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Effects of root and tuber expansion programme on the performance of cassava farmer-beneficiaries in Edo State, Nigeria

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Abstract
The study assessed effects of Root and Tuber Expansion Programme (RTEP) on the performance of cassava farmer-beneficiaries in Edo State, Nigeria. The population of the study comprised all cassava farmers in Edo State that participated in RTEP. A multi-stage sampling procedure was used to select 120 respondents for the study. Data were collected from primary source through the use of validated interview schedule. Analytical tools used were descriptive statistics and multiple linear regression. Findings show that the RTEP made best achievements in conduct of training/workshop on improved cassava production practices, followed by increase in cassava farmers' yield and income. The cassava farmer-beneficiaries were fully involved in the programme's activities such as multiplication of improved cassava varieties and distribution ($\bar{x}$ = 2.86), extension meetings and field visits ($\bar{x}$ = 2.81) and lectures organized by extension workers ($\bar{x}$ =2.77). Socio-economic variables such as age, sex, educational level, farming experience, membership of social organization, extension contact and annual income statistically and significantly influenced level of involvement in the RTEP activities at 5% level. Inadequate fund for start-off, delays in credit/agro-input disbursement, approval of work plans, budgets and procurements, inadequate programme group coverage and gender issue not addressed were major constraints to involvement of the farmers in RTEP. The need for timely and adequate supply of agro-inputs and credits at subsidized rate by the service providers was recommended. This would boost the capabilities of the farmers to start field operations timely, realize more profit, and achieve higher levels of involvement in the RTEP activities.

Keywords: effects, RTEP, performance, cassava farmer-beneficiaries, involvement

1. Introduction

Modern agricultural production technologies contribute to poverty reduction in terms of enhanced productivity and lower per unit cost of production which raises income of adopting farmers (Menale, Shiferaw and Muricho, 2011) [14]. It follows that inadequate use of modern agricultural technologies not only result in decreasing capacity to meet the food needs of the people, but also creates critical limiting factors to all-year- round cultivation, given that production in sub-Saharan Africa (SSA) countries is largely weather-dependent. Hence, research and adoption of crops having the ability to withstand drought, diseases, improve yield and be cultivated throughout the year is crucial for food security and poverty reduction.

Root and tuber crops rank high as drought resistant crops grown all-year-round. They have, therefore, become important staple foods consumed in SSA, accounting for about 20% of calories consumed in the region (Scott, Rosegrant and Ringler, 2000) [25]. The crops also serve as raw materials for agro-based industries in manufacturing products for both rural and urban consumption; and in addition, provide income sources for resource poor farming households (Nwakor, Ifenkwe, Okoye, Onummdu, Anyaegbunam, Ekedo and Onyia, 2011).

In Nigeria, various interventions aimed at improving sustainable productivity, farmers' income and the quality of lives of rural households have been made by federal government of Nigeria with collaboration of national and international organizations. The projects and programmes that have been initiated include Root and tuber expansion programme (RTEPS), Nigeria agricultural development fund (NADF), Agricultural credit guarantee scheme (ACGS), Growth enhancement support (GES) scheme, Commercial agriculture development project (CADP), Fadama III project, National programme for food security (NPFS), Presidential initiatives for cassava production and processing into flour, among several others (Okpe, 2010; FAO, 2013) [20, 9]. However, despite the perceived success of some of these programmes and projects, Nigeria is yet to attain food sufficiency to feed the teaming population. According to Aref, Marof, and Sarjit (2010) [6], lack of participation/involvement was a major reason for failure of many development attempts in developing countries; without community participation, there is obviously no partnership; no development and no programme. Major constraints that affect farmers participation and involvement in agricultural projects and programmes as identified by Kgoisiamang and Oladele (2012) [12] and Nxumalo and Oladele, (2013) [12] include unavailability of land, insufficiency of fund to farm productivity, insufficiency to technical knowledge, high input costs, inaccessibility to market, insufficiency of commitment by extension agent, insufficiency of leadership skills, insufficiency of sense of ownership, and farmers' under development or insufficiency in farms infrastructure and human resources.

