The background of the image is a light gray gradient. It is decorated with numerous water droplets of various sizes. Some droplets are large and prominent, while others are small and subtle. They are scattered across the frame, with a higher concentration in the top-left and bottom-right corners. The droplets have a realistic, three-dimensional appearance with highlights and shadows.

**SAVE WATER, AND IT WILL SAVE
YOU. SO, DON'T FLUSH PLANET'S
MOST VALUABLE RESOURCE.**

The background of the slide is a light gray gradient, decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and subtle, scattered across the top and bottom edges of the frame.

DELINEATION OF GROUNDWATER RECHARGE POTENTIAL SITES IN LAHORE USING REMOTE SENSING AND GIS TECHNIQUES

BILAL ASLAM

SYED ROSHAAN ALI

LAHORE – BASIC INFO

- COUNTRY'S SECOND-MOST POPULOUS CITY.
- LOCATED IN THE NORTH-EASTERN END OF PAKISTAN'S PUNJAB PROVINCE.
- TOTAL LAND AREA OF 404 SQUARE KILOMETERS (156 SQ. MI).
- POPULATION (2017)*
 - TOTAL 11,126,285.
 - DENSITY 20,205/KM2 (52,418/SQ MI)
- LAHORE HAS A SEMI-ARID CLIMATE WITH 600 MM ON AVERAGE ANNUAL RAINFALL.

*2017 Census of Pakistan

GROUNDWATER RECHARGE


- GROUNDWATER RECHARGE:

ENTRY OF WATER FROM THE UNSATURATED ZONE INTO THE SATURATED ZONE BELOW THE WATER TABLE SURFACE, TOGETHER WITH THE ASSOCIATED FLOW AWAY FROM THE WATER TABLE WITHIN THE SATURATED ZONE.

- RECHARGE OCCURS WHEN WATER FLOWS PAST THE GROUNDWATER LEVEL AND INFILTRATES INTO THE SATURATED ZONE.
- IT IS AN EXTREMELY IMPORTANT WATER COMPONENT OF THE CIRCULATION CYCLE IN NATURE.

