Assessment of Rural Dwellers Satisfaction with Quality of Infrastructure in Rural Settlements of Niger State, Nigeria

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Abstract

This study evaluates the responses of rural dwellers to an aspect of their environment, the quality attributes of the infrastructure provided for their use. The quality attributes considered were derived from location, management, economic, environmental and physical qualities of the respective infrastructure namely health, education, water supply, electricity and road.To achieve this aim, a multi-stage sampling technique was employed to systematically select 22 rural settlements in 22 local government areas. In all, a total of 1,792 rural dwellers were selected. Chi-square (X^2) was used to determine the relationships between the quality attributes and perceived level of satisfaction of the respondents in the study area. The findings revealed that the quality attributes of the infrastructure such as availability of personnel, drugs and equipment, distance to facilities, cost, regularity and maintenance of facilities as well as quality of infrastructure were perceived by the rural dwellers to be generally unsatisfactory. Chi-square analysis revealed that there exists significant relationship between perceived level of satisfaction and the entire infrastructure considered. The results of the chi-squire analysis are all significant at 5% level. It can therefore be concluded that the quality attributes of the facilities were generally perceived as unsatisfactory by the rural dwellers. The paper recommends regular monitoring and proper maintenance jointly by the providers and beneficiaries.

Keywords: Satisfaction, Rural Dwellers, Infrastructure, Quality attributes, Transformation and Rural Settlements.

1.0 Introduction

Human perception is necessary for the acquisition and manipulation of information about the nature of the spatial environment. Perception in this context involves an assessment of infrastructure based on standards developed in the mind of the assessor (Olayiwola, 1998). The intention is to highlight the responses of rural dwellers to an aspect of their environment, the quality attributes of the infrastructure provided for their use and role it plays in socio-economic development of their settlements. In a situation where the society is polarized along socio-economic line, there is likely to be variations in the people's perception of adequacy of infrastructure. For example, Molnar, et. al (1979, cited in Olayiwola 1998) demonstrated that satisfaction with infrastructure varies between groups of people-local leaders, business respondents and ordinary person. Olayiwola (1998) notes further that perceptual studies of rural infrastructure are negligible in most developing countries including Nigeria. Yet they are relevant to the improvement of infrastructure in both rural and urban settlements. It against this background that this paper assesses the perceived level of satisfaction with the quality attributes of selected infrastructure namely health, education, water supply, electricity and road by rural dwellers of Niger state in Nigeria.

2.0 Concept, Classification and attributes of infrastructure

There is no ironclad definition of infrastructure. On a broad basis, it refers to all basic inputs into and requirements for the proper functioning of the economy (Jerome and Ariyo, 2004). For example, Fox (1994) defines infrastructure as those services derived from the set of public sector to enhance private sector production and to allow for household consumption. Schubeler (1996) differentiates between urban infrastructure services and social infrastructure. According to him, urban infrastructure refers to services traditionally provided by the public works, transport sector and utilities. These include roads, mass transportation, water supply, drainage and flood protection, sewage, solid waste system and disposal, power distribution, streets lighting and telecommunication. The social infrastructure, on the other hand, refers to health, educational, recreational and cultural facilities. Jerome and Ariyo (2004) observe that infrastructure are very heterogeneous and are usually grouped into two namely, economic and social infrastructure. Economic infrastructure is part of an economy's capital stock that produces services to facilitate economic production or serve as inputs to production (e.g. electricity, roads, and ports) or are consumed by households (e.g. water, sanitation and electricity). Social infrastructure encompasses services such as health, education and recreation with direct and indirect impact on the quality of life. Directly, it supports production and trade; indirectly, it streamlines activities and outcomes such as recreation, health and safety. Similarly, World Bank (1994) states the composition of economic

infrastructure to include public utilities (e.g power, telecommunication, piped water supply, sanitation, sewerage, solid wastes collection and disposal and gas piped); public works (e.g roads, major dams and canals works for irrigation and drainage and other aspects of transport sector such as railways, urban transports, ports, waterways and airports.

A distinction has also been made between urban infrastructure and rural infrastructure. For example, Jacobson and Tarr (1995) define urban infrastructure as the structures and networks that frame and bind together modern cities and metropolitan areas and make it possible to undertake social and economic activities. Idachaba (1985) on the other hand defines rural infrastructure as physical, social and institutional forms of capital which aid rural residents in their production, distribution and consumption activities as well as enhancing the quality of rural life. Bhalla (2000) in his own view regards rural infrastructure as basic public services and facilities which provide an environment for productive activities of individuals and groups in the society.