The root and tuber expansion programme (RTEP) was formulated to address issues of food production and rural poverty (RTEP,

2010). At the local farmers' level, the programme aims to achieve economic growth, improve access of the poor to social services and carry out intervention measures to protect the poor and vulnerable groups. At the national level, the programme was designed to achieve food security and stimulate demand for cheaper staple food such as cassava, yam, cocoyam, potato etc. (Adeniyi, 2009) [1]. The first Tri-term Implementation Review (TIR) of the project was conducted in 2004/2005. Based on the TIR recommendation, RTEP was redesigned to be community-driven, participatory with Rural Enterprise Management (REM), the epic center. In addition, a stakeholder support Fund (SSF), a form of programme has been introduced to address the problem of low investment occasioned by lack of credit in the first tri-term. RTEP targets small holders, i.e., those with less than two hectares of land per household (RTEP, 2010).

The Root and Tuber Expansion Programme (RTEP) in Edo State had been implemented for over ten (10) years. The several activities that have been implemented among farmers and processors of root and tuber crops, since the effective commencement of the programme in 2002 and final completion date in 2010 (Edo State Agricultural Development Programme (EDADP), 2003; PCD, 2010), include multiplication and distribution of improved planting materials, trainings and demonstration on improved agro-processing technologies. Also, the goal of RTEP was to improve the living conditions, income and food security of smallholder households in the programme areas. The specific objectives were to further raise the level of productivity of the target groups, enhance/improve the processing technologies/techniques and promote the marketing of these commodities (Project Completion Digests (PCD), 2010; Ifeanyi, Atala, Ahmed and Omokoro, 2014) [11]. The study therefore seeks to provide information on the extent to which the RTEP has benefited cassava crop farmers in Edo State toward realizing its mandate.

The main objective of the study was to assess the effects of Root and Tuber Expansion Programme (RTEP) on the performance of cassava farmer-beneficiaries in Edo State, Nigeria. The specific objectives were to:

1. determine the level of cassava farmer-beneficiaries' involvement in RTEP activities;
2. examine the extent of achievement of the programme activities;
3. examine the influence of socio-economic characteristics of the cassava farmer- beneficiaries on the level of involvement in RTEP; and
4. identify constraints to involvement of the cassava farmers in the programme.

2. Material and Methods

The study was conducted in Edo State, Nigeria. The State lies between longitude $6^{0}00^{1}$ and $6^{0}45^{1}$ East and latitude 5^{0}-00^{1} and $6^{0}30^{1}$ North of the equator. It is bounded in the North and East by Kogi State, in the South by Delta State, in the South-West by Ondo State. Edo State is generally low-lying area except in the north where it is marked by undulating hills. The State has a wide coastal belt interlaced with rivulets and stream, which form part of the Niger-Delta. The State has a land mass of about 17,802km^2 (Ministry of Agriculture Handbook., 2002) [15]. Edo State is divided into three agro-ecological zones by Edo Agricultural Development Programme (EADP). These are Edo South, Edo Central and Edo North. The State has 18 local Government Areas (LGAs) with the capital at Benin. The State has a total population of 3,218.332 (NPC, 2006). Edo State has a tropical climate marked by two distinct seasons: the dry and rainy seasons. The dry season occurs between November and April; it is usually characterized by dry and dusty Eastern Harmathan inducing wind. The State is endowed with fertile agricultural soil and tropical climate suitable for farming, which makes it an important producer of food and cash crops. The State produces rubber, oil palm, yam, cassava, maize, plantain, groundnut, cocoyam, pineapple, melon and vegetable crops such as green (*Amaranths Spp*).

