Journal of Geography and Regional Planning

Full Length Research Paper

Hierarchy of market centres along the Volta Lake in Ghana: A regional development framework

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This study developed a hierarchical structure of the 43 market centres along the Volta Lake in Ghana using their essential characteristics and functional attributes. The functional composite indices used for classifying the market centres were computed using weighting techniques which were applied to resident population, access roads, marketing periodicity, some services of centrality and selected surrogates of market participation. Twenty eight (28) of the market centres fell in the lowest (6th) level of the market centre hierarchy and were located at varying intervals along the lakeshore. The two 1st and 2nd highest order markets were strategically located in the north of the lake region. The only market centre in the 3rd order was located in the south whereas the two markets of the 4th rank were in the midsection of the lake region. The study emphasized the importance of the market centres as service centres for the Volta Lake Region whose economy is essentially based on agriculture and fishing. The market centres were considered as 'naturally' occurring service centres capable of stimulating growth impulses in their catchment areas. The study recommended the adoption of the hierarchical order of the market centres as a workable framework for planning the development of the Volta Lake Region.

Key words: Market hierarchy, market centre, service centre, growth pole.

INTRODUCTION

Market places are designated sites where buyers and sellers meet to exchange goods and services (Scott, 1970; Douglas, 1975; McCarthy and Perreault, 1990; Schrimper, 2001). They are usually associated with settlements and could be small as periodic markets in villages or large daily markets in towns or cities, hence the notions of market centres or market towns (Hudson, 1976; Goodall, 1987). In a city, the market place could also be an imposing shopping mall or shopping-centre. Scott (1970) distinguished between traditional markets and shopping-centre systems. According to him, traditional markets are at the lower end of the trade-centre hierarchy and, until recent times have been the main retail outlets for food in much of Europe as they are in Africa and Asia. Such lower trade-centres serve agrarian-based peoples and are periodic, that is, trading activities at the centres are organised at regular intervals. Shopping-centre systems on the other hand refer to concentration of retail and shopping activities with large retail shops and department stores (Scott, 1970). In the modern context they can be described as planned shopping plaza with parking facilities (Berry et al., 1988). Scott (1970) contended that periodic and daily markets dominate the trade-centre hierarchy in Asia and Africa. By contrast, the developed world are characterised by shopping-centre systems that rarely incorporate traditional markets.

Market centres are essential in facilitating local ex-

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change of goods, promoting interregional trade and providing goods and services to the population within their respective market areas or economic regions (Ghosh, 1981; Berry et al., 1988). According to Scott (1970), market centres have throughout history been the principal vehicle of commercial exchange and interregional trade. In most countries of the developing world, market centres also serve as focal points of health delivery, local administration, political campaigns, religious programmes, information exchange and innovation diffusion, and entertainment (Addo, 1977; Udo, 1982; Gormsen, 1985; Wanmali, 1985; Alam et al., 1985). These are the political and socio-cultural functions of market centres which affect their spatial structure and organisation, enrich their functional status and distinctively define their importance (Dash, 2005).

In most parts of the developing world periodic markets centres constitute the lifeblood of social and economic activities in their respective catchment areas as they set the rhythm for the movement and convergence of people and goods (McKim, 1972; Good, 1975). They represent the hub around which the economic and social live of rural areas revolve and they have the potential of stimulating growth and development in their economic regions. But the degree to which they perform these functions vary according to the size or rank of the centre. Thus, market centres can be ordered based upon certain criterion or a set of criteria. According to McKim (1972), classification of markets is essential for understanding organisation of marketing activities and relationships between individual markets. Moreover, knowledge of market functions, organisation and overall status of markets is essential for planning future development of market centres and their economic regions.

This study therefore attempts a classification of the market centres along the Volta Lake in Ghana and examines how their status and functioning contribute to the urbanisation and development process in the Volta Lake region. There are 43 markets centres along the Volta Lake. The markets are varied in terms of size and additional functions of centrality that they perform and, for that matter, their degree of importance. It must be emphasized that majority of the markets along the Volta Lake are of recent origin compared to markets in other parts of the country since they emerged or were established after the formation of the lake in 1964. Therefore, their development and functioning provide an excellent illustration of the economic history and population dynamics of the lake region.

The study first provides some background literature on approaches to classification of market centres. Second, the study introduces the study area and study methodology. Third, the study highlights the essential characteristics of the market centres along the Volta Lake. Fourth the study develops a hierarchical structure for the markets and discusses their implications for the urbanisation processes in the lake region. Finally, the study concludes by discussing the relevance of the hierarchical structure of the market centres for service delivery and development of the Volta Lake Region.

Hierarchical arrangement and order of market centres

Under the "central place theory" by Walter Christaller (1933) (Baskin, 1966), market centres are central places whose prime function is the provision of a wide variety of goods and services to the dispersed populations within their respective ranges (Hudson, 1976). The range is the maximum spatial distance over which people are prepared to travel to obtain a particular good or service from the central place. Under the theory, settlements or market centres are arranged in a hierarchical order over a homogeneous economic region and providing goods and services appropriate to their ranks. The central place theory has been applied in several ways to explain observed regularities with respect to size, location, spacing, interdependence, and functioning of settlements and market/service centres (Tarant, 1967; Shonkwiler and Harris, 1996; Ishikawa and Toda, 2000; Mushinski and Weiler, 2002). According to Berry (1967), it provides the "theoretical base of much of urban geography and the geography of retail and service business".

A number of approaches have been suggested and applied in arranging markets in the hierarchical order. Mckim (1972) suggested that local people have general knowledge of the size and importance of markets in their own area and that their perception of markets can be obtained through interview. Mckim further suggested that such distinction among markets can also be achieved through observation during one or two visits to the markets. Based on the interview method Skinner (1964) identified five major types of markets in rural China with increase in importance up the marketing hierarchy: minor (incipient) markets, standard markets, intermediate markets, central markets and regional markets. Skinner's model of market hierarchy has been used by McKim (1972) in Northern Ghana, Trilsbach (1986) in the White Nile Province of Sudan and Lado in Maridi District of Sudan (1988).

