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Spatial Query-Driven Evaluation of Socio-Economic Facilities for Administrative Decision Support in Asaba, Delta State, Nigeria

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ABSTRACT –

This study employed spatial query analysis within a Geographic Information System (GIS) environment to evaluate the status, performance, and infrastructural adequacy of socio-economic facilities in Asaba, Delta State, Nigeria. A geospatial database was developed for health, education, financial, security, religious, and transportation facilities. Structured spatial queries were formulated and executed to extract facility-specific administrative insights based on attributes such as environmental cleanliness, equipment sufficiency, digitization, and service quality. Findings revealed that although a majority of health and educational facilities maintained acceptable standards in terms of hygiene and library functionality, critical deficiencies existed in digitized administration, laboratory support, and infrastructure. Notably, none of the assessed security facilities had computerized systems or GIS-enabled analytical labs, and only one transportation facility offered computerized booking. These insights underscore a significant need for technological integration and infrastructure upgrade across facility sectors. The study demonstrates the utility of GIS-based spatial queries as a decision-support mechanism for urban facility governance and policy formulation.

Keywords: Geospatial query, socio-economic infrastructure, administrative efficiency, GIS analysis, spatial database, Asaba, decision support system, public facilities, infrastructure audit, spatial planning

1. Introduction

Effective administration of socio-economic infrastructure is foundational to achieving sustainable urban development, equitable access to services, and improved quality of life in rapidly urbanizing regions. Urban centers across sub-Saharan Africa, particularly in Nigeria, are experiencing unprecedented demographic expansion and spatial growth, placing immense pressure on public infrastructure and service delivery systems (Adelekan, 2010; UN-Habitat, 2022). As cities expand, the efficient management of critical socio-economic facilities such as hospitals, schools, security services, and transportation networks becomes a central concern for planners, administrators, and policymakers (Agunbiade et al., 2021).

Traditional methods of infrastructure auditing and service monitoring in Nigerian cities have often relied on manual surveys, uncoordinated datasets, and paper-based administrative records, which lack spatial precision and analytical depth (Olaseni & Alade, 2012). These limitations have contributed to unbalanced facility distributions, duplication of services in some areas, and neglect in others. In response to these shortcomings, Geographic Information Systems (GIS) have emerged as essential tools for integrating spatial and non-spatial data to support data-driven governance, especially in developing contexts (Yeh, 1999; Edeh et al., 2020).

GIS facilitates spatial data capture, visualization, analysis, and decision-making. One of its powerful capabilities lies in the execution of spatial queries—structured interrogations of geospatial databases that extract information based on specified attribute conditions or locational parameters (Foote & Lynch, 2018). Spatial query analysis allows administrators to go beyond mapping and engage in real-time facility auditing, resource allocation, and infrastructural monitoring. Through structured SQL (Structured Query Language) statements, queries can identify facilities that meet particular standards (e.g., health facilities with computerized management systems) or reveal administrative shortcomings (e.g., schools with dilapidated buildings or religious institutions without crowd control plans) (Zhou et al., 2021).

In Nigeria, the application of GIS in urban management is gaining attention, particularly for land administration, disaster risk mapping, and health service allocation. However, its application in real-time facility assessment through spatial queries remains underutilized (Ayeni, 2013; Uluocha, 2015). The city of Asaba, the capital of Delta State, offers a relevant case study due to its rapid urban transformation, population density, and functional complexity. Despite being a regional administrative hub, Asaba continues to face challenges related to infrastructural adequacy, technological integration, and service delivery optimization (Ossai & Oliha, 2023).

This study addresses these gaps by constructing a geospatial database of socio-economic facilities in Asaba and applying spatial query techniques to assess their administrative status, infrastructural readiness, and service delivery performance. Facility types examined include health, educational,

financial, religious, security, and transportation infrastructure. The primary objective is to demonstrate how spatial queries can be used as a diagnostic and decision-support tool for public administration.

Specifically, the study aims to: (i) determine which facilities meet key infrastructural and technological standards; (ii) identify underserved or deficient facilities; and (iii) generate spatial intelligence to support evidence-based policy interventions. Through this approach, the study not only contributes to geospatial scholarship but also advances practical solutions for urban governance in resource-constrained environments.

2. Materials and Methods

2.1 Study Area Description

The study was conducted in Asaba, the capital city of Delta State, Nigeria. Located within the South-South geopolitical zone, Asaba lies geographically between latitudes 6°10′ and 6°15′ North and longitudes 6°40′ and 6°45′ East. The city is bounded by the River Niger to the east, linking it with the commercial city of Onitsha in Anambra State. Asaba serves as a significant administrative, commercial, and transport node in the region, attracting both governmental and non-governmental institutions. The city exhibits a mixed land-use pattern characterized by residential, institutional, religious, and commercial functions. Rapid urban growth and demographic expansion in Asaba have intensified the need for a well-structured socio-economic infrastructure that is equitably distributed and efficiently managed.

2.2 Data Acquisition

The study utilized both primary and secondary datasets. Primary data were acquired through field surveys using handheld Global Positioning System (GPS) receivers for the accurate collection of geographic coordinates of socio-economic facilities. Data collection teams visited the sites of identified facilities to capture spatial locations and record attribute information relevant to facility condition, services offered, and infrastructural characteristics.

The facility categories covered include:

1. Health facilities (hospitals, clinics, maternity centers)
2. Educational institutions (primary, secondary, and tertiary)
3. Financial establishments (banks and microfinance institutions)
4. Security installations (police stations, paramilitary outposts)
5. Transportation facilities (bus terminals, motor parks)
6. Religious centers (churches, mosques)

Attribute data collected for each facility type included infrastructure condition (e.g., dilapidation status), technological availability (e.g., presence of computerized front desks or GIS labs), administrative performance (e.g., health safety compliance, student–teacher ratios), and service functionality (e.g., 24-hour services, equipment sufficiency).

Secondary data comprised administrative boundary shapefiles, high-resolution base maps, and geospatial datasets obtained from the Delta State Ministry of Lands and Surveys, the Office of the Surveyor-General of the Federation (OSGOF), and other open-source repositories such as DIVA-GIS and the Humanitarian Data Exchange.

2.3 Geospatial Database Development

All collected spatial and attribute data were integrated into a geospatial database developed using ArcGIS 10.8 software. The database was structured to include distinct feature classes for each facility type, and attribute tables were defined with standardized field names for consistent query execution. Each record in the attribute table corresponded to a unique facility and contained fields such as:

i. Facility_Name
ii. Location_Coordinates
iii. Facility_Type
iv. Clean_Env (Yes/No)
v. Well_Equipped (Yes/No)
vi. Comp_Front_Desk (Yes/No)
vii. Dilap_Build (Yes/No)
viii. Library_Status (Funded/Unfunded)

ix. Health_Safety (Yes/No)

x. Analytic_Lab (Yes/No)

xi. Comp_Booking (Yes/No)

xii. Crowd_Control (Yes/No)

Each attribute was populated based on field assessment and verification against local government facility records.

2.4 Spatial Query Construction and Execution

Structured Query Language (SQL) expressions were used to formulate spatial queries based on defined attribute conditions. These queries were executed within the ArcGIS attribute table environment using the "Select by Attributes" tool to extract and visualize facilities that satisfied or failed to meet administrative standards.

Examples of spatial queries include:

i. SELECT * FROM Health_facilities WHERE Comp_Front_Desk = 'NO'

ii. SELECT * FROM Educational_facilities WHERE Dilap_Build = 'YES'

iii. SELECT * FROM Financial_facilities WHERE Health_Safety = 'YES'

iv. SELECT * FROM Security_facilities WHERE Analytic_Lab = 'YES'

v. SELECT * FROM Transportation_facilities WHERE Comp_Booking = 'YES'

Query results were visualized using thematic point symbols to represent compliance or non-compliance with administrative and infrastructural benchmarks. These were overlaid on base maps for spatial analysis and decision support.

2.5 Data Analysis and Interpretation

Results from each spatial query were analyzed both quantitatively and spatially. Quantitative analysis involved computing the frequency and percentage of facilities meeting specific criteria, such as the proportion of health centers with adequate equipment or the number of security facilities with computerized administrative systems.

Spatial interpretation was conducted using map overlays to assess the geographic distribution of compliant and non-compliant facilities. This enabled the identification of infrastructure clusters, service gaps, and zones of administrative concern. Facilities failing to meet key standards were tagged as priority targets for government intervention or private sector investment.

3. Results

Based on the database created, a structured query analysis was performed to provide answers that have the potential to aid in the proper administration and management of the socio-economic facilities in Asaba Delta State. These queries act as a decision support system on which the authorities in charge of the various facilities can rely on when determining areas that are lacking in these facilities and also areas to be improved upon. These include queries to determine; health facilities with clean environment, well equipped health facilities, health facilities with 24hours service, health facilities with computerized front management system, educational facilities with adequate student teachers ratio, educational facilities with dilapidated buildings, educational facilities with functional and funded library, educational facilities with equipped labs, financial facilities with quick and efficient service, financial facilities that are health safety conscious, security facilities with computerized front desk, security facilities with forensic labs, security facilities with professional and efficient services These sample queries were designed to provide insights based on the situation of the facilities on ground in Asaba Delta State, this in turn will aid decision making in administration and management of these facilities.

3.1 Spatial Query to determine Health facilities with computerized front desk.

A front desk is a front management system used for the reception area at a medical facility and its personnel, is one of the unsung heroes of multi-tasking and keeping everyone happy. This is the first and last area clients visit, and thus it is on the frontlines of keeping customers happy and things running smoothly. From scheduling appointments to collecting payment. A computerized front desk goes a long way in reducing the redundancy of the analog file system. To determine which of the health facilities in Asaba that don't make use of the computerized front desk, a query statement was structured using the SQL (SELECT * FROM Health_facilities WHERE com_fr_dsk = 'NO") as shown in fig 1 and 2.

