
IMPACT ASSESSMENT OF INFRASTRUCTURES ON INCOME OF RURAL FARMERS' DEVELOPMENT IN DASS LOCAL GOVERNMENT AREA OF BAUCHI STATE

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ABSTRACT

The study examined the Impact of Infrastructural Facilities on income of rural farmers' development in some villages in Dass Local Government Area of Bauchi States. Multi-sampling techniques were employed in this study. Six districts were purposively selected and from each district, three villages were included in the survey making a total of 18 villages. Ninety nine respondents were randomly selected from the villages. The data were collected using structured questionnaire and analyzed using descriptive statistics and t-test. The results revealed that majority (75.76%) of the respondents were male and have a mean age of 36.1 years. The result also shows that majority (83.80%) of the respondent were married and have an average household size of 9 persons. Furthermore, the result disclosed that majority (89.89%) had acquired one form of formal education or the other and engaged in one form of economic activity or the other. The infrastructural facilities identified by the respondents include electricity, schools, primary health care centers, markets places, feeder roads, communication facilities among others. The result also disclosed the average annual income of the respondents before and after provision and/or utilization of infrastructural facilities were ₦103, 131.31 and ₦145, 101.10 respectively. The result of the t-test indicated a highly significant difference between mean annual income of the respondents before and after provision and/or utilization of infrastructural facilities at $P < 0.001$. The main constraints affecting the smooth operations of the activities of the respondents were insufficient and irregular electricity supply, inadequate GSM services, poor feeder roads, and inadequate portable water, among others. Thus, there is need for increase in the quantity and quality of infrastructural facilities as well as construction and or rehabilitation of feeder roads and urban rural roads; this may help in improving the economic activities and status of farmers in the study area.

Keywords: Impact, Infrastructure, Farmers, Income, Rural development, Dass L.G.A.

Agriculture constitutes an important part of most low-income countries' economies and is considered generally the primary source of income in rural areas, both directly through crop production and

INTRODUCTION

indirectly through on-farm and off-farm employment in agriculture-related industries (Marie, 2013). The author added that Investments in rural infrastructure were considered to have positive effects on rural development and agricultural production. The issue of the importance of improving rural infrastructure, and in particular rural roads, is not new in the development of a community. According to Shahidur, *et al.*, (2013) rural road investments are found to reduce poverty significantly through higher agricultural production, lower input and transportation costs, and higher agricultural output prices at local village markets. The provision of infrastructural facilities is very important to rural development and agricultural productivity, (Olayiwola, 1996).

Rural development is a strategy to transform rural life by extending to the mass of the rural population benefits of economic and social progress. It clearly endorses effort to increase production and raises productivity in the rural areas. According to Olayiwola (1996), rural development is a process in which effort of the people themselves are united with those of government authorities to improve economic, social and cultural conditions of the communities. The importance of rural development to nation building cannot be over emphasized, it is among other things focus on poverty reduction and productivity improvements. It equally increase the income of rural poor, stem rural – urban migration, ensures overall well being of the people and there by improve their standard of living. Also rural development deals essentially with the provision of infrastructures and social amenities that could transform rural areas especially agricultural production which is the major occupation of rural dwellers (Adeleye and Olayiwola 2005). Rural infrastructure refers to those basic services without which primary, secondary and tertiary production

activities cannot function. Rural infrastructures are classified into three broad classes namely: Rural physical infrastructures (transportation facilities like roads, rail lines, bridges, ports e.t.c., storage facilities like silos, warehouses e.t.c., dams, drainage systems, irrigation canals and soil conservation facilities); Rural institutional infrastructures (co-operative societies, farmers union /groups, financial institutions like credit societies, banks, post office etc. Agricultural research facilities like research sub-stations and experimental farms, demonstration plots etc, marketing crop and animal protection services and telecommunication facilities); and rural social infrastructure (health facilities like hospitals, maternities, dispensaries and health centers e.t.c. Educational facilities like primary, secondary, and tertiary schools as well as vocational and technical colleges etc. and rural utilities like electricity and water supply).

