IJAAAR 10 (1&2): 145-153, 2014 *International Journal of Applied Agricultural and Apicultural Research*

Assessment of community factors influencing the effectiveness of improved cassava production technologies in Osun State, Nigeria.

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Abstract

This study investigated community factors and their influence on the effectiveness of improved cassava production technologies in Osun State. Multistage sampling procedure was employed to select cassava farmers in the study. In the first stage, 40 percent of the LGAs in each of the 3 ADP agricultural zones were selected. In the second stage, two communities were purposively selected from each of the twelve LGAs giving a total of twenty-four communities. The third stage involved the proportionate sampling of 25 percent of the population of registered ADP cassava farmers in each of the selected communities giving a total of three hundred and twelve cassava farmers. Data were summarized with frequency counts, percentages, mean and correlation coefficient. The results show that effectiveness of improved cassava production technologies was significantly and positively related to community participation (r = 0.128; p≤ 0.05) and infrastructural facilities (r = 0.157;p≤ 0.01). The results of the study reveal that leadership participation and infrastructural facilities have influence on the effectiveness of improved cassava production technologies. It is therefore recommended that infrastructural facilities such as access roads, electricity, cassava processing centers should be made available in the rural communities to facilitate the effectiveness and success of agricultural programmes. Also, farmers should be actively involved in the planning and execution of development programmes.

Key words: effectiveness, technologies, improved varieties, infrastructural facilities, food security

Introduction

Cassava, (*Manihot esculenta, Crantz*) is a major staple food in Nigeria. Its ease of cultivation, coupled with its adaptation to a wide variety of soils, makes it a popular crop and is now replacing yam in some parts of Nigeria. It is also more drought resistant than most crops. It is the third most important crop in the tropics after rice and maize, and is consumed daily by up to one billion people, mostly in sub-Saharan Africa (Eugene and Otim-Nape, 2012) Presently, there are over 200 possible uses of cassava worldwide (Yahaya and Aina, 2007) Each component of the plant is useful; the leaves can be consumed as vegetable, cooked as soup ingredient or dried and fed to livestock as protein supplement. The stem is used for

plant propagation and grafting, while the roots are processed for both human and industrial consumption (CBN, 2006)

In view of its usefulness in combating hunger and ensuring food security in the nation, research has been concentrated on improving cassava for increased productivity per hectare of land. The International Institute of Tropical Agriculture (IITA) has played a leading role in the development of improved varieties of cassava which are disease and pest resistant, low in cyanide content, drought resistant, early maturing and high yielding. The improved varieties have been distributed throughout Africa's cassava belt. Varieties with resistance to the major diseases give sustained yield of 50 % more than the local varieties. Also, the National Root Crops Research Institute (NRCRI) has made cassava a priority for extensive research. Over the years, they have developed different cassava packages e.g. improved varieties which are disease resistant, improved planting and pest control methods, the development and dissemination of improved varieties of cassava that are superior to old varieties and resistant to diseases like Cassava Bacteria Blight (CBB) and African Cassava Mosaic Virus(ACMV).

According to Jibowo (2000), community-related factors influence the success of any agricultural programme. The characteristics of the community wherein farmers are situated may have influence on the effectiveness of improved technologies. This is because there are some factors within the social system that are conducive to change while there are also factors that inhibit change (Jibowo, 2000; Ekong, 2003). Such factors include the history of cooperation or conflict; availability of natural resources which favour the innovation such as weather, vegetation and soil fertility status, presence of perennial streams, political homogeneity and presence of essential infrastructural facilities.

Mgbada (2006) reported a significant relationship between accessibility to infrastructural facilities and effectiveness of agricultural programmes. He submitted that the provision of infrastructure such as access roads will enhance the success and effectiveness of agricultural programmes. Akinsorotan (2007) also reported that rural farmers perceived the provision of infrastructural facilities as very relevant and useful to their needs. However, communities differ one from another and therefore the certainty of community factors may not be easy to generalize.

Whereas the central aim of any improved technology, which is to bring an improvement in agricultural productivity and thereby ensure increased standard of living of the farmers and hence overall development of the rural landscape (Ajala, 2011), high production can only be achieved when the improved technologies are effective and have gained mass adoption by farmers. Effectiveness is the measure of the extent to which the improved technologies has produced the expected results or met the objective of disseminating them (Farinde, 1996). Available statistics prove that despite the introduction of improved technologies, increase in the yield of cassava has not been significant over the years (CBN, 2006), coupled with reported reduced cultivated hectarage (NBS, 2008). Could it be due to the interplay or influence of community factors? It is in view of the foregoing that this study was carried out to investigate the influence of community factors on the effectiveness of improved cassava production technologies in the study area.

