



FIG WORKING WEEK 2023

28 May - 1 June 2023 Orlando Florida USA

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Map Revision of Small Scaled Topographic Sheet 303 Abakaliki South-West (SW), Nigeria

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PRESENTATION OUTLINE

- INTRODUCTION
- MATERIALS AND METHODS
- RESULTS AND ANALYSES
- CONCLUSION AND RECOMMENDATION

INTRODUCTION

- Up-to-date and accurate maps are basic tools for any meaningful planning, systematic development, and effective management.
- Once maps are produced in hardcopy, they becomes static, partly out-of-date by the time of their publication.
- The true aim of map revision is to keep all maps up-to-date with relevant changes as may be witnessed over time.

Introduction cont.

- Advancements in instrumentation, techniques and software have given the map makers new tools for creating and updating maps.
- The need for the use of remotely sensed datasets and GIS techniques for updating maps cannot be overemphasized.
- This paper revised the existing Topographical map of sheet 303 Abakaliki South West.

Introduction: study area

- The study area lies within Abakaliki, Ezza North, Ezza South, Ikwo, and Onicha L.G.As of Ebonyi State.
- Latitude $6^{\circ}00'$ - $6^{\circ}15'$ N, and Longitude $8^{\circ}00'$ - $8^{\circ}15'$ E;
- Approximate Area of 780 km^2

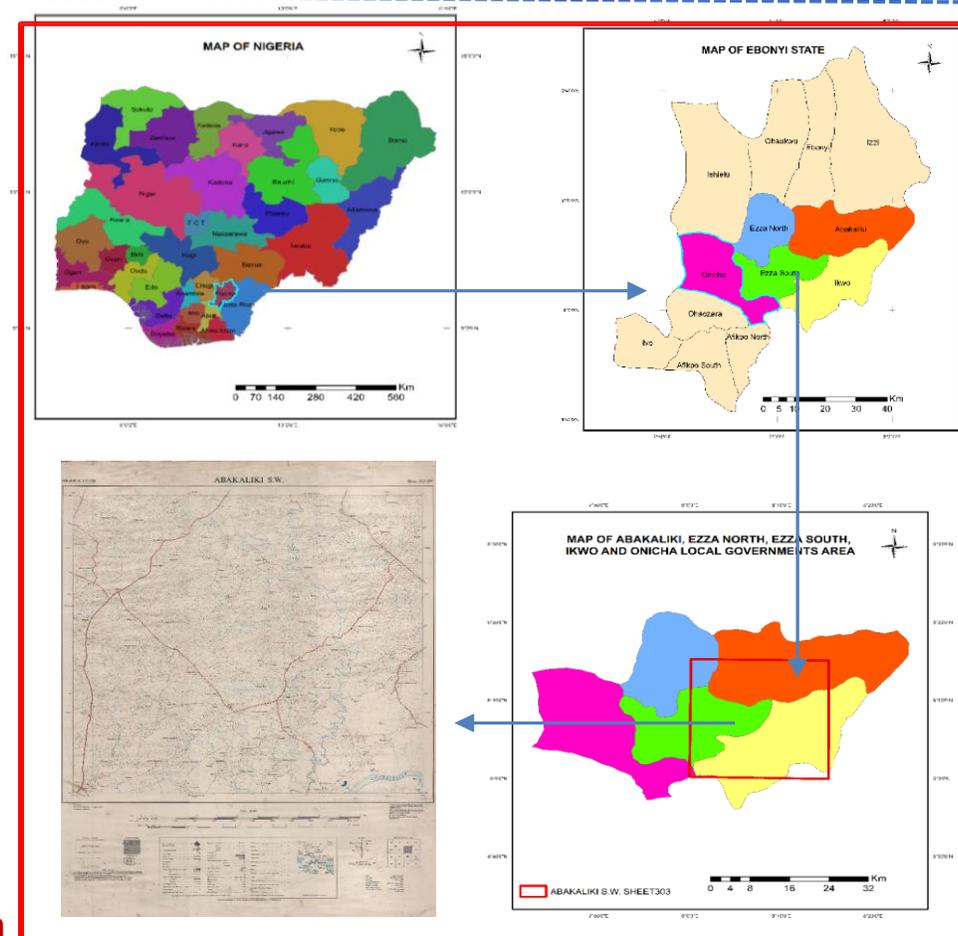


Figure 1: Locational Maps of the Study area

MATERIALS AND METHODS

• Materials :

- ✓ *Abakaliki SW topographical map SHEET 303*
- ✓ *GRID3 Nigeria Infrastructural dataset,*
- ✓ *High-Resolution Satellite Imagery;*
- ✓ *15m Terra-Color imagery*
- ✓ *2.5m SPOT Imagery*
- ✓ *Scanners;*
- ✓ *ASTER DEM*
- ✓ *Computer Sets;*
- ✓ *Printers;*
- ✓ *Esri ArcGIS 10*
- ✓ *Microsoft Office*
- ✓ *Global Mapper*

MATERIALS AND METHODS cont.