Furthermore, improvement in the living standard of people in the rural areas largely depends on the type of infrastructures available. It is unfortunate that infrastructural facilities in most rural areas in Bauchi state and the country at large are not adequate or sometimes even absent. This situation is responsible for the slow pace of development or stagnation in our rural areas which resulted into our teeming youth migrating from rural areas to urban centers to enjoy infrastructures available in the cities. Among consequences of this include malnutrition, vicious cycle of poverty as a result of low production, poor marketing activities and idleness which lead to youth restiveness and other social vices. It was in view of the above the aforesaid that this study was carried out to assess the impact of infrastructures on economic of rural farmers' development in Dass Local Government Area.

METHODOLOGY

Study Area

The study area is Dass Local Government area of Bauchi State. It is located within latitude 10° North and longitudes 10° East (BSADP 2005). The study area shares boundaries with Tafawa Balewa LGA to the south, Toro LGA to the west and Bauchi LGA to the east. Dass Local Government occupies an area of about 456.73 sqkm² (representing 0.69%) of the total land mass of the State which is about 66,292.285 sq.km BSADP (2002). The month of April has been found to be the hottest month of the year with means minimum and maximum temperature of 13.7° c and 30.11°c respectively (Agric. Census Survey 2009). The population of Dass Local government Area is 200,380 persons (NPC, 2006). The common agricultural enterprises the people engaged in are mainly crop and livestock production with some bits of agro-forestry. A very small percentage of the inhabitants are involved in trading, civil service and other forms of economic activities.

Sampling Techniques

Multi-sampling techniques was employed in this study. Six districts were purposively selected namely: Bununu, Wandu, Baraza, Dot, Polchi and Bagel. Furthermore, three villages were selected from each district on the basis of infrastructural facilities available giving a total of 18 villages. Finally, five respondents were randomly selected in the nine villages and six respondents in each of the remaining nine villages and this gave a total of 99 sample size.

Data Collection

This study used primary data which were collected with the aid of structured questionnaire. The data collected are those on socio-economic characteristics of respondents and that of information

on utilization of infrastructures facilities based on their economic activities. Also information on income level of the respondents were collected before and after utilization of infrastructural facilities in the study area.

Analytical Technique

Descriptive statistics and inferential t-test analysis were used in analyzing the data. The descriptive statistics comprises the use of mean, frequency, distributions and percentages. The descriptive statistics was used to analyze all the data of the study, while inferential statistics used t-test to analyse whether there is a significant difference or not between annual income of the respondent before using and/or provision of the infrastructural facilities and after using and/or provision of such facilities. The formula for computing the mean of group data is specified as:

$$\bar{X} = \frac{\sum_{i=1}^k f_i m_i}{N} = \frac{\sum_{i=1}^k f_i m_i}{\sum f_i} \quad \text{--- (1)}$$

Where,

$\bar{X}$ = mean

f_i = number of cases in the i th category, with

$\sum f_i = N$

m_i = midpoint of i th category

k = number of categories

While the formula for calculating mean of ungroup data is given as:

$$\bar{X} = \frac{\sum X_i}{N} \quad \text{--- (2)}$$

Where,

$\bar{X}$ = mean

X_i = observations

N = Total number of observations (sample size)

Σ = Summation

T-test

The t-test was used to determine whether significant difference exist or not between the mean annual income of the respondents before using and/or provision of infrastructural facilities; and after using and/or provision of the facilities. It is specified as:

$$t = \frac{\bar{X}_A - \bar{X}_B}{\text{SED}} \quad \text{-----} \quad (3)$$

Where,

t = t-calculated.

