A Spatial Analysis of Some Indicators of Development in the Rural Areas of Okene, Kogi State, Nigeria

Ismail Nuhu Adeiza[1*], Eleojo Oluwaseun Abubakar[1] and Adebisi Adedayo[2]

[1]*Deptartment of Geography and Environmental Studies, Kogi State University, Anyigba, Nigeria.*
[2]*Deptartment of Geography and Environmental Management, University of Ilorin, Ilorin, Nigeria.*

Authors' contributions

This work was carried out in collaboration with all authors. Authors INA and AA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors EOA and AA managed the analyses of the study. Authors INA and AA managed the literature searches. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

This study examines the indicators of development in the rural areas of Okene in order to determine the levels of socio-economic development of the rural areas by identifying and analysing the available development indicators. Based on the yearnings of the people, the appropriateness of the indicators as catalysts for development and their availability in the selected fifty five (55) rural areas, forty six (46) development indicators were identified and evaluated for the study. The forty six (46) development indicators were subjected to Principal Component Analysis which brought out fourteen (14) dominant indicators that explained the variance in the levels of development in the rural areas. The fourteen indicators (such as institutions, agriculture, health facilities, commerce, super market, infrastructure, irrigation facilities, water facilities, tourist sites, cultural and religion institutions)

_____

Corresponding author: E-mail: firstadeiza@gmail.com;

account for 78.54% in the explanation of the variance in the levels of development in the rural areas. Results show that some positive relationships exist among the development indicators but there is a general low level of infrastructural development in the rural areas of Okene. Relevant recommendations and suggestions were made towards a sustainable rural development in Okene based on the findings of the study.

1. INTRODUCTION

There is no single accepted definition of a rural landscape. Although, there is variation in the perception of the rural area across the globe, but as globalization unfolds, the social, economic and environmental shifts that are occurring in rural worlds everywhere do not occur in isolation [1]. Describe drurality as the functionalist, critical, political and socio-economic representation approach for distinguishing between rural and urban economy and society. They stated further that the term rural is heavily influenced by the location and geographies of the region being considered. The classification of rural settlements vary from country to country, generally, there are basic characteristics of rural area that are common to rural area all over the world especially in developing countries. According to [2], Most Nigerian rural areas are characterised by low income, low savings, low investment, low capital formation, poor infrastructural facilities, gross illiteracy, low social interaction and local politics, under employment, informal groups, high rural-urban migration and low technological base.

Several reasons (such as corruption, unstable government, planning without implementation, implementation without planning, lack of people's participation in planning, absence of reliable data base and so on) have been adduced to why rural development in Nigeria is at a very low level [3].Of a very paramount importance among these reasons is the unavailability of relevant and adequate data of the rural areas and people that are being planned for. [3] recognized this problem that Nigeria's national statistical system is not effective and efficient, that the current system, managed by the Federal Office of Statistics (FOS) is governed by the obsolete 1957 Statistics Act. According to [4], the consequence of this, is that planning for programmes and projects at various levels of government is basically done on ad hoc basic. Data on many other key development areas are also lacking and when available, are often incomplete or inaccurate. However, timely and reliable statistics according to [3] are critical to effective planning, monitoring, and evaluation of performance. The efficacy of rural development policies is based on an accurate data. This to a great extent is responsible for the failure of programmes and projects in Nigeria [4]. Developing the rural area will enhance the national income as most of the resources are tapped in the rural areas. Even oil, the major Nigerian product that yields the highest revenue, is derived from the rural areas.

The rural areas in Okene local government area of Kogi state are of no difference to other rural areas in Nigeria, they face the same challenges and problems of little or insignificant development. This research work analyzed the indicators of development in the rural areas of Okene with a view to provide the necessary information to the rural development stakeholders and decision makers by analysing the available infrastructure, institutions and services in the rural areas of Okene, it also provided answers to questions and issues such as the amount of the various educational, health and institutional facilities in the area; the people's needs and areas that require urgent attention in the rural areas of Okene. This research is significant in many ways; to the government, investors, urban and regional planners and the public. It will help urban and regional planners to strategize on effective planning for the area, knowing the pattern(s) of rural settlements distribution and functions in the area. It will also enable investors in knowing settlements with the required threshold for their investment. More importantly, with knowledge of settlements distribution, functions and available infrastructures in the rural areas of the state, the government can plan and execute rural development programmes across the state knowing where to site such project for maximum service delivery.

2. LITERATURE REVIEW

2.1 Spatial Analysis

Spatial Analysis involves the description of phenomenon across space using a set of

spatially based analytical tools that explicitly focus on comprehending the spatial component of geo-referenced data. Understanding the spatial distribution of data from phenomena that occur in space constitute today a great challenge to the elucidation of central questions in many areas of knowledge, these unique ways of representing data have changed the way geographers reason and infer the existence of patterns, distributions, and relationships in spatial data. Our knowledge about locations, places, regions, and other geographic units is not perfect. Even with imperfect geographic knowledge, effective geographic decision-making can take place, partly because we realize that geographic phenomena occur in proximal spatially distributed forms [5]. The emphasis of Spatial Analysis is to measure properties and relationships, taking into account the spatial localization of the phenomenon under study in a direct way. That is, the central idea is to incorporate space into the analysis to be made. The spatial relationship of the data significantly contributed to the advancement in the comprehension of a phenomenon and understanding spatial correlations among geographically dispersed phenomena through imagining integrative representational modes for communicating spatial information about phenomena in visual, cartographic (maps), auditory (auditory maps), kinaesthetic (mental records of effort), and haptic (tactile map) domains [6]. The application of Geography Information System (GIS) is very fundamental in Spatial Analysis of phenomena because it includes all of the transformations, manipulations, and methods that can be applied to geographic data to add value to them, to support decisions, and to reveal patterns and anomalies that are not immediately obvious. The Spatial Analysis of the development parameters in this work was done on a GIS platform and the results expressed in maps supported by qualitative and quantitative analysis of the development parameters.

2.2 Rural Area

There is no single accepted definition of a rural landscape but instead we have different classifications to designate the rural areas. [1] described rurality as the functionalist, critical, political and socio-economic representation approach for distinguishing between rural and urban economy and society. They stated further that the term rural is heavily influenced by the location and geographies of the region being considered. Someone in England or USA might mention green fields, neat hedged, cosy pubs and village fetes to connote a rural area, someone in regions such as sub-Saharan Africa might suggest that poor infrastructures, absence of electricity, grinding poverty, vulnerable houses, poor health services, etc characterise the rural area. The realities of the rural area are not homogeneous across the globe, this variation across time and space has also influenced the ways that rural is defined, interacted with, inhabited, interpreted and socially reconstructed. Although, there is variation in the perception of the rural area across the globe, but globalization unfolds, the social, economic and environmental shifts that are occurring in rural worlds everywhere do not occur in isolation [7]. The classification of rural settlements vary from country to country, generally, there are basic characteristics of rural area that are common to rural area all over the world especially in developing countries. According to [2], most Nigerian rural areas are characterised by low income, low savings, low investment, low capital formation, poor infrastructural facilities, gross illiteracy, low social interaction and local politics, under employment, informal groups, high rural-urban migration and low technological base. In Nigeria, rural areas have been defined as areas with a population less than 5,000 in 1956, less than 10,000 in 1963 and less than 20,000 today [8]. It could be said that based on size, some designated rural areas that have infrastructural facilities and services similar to those in urban areas and with rapid changes in population size make the use of size often not meaningful. Many rural areas are modernising changeably or dynamically. This gives rise to the concept of the rural urban continuum. It stands that communities cannot be forced into two types of categories but should be seen to represent various modernisation stages on a linear scale. For example, while cities like Lagos and Ibadan may portray maximum of urban characteristics, some communities within and around them are typically rural, and between the two extremes are found communities at different stages of modernisation. The rural people are visibly ravaged by an excruciating poverty, ignorance and disease. In addition rural areas of Nigeria are virtually associated with depression, degradation, poverty and deprivation. In most rural areas in Nigeria, like in other rural setting in developing economies, basic infrastructure, where they exist at all, are too inadequate for any meaningful development. They often depend on shallow wells with untreated water for their water

need. The villagers, most of whom are farmers, work on the land from sunrise to sunset only to produce food for the uncontrollable teaming city population.

The rural dwellers in Nigeria lack most basic needs of life compared to their urban counterparts, they have little or no access to amenities and services that enhance better standard of living such as good roads, potable water, educational, health and institutional facilities [9]. Since independence, successive governments that came to power in Nigeria concentrated their major development and poverty eradication programmes in the urban areas and either neglect or give token to rural areas. This was driven by erroneous belief that rural areas are outside production and therefore contributes little to socioeconomic and political development of the country. This has had negative impact on rural dwellers. The young and energetic youths who supposed to work in the productive sector of rural economic development have found their ways to urban centers to look for jobs that are not available. [10] asserted that the problem of underdevelopment of rural Nigeria was not due to paucity of ideas and plans and at the same time not due to failure to adequately fund rural development. However, [11] noted that in spite of colossal amount of money that have gone into implementing rural development programmes and the proliferation of rural development agencies one after the other, not much impact has been made. The problem in Nigeria is not about conceptualizing policies, plans, programmes and projects. Neither is it about putting down development plans. All the plans are supposed to be prosecuted through programmes and projects. In spite of all the plans and concomitant programmes and projects, there are still lamentation on the state of the socio-economic development and welfare of the rural people. Despite the countless numbers of rural development policies introduced at different times by successive governments coupled with the huge financial and material resources employed, little or nothing is felt at the rural level as each policy has often died with the government that initiated it before it starts to yield dividends for the rural dwellers [12].

2.3 Rural Development

[13] sees development as a process in which communities actively and freely participate in tasks whose objective is to make their collective lives better. The development indicators meant for this research include the various infrastructure, institutions, amenities and services that are available in the rural areas or that can serve as agents and facilitators for sustainable rural development. The concept of rural development has been variously defined by scholars and policy makers to mean quite a number of things, including the improvement, of agriculture, the promotion of rural justice, the creation of requisite infrastructure and social overheads, as well as the establishment of appropriate decentralized structures in order to allow mass participation. Rural development in this paper is perceived as a design to improve the economic and social conditions of rural inhabitants, which must involve strategies for extending the benefits of the development to the rural majority. Rural development efforts include the elimination of poverty, creation of rural employment opportunities, elimination of major inequalities, and ensuring adequate participation of the rural populace in the transformation process. A number of strategies have been adopted for this process and these include agricultural development, infrastructural development, industrialization, and integrated rural development and community development in Nigeria. Rural infrastructure can be defined to include the system of physical, human and institutional forms of capital which enable rural residents to better perform their production, processing and distribution activities as well as helping to improve the overall quality of rural life [2]. Infrastructures are physical items that enhance the well-being of community members. Such infrastructure include: good road network, water supply, electricity, postal service, civic centres, markets, etc. They enhance the rural economy as they attract small-scale industries.