Several authors have come out with different classifications of rural infrastructure (Kahn 1979; Idachaba, 2006 ; Igbozurike, 1983; Bhalla, 2000; Organisation For Economic Cooperation and Development, 1991, Alamu, et. al. 2004). For example, Kahn (1979) classifies rural infrastructure into three: namely, physical infrastructure such as roads, water, electricity; social infrastructure namely, health and educational facilities, community centres, fire and security services; institutional infrastructure which includes credit and financial institutions as well as research facilities. On the other hand, Idachaba (2006) classifies rural infrastructure into four broad groups namely physical, social, institutional and farm Infrastructure. The components of the rural physical infrastructure include transportation system such as feeder roads, access roads, railroads, bridges, ferry services, boats, ports, footpaths; processing facilities such as public processing facilities, machinery, equipment building; and communication systems such as rural telephone services and postal agencies. The rural social infrastructure comprises of health facilities such as hospitals, dispensaries, maternity/health centres; educational facilities such as primary schools, secondary schools, technical schools, vocational schools, Quranic schools, adult education facilities; and rural utilities such as rural electrification and power, and water supplies. The components of rural institutional infrastructure include rural organizations such as cooperatives, farmers unions; rural-based projects such as community projects; financial institutions such as credit societies, banks, government credit institutions, post office savings bank; agricultural research facilities such as research institutions, experimental–outlaying farms, schools of agriculture, demonstration plots; agricultural extension services; crop-animal protection-control-grading services and soil conservation services. Lastly, the rural farm infrastructure consist of storage facilities such as silos, ware houses, go-downs, farm bins, open-air storage facilities; irrigation water facilities such as dams, irrigation canals and tributaries, boreholes, drainage systems; land clearing and preparation systems; farm input supply systems such as seeds, fertilizers, pesticides; and farm roads development/improvement facilities.

Igbozurike (1983) also categorises rural infrastructure into three orders. The first order infrastructure are basic social services which are water supply, medical centres, all season motorable roads and electricity; the second order are social services which constitute the intermediate level of needs and these include schools and financial institutions; while the tertiary social services which include public libraries and community meeting halls are the third order. The Organisation For Economic Cooperation and Development (1991) classifies rural infrastructure into four categories. The first category is intended to open up rural areas to the larger world and this includes the communication network such as roads and water ways. The second category is basic infrastructural services which are necessary to support human development and these include water supply and electricity. The third category is services designed to enhance the quality of life and these include health care facilities, postal services and recreational facilities. The last category is business services that provide a platform for rural business interest and these include consultancy services, research and development investment.

Infrastructure possesses certain attributes which make them unique and which has been identified by various authors (Ugwu, 1993; Zubairu, 2005; Abumere et. al, 2002). Ugwu (1993) for example, identifies three typical characteristics of infrastructure. These include technical characteristics which are indivisibility and long life span among others; economic characteristics that are external effects and economies of scale, high fixed capital and social cost, high risk investment; and institutional characteristics which include absence from market prices, central planning and allocation, control among others. Similarly, Zubairu (2005) reports that infrastructure is essentially social overhead capital, which needs to be distinguished from directly productive activities. According to the author, as social overhead capital infrastructure exhibits the following three characteristics: the services they provide facilitate, or are in some sense basic to, the carrying out a great variety of economic activities; these services are provided practically in all countries by public agencies or by private agencies subject to some public control (i.e. they are provided, either free of charge or at rates regulated by public agencies) and; the services provided cannot be imported.

However, the classifications by Kahn (1979) and Idachaba (2006) prove useful in the selection of rural infrastructure for this study. Consequently, the infrastructure selected for this study namely, road, water, electricity, health and education facilities can be grouped under physical and social infrastructure as classified by

these scholars. These are basic infrastructure as earlier stated which may have positive impact on socio-economic development in the rural settlements.

