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Water Management**

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SURVEILLANCE AND ANALYSIS FOR CAUSES OF WATER POLLUTION IN GROUND WATER

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Content

- I. Overview
- II. Study Objective
- III. Study Area
- IV. Data types and Sources
- V. Methodology
- VI. Results and Discussions
- VII. Conclusions
- VIII. Future Recommendations

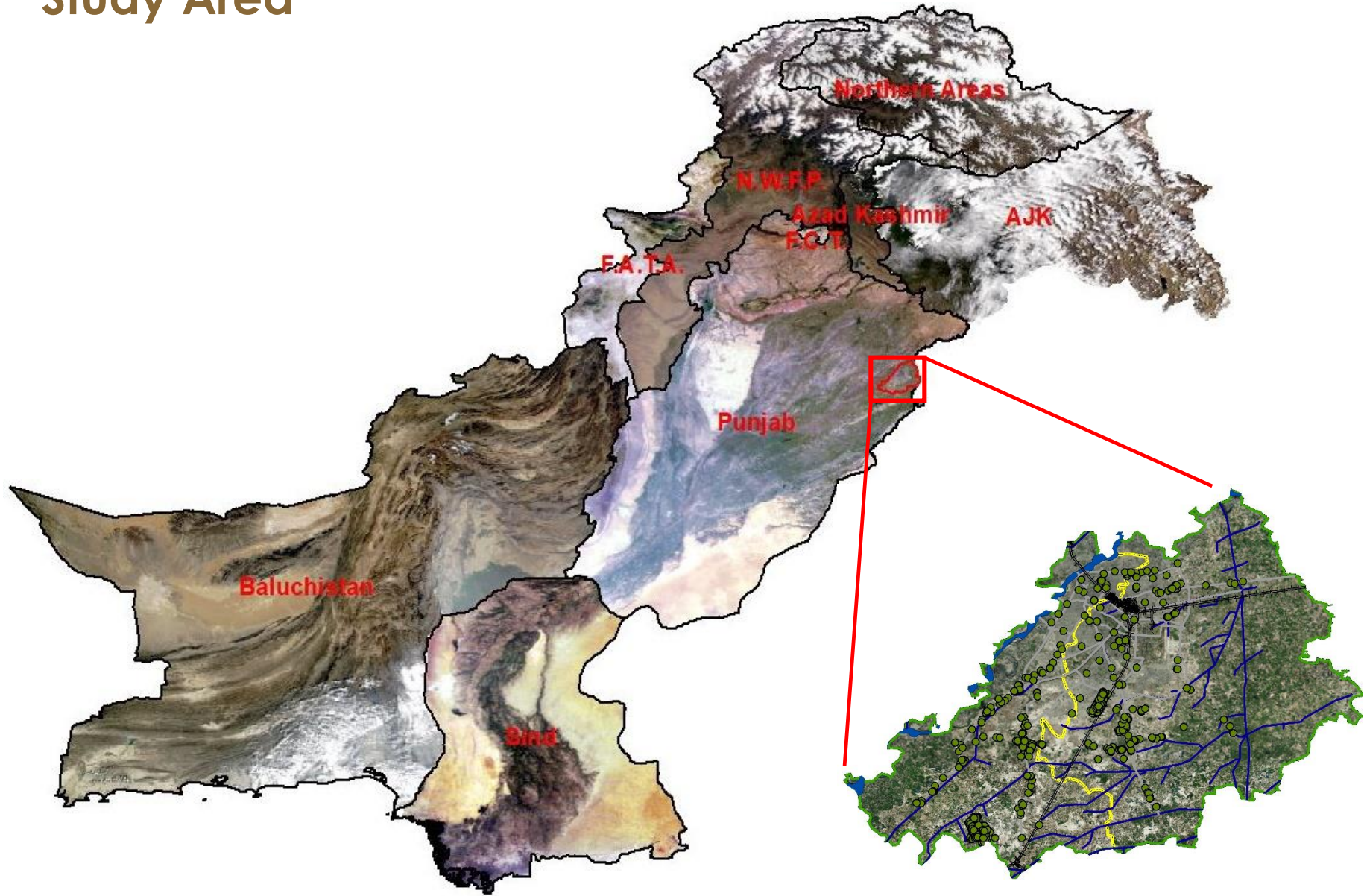
Overview

- Water is essential part of life and without it sustainability of life is impossible. Water contamination is mainly by human activities.
- Industrial waste and pesticides contain higher concentration of toxic materials which could lead to sickness, infections, exposure to diseases and even death.
- According to Yale Environmental Performance Index 2016, Pakistan ranks 148 out of 178.