2.4 The Growth Pole Model

The growth pole model was used in explaining the findings of this work. The growth pole strategy as proposed by François Perroux in 1958 was also perceived as a vehicle to reduce rural urban disparities and to better understand the interdependences between the development zones. The growth pole needed an identifiable resource base capable of stimulating specific production and marketing activities [14]. Growth centres were also historically viewed as central places at the bottom end of the central place hierarchy which contributed directly to the basic economic and social needs of agricultural producers. In performing this function growth poles concentrate on the provision of

infrastructure, collecting and marketing of agricultural inputs, basic agro-processing facilities, social services and low order consumer goods. However, [15] opined that the growth centre strategy had limited success across the world and has failed to be the panacea for rural development. The practical limitations in literature include failure to take off, failure to control out migration, limited investment, underdeveloped infrastructure, lack of security of tenure of properties at these centres, limited funding options and on the whole economic crisis. The strategy often lead to the creation of a large number of small urban centres most of which were not necessarily viable, thus wasting a lot of money, they lacked public funding and they simply failed to spread the intended development to their hinterlands. Study of this nature is meant to provide detailed information about the rural settlements in Okene to enhance the identification of such settlements that can serve as rural central places and growth points to the surrounding rural hinterlands. The government will also be able to plan positively for the growth in the more sustainable settlements and avoid high levels of sporadic growth in smaller settlements. This will ensure that development is provided in areas with access to the widest range of essential services and facilities, thereby allowing an appropriate level of development that will protect or enhance essential services and facilities in existing settlements and also help to protect services and facilities in settlements that support a wider hinterland.

2.5 Indicators of Development and Their Parameters

The eleventh edition of the concise oxford dictionary edited by Catherine Soanes and Angus Stevenson defined a parameter a measurable or quantifiable characteristic of a system. It can also be described as the distinguishing or notable feature of a thing. The development parameters meant for this research include the various infrastructure, institutions, amenities and services that are available in the rural areas or that can serve as agents and facilitators of sustainable rural development. There is no standard or general blueprint in choosing or classifying the parameters, several researchers and scholars such as [16,17,13,18] have differently but similarly listed or classified parameters that serve as indicators in their studies of development or settlements. In this vein, [18] suggested the adoption and modification of the various parameters to suit the local environment and culture of the study area which should also reflect the aspirations of the society concerned. Scanty and inadequate information and statistics on rural settlements and conditions in the study area prompted the summation of the parameters from various sources which include literatures, published reports and statistics, data from state, zonal and local government offices and field survey. Forty six (46) development parameters were generated from these sources to reflect the yearning of the

Table 1. Development indicators and their parameters

SN	Indicators	Development parameters
1	Water	Pipe borne water, Boreholes, Wells, Ponds/Dams, and Stream/Rivers
2	Agriculture	Irrigation facilities, Processing facilities and Storage facilities.
3	Commerce	Small and Medium Scale Industries, Periodic Markets, Daily Markets, Street Markets, Supermarkets and Shops/Stores
4	Health	General/Specialist hospitals, Clinics/Private hospitals, Maternity/Primary Health Centres, Dispensaries and Patent Medicine Stores
5	Education	Senior Secondary Schools, Junior Secondary Schools, Primary/Nursery Schools and Adult/Informal Education centres
6	Infrastructure	Highways, Arterials, Collector roads, Street roads, Ferry/Bridges, Electricity and Drainages.
7	Institutions	Courts, Police posts, Local/Zonal Government Offices, Skill Acquisition/Empowerment Programmes, Agricultural Extension/Research facilities, Cooperative societies, Community Participation in development, and Microfinance Banks
8	Socio-cultural services/facilities	Telecommunication facilities, Post Offices, Community Building/Halls/Artefacts, Churches, Mosques, Other Religious Buildings/Sites, and Tourist sites/Festivals

Sources: Literature and reconnaissance field survey (2015)

people and development features in the study area, the selection of the parameters is majorly guided by the appropriateness of the parameters as agents or catalysts for development and their availability in the study area, the parameters also cover a wide range of parameters enough to measure quantitatively the development characteristics (physical, economic and socio-cultural) of the settlements to be studied. These parameters which are paramount to the development and social wellbeing of the people and community as noted by [17,13,18-21] are grouped into eight (8) sectors (see Table 1) namely Water, Agriculture, Commerce, Health, Education, Infrastructure, Institutions and Socio-cultural services/ facilities.

3. RESEARCH METHODS

3.1 The Study Area: Okene Local Government Area

Okene LGA is composed of Okene and Okengwe districts. There are 11 wards in the Local Government which are Bariki, Ototu, Orietesu, Lafia/Obessa, Okene-Eba, Idoji, Onyukolo, Obehira-Eba, Obehira-Uvete, Abuga/Ozuja and Upogoro/Odenku wards. Okene LGA on latitude 07°33′N and longitude 06°14′E has an area of 328 km sq. and a population of 320,260 at the 2006 National population census. The Local Government is bordered by four Local Government Areas of Kogi and Edo State. It is bordered to the West by Okehi LGA, to the East by Ajaokuta LGA, to the North by Adavi LGA and to the South by Ogori-Magongo LGA and Edo State (see Fig. 1). The people of Okene are well known for the famous Okene cloth weaving, farming, hunting, commerce etc. [22]. There are no official means of distinguishing between rural and urban

settlements in the study area for now because there are no available official population figures for the individual settlements in the Okene LGA. The 55 settlements considered for this research work because of their apparent rural traits (such as engagement in primary production and activities, bad roads, inadequate transportation facilities, mud houses, low level of infrastructural development and obvious low level of civilization) are shown in Table 2.

3.2 Methods and Instruments of Data Collection

The data for this study is from larger study by [23]. Data such as the available physical infrastructure (such as roads, postal agencies, irrigation facilities, telecommunication services, processing facilities, and so on), social infrastructure (health services, schools, utilities, etc), institutional infrastructure (banks, cooperative societies, agricultural extension programmes, NGOs, etc) and industries were mainly sourced from various government agencies (such as Ministies of Education and Health, Bureau of Statistics and Town Planning Board) in Kogi State, Nigeria. Direct field observations, Focus Group Discussions (FGD) and oral interviews with community leaders and stakeholders that have adequate knowledge of the settlements helped in validating and complementing secondary data and also helped in identifying other development parameters such socio-economic activities and facilities.

3.3 Method of Data Analysis

Data were analysed using suitable statistical techniques such as Principal Component Analysis and descriptive statistical techniques such as sum of rankings, and simple

Table 2. Rural settlements in Okene LGA

S/N	Wards	Settlements
1.	Obehira-eba	Ageva, Ozuja, Ohugeri and Ozumi
2.	Obehira-uvete	Idoma, Onyiobankere, Irayiapana, Okekere And Arigo
3.	Upogoro	Upogoro, Idivaju, Iruvadah and Odenku
4.	Abuga/Ozuja	Ohuda, Enyiruwa, Inata, Abuga, Abochehe, Irigoni, Inozi, Onyioto and Eikaoku
5.	Bariki	Bariki, Ahososhi and Iruvucheba
6.	Orietesu	Badoko, Idiche, Old national bank, Iruvukura and Idishehu
7.	LafiaObessa	St.Andrew, Jimohmechoro, Odinga, Idabami and Ozuwaya
8.	AgassaAhache	Ukowa, Oriadobe, Ukako, Osiva, Iduka I and Agassa
9.	Idoji	Idukokoro, Idoji, Inike and Etahi
10.	Onyukoko	Enyinare, Iduka II, Idapokiti, Esomi, Oguda and Ohiana
11.	Ototu	Idogido, Idochi, Idoboroja and Idare

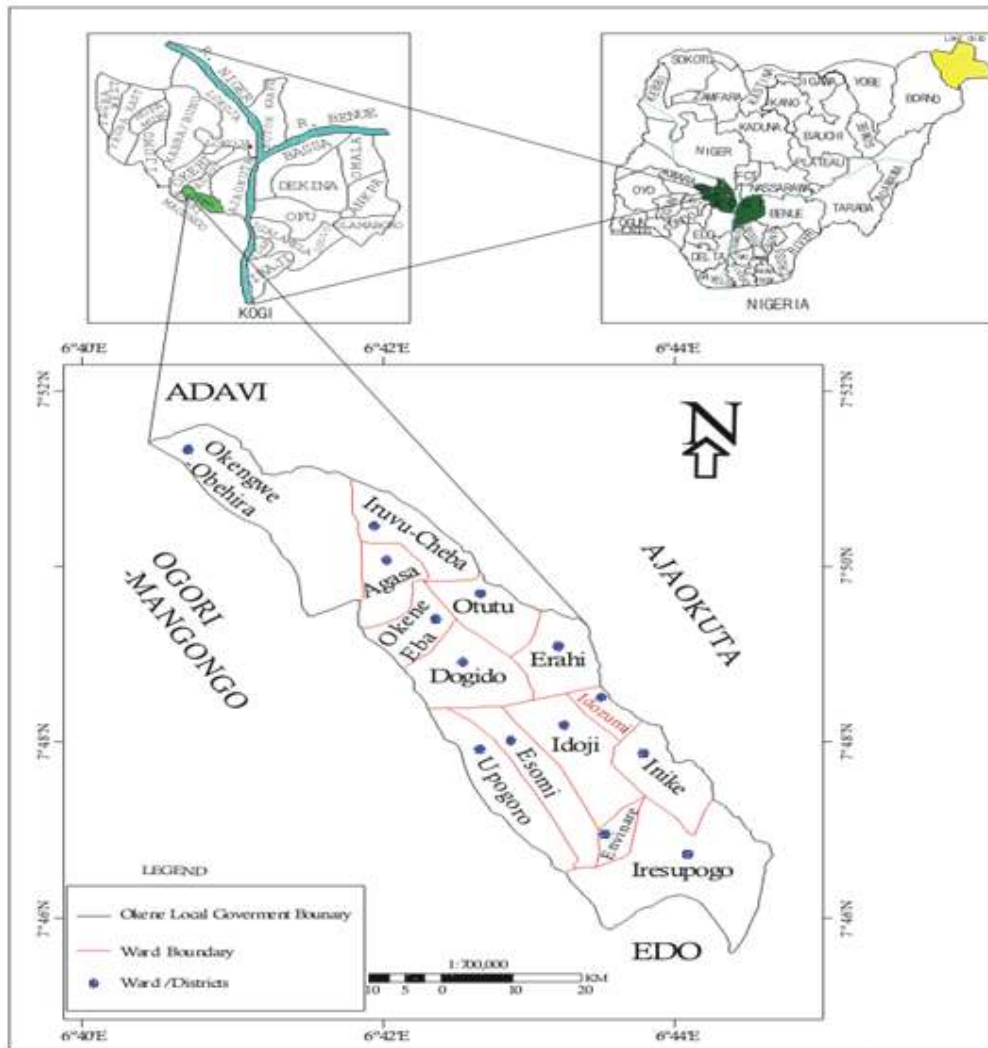*Source: Revenue Unit, Okene LGA Secretariat (2015).*

Fig. 1. Okene L.G.A. showing the Wards/Districts
Source: GIS Lab. Dept. of Geography and planning, Kogi State University, Anyigba

percentages. Results are presented in graphs, tables and maps. Factor analysis was employed to rewrite and reorganize the forty-six (46) development parameters (see Table 1) that were used for scoring and ranking the settlements in an orthogonal form. This made the extraction of the dominant development parameters in the study area possible and the important development parameters of rural settlements in Okene were identified. The factor analysis also showed the important loadings of the parameters and weighting of each variable according to the strength of its correlation with other variables which was useful in identifying and assessing the important development parameters.

