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THE EFFECT OF THE EUROPEAN UNION (MPP6) INFRASTRUCTURAL DEVELOPMENT ON THE PRODUCTIVITY OF FOOD CROP FARMERS AND DEVELOPMENT OF RURAL AREAS IN IMO STATE

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ABSTRACT

The study examined the effect of the European Union infrastructural development on the productivity of food crop farmers and development of rural areas in Imo State. The specific objectives were to describe the socioeconomic characteristics of respondents, determine the extent of infrastructural development in the area and ascertain the impact of the scheme on the productivity of the rural food crop farmers. Primary data were collected with the aid of structured and validated questionnaire from 240 respondents comprising of farmers in the beneficiary and non-beneficiary communities using the multi-stage sampling technique. The data retrieved from the questionnaire were analysed with the use of the descriptive statistics, the infrastructural index model and the ordinary least squares regression model. The mean infrastructural index for the beneficiary and the non-beneficiary communities was 0.84 and 1.01, respectively; these figures were used to rank communities based on their level of development. The study showed that 18.2, 72.7 and 9.1% of the sampled beneficiary communities were developed, moderately developed and underdeveloped, respectively while 81.8 and 18.2% of the non-beneficiary communities were moderately developed and underdeveloped, respectively. The pooled result of the ordinary least square regression model showed a good fit at p < 0.05, that a reduction in distance and cost of accessing the infrastructural facilities in the benefiting communities would increase food crop production in the area. The null hypothesis that the EU (MPP6) infrastructural facilities has no significant influence on the value of food crop production in the beneficiary communities was rejected as the F-cal obtained was greater than the F-tab at p 0.01 level. European Union through their Micro Project Programmes (MPP6) should expand it geographical scope to ensure that more infrastructural facilities are provided particularly in the non –beneficiary communities as this will bring about an increase in the productivity level of food crop farmers and the development of the rural areas.

Key words: rural infrastructure, agricultural productivity, infrastructural index, European Union Micro Project Program

INTRODUCTION

The main objectives of agricultural development are to increase productivity and income, diversify rural economy and generally enhance the quality of life of the rural farmers who are resident in the rural areas. In Nigeria, the rural areas are inhabited by the bulk of the national population. It is estimated that about 61% of the country's population are rural dwellers, and predominantly small scale farmers (World Resources, 1997), and over 90% of the Nigeria's total food produce comes from these small farmers and at least 60% of the nation's population earn their living from these small scale farming (Olayemi, 1980). However, larger percentage of these small scale farmers will remain poor unless basic infrastructures are provided in these rural areas (Ale *et al*., 2011).

Infrastructures are those underlying or basic forms of physical, social and institutional capital which enhance production and consumption activities and ultimately improved the wellbeing of rural communities. Rural infrastructures constitute the necessary components or ingredients for motivating rural residents to be more productive and achieve relative self-reliance (Ekong, 2005). Infrastructural facilities refer to those basic services without which primary, secondary and tertiary productive activities cannot function effectively (Hirschman, 1958). In other words, infrastructural facilities are elements in the package of basic needs, which a community would like to procure for better living (Olayiwola, 2005).

The role of infrastructural facilities in grassroots development and poverty reduction cannot be over-emphasized whether in urban or rural environments. McNeil (1993) shows that

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adequate infrastructure reduces the costs of production, which affects profitability, levels of output, and employment. When infrastructure works, productivity and labour increases. When it does not work, citizens suffer, particularly the poor. Thus, economic renewal and societal welfare become postponed or halted (Akinola, 2007). Infrastructures are key stimulants to agricultural development and growth (FAO, 1996). But most developing countries including Nigeria still suffer from inadequate rural infrastructural facilities (Olayiwola and Adeleye, 2005).

Even though Nigeria government initiated several projects to improve the quality and quantity of infrastructure in the rural areas through programmes such as the construction of small dams and boreholes for rural water supply and the clearing of feeder roads for the evacuation of agricultural produce, the supply of electricity to rural areas from large irrigation dams, the establishment of River Basin Development Authorities (RBDAs), Directorate for Food, Roads and Rural Infrastructure (DFRRI) and the Agricultural Development Programme the impact of such programmes on the lives of many rural people in the country is still considered to be limited (Ale *et al*., 2011). Studies have also shown that, despite all these developmental interventions, including the human and material resources devoted to the sector, the productive efficiency of most food crops farmers is still low as the few policies and programs initiated and implemented by successive government over the years have not resulted in meaningful enhancement of the development of the rural areas (Ezeah, 2005).