Skinner's market typology characterises the highest order market, regional market, as supporting trading activities on daily basis (and may function both day and night) whereas minor market, which is at the lowest end of the hierarchy, has rather small threshold to have organized periodic marketing. Standard, intermediate and central markets function predominantly on periodic basis. Central markets usually enjoy strategic location on the transportation network and perform retailing and some wholesaling functions. Standard and intermediate markets are similar in terms of functions but the latter is associated with larger villages and small towns. They serve as bulking centres of produce from dispersed locations and starting point of vertical commodity flows.

Table 1. Features of markets in Skinner's hierarchical market typology.

Market category	Location	Dominant function	Nature of transaction
Minor	Village	• Commodity exchange between neighbouring villages	• "horizontal" (goods are of equal values)
Standard	Village	• Starting point for flow of agricultural and craft goods to higher markets. • Serves rural population with urban goods.	• Some degree of "vertical" exchange activity of higher order goods • Periodic
Intermediate	Large villages and small towns	• Similar as that of the standard market but has larger threshold.	• Larger vertical flows of higher order goods. • Periodic and some level of permanent trading.
Central	Strategic sites on transportation network.	• • Serves a large market threshold	• • Retailing and important wholesaling functions. • Periodic and permanent trading.
Regional	Larger central places, urban centres; regional cities	• Supports larger markets	• Functions day and night

They are also end-points for the distribution of a range of manufactured items. The essential characteristics of markets in the Skinner's market hierarchy can be summarised by Table 1.

The economic importance of markets also provides a basis for classifying them. The criteria in this case can be volume of activities at the centre which is reflected in the number of people patronising the market (buyers and sellers), number of traders and stalls, the amount or value of goods and services exchanged, and the extent of market's area of influence (Berry et al., 1988; Mckim, 1972). Berry et al. (1988) further indicated that the degree to which market centres possess or perform non-periodic tertiary activities and the variety of trading activities performed provide additional criteria for classifying them. According to Mckim (1972), though adoption of economic indicators yield definitive classification, it requires more time and resources. Addo (1988) adopted the following interrelated variables to develop a hierarchy of traditional markets in Manya-Krobo in Ghana: taxes or market tolls, number of settlements within the market's local area of influence, and number of vehicles visiting the market from its external sphere of influence.

According to Dash (2005), several authorities have employed both qualitative and quantitative weighting techniques for computing composite indices for establishing hierarchy of market centres and settlements, and for planning rural growth centres. This approach is based on the principle that, apart from their major marketing function, market centres perform other services which enrich their functional status and distinctively define their importance. Dash (2005) adopted this approach to establish a seven level hierarchy of market centres in Cuttack-Bhubanneswar in Orissa, India. The selected parameters of the market centres used were size of resident population, quality of access road, distance from nearest urban centre and market facilities including bus stop, railway station, water facility and electricity. The functional attributes were periodicity of market, and social service including education, health, post and telegraph and banking. Some of the parameters and attributes were further subdivided into sub-types. Dash (2005) computed the functional composite indices of the market centres by using the formula:

$FCI_J = \Sigma F_i W_i (i = 1.......n)$,
Where;
FCI_j is the functional composite index of the jth market centre,
F_i is number of units under the ith function/sub function,
W_i is weight of the ith function/sub function.

The approach adopted by Dash (2005) in classifying market centres suggests that, a variety of relevant parameters and attributes could be used under different circumstances to build the hierarchical order of market centres and settlements in general. Again, the derivation of the functional composite index lends itself to the application of the rank sum test. Hence, Kruskal-Wallis Test (SPSS v17) was used in this study to compute the mean rank scores of the market centres and the results used in deriving the hierarchical classes and order.
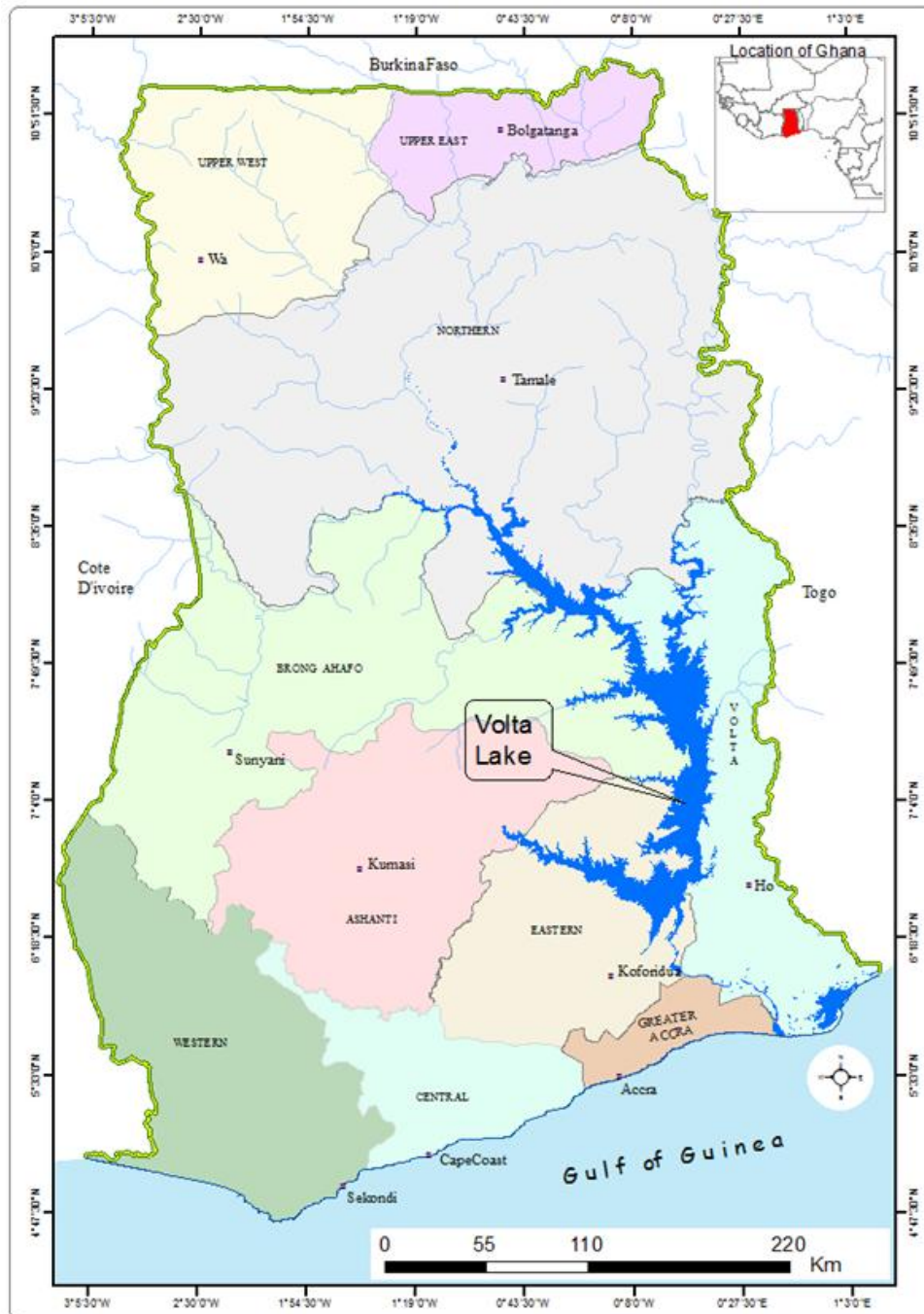
Figure 1. Map of Study Area (Volta Lake Shores) relative to the rest of Ghana.