The objectives of the study therefore were to:

1. Analyze cassava farmers' community related factors affecting the effectiveness of improved cassava production in the study area, and;
2. Investigate the influence of community factors on the effectiveness of the improved cassava production technologies

Hypothesis

There is no significant relationship between the effectiveness of improved cassava technologies and selected community factors, namely: community participation, ethnic heterogeneity, accessibility to extension facilities and availability of infrastructural facilities.

Methodology

Multistage and proportionate sampling procedures were employed to select the cassava farmers. The first stage encompassed the selection of four Local Government Areas (LGAs) from each of the three agricultural zones based on their involvement in cassava production. This means forty percent of the LGAs in the State were sampled proportionately based on the number of LGAs in each agro-ecological zone of the State. At the second stage, from each of the twelve selected LGAs, two communities with higher concentration of cassava growers were selected, giving a total of twenty-four communities. At the third stage, from each of the twenty-four communities, samples were proportionately selected based on the population of each of the selected communities giving a total of three hundred and twelve respondents. Data were summarized with frequency counts, percentages, mean and correlation coefficient.

Measurement of Variables

*Dependent variable***:** The dependent variable of the study was the effectiveness of the improved cassava production technologies. Effectiveness of the improved cassava production technologies refers to the degree or extent to which the improved technologies have met the purpose for which they have been developed and disseminated to farmers. Following the procedure of Adeokun *et al*. (2007) and Mgbada (2006), farmers were given a 23- item statement on the improved cassava production technologies, measured on a five-point scale thus: Very effective (5 points), Effective (4 points); Fairly effective (3 points), Rarely effective (2 points) and Not effective (1 point). Effectiveness index was the sum of the scores on all 23 statements per farmer. The maximum score was 115, while the minimum was 23. To know the level of effectiveness of the improved technologies, total score for each respondent was grouped into 3 categories: high, low, and medium. The high was placed within mean+standard deviation, the low within mean–standard deviation, while the medium within mean $\pm$standard deviation range.

Independent variables: The following independent variables (community-related variables) for the study were measured thus: Leadership participation was measured through the number of times that each of the respondents had been called upon to contribute to community affairs in the past two years. The number of times was recorded. Ethnic heterogeneity was measured by identifying the number of other ethnic/tribal groups in the community apart from Yoruba and the number was recorded.

Accessibility to extension was measured by the distance the cassava farmers travelled to get to the nearest extension office and was recorded in kilometres (km). Availability of infrastructural facilities refers to the presence of infrastructural facilities in the community of the respondents and was scored thus: Available, (1 point); Not available (0 point); and the working condition of the infrastructure was scored thus: Always working (3 points); Partially working (2 points) and Not working (1 point).

Table 1: Distribution of cassava farmers according to the level of effectiveness of improved cassava production technologies (n=312)

Level	Scores	Frequency	percentage
High	Above 95	69	22.1
Medium	70 – 94	213	68.3
Low	Below 70	30	9.6

Mean = 82.7;

Standard deviation = 12.07

Source: *Field Survey*, 2009

Results and discussion

Effectiveness of improved cassava production technologies.

Data in Table 1 show that 22.1 percent of the technologies had high level of effectiveness, 68.3 percent had medium level of effectiveness, while 9.6 percent had low level of effectiveness. The mean was 82.7, while the standard deviation was 12.07. This finding agrees with the findings of Olaniyi (2008), who reported a medium level of effectiveness (40-76.9 %) for the various non-indigenous storage practices for maize, cowpea and yam in Oyo State; and Farinde (1991) who reported that majority (72.62%) of farmers in the T & V extension system of the Lagos State ADP had their effectiveness scores within the medium level. In addition, Olaleye (2006) while evaluating the effectiveness of extension teaching methods, reported that majority (74.17%) of farmers perceived field trip as an effective extension teaching method, followed by results demonstration method which had 53.64 percent effectiveness. In summary, it could be said that the improved cassava production technologies disseminated to farmers through the Osun State ADP were moderately effective.