4. RESULTS AND DISCUSSION OF FINDINGS

4.1 Weights of the Development Parameters

The development parameters were evaluated and assigned points based on the importance attached to such parameters by the people. The people in the various settlements were asked to assign points to each of the parameters on a 5-point likert scale based on their importance to the development of their settlements, the average of the weights assigned to each parameter from all the settlements is the point that was used for the analysis (see Table 3). Apart from assigning points, this method brought out the development

parameters that are very important to the people and the ones they yearn for. The accumulated points of the settlements were computed and used to determine the rank size (score) of individual settlements. Pipe borne water, Boreholes, Small scale industries, General/ specialist hospitals, Senior Secondary Schools, Highways, Arterial roads, Electricity and Community Participation in development are the highly weighted development parameters in the study area; these parameters are reflections of the high importance attached to them because of their inadequacy in study areas. Lack of adequate potable water supply is a major problem in the

Table 3. Weights of the development parameters

Indicators	Development parameters	Weight
Water	Pipe borne water	4.9
	Boreholes	4.2
	Wells	3.4
	Ponds/dams	2.5
	Rivers/streams	1.6
Agriculture	Irrigation facilities	3.1
	Processing facilities	2.9
	Storage facilities	2.3
Commerce	Small scale industries	4
	Medium scale industries	3.6
	Periodic markets	3.5
	Daily markets	2.4
	Street markets	1.5
	Supermarkets	1.8
	Shops/stores	2.3
Health	General/specialist hospitals	4.5
	Clinics/private hospitals	3.6
	Maternity/PHCs	3.9
	Dispensaries	2.1
	Patent Medicine stores	1.7
Education	Senior Secondary Schools	4.6
	Junior Secondary Schools	3
	Nursery/Primary Schools	2.8
	Adult/Informal education centres	1.5
Infrastructure	Highways	4.5
	Arterials	4.4
	Collector roads	3.4
	Street roads	3.9
	Ferry/bridges	1.7
	Electricity	4.4
	Drainages	3
Institutions	Courts	1.9
	Police Posts	3.1
	Local/Zonal Govt. offices	1.3
	Skill acquisition/empowerment	3.5
	Agricultural Extension	2.8
	Cooperative Societies	3.8
	Community Participation in development	4.2
	Microfinance Banks	2.5
Socio-cultural services/facilities	Telecommunication facilities	2
	Post offices	1.5
	Halls/Artefacts	2.5
	Churches	1.6
	Mosques	2
	Other Religious centres	1.3
	Tourist Sites/festivals	2.2

Source: Fieldwork, 2015

rural areas of Okene, hand dug wells and polluted stream/river that could bring a lot of water borne diseases are the major sources of water in the area.

4.2 The Available Development Parameters in the Various Settlements and their Corresponding Ranks

This section highlights the various development parameters in each of the settlements according to the development indicators which are water, Agriculture, Commerce, Health, Education, Infrastructure, Institutions and Socio-cultural services/facilities. The ranks of the settlements are also established indicator by indicator based on the total points a settlement earned in a particular indicator as shown in Table 4.

4.2.1 Water

Pipe borne water is available in 26 settlements (47.3%) although the supply is neither adequate nor constant. Boreholes and wells are also common in most of the settlements (87.3%), they are the most readily available and reliable sources of water for the people. Settlements such as Ageva, Ohugeri, Ozumi, Idoma, Abuga, Onyioto, Bariki, Idabami and Ozuwaya have access to water from the river flowing through or near them. Agassa, Etahi, Ozumi, Iruvucheba and Inike have higher ranks because of the various and several water facilities in them especially Boreholes and Wells, while settlements like Ukako, Osiva, Inozi, Idivaju and Iruvada have the lowest ranks because of little or absence of any source of water within the settlement.

4.2.2 Agriculture

Irrigation facilities, Processing facilities and Storage facilities are the parameters used in ranking the settlements. There is no difference or specialty in the agricultural facilities or activities in almost all the settlements, only three settlements (Abuga, Onyioto and Eika Oku) out of the fifty five settlements of study practices irrigation farming. Processing facilities such as cassava-processing mills and corn mills are only available in Ageva and Oguda, the high intensity of farming in these settlements could be a factor that necessitates the presence of the processing mills. Storage facilities (constructed or improvised) for yam barns and grain stacks in various farms and community warehouses are present in all the settlements (96.4%) except Idivaju and Idoji. Onyioto, Eikaoku, Oguda and Ageva rank higher in agriculture while Idivaju and Idoji rank lowest.

4.2.3 Commerce

The people attached much importance to Periodic markets than the daily and street markets because of the high volume of sales and variety of products on the market days, only six settlements (11%) provide periodic market services. Agassa, Idoji, Ozumi, Bariki and St. Andrew rank higher in the provision of commercial services and facilities, while nine settlements (16.4%) namely Idaviju, Iruvadah, Odenku, Abochehe, Irigoni, Inozi, Oriadobe, Idapokiti and Idochi provide no commercial services or facilities.

4.2.4 Health

The identified health facilities in the study area are General/Specialist hospitals, Clinics/Private hospitals, Maternity/Primary Health Centres, Dispensaries and Patent Medicine Stores. Two settlements (Ageva and Idare) have general hospitals. About 60% of the settlements (32 of them) have a clinic, a private hospital or maternity/primary healthcare in them. There are no health facilities in over 20 settlements (40%) in the study area. Ageva, Agassa, Oguda, Ohiana and Enyinare are the foremost settlements in the provision of healthcare services.

4.2.5 Education

There is the presence of either a nursery or primary school in virtually all the settlements (over 80%) while 45.5% of the settlements are having either having a junior or a senior secondary school. There is no any educational facility or service in Idivaju, Iruvadah, Enyiruwa, Inata, Irigoni, Onyioto, Idiche and Idishehu.

4.2.6 Infrastructure

There is a good network of street roads in all the settlements but its only 38.2% of the settlements that have collector roads that could connect them to other types of roads (arterials and highways) and other places. 43 settlements (78.2%) have steady electric power supply, there is also a good drainage system in over 78% of the settlements. Apart from street roads, electricity and drainages, there is a general low level of infrastructural development in the rural areas of Okene especially in settlements like Okekere, Idivaju, Iruvadah, Ohuda, Inata, Irigoni, Oriadobe, Ukako, IdukaII and Idapokiti.

4.2.7 Institutions

The institutional facilities and services in the study area are Courts, Police posts, Local/Zonal Government Offices, Skill Acquisition/ Empowerment Programmes, Agricultural Extension/Research facilities, Cooperative societies, Community Participation in development, and Microfinance Banks. Agassa, Idoji, Ozumi, Bariki and Ageva rank higher in the provision of institutional facilities and services while there are no such facilities or services in Idochi, Esomi, Idapokiti, Abochehe, Inata and Iruvadah. Community participation in development is a common thing in many of the settlements (over 76%). Community participations in development are in form of monthly/yearly contribution for a common project, individual sponsorship of a project and household contribution of man power to community projects.

4.2.8 Socio-cultural services and facilities

These services and facilities include Telecommunication facilities, Post Offices, Community Building/Halls/Artefacts, Churches, Mosques, Other Religious Buildings/Sites, and Tourist sites/Festivals found in the study area. The leading settlements in the provision of these services are St. Andrew, Agassa, Idabami, Ageva, Jimohmechoro, and Iruvucheba while Irayiapana, Okekere, Iruvadah, Inozi, Iruvukura, Osiva, IdukaII, Idapokiti, Esomi and Ohiana rank lowest in the provision of socio-cultural services and facilities. Town hall or community building and a popular annual festival known as 'echeanne' are the common socio-cultural facility and service in all the settlements.

4.3 Analysis of the Dominant Development Parameters that Determine the Rank Size of the Rural Settlements in Okene LGA

In determining the relationship that exist among the forty-six developmental variables that were used in the analysis, the variables were subjected to factor analysis and an m × m correlation matrix was computed to form the basis of the factor analysis. The correlation coefficients show that both positive and negative correlations among the variables. Notably among these are: Skill acquisition and empowerment having positive correlations among eighteen (18) variables (such as pipe borne water, boreholes, wells, small and medium scale industries, street markets, shops, schools, etc) which indicate the powerful influence of skill acquisition and empowerment as a major catalyst in bringing about development in the study area. Surprisingly, churches have a positive correlation among seventeen (17) variables especially between pipe borne water, stores, private hospitals/clinics and skill acquisition and empowerment; this can be attributed to the fact that churches through their humanitarian services directly or indirectly influence the existence or development of those variables. Also, arterials and collector roads have positive correlation among 10 and 11 variables respectively especially between storage facilities, street markets, shops/stores, schools, highways, small and medium scale industries. This highlights the importance of good and accessible roads in the development of the rural areas. Other significant variables having positive correlation among several variables are the schools (senior secondary schools -11, junior secondary schools -9 and Nursery/primary schools -12) having positive correlations between wells, small and medium scale industries, street markets, shops, clinics, maternity, dispensaries and patent medicine stores. The cooperative societies have 10 positive correlations, zonal government offices 9, shops/stores 7, clinics 7, electricity 6 and so on.

