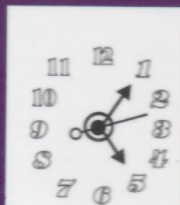




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Contributions are invited from all over the world, and especially from scholars and practitioners working on literacy, adult education and development in general in Nigeria, and other African countries in particular. Book reviews and notes on organisations and agencies as well as research projects and reports of recent conferences are also welcome.

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Contents

Effective Principalship: An Appraisal of School Management and Leadership Problems in Nigeria <i>Talatu Ibrahim Umar</i>	319
Using Service Learning Instructional Strategy in Teaching Social Studies for Improving Students' Creativity Skills and Reducing Unemployment <i>Tolulope Victoria Gbadamosi and Olaronke Modupeoluwa Ajayi</i>	334
Evaluation of Vocational Training and Youth Skill Acquisition Programmes in Lagos State, Nigeria <i>J.O. Okebiorun</i>	353
Influence of Literacy on the Adoption of National Centre for Agricultural Mechanization's (NCAM) Innovations by Cassava Farmers in Kwara State, Nigeria <i>S. A. Aderinoye-Abdulwahab and M.O. Salawu</i>	370
Addressing the Educational Needs of the Internally Displaced Persons (IDPs) in Maiduguri, Borno State through Continuing Education <i>Eyitayo Oluremi Oni</i>	385
The Implementation of Non-Formal Education Policy in Nigeria: Issues and Prospects. <i>Stephen Chekwubechukwu Onyekwelu, Abdullahi Mohammed and Hussaini Tukur Hassan</i>	397

**Influence of Literacy on the Adoption of National Centre for
Agricultural Mechanization's (NCAM) Innovations by
Cassava Farmers in Kwara State, Nigeria**

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Abstract

This study investigates the influence of literacy on certain innovations by the National Centre for Agricultural Mechanization (NCAM) among cassava farmers in Ifelodun Local Government Area of Kwara State, to strengthen the use of agricultural innovation in cassava farming so as to increase productivity. The study selected four villages that benefitted from NCAM innovations. Eighty respondents were randomly selected across the four villages while a questionnaire was used to collect data for the study. Of these respondents, 88.8% were male, while only 11.2% were female. Cassava farming is dominated by the elderly as 37% of the sample were above 50years. Only 13.8% of the farming population were young, while more than 80% of them are married. Household pattern was constituted of 52% extended family types and 49% nuclear. Furthermore, it was discovered that the

sample diversified largely into artisanship (93%), while only about 6% were civil servants. Interestingly, an equal proportion (37%) attained primary or no formal education at all. Only a few (15%) attained secondary education. Normal tractors, four wheeled mini tractors, and cassava peelers were among the types of innovation adopted by the farmers, whilst the motorized cassava chipper and cassava frying machine were not accepted at all. More than 80% believed that the NCAM innovation had helped to increase the quality of their produce, as well as reduce their labour input. A high level of illiteracy was found to be a limiting factor in the adoption of innovations. Farmers can better adopt innovations if they are aware of the usage and full benefits of the machines. Therefore, extension workers can engage farmers in awareness and sensitization workshops on the importance and usage of the NCAM innovations.

Keywords: Technology, Growth, Diversified Economy, Extension Agencies, Food Security, Poverty.

Introduction

Agriculture in Nigeria is a sector that requires great improvement in order to increase productivity. Nigeria, with her vast agricultural resources, needs to operate an economy which does not depend largely on petroleum, but rather a diversified economy. In order for Nigeria to successfully diversify her economy and avoid the consequence of dependence on a single product (Umaru and Anono, 2012), there is a need for innovation that will boost the agricultural sector. In as much as some innovations may require a minimal level of education, there are a

number of technologies that will demand a higher level of literacy (Ilevboaje, 2004). Agriculture is a vital tool for improving growth, overcoming poverty and improving food security. It is thus a critical sector that drives the economic development and industrialization of developing nations, and serves as a means of reducing unemployment. Increase in agricultural productivity as well as extension education is important for the growth of the Nigerian economy.

A major problem facing agricultural productivity in Nigeria is illiteracy. This has over the years posed great challenges to agricultural development as well as productivity. Farmers' literacy level generally affects agricultural practices in Nigeria, especially in the rural areas. Extension and research works are more tedious with the low literacy level of farmers. Although farmers usually have a rich knowledge of local conditions and valuable practical knowledge or experience of how best to successfully exploit their environment, they require innovation information generated from research and development to boost their productivity (Apata, 2010).