- **Materials :**

Table 1: Shows the coordinate of the mapped area

Point ID	Geographical coordinates to be converted (° ' ")		Result of the Universal Transverse Mercator coordinate	
	Latitude	Longitude	Northing (m)	Easting (m)
Pt1	6 15 00	8 00 00	690824.721	389453.656
Pt2	6 15 00	8 15 00	690778.738	417111.412
Pt3	6 00 00	8 15 00	663140.666	417072.812
Pt4	6 00 00	8 00 00	663184.837	389402.183

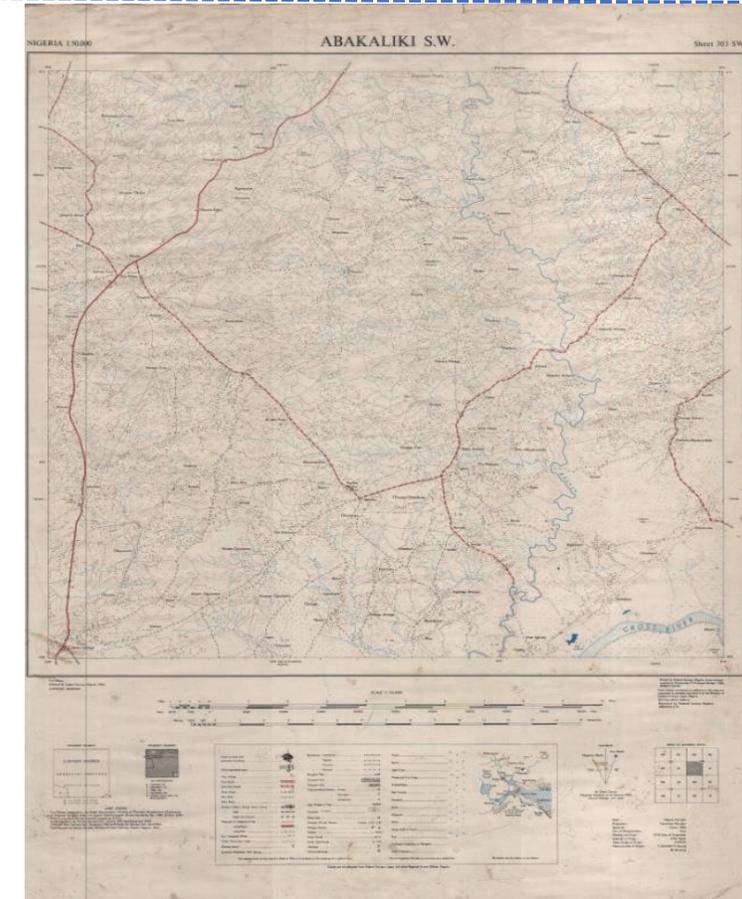


Figure 2: The acquired 1966 map sheet

MATERIALS AND METHODS cont.

- **Methods** of Data Sources, Acquisition, and Processing:

- ✓ Planning and preparation
- ✓ Data searches (for both primary and secondary data)
- ✓ Data Acquisition: GRID³ Infrastructure dataset; Satellite dataset ; Aster DEM
- ✓ Data processing and Generating Relief information (from DEM data)
- ✓ Database Creation; Data Security; Data Integrity and Database Maintenance

MATERIALS AND METHODS cont.

- **Methods** of Data Sources, Acquisition, and Processing:

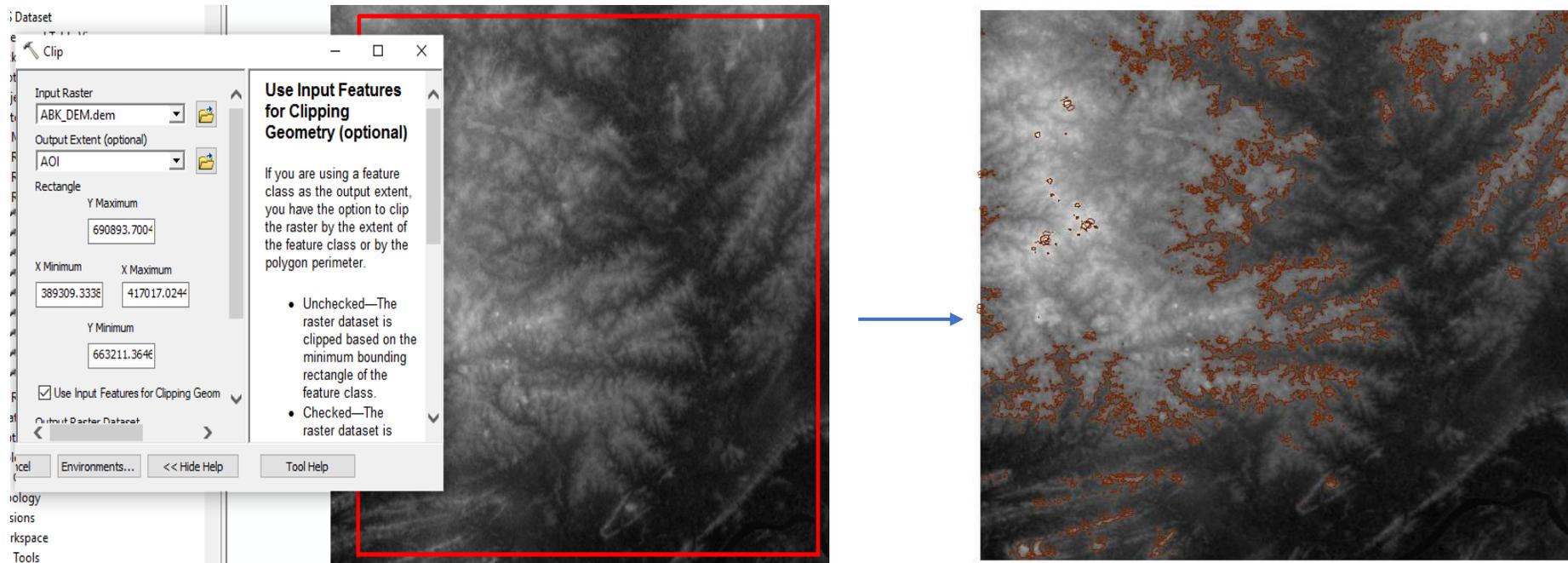


Figure 3: Clipping of DEM File to fall within Area of Interest and generated contour output

RESULTS AND ANALYSES: Land use and Expansion

Table 2: Showing expansion of settlement as at 1966

Major settlement extent of expansion as at 1966

Settlements	Area (m2)	Perimeter (m)	Coverage (%)
Amagu	1086004.868628	9697.914268	0.14
Amuzu	1081541.302359	10164.10846	0.14
Igbidu	310996.16053	8667.560135	0.04
Akahufu	2782454.808565	24845.931924	0.36
Echialike	1984069.027513	18349.639274	0.26

Table 3: Showing expansion of settlement as at 2019

Major settlement extent of expansion as at 2019

Settlements	Area (m2)	Perimeter (m)	Coverage (%)
Amagu	4341400.721194	8978.105045	0.57
Amuzu	7583074.471298	13188.408444	0.99
Igbidu	2078044.386122	5933.871442	0.27
Akahufu	5713300.554281	11292.955386	0.75
Echialike	6087833.327937	9940.235933	0.80