In addition, it was also observed from the correlation table that there were high positive correlation coefficients between some pairs of variables such as boreholes and wells (0.796), skill empowerment and wells (.801), agricultural extension and processing facilities (0.701), skill empowerment and small scale industries (0.799), nursery/primary schools and street markets (0.734) and between churches and shops/stores (0.775), all these shows the importance of these parameters in bringing about development in the study area. The forty-six developmental variables were further put through factor analysis, after vari-max rotation only 14 developmental factors dominated the explanation of the variance in the hierarchical order of settlements in Okene LGA. Variables with loadings greater than 0.70 were selected as defining variables; this helped in overcoming the problem of naming the components. The results of the factor analysis after vari-max rotation show fourteen underlying factors. These fourteen factors altogether gives 78.54% in the explanation of the variance in the development parameters of rural settlements in Okene LGA (see Tables 5 and 6).

Table 4. Points and ranks of the settlements from the development indicators

Settlements	Water		Agriculture		Commerce		Health		Education		Infrastructure		Institutions		Socio-cultural		
	Points	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank	
Ageva	20.9	6.5	5.2	4.5	19.9	6	20.9	1	25.3	4	14.7	16	19.8	5	11.8	3.5	46.5
Ozuja	15.9	12.5	2.3	29.5	2.3	36.5	8.9	11.5	16.2	12	16.4	10	13.7	13	10.3	15	140
Ohugeri	9.9	22	2.3	29.5	9.6	15	10.6	6.5	18.6	7	13	22	7.7	22.5	10.3	15	139.5
Ozumi	28.5	3	2.3	29.5	28.6	3	8.9	11.5	17	10.5	14.7	16	22	3	10.3	15	91.5
Idoma	13.3	17	2.3	29.5	6.1	21.5	3.9	26	18.3	8	16.4	10	11.2	15.5	10.3	15	142.5
Onyiobankere	3.4	43	2.3	29.5	4.6	25	0	44.5	10.2	21	11.3	29	6.1	27	8.7	34	253
Irayiapana	3.4	43	2.3	29.5	2.3	36.5	0	44.5	11.4	18	11.3	29	4.2	36	6.7	49.5	286
Okekere	3.4	43	2.3	29.5	2.3	36.5	0	44.5	8.6	23.5	6.9	48	4.2	36	6.7	49.5	310.5
Arigo	15.9	12.5	2.3	29.5	6.1	21.5	5.6	19	17.6	9	16.4	10	7.7	22.5	8.7	34	158
Upogoro	13.5	17	2.3	29.5	4.6	25	5.6	19	13.2	16	13.4	21	15	9	8.7	34	170.5
Idivaju	0	53.5	0	54.5	0	51	0	44.5	0	51	3.9	54	4.2	36	4.7	55	399.5
Iruvadah	0	53.5	2.3	29.5	0	51	0	44.5	0	51	3.9	54	0	52.5	6.7	49.5	385.5
Odenku	5.9	32	2.3	29.5	0	51	3.9	36	5.8	30.5	11.3	29	4.2	36	8.7	34	278
Ohuda	3.4	43	2.3	29.5	16.6	8	0	44.5	2.8	42.5	6.9	48	4.2	36	10.3	15	266.5
Enyiruwa	7.6	28.5	2.3	29.5	2.3	36.5	0	44.5	0	51	11.3	29	4.2	36	8.7	34	289
Inata	3.4	43	2.3	29.5	2.3	36.5	0	44.5	0	51	6.9	48	0	52.5	8.7	34	339
Abuga	5	33	5.4	29.5	10.8	13	1.7	33	7.1	28	11.3	29	3.5	37	10.3	15	217.5
Abochehe	3.4	43	2.3	29.5	0	51	0	44.5	5.8	30.5	6.9	48	0	52.5	8.7	34	333
Irigoni	3.4	43	2.3	29.5	0	51	0	44.5	0	51	6.9	48	4.2	36	8.7	34	337
Inozi	0	53.5	2.3	29.5	0	51	0	44.5	2.8	42.5	8.3	39.5	4.2	36	6.7	49.5	346
Onyioto	1.6	51	5.4	2	4	28	0	44.5	0	51	14.7	16	7	26	8.7	34	252.5
Eikaoku	11	20.5	5.4	2	8.4	17.5	0	44.5	17	10.5	20.9	2	11.2	15.5	8.7	34	146.5
Bariki	20.9	6.5	2.3	29.5	23.1	4	10.6	6.5	2.8	42.5	11.3	29	21.4	4	10.3	15	137
Ahosochi	12.5	18.5	2.3	29.5	2.3	36.5	3.6	30.5	0	51	11.3	29	4.2	36	10.3	15	246
Iruvucheba	26.9	4	2.3	29.5	14.5	9	8.9	11.5	13.2	16	19.2	4.5	14.7	10.5	11.6	5.5	90.5
Badoko	9.1	23	2.3	29.5	4.6	25	5.3	22	5.6	35	11.3	29	4.2	36	10.3	15	214.5
Idiche	4.9	34.5	2.3	29.5	2.3	36.5	0	44.5	0	51	8.3	39.5	4.2	36	8.7	34	305.5
Old national bank	8.3	25.5	2.3	29.5	4.6	25	5.3	22	2.8	42.5	14.7	16	7.7	22.5	8.7	34	217
Iruvukura	8.3	25.5	2.3	29.5	2.3	36.5	0	44.5	5.8	30.5	11.3	29	4.2	36	6.7	49.5	281
Idishehu	8.3	25.5	2.3	29.5	6.9	19.5	5.3	22	0	51	19.2	4.5	17.5	8	8.7	34	194
St. Andrew	20.1	8	2.3	29.5	21.4	5	7	17	13.2	16	20.9	2	14.3	12	11.9	1.5	91
Jimohmechoro	15.9	12.5	2.3	29.5	13.2	10	5.6	19	5.6	35	14.7	16	9	18	11.6	5.5	145.5
Odinga	4.9	34.5	2.3	29.5	11.5	12	3.6	30.5	10.2	21	11.3	29	3.5	47	10.3	15	218.5

Settlements	Water		Agriculture		Commerce		Health		Education		Infrastructure		Institutions		Socio-cultural		
	Points	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank	Points	Rank	
Idabami	16.6	11	2.3	29.5	6.9	19.5	0	44.5	4.6	48	14.7	16	8.3	19	11.8	3.5	191
Ozuwaya	20	9	2.3	29.5	8.6	16	9.2	8.5	8.4	26	20.9	2	11.2	15.5	10.3	15	121.5
Ukowa	3.4	43	2.3	29.5	1.5	45.5	0	44.5	8.4	26	8.3	39.5	3.5	37	8.7	34	299
Oriadobe	3.4	43	2.3	29.5	0	51	0	44.5	2.8	42.5	6.9	48	3.5	37	8.7	34	329.5
Ukako	3.4	43	2.3	29.5	2.3	36.5	0	44.5	2.8	42.5	6.9	48	3.5	37	8.7	34	315
Osiva	0	53.5	2.3	29.5	2.3	36.5	0	44.5	10.2	21	8.3	39.5	4.2	36	6.7	49.5	310
Iduka I	8.3	25.5	2.3	29.5	2.3	36.5	3.9	26	5.8	30.5	8.3	39.5	4.2	36	10.3	15	238.5
Agassa	34.5	1	2.3	29.5	37	1	20.5	2	44	1	19.1	7	26.8	1	11.9	1.5	44
Idukokoro	12.5	18.5	2.3	29.5	4.6	25	3.9	26	8.4	26	8.3	39.5	7.7	22.5	10.3	15	202
Idoji	19.3	10	0	54.5	32.1	2	8.9	11.5	35	2	19.1	7	25.2	2	10.3	15	104
Inike	23.5	5	2.3	29.5	19.3	7	9.2	8.5	26.2	3	19.1	7	14.7	10.5	10.3	15	85.5
Etahi	31.1	2	2.3	29.5	8.4	17.5	7.5	15.5	21.6	6	14.7	16	18.2	7	10.3	15	108.5
Enyinare	3.4	43	2.3	29.5	12.7	11	11.1	5	5.6	35	11.3	29	7.7	22.5	10.3	15	190
Iduka II	6.8	30.5	2.3	29.5	2.3	36.5	7.5	15.5	5.6	35	6.9	48	4.2	36	6.7	49.5	280.5
Idapokiti	3.4	43	2.3	29.5	0	51	3.9	26	5.6	35	6.9	48	0	52.5	6.7	49.5	334.5
Esomi	3.4	43	2.3	29.5	2.3	36.5	3.6	30.5	8.6	23.5	8.3	39.5	0	52.5	6.7	49.5	304.5
Oguda	11	20.5	5.2	4.5	10.1	14	15.3	3	24.9	5	14.7	16	18.4	6	8.7	34	103
Ohiana	7.6	28.5	2.3	29.5	2.3	36.5	11.4	4	16	13	8.3	39.5	7.7	22.5	6.7	49.5	223
Idogido	6.8	30.5	2.3	29.5	1.5	45.5	3.6	30.5	11.2	19	14.7	16	11.2	15.5	8.7	34	220.5
Idochi	3.4	43	2.3	29.5	0	51	0	44.5	2.8	42.5	3.9	54	0	52.5	8.7	34	351
Idoboroja	3.4	43	2.3	29.5	2.3	36.5	0	44.5	2.8	42.5	11.3	29	4.2	36	8.7	34	295
Idare	15.9	12.5	2.3	29.5	2.3	36.5	7.9	14	14	14	11.3	29	4.2	36	8.7	34	205.5

Source: Fieldwork, 2015

Table 5. Rotated component matrix[a]