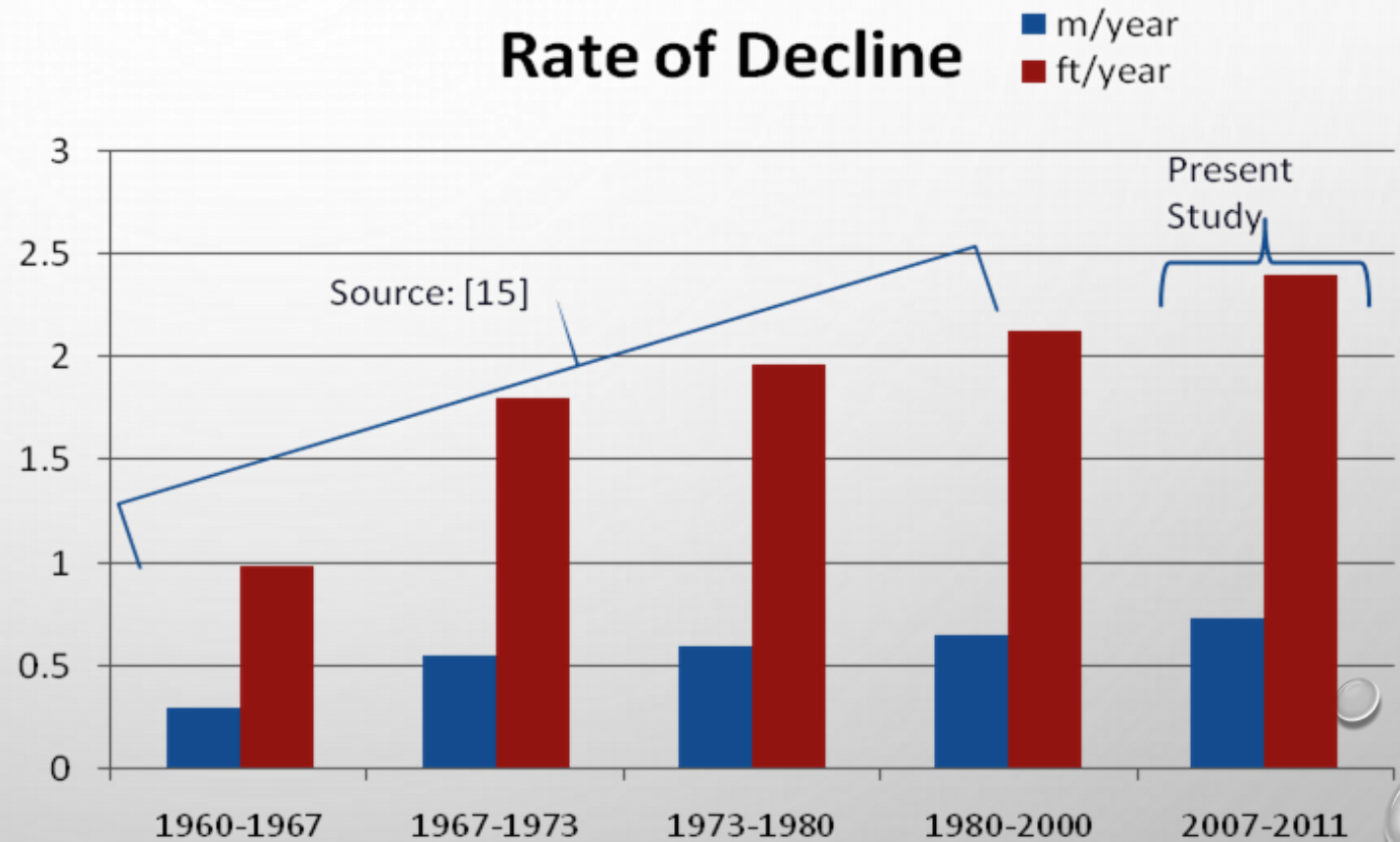


POTENTIAL RECHARGE ZONES- NEED OF THE TIME

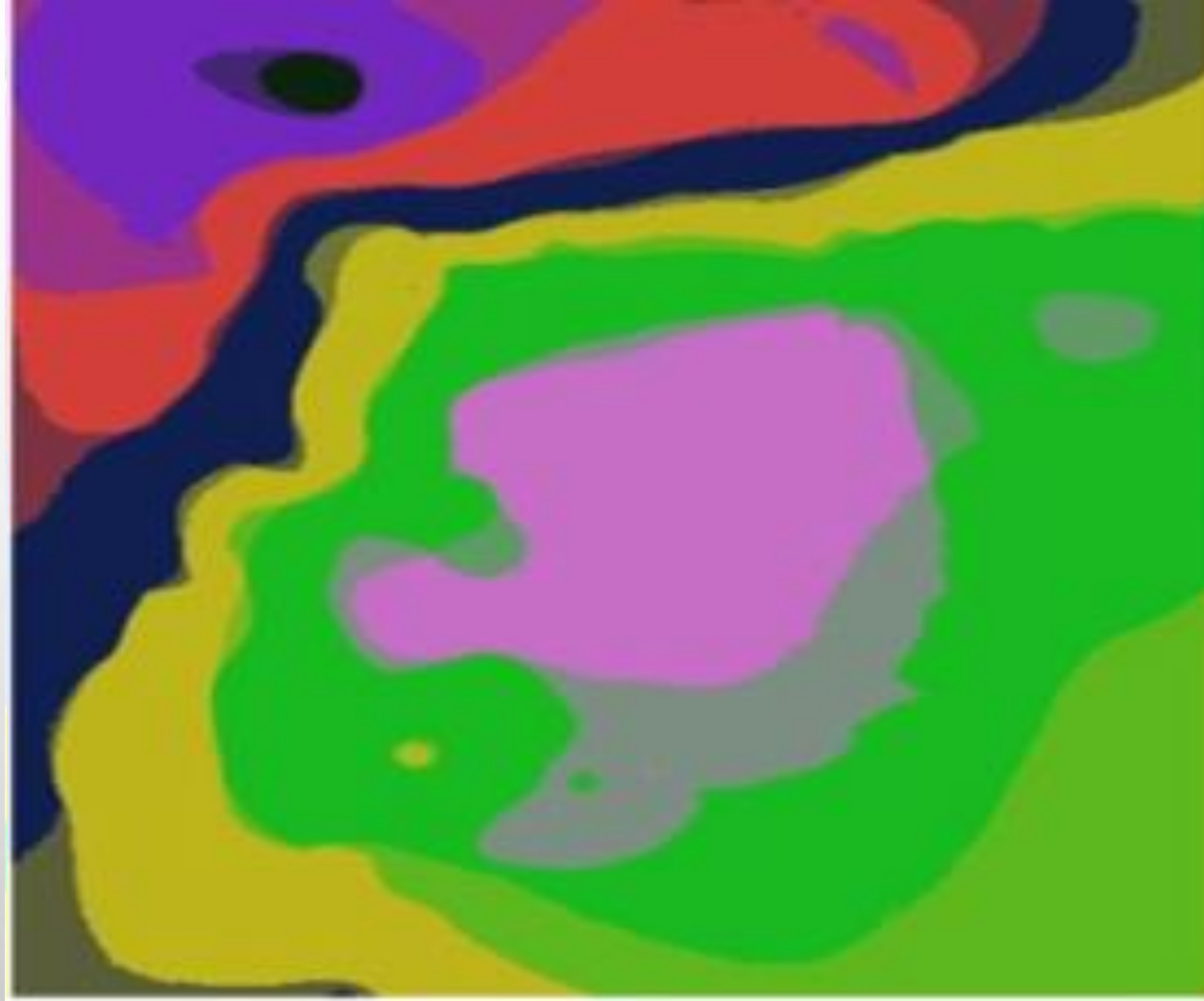
- WATER MANAGEMENT
 - URBAN PLANNING
 - LAND SUBSIDENCE
 - BETTER QUALITY OF WATER
 - ENHANCE WATER RECHARGE POTENTIAL AND INCREASE WATER TABLE
- 