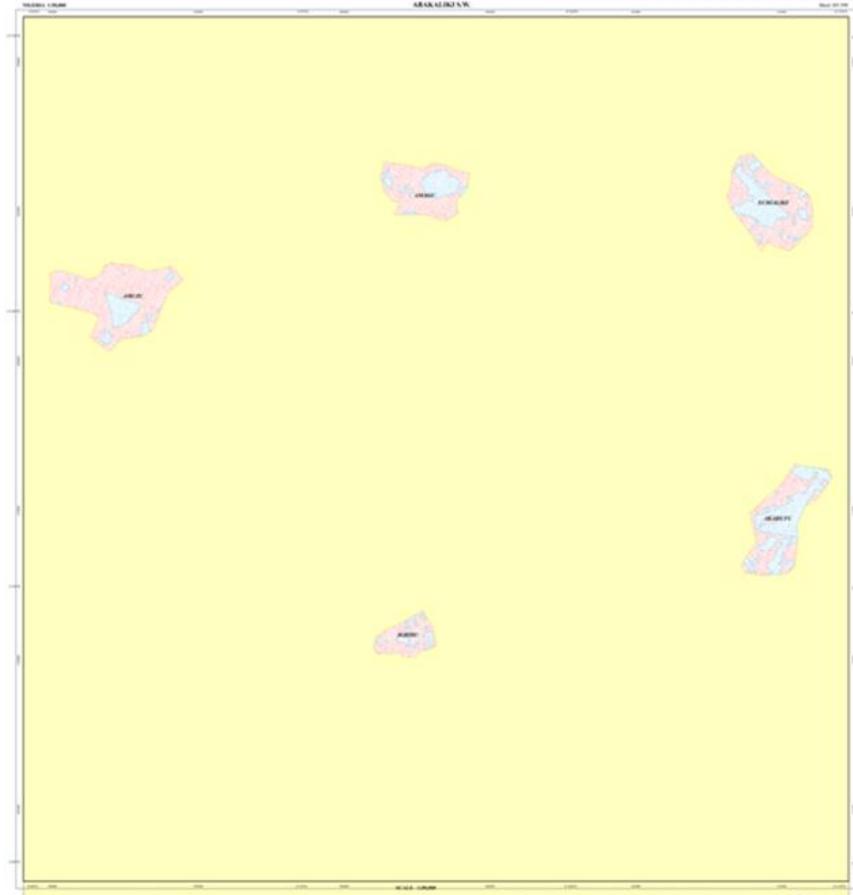


Figure 4: Settlement coverage measured in 1966 & 2019

RESULTS AND ANALYSES

Land use and Expansion

- A high concentration of human activities in major towns.
- There was no school as of 1966
- In 2019 a total of 308 Primary schools, 143 Secondary schools, and 7 Tertiary schools were discovered.