THE STUDY SETTING AND METHODOLOGY

The Volta Lake is found in the east mid-section of Ghana (Figure 1). The lake was the result of the construction of the dam wall across the river's channel at Akosombo in 1964 for hydroelectric power generation. The lake is acclaimed to be one of the largest man-made lakes in the world. It covers a total area of about 8,500km^2, representing roughly 3.5% of Ghana's territory. From the dam wall in the south, the lake stretches for a distance of about 450km to Yapei in the North. It has a shoreline of 4,800km and its storage capacity is 152billion m^3 at full supply level (Diaw and Schimdt-Kallert, 1990; Kalitsi, 1999).

The Volta Lake region forms part of the middle belt of the country which falls largely within the forest-savannah transitional agro-ecological zone. The middle belt geographical region suffered from wars and slave raids in the

Table 2. Distribution of market centre by population classes.

Classes of population size	No. of Market centre	% of Total	Assigned weight
Above 15,000	1	3.25	6
10,000 – 15,000	1	3.25	5
5,000 – 10,000	3	7.00	4
2,000 – 5,000	12	28.00	3
1,000 – 2,000	6	14.00	2
Below 1,000	20	46.50	1
Total	43	100.00	

past. As a result the region is characterised by low population densities with few areas of high population concentration and limited number of towns of historical significance, such as Yeji, Prang, Kete (and Krachi) [Dickson and Benneh, 1995]. Since the formation of the lake however the region has attracted migrant farmers and fishermen in view of the vast agricultural lands and extensive fishing grounds of the Lake. There are over 1,500 settlements along the lake (Government of Ghana, 1995), 43 of which serve as market centres. Over the decades some of them have grown to become important transhipment points as well as service and administrative centres that possess the capacity to stimulate development in their respective catchment areas.

Generally, the middle belt of the country is rural. It is among the least developed parts of the country with low levels of literacy, limited access to health and educational facilities, as well as, safe water sources. Indeed, the region forms part of the rural savannah which contributes as much as 45.5% to national poverty (Ghana Statistical Service, 2000). Many places lack motorable roads (Dickson and Benneh, 1995). The Volta Lake therefore provides an important means of transport in the region in view of the massive inundations. The middle belt is noted for the production of a variety of basic food staples including yam, cassava, millet, guinea corn and beans (Dickson and Benneh, 1995; Titriku, 1999). The lake itself produces as much as 98% of the country's freshwater fish (Braimah, 1999). These items attract traders from urban consuming centres in the southern half of the country to the major market centres along the lake.

The study methodology involved on-the-spot visits to the market centres for the conduct of interviews and determination of the essential characteristics and functional attributes of the market centres through observation and market and traffic surveys. The characteristics of the market centres identified included the nature of access roads, number of days of continuous trading activities and number of permanent trading establishments. Other functional attributes of the market centres were types of services of centrality including health centres, schools and credit institutions. The average numbers of vehicles visiting the centres on market days both on-land and water, were determined and used as surrogates of market participation. Officials of the local

branches of the transport associations (Ghana Private Road Transport Union, Boat Owners and Operators Union) provided information on vehicular visits on market days during the peak and lean marketing periods, September to March and April to August respectively. The peak marketing period coincides with the season for harvesting farm produce. The populations of the centres were obtained from the 2000 Population and Housing Census of Ghana Report (Ghana Statistical Service, 2005). The above characteristics, attributes and variables were weighted to compute classes of aggregate composite index values of the market centres for establishing their hierarchical order.

Determining the hierarchy of market centres along the Volta Lake

It has already been mentioned that the 43 market centres along the Volta Lake are varied in terms of spatial and physical characteristics, size, level of market participation and additional functions of centrality that they perform.

Size of market centre

Size of market centre is taken to mean the resident population of the centre which largely influences types and volume of commodities traded at the market centre, both on market and non-market days, as well as, other services offered by the centre. On the basis of size, the market centres have been categorized into six groups as indicated in Table 2. Twenty (20) out of the forty three (43) market centres have resident populations of below 1,000. Only two (2) of the market centres have resident population of above 10,000. Based on the six population classes defined, population size has been assigned a six point weighting scale of one (1) as the lowest to six (6) as the highest.

Access road

The nature and quality of access road has been classified

using Ghana Highway Authority's classification scheme. These are: first class all weather asphaltic concrete mix road, second class bituminous paved surface road and third class unpaved feeder road (gravel or earth), which could be impassable during certain times of the year (Ghana Highway Authority, 2003). Five (5) of the markets are linked by first class road, two are accessible by second class road and the rest are linked by feeder roads. Road type or quality has been assigned a three-point weighting scale of one (1) as the least for feeder road, two (2) for second class road and three (3) for first class road.

Marketing periodicity

Marketing periodicity refers to the number of days of continuous trading activities. Three (3) of the market centres have three-days of trading, four (4) have two-days and thirty six (36) have one-day. The weighting scale for marketing periodicity is one (1) for one-day, two (2) for two-days and three (3) for three days.

Other services of centrality

Apart from the dominant marketing function, the market centres perform other services for the population in their respective areas of influence. The rank or level of services offered by the market centre distinctively defines its level of importance and status. The services under consideration here are education, health and banking. For banking, distinction was made between automated commercial bank, rural bank, agency of rural bank and credit union in that order. Similarly distinction was made between tertiary institution, and first and second cycle schools. With respect to health delivery services the sub-types were hospital, health centre and clinic, in line with Ghana Health Service's classification (Government of Ghana, 1996).

