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MAPPING AND SUITABILITY ANALYSIS OF EXISTING ELECTORAL POLLING UNITS IN KATSINA LOCAL GOVERNMENT AREA OF KATSINA STATE, NIGERIA

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PRESENTATION OUTLINE

- INTRODUCTION
- MATERIALS AND METHODS
- RESULTS AND ANALYSIS
- CONCLUSION AND RECOMMENDATIONS

INTRODUCTION

- Nigeria is one of the largest democracies in the world, with the largest population in Africa.

- The Independent National Electoral Commission (INEC) is responsible for voters registration and conducts of election at local, state and federal level.

- Over 56,872 new polling units created in the country with a of 176,846 (as of 16th June, 2021)

INTRODUCTION cont.

- Decongesting overcrowded Polling Units, dispersing voters as evenly as possible, ease of access to ballot boxes were some of the reasons for new PUs

- This faced a lot of criticism because of alleged disproportionate distribution of the polling units based on rule of thumb rather than scientific approach.

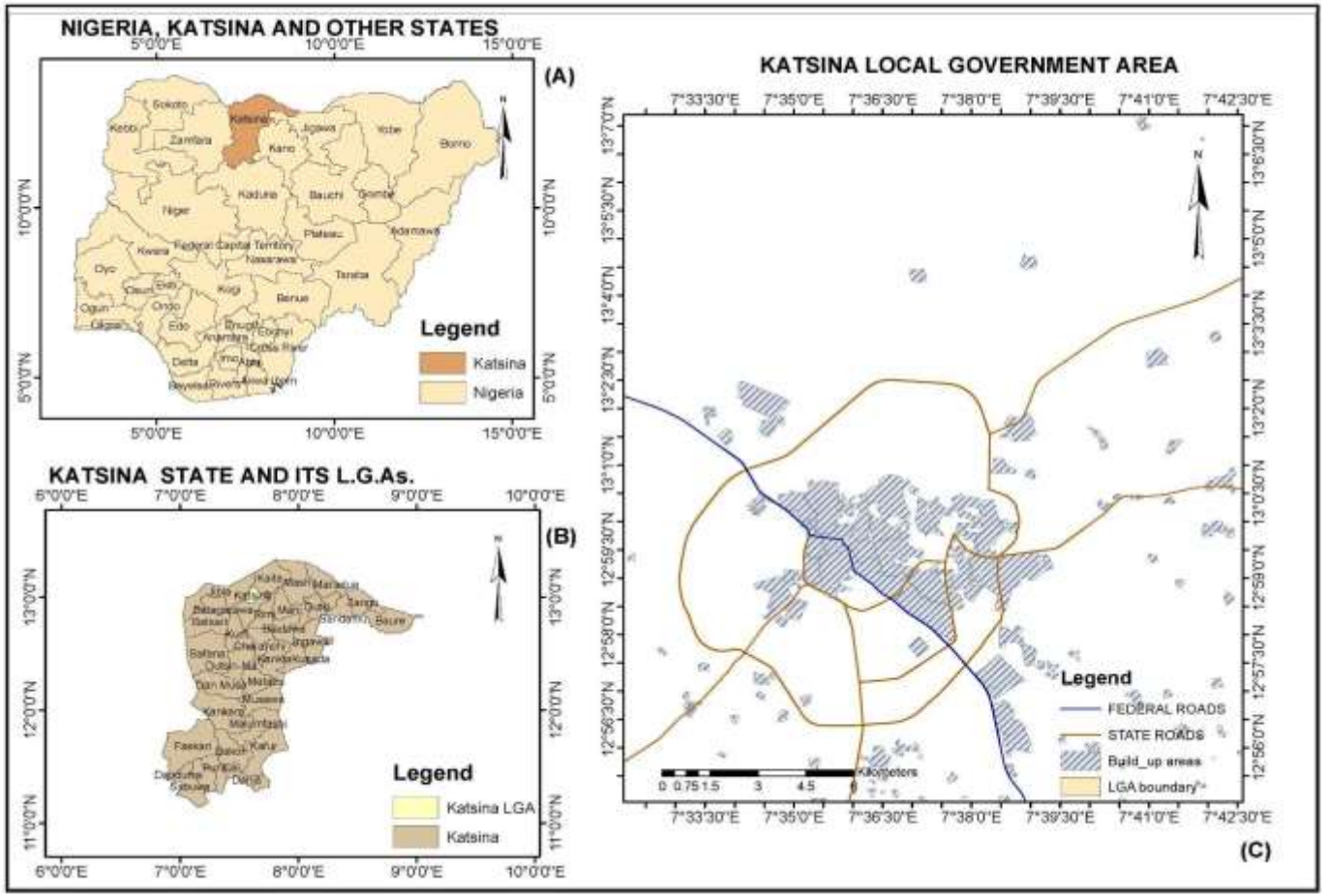
INTRODUCTION cont.