The population of the study comprised all cassava farmers in Edo State that participated in RTEP. A multi-stage sampling procedure was used to select 120 respondents for the study. Stage I involved random selection of two extension blocks from each agricultural zone, giving a total of six (6) blocks selected from the 3 zones (Edo Central, Edo North and Edo South). In stage II, two (2) extension cells/circles were randomly selected from each of the selected extension blocks, giving a total of twelve (12) extension cells/circles. Stage III involved collection of the list of registered cassava farmers (prerequisite for benefiting from the project) for each extension blocks and cells from the project's state head office, Benin. From the list, a total of ten (10) RTEP registered cassava farmers were randomly selected from the selected 12 extension cells, giving a total of 120 farmers. Thus, the sample size was 120 RTEP registered cassava farmers.

Data for the study were collected from primary source through the use of validated interview schedule. The interview schedule contained relevant questions that were divided into sections according to the objectives of the study. The instruments for data collection were validated by two academic staff in the Department of Agricultural Economics and Extension, Chukwuemeka Odumegwu Ojukwu University (COOU). One hundred and twenty (120) interview schedules were administered to the respondents with the help of three trained enumerators from the study area.

The IBM-SPSS Statistics software (Version 23) was used to analyze data. Frequency, percentage and mean score were used to achieve level of cassava farmer-beneficiaries' involvement in RTEP activities (Objective i), cassava farmers' perception of the extent of achievements of the programme (Objective ii) and constraints to involvement of the respondents in the RTEP (Objective iv) were analyzed using mean statistics. Objective iii, influence of socio-economic characteristics of the cassava farmer-beneficiaries on the level of involvement in RTEP, was realized using multiple linear regression analysis.

3. Results and Discussion

3.1 Level of involvement of cassava beneficiaries in RTEP activities

Table 1 shows responses of the farmers to the level of involvement in selected RTEP activities. According to the table, the RTEP cassava farmer-beneficiaries were highly involved in the following programme activities such as multiplication of improved cassava varieties and distribution ($\bar{x}$ = 2.86), extension meetings and field visits ($\bar{x}$ = 2.81), lectures organized by extension workers ($\bar{x}$ =2.77), special training/workshop ($\bar{x}$ = 2.56), provision of technical assistance ($\bar{x}$ =2.50), training for women 's group (WIA) on quality control in development of

cassava chips ($\bar{x}$ =2.35), marketing linkage technology development workshops for cassava ($\bar{x}$ =2.15), pre-planting training ($\bar{x}$ = 2.05) and field day ($\bar{x}$ =2.42). These were regarded as high level of involvement by the RTEP cassava beneficiaries, while the low level of involvement by the beneficiaries included preparation of cassava production and processing technology ($\bar{x}$ =1.88), reading of cassava improvement and recipe leaflet ($\bar{x}$ =1.27), youth in agriculture production promotion ($\bar{x}$ = 1.58), conduct of monitoring and evaluation ($\bar{x}$ =1.29) and rendering of agro information ($\bar{x}$ =1.55). These imply that the beneficiaries were not fully involved in some of the programme activities. This finding agreed with Farshid (2011), that farmers least involved in agricultural planning, monitoring and evaluation.

Table 1: Level of involvement of the beneficiaries in RTEP activities (n= 120)

Activity	Mean ($\bar{x}$)	SD
Multiplication of improved cassava varieties and distribution	2.86*	0.342
Preparation of cassava production and processing technology	1.88	0.788
Extension meetings and field visits	2.81*	0.432
Lectures organized by extension workers	2.77*	0.543
Special training/workshop	2.56*	0.572
Provision of technical assistance	2.50*	0.603
Reading of cassava improvement and recipe leaflet	1.27	0.811
Youth in agriculture production promotion	1.58	0.752
Training for women 's group (WIA) on quality control in development of cassava chips etc	2.35*	0.600
Marketing linkage technology development workshops for cassava	2.15*	0.745
Pre-Planting Training	2.05*	0.744
Field Day	2.42*	0.592
Conduct of monitoring and evaluation	1.29	0.773
Rendering of agro information	1.55	0.769