Other economic indicators

Some economic indicators were also considered for the hierarchical ranking of the market centres. First, the numbers of water and overland transport vehicles visiting the market centres on market days were taken as surro-gates of levels of market visitation. The water transport vehicles comprise canoes, small boats with low capacity outboard engines and bigger boats fitted with 2–3 usually 40 horse power outboard motors. All the boats are made of wood and the bigger ones carry passengers, ranging between 50-80, as well as all kinds of cargo. The Inland Waterways Division of the Ghana Maritime Authority (GMA) estimates the number of such non-conventional large wooden vessels operating on the lake to be 490

(GMA, 2007). Types of road vehicles visiting the market also reflect the quality of the road. For example, where the road leading to the market centre is of poor quality taxis find it difficult to ply this centre.

Second, the size of the resident population reflects the nature and number of permanent trading establishments and types of commodities they sell. The categories of trading establishments considered were shops in concrete and mud housing structures, and kiosks made of wood and metal container shops. These trading establishments sell mainly manufactured consumer goods (including alcoholic beverages). Distinction was made between pharmacy shops and retail chemical shops (popularly called drug store) in line with Ghana Pharmacy Council's classification (Government of Ghana, 1994). Fuel sales points were also considered and distinction was made between filling stations and surface tanks retail points.

Derivation of functional composite indices (FCI)

The parameters and the attributes of the market centres and their corresponding assigned weights and frequencies were organised in a table format as represented in Table 3. Only two market centres (Yeji and Mangoase), out of the 43, have been shown in Table 3 in view of lack of space. Using the weights and frequencies of the attributes and variables, the composite index values of the individual market centres were generated using SPSS, version 17. The aggregate composite index values of the market centres range from a low of 0.64 for Mangoaseto the highest value of 35.18 for Yeji (Table 3).

Applying the mean and standard deviation grouping technique (the sum of values of attributes and variables divided by the number of attributes, and their disper-sions), the market centres have been classified into six (6) hierarchical orders based on resident population (Table 2) which correlates positively with all the other variables. The six hierarchical classes and orders were determined by finding the range (highest index value, 35.18, minus the lowest index value, 0.64) and the diffe-rence divided by the predetermined population groupings of 6 to arrive at the class interval. The class interval was used to define the limits of the hierarchical classes. Statistically:

Range = Highest index value – Lowest index value
35.18 – 0.64 = 34.54
Class interval = Range ÷ Population classes
34.54 ÷ 6 = 5.76

Starting with the lowest index value of 0.64, the class interval (5.76) was added to obtain the upper limit (6.40) of the lowest (6th) hierarchical class and order. The upper limit of the (5th) hierarchical class was obtained by adding the class interval to the upper limit of the 6th hierarchical order (5.76 + 6.40 = 12.16). The procedure was

Table 3. Structure of frequency distribution and weighting scale for different attributes and variables of market centres.[*]

Parameter/Attribute	Sub-Type/Class	Score/Weight	Weights / Frequencies of Market Centres			
			Yeji	xxxx	xxxx	Mangoase
Attributes						
Road quality	Feeder	1				1
	Secondary	2				
	First class	3	3			
Periodicity	1 – day	1				1
	2 – days	2				
	3 – days	3	3			
Resident Population	less than 1,000	1				1
	1,000 –2,000	2				
	2,000 – 5,000	3				
	5,000 – 10,000	4				
	10,000 – 15,000	5				
	More than 15,000	6	6			
Services of centrality						
Financial services	Other (Credit Union)	5				
	Rural Bank Agency					
	Rural Bank	2				
	Commercial Bank	1				
Education	1st cycle	10				1
	2nd cycle	2				
	Tertiary					
Health Care Facility	Health Post	1				
	Clinic	1				
	Hospital	1				
Trading establishments						
Fuel Stations	Retail surface tanks	35				
	Filling station	3				
Pharmaceuticals	Chemical Shop	20				
	Pharmacy	1				
Consumer goods shops	Wooden kiosk/	182				
	metal containers	188				
Proxies of market participation						
Overland Transport Vehicles	Taxis	100				
	Mini buses	60				
	Buses	65				1
	Coaches	6				
	Trucks	35				
	Tractor-trailers	15				
Water Transport Vehicle	Large boats	105				2
	Small boats	70				1
	Canoes	65				10

Table 3. Contd.

Composite weight	35.18	0.64

*In view of limited space, the table shown here is in respect of only two market centres which have the highest and lowest FCI, and are the first and last respectively in the market hierarchy.

Table 4. Distribution of market centres by hierarchical classes and order.

Classes of functional composite index value	Hierarchical order	No. of market centres	% of total no.
29.44 – 35.18	1	1	2.3
23.68 – 29.44	2	1	2.3
17.92 – 23.68	3	1	2.3
12.16 – 17.92	4	2	4.7
6.40 – 12.16	5	10	23.3
0.64 – 6.40	6	28	65.1

Footnotes: Mean: 6.0872; SD: 6.87131; Max 35.18; Min, 0.64.

repeated successively to define the limits of the rest of the hierarchical classes as indicated in Table 4, which also shows the distribution of the market centres by hierarchical classes and orders.

Hierarchical and spatial distribution of market centres

Table 5 shows the individual market centres, their composite index values and their respective hierarchical orders. Figure 2 also shows the spatial distribution of the various levels of market centres at different sections of the lake. Twenty eight (28), representing nearly sixty five per cent (65.1%), of the market centres are classified as 6th order market centres. These are located at varying intervals along the entire profile of the lake and are therefore widespread in terms of their distribution. They are linked by feeder roads. They have relatively small populations (ranging between 64 and 202) and they attract market participants from their immediate locale. The period of brisk trading activities associated with these markets last not more than six (6) hours during the day.

