extension programming for cassava in Delta state, Nigeria. Specific issues examined are the socio economic characteristics of extension personnel in the study area, the willingness of extension personnel to incorporate indigenous knowledge system in extension programming of cassava, and indigenous technologies for cassava cultivation and their extent of incorporation by the ADP. Data were collected with the aid of a structured question naire. Multi-stage sampling technique was used to select 48 respondents from Delta North and 53 from Delta Central respectively, given a total of 101 respondents that were sampled. The result showed that a high percentage of extension personnel (67.3%) disagreed that indigenous technologies should be incorporated in extension service delivery while 32.7% of them agreed.

The major indigenous practices associated with cassava cultivation that had been highly incorporated into extension programming by the extension agents include mixed/intercropping (mean=2.69), burying of cuttings (mean=2.66) and leaving cuttings to dry 2-3 days before planting (mean=2.52). Practices such as splash and burn land preparation (mean=2.42), zero tillage (mean=2.40) and use of scare crows (mean=2.32), use of traditional planting distance (mean=1.49), staggered planting (not in rows) (mean=1.22), use of wood ash as insecticide (mean=1.21) and use of traditional cultivars (mean=1.17) have not been highly incorporated into extension programming by the extension personnel.

The Friedman test (chi-square=378.91), was significant at the 5% level. This means that significant differences existed in the levels of incorporation of indigenous practices by the ADP. The post hoc test revealed that Mixed/intercropping (mean=2.69), burying cassava cuttings (mean=2.66) and Leaving cuttings to dry 2-3 days before planting (mean=2.52) were the highest or mostly incorporated indigenous technologies with no significant difference existing in their levels of incorporation but were significantly different from Slash and burn land preparation (mean=2.42) and minimum tillage (mean=2.40). However, the level of incorporation of use scare crows (mean=2.32) was significantly different from random spacing (mean=1.49), staggered planting (not in rows) (mean=1.23), use of wood ash as insecticide (mean=1.21) and use of traditional cultivars. The study recommended that researches should be conducted to find out the usefulness of farmers indigenous knowledge system and if need be, these indigenous knowledge should be incorporated into extension programme planning and implementation. Also, farmers' informal experiments should be monitored and recorded by extension agents to enable them identify their areas of strength and weakness and report to research stations for possible improvement. This will help boost the confidence of farmers in extension agents as they will see themselves playing active roles in innovation development.

**Keywords:** Assessment; Indigenous knowledge; Extension programming; Cassava cultivation

**Abbreviations:** IKS: Indigenous Knowledge System

## Introduction

Knowledge is an important intellectual good and can be a key for opening doors. Acquiring knowledge continuously throughout one's life or life-long learning has become a crucial requirement for people in all shades of human endeavor. Development starts with the people. Regardless of the

opportunities placed on their doorsteps, if man fails to wield control over the environment in which he finds himself, to make appreciable progress any endeavour becomes somewhat difficult. Man's quest and ability to adapt to certain situations for meeting particular needs becomes crucial for his survival in

the midst of competing forces with which he must contend on a daily basis. According to Kolawole 2008, man has from onset devised various strategies to comprehend his environment. His personal experience, reasoning and research are however three basic approaches he used to achieve this goal. All the three are eventually used by him over time to predict his spatial surroundings. The acquaintances he (the peasant) has with his environment, based on certain experiences, enable him to draw conclusions from the accumulated body of knowledge which he has acquired over many years. From this, derives what is known as indigenous knowledge system (IKS).

Indigenous knowledge (IK) is the systematic body of knowledge acquired by local people through accumulation of experiences, informal experiments, intimate and understanding of the environment in a given culture. Local people, including farmers, landless laborers, women, rural artisans and cattle rearers, are custodians of indigenous knowledge systems (IKS). In Nigeria, this kind of knowledge has helped rural farmers who are there major food producer to sustain their production for many years.

