Assessment of accessibility of recreational facilities through identification and mapping focus on Greater Jos, Plateau State Nigeria

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Abstract. This paper provides a review of assessing the accessibility to recreational facilities owing to the fact of a theory that services are high in demand but few in supply. An integrated qualitative method was employed in this research, using the Geometrical Data Analysis and Point Mode which identified and map out the various recreational activity areas. It touches on the concept and policy as it affects recreational facility provision. The challenges range from distance to a recreational facility, high cost of transportation to a recreational facility area, and inadequate recreational facility as it relates to population threshold. It further discusses the random distribution as it affects the different sectors. Based on the problems mentioned, suggestions were offered to achieve equity in distribution, appropriateness and proper location of the recreational facilities. Thus, the need to make provision of recreational facilities achievable according to the laid down policies and strategies to areas of disadvantage, which invariably connotes easy reach and enhances the development of a friendly city.

1. Introduction
The most striking concern that has not been adequately looked at, is the unorganized distribution of the recreational facilities by both public and private providers. This is with regards to their effectiveness in terms of proper functioning, as well as improvement in the provision as enshrine in the policies [11]. Thus, the ineffective coverage of services in an area or by population is a concern. This reflects the distribution of the recreational facilities which in most cases are not evenly distributed, and the allocation being politically motivated or done by private establishments for profit-making. Failure to consider the policy of allocation or distribution is always a concern in most cases [3].

The provision and distribution of the recreational facility that is geared toward filling the leisure when poorly located, people are not synthesized to be informed of the said facility or its type [13].

The population of Jos is said to be estimated at 1.4m and, Bukuru and environ 0.3m [9]. The main concern in research such as for recreation facility is demand and supply. Both public and private providers make provision and manage recreational facilities. Whatever is their motive either profit-making or otherwise should be measured by the policies with regards to demand and supply. This is with emphasis on the number of individuals desiring to take part in a specific recreational activity and location [17].

The results of this study intend to offer practical insights and implications which will, in turn, be useful to the public, leisure agencies and improve equitable access in the provision facilities, and to
demonstrate spatial variations in map-equity measures. Hence, the concern of this research is to bring up an existing knowledge on the state of recreational facilities in the Greater Jos, considering its provision with regards to accessibility. It will also determine whether the spatial provision and distribution of recreational facilities have a significant influence on accessibility.

Policies and strategies are paramount to determining the recreational facility area in plans. The city of Los Angeles, considering its public parks and natural open space is well over 36,000 acres [3]. While, Abuja’s Master Plan was produced and provided for its regional recreational facility development such as the national park, national monument, and theatres among others were included in the plan. Similarly, the provision of green areas in the plan is for the enhancement of habitation, aesthetic, and conservation purposes [5].

The concern of social inclusiveness as policy and the accessibility of disadvantaged groups to public recreational facilities is paramount for local government in terms of consideration, and in whatever manner the provision occurs [8]. There is then the need for man to live in an environment that is conducive to recreation. This is why the New Urban Policy make the creation of urban parks mandatory [2]. In essence, the distance to recreational areas affects the participation of people in recreational activities greatly [15].

Community differs in identification and characteristics, and so develop its standards for recreation areas, parks, and open space as the case may be. Thus, in a bid to providing adequate and appropriate numbers considering the hierarchy of recreation facilities, Cities attempts to provide useful and proper locations. One-half mile has been estimated to cover a 20-minutes walk for most people within the community, which is commonly considered as a vital threshold in distance, while exceeding that distance individuals will refrain from walking to the service area. In essence, recreational areas are located within the neighbourhood for residents’, effective use either active or passive [16].

1.1. Concept and Trend of Outdoor recreation

In the United States, there was an experience of growth in the trend for interest in nature-based on outdoor recreation, having appeal for natural areas. Involvement in outdoor activities increased considerably since 1960, with attendant activities such as camping, bicycling, canoeing, and skiing, among other activities [4]. This tends to be the experience and practice worldwide, the involvement in recreation activity in protected green areas and different other natural potentials [12].