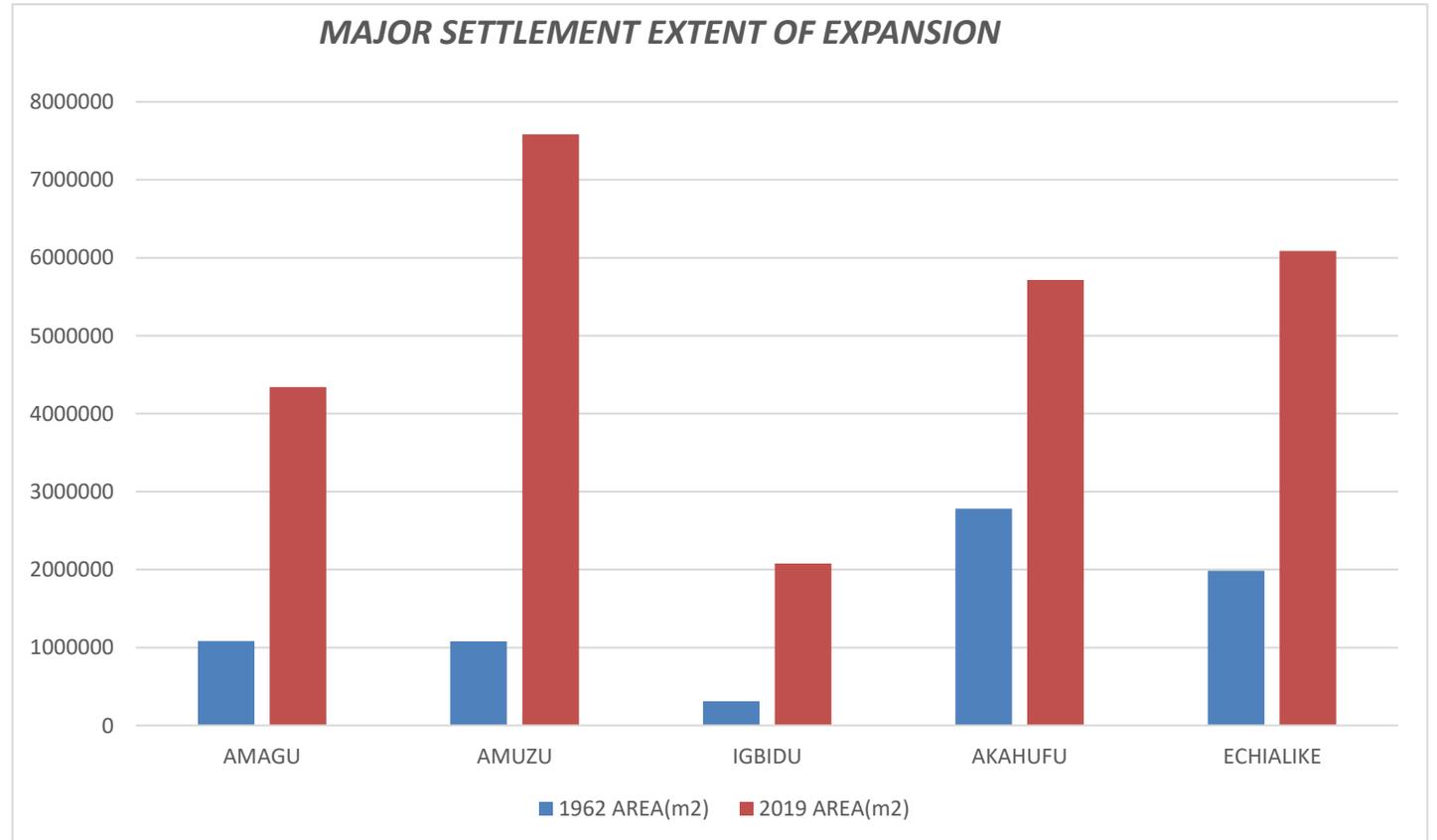


Figure 5: Comparison of settlements extent as of 1966 and 2019

RESULTS AND ANALYSES

Analysis of Road

Table 4: Roads identified in 1966

Roads	Length (m)	Coverage %
Main road	33305.4875	16.034
Secondary roads	75526.3019	36.362
Minor roads	98877.1235	47.604
Total	207708.9129	100.000

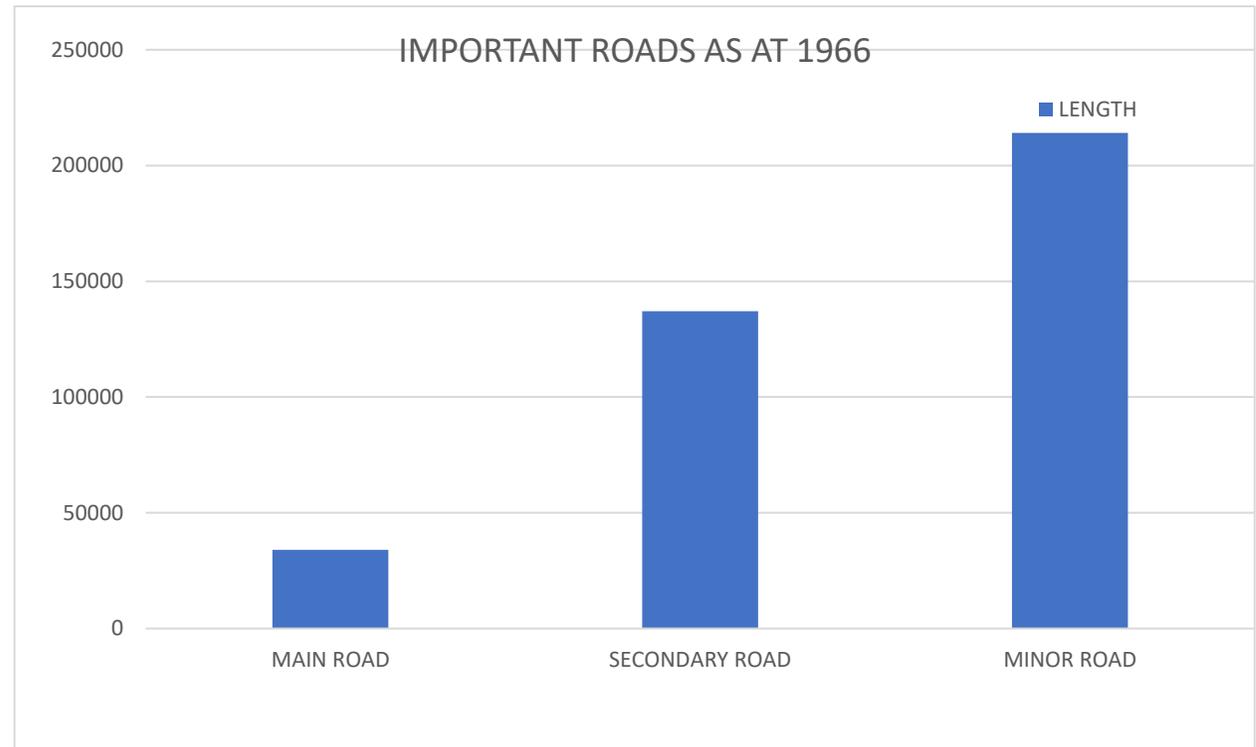


Figure 6: Bar chart showing Total Length Coverage of Road Type in 1966 (Source: topographic map sheet 303 ABAKALIKI S. W.)

RESULTS AND ANALYSES

Analysis of Road cont.