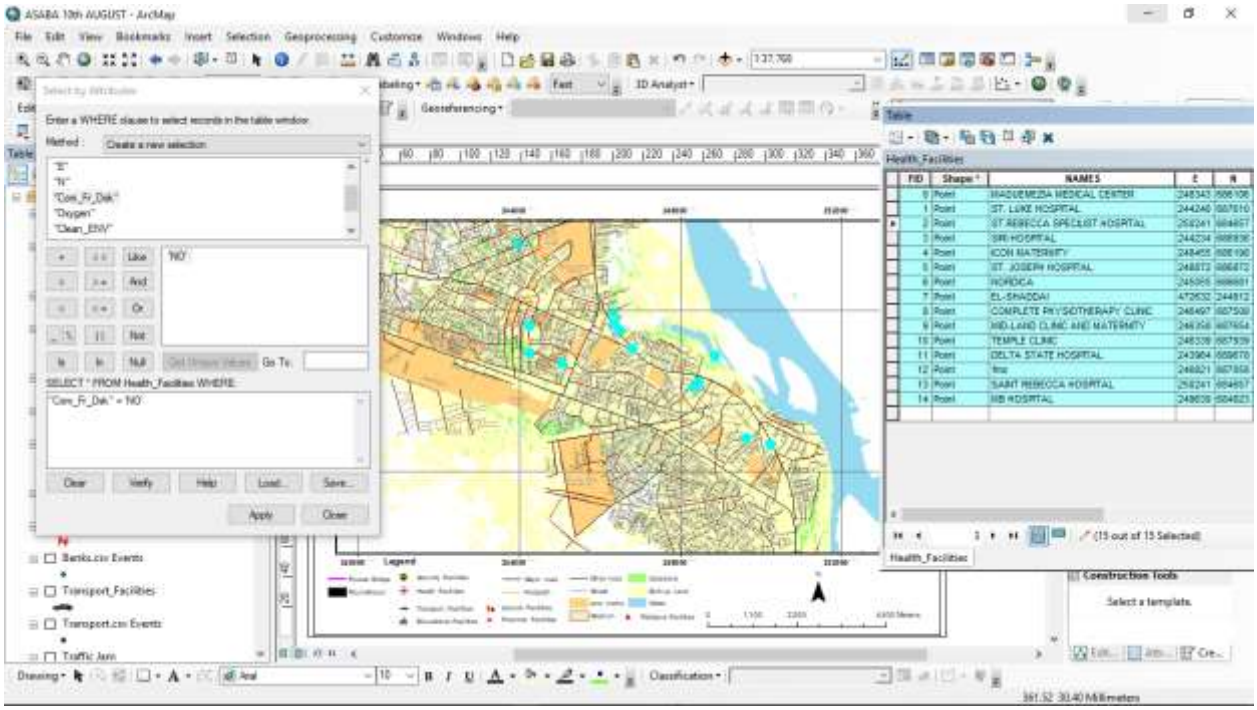

Figure 1: Query to determine health facilities that don't make use of a computerized front desk.

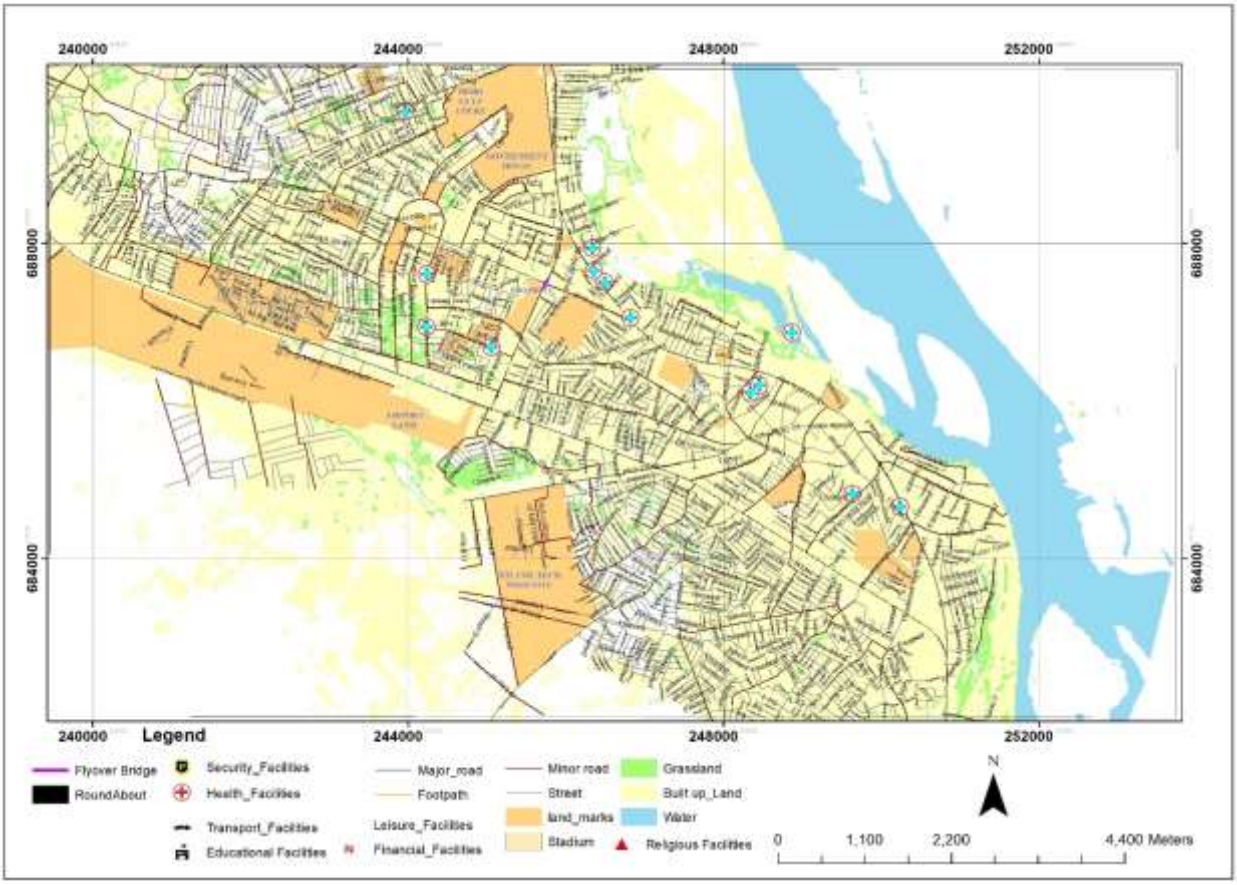

Figure 2: health facilities that don't make use of a computerized front desk

From Figure 1 and 2, the results of the spatial query revealed that none of the 15 health facilities in Asaba make use of a computerized front desk system. The health facilities are still making use of the analog front file system which introduces redundancy, disorganization and loss of patient information due to improper management. The significance and adoption of a computerized front desk system not only makes the clientele and patients feel warm and welcome. It also takes care of scheduling the appointments at the correct time and with the correct doctor, enhances interactions and communications with clients in a positive and confident manner over the phone or in the reception area, enhances efficient handling of billing errors and detailing client

invoices, pulling up medical records for the doctors, copying, faxing, and e-mailing documents between clinics, hospitals, and clientele and lastly keeping the reception area clean. In this light, the health facilities are advised to upgrade to a computerized front desk management system in order to enhance efficiency of administration in health facilities.

3.2 Spatial Query to determine Health facilities with clean environment.

Thorough environmental hygiene is important for the prevention of transmission of infectious diseases within healthcare settings. Environmental hygiene encompasses effective cleaning of surfaces using appropriate products, decontamination of medical equipment and devices used in patient-care procedures, safe and appropriate handling of sharps, blood and body fluid spills, waste and linen. To determine if the health facilities in Asaba have a clean and conducive environment, a query statement was structured using the SQL (SELECT * FROM Health_facilities WHERE clean_env = 'YES') as shown in fig 3 and 4.