The neglect of rural infrastructural facilities (such as roads) has impeded the accessibility of farmers from sources of farm inputs, equipments and new technology, it has also reduced the profitability of agricultural production, marketing of agricultural commodities and prevents farmers from selling their produce at reasonable price due to spoilage (IFAD, 2011; Akpan, 2012) and this has invariably led to a decline in the income of the rural farmers and thus has led to an increase in their poverty status. According to World Bank survey (2002), about 70% of these Nigerians are poor, living on less than one dollar per day.

It was for this reason that the European Union (EU), through their Micro Project Programme in the six Niger Delta states (MPP6), intervened particularly in the areas of infrastructural development since, according to FAO (2005), rural infrastructure play crucial role in economic growth, poverty reduction and empowerment of the poor. Thus it is not certain, if the impact of the EU MPP6 has led to an increase in the productivity and development of the rural areas. Thus, the study sought to carry out an impact evaluation of the EU MPP6, aiming at determining whether the programme has achieved the desired outcome of increased productivity and rural development. The specific objectives were to; describe the socio-economic characteristics of respondents, determine the extent of infrastructural development in the area and ascertain the effect of the scheme on the productivity of the rural food crop farmers.

MATERIALS AND METHODS

The study was carried out in Imo State. The state lies within latitude $5^{\circ}40'$ and $7^{\circ}25'$ north of the equator and Longitude $6^{\circ}50'$ and $7^{\circ}25'$ east of the meridian. The state covers a land area of 7,480 km^2 with a population of 3,934,899 (NPC, 2006). The state is characterized by tropical climate with high humidity and temperatures; rainfall and temperature ranges are 1500-2300 mm and 34-37°C, respectively. The state is divided into three main agricultural zones namely Owerri, Okigwe and Orlu. It is further divided into 27 local government areas (LGAs). The main crops grown in the area include cassava, cocoyam, yam, maize, melon and vegetables. Imo State was purposively chosen for the study because it was among the six Niger Delta states that benefitted from the EU MPP6 and because of its proximity to the researcher.

Sampling Technique and Data Collection

The multi-stage sampling technique was employed in selecting the study sample. In the first stage, the state was stratified into three agricultural zones namely Owerri, Okigwe and Orlu. Secondly, from each of these zones, two LGAs were randomly selected making a total of six LGAs. In the third stage, four rural communities comprising of two beneficiary and two non-beneficiary communities were purposively selected from each of the selected LGAs, making a total of 24 autonomous communities. In the fourth stage, two villages were selected from each of the autonomous communities thereby given a total of 48 villages.

The sampling frame comprised the list of food crop farmers in each village within the selected autonomous communities who are registered with the state ADP. From the sampling frame, five farmers were randomly selected from each village thereby given a total of 240 farmers for both the beneficiary and non-beneficiary communities. A well structured and validated questionnaire was administered to all the selected farmers using the ADP enumerators in the area. The sampling was designed to generate a total of 240 respondents; however after data management only 220 questionnaire representing 91% were retrieved and used for the analysis. Data were collected from primary and secondary sources. The infrastructures considered were school, market, health, portable water and roads. Other information such as farmer's socio-economic features and income from farming activities were elicited.

Analytical Procedure
The data were analyzed using descriptive statistics, the composite measure of infrastructure index and the ordinary least square regression model.

The Composite Measure of Infrastructure Development
The infrastructural index used here is based on the sampled communities' level data in line with Fakayode *et al.* (2008). The composite degree of infrastructure development used was adopted after Adeoye *et al.* (2011), Ashagidigbi *et al.* (2011), Balogun *et al.* (2012), Bulus and Adefila (2014), and Babatunde *et al.* (2014). It was obtained in a process listed in the equations below. Individual transportation cost *(IDCi)* of the respondents in each of the villages was taken as the sum of individual cost of access *(TCi)* to five basic infrastructure elements in this study. Average total cost *(ATC)* of getting to each of these infrastructure elements across these communities was computed and used to divide the average costs *(ACi)* of getting to a particular facility in each of the communities. The outcome of this step *Wi* was summed up to obtain the infrastructural index *(INF).* The *INF* indicates the degree of underdevelopment; the higher the value of this index, the more under-developed the village is considered (Ahmed and Hossain, 1990):