The 1st and 2nd order markets are identified as Yeji and Dambai respectively. They are located on the southern shores of the lake in the northern section of the lake region (Figure 2). These sites are the end-points of the major north-south routes of the country that were cut off during the formation of the lake; Yeji is in the west and Dambai in the east. However, the road in the western corridor linking Yeji to the rest of the country is of a better quality than that in the east which is currently being upgraded. Both centres serve as district administrative

capitals in the predominantly rural north of the lake region and have the highest resident population figures: Yeji (18,593) and Dambai (13,768). Dambai has two days of continuous trading activities and Yeji has three days, which is indicative of the comparatively higher volume of trading activities, as well as, the importance of these market centres. The market yard at Dambai is the biggest (68,737.5 sq. m), and at the time of the research the district authority had secured a credit facility of GHC2m (two million Ghana Cedis), the equivalent of $1.4m, from the national workers' pension institution, the Social Security and National Insurance Trust (SSNIT), for market infrastructural development.

The two high order markets have local branches of the automated Ghana Commercial Bank. Yeji has two (2) additional rural banks and five (5) credit unions, whereas Dambai has one (1) rural bank. Each of the centres has a pharmacy shop in addition to many chemical shops (Yeji – 20 and Dambai – 6). Yeji has a hospital and Dambai has a clinic. Dambai has a college of education, one (1) secondary school and 9 first cycle schools, whereas Yeij has two (2) secondary schools and 10 first cycle schools. Additionally, they have many permanent trading establishments some of which undertake wholesaling in addition to the dominant retailing services that they offer to the resident population and other periodic market participants.

The 3rd order market is Akateng and 4th order comprises Tapa Abotoase and Dzemini. Tapa Abotoase is located in the mid-section of the eastern shores of the lake. Akateng and Dzemini are further south and closer to higher population centres of the southern part of the country. Tapa Abotoase is linked by the major trunk road in the eastern part of the country. Akateng is linked by a

Table 5. Individual market centres and their respective hierarchical orders.

Hierarchical order	Market centre	Composite weight index value	No. of market centres
1	Yeji	35.18	1
2	Dambai	24.29	1
3	Akateng	20.43	1
4	Tapa Abotoase	15.82	2
	Dzemini	12.14	
5	Buipe	11.11	10
	KeteKrachi	10.43	
	Ekye- Amanfrom	10.39	
	Kotoso	9.54	
	Sempoah	8.82	
	Damanko	8.32	
	Nketepa	8.21	
	KpandoTorkor	7.86	
	Prang	7.21	
	Foso	7.11	
6	New Kyiase	5.50	28
	Kabiti	3.86	
	Gulubi	3.43	
	Batorkope	3.39	
	Ngyari	2.89	
	Matemanu-Tornu	2.79	
	Bidi	2.75	
	AmankwaNsoanu	2.64	
	Parabo No. 1	2.64	
	Kitare	2.54	
	Makango	2.50	
	Boafri	2.46	
	Bladjai	2.40	
	Kejehu-Bator	2.32	
	LabolaboTornu	2.32	
	Dedeso	1.96	
	Kafaba N. 2	1.96	
	WusutaKpede	1.89	
	Hausakope	1.86	
	Tato Bator	1.79	
	Bruben	1.68	
	Dadoto	1.68	
	B-Zongo	1.57	
	Motorway	1.29	
	Katanga Tornu	1.25	
	Kpechu	1.11	
	DodiAsantekrom	0.93	
	Mangoase	0.64	
Total		260.9	43

third class road whereas Dzemini is accessible by a third class road. All the markets of the 3rd and 4th ranks of the market hierarchy together with Buipe, the first of the 5th order markets, have more than 2-days of continuous
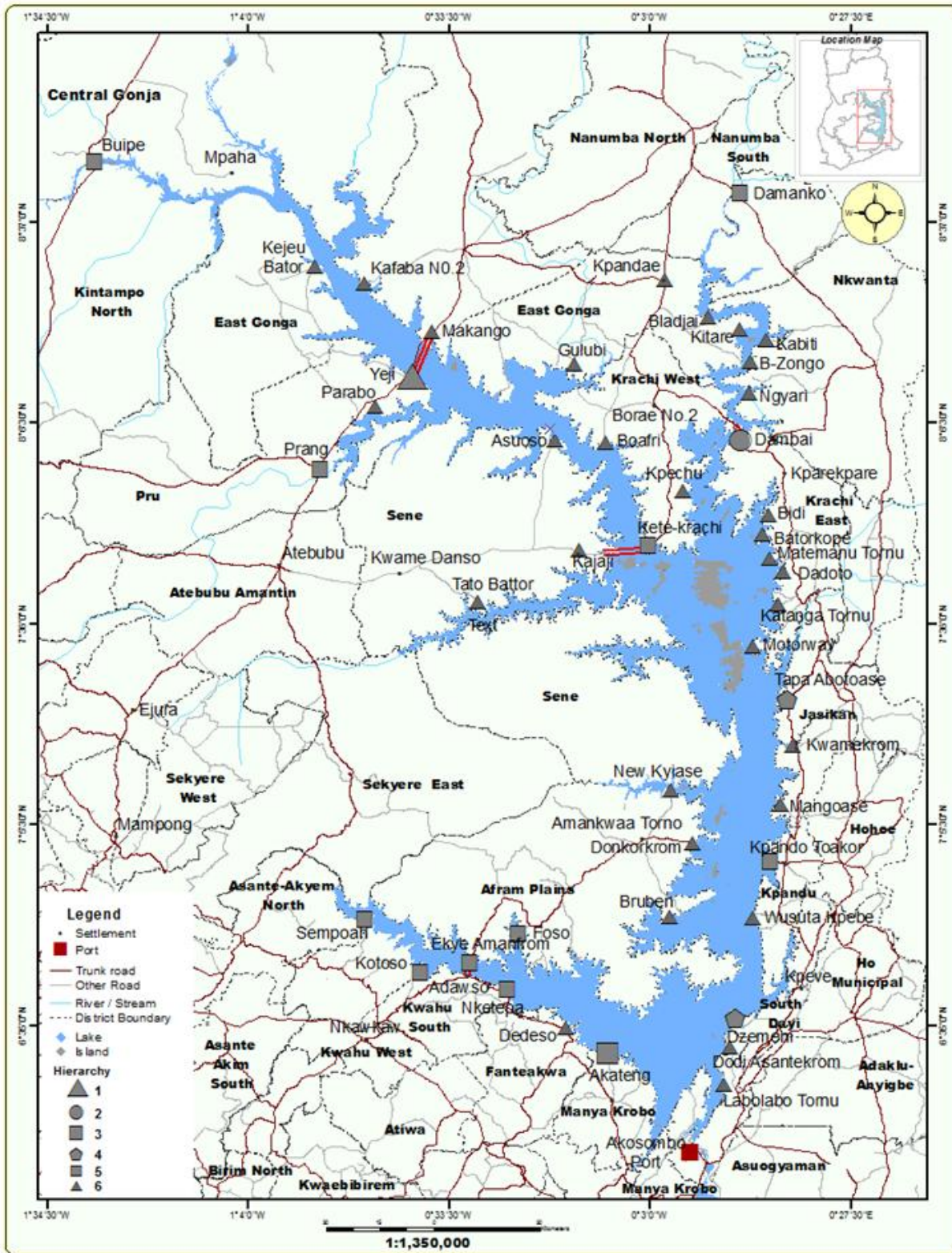
Figure 2. Spatial distribution of various levels of market centres.