1.2. Concept

Recreational activity varies; from leisure activity at home like playing and watching television, passive recreation such as pleasure walk to active games and competitive sports. Open spaces and other recreational facilities should be easily accessible from home and workplace where applicable. Open space and recreation facilities are provided in developed areas, while hinterlands and different other areas of potentials need to be harnessed. The provision is said to be averagely, reflecting the character of nature and devoid of being a nuisance [6]. Recreation is an exclusive activity that people partake, being part of human activity in life, practice diversely, suited by individual interests, and socially depicting society. Thus, recreational activities may be communal, that has been practised in a group, family or community, or individual. It can be active or passive, outdoor or indoor, healthy or dangerous. Hence, it is of great benefit to society [5].

1.3. Insufficient Provision

Presently, in developing countries, situations with regards to recreation have started changing and been noticeable after 1990, the improvement of economic development and an increasing number of people in the middle-income class. Millions of people in cities are ever demanding more recreational areas, to engage in different activities during their free time. This is in connection with the interest that has been shifted to green and forestry areas for picnicking and other passive recreation. Because of the increasing number of people in the children’s parks and other parks within the urban areas, crowdedness is experienced, implying the insufficiency of recreational facility areas [10]. Insufficient allocation of
recreational area facility is often a reason that thwarted the long-term success of recreational projects. This resulted in the provision of recreational facilities that are inappropriate and insufficient to serve the community intended for [7]. Report on Abuja shows little above 11% of the recreational sporting facilities were developed according to the recommendation of the Master Plan. This explains a reason for the short supply or inadequate provision of recreational facilities [5]. The shortage of the facility in one area causes the population to travel to areas of the surplus, thus causing imbalance and congestion to the available facilities. It dictates a joint approach in planning and equitable distribution of such facilities even within a neighbourhood. Competition from the other urban land uses like housing and commercial activities, have led to low priority given to recreational facility space allocation [13].

There are no substantial works of literature with regards to assessment of recreational facilities, let alone the theories or models, for a typical research approach. However, some theories evolve and seem to be helpful. Most theories, appear and to some extent distort the outcome and wholesomeness values to the system. Parks like any other fixed locational facilities are not distributed in equidistance nor being accessible to everybody. Thus, challenging to provide the required services considering the high demand and characteristics of areas that vary as well as individuals’ attitudes. This situation and deficiency confirm the issue of territorial justice, which aim is to provide services that are even in a given geographical space. Factors that are considered, invariably determining factors in service and rendered for users were studied and classified as ‘service and user factors’. The services under high pressure in use and of distance and accessibility, are measured by travel time and congestion level measured against comfort. The variety of recreational activities could be a reflection of an indicator of quality that is based on value, and adequacy. While, safety depicts the sanity of the environment, physical attractiveness, and maintenance, which suggest aesthetic value [1 and 14].

1.4. Mapping and Inventory

Carrying out an inventory of recreational areas includes, gathering identifiable information of the available facilities, and the related attributes of the services that have been provided to the community. It is solely to allow a substantive assessment of the adequacy of the existing provision of the facility. Thus, it enhances the verification of current provision of the services as well as potential resources from the community, which is used to determine the needs of the city considering the quantity, quality, and types of services or facilities to be provided. This helps in providing information based on community assessment, peculiarity, and behaviour in terms of need with which to achieve precision. Geographic Information Systems (GIS) and Facilities Information Systems (FIS), are new developments that are used to pick up inventories. The common ones used are MapInfo and ArcInfo which are computer-based for identification, recording and mapping an array of information, including recreational facility areas. The software assists planners and managers of the environment in carrying out their scientific work efficiently. The facility mapping software is said to be useful in selecting locations of new facilities, production of maps, reporting on conditions of parks, and recreation areas. It also helps to display and analyse land use data, population analysis, updates on land development, and boundary data collections [7].

2. Method

This paper provides a review of assessing the accessibility to a recreational facility through identification and mapping. An integrated qualitative method was adopted which embrace the use of Geometrical Data Analysis using point mode. It uses using remote sensing software and Geographic Positioning System that determines the place of recreation and identified the types of recreational activities in the area. Hence, the tools were used to identify, mapped out, and assess the accessibility to the various recreational activity areas.