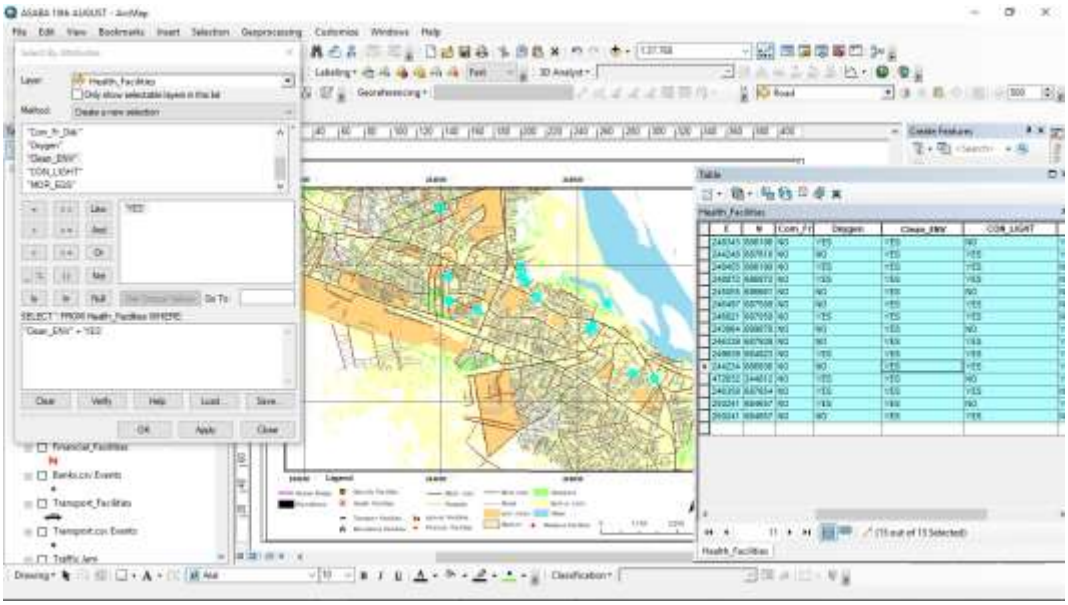

Figure 3: Query to determine Health facilities with clean environment

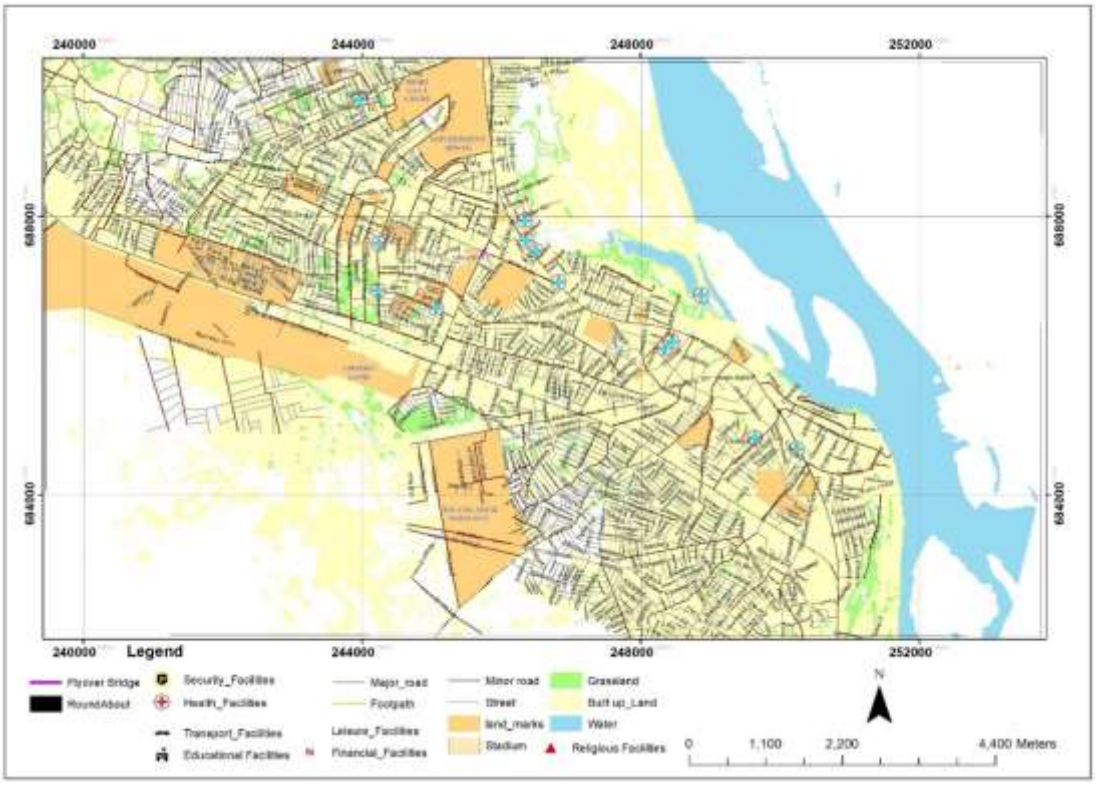

Figure 4: health facilities with clean environments

From Figure 4.14 and 4.15, the results of the spatial query revealed that all 15 health facilities in Asaba relatively keep their environment clean. This is essential because keeping hospitals clean is a crucial patient safety issue. The importance of the hospital environment in patient care has only recently been recognized widely in infection prevention and control (IPC) (WHO, 2009). According to Alexandra *et al*, (2018), there is now enough evidence to demonstrate that maintaining the hygiene of the hospital environment helps prevent infections. Cleanliness and hygiene are important in any public place, but in hospitals and medical practices it is critical due to the fact that the spread of germs can endanger individuals who are already at risk. According to the Department of Health in UK, these healthcare association infections cost the health service around £1 billion a year (Gavan, 2018).

Therefore, keeping cleaning standards at the highest level is not only important to adhere to legislation, but will also help save health care services time and money. Hospital cleaning is a crucial part of overall health and safety, as it's a major contributor to controlling the spread of infections.

3.3 Spatial Query to determine well equipped Health facilities.

According to Dancer, 2014, hospitals need to be prepared for anything that might come through the doors. That's why keeping key pieces of medical equipment on-hand at all times are so crucial to providing complete care. In order to provide comprehensive treatment for patients, there is a standard set of equipment that all hospitals should have ready. This list of medical equipment can often be refurbished as well as new, allowing hospitals to afford to carry reserves for these key pieces. Defibrillators, patient monitors, surgical Tables, EKGs, anesthesia machines, sterilizers, lights, ultrasounds, and electrosurgical units, blanket/fluid warmers are all necessary piece's hospital equipment. Keeping these on hand are critical to the operational success of a hospital and the health care provided within it. To determine well equipped health facilities in Asaba, a query statement was structured using the SQL (SELECT * FROM Health_facilities WHERE well_equipped = 'YES') as shown in fig 4.16 and 4.17.

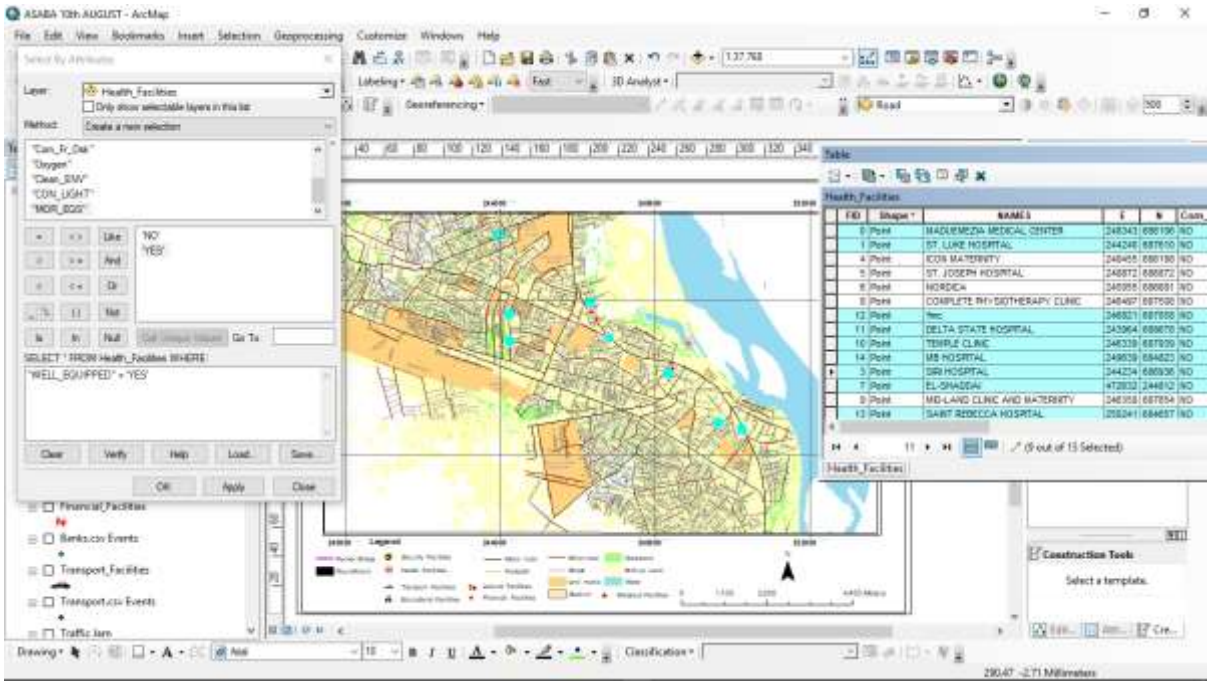

Figure 5: Query to determine health facilities that are well equipped.

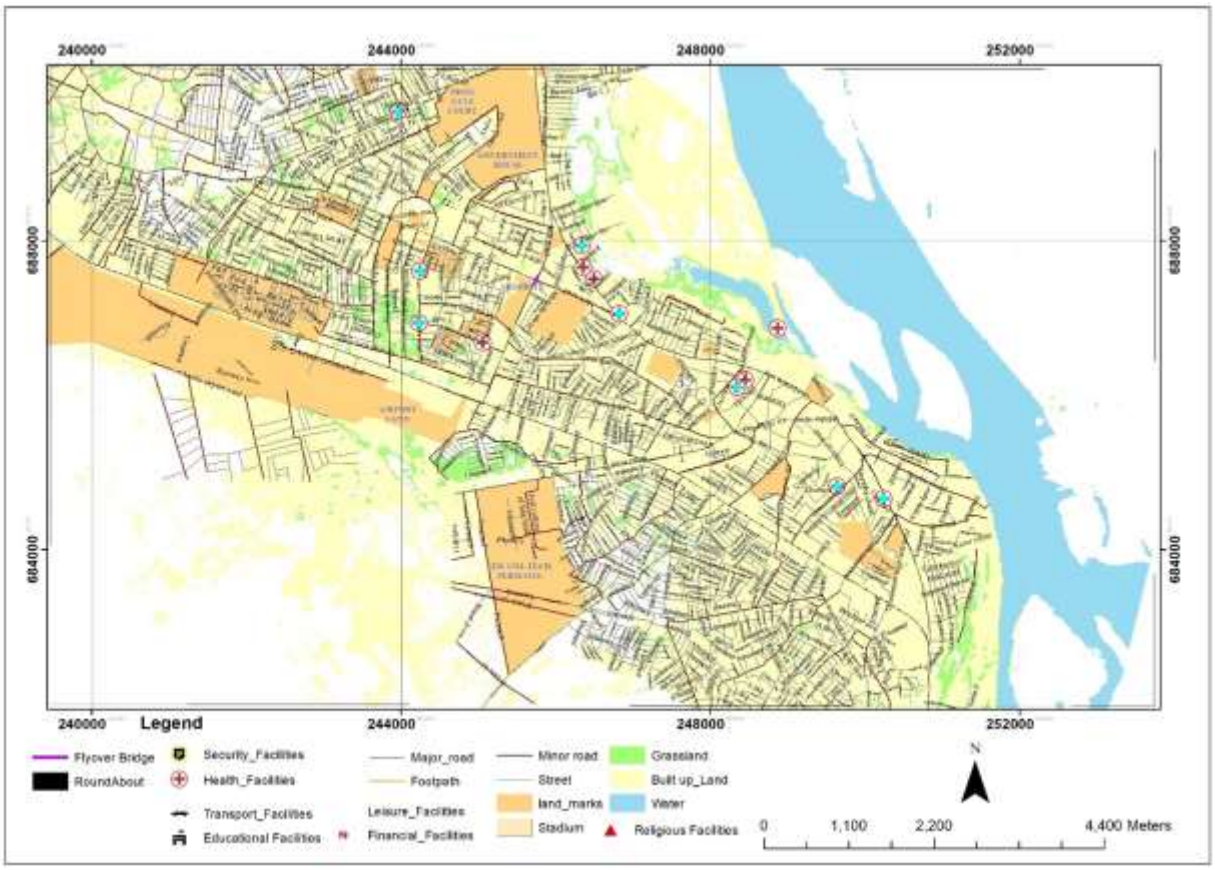

Figure 6: health facilities that are well equipped.

From Figure 5 and 6, it can be deduced that only 9 out of 15 health facilities are well equipped. That's about 60% of the health facilities in Asaba Delta State, while the other 40% are not well equipped. This is not good on the status of health care in Asaba, Delta State, there are no two ways about it: health equipments in healthcare have saved countless lives, not only that, having well equipped health care facilities have a massive impact on all processes and practices of healthcare professionals (The Global Fund, 2009). Having ill equipped health facilities will result to out of pocket spending by the patients. Some may be asked to go buy surgical gloves, oxygen, or even go to other facilities for MRI, CT and X-Ray scans. Health equipments play a vital role in the diagnosis, monitoring and treatment of different kinds of health conditions, these devices are designed to maintain rigorous safety standards in order to ensure the safety of patients (WHO, 2010; USAID, 2009). The absence of these health care tools could significantly pull down the health care industry and become detrimental to the lives of the inhabitants of Asaba. Having 40% ill equipped health care facilities will have implications on the inhabitants of Asaba this causes the inhabitants to travel out of city or state to assess health care. Therefore, it is highly imperative that these health care facilities e.g. Maduemezia Hospital, Temple Hospital, Siri Hospital, Icon Hospital, El-Shaddai And Mid-Land Hospital are equipped properly to guarantee the functionality and their reliability in health care services.