All governments, research bodies and international services are instituting a wide range of measures to modernize and increase the agricultural productivity of farmers (Shiru, 2008). Thus, farmers would have to unlearn the traditional methods and adopt the recommended farming techniques in order for Nigerian agriculture to improve. Perhaps, the slow development of Nigerian agriculture can be attributed to the inability of Nigerian farmers to respond positively to new ideas or innovations (Suleman, 2011). Although for farmers to respond positively to new ideas or innovations, they must be properly educated on the application of new ideas or practices to their farming activities. Previous governments worked assiduously to revitalize agriculture in order to make Nigeria food self-sufficient and increase export of

agricultural products (Talabi and Onasanya, 2011). Agricultural institutions were also set-up to increase agricultural productivity by developing agricultural innovations because it is a major factor in determining the income level of the farming sector, meeting the food requirements of the continually expanding population, and generating foreign exchange to finance domestic programmes, amongst others.

In Nigeria, cassava production is well-established. Cassava is processed in many centres and fabricating enterprises set up in the country. Though the crop is produced in 24 out of the 36 states in the country, it is dominant in the southern part of the country. In the past, government has tried to promote self-sufficiency through cassava while curtailing rice and wheat imports (The Pointer, 2019). According to the Nigerian Presidential Initiative of July 2002, the cropped area of cultivation of cassava was proposed to increase to 5 million hectares by the end of 2010, with a projected annual yield of 150 million tonnes, resulting in annual export earnings of US\$5 billion. To facilitate initiatives like this, the innovation of pro-Vitamin A cassava varieties was launched by the Federal Government of Nigeria, and introduced to 1.8 million farmers in the country (FAO, 2010; FAO, 2016).

The National Centre for Agricultural Mechanization (NCAM) as an agricultural institute was created for the improvement of agricultural machinery and equipment and quality agricultural products, through the employment of mechanized farming techniques, and also to serve as a national and an international centre of excellence for the development, promotion and acceleration of agricultural mechanization. The low cassava productivity in Nigeria has been attributed to farmers' inability to positively respond to new ideas or innovation. Poverty, illiteracy of rural farmers, and unwillingness to adopt improved agricultural innovations over their traditional ways of farming have also posed

great challenges to agricultural development and productivity (World Bank, 2008). NCAM, in a bid to improve the productivity of farmers, introduced innovations such as tractors, four-wheeled mini-tractors, mechanical cassava peelers, cassava lifters, motorized cassava planters, among others to the people of Ifelodun Local Government Area in Kwara State. This study investigated the adoption rate of these agricultural innovations by NCAM by highlighting the importance of such innovations on agricultural productivity, and determined the influence of literacy on the adoption of these innovations.

Methodology

The National Centre for Agricultural Mechanization is situated in Ifelodun Local Government Area in Kwara State. It has a land area of about 3435 km² and a population of 206,042 (NPC, 2006). The area is located between latitude 7°45'N and 9°30'E and longitude 2°30'E and 6°35'E. It is characterized by dry and wet seasons. The annual rainfall ranges between 1000 and 1500 mm. Average temperature is around 30°C and humidity ranges from 35 to 60%. The major source of livelihood and occupation of the people in the area is farming. Farming is traditional in nature with emphasis on the cultivation of crops such as sorghum, cassava, yam, maize and melon.

The study population comprised cassava farmers from Ifelodun LGA. A multi-stage sampling procedure was used in selecting the sample for the study. The first stage involved the purposive selection of Ifelodun Local Government Area in Kwara State, because the farmers in the area are direct beneficiaries of the innovations developed by NCAM. The second stage involved the random selection of four (4) villages from Ifelodun Local Government Area – Ganmo, Amoyo, Share and Idofian. The third

stage was a snow-balling selection of 20 farmers from each of the four selected villages to make a sample size of eighty (80).

Data was obtained through the use of questionnaires and interviews. The questions raised helped to answer the study objectives and a Likert-type scale was used to rank and analyse the data collected. Issues like the influence of literacy were measured using a 5-point Likert-type scale of Strongly agree, Agree, Undecided, Disagree and Strongly disagree to determine the influencing factors of adoption of the innovations. In the same vein, frequencies and percentages were used to rank responses.

Results and Discussion

Socio-economic factors influencing adoption of NCAM innovations

The socio-economic characteristics of the farmers are presented in Table 1. Among the characteristics examined are: age, marital status, level of education, awareness of NCAM innovation and household type.

Table 1: Socio-economic factors of the respondents (n=80)

Age	Frequency	Percentage
20-30	11	13.75
31-40	12	15.00
41-50	22	27.50
>50	35	43.75
Sex		
Male	70	87.50
Female	10	12.50
Marital Status		
Single	10	12.50
Married	63	78.75
Separated	07	08.75
Household Type		
Nuclear	32	40.00
Extended	48	60.00

Level of Education		
Primary	30	37.50
Secondary	12	15.00
No formal	30	37.50
Tertiary	08	10.00
Awareness of NCAM		
Radio	36	45.00
Television	15	18.75
Extension agents	19	23.75
Print & Internet media	11	13.75

Years of use of NCAM innovation		
<5	08	10.00
5-10	64	80.00
>5	08	10.00
Secondary occupation		
Artisans	75	93.75
Civil servants	05	06.25
Farming Experience		
< 20 years	17	21.25
20-40 years	55	68.75
>40 years	08	10.00

Source: Field Survey, 2018.