$\bar{X}_A$ = Mean income after using and/or provision of infrastructural facilities. (Amount ₦)

$\bar{X}_B$ = Mean income before using and/or provision of infrastructural facilities. (Amount ₦)

SED= Standard Error of the means income differences

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

The descriptive statistics for the socioeconomic characteristics of respondents is presented in Table I. As shown in the table the mean age of the respondents was 36.1 years implying that the respondents on the average were in active stage in their life. The result agrees with the findings of Abdu, (2012) where majority of the respondents were youth which usually take risk with the anticipation of high returns from their economic activities. The result also showed that majority (75.76%) were male and with an average household size of 9 persons. Furthermore, 89.89% of them had acquired one form of formal education or the other. The result conformed with the findings of Bose *et al.*, (2012) and Yusuf, *et al.*, (2009) who had found that marketers acquired one form of western education or the other and it was agreed that education is an important factor in decision-making which in turn facilitate adoption of improve techniques in various form of economic activities. Further, 30.30% of the respondents engaged in farming and grain milling as their occupation. Similarly, 28.28%, 27.27%, 25.25% and 24.24% of them participated in mixed farming, farming and trading; and welding, respectively as their economic activities. The implication of this result is that the sampled respondents in the area have diversified source of income for their livelihood.

Table 1: Socio-economic characteristics of the respondents in the study (n=99) area

Variables	Frequency	Percentage (%)
Age		
21-30	16	16.16
31-40	63	63.64
41-50	13	13.13
51-60	7	7.07
$\bar{X} = 36.1$ years		
Sex		
Male	75	75.76
Female	24	24.24
Household size		
1-5	18	18.18
6 - 10	49	49.49
10 - 15	23	23.23
16 - 20	7	7.07
21 - 25	2	2.02
$\bar{X} = 9$ persons		
Form of education		
No formal education	10	10.10
Adult education	10	10.10
Primary education	6	6.06
Secondary education	38	38.38
Tertiary education	35	35.35
Occupations		
Mixed farming	28	28.28
Farming and Artisan enterprise	20	20.20
Farming and Grain milling	30	30.30
Farming and Trading	27	27.27
Farming and Civil service	23	23.23
Tailoring	24	24.24
Welding	25	25.25
Total	177*	178.77*

*Multiple responses obtained

Source: Field survey, 2011

General information on Infrastructures

Infrastructures play an important role in promoting agricultural productivity and economic development which in turn improve the living standard of the people in the communities. The result in Table 2 showed that 39.39% of the respondents identified electricity in the villages, while 38.38% and 37.37% of the respondents mentioned schools and feeder roads, respectively. Furthermore, 27.27% and 30.30% of the respondents indicated that market places/stalls are available in their localities and GSM services,

respectively, which were probably the reason for their high participation in marketing activities. Similarly, 20.20% and 15.15% of the respondents pointed out the availability of hospitals/primary health care centers and portable water supply, respectively. This implied that there are various forms of infrastructures in the study area. The respondents did not respond on the existence of Banks, which indicates that they do not have such institutional infrastructure in their localities.

Table 2: Distribution of respondents according to infrastructures available in the area.

Facilities	Frequency	Percentage
Electricity	39	39.39
Portable water supply	15	15.15
School	38	38.38
Hospitals/Primary H/care centers	20	20.20
Market places	27	27.27
Feeder Roads	37	37.37
Irrigation Canals/ Dams	34	34.34
GMS	30	30.30
Banks	-	-
Total	240*	242.40*

*Multiple responses obtained

Source: Field survey, 2011

Furthermore, Table 3 shows various forms of infrastructural facilities used by the respondents in the study area. The result revealed that 49.49% of the respondents were using electricity in one form or the other. This may be due to the fact that most of the household benefit from it either for domestic or business purposes. This is followed by 48.48% and 42.42% of the respondents who were benefiting from schools and market places (stalls), respectively. Similarly, 38.38% and 32.32% of the respondents have access and utilizing feeder roads and primary health

care facilities, respectively. Only 27.27% of the respondents have access to portable water supply. The implication of this finding is that the respondents were utilizing the available infrastructures, thereby improving their economic status. Shahidur, *et al.*, (2013) reported that rural infrastructures like electricity, market places, feeder roads, schools, e.t.c. found to reduce poverty significantly which in turn improve the living standard of the rural people. On the other hand, the result disclosed that 29.29% of the respondents have been utilizing these infrastructures facilities for 11-15 years. Only 5.05% of the respondents have benefitted and/or utilized the

infrastructural facilities for the period of 21 – 25 years. The mean years of utilizing infrastructural facilities were 12.3 years. The implication of this finding is that most of

the infrastructural facilities were provided many years back and were not adequate now thus, affecting their economic activities.