POTENTIAL RECHARGE ZONES- NEED OF THE TIME

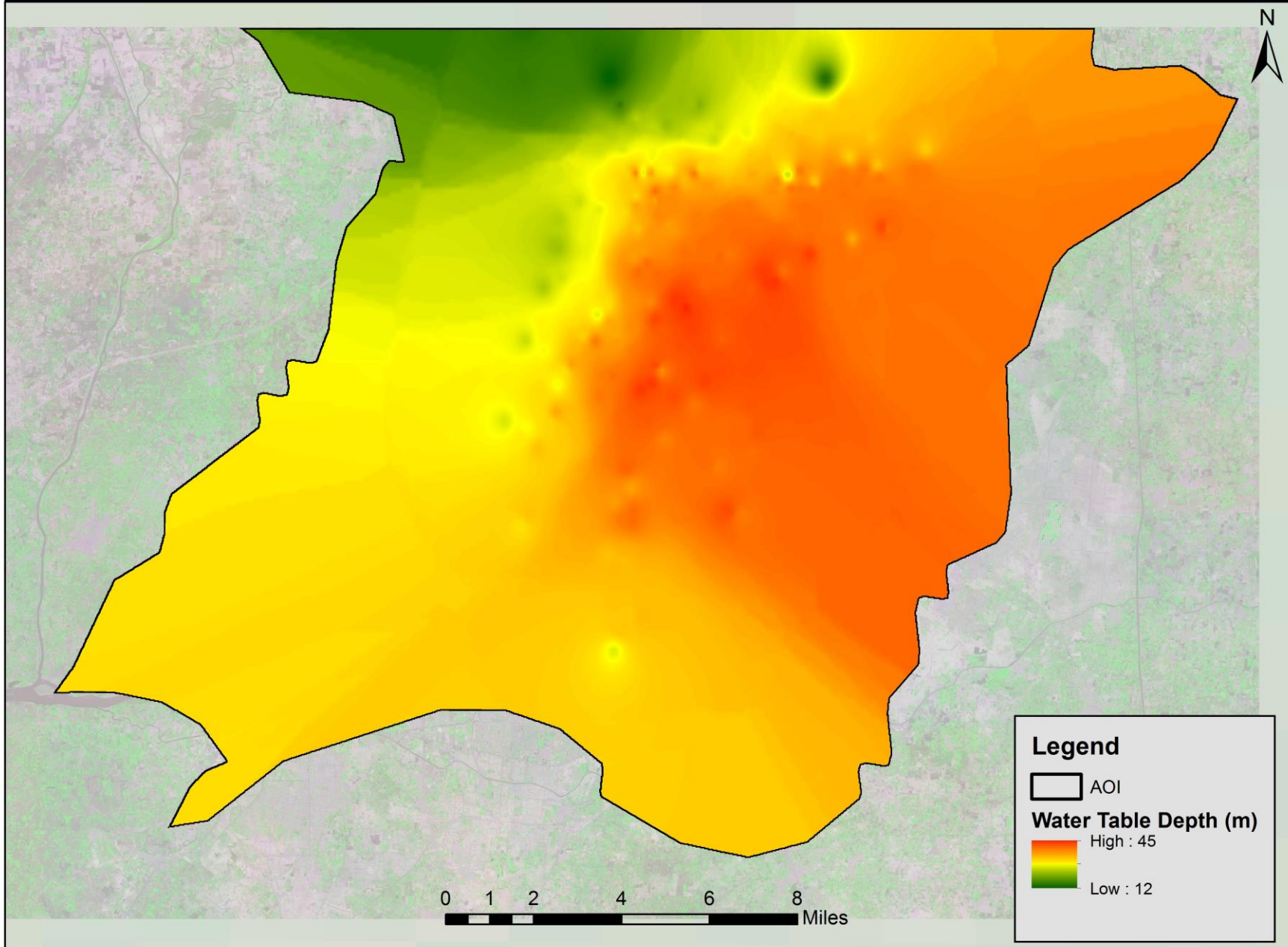
CORRELATIONS		
	Average Rain	
	Pre-Monsoon	Post-monsoon
Raster Mean	-0.919	-0.775
Points Mean	-0.863	-0.756