*= $\bar{x} \geq 2.00$ = high level of involvement; SD= standard deviation.
***Source*:** Field Survey, 2018

3.2 Programme performance: Cassava farmers' perception of the extent of achievements of the programme

Entries in Table 2 show that the respondents agreed that the RTEP achieved the following activities to great extent ($\bar{x} \geq 2.00$). These activities included: training/workshop on improved cassava production practices ($\bar{x}$ =2.84), training on improved cassava processing technologies ($\bar{x}$ =2.67), provision of technical assistance ($\bar{x}$ =2.74), access to fertilizers, insecticides and herbicides ($\bar{x}$ =2.20), provision of credit/loan by RTEP ($\bar{x}$ =2.56), provision of improved cassava planting materials ($\bar{x}$ =2.78), creation of strong marketing linkages between producers and processors ($\bar{x}$ =2.16), constructing/upgrading cassava processing sheds/centres/factories ($\bar{x}$ =2.11), promotion of adoption of farming system for maintenance of soil fertility($\bar{x}$ = 2.03) and increase in cassava farmers' yield and income ($\bar{x}$ = 2.80). The findings imply that majority of the cassava farmer-beneficiaries of RTEP are given adequate training/workshop on improved cassava production practices and cassava processing technologies, provided with technical assistance, credit/loan and improved cassava planting materials. Also, there are increase in farmers' yield and income and constructing/upgrading cassava processing sheds/centres/factories and promotion of adoption of farming system for maintenance of soil fertility, especially the planting of leguminous crops and alley cropping, together with the use of organic and inorganic fertilizers. These findings are in line with Adeola, Adebayo and Oyelere (2008) [2] which reported that all the participating farmers claimed to have access to the inputs distributed by the project. Manyong, Ikpi, Olayemi, Yusuf, Omonona and Idachaba (2003) [13] in the analysis of stakeholders' perception of the performance of Nigeria's Agricultural sector noted that the overall performance of agriculture was rated slightly better than before, and across the zones, access to inputs, high demand for products, availability of transport facilities, availability of raw materials and good economic climate are the main enhancing factors.

Table 2: Responses of the respondents on the extent of achievement of RTEP

Activities	Extent of achievement	
	Mean ($\bar{x}$)	SD
Training/workshop on improved cassava production practices	2.84*	0.539
Training on improved cassava processing technologies	2.67*	0.622
Provision of technical assistance	2.74*	0.770
Access to fertilizers, insecticides and herbicides	2.20*	0.635
Provision of credit/loan by RTEP	2.56*	0.694
Provision of improved cassava planting materials	2.78*	0.546
Demonstration on improved agro-processing technologies	1.35	0.813
Multiplication of improved cassava planting materials	1.84*	0.804
Creation of strong marketing linkages between producers and processors	2.16*	0.719
Constructing/upgrading cassava processing sheds/centres/factories	2.11*	0.772
Higher level of awareness about the potentials of cassava for household consumption	1.53	0.891

Promotion of adoption of farming system for maintenance of soil fertility	2.03*	0.702
Increase in cassava farmers' yield and income	2.80*	0.530

***Source*:** Field survey, 2018 *= $\bar{x} \geq 2.00$ = achieved to great extent; SD= standard deviation

3.3 Influence of socio-economic characteristics of cassava farmer-beneficiaries on the level of involvement in RTEP

Table3 shows the result of regression analysis of the relationship between the independent variables (age, sex, educational level, household size, marital status, farm size, farming experience, membership of social organization, extension contact and annual income) of cassava beneficiaries and level of involvement in RTEP activities in Edo State. The result of the independent variables significantly influenced the dependent variables given R^2 and F-statistic values of 0.752 and 0.674, respectively. These variables were able to explain 67.4% of the variation in participation in RTEP activities among cassava farmer-beneficiaries (R^2= 0.674). Out of the ten variables investigated, seven (7) variables, age, sex, educational level, farming experience, membership of social organization, extension contact and annual income were found to be statistically significant at 5% level while the rest three, household size, marital status and farm size were not significant.