3.0 Study Area
Niger state is located between latitudes 8° 20 ' N and 11°30' N and longitude 3° 30'E and 7°20'E. The state is situated in the North Central geo-political zone and shares its borders with the Republic of Benin (West), Zamfara State (North), Kebbi (North-West), Kogi (South), Kwara (South-West), Kaduna (North-East) and the Federal Capital Territory FCT (South-East) (Niger State Government, 2004). Figure 1 shows the location of Niger state in Nigeria. The state covers a total land area of about 76,000sq.km, or about 9 percent of Nigeria's total land area. This makes the state the largest in the country (Baba, 1993, Online Nigeria, 2003.). At inception in 1976, the state had only eight Local Government Areas (LGAs), however, with the series of state and local government creation exercises and boundary adjustments between 1979 and 1996; the number of LGAs in the state has increased to twenty-five.
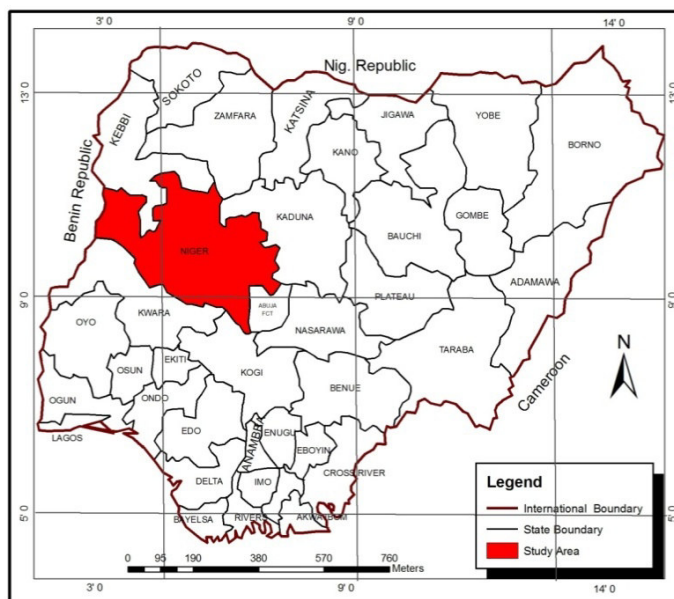
Figure 1: Map of Nigeria showing Niger State.
Source: Federal Ministry of Lands, Housing and Urban Development, Abuja.

In terms of human settlements, the majority of the people of the State reside in rural areas. According to Baba (1993) for example, 90 percent of the state population were rural residents. Similarly, following 1991 population census Morenikeji, et. al (2000) reported that there were 2,371 rural settlements with a total population of 1,868,939 and eight urban settlements with a combined population of 552,642 in the state making the state essentially rural. According to Baba (1993), the characteristic rural settlements in the Nupe cultural area are of the nucleated type in which each settlement consists of many compounds built in close quarters and each compound houses a family which is an independent production/consumption unit. On the other hand, outside Nupe territory, dispersed rural settlements predominate in northern local government areas of Mariga, Magama, Borgu and Shiroro in which the residents commonly form one unit of production/consumption. Some of the major urban settlements in the state include Minna the State Capital, Bida, Suleja and Kontagora.

4.0 Research Methods
For this study, the 22 local government areas that are either completely rural local government areas or partially rural local government areas form the focus. The completely rural local government areas as defined here, are local government areas consisting of all settlements having population below 20,000 including their headquarters, while the partially rural local government areas have only their headquarters with population of more than 20,000. The selection of settlements was done by ranking all the settlements in each local government area in descending order and selecting the first settlement with population of less than 20,000. In all, a total of 22 settlements were selected from 22 local government areas.

For the administration of questionnaires, 5% of the households in each of the selected rural settlements was selected for interview using systematic random sampling method to pick the respondents in each settlement. The total number of questionnaires administered was 1,792. This was derived from estimated number of households using average rural household size of 5 (National Bureau of Statistics, 2006). The perceived quality

of the infrastructure by the respondents in the selected settlements was established based on the analysis of the degree of satisfaction of the attributes of the infrastructure. The respondents ranked their opinions on the level of satisfaction with the quality attributes of the facilities. The responses were then subjected to Chi-square analysis to establish if there is significant relationship between the level of satisfaction and quality attributes of the selected infrastructure. .

5.0 Results and Discussion
5.1 Respondents satisfaction with health infrastructure
The responses on quality attributes of health facilities are shown in Table 1. The variables considered as quality attributes were the location of health facilities, availability of health personnel, availability of drugs, availability of equipment, distance travelled to the facilities and cost of treatment received. The study revealed that 1,051 (58.6%) of the respondents perceived the location of the health facilities to be satisfactory while 830 (46.3%) of the respondents perceived availability of health personnel as fairly satisfactory. Availability of drugs was considered by 785 (43.8%) of the respondents as fairly satisfactory, while 825 (46.0%) of respondents perceived availability of equipment to be fairly satisfactory. Distance travelled to facilities and cost of treatment received were perceived to be fairly satisfactory by 718 (40.1%) and 894 (49.9%) of the respondents respectively.