$$ACi = \frac{\sum_{i=1}^{n} IDci}{n} \quad 1$$

$$TCi = \sum_{i=1}^{n} ACi \quad 2$$

$$ATCi = \frac{TCi}{N} \quad 3$$

$$INF = \sum_{i=1}^{n} Wi \quad 4$$

$$Wi = \frac{ACi}{ATCi} \quad 5$$

In these equations, *IDCi* is individual transportation cost of getting to each infrastructure by the respondents in each community (₦); *ACi* is average cost of transportation in each community to a particular infrastructure (₦); *TCi* is total cost of transportation to a particular infrastructure across communities (₦); *ATC* is average cost of transportation to a particular infrastructure across communities (₦); *Wi* is weight of average cost of transportation attached to infrastructure in each community; *INF* is infrastructural index; *N* is total number of communities; and *n* is number of respondents in each community.

The Ordinary Least Square Regression Model
This model was used to ascertain the effect of the EU infrastructural development on the value of productivity of food crop farmers in the beneficiary and non-beneficiary communities. The distance and cost of accessing these facilities were used as proxies to infrastructural index and the value of food crop production were all fitted into the model.

$$lnVFPij = \& + \&_1 lnDstij + \&_2 lnCstij + u \quad 6;$$

where VFPi is value of food crop production (₦); Dst is distance to infrastructure (km); Cst is cost of accessing infrastructure (₦); *u* is stochastic error term; *i* is infrastructure, 1 for beneficiaries and 2 for non beneficiaries of intervention; *j* is distance and cost of accessing facilities whereby 1, 2, 3, 4 and 5 are for health, school, borehole, market and road facilities, respectively.

Table 1: Distribution of the respondents according to their socio-economic characteristics

Variable		Beneficiaries of MPP6 Intervention		Non-beneficiaries of MPP6 Intervention	
		Freq	Percentage	Freq	Percentage
Age	31 – 40	20	18.18	22	20.00
	41 – 50	24	21.82	28	25.46
	51 – 60	42	38.18	40	36.36
	61 and above	24	21.82	20	18.18
	Mean	51.86		50.77	
Gender	Male	80	72.73	98	89.09
	Female	30	27.27	12	10.91
Household size	1 – 3	14	12.73	22	20.00
	4 – 6	27	24.55	21	19.09
	7 – 9	52	47.27	44	40.00
	10- 12	17	15.45	23	20.91
	Mean	7		6	
Major occupation	Farming	65	59.09	66	60.01
	Trading	21	19.09	18	16.36
	Civil servants	16	14.55	16	14.54
	Artisan	8	7.27	10	9.09
Farm size	1 – 3	85	77.27	81	73.64
	4 – 6	17	15.45	22	20.00
	7 – 9	7	6.36	7	6.36
	10 and above	1	0.92	0	0.00
Educational attainment	No formal education	2	1.82	4	3.64
	Primary education	48	43.64	51	46.36
	Secondary education	37	33.64	31	28.18
	Tertiary education	23	20.90	24	21.82

Source: Field data, 2015

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

Table 1 shows the distribution of the respondents according to their socio-economic characteristics. From the table, the mean ages of the respondents in the beneficiary and non-beneficiary communities were 52 and 51 years, respectively, indicating that the respondents were at the active and productive stage of their life. This finding is consistent with that of Ibitoye *et al.* (2014). Majority of the respondents in the beneficiary and non-beneficiary communities (7 and 89%, respectively) were males. The higher proportion of male implies that the male folk are more concerned about rural infrastructural development than the female folk in the study area.

Furthermore, the mean household size of the respondents in the beneficiary and non-beneficiary communities were 7 and 6 persons, respectively. The relatively large household size is an advantage in the area of provision of labour force for agricultural production in the study area. Majority of the respondents in the beneficiary and non-beneficiary communities (59 and 60%, respectively) had farming as their major occupation. This depicts the necessity to make rural life better through adequate provision of rural infrastructures. The study also found that majority of the respondents in the beneficiary and non-beneficiary communities (77 and 74%, respectively) had farmlands between 1 and 3 ha, indicating that they were small-scale farmers producing at a subsistence level. Majority of the respondents in the beneficiary and non-beneficiary communities (44 and 46%, respectively) had attained primary education, indicating that the respondents in the area are moderately educated. This is consistent with the findings of Orebiyi *et al.* (2000) who opined that education is an investment in human capital which is able to raise the quality of skill of man, narrow his information gap and increase his allocative abilities thereby leading to more productive performance.