Table 5: Identified road in 2019

Important roads	Length (m)	Coverage %
Main roads	33975.83489	8.82
Secondary roads	137068.700179	35.59
Minor roads	214080.694126	55.59
Total	385125.2292	100

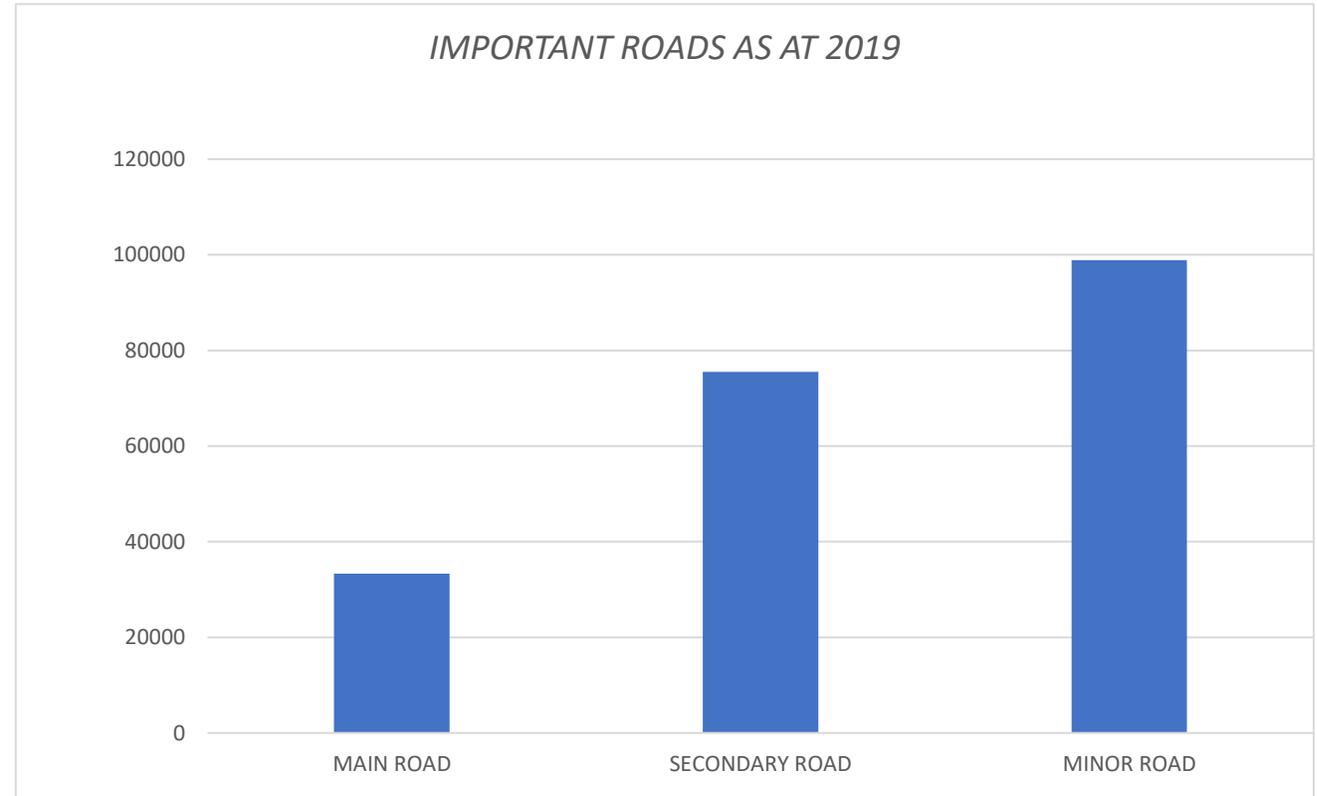


Figure 7: Bar chart Showing Length of Road type in 2019 (Source: GRID³ NIGERIA.)

RESULTS AND ANALYSES

Analysis of Road cont.

Table 6: Comparison of road Length in 1966 & 2019

Road Type	Length (m) (1966)	Length (m) (2019)
Main road	33305.487518	33975.83489
Secondary road	75526.301912	137068.700179
Minor road	98877.123471	214080.694126
TOTAL	207708.9129	385125.2292