Results presented in Table 1 show that a substantial number of the respondents were above the age of 50, implying that the farmers in the study are relatively old. This finding is supported by Ani (2007) who stated that farming is now in the hands of old farmers, hence, the adoption of innovations and productive effort per unit of labour may be declining. Therefore, there is a need for the young to be more actively involved in cassava farming. The results further imply that the majority of the respondents were

married. This is likely to influence the level of adoption and use of innovation techniques as a result of combined efforts from multiple stakeholders, in order to achieve production efficiency. The results further show that the majority of the farmers are not only married, but their household style is the extended family type, hence, there is a tendency for the number of children and other dependents to be high. This family type is common among farmers, as it boosts farm labour supply. However, this may not work in favour of the adoption of innovation and technology, as farmers tend to believe that their population strength is sufficient to increase productivity.

Table 1 shows a sizeable portion of the sample as educated. This means that those with formal education could read and write and this could assist them in the adoption of innovative ideas and by extension, positively influence their adoption level. On the other hand, those with no formal education were also substantial. The pattern of these results may be the reason for an overall low adoption level as seen in subsequent results (Tables 2 and 4). The low percentage of civil servants to the larger percentage of artisans might have been due to their low education status, thus supporting their diversification into different trade options. The results show that the majority of the farmers have more than 20 years of experience, signifying that they have been farming for long. This indicates that cassava farming is an old enterprise. Ehirim, Odurukwe, Ajaero, & Emenyonu (2006) observed that changes are expected over time due to high farming experiences. A farmer with farming experience of several years is expected to be exposed to innovative ideas that can result in increase in production. Results of this study will demonstrate whether farmers are willing to adopt such innovations.

Adoption of NCAM innovations

Table 2 shows the result of the type of innovation made available by NCAM to farmers and the rate/level at which farmers adopted and used them.

Table 2: Ranking of adoption of NCAM innovations by cassava farmers in the study

Innovation	Frequency	Percentage	Rank
Normal tractor	42	52.5	1 st
Four-wheel mini tractor	15	18.75	2 nd
Cassava lifter	12	15.00	3 rd
Cassava planter	07	8.75	4 th
Cassava harvester machine	04	5.00	5 th
Mechanical cassava peeler	00	0	6 th
Cassava manual chipper	00	0	6 th
Motorised cassava chipper	00	0	6 th
Cassava frying machine	00	0	6 th

Source: Field Survey, 2018.

Out of the 9 types of innovations listed, only 5 have been utilized by the farmers. The normal tractor is the most commonly used among the innovations made available by the NCAM. This is not surprising as this is the innovation that is most familiar to the farmers.

Effect of innovation on productivity of cassava farmers in the study

The results in Table 3 show the effects of the innovations. A Likert-type scale was used to rank the seven effects of the NCAM innovations adopted by the farmers.

Table 3: Effect of innovations on agricultural productivity

Effect	SA Freq (%)	A Freq (%)	U Freq (%)	D Freq (%)	SD Freq (%)	Rank
Improve the quality of farm produce	26 (32.50)	42 (52.50)	6 (7.50)	5 (6.25)	1 (1.25)	1 st
Generate more profit and income	50 (62.50)	24 (30)	0	5 (6.25)	1 (1.25)	2 nd
Reduce manual labour and ease farming practices	33 (41.25)	46 (57.50)	0	0	1 (1.25)	3 rd
Increase productivity	31 (38.75)	49 (61.25)	3 (3.75)	6 (7.5)	3 (3.75)	4 th
Reduce production period	19 (23.75)	35 (43.75)	15 (18.75)	10 (12.50)	1 (1.25)	5 th
Enhance usage of fertilizer	17 (21.25)	20 (25.00)	32 (40.00)	7 (8.75)	4 (5.00)	6 th
Enhance use of pesticides and herbicides	9 (11.25)	26 (32.50)	30 (37.50)	13 (16.25)	2 (2.50)	7 th

Source: Field Survey, 2018.

Key: SA- strongly agree, A-agree, U- undecided, D- disagree, SD- strongly disagree

A large percentage agreed that the innovation adopted helped them to reduce manual labour and made farming practices easier, thereby causing this effect to rank first. The other effects of the adopted innovations are listed according to how they have affected the respondents' farming activities, production, and livelihoods, in the long run. "Generate more profit and income" emerged second, while "enhanced usage of pesticide and herbicide" ranked last

(7th), meaning the majority of the farmers did not feel the effect or the adoption rate of this particular technology is relatively low when compared to others on the list. By implication, the adoption of NCAM innovations by cassava farmers in the study; did not have significant effect on usage of fertilizer and pesticides.