During the process of technology development, farmers' informal experimentation has not been considered. During the process of technology dissemination, feedback information from farmers after the introduction of technology is rarely recorded. During the process of technology development, farmers' informal experimentation has not been considered. During the process of technology dissemination, feedback information from farmers after the introduction of technology is rarely recorded.

Understanding farmers' knowledge allows a framework of reference for posing technical scientific questions in research. It also provides the basis for evolving technology options that are not imposed as foreign packages which contradict existing practices. Therefore, identifying, documenting and incorporating indigenous knowledge system into agricultural extension organization is essential in order to achieve sustainable agricultural development Onyemekonwu [1].

In extension programming, agricultural extension officers and research staff dominate the extension programme planning and implementation process but farmers and representatives of agricultural inputs and marketing agencies are not involved at all levels. During the colonial era, innovation was managed by public institutions or public private partnership in response to the needs of the private sector. Information and financial flow were channeled along commercial commodity lines, involving a selected group of scientists, planters and representatives of multinational organizations. At that time, food production and subsistence agriculture for home consumption or sale on the domestic market were not taken into consideration. Little use was made of indigenous knowledge Flori [2].

According to Getahun [3], the absence of effective link between indigenous knowledge and conventional ones is one of

the major problems that hinder the effectiveness of agricultural development in general and that of agricultural research and extension system in particular. There have been various attempts both by extension and research organizations to invigorate linkages. Yet, the linkage remains as weak as the number of times solutions were sought to further strengthen them Getahun [3].

The primary role of agricultural extension is that of transmitting improved agricultural technologies to farmers who are the end users of all findings emanating from agriculture related researchers as well as taking their problems to appropriate research or government agencies for solution. It is an educational process designed for farmers to enable them adopt improved practices and by so doing, raise their standard of living through their own effort and using their own resources Erie [4]. Extension workers who are charged with the task of disseminating improved farm practices to farmers have the responsibility of understanding the social setting i.e., the local culture in which such information and changes are to be introduced. Failure in this respect can weaken their success in persuading farmers to adopt recommended practices Onemolease [5]. The study therefore sought to assess the level of incorporation of indigenous knowledge system in extension programming of cassava in Delta state, Nigeria.

### Objectives of the study

The main purpose of the study is to assess the level of incorporation of indigenous knowledge system in extension programming for cassava in Delta State. The specific objectives are to

- i. examine the socio-economic characteristics of extension personnel in the study area,
- ii. assess the willingness of extension personnel to incorporate indigenous knowledge system in extension programming of cassava, and
- iii. assess indigenous technologies for cassava cultivation and their extent of incorporation by the ADP

### Hypothesis of the study

Ho: There is no significant difference in the levels of incorporation of indigenous technologies for cassava in extension programming by the ADP.

### Methodology

This study was carried out in Delta State, Nigeria. Delta State is located in Southern Nigeria, and it is one of the six states in the South-South geopolitical zone of the country. It lies roughly between longitude 5° .00" and 6° .45" and shares common boundaries with Edo to the North, Bight of Benin to the South West, Ondo to the North West, Imo and Anambra to the East, Bayelsa to the South and Rivers to the South East respectively Delta State Agric Policy [6]. Delta State has a population of 4098391 NPC [7] with a projected population of 4813917 in 2011

NBS [8]. The state is generally low-lying and has a deep coastal belt inter-laced with rivulets and streams which form the Niger Delta. The Atlantic Ocean forms its southern boundaries with coast line of 160 kilometers. The traditional income generating activities of the people are crop farming, fish farming, lumbering, weaving, canoe and pot making Delta State Monthly Planner [9].

The study is limited to IKS associated with cassava cultivation. Multi-stage sampling technique was adopted. The first stage involved purposive selection of Delta North and Delta Central agricultural zones because they have the highest intensity of cassava cultivation and agricultural extension activities. The second stage involved proportionate sampling of the extension block or local government areas (9 LGAs from Delta North and 8 LGAs from Delta Central agricultural zones respectively) using 50% of the population. The third and final stage involved random selection of the respondents with 48 from Delta North and 53 from Delta Central, given a total of 101 respondents that were sampled. Data were collected from the extension agents using questionnaire.