Infrastructural Index Estimation and Development Status of Communities in the Area

The infrastructural index was computed to show the development status of communities with and without the EU MPP6 intervention. Table 2 shows that communities with the intervention had a mean infrastructural index with a standard deviation of 0.840±0.199, while 1.01±0.284 was obtained for communities without the intervention. The higher standard deviation of 0.284 in the non-beneficiary communities represents more divergent project locations, while a lower standard deviation of 0.199 in the beneficiary communities implies that the EU through their Micro Project Programme had converged infrastructures to the benefit of the rural people and thus a reflection of higher development status among the benefitting communities. Table 2 also shows that the mean infrastructural index for the communities with and without the EU MPP6 intervention were 0.840 and 1.01, respectively. This implies that the communities with the intervention were more developed when compared with their counterpart. Also, among the communities with the EU MPP6 intervention, 18.2% were developed, 72.2% were moderately developed and 9.1% were underdeveloped. The high percentage rate of development was attributed to the presence of the intervention who had centrally located the various infrastructural facilities to the places where the distance and cost of accessing them is relatively better and cheaper.

For the communities without the EU MPP6 intervention, none of them was developed, 81.8% were moderately developed and 18.2% were underdeveloped. This percentage level of underdevelopment (18.2%) suggests that access to various infrastructural facilities by the respondents were at a higher cost probably due to the far distance they had to cover in accessing the infrastructural facilities.

Table 2: Estimation of infrastructural index (inf. Index) and development status of communities with and without the European Union MPP6 infrastructural intervention

Infrastructure	Beneficiary Communities			Non-Beneficiary Communities		
	Community	Inf. Index	Development status	Community	Inf. Index	Development status
Health centre	Achara	0.900	Moderately developed	Ehume	1.507	Under-developed
Road	Alike	0.909	Moderately developed	Amanze	0.909	Moderately developed
Health centre	Umuakagu	0.900	Moderately developed	Umunumo	0.747	Moderately developed
Borehole	Ntu	1.212	Under-developed	Nguruumuaro	1.280	Moderately developed
School	Eziama	0.787	Moderately developed	Umuekwunee	0.923	Moderately developed
Borehole	Egbelu	0.606	Developed	Egbu	0.732	Moderately developed
School	Ulakwo	0.787	Moderately developed	Awaka	0.923	Moderately developed
Market	Amazu	0.646	Moderately developed	Amaeboebenato	0.708	Moderately developed
Health centre	Umuhu Okabia	0.530	Developed	Assa	0.821	Moderately developed
Market	Awalla	1.011	Moderately developed	Umuaghobe	1.109	Moderately developed
Road	Umuduru	0.982	Moderately developed	Umulewe	1.430	Under-developed
	Mean	*0.840*		*Mean*	*1.010*	
	Std. dev.	*0.199*		*Std. dev.*	0.284	
Inf. Index Boundaries:		< 0.641, Developed (18.2%) 0.642-1.039, Moderately developed (72.7%) >1.039, Underdeveloped (9.1%)			< 0.726, Developed (0.00%) 0.727-1.294, Mod. developed (81.8%) > 1.294, Underdeveloped (18.2%)	

Source: Field data, 2015

Impact of the EU MPP6 on Food Crop Production in Beneficiary and Non-Beneficiary Communities

Table 3 shows the impact of accessing the EU MPP6 infrastructural development on the productivity of food crop farmers in the beneficiary communities as well as the impact of accessing similar infrastructural facilities on the productivity of food crop farmers in the non-beneficiary communities. The pooled results as shown in the table had a good fit at $p < 0.05$ critical level of probability; this shows that at an aggregate level, a reduction in distance and cost of accessing the EU MPP6 in the benefiting communities would have an increasing effect on the value of food crop production in the area.