2008



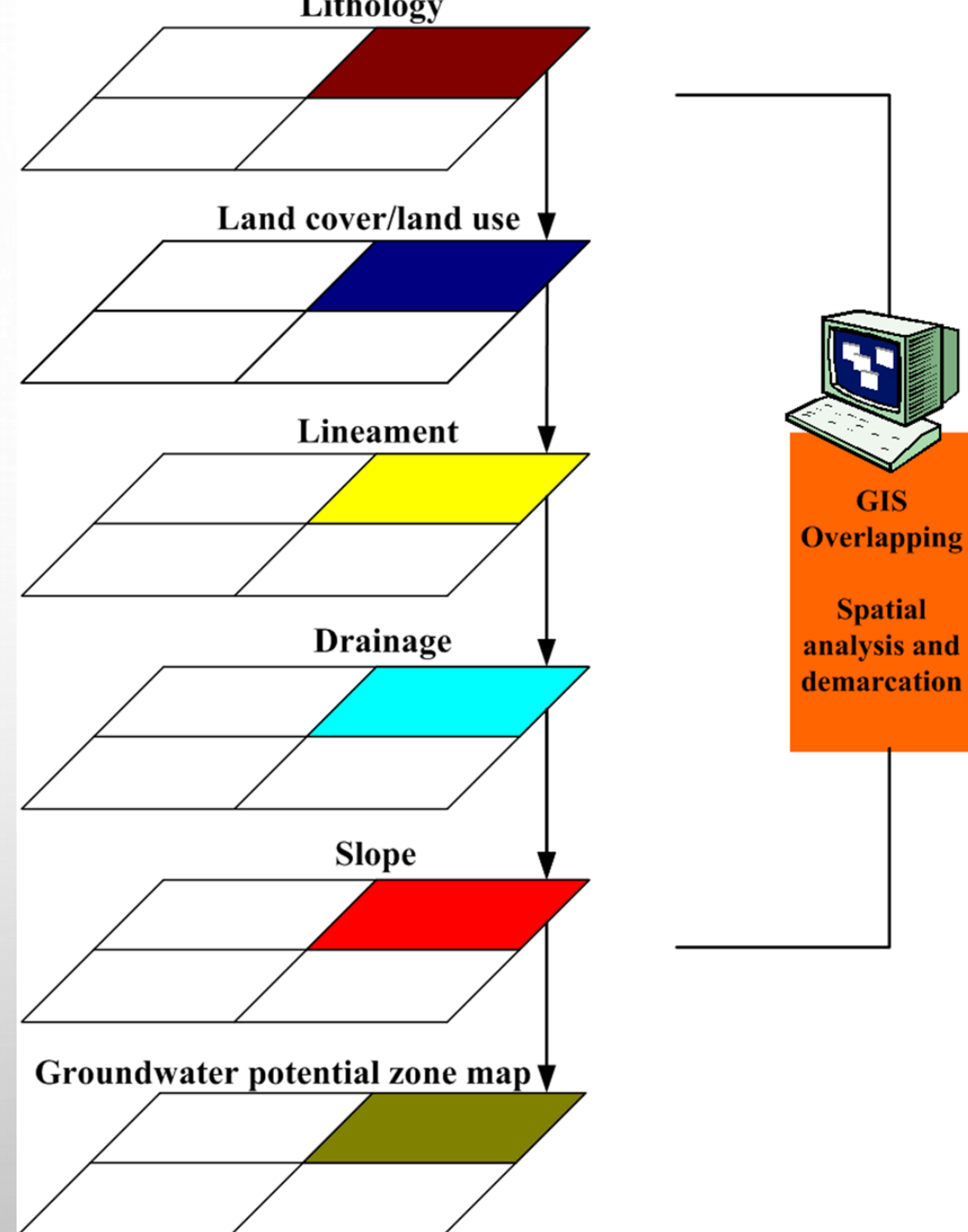
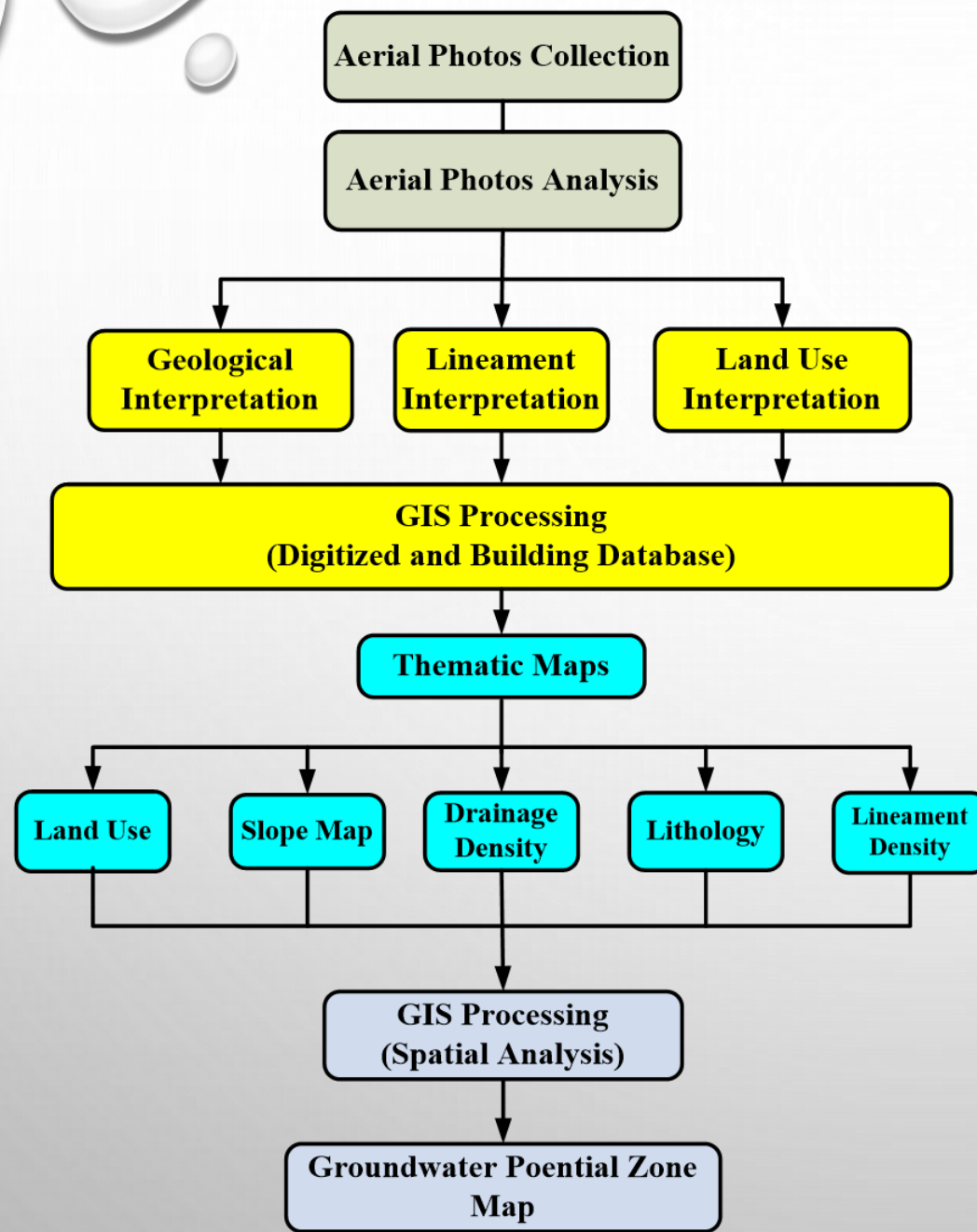
Depth of Ground Watertable (Oct-2014)