Overview

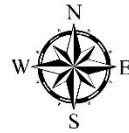
- The environmental profile of Pakistan indicates that about 40% of deaths are related to waterborne disease.
- At least three-quarters of the total waste generated (3800 tons/day) in Lahore is dumped at these sites without proper treatment.
- It was reported in the Daily newspaper (20 May, 2008), that according to UNEP's data about 47% drinking water in Lahore city was contaminated.

Study Area

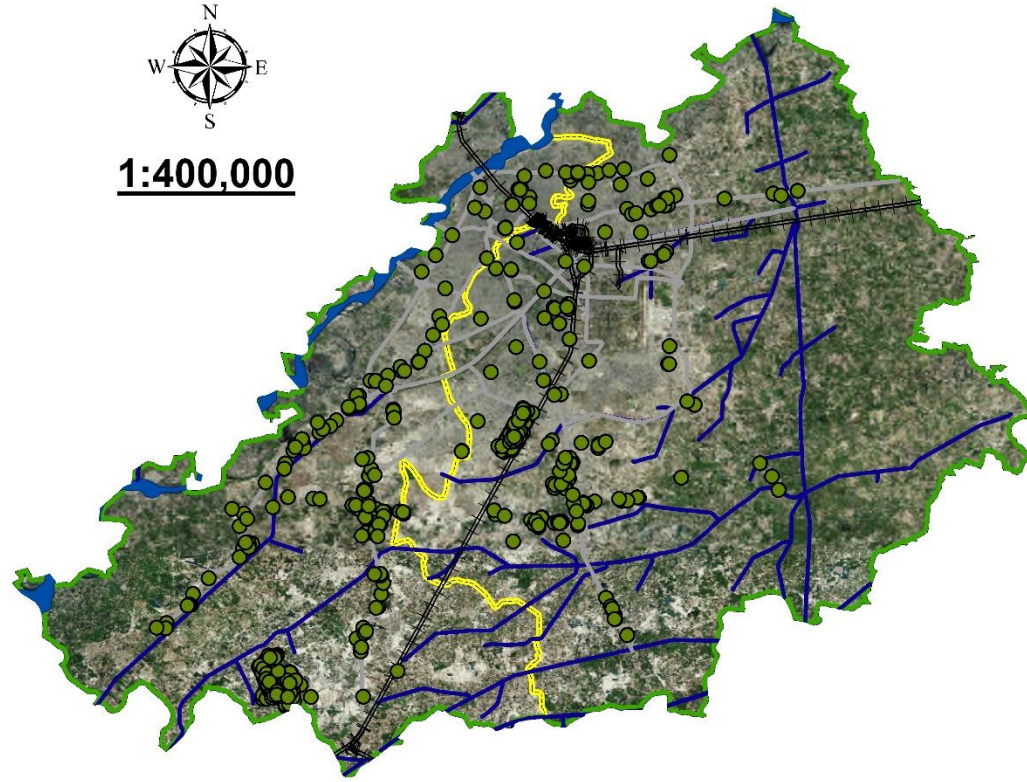


Study Area








Geographical Map of District Lahore

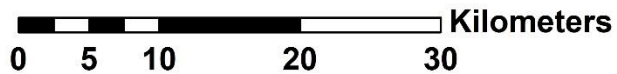


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Legend

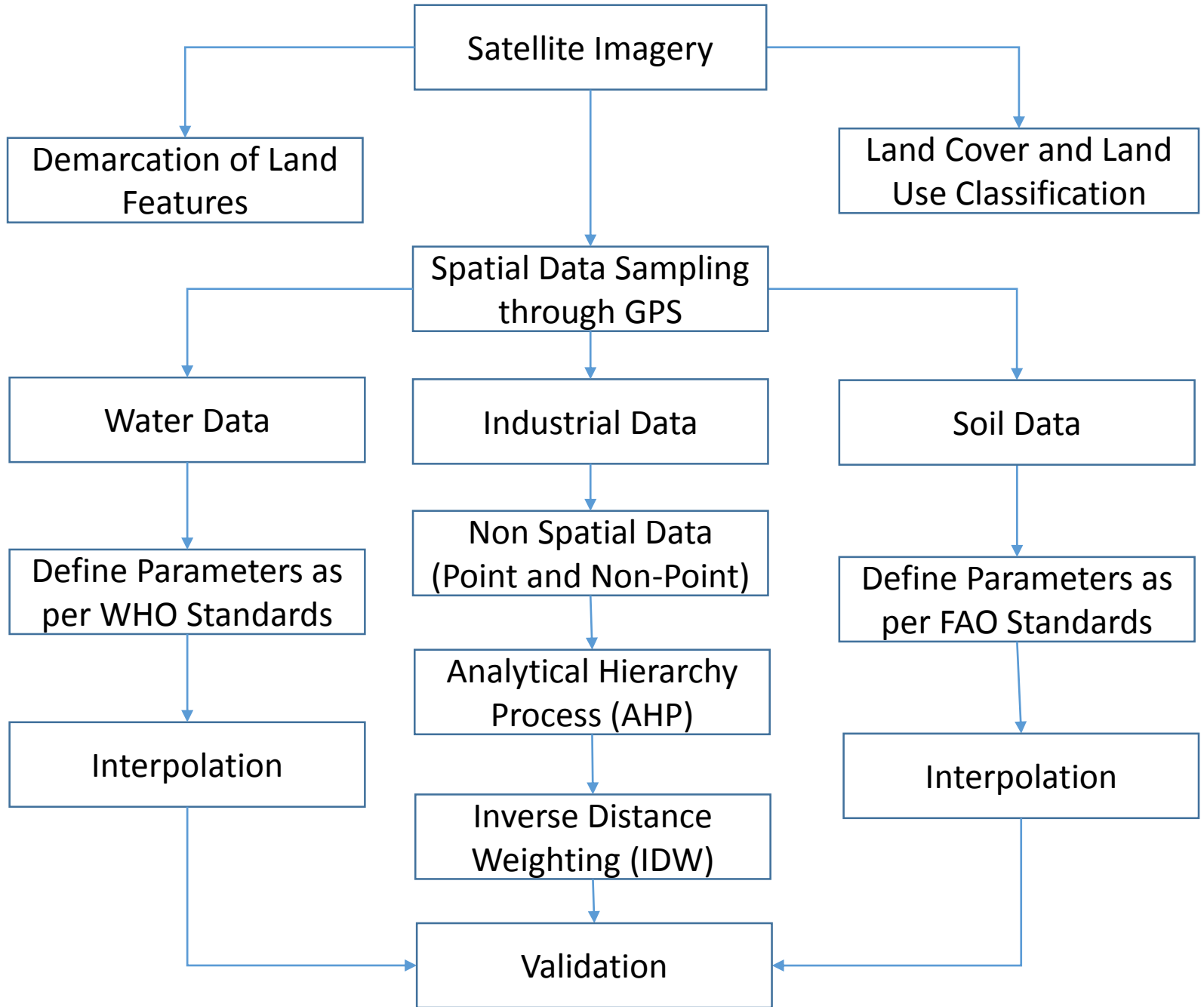
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|--|---|
|  Industry POI |  River |
|  Railway Line |  Tehsil Boundary |
|  Road Network |  District Boundary |
|  Water Channel | |