3.4 Spatial Query to determine educational facilities with dilapidated buildings.

According to (Akomolafe and Adesua, 2016), physical buildings in the school setting go a long way to motivate students to learn. Physical buildings in any school system range from the school classroom, library, laboratories, toilet facilities to other infrastructures that would likely motivate students towards learning. Experience has shown that most of the physical facilities that are germane to effective learning/academic performance of students appears not to be sufficient in our educational system today (Ajayi, 2000). Those available seem not to be of standard quality, some seem to lack maintenance culture, while some are in dilapidated conditions (Ajayi. and Ayodele, 2001). The status of physical facilities in educational system today appears to be of great concern to educators (Akomolafe and Adesua, 2016), it seems that the provision of these buildings has dwindled over the years, perhaps due to increase in school enrolment rate which had led to population explosion in public schools (Okunola, 1985). School physical facilities are essential tools to facilitate and stimulate learning programmes. It is with this that this query was formulated to determine educational facilities in dire need of new buildings for conducive learning environment in Asaba. Using the query statement (SELECT * FROM Educational_facilities WHERE Dilap_Build = 'YES') as shown in fig 7 and 8.

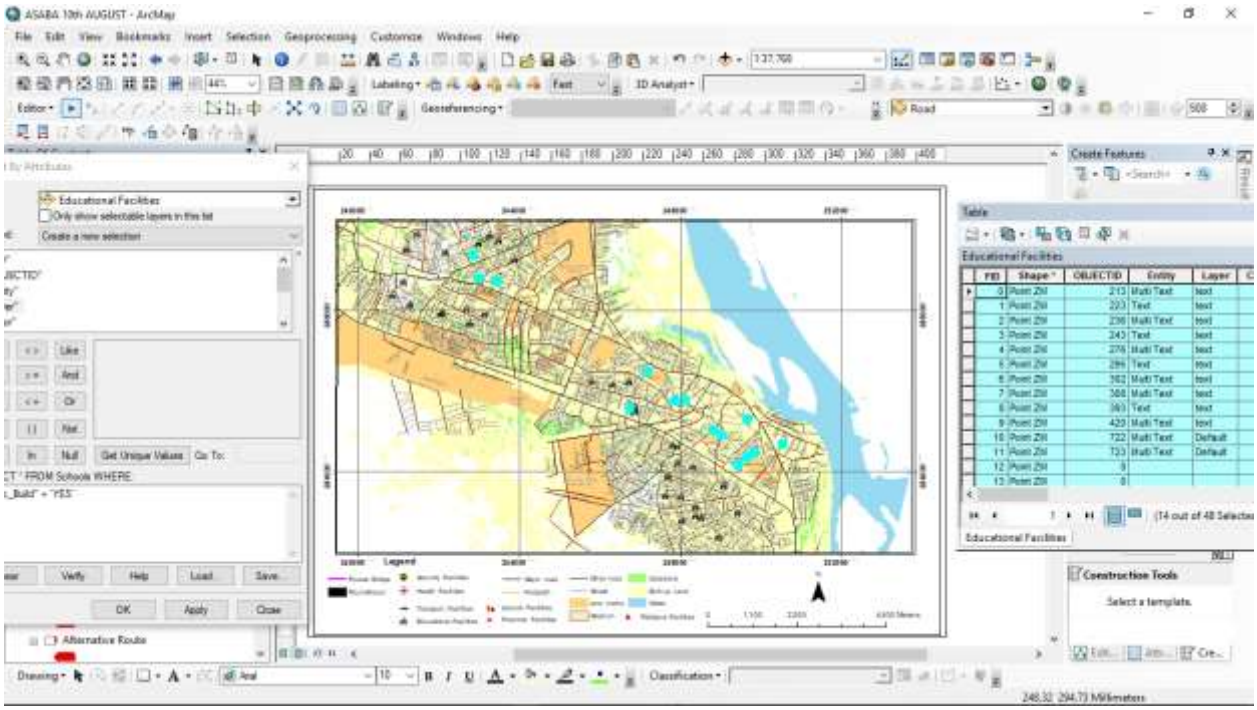

Figure 7: Query to determine educational facilities with dilapidated buildings

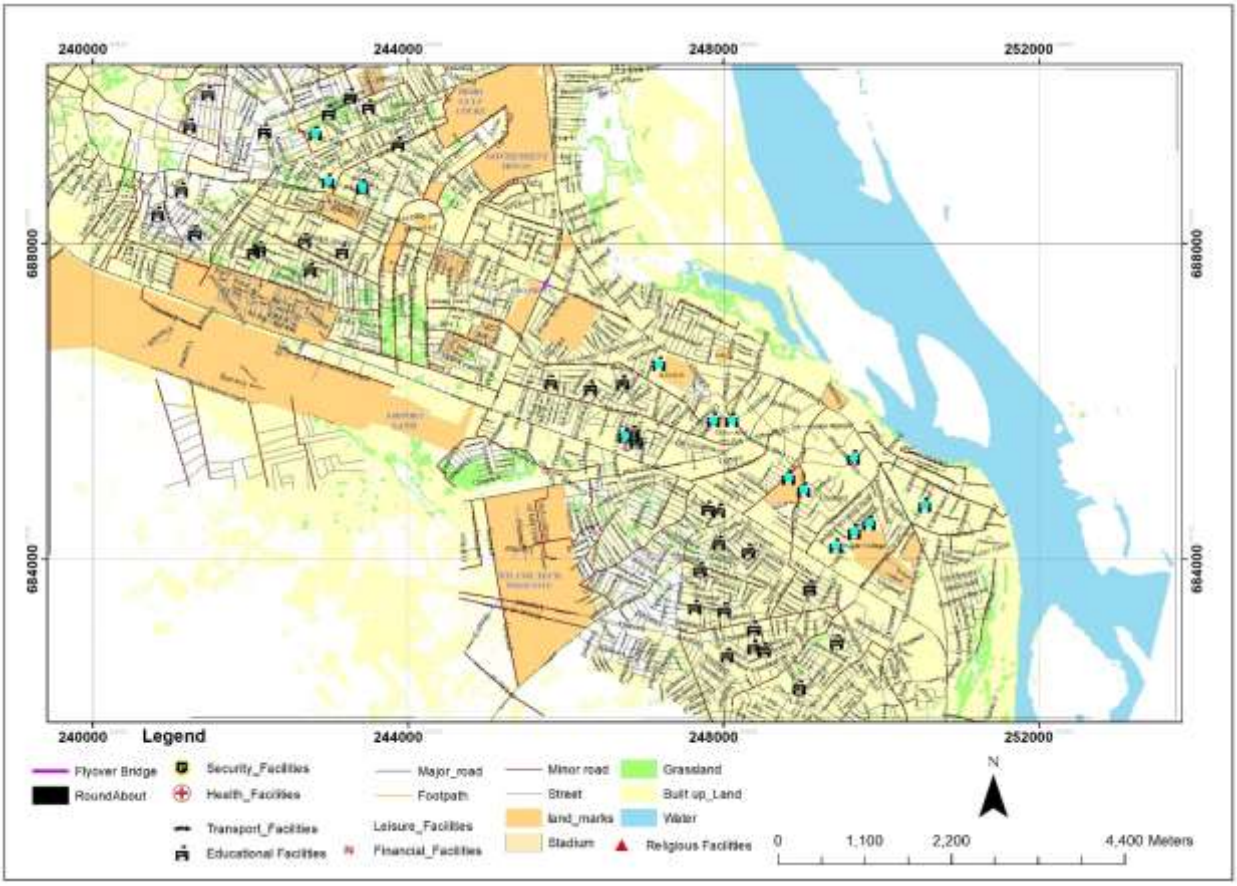

Figure 8: Educational facilities with dilapidated buildings

From Figure 7 and 8, it can be deduced that only 14 out of 42 Educational facilities had dilapidated buildings. This result indicated that 33.33% of educational facilities in Asaba need new and renovated buildings, it is therefore a perquisite that solutions to the dilapidated buildings be found as the students and teachers need them in an ideal working environment. The studies of (Akomolafe and Adesua, 2016; Buckley *et al*, 2003 and Young, 2003), all agreed that if physical facilities are available, students tend to have interest in learning; this will invariably lead to high performance. Apart from

protecting students and teachers from sun and rain, there should be an air of comfortability when students and teachers enter a building instead of fear or eminent collapse.

3.5 Spatial Query to determine educational facilities with functional and funded library.

The importance of a functional and funded library cannot be over emphasized. A functional and funded library is an important source of knowledge to young minds in schools. It helps develop the habit of reading. The school library plays a great role in the life of students by serving as the store house of knowledge. School libraries help to impact positively on the academic achievement of the students. According to (ACRL, 2017), libraries help students perform better by facilitating the work of the classroom teacher ensuring that student has equiTable access to resources, irrespective of home opportunities or constraints and by promoting problem-solving and communication skills. Against this backdrop it was important to structure a query that could determine the number of educational facilities with well-functioning and funded libraries in Asaba, a query statement was structured using the SQL (SELECT * FROM Educational_facilities WHERE “Library” = ‘well-funded’ AND “Library” = ‘funct’) as shown in fig 9 and 10.