	Component													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Pipe borne	.375	-.149	.240	.500	.047	.140	.315	-.158	.149	-.257	.050	.165	.153	-.029
Boreholes	.715	.072	.025	.304	-.069	.260	.084	-.093	.092	-.118	.179	.200	-.053	.132
Wells	.780	.054	.145	.262	.016	.130	.138	-.021	-.049	.169	.110	.169	-.041	.080
Ponds dams	-.030	-.037	.001	.091	-.060	-.020	-.108	-.026	.868	.118	.047	-.018	-.033	.056
Rivers streams	.065	-.047	.449	.125	.346	.168	.180	.509	.362	.033	-.006	-.125	-.057	.041
Irrigation facilities	-.038	-.035	-.115	-.050	.004	-.014	.050	.874	-.029	.078	.030	.026	.004	.033
Processing facilities	.092	.789	.552	-.003	-.024	-.029	.004	.024	-.034	.036	-.045	-.021	.049	-.033
Storage facilites	-.214	.058	.048	.040	.010	.051	.163	.045	.015	-.033	.848	.024	.029	-.017
Small scale Ind	.791	.082	.232	-.005	.214	.285	-.001	.053	.008	.035	-.186	.122	-.006	-.004
Medium scale Ind	.749	-.100	-.104	-.052	-.054	-.132	.009	-.029	-.081	.076	-.285	.369	.017	-.021
Periodic mkts	.196	-.013	.332	.118	.490	-.068	.237	-.031	-.054	.109	-.388	-.187	-.042	-.389
Daily mkts	.000	-.024	-.048	-.067	.765	-.002	.110	.360	-.082	.042	.029	-.074	-.072	-.055
Street mkts	.674	.190	.096	.133	-.027	-.105	.163	.344	-.183	.065	.041	-.313	-.127	.095
Super mkts	.166	-.012	.005	.059	-.036	.945	.018	-.010	-.036	.023	.050	-.067	-.034	.014
Shops stores	.749	.025	-.024	.174	.221	.275	.235	.036	.069	-.070	.079	.049	.040	-.184
Gen Spec Hosp	.022	.019	.823	.139	-.075	-.027	.042	-.090	-.186	.101	.039	-.018	-.058	.088
Clinics Private Hosp	.547	.078	.343	.256	.168	.152	.197	-.112	-.085	-.005	-.165	.019	.271	-.235
Maternity PHCs	.370	.631	-.020	.214	-.105	-.199	-.217	-.087	.131	.018	.251	-.044	-.145	-.057
Dispensaries	.751	-.029	-.086	-.179	.036	-.132	-.178	-.040	-.060	-.034	.319	-.050	.073	.030
Patent Med stores	.489	-.125	.176	.377	.303	.277	.219	-.098	-.011	.133	.051	.026	.172	.168
Sen Sec Schs	.786	.308	.073	.102	-.055	-.141	.032	-.165	.111	.020	.001	-.117	.044	.078
Jun Sec Schs	.693	.133	-.032	.050	-.227	.107	-.193	-.004	-.014	.065	-.319	.045	-.117	-.122
Nur Pry Schs	.634	.103	.129	.481	-.175	-.051	.116	.109	-.210	.137	-.009	-.219	-.157	.121
Adult Informal	.039	.598	.402	.094	.058	-.084	.086	.466	-.060	.024	.029	-.122	-.060	.017
Highways	.047	-.014	-.192	.242	-.160	.401	.158	.189	.126	.131	-.073	.371	.395	.075
Arterials	.826	-.068	-.157	-.063	-.063	-.196	.070	-.090	-.019	-.138	-.223	-.146	-.044	-.008
Collector Rds	.511	.201	.086	.316	-.257	.137	.235	.206	.301	.138	-.012	.166	.273	.161
Street rds	.075	.018	.048	-.065	.062	.022	.004	.038	.040	-.049	-.031	.019	.026	.893
Ferry bridges	-.006	-.004	-.170	.581	-.142	.187	.215	.139	.281	.219	-.005	-.276	.135	.218
Electricity	.240	.072	.078	.649	.049	-.002	-.029	.187	.167	-.089	.119	.139	.093	-.119
Drainages	.209	.049	.061	.032	.052	.044	.769	.049	-.035	.245	.152	.074	.039	-.190
Courts	-.018	-.008	-.050	.068	.780	-.033	-.009	-.144	-.003	.079	.008	.047	.001	.109
Police Posts	.039	.760	-.173	.052	-.030	.524	.128	-.093	-.002	.024	-.030	-.006	-.006	.041

|	Component													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
LZ govt offices	.401	.457	.397	-.120	.372	-.101	.024	-.053	.273	-.029	.160	.251	.009	.017
Skill Acq Empowerment	.805	.056	.106	.194	.096	.121	.161	.169	.146	.092	-.172	.059	.130	.027
Agric Ext	.023	.939	-.072	-.015	-.006	-.022	.021	-.014	-.051	.029	-.012	.011	.004	.026
Coop Societies	.498	-.034	.403	-.004	-.034	.205	-.349	.041	.090	.131	.251	-.118	.426	-.022
Comm Participatio	.187	.101	-.001	.734	.084	.028	-.175	-.230	-.144	-.017	-.059	.093	.071	-.131
Microfin Banks	-.038	-.038	-.034	.135	-.038	-.060	.094	-.051	-.052	.038	.027	-.053	.910	.026
Telecomm Fac	.129	.024	.098	-.058	.106	.048	.638	.142	-.079	-.286	.070	.094	.117	.211
Post offices	.072	.107	.744	-.149	-.021	-.040	.093	.031	.487	-.061	-.024	.025	.021	-.061
Halls Artefacts	-.075	.030	.090	.071	.102	.057	-.160	.095	-.024	.676	-.001	.148	.016	-.052
Churches	.572	-.047	.072	.266	.229	.291	.334	.049	.153	-.274	.066	.060	-.033	-.153
Mosques	.181	.004	-.037	.294	.018	-.039	.130	-.020	.297	.450	.396	-.047	-.035	-.150
Other Religions	.103	-.026	-.009	.094	-.019	-.043	.122	-.027	-.033	.061	.033	.876	-.056	.033
Tourist sites festivals	.102	.030	.008	-.126	.035	-.001	.111	.013	.097	.707	-.054	-.049	.061	.024

*Extraction Method: Principal Component Analysis.*
Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 14 iterations