Influence of literacy on the adoption of NCAM's innovation

The results in Table 4 present the influence of literacy on the adoption of agricultural innovation.

Table 4: Influence of literacy on the adoption of NCAM's innovation by cassava farmers in the Study

Factor	SA Freq (%)	A Freq (%)	U Freq (%)	D Freq (%)	SD Freq (%)	Ranking
Lack of proper government intervention	53 (66.25)	26 (32.50)	0 (0.00)	0 (0.00)	1 (1.25)	1 st
High level of illiteracy	52 (65.00)	26 (32.50)	0 (0.00)	1 (1.25)	1 (1.25)	2 nd
High cost of innovation	47 (58.75)	31 (38.75)	0 (0.00)	1 (1.25)	1 (1.25)	3 rd
High poverty rate	42 (52.50)	36 (45.00)	0 (0.00)	1 (1.25)	1 (1.25)	4 th
Lack of adequate information on innovation	38 (47.50)	40 (50.00)	1 (1.25)	0 (0.00)	1 (1.25)	5 th
Lack of proper management of extension agencies	21 (26.25)	37 (46.25)	1 (1.25)	18 (22.50)	3 (3.75)	6 th
Lack of adequate raw materials for manufacturer	14 (17.50)	24 (30.00)	17 (21.25)	16 (20.00)	13 (16.25)	7 th

Source: Field Survey, 2018

Key: SA- strongly agree, A-agree, U- undecided, D- disagree, SD- strongly disagree

The items listed in Table 4 all point to the role that literacy can perform in the adoption of the NCAM innovations for improved agricultural productivity. The farmers ranked lack of government intervention as 1st. This is ironical as the innovations (technologies) provided by NCAM are a government intervention.

It is rather unfortunate that farmers are not able to adequately utilize the innovations probably because of their low level of literacy, hence the low adoption rate and the conclusion that government intervention is lacking. Additionally, the high illiteracy level ranked second. This could imply that farmers may not be aware of the importance of the innovations provided by the NCAM. Furthermore, it could also mean that farmers are unable to comprehend the operation of the innovations, and this may have contributed to the low adoption of the technologies.

It is noteworthy that the majority of the cassava farmers in the study are old, lack formal education, and rely largely on family labour, hence, it is not surprising that illiteracy ranks high as a limiting factor to a high adoption rate. Other factors posing serious limitations to a high adoption rate include: the high cost of innovations and lack of proper management of extension agencies. To further buttress the point that the literacy levels of the farmers play a major role in the adoption of the technologies (innovations), the farmers must have the capacity to process information and access resources at their disposal. Again, the influence of literacy can be felt as the results show that the farmers are not able to properly manage extension agencies (6th in ranking order). It was also observed that the innovations were considered costly (this ranked 3rd), perhaps an adequate level of literacy among the farmers could have offered alternative options and sources to the costly innovation. It can therefore be deduced that the high illiteracy level of farmers plays a significant negative role on the adoption of the innovations. Moreover, the information on the available technologies are readily available at NCAM for the farmers' use, however, the high illiteracy level was probably also a major hindrance to access to adequate information on the innovations (5th on the rank).

Conclusion

Based on the findings of this study, it is observed that the majority of the farmers used the innovations for pre-planting and planting, while some used harvesting machinery such as normal tractors and four-wheeled mini-tractors. Furthermore, this study showed that post-harvest innovations introduced by NCAM, such as mechanical cassava peelers, cassava manual chippers, and motorized cassava chippers were not adopted. This implies that none of the farmers in the study area engaged in the commercial post-harvest production of cassava. This study also showed that most of the farmers used other agricultural innovations like fertilizers, pesticides and herbicides, and most of them agreed that the innovations had a positive effect on their productivity (as shown in Table 3). This study has shown that a high level of illiteracy is a key factor hindering the adoption of innovations, while most farmers agreed that a lack of proper government intervention is a problem affecting their adoption of the innovations. Hence, there is a need for government to synergise with extension agents to boost the farmers' literacy level, possibly through non-formal education.

This study therefore recommends an awareness and sensitization drive, to enable the farmers have better access and utilize the available NCAM innovations. This could be done through the organization of adult non-formal education classes for the farmers in their steads. Government would also need to provide more support to farmers by subsidizing the cost of these technologies. Some of the innovations could also be made available through appropriate authorities like ministries, local government authorities and extension agencies, where farmers can patronize or hire at subsidized rates. There should also be proper management of extension agencies, so that farmers will receive

adequate information on the innovations which may then aid better adoption.

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