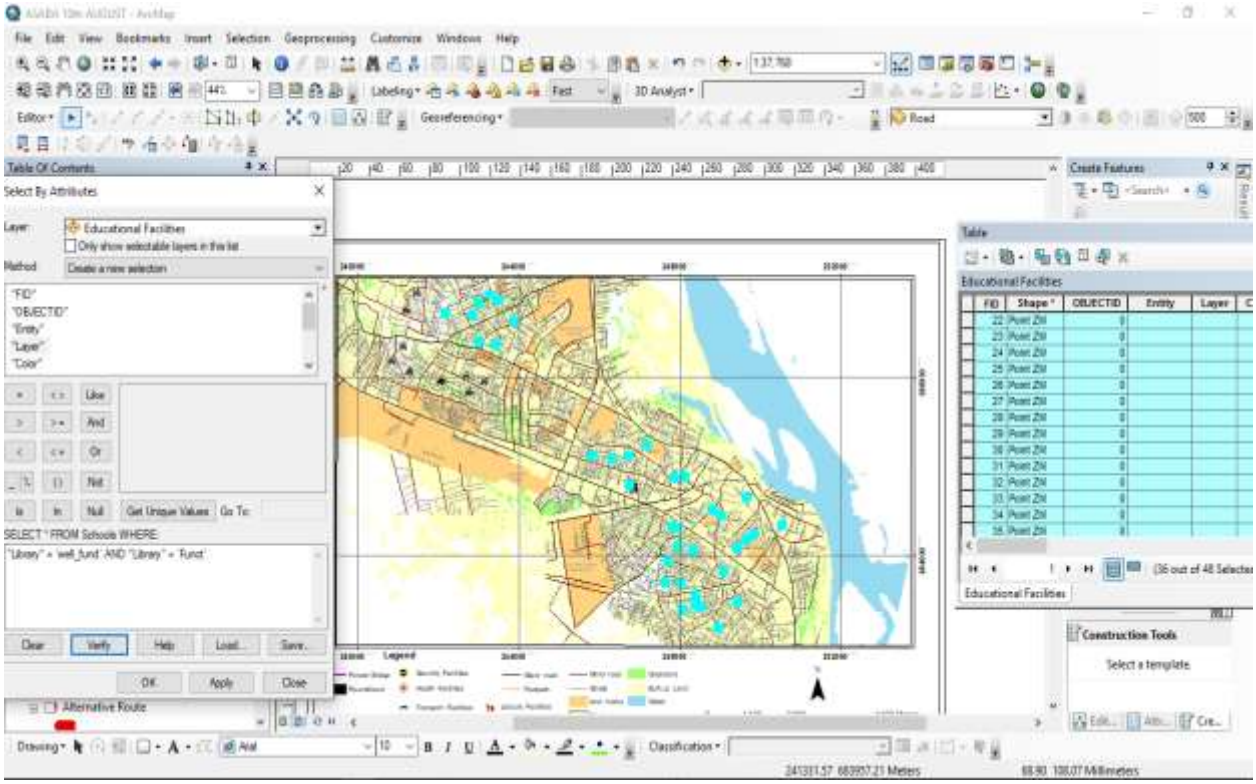

Figure 9: Query to determine educational facilities with well-funded and functional library.

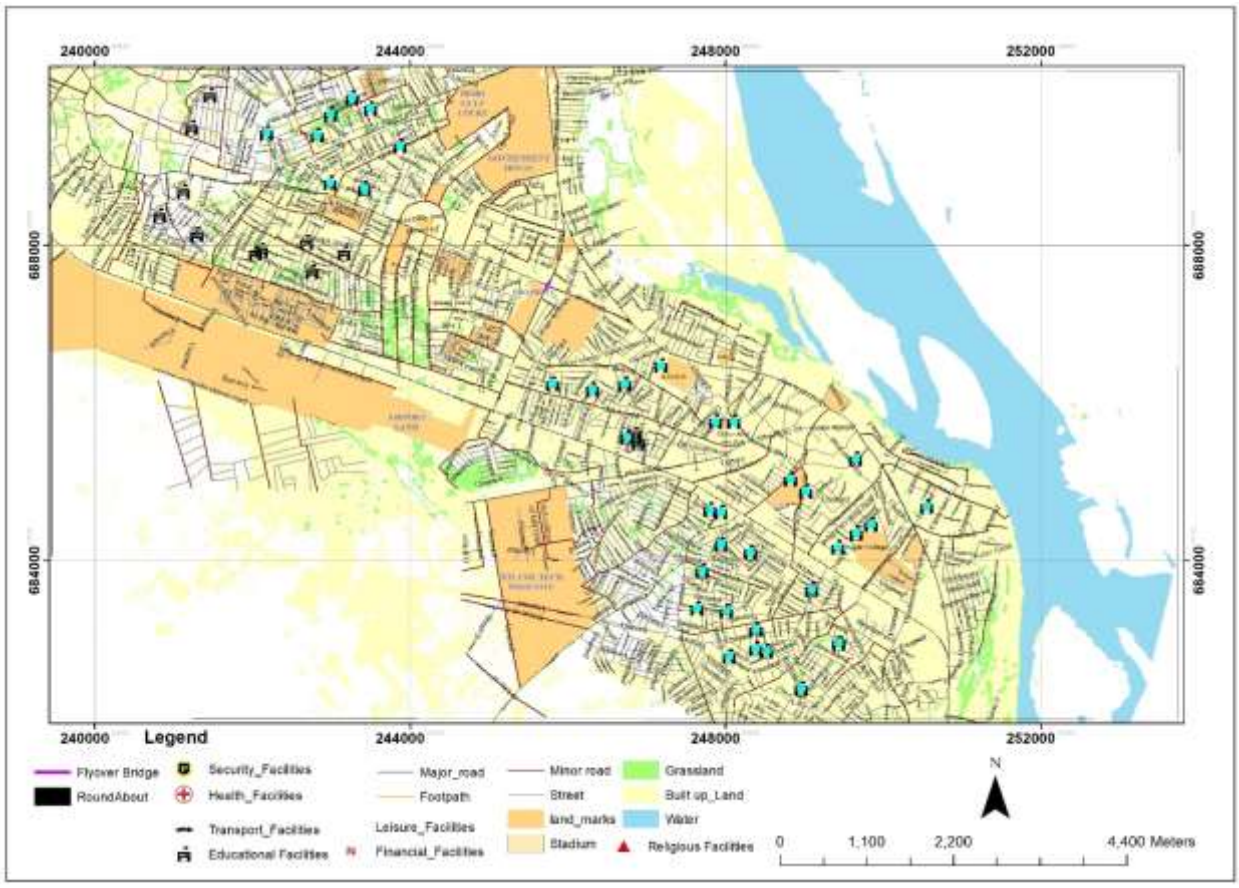

Figure 10: Educational facilities with well-funded and functional library.

From Figure 9 and 10, it can be deduced that only 38 out of 48 Educational facilities had well-funded and functional libraries. This result indicated that 79.16% of educational facilities in Asaba had well-funded and functional libraries, this is a good percentage as nearly all the educational facilities in Asaba have functional libraries. This is crucial as access to functional and funded libraries will create opportunities for learning, support literacy and education, and also help shape the new ideas and perspectives that are central to a creative and innovative society. They also help ensure an authentic record of knowledge created and accumulated by past generations. In a world without libraries, it would be difficult to advance research and human knowledge or preserve the world's cumulative knowledge and heritage for future generations. However, it is advised that the remaining 20.84% of educational facilities without functional libraries be helped in stocking up on currents text books and innovative works that will aid in student's intellectual development.

3.6 Spatial Query to determine financial facilities that are health safety conscious.

Health and safety should be a practice in day-to-day administration of financial activities, because of the exchange of note bills from hand to hand and multiple entries and exists it is essential that financial facilities have hand sanitizers in the halls to avoid the transfer of germs. According to publication by (Debgroub, 2018) all activities in banking halls expose hands to harmful germs and bacteria. Illness is linked to productivity loss, costing employers $225.8 billion annually in the U.S (CDCfoundation, 2018). Considering that 80 percent of all infections are transmitted by hands, it's crucial to implement an effective hand hygiene program at work (Isabelle, 2018). Against this backdrop it became necessary to query and determine financial facilities that are health safety conscious, using the query statement (SELECT * FROM Financial_facilities WHERE "healt_safety" = 'YES' as shown in fig 11 and 12.

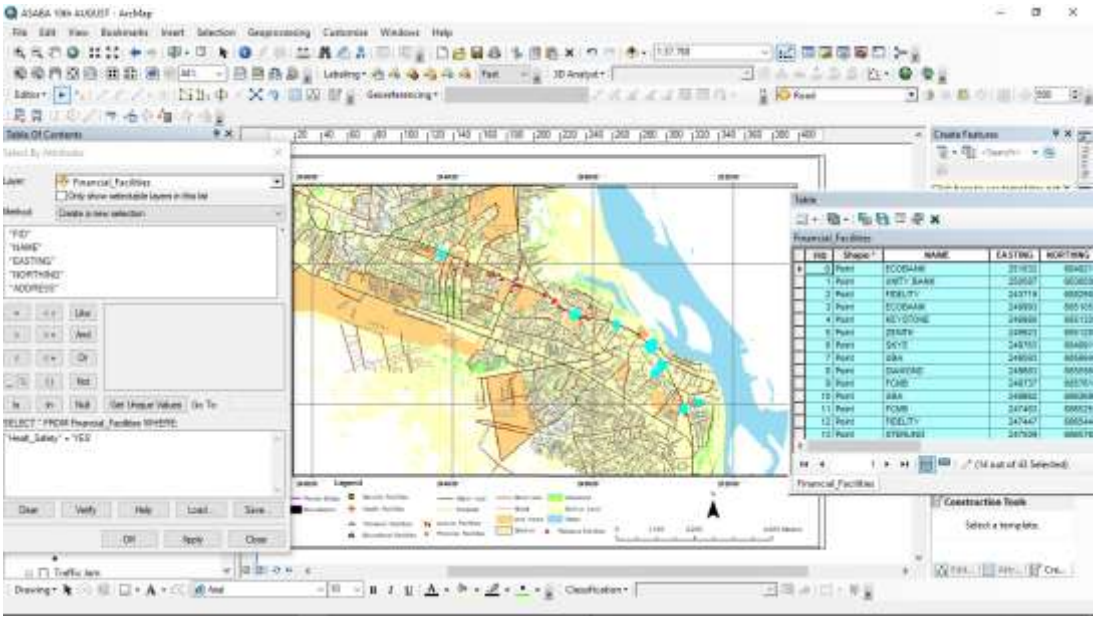

Figure 11: Query to determine financial facilities that are health safety conscious