Table 6. Relative importance of factors with eigen values greater than 1.0

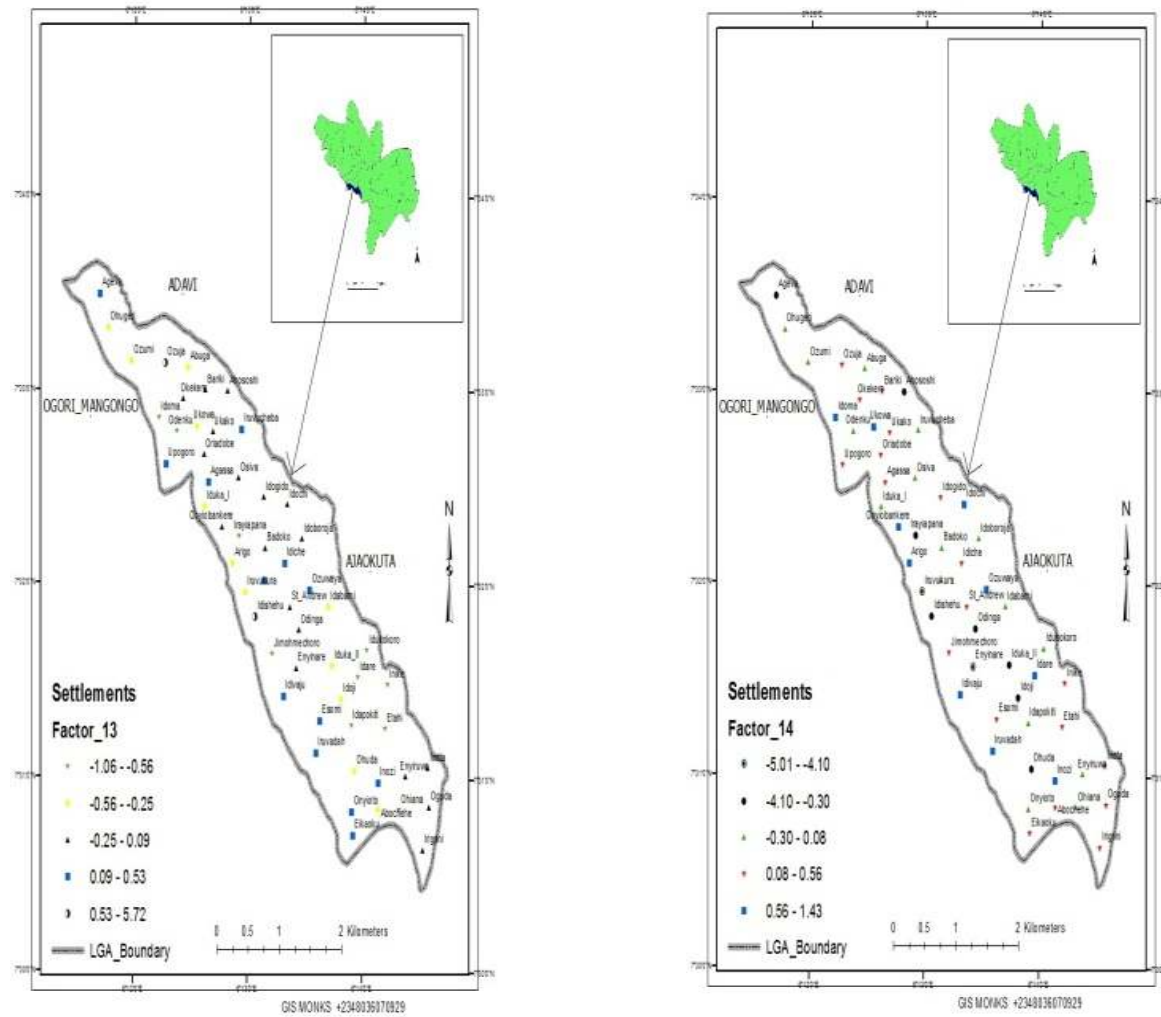| Component description	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
Eigen value	8.89	3.37	2.86	2.82	2.25	2.11	1.95	1.90	1.81	1.74	1.73	1.68	1.55	1.41
% variance	19.32	7.32	6.22	6.13	4.89	4.59	4.25	4.14	3.93	3.80	3.77	3.66	3.38	3.08
% Cum. variance	19.32	26.65	32.87	39.01	43.90	48.50	52.76	56.90	60.84	64.64	68.41	72.07	75.45	78.54
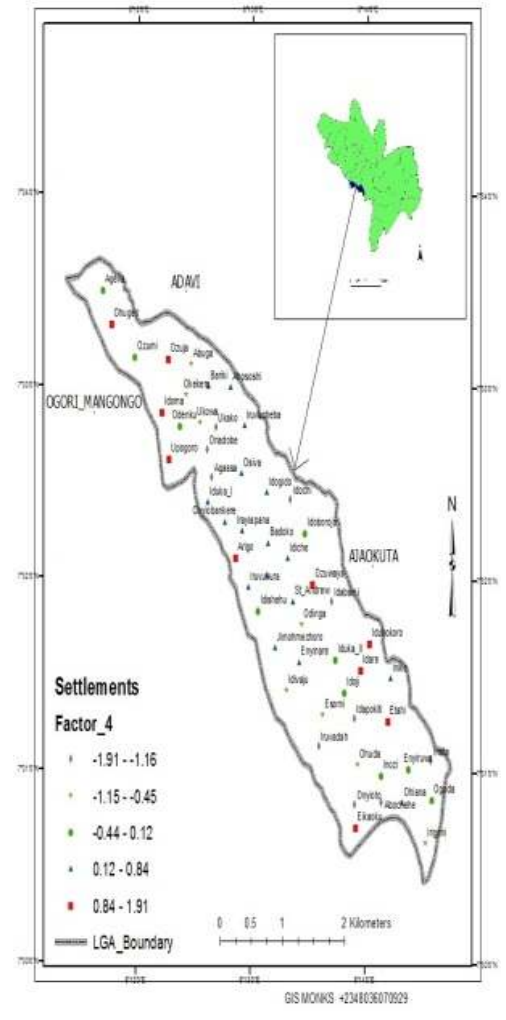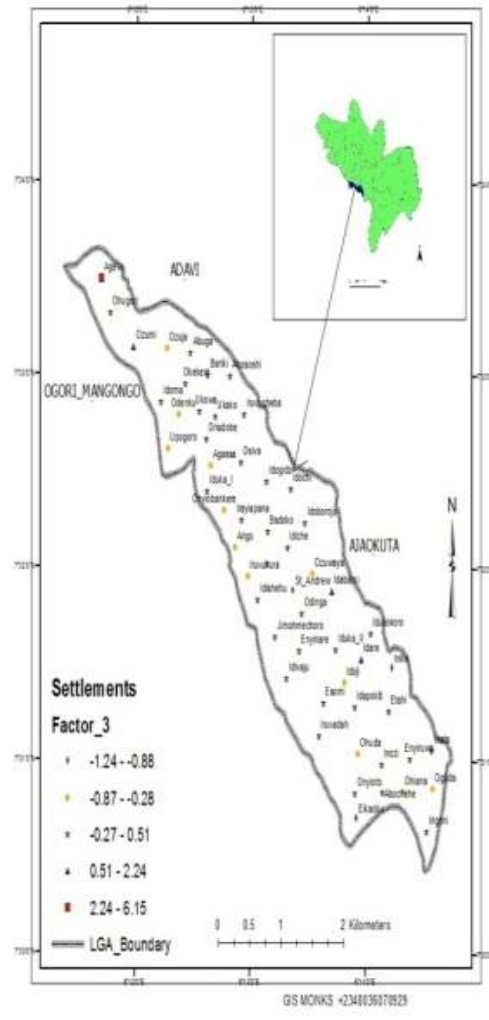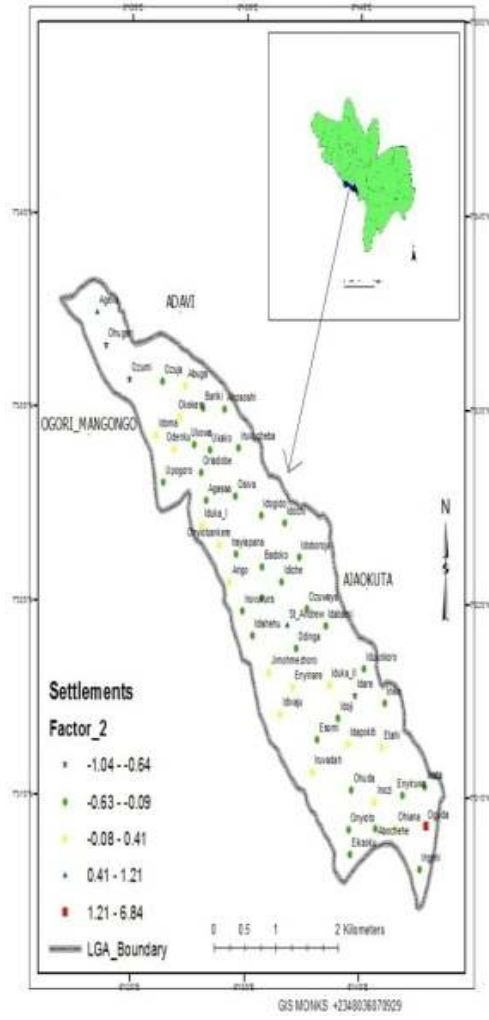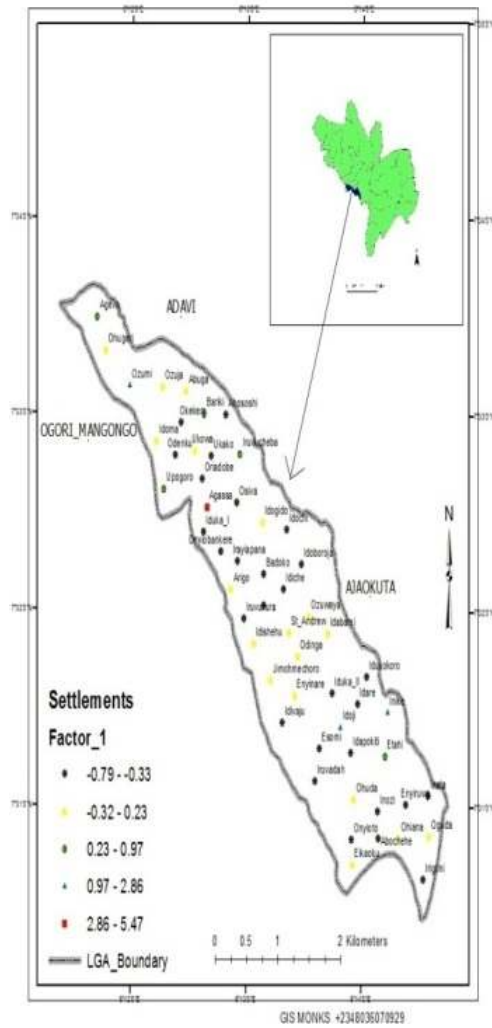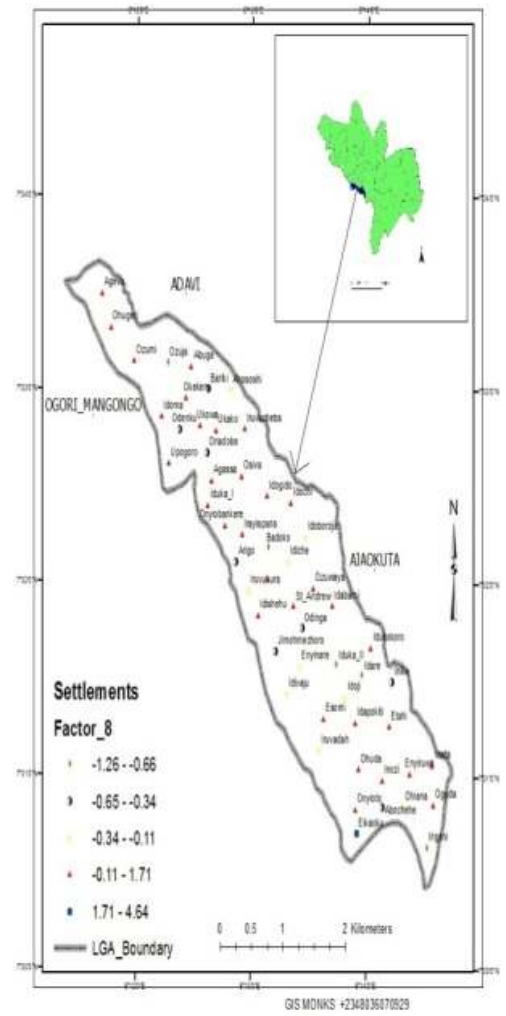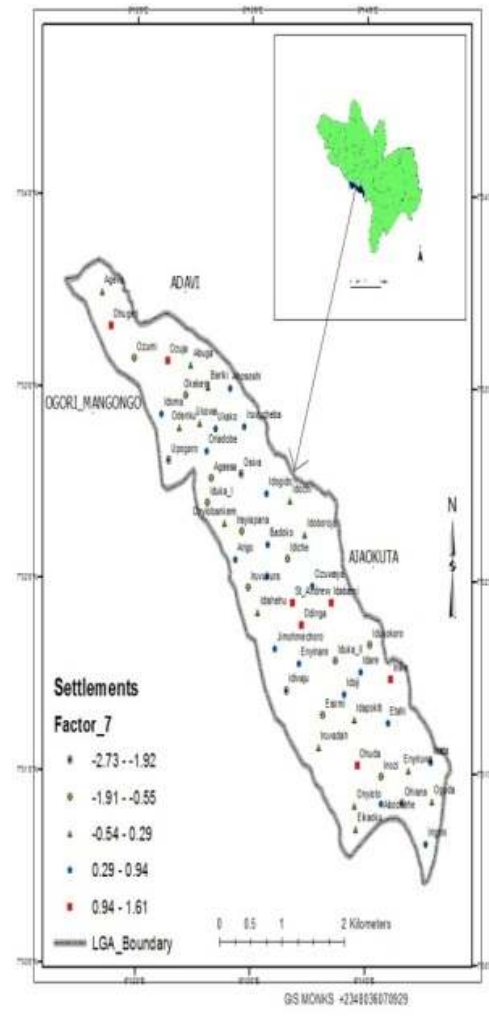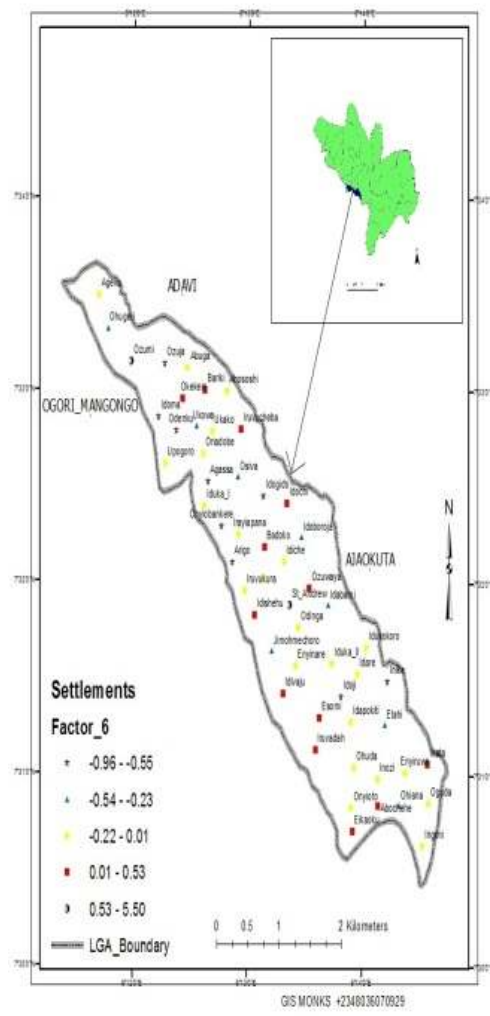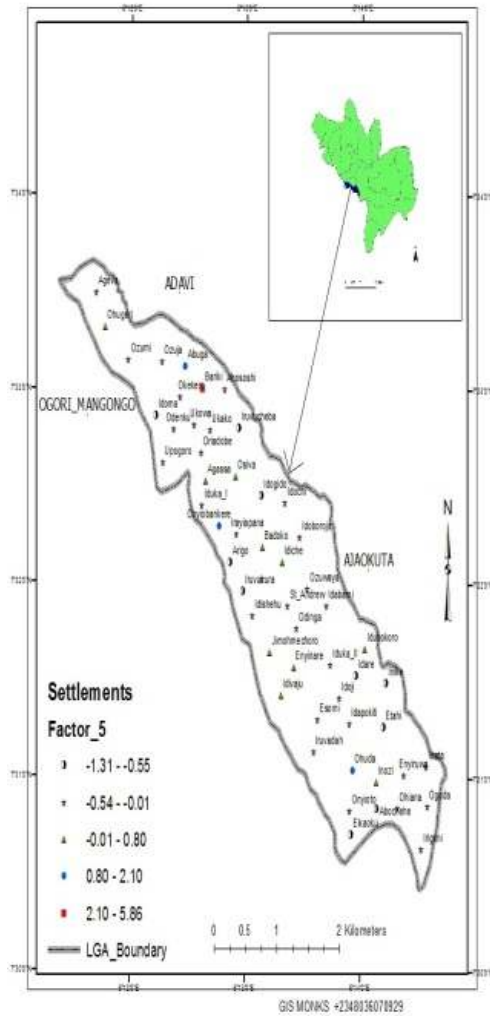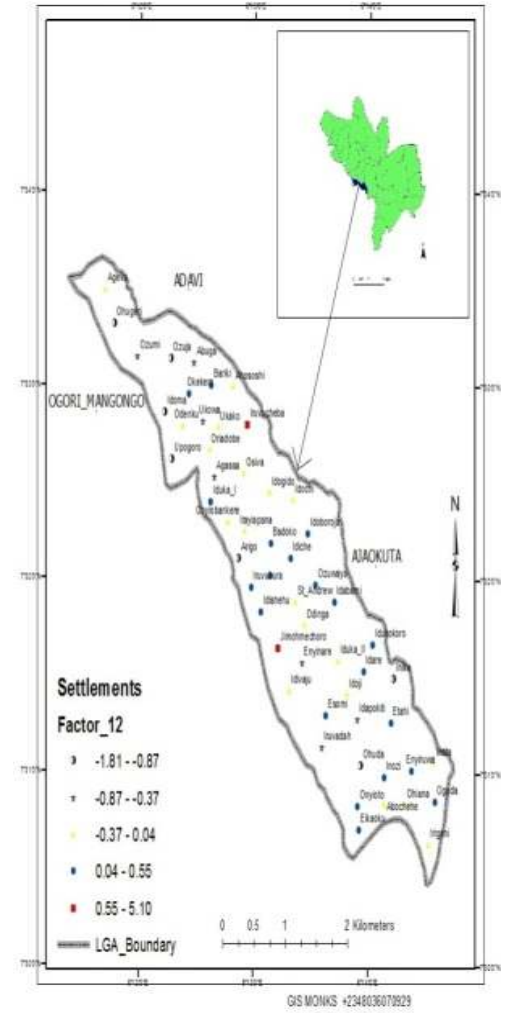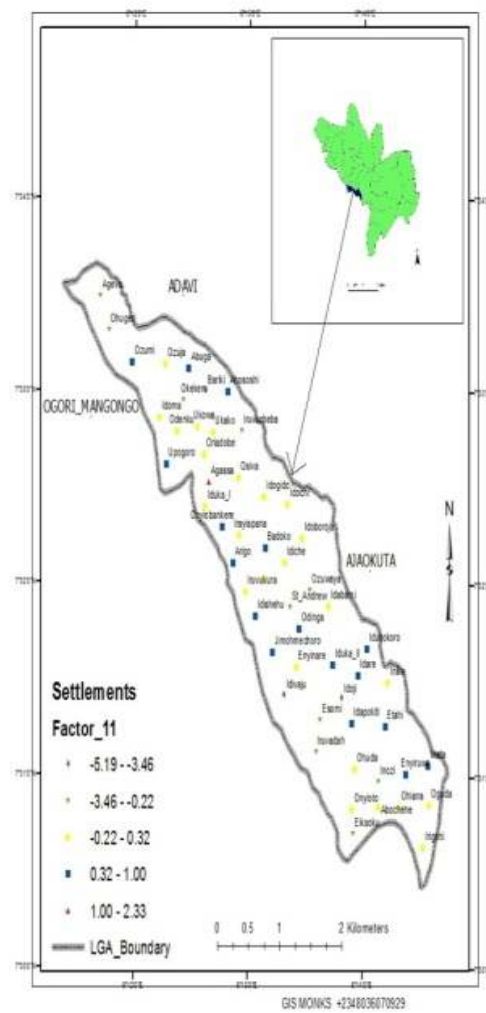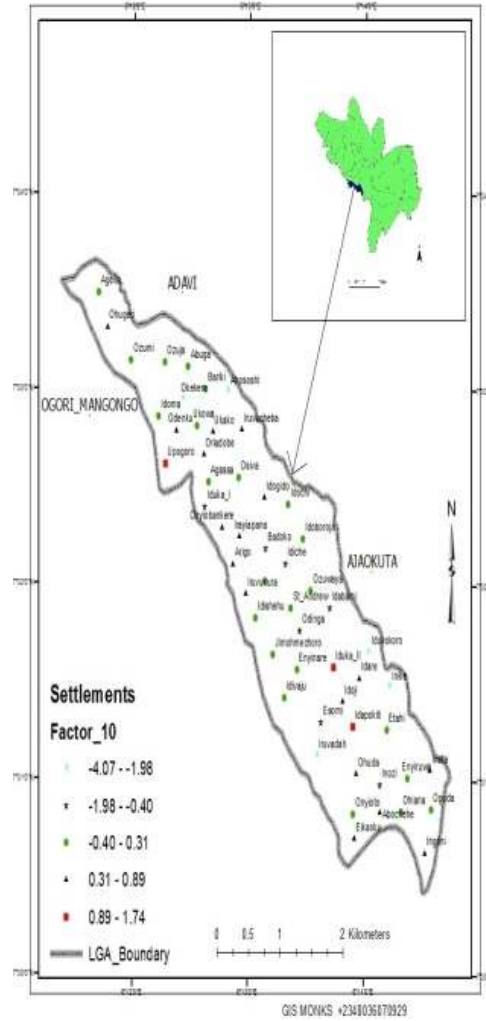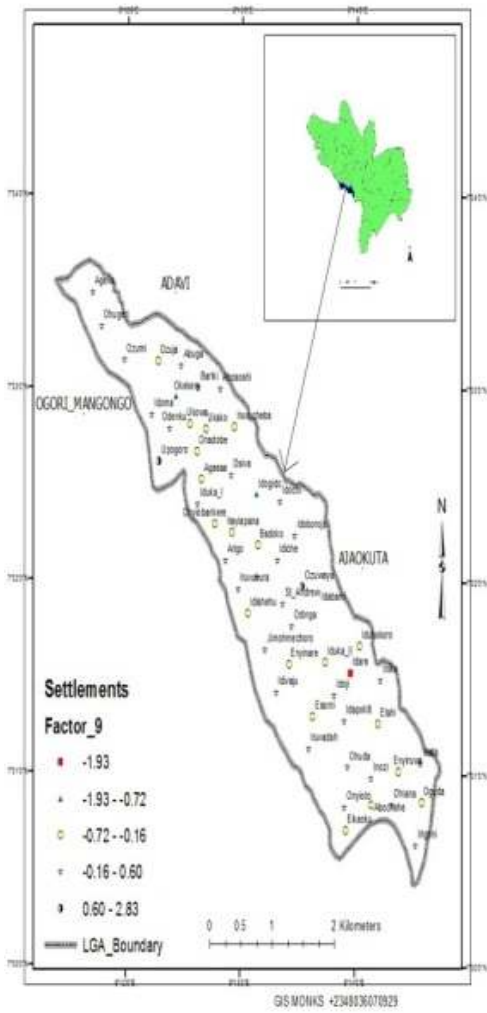
Fig. 2. Settlements' mean scores of the 14 developmental factors