Table 3: Distribution of respondents according to infrastructural facilities used and years of utilization in the study area.

Facilities	Frequency	Percentage
Electricity	49	49.49
School	48	48.48
Market	42	42.42
Feeder Roads	38	38.38
Hospitals/Primary H/care	32	32.32
Portable Water	27	27.27
Total	236*	238.36*
*Multiple responses obtained		
Years of utilization		
1 – 5	13	13.13
6 – 10	25	25.25
11 – 15	29	29.29
16 – 20	27	27.27
21 – 25	5	5.05
X = 12.3 years		
Total	99	99.99

Source: Field survey, 2011

Sources of infrastructural facilities

The result in table 4 revealed that most of the facilities used by the majority (65.66%) of the respondents were provided by government. This might be attributed to expensiveness of the infrastructures and rural people or groups cannot be able to shoulder it. Furthermore, 23.23% of the respondents disclosed that some of the infrastructural facilities are provided by the communities. Only 2.02% of the respondents indicated that such facilities were provided by non-governmental

organizations. This finding agrees with the findings of Adegnugba (2003) that most of the rural societies in Nigeria depends on government for provision of basic infrastructures but corruption and lack of continuity of government policies has interfered with the provision of such facilities. On the other hand, the finding also revealed that majority (54.55%) of the respondents indicated that the facilities were in good condition. In the same manner, 30.30% and 11.11% of them acknowledged that the condition of infrastructures were fair and very good, respectively in the study area.

Table 4: Distribution of respondents according to service providers and condition of infrastructural facilities in the study area.

Facilities	Frequency	Percentage
Government	65	65.66
Non-governmental organization	2	2.02
Individual	4	4.04
Community	23	23.23
Others	5	5.05
Total	99	99.99
Condition of facilities		
Very good	11	11.11
Good	54	54.55
Fair	30	30.30
Poor	4	4.04
Total	99	99.99

Source: Field survey, 2011

Income level of the respondents

The result in Table 5 showed that before provision and/or utilizing of infrastructure, only 22.22% of the respondents had annual income of < ₦50,000, while 19.19% earned between ₦200, 001- ₦250,000. This is closely followed by 18.18% and 15.15% of the respondents who earned up to ₦50,000-100,000 and ₦100,001-150,000, respectively. Only 4.04% of the respondents had annual income of up to ₦ 300,001 and above. The annual mean income before provision and/or utilizing of infrastructural facilities was ₦103,131.31. On the other hand, the result disclosed that after provision and utilizing the infrastructural facilities, 24.24% of the respondents had annual income of up to ₦150,001- ₦200,000. This is followed by 21.21% of the respondents who earned between ₦200,001- ₦250,000 annually.

Furthermore, the result reveals that 13.13% of the respondents earned between ₦300,001 – ₦350,000 annually. The annual mean income after provision and/or utilizing of infrastructural facilities was ₦145,101.01. The implication of this finding is that there was increased in annual income of the respondents after provision and /or utilization of the infrastructural facilities. That is before the provision and or utilization of the facilities, the highest amount generated annually by 22.22% of the respondents was < ₦50,000. While after provision and/or utilization of infrastructures the amount was between ₦150,001 - ₦200,000 which constituted about 24.24% of the respondents. This result conformed with that of Marie, (2013) and Shahindur, *et al.*, (2013) where they ascertained that rural infrastructures had positive impact on the productivity and income of rural dwellers.