- **Related research carried out in the past mostly worked on either:**
  - ***their distribution pattern and their proximity to voters;***
  - ***polling units geodatabase;***
  - ***determination of suitable locations for polling units, etc*.**

- **This study therefore used geospatial technique to map out the existing PUs and create a suitability map to analyse the suitability or otherwise of the existing PUs to aid in conduct of free, fair, peaceful, and credible elections.**

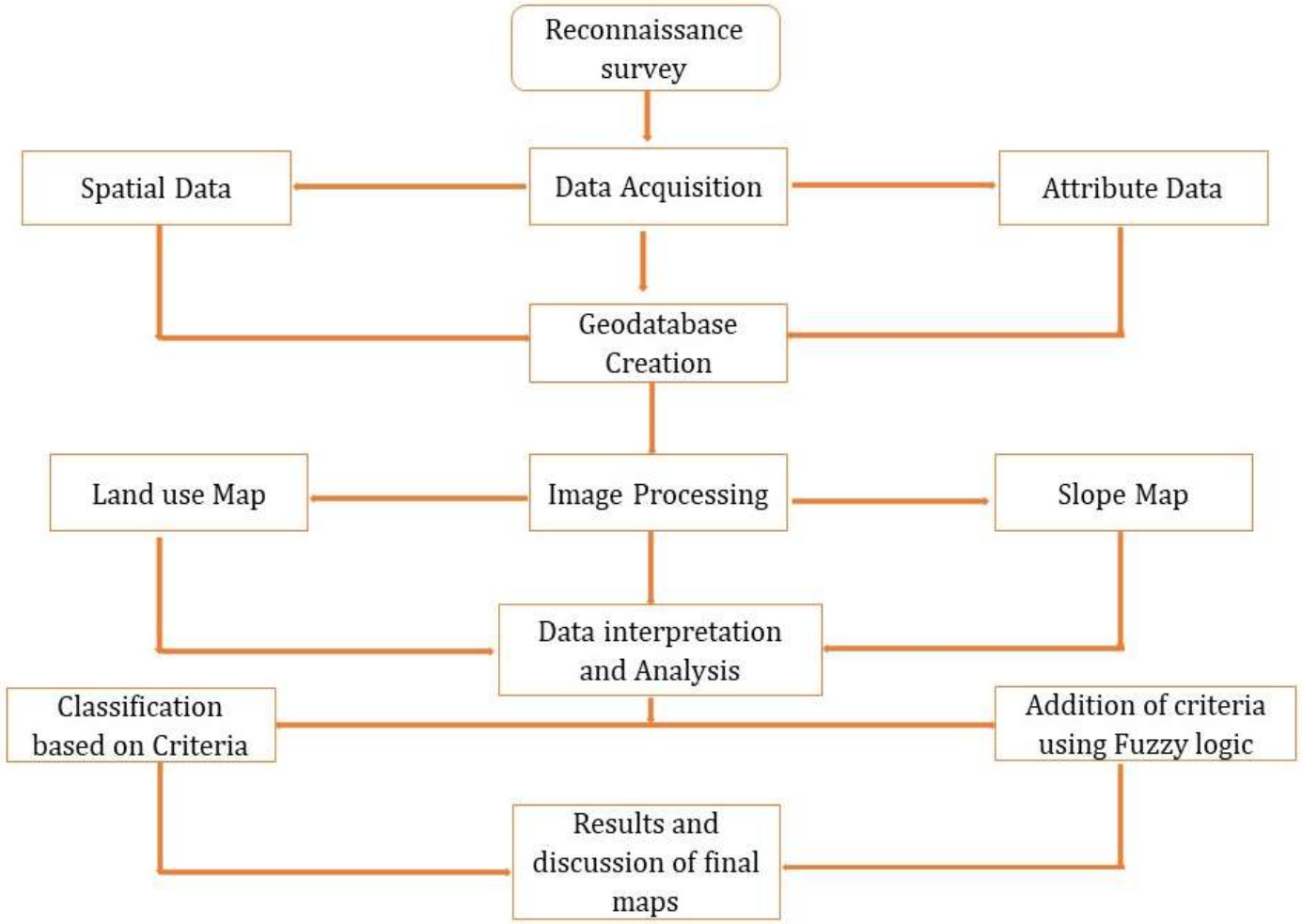
Study area

- Katsina L.G.A. is the capital of Katsina State, Nigeria
- Area: 142 km²
- Latitude 12° 45'N to 13° 15'N and Longitude 7° 31'E and 8° 00'E.
- Projected population 429,400 (NPopC, 2016).
- 12 voters polling wards and 281 PUs



MATERIALS AND METHODS

- **Methodology workflow diagram**



MATERIALS AND METHODS

S/N	Data Type	Data name	Date	Resolution/Scale	Source
1	primary	Interview	19/8/20	Not Applicable	INEC office Abuja
2	primary	GPS coordinates	4/11/20	Not Applicable	Field
3	secondary	Imagery of Katsina LGA (Landsat8)	10/2/21	30m	USGS Website
4	secondary	SRTM	10/2/21	90m	USGS Website

MATERIALS AND METHODS

Fuzzy membership value in metre assign for each factor

Factors	A	B	C	D
Hospital	100	600	800	>1000
School	50	400	700	>1000
Settlements	100	500	700	>1000
Highway	200	500	700	>1000
Major road	100	400	800	>1000
Other road	100	400	700	>1000
Police station	100	400	800	>1000