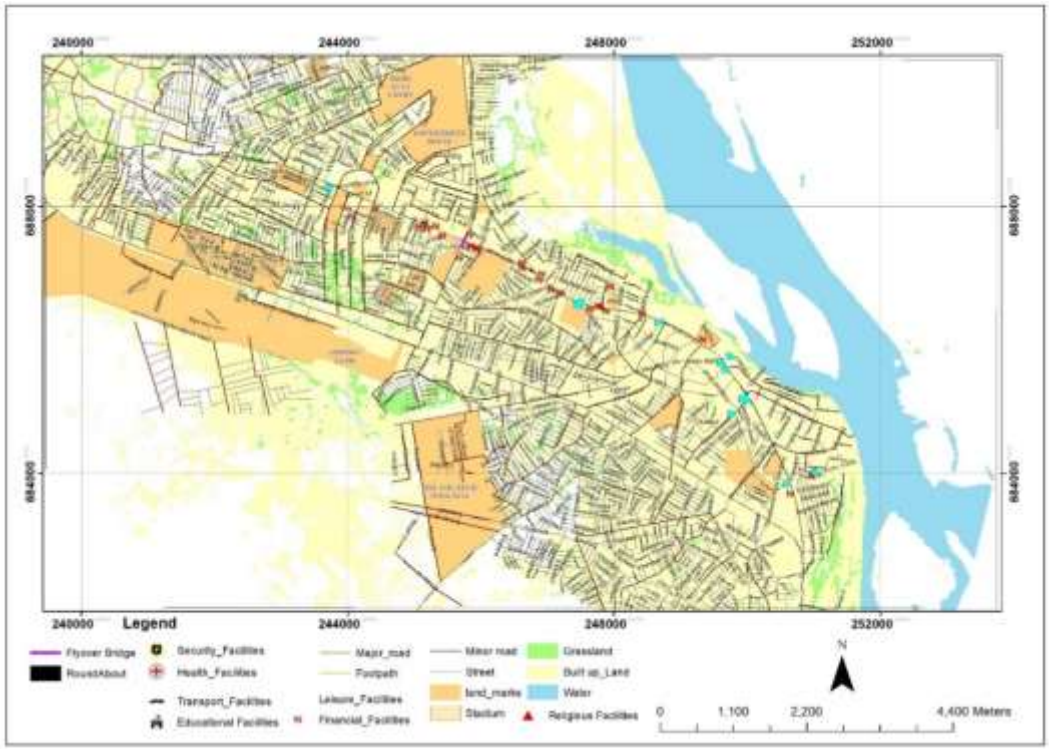

Figure 12: Financial facilities that are health safety conscious

From Figure 11 and 12, it can be deduced that only 14 out of 43 financial facilities were health safety conscious. This result indicated that only 32.55% of the financial facilities in Asaba were health safety conscious, this is a poor percentage as nearly 67% of the financial facilities do not have health and safety practices. It is advised that banking halls which is a high traffic area adopt health safety practices by placing hand sanitizers at strategic locations to help curb the spread of germs and outbreak of epidemics, the case of the ebola outbreak being an example.

3.7 Spatial Query to determine Security facilities with computerized management system.

Security organizations collect and store a vast amount of information. Traditionally, this information resided on sheets of paper stored in file cabinets. Today, police organizations are being transformed by the information age. Most have implemented management information systems (MIS) to record, store, access, and analyze data on reported crimes and arrests. it became necessary to query and determine if the security facilities in Asaba have embraced

the use of management systems, using the query statement (SELECT * FROM security_facilities WHERE “comp_fr_dsk” = ‘YES’ as shown in fig 13 and 4.14.

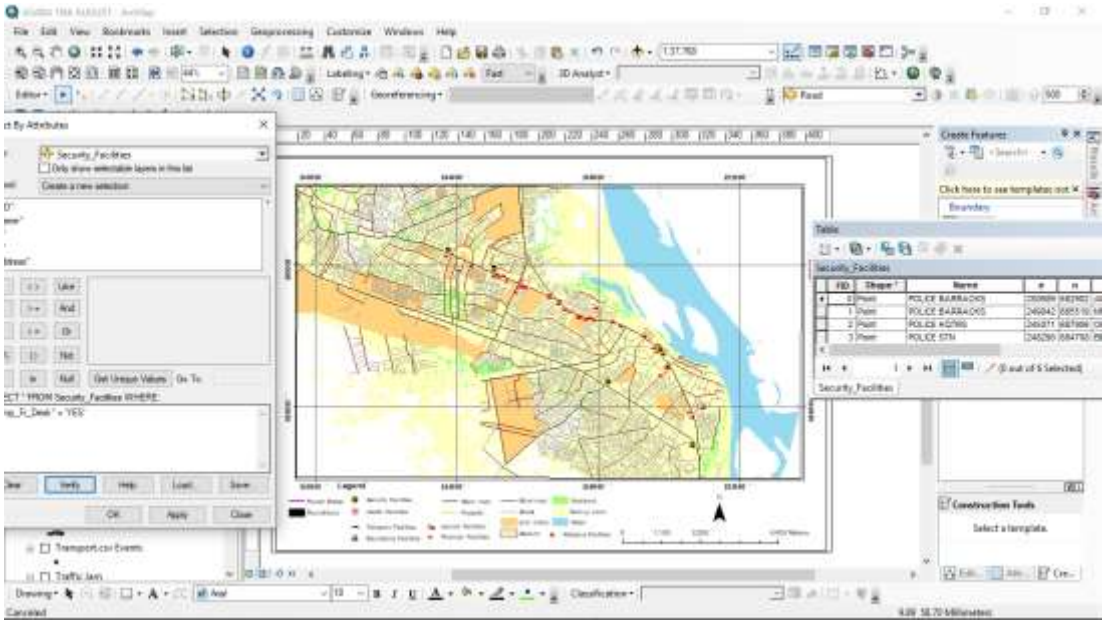

Figure 13: Query to determine security facilities with computerized management systems

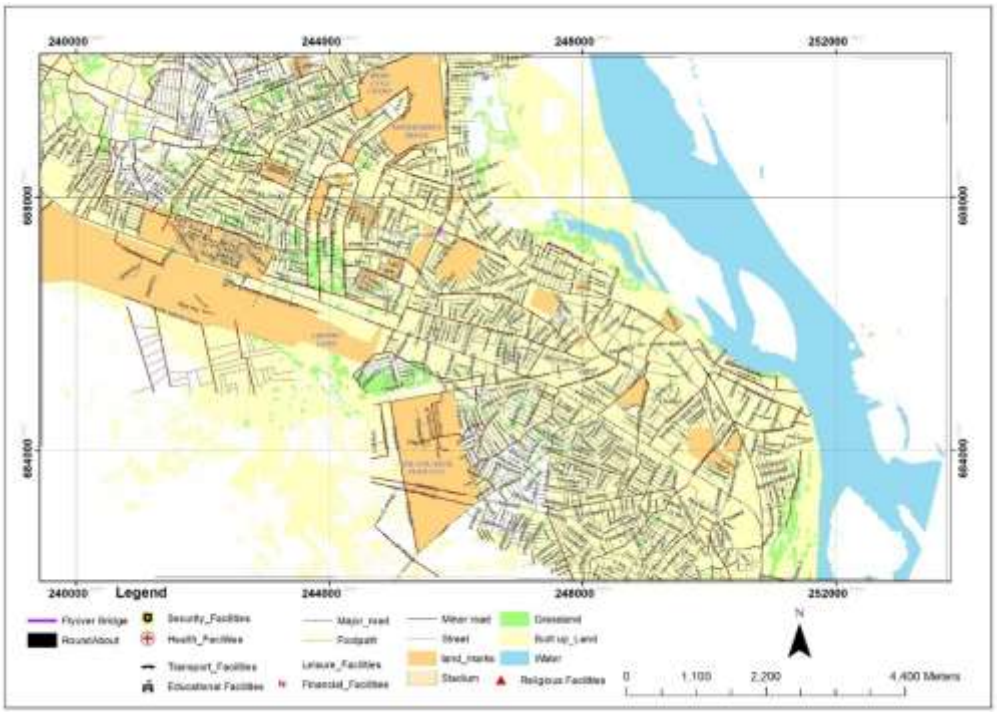

Figure 14: Security facilities with computerized management system.

From Figure 13 and 14, it can be deduced that none of the security facilities had a computerized management system. This result indicated that all of the security facilities in Asaba were still using the analog method of file storage, this is poor as this method promotes redundancy and is less transparency. The importance of having a computerized management system can never be overemphasized, and the security facilities are advised to upgrade as having information management capabilities plays a critical role in supporting all policing and administrative processes and enabling the delivery of quality services. Effective information management enables security forces to unlock the value of information and improve their efficiency and effectiveness by reducing the cost, time and resources of data collection and entry, providing timely access to high quality information held by different security organizations by enabling police forces to share high quality information securely and effectively.

3.9 Spatial Query to determine Security facilities with GIS Analytic labs.

Using geographic mapping techniques to analyze trends in crime, disorder, arrests, and calls-for-service is now becoming popular in many security agencies. Geographic Information Systems (GIS) are useful for visually plotting the occurrence of particular offenses within a jurisdiction. By combining statistics on crime with descriptions of land areas, crime analysts are able to "map-out" those areas in the community with concentrations of particular problems. The police can then focus their efforts within these relatively small "hot spots.". it then became necessary to query and determine if the security facilities in Asaba make use of GIS analytic labs, using the query statement (SELECT * FROM security_facilities WHERE “Analytic_lab” = ‘YES’ as shown in fig 15 and 16.