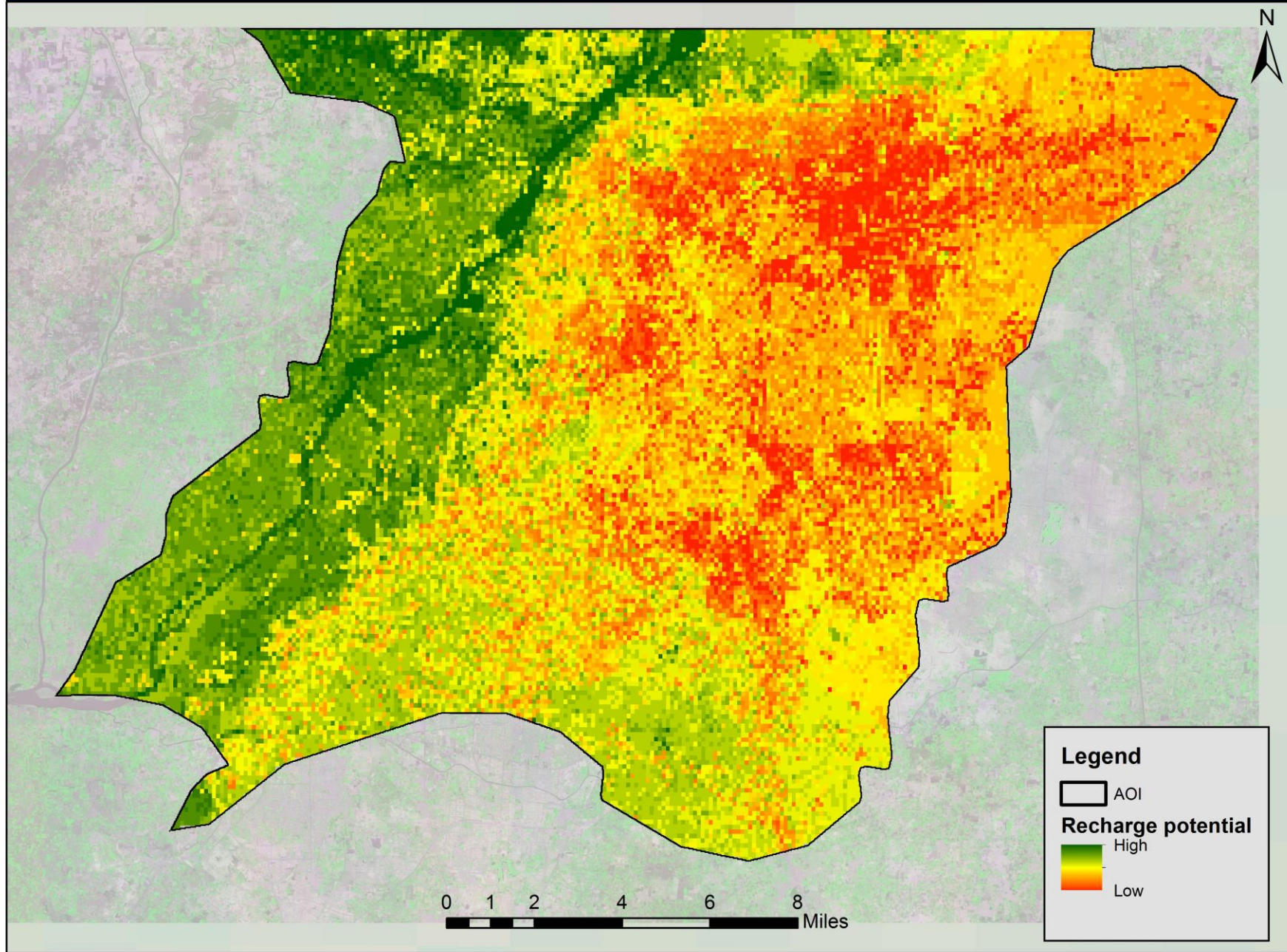
ANALYTIC HIERARCHY PROCESS

	Land use	Lithology	Curvature	Water table depth	Elevation	Slope	Drainage	Weightage (%)
Land use	1	5	7	5	6	6	8	25
Lithology	1/5	1	6	7	7	5	3	17
Curvature	1/7	1/6	1	2	1/3	1/4	1	5
Water table depth	1/5	1/7	1/2	1	5	3	2	15
Elevation	1/6	1/7	3	1/5	1	3	4	15
Slope	1/6	1/5	4	1/3	1/3	1	6	15
Drainage	1/8	1/3	1	1/2	1/4	1/6	1	8