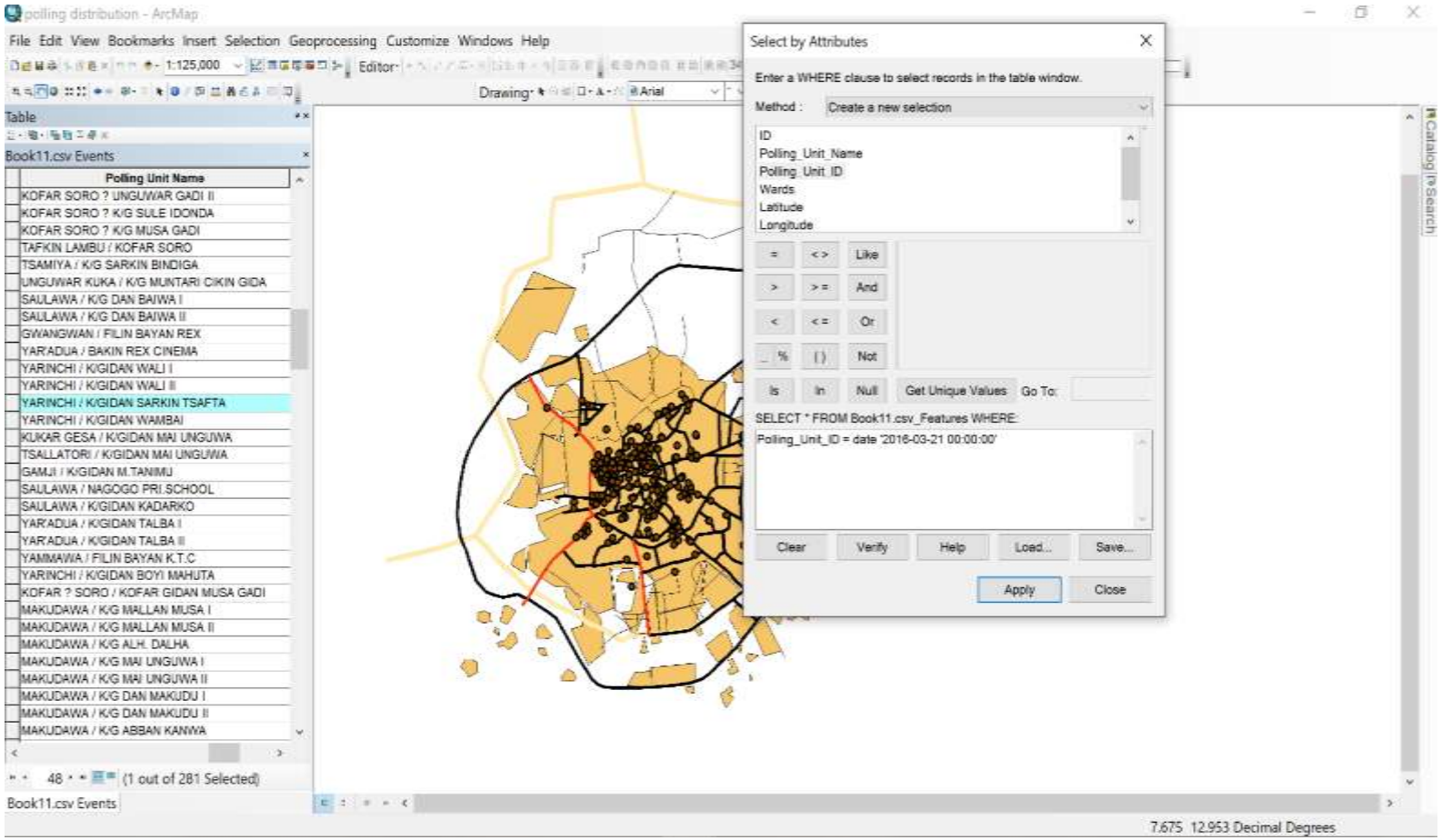
MATERIALS AND METHODS

Weight matrix showing a comparison of each factor against one another.

Factors	HW	MR	OS	OR	SH	SM	HP	SD
Highway (HW)	1							
Major road (MR)	3	1						
Open space (OS)	8	5	1					
Other road (OR)	3	3	1/5	1				
School (SH)	5	4	1/2	4	1			
Settlement (SM)	3	3	1/3	3	1/3	1		