Table 6 shows the relative importance of the first fourteen factors which together account for 78.54% of the total variance at a cut off value of 1.41 of the eigen values. The factors and their major loadings from the rotated factor loadings on Table 5 are: Factor I: Arterials (0.826) and Skill acquisition and empowerment (0.805), Factor II: Processing facilities (0.789) and Agricultural extension (0.939), Factor III: General hospital (0.823), Factor IV: Community participation (0.734), Factor V: Daily markets (0.765) and Courts (0.780), Factor VI: Supermarkets (0.945), Factor VII: Drainages (0.769), Factor VIII: Irrigation facilities (0.874), Factor IX: Ponds/Dams (0.868), Factor X: Tourist sites/Festivals (0.707), Factor XI: Storage facilities (0.848), Factor XII: Religion (0.876), Factor XIII: Microfinance banks (0.910) and Factor XIV: Street roads (0.893).

Factor I: This factor contributed 19.32% explanation to the variance and has an Eigen value of 8.89. In other words, arterial which is a factor of infrastructure and skill acquisition/ empowerment which is a factor of institution contributed highest to the explanation of the variance in the development parameters of settlements in Okene LGA. Factor I is named as physical and institutional infrastructure.

Factor II: This factor has an Eigen value of 3.37 and contributed 7.32% to the variance in the development parameters of settlements in Okene LGA. It has the highest loading on agricultural extension and processing facilities, it is named agricultural infrastructure.

Factor III: This factor has an Eigen value of 2.86 and explained 6.22% of the variance in the development parameters of settlements in Okene LGA. Factor III is named as health facilities.

Factor IV: The fourth factor community participation in development has the highest loading on community participation with an Eigen value of 2.82 and explained 6.13% of the total variation in the development parameters.

Factor V: The fifth factor is responsible for a total of 4.89% of the variance in the development parameters.

Factor VI: The sixth factor has the highest loading on super market with an Eigen value of 2.11 and explained 4.59% of the total variance and it is named as commerce.

Factor VII: It has the highest loading on drainage which is a factor of infrastructure and quality of the environment. It is named as quality of the environment.

Factor VIII: The eighth factor has the highest loading on irrigation facility and it is named as irrigation facilities.

Factor IX: This factor has an Eigen value of 1.81 and contributed 3.93% to the variance in the development parameters. It has the highest loading on ponds/dams which is a factor of water facilities and it is named as water facilities.