In order to ensure the validation of data gathering instruments, experts in the field of Agricultural Extension and Rural Sociology were presented with the instrument for assessment, criticisms and suggestions (face validity). Also the test-re-test method of establishing reliability of scale in the research instrument was used. A correlation coefficient of 0.817 was obtained indicating reliability of instrument. Data collected for the study were coded for computer based analysis. Descriptive statistics comprising of frequency count, mean, and percentages were used for data analysis. Inferential statistics (Friedman test) was used to test the hypothesis at 0.5 level of significance. The Friedman test is a non-parametric statistical test developed by the U.S. economist, Milton Friedman (1937). It is similar to parametric repeated measures ANOVA except that it is applied when the data are ranked data. It is also used to test the significance of detect differences in treatments across multiple test attempts Bortz et al. 2010. The computer software used was the Statistical Package for Social Sciences (SPSS)

## Results and Discussion

### Extension agents' personal characteristics

**Table 1:** Socio-economic characteristics of extension personnel.

Characteristics	Frequencies	Percentages	Mean
Age (Years)			
25-29	9	8.9	42
30-34	7	6.9	
35-39	20	19.8	
40-44	25	24.8	
45-49	25	24.8	
50-54	13	12.9	
55 and above	2	2	
Total	101	100	

Academic qualification			
OND	24	23.8	
HND/B.Sc./B.A.	66	65.3	
M.Sc./Ph.D	11	10.9	
Total	101	100	
Experience (year)			
Less than 5	8	7.9	14.5
9-May	19	18.8	
14-Oct	24	23.8	
15-19	24	23.8	
20-24	14	13.9	
25-29	9	8.9	
30 and above	3	3	
Total	101	100	
Salary grade level			
07-08	15	14.9	
09-10	26	25.7	
12and above	59	59.4	
Total	101	100	

Source: Field Survey data, 2014.

The extension agents' characteristics examined in the study were: age, academic qualification, experience and salary grade level. The results are presented in Table 1.

The result shows that the modal age (24.5%) for the extension workers were 40-44 years and 45-49 years, the average being 42 years, indicating that the workers were fairly young. This result is in agreement with Erie [4] who reported a mean age of 42 for extension personnel in Edo State, Nigeria and that of Belonwn [10] who reported a mean age of 42.1 years for extension personnel in Delta State, Nigeria. This age is good for effective functioning of extension personnel, as experts argue that farmers do not readily accept new ideas from agents whom they consider much younger than themselves Erie [4]. Most (65%) of the extension personnel were holders of the Higher National Diploma, Bachelor of Science (B.Sc.) or Bachelor of Arts. About 11% had M.Sc./Ph.D.

The data indicated that the extension personnel attained higher educational qualification which could increase their efficiency in extension service delivery. The fact that all the respondents had formal education is an advantage, since education is generally considered as an important variable that enhance the introduction and implementation of programmes in rural areas Akpovi 2002. This result is good for effective extension service delivery in the state as Agbamu [11] had stated that insufficiently qualified, inexperienced and poorly trained personnel cannot do much to improve the quality of extension service offered to farmers. The average experience was 14.5

years. These numbers of years would be enough for the extension agent to understand the local culture of the farmers.

**Extension agents’ perception on the use of indigenous technologies in extension service delivery**

**Table 2:** Extension agents’ perception on the use of indigenous technologies in extension service delivery for cassava.

Category	Frequency	Percentage
Yes	33	32.7
No	68	67.3
Total	101	100

Source: Field data 2014.