Hospital (HP)	5	3	1/5	1/3	1/3	1/2	1	
Slope degree (SD)	1/3	1/3	1/9	1/3	1/9	1/3	1/3	1

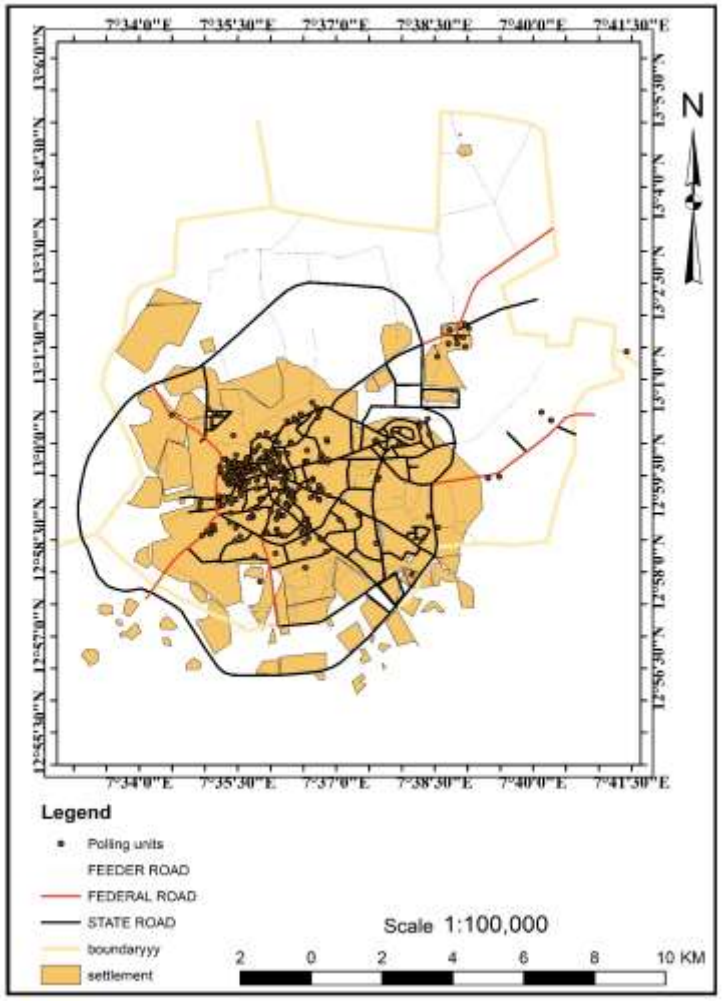
RESULTS AND ANALYSIS

- **Queries of geodatabase of existing polling units**
  - ✓ ***A geodatabase of total of 281 polling units;***
  - ✓ ***Different attributes such as polling unit ID and wards within the study area, etc.***