2.1 Map Profile
Maps were produced, updated and extensively used for data analysis. The maps were produced through remote sensing, using Geographic Information System to geo-reference and digitalize the identified objects to reflect the right positions on the ground. The tools were effectively used to generate the required maps and presented through the Geometric data and point mode. The maps include:

i. The physical Land use pattern of Greater-Jos (Figure1) in linear scale 1:1.5km
ii. The contour of Greater Jos (Figure2) in linear scale 1:1.5km
iii. The existing category of recreational facilities in Greater Jos (Figure3) in linear scale 1:1.5km

3. Results and Discussion

3.1. Identification of Recreational Facilities in Greater Jos

The research identified the available recreational facilities which were recorded using the GPS and presented in their true locations by the X and Y coordinates on table 1 and as can be seen superimposed on map (figure 1). While figure 2 shows the distribution of the facilities indicating their positions and names for easy identification.

Interestingly, figure 3 reveals the distribution of the recreational facilities by sectors showing their category and lopsided development.

Table 1. Inventory of Recreational facilities in the Greater Jos.

| NAME | LAT  | LONG  | LAT | LAT | LAT | LAT | LAT | LAT | LAT | LAT | LAT | LAT | LONG | LONG | LONG | LONG | LONG |
|------|------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
|      | D    | M    | S   | D   | M   | S   | D   | M   | S   | D   | M   | S   | D    | M    | S    | D    | M    |
| PLAPOLY FOOTBALL FIELD 1 | 9°40’00” | 8°53’06” | 9 | 40 | 2 | 9.6722 | 8 | 53 | 0.6 | 8.885 |
| PLAPOLY FOOTBALL FIELD 2 | 9°39’24” | 8°53’35” | 9 | 39 | 9.24 | 8.6756 | 8 | 53 | 1.59 | 8.8877 |
| CENT. PRL.SCH. BASSA | 9°56’54” | 8°45’61” | 9 | 56 | 8.69 | 9.9574 | 45 | 6.18 | 8.7671 |
| PRESTIGE GYM BASSA | 9°57’24” | 8°45’18” | 9 | 57 | 2.42 | 9.9567 | 8 | 45 | 1.87 | 8.7551 |
| AMMA PARK BASSA | 9°57’27” | 8°45’22” | 9 | 57 | 2.27 | 9.9563 | 8 | 45 | 2.2 | 8.7561 |
| GREEN-HOUSE BASSA | 9°57’21” | 8°45’50” | 9 | 57 | 2.13 | 9.9559 | 8 | 45 | 5.01 | 8.7639 |
| GSS BASSA | 9°57’24” | 8°50’49” | 9 | 53 | 2.34 | 9.8898 | 8 | 50 | 4.91 | 8.8469 |
| WILDLIFE PARK | 9°53’23” | 8°50’59” | 9 | 52 | 2.71 | 9.8741 | 8 | 51 | 5.07 | 8.8640 |
| SOLOMON LAR AMUSEMENT PARK | 9°52’21” | 8°51’50” | 9 | 52 | 3.11 | 9.8753 | 8 | 51 | 5.28 | 8.8646 |
| SOLOMON LAR AMUSEMENT PARK 1 | 9°52’31” | 8°51’52” | 9 | 52 | 2.71 | 9.8741 | 8 | 51 | 5.07 | 8.8640 |
| PILOT SCI SCH LAMINGO | 9°54’59” | 8°56’67” | 9 | 54 | 6.97 | 9.9193 | 8 | 56 | 6.76 | 8.9521 |
| SHIRE HILLS | 9°54’66” | 8°56’69” | 9 | 54 | 8.67 | 9.9240 | 8 | 56 | 6.94 | 8.9526 |
| JCM | 9°54’86” | 8°55’09” | 9 | 54 | 8.67 | 9.9240 | 8 | 55 | 0.94 | 8.9192 |
| GSS DU | 9°46’61” | 8°53’39” | 9 | 54 | 6.14 | 9.0170 | 8 | 53 | 9.95 | 8.9109 |
| SHEN | 9°44’25” | 8°54’35” | 9 | 44 | 2.59 | 9.7405 | 8 | 54 | 3.58 | 8.9099 |
| BISCHI | 9°44’25” | 8°50’74” | 9 | 44 | 2.55 | 9.7404 | 8 | 50 | 7.48 | 8.8541 |
| SCI SCH KURU | 9°40’30” | 8°46’92” | 9 | 40 | 5.3 | 9.6813 | 8 | 46 | 9.21 | 8.7922 |
| FARIN LAMBA PRIM SCH | 9°41’30” | 8°44’65” | 9 | 41 | 3.3 | 9.6925 | 8 | 44 | 6.54 | 8.7515 |
| VOM FOOTBALL, PITCH | 9°41’28” | 8°44’80” | 9 | 41 | 2.83 | 9.6911 | 8 | 44 | 8.02 | 8.7556 |