Table 2 shows the perception of extension personnel on the incorporation of indigenous technologies on cassava cultivation. The result indicated that a high percentage of extension personnel (67.3%) disagreed that indigenous technologies should be incorporated in extension service delivery while 32.7% of them agreed. This result revealed that a high percentage of extension personnel do not want indigenous knowledge systems to be incorporated into extension service delivery, which suggest that, they placed low value on these indigenous technologies. Based on these, extension agents may not be interested in incorporating indigenous knowledge system into extension service delivery. This result is in line with the submissions of Flori [2] that in

extension programming, agricultural extension officers and research staff dominate the extension programme planning and implementation process while farmers and representatives of agricultural input and marketing agencies are not involved at all. Ragasakaran & Waran [12] also argued that during the process of technology development farmers’ informal experimentation are not considered by researchers. This is probably because they feel such IKS are not very relevant to modern farming practices.

**Perceived attributes of indigenous technologies**

Table 2 showed the perceived attributes of indigenous technologies for cassava cultivation by the extension agents. The results showed that the important attributes of indigenous technologies associated with cassava cultivation include: they easily diffuse over small homogenous zones mainly (mean=4.06), have low application cost (mean=3.51), they generate only small increment on output (i.e., unproductive) (mean=3.41) and have limited adaptability (mean=3.10). Attributes such as; generally location and site specific (mean=2.46), environmental and ecological friendliness (mean=2.19) and sustainability (mean 2.05) were not considered important attribute of IKS associated with cassava cultivation technologies the extension agents. This result indicated that extension agents, though perceived indigenous knowledge to diffuse over small homogenous zones, mainly from farmer to farmer, are low in cost of application; however they are largely unproductive and have limited adaptability and sustainability Table 3.

**Table 3:** Perceived attributes of indigenous technologies.

Attributes	Perception (%) N = 101				
	Strongly Agree	Agree	Disagree	Strongly disagree	mean
They diffuse over small homogenous zones mainly through farmer to farmer.	1	67.3	30.7	1	4.06*
Low in cost of application	0	1	21.8	77.2	3.51*
They generate only small increment on output (unproductive).	69.3	10.9	11.9	7.9	3.41*
They have limited adaptability.	3	78.2	16.8	2	3.10*
They are generally location and site specific.	1	45.5	52.5	1	2.46
They are usually environmental and ecological friendly.	3	27.7	55.4	13.9	2.19
They are sustainable	0	18.8	68.3	12.9	2.05

\*Important attribute (≥ mean=2.50)

Source: Field data, 2014.

The findings agrees with the submission of Grenier [13], who stated that indigenous knowledge that was once adopted and effective for securing livelihood in a particular environment becomes inappropriate under conditions of environmental degradation. This finding that IKS have limited adaptability is supported by Ossai [14], who stated that, indigenous knowledge is location and culture specific, and Nowroozi & Alegha [15], who noted that an effective indigenous technology in one geographical location isn’t necessarily effective in another location.

**Indigenous practices associated with cassava cultivation crops and their level of incorporation**

Table 4 shows indigenous practices associated with cassava cultivation and their extent of incorporation by extension agents. The result showed that, the major indigenous practices associated with cassava cultivation that had been highly incorporated into extension programming by the extension agents include mixed/intercropping (mean=2.69), burying of cuttings (mean=2.66) and leaving cuttings to dry 2-3 days before

planting (mean=2.52). Practices such as splash and burn land preparation (mean=2.42), zero tillage (mean=2.40) and use of scare crows (mean=2.32), use of traditional planting distance (mean=1.49), staggered planting (not in rows) (mean=1.22), use

of wood ash as insecticide (mean=1.21) and use of traditional cultivars (mean=1.17) have not been highly incorporated into extension programming by the extension personnel.