Chi-square statistics was used to determine if there is significant difference between the level of satisfaction (which has been collapsed into unsatisfactory and satisfactory) and quality attributes scores. It was found that there is significant difference between the level of satisfaction and the quality attributes of infrastructure because the table value of 11.071 was found to be less than the calculated x^2 value of 1700.

The conclusion that can be drawn from the above is that the quality attributes of health facilities namely availability of health personnel, drugs, equipment, distances travelled to facilities and cost of treatment received were perceived to be unsatisfactory by the rural dwellers except the location of the facilities.

Table 1: Respondents Satisfaction with Health Infrastructure

Quality Attributes	Highly Unsatisfactory		Unsatisfactory		Fairly Satisfactory		Satisfactory		Highly Satisfactory	
	No	%	No	%	No	%	No	%	No	%
Location of Facilities	20	1.1	122	6.8	425	23.7	1,051	58.6	174	9.7
Availability of Health Personnel	28	1.6	229	12.8	830	46.3	665	37.1	40	2.2
Availability of Drugs	70	3.9	592	33.0	785	43.8	332	18.5	13	0.7
Availability of Equipment	92	5.1	587	32.8	825	46.0	275	15.3	13	0.7
Distances Travelled to Facilities	17	0.9	235	13.1	718	40.1	683	38.1	139	7.8
Cost of Treatment Received	87	4.9	492	27.5	894	49.9	296	16.5	23	1.3

Source: Author's fieldwork, 2011

Table 2: Collapsed Chi-square (X^2) Analysis of Health Infrastructure

Attributes	Satisfactory	Unsatisfactory	Total
Location	567	1,225	1,792
Personnel	1,087	705	1,792
Drugs	1,447	345	1,792
Equipment	1,504	288	1,792
Distance	971	821	1,792
Cost	1,473	319	1,792
Total	7,049	3,704	10,753

Df(5) = 1700   Pr = 0.000, Table value = 11.071
Source: Author's fieldwork, 2011

Note: Responses on the perceived quality attributes of the infrastructure were collapsed to "unsatisfactory" and "satisfactory" scales to enhance the strength and validity of the Chi-square.

5.2 Respondents satisfaction with educational Infrastructure
The responses on quality attributes of educational facilities are shown in Table 2. The quality attributes considered were the location of facilities, number of teachers, availability of books, availability of classroom furniture, availability of classrooms, distance travelled to facilities, and school fees payable. The study revealed that 1,045 (58.3%) of the respondents perceived the locations of educational facilities to be satisfactory, while

the number of teachers is perceived to be fairly satisfactory by 816 (45.5%) of the respondents. The study further revealed that availability of books, availability of classrooms and distance travelled to the facilities were perceived to be fairly satisfactory by 695 (38.8%), 806 (45.0%) and 867 (48.4%) of the respondents respectively. Distances travelled to the facilities and schools fees payable were perceived to be satisfactory by 906 (50.6%) and 683 (38.1%) of the respondents respectively.

To determine if there exists a significant difference between the levels of satisfaction (which was collapsed into unsatisfactory and satisfactory) and the quality attributes of infrastructure, the chi-square statistics was employed. It was found that there is significant difference between the quality attributes and level of satisfaction. This is because the table value of 12.592 was found to be less that the calculated x^2 value of 3300.

It can be inferred from the above that the quality attributes of educational facilities namely number of teachers, availability of books, classrooms furniture, classrooms were perceived to be unsatisfactory by rural residents except location of facilities, distance travelled to facilities and school fees payable.

Table 3: Respondents Satisfaction with Educational Infrastructure

Quality Attributes	Highly Unsatisfactory		Unsatisfactory		Fairly Satisfactory		Satisfactory		Highly Satisfactory	
	No	%	No	%	No	%	No	%	No	%
Location of Facilities	5	0.3	51	2.8	424	23.7	1,045	58.3	267	14.9
Number of Teachers	25	1.4	119	6.6	816	45.5	741	41.4	91	5.1
Availability of Books	239	13.3	669	37.3	695	38.8	176	9.8	13	0.7
Availability of Classroom Furniture	145	8.1	621	34.7	806	45.0	200	11.2	20	1.1
Availability of Classrooms	47	2.6	228	12.7	867	48.4	601	33.5	49	2.7
Distance Travelled to Facilities	8	0.4	71	4.0	570	31.8	906	50.6	237	13.2
School Fees Payable	14	0.8	34	1.9	352	19.6	683	38.1	709	39.6