Table 2: Distribution of cassava farmers according to community participation, sources of influence to adopt technologies, heterogeneity and accessibility to extension (n = 312)

Characteristics		Frequency	Percentage
Community participation			
None		138	44.2
1 – 5		140	44.9
6 – 10		20	6.4
10 and above		14	4.5
Mean	*= 2.44*		
Standard deviation	*= 3.54*		
Source of influence to adopt improved technologies			
Sources			
Extension Agents		11	3.5
Spouse		14	4.4
Relative		25	8.3
Neighbours		13	44.6
Mass media		93	29.6
Community attitude		30	9.6
Ethnic heterogeneity			
None		84	26.8
1 – 2		155	49.7
3 – 4		50	16.2
>4		2	7.3
Accessibility (km)			
Less than 1 km		113	36.3
1 – 5		102	32.8
6 – 10		37	11.8

Community related factors: Results in Table 2 revealed that less than an average (44.9%) of the respondents were called between 1 and 5 times to participate in community affairs. The mean (2.44) also indicated a low level of participation in community affairs. This finding agrees with that of Olaniyan (1998), who reported that majority of cassava farmers claimed to have been called upon to contribute to community affairs between one and three times. Also, 44.6% of the farmers were influenced to adopt improved technologies by their neighbours. About 49.7 % of the farmers had only between 1 and 2 ethnic groups in their communities. This is a low level of ethnic heterogeneity. The more heterogeneous a population, the more likely the probability of introduction of improved technologies; as the presence of new groups of people help to neutralize old beliefs, ideas and introduce new ones. A high percentage (69.1 %) of the farmers travelled less than 6 km to extension office.

Table 3: Rank order of infrastructural facilities according to availability of infrastructural facilities.

Infrastructure	*Weighted Mean Score (WMS)*
Communication network	4.32
Tractor hiring unit/center	4.30
School	4.28
Market	4.23
Resource development center	4.22
Motorable road	4.18
Cassava processing center	4.18
Electricity	4.17
Bank	4.14
Pipe borne water	4.11
Health center	4.10
Police station	4.06
Filling station	4.04

Source: *Field Survey*, 2009

Table 4: Correlation analysis showing the relationship between effectiveness of improved cassava production technologies and selected community characteristics.

Variables	*Pearson correlation coefficient r*	*Coefficient of determination r^2*	*decision*	*percentage contribution %*
Community participation	0.128*	0.016384	S	1.6
Ethnic heterogeneity	0.071	0.005041	NS	0.5
Accessibility	0.067	0.004489	NS	0.4
Infrastructural facilities	0.157**	0.02469	S	2.4

Source: *Field Survey*, 2009
*Significant at $p \leq 0.05$
** Significant at $p \leq 0.01$

This is an indication of a high level of accessibility of cassava farmers to extension, which should enhance the awareness, adoption and effectiveness of technologies. As shown in Table 3, communication network is the most readily available infrastructural facility, while filling station ranked last. The availability of communication network is of a great advantage that may enhance the effectiveness of improved technologies, as most rural farmers have access to, and have

accepted the use of mobile phones, and it could be a useful tool in increasing the awareness of improved technologies.

Results of tested hypothesis: The summary of the correlation analysis is shown in Table 4 and the results show that effectiveness of improved cassava production technologies is significantly and positively related to:

(i) community participation (r = 0.128) at 0.05 level of significance.

(ii) infrastructural facilities (r = 0.157) at 0.01 level of significance.

The coefficient of determination (r^2), shows the percentage variation in farmers' level of effectiveness as explained by each of the X- variables in the study. The 1.6 percent and 2.4 percent variations in effectiveness were attributed to community participation and infrastructural facilities respectively.

The implications of these statistical results include:

i). The more the participation of the cassava farmers in community affairs, the higher the effectiveness of improved cassava technologies. The positive coefficient of community participation with effectiveness means that as the number of participation increases, the effectiveness of improved technologies increases. This finding is in agreement with Olaniyan (1998), who reported community participation as a significant factor determining the success of improved agricultural technology programme in Oke-Ogun area of Oyo State, Nigeria.

(ii) The more the availability of infrastructural facilities, the higher the effectiveness of improved technologies. This finding may be true if the farmers perceived the presence of these infrastructural facilities as a motivating factor towards enhancing effectiveness of improved technologies. This finding is in agreement with Mgbada (2006), who reported a significant relationship between accessibility to infrastructural facilities and effectiveness of improved technologies and Akinsorotan (2007), who reported that rural farmers perceived the provision of infrastructural facilities as very relevant and useful to their needs.

Conclusion and recommendations

The results of this study show that leadership participation and infrastructural facilities have influence on the effectiveness of improved cassava production technologies. It is therefore recommended that farmers should be actively involved in the planning and execution of development programmes. Also, infrastructural facilities such as access roads should also be made available in the rural communities to facilitate the effectiveness and success of agricultural programmes.

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