trading. Buipe is the port in the northern section of the lake and on the second major trunk road linking the southern section of the country with the north. Buipe and Kete Krachi (the second of the 5th order markets) are also

administrative capitals.

The hierarchy of market centres as a regional development framework

The importance of market centres as service and growth centres has received attention from many scholars and development planners. For example, in his study of market centres in the agricultural region of Manya-Krobo in Ghana, Addo (1988) concluded that the market centres constituted a major factor in the urbanisation process of the region. Eighmy (1972) also explained how the local exchange function of some periodic markets in western Nigeria became more complex and their central functions increased which made them become "growth pole" or "service centres".

The "growth pole" as a regional development concept received great attention in the 1960s after its formulation by the French economist François Perroux in 1949 (Gantsho, 2008; Rossi, 2009). The theory was seen as an abstract conceptualization of a propulsive industry which demonstrated functional relations with other Industries and having the capacity to innovate and stimulate growth impulses in other sectors (Sharma, 1984; Rossi, 2009). It was concerned with firms and industries and their interrelations (Sharma, 1984) and was therefore criticised for the apparent exclusion of geographical space. Sharma (1984) attributes the spatialization of the growth pole theory to authors like Myrdal (1957), Hirschman (1958), Boudeville (1966) and Friedmann (1973) who emphasized the regional character of the economy. They explained that growth or economic progress does not occur everywhere at the same time and that once it has appeared there is spatial concentration of economic growth at the initial starting points through the operation of certain forces (Sharma, 1984; Carr, 2003). There is always unbalanced regional growth and that economic change starts in the advantaged region and spreads or trickles down to the lagging peripheral regions (Carr, 2003).

Hirschman (1958) used the terms 'growing points' and 'growing centres' instead of pole. He also used the terms 'polarisation effects' and 'trickle-down' effects to denote the processes of concentration of development at the initial point and spread effects in the lagging areas. Myrdal (1957) however used the terms 'spread' and 'backwash' effects in his cumulative causation model, which is analogous to trickle down and polarisation effects, and argued that there is the tendency for the polarisation forces to be stronger than the trickle-down forces. He explained that the spread of development in space through movement of labour, capital and goods favours the lucky region.

Friedmann (1973) referred to the major centres of innovation spread and high capacity of innovation change as core regions and other areas within the spatial system whose development path is determined mainly by core regions as peripheral regions. By virtue of their characteristics, cities and towns tend to be favoured as points of growth. Thus there is a hierarchical system of settlements which is held by their integration such that economic change transmits from higher orders to lower orders in the hierarchy.

The growth pole theory has been adopted and applied in various ways as a policy and planning tool in different regional contexts in both industrialized and developing countries to address regional imbalances but with mixed results. But many share the view that the concept is a relevant planning tool for accomplishing development in rural areas (Gantsho, 2008). Ertur (1984) contends that the practical conceptual parameters of the growth centre approach to regional development are limitless. Ertur (1984) distinguished between the "urban industrial growth pole" approach and "rural service centre-oriented" development approach. The latter is based primarily on rural horizontal settlement linkages and interdependencies whereas the former is based on urban industrial hierarchical system. Okafor (1986) emphasised that rural service centres are fundamentally important as they support a package of services for the surrounding villages and transmit growth impulses. The challenge therefore is how to design and implement growth centre strategy that would meet the spatial policy needs of developing countries (Sharma, 1986). In this respect, Okafor (1986) advocates for proper placement of rural service centres in the hierarchy of settlements.

One fundamental issue associated with the growth pole development strategy is the criteria for preferential selection of the growth centre(s). Within the context of agropolitan-transformational planning approach, the rural market centre settlement hierarchy is a more appropriate settlement level for realising the impact of infrastructural investment and providing the basic needs of majority of rural dwellers (Ertur, 1984). Market centres are naturally occur-ring growth poles - they are emerging urban centres - and therefore offer themselves as potential candidates for satisfying the criteria for selecting regional/local growth nuclei. According to Gantsho (2008), there is linkage between growth poles, economic growth and urbanisation Good (1975) argues that the performance of market centres as development nodes is "……related to their degree of articulation with their local hinterlands and with the urban centres, transportation networks, and organisational frameworks that compose the spatial system of which they are part".

The hierarchical structure of market centres along the Volta Lake indicates that the market centres perform different levels of functions for their hinterland areas based on their rank and status. As already noted above, the high order market centres have more functional attributes than the lower order markets. The high order markets are centres of comparatively higher populations. For example, Yeji and Dambai with populations of 18,593

Table 6. Population of market centres (1970, 1984 and 2000).

Market centre	Population			Intercensal % increase	
	1970	1984	2000	1970 - 1984	1884 – 2000
Yeji	5,485	11,144	18,539	103.00	67.00
Dambai	823	5,210	13,768	533.00	164.30
Akateng	1,403	2,229	2,983	58.90	33.80
Tapa Abotoase	1,093	1,918	4,193	75.50	118.60
Dzemini	353	920	3,403	160.62	269.90
Buipe	91	1,002	1,359	1001.10	35.60
KeteKrachi	5,097	6,353	9,285	24.60	46.20
Ekye-Amanfrom	-	1,883	4,975	-	164.21
Kotoso	134	590	2,138	340.30	262.40
Sempoah	23	576	2,954	2,404.40	412.90
Damanko	365	4,252	6,856	1,064.90	61.20
Nketepa	932	1124	3,299	20.60	193.50
KpandoTorkor	738	1,537	2,702	108.27	75.79
Prang	4,498	5,654	7,146	25.0	26.40
Foso	551	623	856	13.10	37.40
National	8,559,313	12,296,081	18,912,079	43.66	53.81

Sources: Ghana Statistical Service, (1989); Ghana Statistical Service, (2005).

and Dambai 13,768 respectively (GSS, 2000) are strategic urban centres in the middle belt of the country. Together with Buipe and Kete Krachi, they serve as administrative centres in the predominantly rural northern sector of the Volta Lake region. These centres have therefore received civil servants and benefited from the central functions that they perform.