Source: Author's fieldwork, 2011

Table 4: Collapsed Chi-square (X^2) Analysis of Educational Infrastructure

Attributes	Satisfactory	Unsatisfactory	Total
Location	498	1,294	1,792
Teachers	1,080	832	1,792
Books	1,603	189	1,792
Furniture	1,572	220	1,792
Classroom	1,142	650	1,792
Distance	649	1,143	1,792
Fees	400	1,392	1,792
Total	6,944	5,738	12,682

Df(6) = 3300   Pr = 0.000, Table value = 12.592
Source: Author's fieldwork, 2011

Note: Responses on the perceived quality attributes of the infrastructure were collapsed to "unsatisfactory" and "satisfactory" scales to enhance the strength and validity of the Chi-square.

5.3 Respondents satisfaction with water supply
The responses on quality attributes of water supply are shown in Table 3. The attributes that were considered are location of facilities, quantity of water supplied, quality of available water, maintenance of water supply facilities, distance travelled to facilities and cost of services received by the respondents. The study revealed that the location of facilities, quantity of water and quality of water were perceived to be satisfactory by 804 (44.9%), 638 (35.6%) and 639 (35.7%) of the respondents respectively. Similarly, distances travelled to facilities were also perceived to be satisfactory by 702 (39.2%) of the respondents. However, maintenance of facilities and cost of services received were perceived to be fairly satisfactory by 706 (39.4%) and 697 (38.9%) of the respondents respectively.

The scores of the perceived level of satisfaction (which was collapsed into unsatisfactory and satisfactory) and quality attributes were also subjected to Chi-square statistics to establish if significant difference exists. It was found out that there is significant difference between the level of satisfaction and quality attributes of water facilities. This is because the table value of 11.071 is less than the calculated x^2 value of 344.1981.

The inference that can be drawn from the above is that the quality attributes of water supply namely quantity and quality of water, maintenance of facilities and cost of service were perceived to be unsatisfactory by the respondents except location and distance travelled to facilities.

Table 4: Respondents Satisfaction with Water Supply

Quality Attributes	Highly Unsatisfactory		Unsatisfactory		Fairly Satisfactory		Satisfactory		Highly Satisfactory	
	No	%	No	%	No	%	No	%	No	%
Location of Facilities	132	7.4	256	14.3	418	23.3	804	44.9	182	10.2
Quantity of Water	169	9.4	328	18.3	534	29.8	638	35.6	123	6.9
Quality of Water	160	8.9	324	18.1	554	30.9	639	35.7	115	6.4
Maintenance of Facilities	179	10.0	371	20.7	706	39.4	422	23.5	114	6.4
Distances Travelled to Facilities	153	8.5	218	12.2	499	27.8	702	39.2	220	12.3
Cost of Service	150	8.4	363	20.3	697	38.9	426	23.8	156	8.7

Source: Author's fieldwork, 2011

Table 5: Collapsed Chi-square (X^2) Analysis of Water Supply

Attributes	Satisfactory	Unsatisfactory	Total
Location	806	986	1,792
Quantity	1,031	761	1,792
Quality	1,038	754	1,792
maintenance	1,236	556	1,792
Distance	870	922	1,792
Cost	1,210	582	1,792
Total	6,191	4,561	10,752

Df(5) = 344.1981   Pr = 0.000, Table value = 11.071

Source: Author's fieldwork, 2011

Note: Responses on the perceived quality attributes of the infrastructure were collapsed to "unsatisfactory" and "satisfactory" scales to enhance the strength and validity of the Chi-square.

5.4 Respondents satisfaction with electricity Supply

The responses on quality attributes of electricity supply are shown in Table 4. The quality attributes considered were regularity of electricity supply, cost of services received and regular maintenance of the facilities. The study revealed that 593(33.1%) of the respondents perceived regularity of electricity supply to be fairly satisfactory. However, the cost of services received (i.e electricity tarrif) and maintenance of facilities were perceived to be fairly satisfactory by 631 (35.2%) and 744 (41.5%) of the respondents respectively.

When the scores were subjected to Chi-square statistics to determine if there is significant difference between the perceived levels of satisfaction (which was collapsed into unsatisfactory) and satisfactory and the quality attributes of electricity supply, it is found to be significant. This is because the table value of 5.991 is less than the calculated x^2 value of 93.2777.