Factor X: The tenth factor has the highest loading on tourist site/festival which is a socio-cultural factor. Factor ten is named as socio-cultural services.

Factor XI: The eleventh factor has the highest loading on storage facilities with an Eigen value of 1.73, it is a factor of agriculture and it is named agricultural storage facilities.

Factor XII: It has the highest loading on religion which is a socio-cultural factor and is named as religious tolerance.

Factor XIII: The thirteenth factor has the highest loading on micro-finance bank with an Eigen value of 1.55 explaining 3.38% of the total variance in the development parameters. It is named financial institutions.

Factor XIV: It has the highest loading on street roads. It is named as accessibility of the settlements.

4.4 Spatial Pattern of the Developmental Parameters

Table 5 shows the rotated component scores of developmental variables responsible for variation in the development parameters of settlements in Okene LGA using the fourteen (14) identified factors as criteria. Table 6 shows that factor I (physical and institutional infrastructure) contributed highest to the variation in the development parameters of Agasa with a factor score of 5.70 and lowest to Inozi with a factor score of -0.79. Factor II (agricultural infrastructure) contributed highest to the variation in the development parameters of Oguda with a factor score of 6.84 and lowest to Idare with a factor score of -1.02. Factor III (health facilities) contributed highest to the variation in the development parameters of Agava with a factor score of 6.15 and lowest to Inikewith a factor

scores of -0.90. Factor IV (community participation in development) contributed highest to the variation in the development parameters of Idoma with factor score of 1.91 and lowest to Inata with a factor score of -1.80. Factor V (socio-economic facilities) contributed highest to the variation in the development parameters Bariki with factor score of 5.86 and lowest to Iruvukura with factor score of -0.80. Factor VI (commerce) contributed highest to the variation in the development parameters of St. Andrew with a factor score of 5.50 and lowest to Agasa with factor score of -0.41. Factor VII (quality of the environment) contributed highest to the variation in the development parameters Ohugeri with factor score of 1.61 and lowest to Ohiana with a factor score of -2.40. Factor VIII (irrigation facilities) contributed highest to the variation in the development parameters of Abuga with a factor score of 4.6 and lowest to Idare with a factor score of -1.30. Factor IX (water facilities) contributed highest to the variation in the development parameters of Idabami with a factor score of 4.90 and lowest to Idare with a factor score of -2.00. Factor X (socio-cultural services) contributed highest to the variation in the development parameters of Idapokitiwith a factor scores of 1.14 and lowest to Ahosochi with a factor scores of -4.07. Factor XI (agricultural storage facilities) contributed highest to the variation in the development parameters of Agasa with factor score of 2.30 and lowest to Idoji with a factor score of -5.00. Factor XII (religious tolerance) contributed highest to the variation in the development parameters of Iruvucheba with factor score of 5.10 and lowest to Ohugeri with factor score of -2.00. Factor XIII (financial institutions) contributed highest to the variation in the development parameters of Idishehu with a factor score of 5.70 and lowest to Idare with factor score of -1.10. Factor XIV (accessibility of the settlements) contributed highest to the variation in the development parameters of Idare with factor score of 1.43 and lowest to Iruvukura with a factor score of -4.1. All these fourteen factors revealed the underlying factors responsible for the variation in the development parameters of rural settlements in Okene LGA.The analysis of these major 14 factors across the study area is to portray the strength and weaknesses of each rural settlement in terms of development in order to inform the relevant government agencies and stakeholders in determining the areas the required developmental projects and to what extent.

4.5 Summary of Findings

On the available spatial distribution of the development parameters, it is noted that parameters such as pipe borne water is available in 26 settlements (47.3%) although the supply is neither adequate nor constant, boreholes and wells that are the most readily available and reliable sources of water for the people are also common in most of the settlements (87.3%), in agriculture, there is no difference or specialty in the agricultural facilities or activities in almost all the settlements. The people attached much importance to Periodic markets than the daily and street markets because of the high volume of sales and variety of products on the market days, only six settlements (11%) provide periodic market services in the study area. On healthcare, it is discovered that there are no health facilities in over 20 settlements (40%). Notably, there is the presence of either a nursery or primary school in virtually all the settlements (over 80%) while 45.5% of the settlements are having either having a junior or a senior secondary school. Apart from street roads, electricity and drainages, there is a general low level of infrastructural development in the rural areas of Okene especially in settlements like Okekere, Idivaju, Iruvadah, Ohuda, Inata, Irigoni, Oriadobe, Ukako, IdukaII and Idapokiti as also observed by [24], Town hall or community building and a popular annual festival known as *'echeanne'* are the common socio-cultural facility and service in all the settlements.

The analysis of the developmental parameters that were used in the study shows that forty-six (46) developmental variables were identified in the study area which were subjected to Principal Component Analysis (factor analysis), fourteen (14) development parameters dominated the explanation of the variance in the developmental parameters in Okene LGA, after vari-max rotation, variables with loadings greater than 0.70 were selected as defining variables to help in overcoming the problems of naming the components and bringing out the dominant parameters. The fourteen factors (namely infrastructure and institution, agriculture and institution, availability of health facilities, institution, institution and commerce, availability of super market, availability of infrastructure, availability of irrigation facilities, availability of water facilities, availability of tourist site, availability of agricultural storage facilities, cultural and religion, availability of micro-finance banks and availability of street roads) altogether

gives 78.54% in the explanation of the variance in the developmental parameters in Okene LGA.

5. CONCLUSION AND RECOMMENDATIONS

The knowledge of settlements distribution, functions and available infrastructures in the rural areas is very essential and important in the quest for sustainable rural development, with this research work, the government, planners, NGOs, academicians, researchers and other development stakeholders can plan and execute rural development programmes across Okene LGA and its environs knowing where to site such project for maximum service delivery. The government will also be able to plan positively for growth and development in more viable and sustainable settlements to avoid high levels of sporadic growth in smaller settlements. This will ensure that development is provided in areas with access to the widest range of essential services and facilities, thereby allowing an appropriate level of development that will protect or enhance essential services and facilities in existing settlements and also help to protect services and facilities in settlements that support a wider rural hinterland.

There are several suggestions and recommendations on rural development by different scholars, authors and researchers, but the ones made here are based on the findings of this research works to reflect the true nature of the study area and the developmental yearnings and requirements of the people in the rural areas of Kogi State. Considering the scarce and limited resources available for rural development and the very low level of development in some settlements such as Inata, Inozi, Idochi, Iruvadah and Idivaju, it is recommended that the people in these settlements be relocated and resettled in the more developed settlements and the conversion of their settlements for extensive and plantation (yams, plantains and grains) farming with adequate support from the government and extension workers. This will increase food production in the area in subsistence and commercial quantities, create employment and enhance rural development. The rural people of Okene should be duly involved in planning and implementation of developmental projects to ensure that what is provided for them is what they actually need. The areas of education, roads, mechanized agriculture, standard houses and human development should be focused on to bring about prompt and sustainable development in the area.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Daniels P, Bradshaw M, Shaw D, Sidaway J. An introduction to human geography: Issues for the 21th Century. 3rd Editio. Daniels P, Bradshaw M, Shaw D Sidaway J, Editor. London: Pearson; 2008.
2. Olayide SO, Falusi AO. Policies for rural development in Nigeria. In: National Seminary on Rural Development Kaduna, Nigeria. 1999;33–4.
3. Government N. National Economic Empowerment and Development Strategy (NEEDS). Abuja; 2004.
4. Onah OF. Organizational environment and time use at the Local Government Level; 1998.
5. Tobler WA Computer movie simulating urban growth in the detroit regions. Economic Geography. 1970;46(2):234–40.
6. Reginald GG. The nature of geographic knowledge. Annals of the association of American geographers. Published by Association of American Geographers. 2002;92(1):1–14.
7. Murray WE. Geographies of globalization. London and New York: Routledge/Taylor and Francis; 2005.
8. Igbokwe EM. Integrating rural knowledge systems in agricultural resources and development. Journal Research. 2001;1: 69-71.
9. Aderonmu JA. Poverty eradication in rural Nigeria: The role of local government. In: Conference on Empowerment of Rural People Organized by Charity Centre for Advancement and Rural Empowerment; 2007.
10. Omale I, Molem S. A survey of approaches to poverty alleviation and anassessment of previous programmes. In. Obadan M, Fajingbesi AA. and Uga EO. (eds). Integrating Poverty Alleviation Strategies into Plans and Programmes in Nigeria; 2003.
11. Ikotun A. Strategies for promoting Integrated Rural Development in Nigeria: Theoryand practice. Badagry: Matram; 2002.

12. Ogidefa I. Democracy and good governance: Nigeria's dilemma. African Journal of Polit Sci Int Relations. 2010;4(6):201–8.

13. Adedayo A. Spatial dimensions of rural development projects in Kwara State. In: Proceedings of Annual Conference of the Nigerian Geographical Association. 1983; 110–4.

14. Mutizwa-Mangiza, ND. and Helmsing, AHJ. (*Eds*). Rural development and planning in Zimbabwe. Athenaeum Press Ltd.; 1991.

15. Manyanhaire IO, Rwafa RJ, Mutangadura J. A theoretical overview of the growth centre strategy: Perspectives for reengineering the concept in Zimbabwe. Journal of Sustainable Development in Africa. 2011;13(4).

16. Okafor FC. The importance of tertiary services in the functional structure of rural settlements: A case study of Akwa-Nnewi Region of Nigeria. Niger Geogr. 1981;24: 131–40.

17. Idachaba FS, Olayide SO. Rural infrastructures and the small farmers in Nigeria: Problems and prospects. Integr Rural Dev. 1980;249–55.

18. Adedayo A. Spatial ecology of social deprivation in a rural Nigerian Environment. Int J Environ Stud. 1988;31: 45–53.

19. Jolayemi MB. Socio-economic Development of rural settlements in the formerirepodun LGA of Kwara State. University of Ilorin; 1992.

20. World development. World development report: Development and Environment. Washington, DC; 1993.

21. Afolayan GP. Community participation in urban infrastructure provision: The case of medium sized towns in Kwara State, Nigeria. University of Ilorin,Ilorin.; 2008.

22. Usman NA. Okene local government area. (Internet); 2011. Available:http://nuraabatemiusman.wordpress.com/constituency/okene-lga

23. Ismail NA. Hierarchical ordering of rural settlements using some development parameters in Okene LGA of Kogi State, Nigeria. University of Ilorin, Ilorin; 2015.

24. Age AI, Vihi SK, Adeiza OD. Assessment of rural and agricultural development projects in Okehi local government area of Kogi State, Nigeria. Asian Journal of Agricultural Tension, Economics & Sociology. 2015;9(1):1-11.

_____

Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/19042