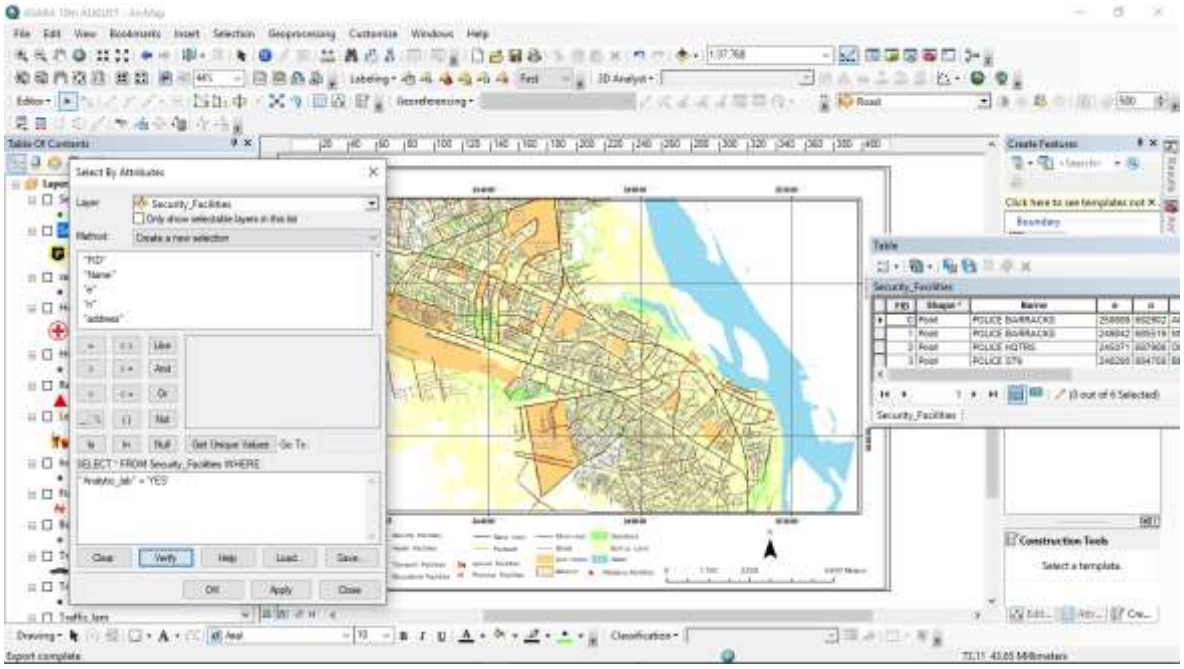

Figure 15: Query to determine security facilities that have GIS analytic labs

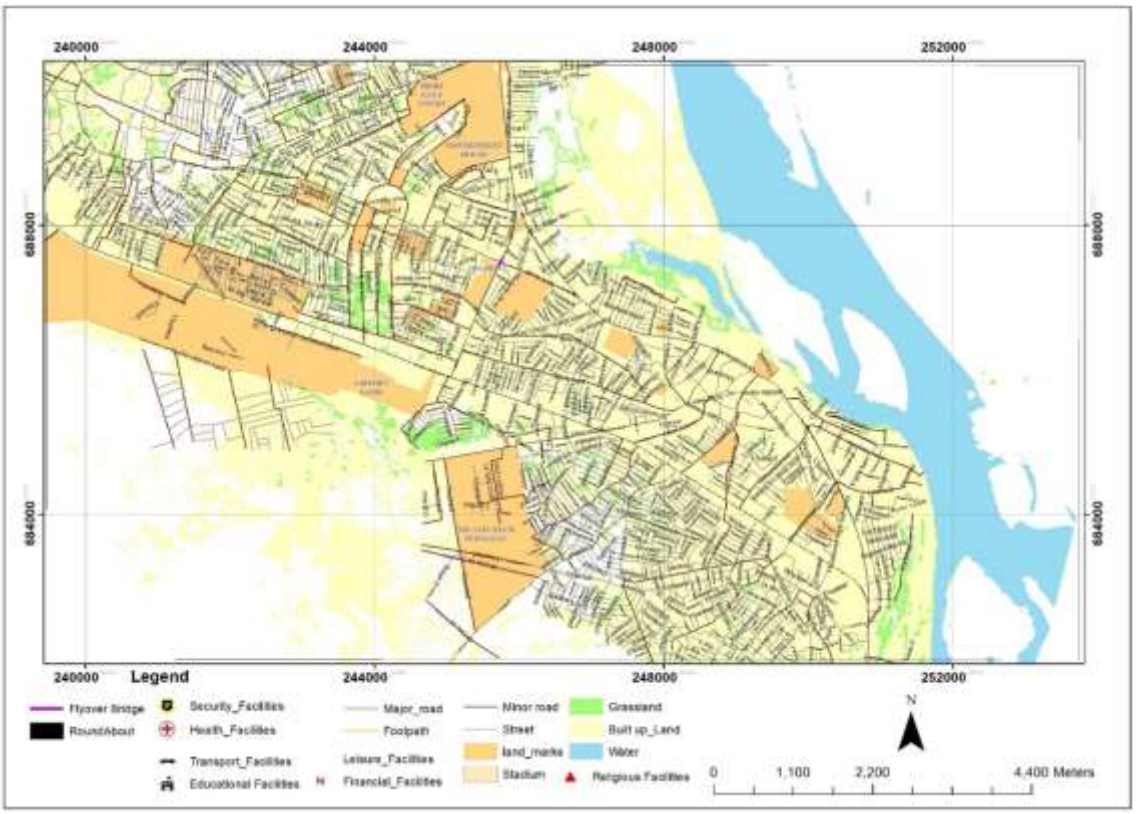

Figure 16: Security facilities with GIS analytic labs.

From Figure 17 and 18, it can be deduced that none of the security facilities had a GIS analytic lab. This result indicated that none of the security facilities in Asaba were using advanced techniques in crime analytics. The application of GIS is highly recommended in crime mapping administration in Asaba security facilities as ideally, GIS analytics can help to track crime trends. Thus, if there is a common trend of kidnapping in a particular location, a hotspot analysis and buffer operation can be applied and the results can help a police sting operation in the affected and surrounding areas, also an alternative route can be prescribed to commuters to help them avoid kidnapping spots while the police conduct their operations.

3.10. Spatial Query to determine transportation facilities with computerized bookings.

According to Akinyede *et al*, (2017), computerized booking systems bring activity business owners into the 21st century and it is defined as making a reservation or appointment for a service via the Internet. When you adopt computerized booking systems, your business gets an exciting edge for selling services, with it, customers can book for tickets online and pay via the Internet beforehand using debit/credit or master cards, thereby improving business administration. Knowing the benefits that one stands to gain from this, it became necessary to query and determine if the transportation facilities in Asaba make use of computerized bookings, using the query statement (SELECT * FROM transportation_facilities WHERE “comp_bookings” = ‘YES’ as shown in fig 17 and 18.

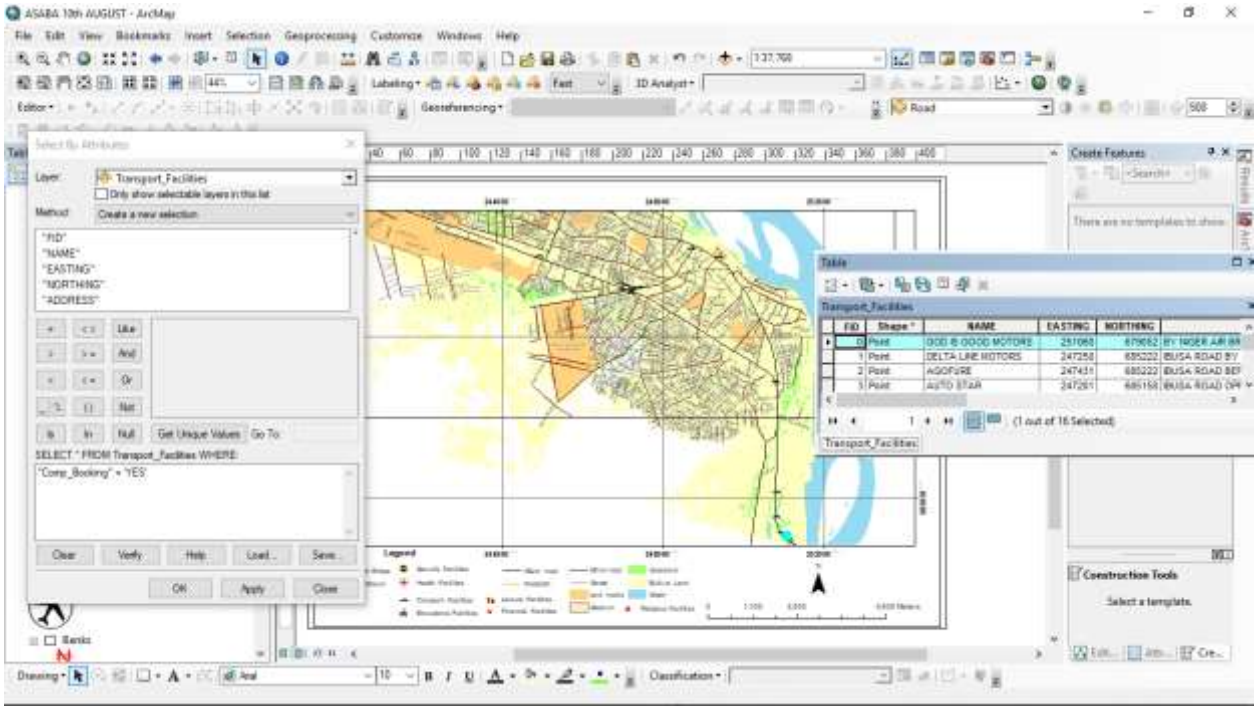

Figure 17: Query to determine transportation facilities with computerized bookings

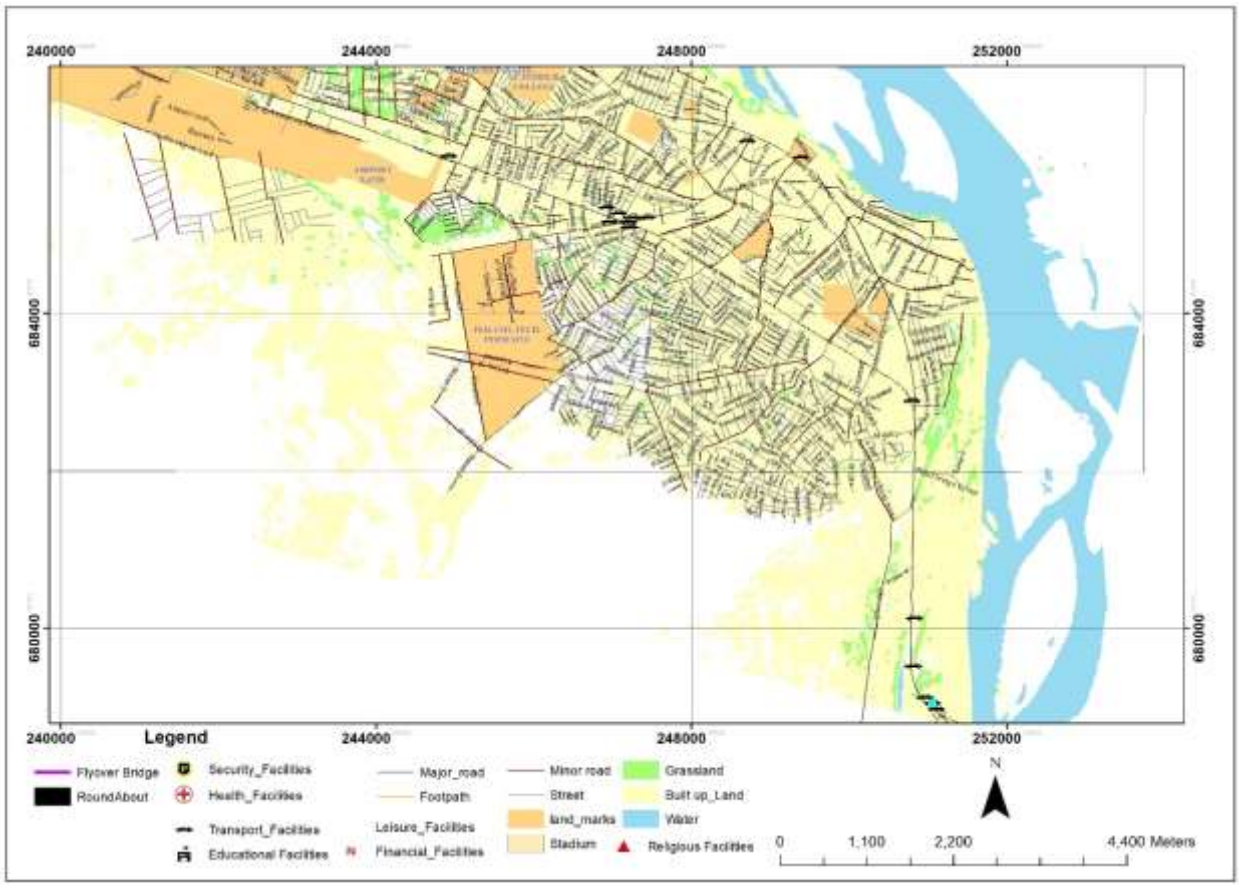

Figure 18: Transportation facilities with computerized bookings

From Figure 17 and 18, it can be deduced that only 1 out of the 16 transportation facilities make use of computerized booking system. The implication of this result means that there will be less transparency in the business administration of transportation facilities in Asaba, there would be no way for the owners to tracking how much these facilities generate daily, there would be no way for customers to transport goods and effectively track the movement of their goods. On ground except from God is Good transport, every other transportation facility makes use of the traditional receipt booking system which works but is prone to transparency issues and does not enhance transportation administration. Adopting a computerized booking service will promote ease of business, enhance efficiency and promote transparency in the transportation sector.