Age of the cassava farmer-beneficiaries exerted positive and significant influence on extent of involvement in RTEP activities. This implies that any increase in age leads to a corresponding increase in the involvement in RTEP activities. Sex of the beneficiaries significantly influenced their involvement in RTEP activities positively. This implies that sex of beneficiaries is one of determinants of involvement in RTEP activities. Education showed a positive relationship with involvement in RTEP activities. A unit increase in the level of education increased the probability of the participation in RTEP activities. Producers are more disposed to understand package introduced by the programme and other informants. This underlines the importance of human capital development in increasing the level of involvement in RTEP activities. This agrees with Aniedu and Aniedu (2013) [4] who pointed that education is very essential in the development process.

The effect of years of farming experience was positive and significant on involvement in RTEP activities in the study areas. This implies that the more farming experience a producers acquired, the higher the productivity and involvement in RTEP activities. This is in line with the findings of Okoye, Dimelu, Okoye and Agwu (2009) [19] which stated that the more experience a farmer is, the more efficient he/ she will be in decision- making processes and he/ she would be willing to take risks associated with the adoption of innovations. Membership of social organization was also perceived by the producers as the determinants of involvement in RTEP activities. It had a positive influence which implies that it is directly related to the dependent variable. Therefore, the higher the number of social organizations belonged, the higher the level of involvement in RTEP activities. Extension contact had also a positive influence on the involvement in RTEP activities in the study area. This implies that frequent contact with extension agents by the producers gives them opportunity to participation in RTEP activities. Therefore, regular contact with extension agents makes producers aware of improved innovations and how they can apply them to improve their livelihood. Annual income had a positive influence on the involvement in RTEP activities in the area. This implies that the more income realized by the producer, the higher the level of involvement in RTEP activities. This agrees with Alinor (2002) which noted that capital increases the scales of production and being enlarged, translates to more increase in output.

Table 3: Regression output on the relationship between cassava farmers' socio-economic characteristics and level of involvement in RTEP

Unstandardizd Standardized Coefficient				
Variables	**B**	**SD Error**	**Beta**	**t**
Constant	1.942	0.874	-	2.631*
Age	1.411	0.237	0.880	8.905*
Sex	1.700	0.630	0.320	4.193*
Educational level	1.528	0.504	0.533	4.234*
Household size	0.177	1.618	0.056	0.104
Marital status	-2.284	1.735	-0.141	-1.316
Farm size	0.045	0.029	0.238	1.731
Farming experience	1.666	0.328	0.297	3.968*
Membership of social organization	0.913	0.352	0.327	3.064*
Extension contact	1.715	0.538	0.524	4.076*
Annual income	1.507	0.316	0.379	2.823*

*P≤0.05, R = 0.752, R^2 = 0.674, Adjusted R^2 = 0.562

***Source*:** Field Survey, 2018

3.4 Constraints to cassava farmers' involvement in the RTEP

Table 4 shows the mean distribution of identified constraints to effective cassava farmers' involvement in the RTEP in the study area. The result reveal that inadequate fund for start-off ($\bar{x}$ = 2.68), delays in credit/agro-input disbursement ($\bar{x}$ =2.89), delays in the approval of work plans, budgets and procurements ($\bar{x}$ = 2.78), poor awareness and sensitization of the programme ($\bar{x}$ = 2.24), difficulty in marketing products due to poor linkages ($\bar{x}$ = 2.22), difficulty in forming co-operative society ($\bar{x}$ = 2.10), poor extension service visit to farmer/ insufficiency of commitment by extension agent ($\bar{x}$ = 2.05), inadequate programme community group coverage ($\bar{x}$ = 2.69), gender issue not addressed ($\bar{x}$ = 2.59), inadequate land for massive cassava production ($\bar{x}$ = 2.55) and insufficiency of sense of ownership for sustainability ($\bar{x}$ = 2.34) were the major constraints to farmers' involvement in RTEP. This is an indication that the programme is being faced with numerous challenges, although it made some remarkable achievements on the lives of cassava farmer-beneficiaries.