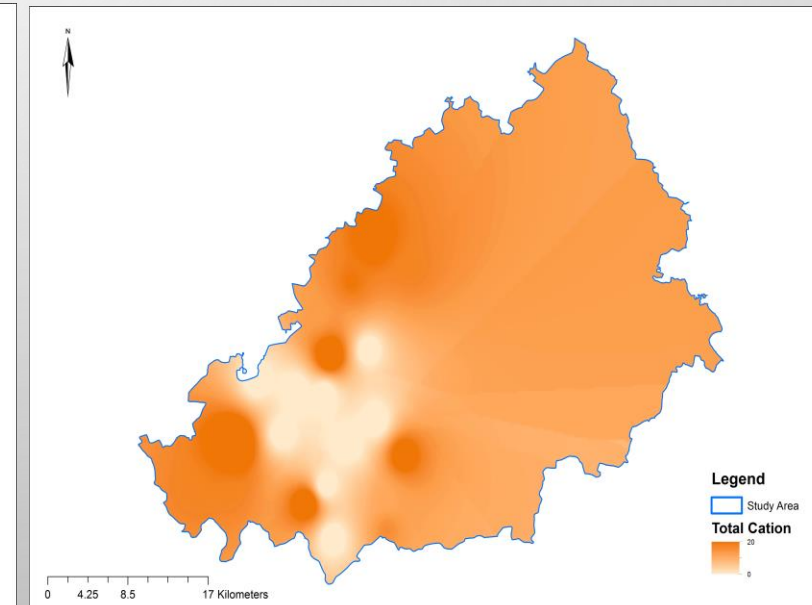
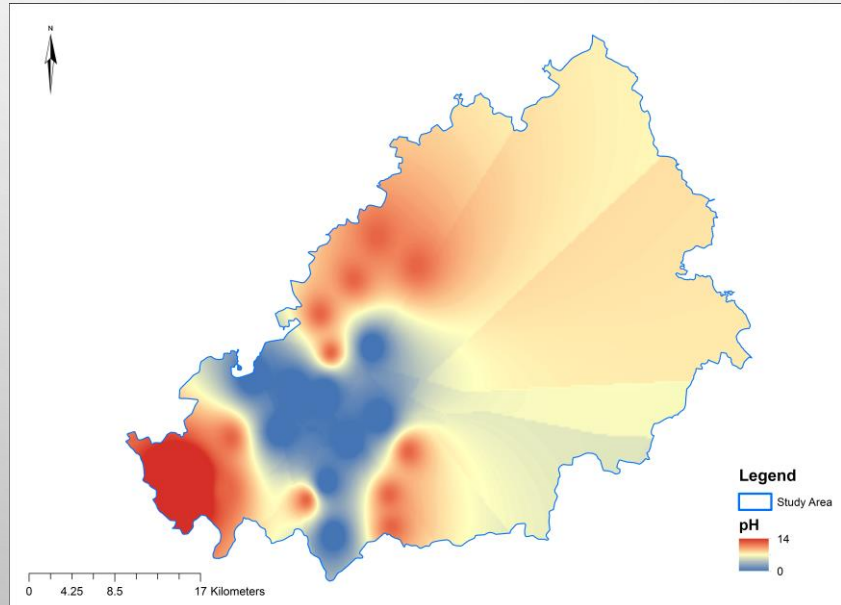
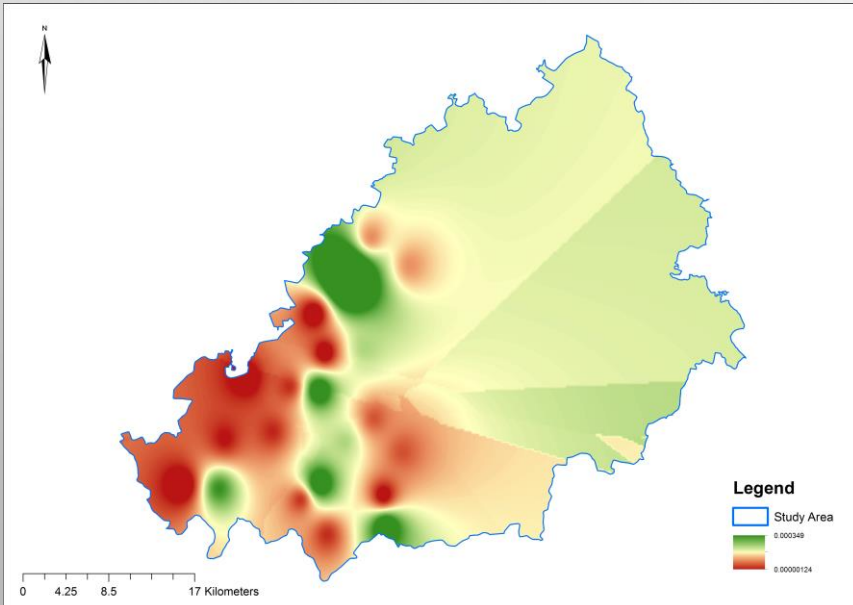
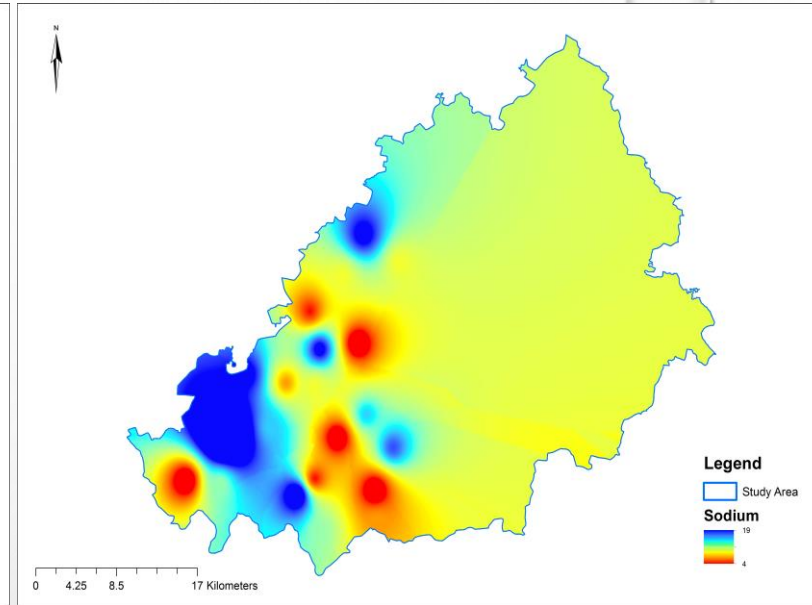
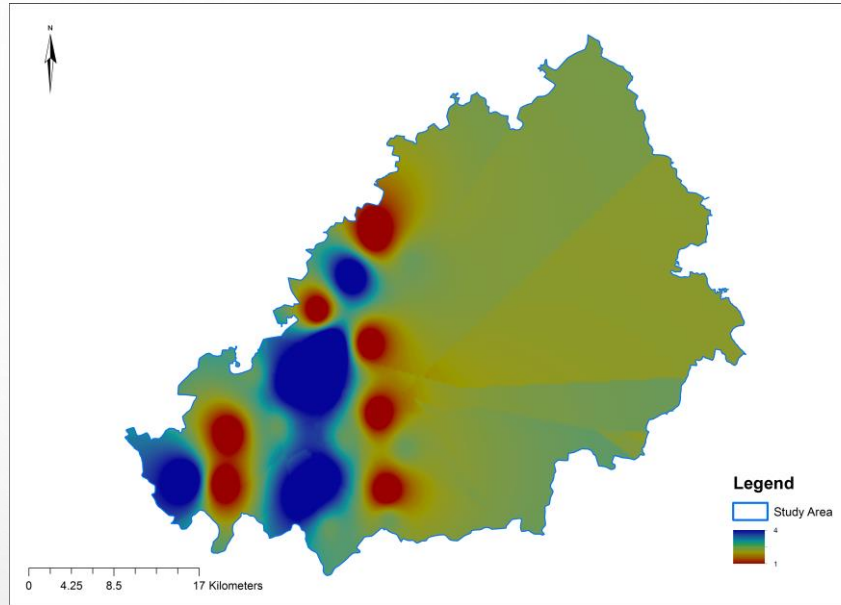
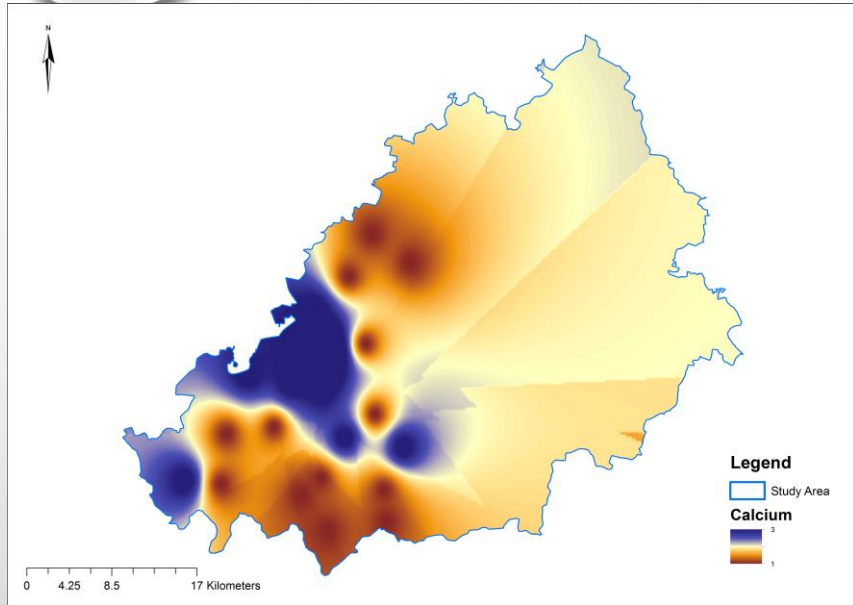