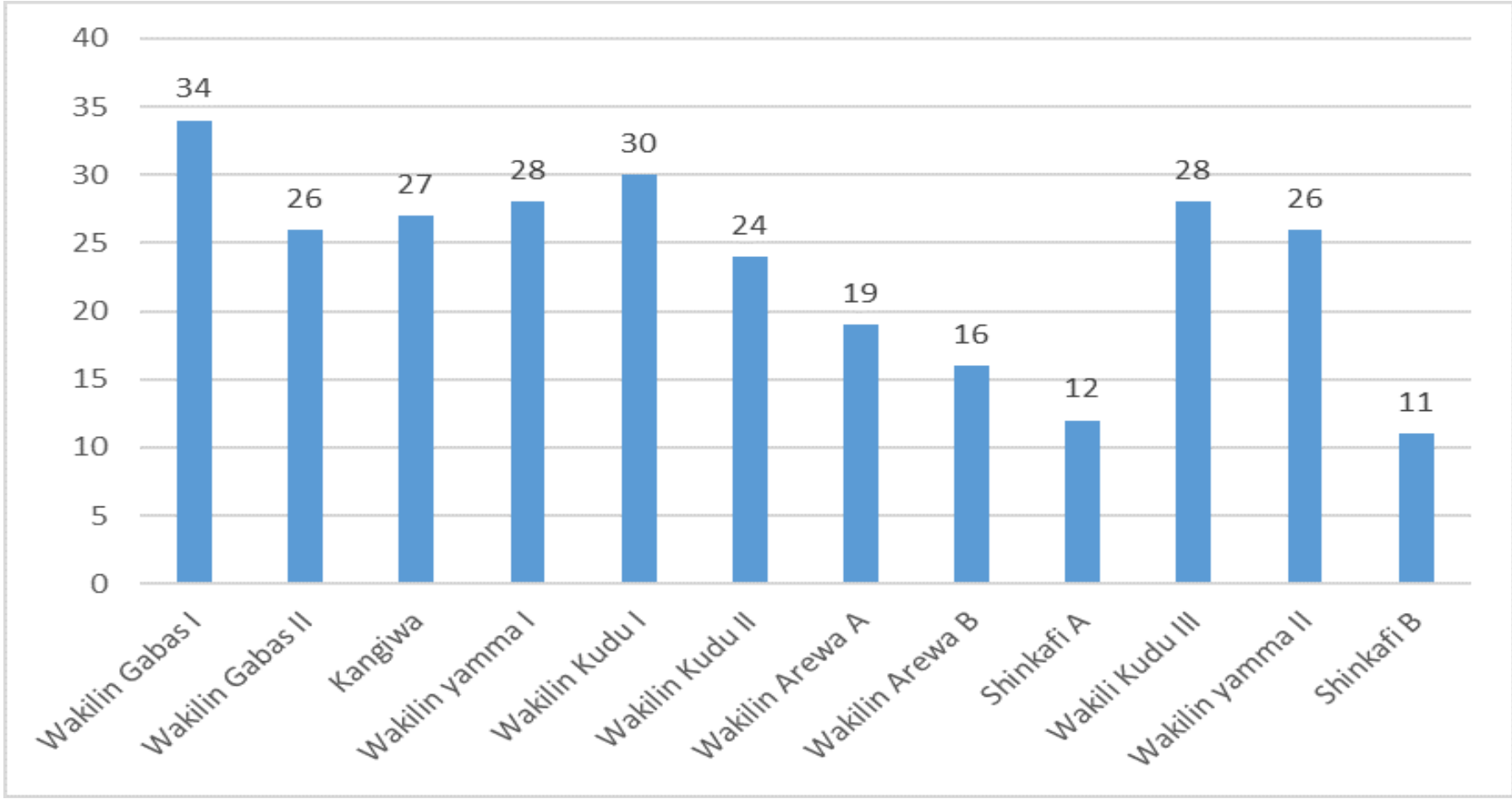
RESULTS AND ANALYSIS

- **Existing polling units in Katsina LGA**

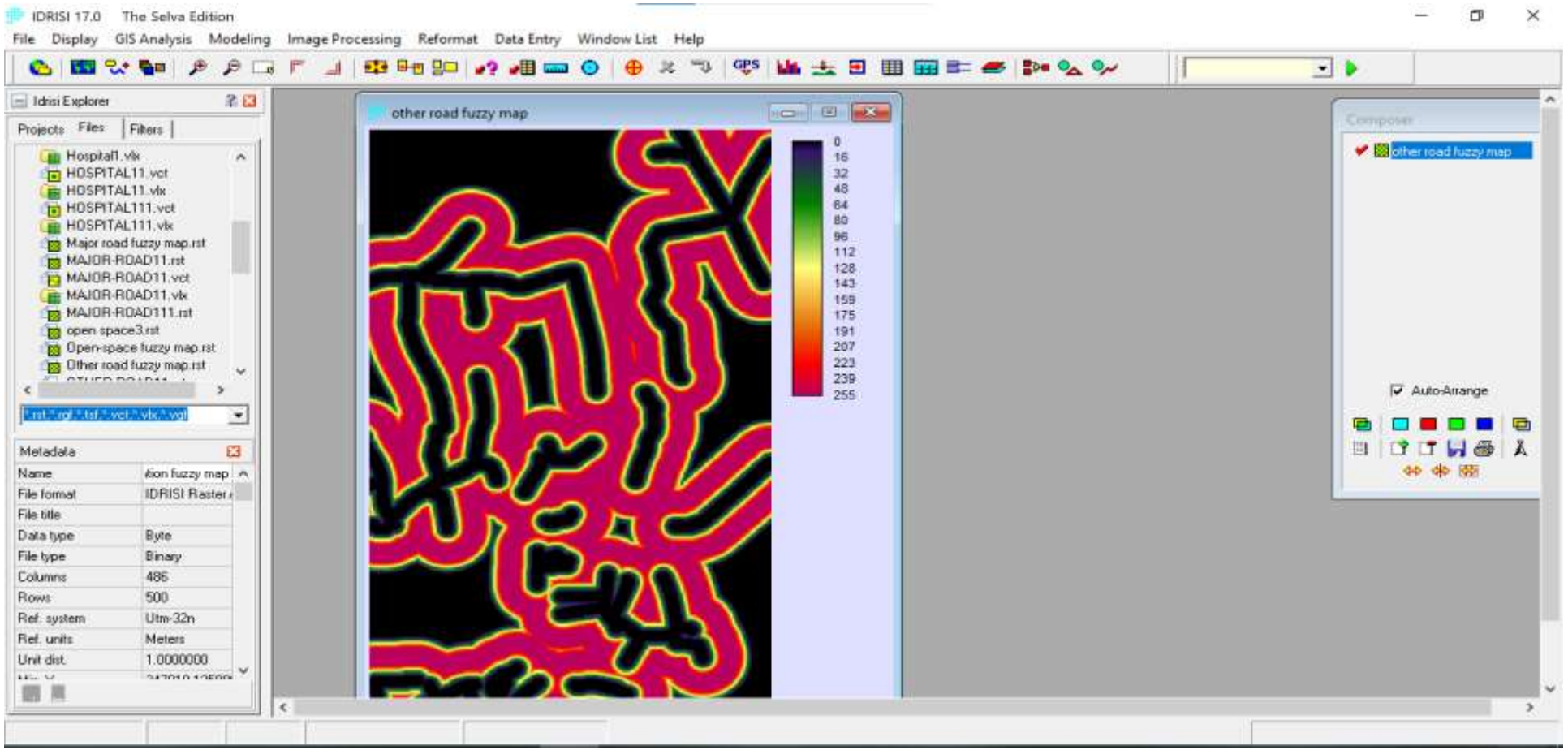


RESULTS AND ANALYSIS

- **Spatial spread of the existing polling Units**



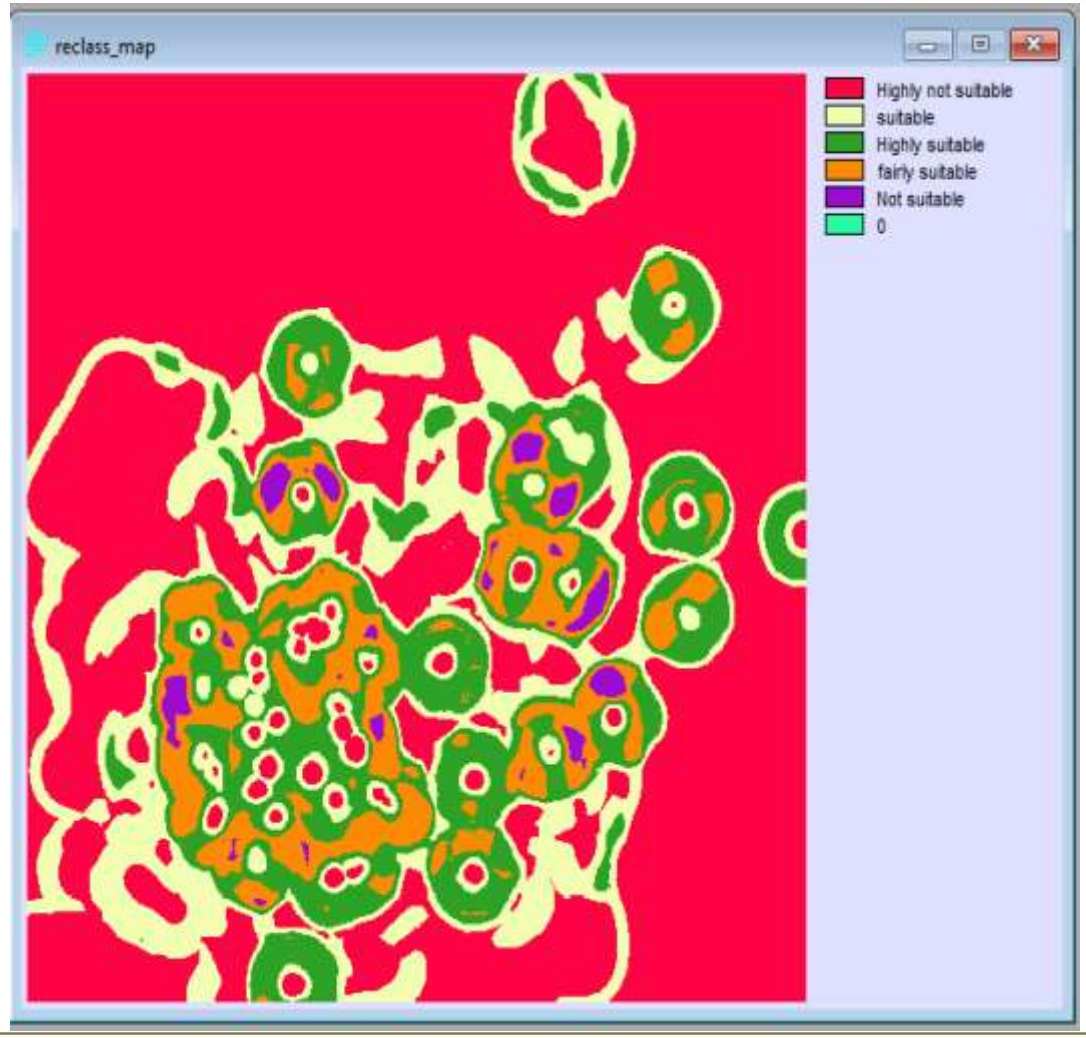
Fuzzy logic of other roads factor



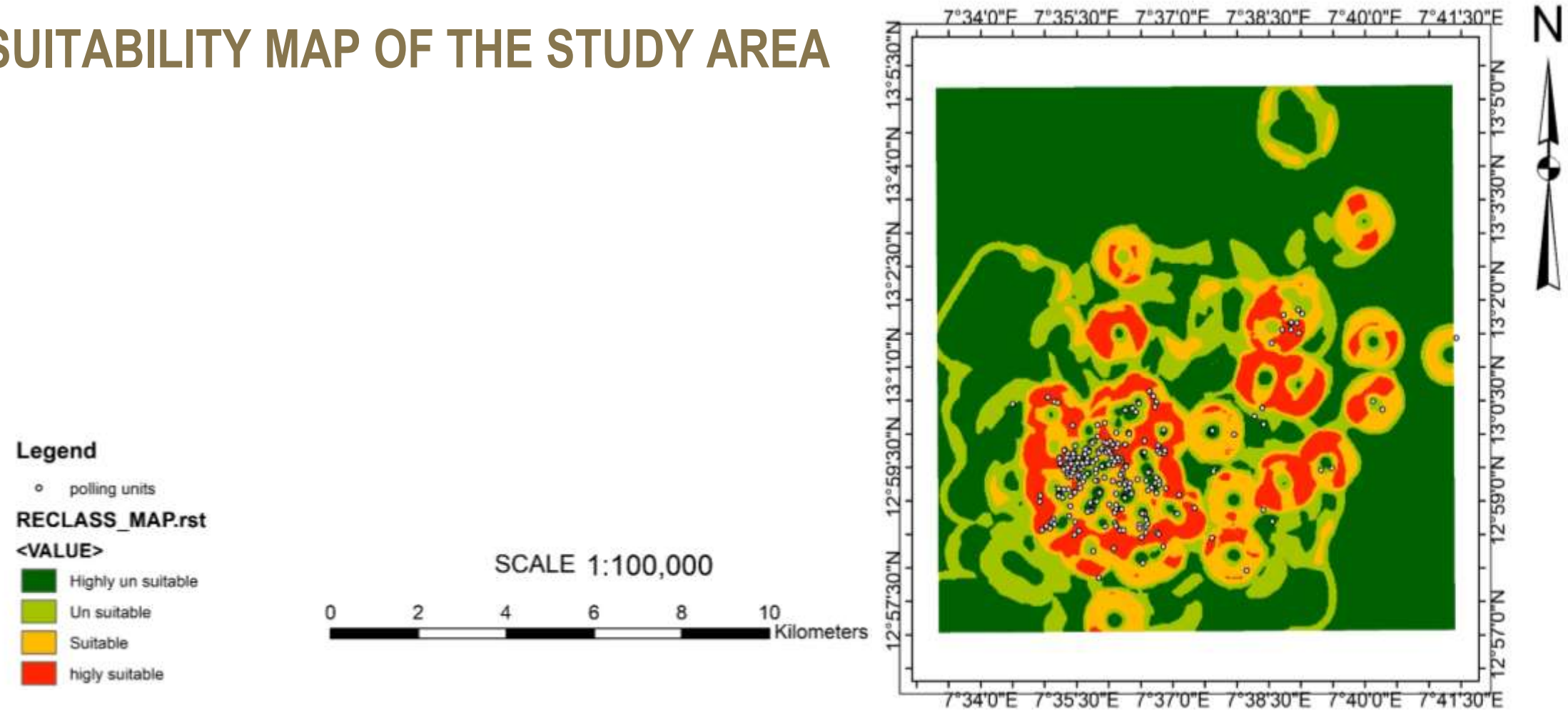
Analytic hierarchy process

- The eigenvector of weight derived from the matrix consistency is given as;
  Highway_fuzzy_map.rst: 0.0351;
  Major_road_fuzzy_map: 0.0521
  Open_space_fuzzy_map: 0.3280