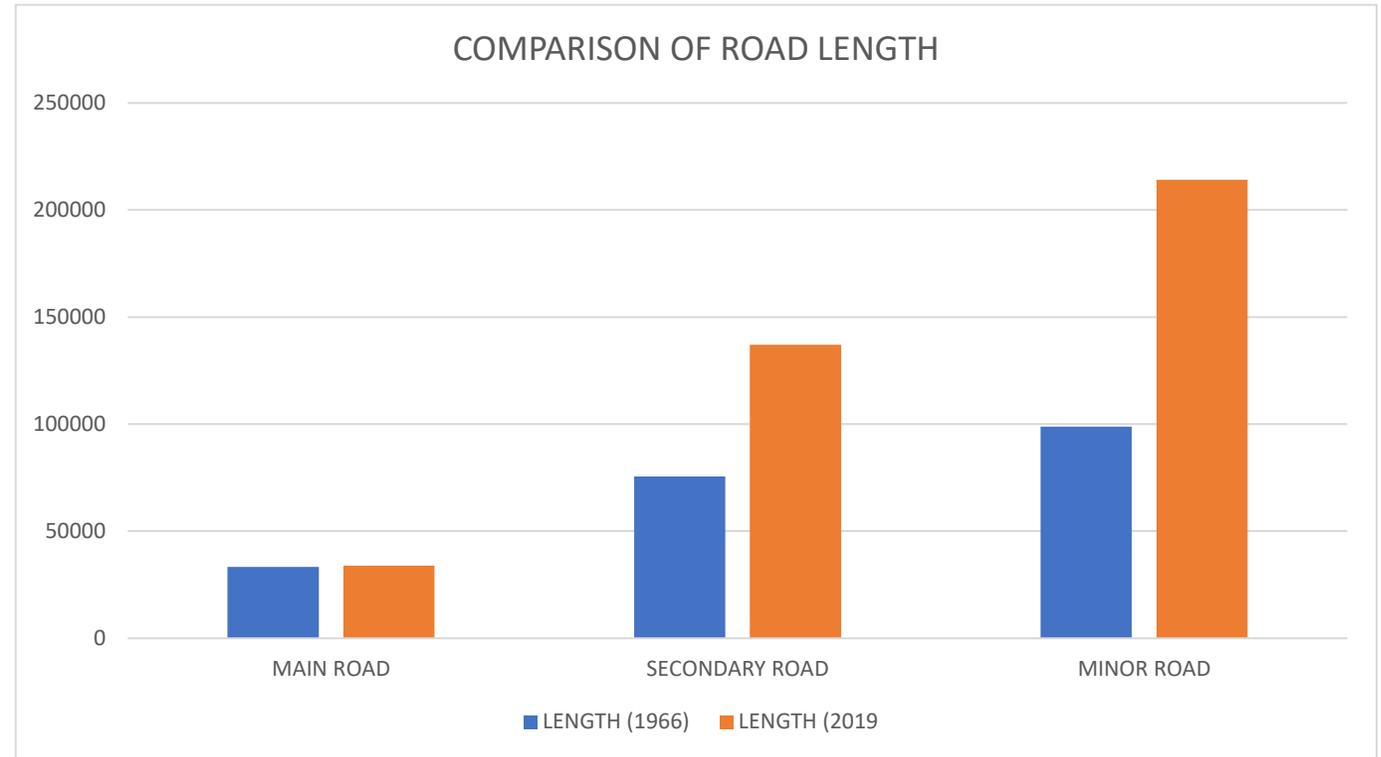
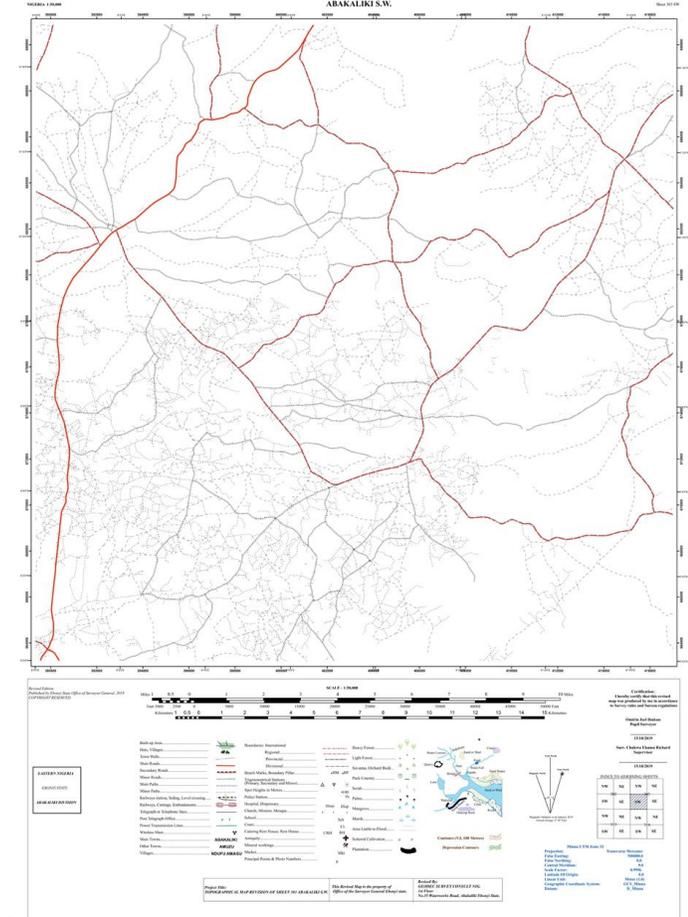
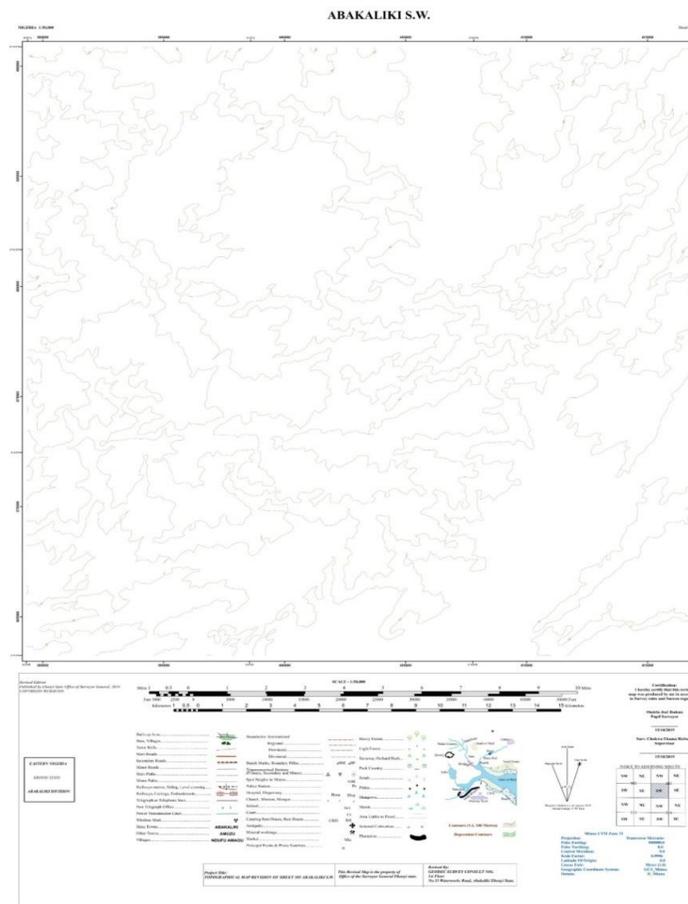