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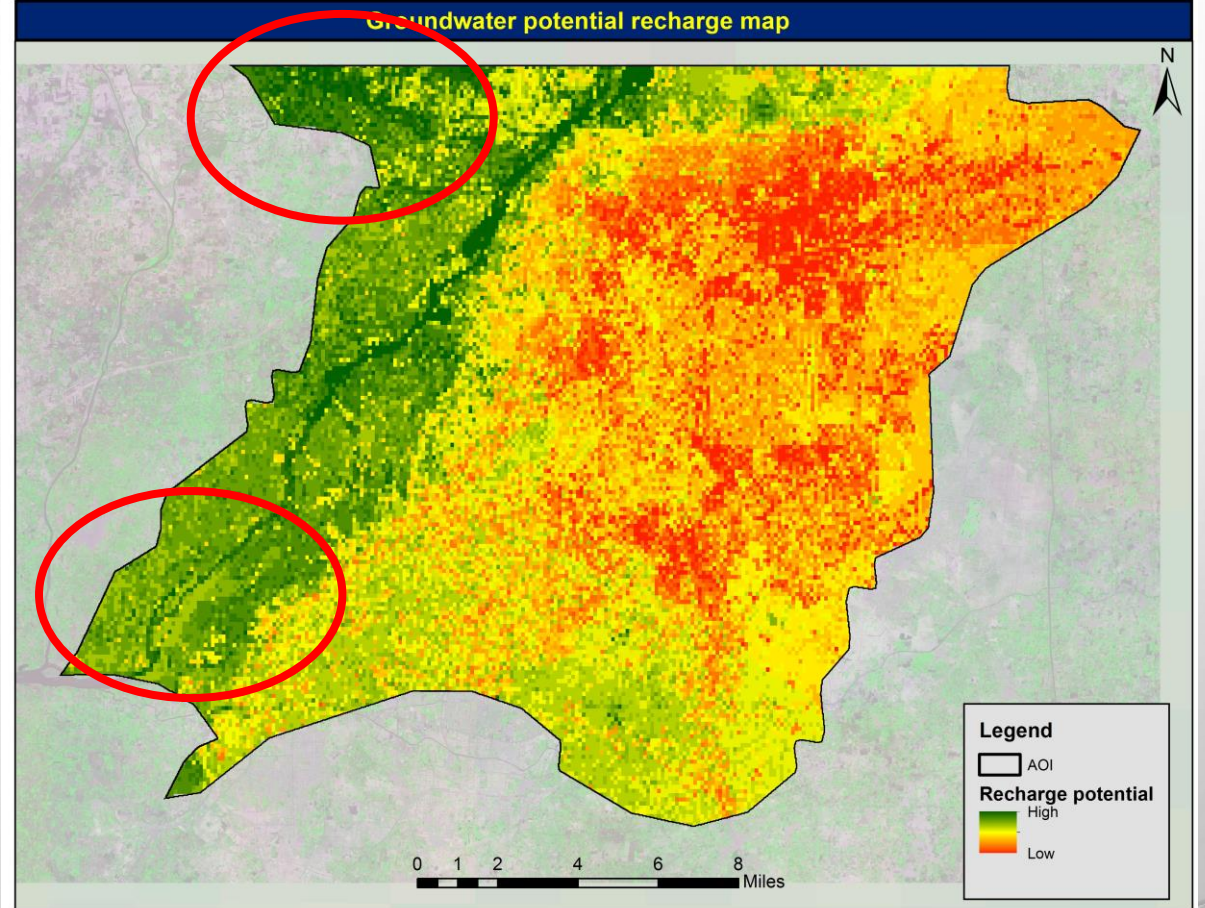
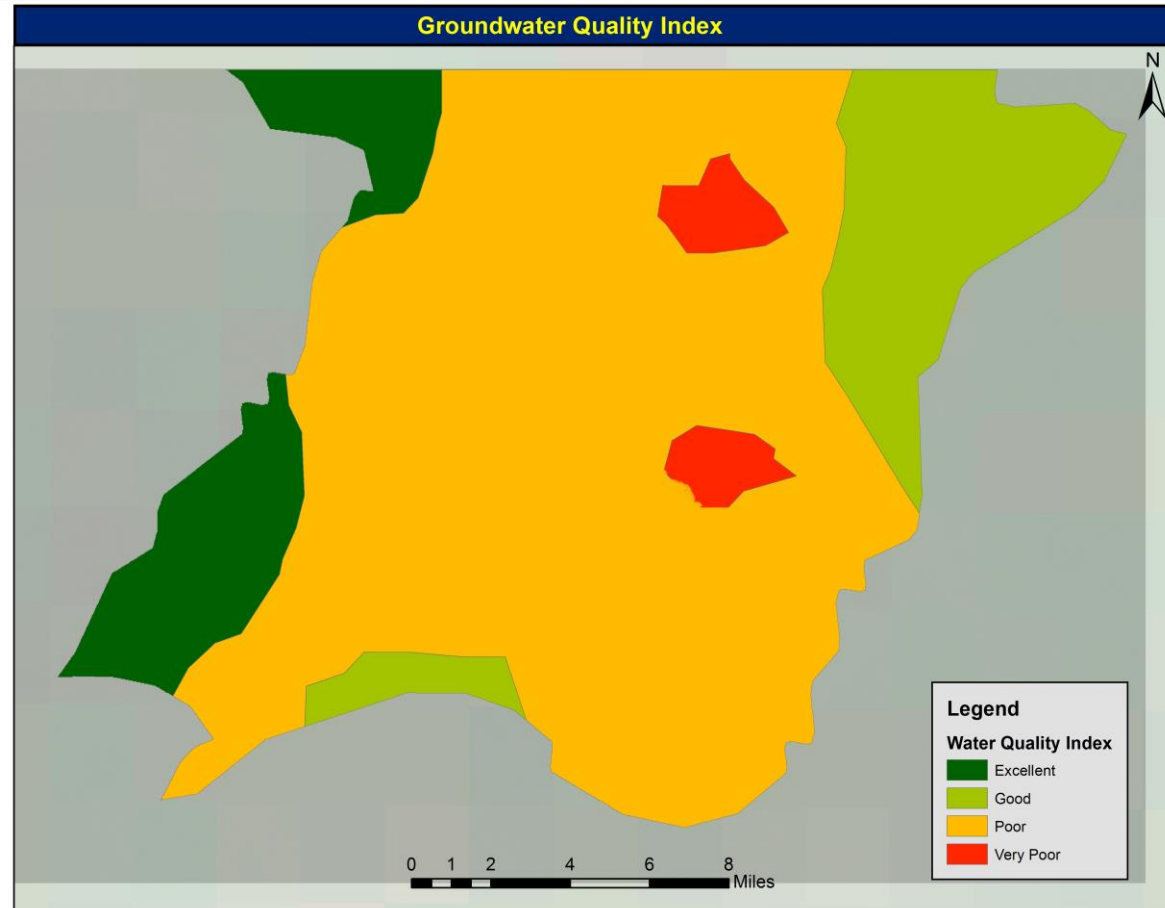
Groundwater potential recharge map



WATER QUALITY




Water Quality Index v Recharge Zones



$$WQI = \text{Antilog} [\Sigma W \log_{nn=i} 10 q_{ni}]$$



CONCLUSION

- Potential Recharge Zonation.
 - Correlation with water quality.
 - Possible mitigations.
 - Future Work.
- 



QUESTIONS...!!!!

The art and science of asking questions is the source of all knowledge.

-Thomas Berger