The findings agree with RTEP (2010) which reported that the project was hindered by the prolonged and avoidable delays in programme loan effectiveness, disbursement effectiveness, payment of initial deposit and implementation start-up, loan amendment, replenishment turn-around as well as insufficiently and untimely counterpart fund contribution. Also, there were prolonged delays in the approval of work plans, budgets and procurements, constraints of post-harvest handling processing, product diversification and utilization, as well as marketing. According to Kgoisiamang and Oladele (2012) the major constraints that affect farmers participation in agricultural projects were unavailability of land, insufficiency of fund to farm productivity, insufficiency to technical knowledge, high input costs, insufficiency of commitment by extension agent,

insufficiency of leadership skills, insufficiency of sense of ownership, and farmers' under development or insufficiency in farms infrastructure and human resources. Aref (2010) indicated that some constraints to participation in communities include lack of knowledge, lack of effective and strong government institution, inadequate focus on human resources development, dependency on government and lack of authority in communities.

Table 4: Distribution of constraints to involvement of the cassava farmers in the RTEP according to mean scores.

Constraint	Mean ($\bar{x}$)	SD
Inadequate fund for start-off	2.68*	0.633
Poor access to cassava planting materials	1.81	0.880
Delays in credit/agro-input disbursement	2.89*	0.366
Delays in the approval of work plans, budgets and procurements	2.78*	0.546
Poor awareness and sensitization of the programme	2.24*	0.730
Difficulty in marketing products due to poor linkages	2.22*	0.793
Difficulty in forming co-operative society	2.10*	0.779
Poor extension service visit to farmer/ Insufficiency of commitment by extension agent	2.05*	0.737
Inadequate involvement of farmers in all programme stages	1.87	0.844
Poor access to fertilizer, insecticides and herbicides	1.80	0.824
Inadequate programme community group coverage	2.69*	0.428
Gender issue not addressed	2.59*	0.530
Inadequate land for massive cassava production	2.55*	0.645
High cost of technologies introduced	1.53	0.803
Inadequate training of farmer on the improved cassava technology	1.30	0.837
Insufficiency of leadership skills	1.77	0.877
Insufficiency of sense of ownership	2.34*	0.660

*= $\bar{x} \geq 2.00$ = major constraint SD= Standard deviation
***Source*:** Field Survey, 2018

4. Conclusion and Recommendations

The root and tuber expansion programme (RTEP) in Edo State under study made appreciable achievements in the various activities of its mandate/target among the cassava farmer-beneficiaries of the programme. However, there were some challenges to effective implementation of the programme. This calls for urgent need to address these factors hindering the full performance of the programme, which will go a long way in addressing food security, poverty and as well sustain the programme and inform better packaging of similar programmes. There should be timely (before the farming season kicks off) and adequate supply of agro-inputs and credits at subsidized rate by the service providers. This will address issues on delays in credit/agro-input disbursement and in the approval of work plans, budgets and procurements. This would encourage farmers start field operations timely and discourage farmers from relying on high cost of privately sold agro-inputs. Government and the various communities should endeavour to provide modern road and market infrastructural facilities so as strengthen the linkages between producers, processors and consumers. Agricultural extension service agencies should encourage and assist RTEP farmers to belong to agricultural co-operative society. This will help them in pooling their resources to acquire more land and credits in order to increase productivity. In order to encourage massive participation of famers in the RTEP, there should be an increase in the number of extension workers in the field for more contacts; and adequate programme community group coverage of other communities.

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