It can be concluded from the above that all the quality attributes of electricity supply namely regularity of supply, cost of services and maintenance of facilities were perceived to be unsatisfactory by the respondents.

Table 6: Respondents' Satisfaction with Electricity Supply

Quality Attributes	Highly Unsatisfactory		Unsatisfactory		Fairly Satisfactory		Satisfactory		Highly Satisfactory	
	No	%	No	%	No	%	No	%	No	%
Regularity of Supply	285	15.9	219	12.3	557	31.1	593	33.1	138	7.7
Cost of Services	283	15.8	389	21.7	631	35.2	377	21.0	112	6.2
Maintenance of Facilities	300	16.7	302	16.9	744	41.5	339	18.9	107	6.0

Source: Author's fieldwork, 2011

Table 7: Collapsed Chi-square (X^2) Analysis of Electricity Supply

Attributes	Satisfactory	Unsatisfactory	Total
Regularity	1,061	731	1,792
Cost	1,292	490	1,792
Maintenance	1,186	506	1,792
Total	3,649	1,726	5,375

Df (2) = 93.2777 Pr = 0.000, Table value = 5.991
Source: Author's fieldwork, 2011
Note: Responses on the perceived quality attributes of the infrastructure were collapsed to "unsatisfactory" and "satisfactory" scales to enhance the strength and validity of the Chi-square.

5.5 Respondents satisfaction with road Infrastructure

The responses on quality attributes of road infrastructure are shown in Table 5. The attributes considered were quality of the roads, availability of vehicles, cost of transportation and regular maintenance of the roads. The study revealed that quality of the roads, cost of transportation, and maintenance of the roads were perceived to be fairly satisfactory by 722 (40.6%), 782 (43.6%), and 699 (39.0%) of the respondents respectively. However, only availability of vehicles was considered as satisfactory by 726 (40.5%) of respondents.

The scores were subjected to Chi-square statistics to establish whether there is significant difference between the perceived level of satisfaction (which was collapsed into unsatisfactory and satisfactory) and quality attributes of road infrastructure or not. It was found to be   significant because the table value of 7.815 is less than the calculated x^2 value of 491.9204.

The inference that can be drawn from the above is that the quality attributes of road infrastructure namely quality of road, availability of vehicles, cost of transportation and maintenance of road were perceived to be unsatisfactory by the respondents.

Table 8: Respondents Satisfaction with Road Infrastructure

Quality Attributes	Highly Unsatisfactory		Unsatisfactory		Fairly Satisfactory		Satisfactory		Highly Satisfactory	
	No	%	No	%	No	%	No	%	No	%
Quality of Roads	180	10.0	309	17.2	727	40.6	538	30.0	38	2.1
Availability of Vehicles	114	6.4	220	12.3	665	37.1	726	40.5	67	3.7
Cost of Transportation	237	13.2	449	25.1	782	43.6	310	17.3	14	0.8
Maintenance of Road	371	20.7	468	26.1	699	39.0	239	13.3	15	0.8

Source: Author's fieldwork, 2011

Table 9: Collapsed Chi-square (X^2) Analysis of Road Infrastructure

Attributes	Satisfactory	Unsatisfactory	Total
Quality	1,216	576	1,792
Vehicles	999	793	1,792
Cost	1,414	378	1,792
Maintenances	1,538	254	1,792
Total	5,137	1,949	7,086

Df (3) = 491.9204 Pr = 0.000, Table value = 7.815
Source: Author's fieldwork, 2011
Note: Responses on the perceived quality attributes of the infrastructure were collapsed to "unsatisfactory" and "satisfactory" scales to enhance the strength and validity of the Chi-square.

6.0 Conclusion and Recommendations

From the forgoing, the results of chi-square analyses show that significant differences exist between the level of satisfaction and quality attributes of the selected infrastructure. It can therefore be concluded that the respondents were not satisfied with the quality attributes of selected infrastructure namely health, education, water supply, electricity and road by the rural dwellers. Consequently, the quality attributes namely, availability of personnel, drugs and equipment, distance to facilities, cost, regularity and maintenance of facilities as well as quality of roads that were perceived by the rural dwellers to be unsatisfactory, this can be addressed through regular monitoring and proper maintenance jointly by providers and beneficiaries. This can be done through collaborative arrangement between the federal, state and local governments. This should be in form of a policy that can be integrated into Niger State Government Plan of Action and Vision 3:2020 documents.

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