Table 3 also shows that distance to health and markets were significant and had an inverse effect on the value of food crop production in the benefitting communities. This implies that a reduction in distance to health facilities by 1.0% would give a more than proportionate increase in the value of food crop production by 2.145%. Similarly, a reduction in the distance of accessing market facilities by 1.0% would give a more than proportionate increase in the value of food crop production by 1.359%. Thus a reduction in the distance of accessing school, borehole and road facilities was not significant even at 10% probability level. This implies that a reduction in the distances of accessing these facilities would give a less than proportionate decrease in the value of food crop production in the study area.

Furthermore, the cost of accessing the MPP6 facilities behaved in the same manner; the cost of accessing health and market were significant and inversely related to the value of food crop production. Thus a reduction in the cost of accessing the health and market facilities by 1.0% would give a more than proportionate increase in the value of food crop production by 1.972% and 1.048%. The pooled results had a good fit as the reductions in distance and cost of accessing MPP6 facilities were significant at 1 and 10% in the benefitting communities, while the reductions in the distances and cost of accessing the same facilities but not with the MPP6 intervention were not significant in the non-benefitting communities.

The null hypothesis that the EU MPP6 infrastructural development has no significant impact on food crop production in the beneficiary communities was rejected as the F-cal obtained was greater than the F-tab at $p < 0.01$. It thus follows that EU MPP6 infrastructural development has significant effect on the value of food crop production in the beneficiary communities.

Conclusion and Recommendation

Findings of the study reveal that the communities with the European Union Micro Project Programmes (EU MPP6) as form of infrastructural intervention

Table 3: Impact of the EU infrastructural development on the productivity of farmers in the beneficiary (with MPP6) and non-beneficiary (without MPP6) communities

Variables	Health		School		Borehole		Market		Road		Pooled	
	With	Without	With	Without	With	Without	With	Without	With	Without	With	Without
LnDstMPP6	-2.145*	0.04	0.280	2.798***	0.314	1.842	-1.359*	1.000	0.214	1.942	1.336**	-0.695
(std. error)	0.948	0.272	0.460	0.809	1.237	1.950	0.536	0.826	1.137	1.850	0.304	0.466
(t-value)	2.262	0.147	0.608	3.458	0.253	0.944	2.535	1.210	0.188	1.049	4.394	1.491
LnCstMPP6	-1.972*	1.045***	0.178	-1.405*	3.319***	5.432*	-1.048*	0.579	3.219***	5.432*	-0.756*	1.654
(std. error)	0.922	0.290	1.195	0.781	1.129	2.770	0.410	0.770	1.029	2.970	0.430	1.119
(t-value)	2.139	3.603	0.148	1.801	2.938	1.961	2.556	0.751	3.128	1.828	1.801	1.478
Constant	20.388*	5.412***	5.596*	16.457	26.059*	-17.584	12.983*	6.647*	26.059*	-17.584	14.580*	2.410***
(std. error)	4..274	1.358	1.928	4.236	4.757	16.188	5.526	3.512	4.857	15.188	1.998	0.581
(t-value)	4.770	3.985	8.089	3.885	5.47	1.086	2.349	1.892	5.365	1.157	7.297	4.148
R^2	0.502	0.434	0.452	0.614	0.602	0.334	0.279	0.626	0.702	0.324	0.102	0.805
Adjusted R^2	0.476	0.403	0.388	0.569	0.637	0.132	0.182	0.581	0.617	0.131	0.085	0.648
F-statistics	18.683***	14.164***	7.109***	13.525***	8.158**	1.680*	4.849**	14.198***	8.258**	1.680	6.115***	99.328***
Observation	40	40	20	20	20	20	20	20	10	10	110	110

Source: Field data, 2014; ***Sig @ 1.0%; **Sig @ 5.0%; *Sig @ 10%

had a lower infrastructural index of 0.840 and they were more developed when compared with their counterparts in the non-beneficiary communities. The pooled results of the ordinary regression model also reveal that at an aggregate level, a reduction in the distance and cost of accessing the EU MPP6 infrastructural facilities would have an increasing effect on the value of food crop production.

The study recommends that the EU through their Micro Project Programme should establish more infrastructural facilities particularly in the communities where they have not intervened as this would bring about the development of the rural areas. The EU should also consider widening its scope of operation to include direct investment in agricultural production such as the provision of credit facilities to farmers, rural electrification, provision of fertilizers, provision of processing and storage facilities, etc. This is necessary because agricultural production remains the major economic activity of the rural people.

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