The population trends of the market centres indicate that there have been remarkable increases over the years (Table 6). Between the periods of 1970-1984 and 1984-2000 the population of Yeji increased by 103 and 67% respectively. The corresponding figures for Dambai were 533 and 164%. Generally, the increases for the market centres were higher than the national figures of 54 and 44% (Table 6). The increases in populations of the market centres can largely be explained by their status as local business centres which make them attractive.

During the field survey, local government adminis-trators, officials of transport unions and marketing asso-ciations, opinion leaders, as well as individual market participants emphasized the importance of the market centres. They mentioned that increases in the resident populations of the centres have occurred concurrently with increase in the variety of commodities available for sale. Some of the permanent trading establishments sell a range of consumer durables including refrigerators, cooking stoves, television sets and other electrical appliances. At Yeji in particular vehicle spare parts were also on sale. The market centres have therefore given the local populations the opportunity to benefit from a wide variety of consumer goods. Increases in the resident populations of the market centres have also created

demand for locally produced foodstuffs as well as meat and fish. Again, farmers and fisher folks acquire agricultural inputs such as pesticides, fertilizers and seeds, and fishing gear at the market centres. These inputs are essential for the productive sectors of the local economy.

The necessity to exchange locally produced commo-dities at the market centres has led to the development of road networks which connect the markets to some of their hinterland communities. However with the exception of villages along the main road the quality of the roads are generally poor. The functioning of the market centres regulates movement of vehicles to production points in the hinterland. Similarly, the trip cycle of boats to commu-nities along the lake is dictated by the organisation of trading activities and functioning of the market centres. Thus, the socio-economic lives of the local people are organised around the market centres as they set the rhythm for the movement of goods and people (McKim, 1972; Good, 1975). The market centres also attract peo-ple, mostly traders, from their complementary urban consuming centres particularly in the southern half of the country.

CONCLUDING REMARKS AND POLICY SUGGESTION

This study has sought to examine the spatial charac-teristics, service functions and population dynamics of market centres along the Volta Lake. The study has emphasized the importance of the market centres as local business centres. The market centres link many

villages and therefore integrate them into the national economic system through commodity exchange, information flow and innovation spread. The market centres facilitate trading activities in the Volta Lake Region whose economy is essentially based on agriculture and fishing. Apart from their economic functions the higher order markets in particular offer additional services of centrality that make them attractive. They are therefore the drivers of the urbanisation process in the region. Indeed, the human geography and economic history of the Volta Lake Region cannot be understood without reference to the functioning of the market centres.

Theoretically, the dynamic development of market centres in the economic landscape, as explained by Eighmy (1972), Hodder and Lee (1977) and Berry et al (1988), is in response to increases in economic productivity, income and demand, population density and urbanisation, as well as, improved accessibility. There is linkage between market development, increase in service delivery and urbanisation. Within this context it is emphasized that the continuous functioning of many of the low order markets in the region will, to a large extent, depend on sustainable supply of farm produce and fish from their local catchment areas. It can be predicted that some of them, particularly those on the eastern shores (left bank) of the lake which are relatively closer to each other, will be submerged by more strategic ones and gradually phase out. This will happen when producer-sellers (fish mongers and farmers) and other traders take advantage of the more strategic markets and patronise them on a continuous basis.

With respect to the high order markets, they already enjoy strategic locations along the lake and will continue to grow along with increases in resident population, provision of social amenities and strengthened linkages with their catchment areas through improved accessibility. Indeed, they are modest growth poles and have become diffusion centres of modernisation and loci for the concentration of further innovation. They have the capacity of transmitting growth impulses to the lagging regions that they serve. However, in view of the peculiar characteristics and development challenges of the Volta Lake Region, a regional planning unit could be established that could adopt the hierarchical order of the market centres as a workable framework for planning the overall development of the region. The unit would ensure that the market centres provide more effective and efficient services to their resident population and those in their respective catchment areas using much tested urban and regional development principles.

REFERENCES

Addo ST (1977). "Rural-Urban Linkages in Development Planning in Ghana". Ghana Soc. Sci. J. 4(2):35-57.

Addo ST (1988). "Traditional Markets in the Development Process in ManyaKrobo in Ghana". Singapore J. Trop. Geogr. 9:1.

Alam SM, Begum D, Khair ABMA (1985). "Periodic Markets as Growth Centres in the Rural Hinterland of Metropolitan Hyderabad". In: ICRISAT (International Crops Research Institute for the Semi-Arid Tropics), 1985. Agricultural Markets in the Semi-Arid Tropics. Proceedings of the International Workshop held at ICRISAT Centre, India, Pantancheru, 24-28 Oct 1983 ICRISAT. pp.139-146.

Baskin CW (1966). Central places in Southern Germany by Walter Christaller. Prentice Hall, Inc. Englewood Cliffs: NJ.

Berry BJL (1967). Geography of Market Centres and Retail Distribution. Prentice–Hall, Inc. Englewood Cliffs, N. J.

Berry BJL, Epstein BJ, Gosh A, Smith RHT (1988). Market Centres and Retail Location. Prentice Hall, NJ.

Boudeville JR (1966). Problems of Regional Economic Planning. Edinburgh University Press.

Braimah LI (1999). "Management of Fisheries Resources of Lake Volta. In Gordon, C. & Amatekpor, J. K. (eds.). The Sustainable Integrated Resources of Lake Volta.Development of the Volta Basin in Ghana. VBRP, 1999.

Carr M (2003). New Patterns: Process and Change in Human Geography. Nelson Thorns Ltd. UK.

Christaller W (1933). Central Places in Southern Germany. Translation by C. W. Baskin, 1966, Prentice–Hall, Inc. Englewood Cliffs, N.J.