**Table 4:** Indigenous practices associated with cassava cultivation and their extent of incorporation by the ADP.

Practices	Extent of Incorporation (%) N=101				
	Very High	High	Low	Very Low	Mean
Mixed/intercropping	8.9	56.4	29.7	5	2.69*
Burying cassava cuttings	11.9	36.6	39.6	39.6	2.66*
Leaving cuttings to dry 2-3 days before planting	2	52.5	41.6	4	2.52*
Slash and burn land preparation	3	42.6	48.5	5.9	2.42
Minimum tillage	0	45.5	49.5	5	2.4
Use of scare crows	1	42.5	44.6	11.9	2.32
Random spacing	1	5	36.6	57.4	1.49
Staggered planting (not in rows)	0	5	13.9	81.2	1.23
Use of wood ash as insecticide	0	2	17.8	80.2	1.21
Use of local cultivars	0	3	11.9	85.1	1.17

\*highly incorporated. (mean ≥2.50)

Source: Field data, 2014.

The findings therefore, revealed that extension agents have incorporated the indigenous practices that they believe to be relevant to increased productivity. The general results suggest the level of incorporation of IKS associated with cassava is low. This may not be unconnected to agents' low perception of the value of such technology to increased productivity. This result also implies that extension agents do not see indigenous technologies as good enough to be incorporated in extension programming for cassava cultivation but rather concentrate on foreign technologies. This may have accounted for the submission of UNESCO (2013) that the lust for modernity and new technologies are threatening the loss of great store of knowledge held by native people. This result also may have prompted the submission of Emegwali [16], that good number of groups in Africa and elsewhere in the world has suffered from long term discrimination, inequality and exclusion from planning and execution of development programme and projects.

**Ho: There is no significant difference in the extent of incorporation of indigenous technologies for cassava in extension programming by the ADP**

Table 5 shows the differences that existed in the extent of incorporation of indigenous technologies for cassava by the ADP. Freidman test was used to differentiate the significant indigenous practices that have been incorporated by the ADP. The Friedman test (chi-square=378.91), was significant at the 5% level. This means that significant differences existed in the extents of incorporation of indigenous practices by the ADP. Mean with different superscript are significantly different in their levels of incorporation as shown in Table 5. The post hock test revealed that Mixed/intercropping (mean=2.69), burying cassava cuttings

(mean=2.66) and Leaving cuttings to dry 2-3 days before planting (mean=2.52) were the highest or mostly incorporated indigenous technologies with no significant difference existing in their extents of incorporation but were significantly different from slash and burn land preparation (mean=2.42) and minimum tillage (mean=2.40). However, the extents of incorporating of use scare crows (mean=2.32) was significantly different from random spacing (mean=1.49), staggered planting (not in rows) (mean=1.23), use of wood ash as insecticide (mean=1.21) and use of traditional cultivars [17,18].

**Table 5:** Test of difference in the extent of incorporation of technologies in extension programming of cassava.

Practices	Mean
Mixed/intercropping	2.69a
Burying cassava cuttings	2.66a
Leaving cuttings to dry 2-3 days before planting	2.52a
Slash and burn land preparation	2.42b
Minimum tillage	2.40b
Use of scare crows	2.32c
Random spacing	1.49d
Staggered planting (not in rows)	1.23d
Use of wood ash as insecticide	1.21d
Use of local cultivars	1.17d

Chi-square is significant at 5% (378.91); df=9;

Mean with superscript are significantly different in their levels of incorporation

Source: Field data 2014

## Conclusion

Based on the findings of this study, the researchers concluded that the level of incorporation of IKS in extension programming for cassava in Delta State is low. Even if there seems to be an existing relationship between extension agents and farmers in terms of utilization of farmers indigenous knowledge, extension agents have not meaningfully considered farmers' indigenous knowledge as being useful in extension service delivery as a result of the value they place on indigenous technologies [19,20].

## Recommendations

The researchers recommended that;

- i. Researches should be conducted to find out the usefulness of farmers indigenous knowledge system and if need be, these indigenous knowledge should be incorporated into extension programme planning and implementation.
- ii. Farmers' informal experiments should be monitored and recorded by extension agents to enable them identify their areas of strength and weakness and report to research stations for possible improvement. This will help boost the confidence of farmers in extension agents as they will see themselves playing active roles in innovation development.

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