3.11 Spatial Query to determine religious facilities with crowd control.

Crowd control is a public security practice where large crowds are managed to prevent the outbreak of crowd crushes (Winter, 2012). In Asaba where most of the religious worshippers' park roadsides thereby causing traffic for commuters, effective crowd management is important to be able to manage expected and unexpected crowd occurrences. Therefore, a query was structured to determine religious facilities that employ use of crowd control, using the statement (SELECT * FROM religious_facilities WHERE "crowd_contr" = 'YES' as shown in fig 19 and 20.

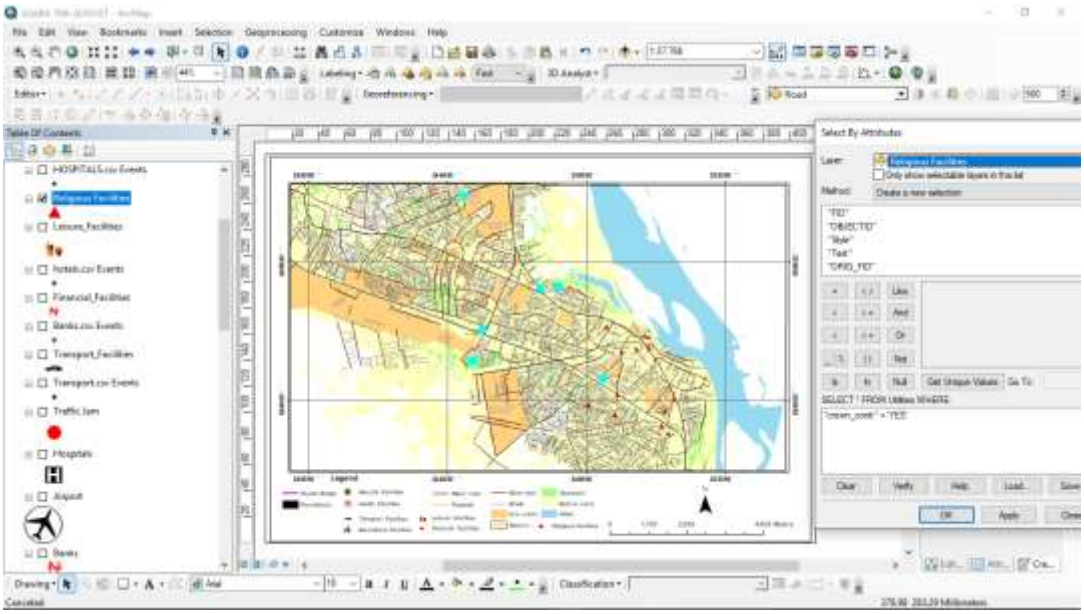

Figure 19: Query to determine religious facilities that employ crowd control.

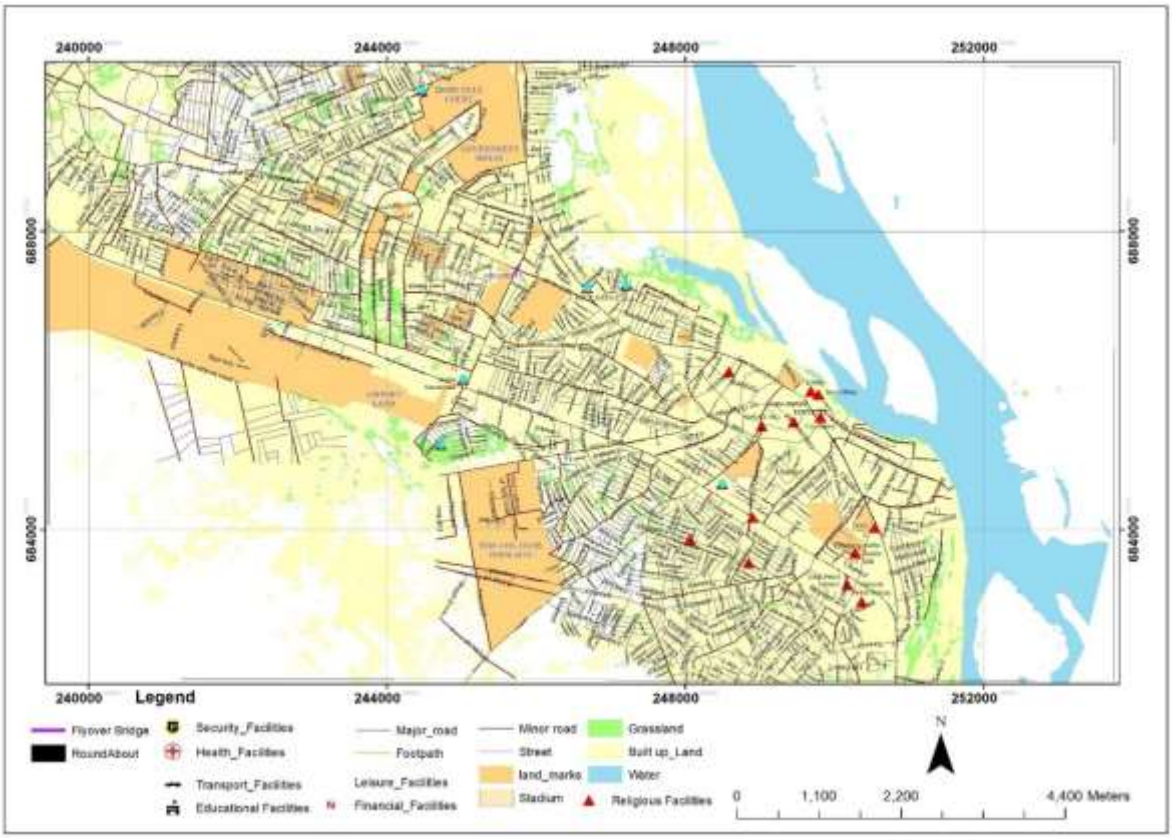

Figure 20: Religious facilities that employ crowd control in Asaba

From Figure 19 and 20, it can be deduced that only 6 out of the 25 religious facilities make use of crowd control. The implication of this result means 76% of religious facilities neglect the crowd control aspect. Neglecting crowd control will bring about issues like traffic congestions. Crowd control should be an important part of any organization, organized parking and controlled crowd movement will help enhance security monitoring, which will enable effective monitoring of expected and unexpected crowd occurrences in Asaba.

4. Conclusion

This study utilized spatial query analysis within a Geographic Information System (GIS) framework to assess the functional status and administrative sufficiency of socio-economic facilities in Asaba, Delta State, Nigeria. The objective was to extract spatially-referenced insights capable of informing

evidence-based decisions in the management of health, education, financial, religious, transportation, and security infrastructure. By integrating field-acquired facility data with structured attribute queries, the study provided a diagnostic evaluation of the readiness, technological adoption, and physical adequacy of facilities across diverse sectors.

The results revealed a dichotomy in infrastructural conditions and administrative sophistication among the different categories of facilities. Health facilities, although maintaining a generally clean environment, demonstrated significant technological deficits. None of the 15 surveyed health institutions had adopted computerized front desk systems, and only 60% were found to be well equipped, indicating an urgent need for modernization. This shortfall presents potential consequences for clinical service quality, patient record accuracy, and overall administrative efficiency.

Similarly, educational facilities exhibited a mixed pattern. While approximately 79% had functional and funded libraries, a substantial proportion (33.33%) were housed in dilapidated buildings, which undermines effective teaching and learning environments. The results further indicated that physical infrastructure in schools requires significant upgrading to meet acceptable standards of safety, comfort, and pedagogical adequacy.

In the financial sector, only 32.55% of institutions were identified as health-safety conscious, highlighting poor compliance with public hygiene protocols in an environment characterized by high physical contact and currency exchange. This has implications for disease transmission, especially in the context of ongoing global public health challenges.

Security facilities emerged as the most technologically underserved category. The spatial queries confirmed that none of the security installations had computerized management systems or GIS-based crime analysis laboratories. These technological inadequacies limit the capacity of law enforcement agencies to efficiently record, retrieve, analyze, and act upon data—thereby weakening institutional readiness in responding to crime trends, monitoring criminal hotspots, and conducting evidence-based operations.

Transportation facilities also reflected technological insufficiencies, with only one out of sixteen surveyed entities adopting computerized booking systems. This exposes the sector to operational opacity, limits customer convenience, and undermines administrative transparency. Moreover, the analysis of religious facilities indicated that 76% had no mechanisms for crowd control, a critical deficiency in a city where unregulated gatherings contribute to traffic congestion and compromise public safety.

The cumulative findings underscore a systemic lack of technological integration, infrastructural standardization, and proactive administrative oversight in the management of Asaba's socio-economic infrastructure. These inadequacies impede service delivery, increase operational inefficiencies, and elevate public health and safety risks. Furthermore, they reveal gaps in planning coordination, regulatory enforcement, and investment prioritization.

However, the study also illustrates the significant potential of GIS-driven spatial queries as a tool for urban governance. The ability to interrogate facility attributes spatially and generate targeted insights provides urban administrators with an actionable decision-support mechanism. Spatial queries not only assist in identifying infrastructural deficits but also support planning for equitable resource allocation, performance benchmarking, and development forecasting.

Moving forward, it is recommended that relevant state agencies institutionalize spatial databases for all critical infrastructure sectors and establish regular data update protocols. The integration of geospatial analysis into routine administrative procedures will enhance transparency, facilitate monitoring and evaluation, and promote strategic infrastructure investment. Additionally, policy frameworks should prioritize the digitization of service delivery platforms, particularly in health, security, and transportation sectors, where technological gaps were most acute.

Finally, the study's methodology offers a scalable model for other urban centers in Nigeria and the Global South. By demonstrating how geospatial technologies can be employed not merely for mapping but for strategic decision-making, this research contributes to a growing body of work advocating for smart, data-informed, and spatially just urban governance.

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