Dash N (2005). Hierarchy of Market Centres in the Rural Hinterland of Cuttachk-Bhubaneswar. Indian J. Reg. Sci. XXXVII(1):120-125.

Diaw K, Schmidt-Kallert E (1990). Effect of Volta Lake Resettlement in Ghana – A Reappraisal after 25 years. Institute for Afrika-Kunde, Hamburg.

Dickson KB, Benneh G (1995). A New Geography of Ghana. Longman Group (UK) Ltd. London.

Douglas E (1975). Economics of Marketing. Harper & Row Co. Ltd. New York.

Eighmy TH (1972). "Rural Periodic Markets and the Extension of an Urban System: A Western Nigeria Example". Economic Geography. Spatial Structure and Process in the Tropical West Africa. 48(3):229-315.

Ertur SO (1984). "A Growth-centre Approach to Agropolitan Development". Habitat Int. 8(2):61-72.

Friedmann J (1973)."A General Theory of Polarised Development", Urbanisation, Planning and National Development. Friedman, J. (Ed.). Sage Publications, Beverly Hills.

Gantsho MSV (2008). "Cities as Growth Poles: Implications for Rural Development". A Paper Presented on the Occasion of the Annual Meetings Seminar, Maputo, Mozambique. May 14-15, 2008.

Ghana Highway Authority (2003). Pavement Maintenance Management Programmes Manual. Ghana Highway Authority, Accra.

Ghana Maritime Authirity (2007). "Safety of Navigation of Non-convention Craft and Inland Water Ways Vessels" Report at a Conference organised by the GMA and International Maritime Organisation, Accra, Oct. 2007.

Ghana Statistical Service (1989). 1984 Population and Housing Census of Ghana. Ghana Statistical Services, Accra.

Ghana Statistical Service (2000) Poverty Trends in Ghana in the 1990's. Ghana Statistical Services, Accra.

Ghana Statistical Service (2005). 2000 Population and Housing Census of Ghana. Ghana Statistical Services, Accra.

Good CM (1975). "Periodic Markets and Travelling Traders in Uganda". Geogr. Rev. 65(1):49-72.

Goodall B (1987). Dictionary of Human Geography. Penguin Books Ltd. Middlesex, England

Gormsen E (1985). "The Role of Market Places in Developing Countries". In: ICRISAT (International Crops Research Institute for the Semi-Arid Tropics), 1985.Agricultural Markets in the Semi-Arid Tropics. Proceedings of the International Workshop held at ICRISAT centre, India, Pantancheru, 24-28 Oct. ICRISAT. pp.121-130.

Ghosh A (1981). "Models of Periodic Marketing and the Spatiotemporal Organisation of Market Places". Prof. Geogr. 33:475-483.

Government of Ghana (1996). The Ghana Health Service Act, (525), 1996.

Government of Ghana (1994). The Pharmacy Act, (Act 489) 1994.

Government of Ghana (1995). Fisheries Sub-sector Capacity Building Project. Department of Fisheries, Ministry of Food and Agriculture. Accra.

Hirschman AO (1958). The Strategy of Economic Development.

W.W. Norton & Company. New-York.

Hodder BW, Lee R (1977). Economic Geography. Metheun & Co. Ltd. London.

Hudson FS (1976). Geography of Settlements. Macdonald and Evans, Plymouth.

Ishikawa T, Toda M (2000). "Some Economic Extensions of Central-Place Theory Involving Profit Maximisation". Urban Stud. 37:481-495.

Kalitsi EAK (1999). "The Role of Volta River Authority in the Development of the Volta Basin". In Gordon, C. &Amatekpor, J. K. (eds.). The Sustainable Integrated Resources of Lake Volta.Development of the Volta Basin in Ghana. VBRP, 1999.

Lado C (1988). "Some Aspects of Rural Marketing Systems and Peasant Farming in Maridi District, Southern Sudan". Transactions of the Institute of British Geographers, New Ser. 13:361-374.

McCarthy EY, Perrault WD (1990). Basic Marketing. Homewood Cliffs, N.J.

Mckim W (1972). "The Periodic Market System in North Eastern Ghana". Econ. Geogr. 48(3):333-344.

Mushinski D, Weiler S (2002). "A Note on the Geographic Interdependencies of Retail Market Areas," J. Reg. Sci. 42:75-86.

Myrdal G (1957). Economic Theory and Underdeveloped Regions. Methuen & Co. Ltd. London.

Okafor FC (1981). "Rural Service Centres and Settlement Stabilisation in Nigeria". Habitat Int. 10(3):171-178.

Rossi U (2009). Growth Poles, Growth Centres. In Kitchin, R. and Thrift, N. Int. Encyclopedia Human Geogr. 4:651-656.

Schrimper RA (2001). Economics of Agricultural Markets. Prentice Hall. NJ.

Scott EP (1970). Geography of Retailing. Hutchison. London.

Sharma PR (1984). "Growth Centre and Regional Development: Aspects of Theory and Policy". Habitat Int. 8(2):133-150.

Shonkwiler JS, Harris TR (1996). "Rural Rental Business Thresholds and Interdependencies". J. Reg. Sci. 36:617-630

Skinner GW (1964). "Marketing and Social Structure in Rural China". J. Asian Stud. 24:3-43.

Tarant JR (1967). "Retail Distribution in Eastern Yorkshire in Relation to Central Place Theory. Occasional Paper in Geography, 8. University of Hull.

Titriku PK (1999). "Agriculture in the Volta Basin: Problems and Prospects. In: Gordon C & Amatekpor JK. (eds.). The sustainable Integrated Resources of Lake Volta. Development of the Volta Basin in Ghana. VBRP, 1999.

Trilsbach A (1986). Marketing and Trade in White Nile Province. In Davies HR. J.Rural Development in the White Nile Province, Sudan. United Nations University. Tokyo, Japan.

Udo KR (1982). "The Human Geography of Tropical Africa".Heineman Educational Books Ltd., Ibadan.

Wanmali S (1985). "Network of distribution of goods and services in rural India: Some Spatial Considerations". In: ICRISAT (International Crops Research Institute for the Semi-Arid Tropics), 1985.Agricultural Markets in the Semi-Arid Tropics. Proceedings of the International Workshop held at ICRISAT Centre, India, Pantancheru, 24-28 Oct 1983 ICRISAT. pp.139-146.