  Other_road_fuzzy _map: 0.1144
  School_fuzzy_map: 0.2349
  Settlement_fuzzy_map: 0.1297
  Hospital_fuzzy_map: 0.0806
  slope degree: 0.0252
- Consistency ratio = 0.09, consistency is acceptable (based on existing literature as reported by WC Wedley

Reclassified of suitability map



SUITABILITY MAP OF THE STUDY AREA



Validation of the results obtained

Classes	Percentage (%)	No of Polling Units
Highly Suitable	21	59
Suitable	27	76
Fairly Suitable	26	73
Unsuitable	16	46
Highly not Suitable	10	27

CONCLUSION

- Polling units geodatabase was created, with a total of 281 polling units showing their names, ward, ID, and location.
- Dispersion, clustering, outliers and PUs confined to built-up areas were analysed.
- 10 polling units were highly not suitable, 16 not suitable while about 26 polling units fell within the fairly suitable,

PROBLEMS ENCOUNTERED

- **Difficulties in locating some polling units using the addresses given.**

- **Hoarding of other relevant attribute data by INEC (though they described such as sensitive and not for public)**

RECOMMENDATIONS

- Adopt a (geospatial) scientific method in citing subsequent polling units, rather than rule of thumb.
- The independent body should also make more attribute data available for further research.
- Decongest clustered polling units, and use proper suitability analysis to relocate them to a suitable location.

Thank You for Listening

Dziękuję za wysłuchanie

Jama`a muna godiya kwarai

Full paper is available on Survey Review Journal: https://www.tandfonline.com/doi/full/10.1080/00396265.2022.2100956