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3.2. Mapping of Recreational Facilities in Greater-Jos
The challenges range from distance to recreational area, being 1-15km to a type of activity, while, 95% were privately owned for business purposes and the provision is inadequate relating to the threshold population. It further discusses the haphazard distribution as it affects the ten (10) zoning/sectors of the Greater Jos area.

![Contour Map with the 10 subcenters](image)

**Figure 1.** Contour Map with the 10 subcenters.

The results show that the study area is experiencing the inadequate provision of recreational facilities, while some areas are lacking the facilities, and the available recreational facilities are only within the core city which maintains its status as the capital city. The core city tends to have a variety of facilities as it can be seen as reflected in map figure 3. The scenario suggests that it is an area of advantage, considering the short time to journey to recreational centres within and outside the sector areas, different types, and hierarchies of facilities. The presence of the facilities also gives the core city a sense of identification and defined as a complete system that witnesses the adherence to the policy of the provision of facilities.

Also, from the findings, it shows disappointing in the distribution of the facility. As can be seen in other sectors apart from sectors 2, 3 and 10, all other sectors are lacking the facilities let alone the types, nor having the appropriate types of outdoor facilities, reference to figure 1 and 2.
The impression of figure 1 shows the distance in diameter, north to south and east to west having 31,832.401m and 48, 505.624m respectively, as well as the determined radius of 15km being half of the diameters. The result implies that the average distance covered to the recreation area, in areas of abundance being the city centre is quite a distance and cost demands. Since those living in the periphery are the less privileged in terms of economic buoyancy, and deprivation of the recreational facilities. The reason for this scenario is because the policy says one (1) district facility to 100,000 population and the presence of recreational centres in every sector (figure 3).

It seems inappropriate considering the unfair distribution of outdoor recreational facilities in the Greater Jos. These findings served a great deal in showing uneven development with regards to the provision of the facilities, which invariably enhances development. It is an approach toward achieving a system that works to put things right according to the policy and strategy of the provision and distribution to serving Greater Jos effectively. It connotes strategy and policy that would provide quality opportunities for the garden and parks departments of government and non-governmental organisations. Thus, they could serve as a guide for future actions and decisions on the provision of the facilities.
Further research will require intensive and extensive discussion concerning public involvement and implementation strategies of the provision and distribution of the recreational facility area in Greater Jos.

![Figure 3. Map showing Category existing recreational facilities.](image)

4. Conclusions
It suffices to state that, the challenges of the provision of recreational facilities stemmed from distance to facility area, being inadequate measured to a threshold, lopsided and haphazard distribution. It affects the sectors in different capacities and serving as inferences to the ability of identification, and mapping process that has been applied. Identification and mapping are the efficient processes in presenting the true situations and locations of the available recreational facility areas. Based on the problems mentioned, recommendations are proffered towards ameliorating inequality in the distribution of the facilities. Hence, the need to implement policies and strategies to improve the provision of recreational facilities to disadvantaged areas. The adequacy and skill of using GIS software need to be enhanced and put to practice effectively, to define resource areas adequately towards improvement and to harness the potential recreational areas with a view of making it viable and available to the people. The recommendations connote that recreational facility areas need to be accessible to the people which will invariably enhance the development of a friendly city by extension the Greater Jos.
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