Table 5: Distribution of the respondents according to annual income in the study area

Before provision and/or utilization of infrastructure year 2010			after provision and/or utilization of infrastructure year 2010		
Income (₦)	Freq	(%)	Income (₦)	Freq	(%)
<50,000	22	22.22	<50,000	4	4.04
50,001-100,000	18	18.18	50,001 – 100,000	10	10.10
100,001-150,000	15	15.15	100,001 – 150,000	16	16.16
150,001-200,000	13	13.13	150,001 – 200,000	24	24.24
200,001-250,000	19	19.19	200,001 – 250,000	21	21.21
250,001-300,000	8	8.08	250,001 – 300,000	11	11.11
300,001- 350,000	4	4.04	300,001 – 350,000	13	13.13
X = ₦103,131.31			X = ₦145,101.01		
Total	99		99		

Source: Field survey, 2011

Accordingly, the result in Table 6 showed that the annual minimum income of the respondents before and after provision and/or utilization of infrastructural facilities were ₦10,000 and ₦18,000, respectively. While the annual maximum income of the respondents before and after were ₦400,000 and ₦520,000, respectively. The annual mean income before and after provision of the infrastructural facilities were ₦103,131.31 and

₦145,101.01 respectively. The Table further indicated that t-calculated was 3.651 which was highly significant at $P < 0.001$. This implied that there was significant difference between annual mean income before and after provision and/or utilization of the infrastructures. Thus, utilization of those facilities has positive impact on the income level of the respondents as justified by the t-value.

Table 6: T-test results on significant difference between annual mean income of respondents before and after provision and/or utilization of infrastructural facilities in the study area.

Variables	Income (₦)		
	Minimum	Maximum	Average
Before using infrastructure	10,000.00	400,000.00	103,131.31
After using infrastructure	18,000.00	520,000.00	145,101.01

Standard Error = 11494.88**t-value = 3.651******** implies $P < 0.001$

Source: Field survey, 2011

Constraints Affecting Economic Activities of the Farmers in the Area

The result in Table 7 showed that 41.41% of the respondents disclosed that insufficient and irregular electricity supply was serious problem in the study area. While 36.36% and 32.32% of the respondents said inadequate GSM services, and poor feeder roads,

respectively hindered their economic activities in the area. Similarly, 31.31%, 30.30%, 19.19% and 10.10% of the respondents Identified inadequate portable drinking water, inadequate health centers, inadequate capital and high cost of inputs, respectively are some of the constraints affecting their activities in the area.

Table 7: Distribution of the respondents according to constraints affecting their economic activities in the study area.

Problems	Frequency	Percentage
Inadequate capital	19	19.19
Inadequate portable water	31	31.31
Insufficient and irregular electricity supply	41	41.41
Poor feeder roads	32	32.32
High price of inputs	10	10.10
Inadequate GSM services	36	36.36
Inadequate health centers	30	30.30
Total	199*	200.99*

*Multiple responses obtained

Source: Field survey, 2011

Conclusion and Recommendations

This paper examined the impact of infrastructures on income of rural farmers' development in some villages in Dass Local Government Area of Bauchi state. Infrastructural facilities identified in the study area include electricity, feeder roads, schools, health care centers, among others. Majorities (75.76%) of the respondents were male and acquired one form of formal education or the other. The respondents were mainly involved in mixed farming, farming and artisan enterprises, farming and trading and welding, among other economic activities in the study area. The annual mean income before and after the provision and/or utilization of infrastructural facilities were ₦103,131.31 and ₦145,101.01, respectively. However, the respondents complained on insufficient and irregular supply of electricity, inadequate GSM services,

poor feeder roads, and inadequate portable water and health centers as the most serious problems affecting their occupations in the study area. Based on the findings, the study recommends that government and relevant agencies should increase in the quality and quantity of infrastructural facilities such as electricity supply, GSM services, Portable water, health centers and alike in the area. This unequivocally transforms the rural areas and improves the living standard of the rural dwellers. In addition, construction and /or rehabilitation of roads especially the feeder and urban rural ones may help in reducing the current transportation problems and improve agricultural productivity and other economic activities in the area.

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