Figure 8: Bar chart showing a Comparison of Road Length in 1966 and 2019

RESULTS AND ANALYSES



Figures 9: Revised map sheet of 2019

RESULTS AND ANALYSES **cont.**

- ✓ Changes in the elevation of the mapped area were discovered after generating the contour from the DEM dataset.
- ✓ some areas have increased in elevation as a result of landfill and urbanized construction while others decreased in elevation as a result of sand mining and mineral extraction.
- ✓ The elevations of places close to Cross River State have decreased i.e. the elevations were less than the elevation of the same area in 1966, this could be a result of coastal erosion or subsidence.

RESULTS AND ANALYSES **cont.**

- The 1966 topographic map of Abakaliki South West of scale 1:50,000 was revised in this study.
- The result shows a high concentration of human activities in major towns like Amagu, Amuzu, Igbidu, Akahufu, and Echialike as regards the built-up areas in the classification result.
- These findings are applicable for planning the environment; for monitoring the trends and changes within a particular locality; for mineral and energy exploration and/or exploitation; and lastly, for national defense, navigation, and positioning.

RESULTS AND ANALYSES: **Problems Encountered**

- Getting the actual names of the towns, was difficult as most towns are being called multiple names.
 - ✓ *To take care of this situation only names from recognized publishers were adopted.*
- Security challenge into accessing some nooks and cranes of the study area to acquire spatial and attribute data.
 - ✓ *However, this was surmounted by going with security personnel to the area, though this caused a delay on a few occasions.*

CONCLUSION

- From the findings, there were many changes in the topographic information; settlements, road types, and road names in the mapped area for 2019 when compared to what was existing in the 1966 topographic sheet.
- Further analysis showed that a lot of changes had happened from 1966 to 2019.

RECOMMENDATION

- ☛ It is recommended that, the revision of all categories of maps should be embarked upon as often as possible.
- ☛ Integrated approach should be employed in any map production because it provides versatility in acquiring data from various sources and as well as in processing, and presentation.
- ☛ End users should always go for the revised UpToDate topo maps instead of obsolete and nearly outdated ones.

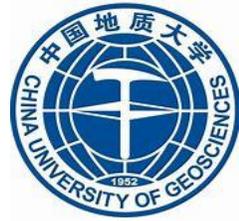


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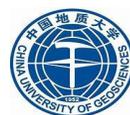
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