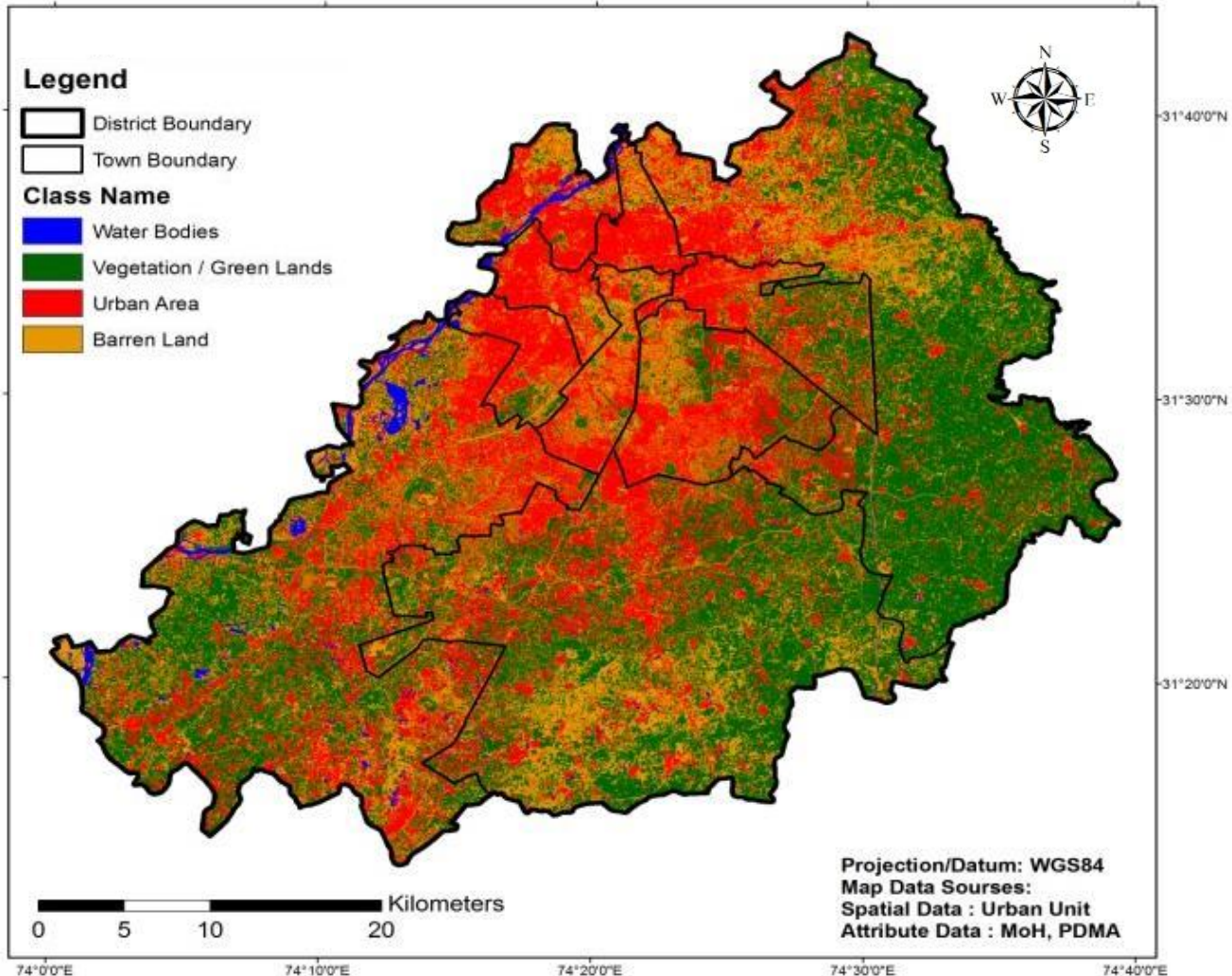
Data Types and Sources

- Satellite Data (Earth Explorer)
- Soil Data (GPS Survey)
- Industry Points (GPS Survey)

Methodology



Land Cover and Land Use Map of District Lahore

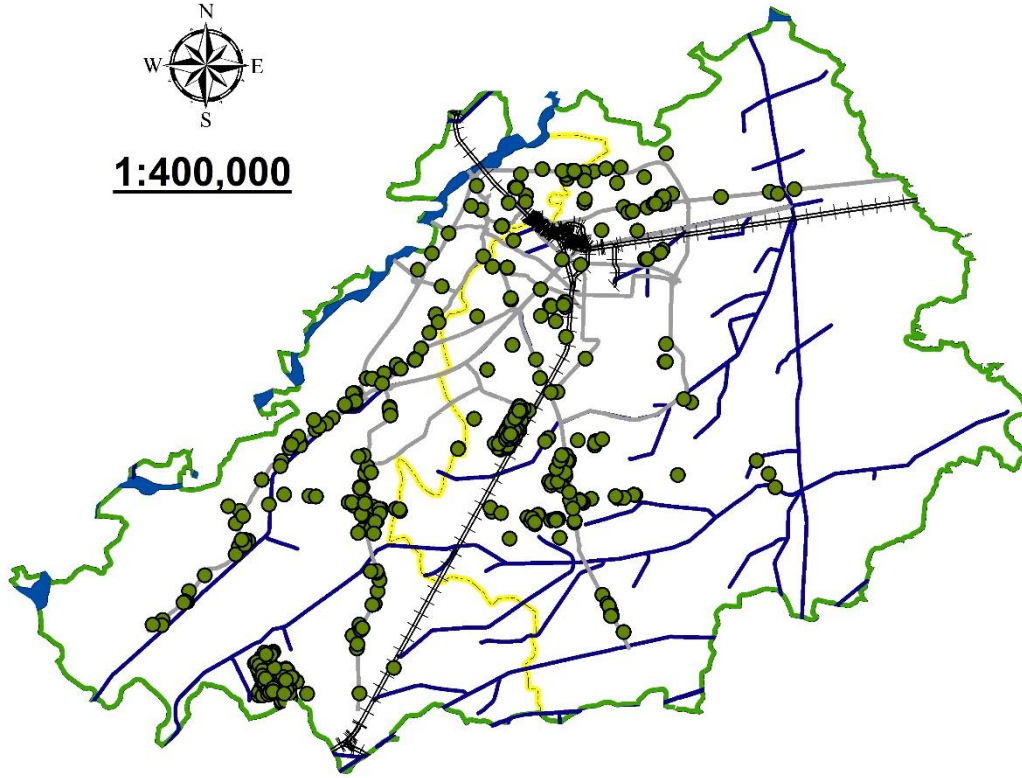


Industrial Map of District Lahore

Industrial Map of District Lahore

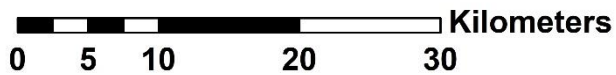


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Legend

- Industry POI
- ▬▬▬▬▬▬ Railway Line
- Road Network
- Water Channel
- ▬ River
- ▬▬▬▬▬▬ Tehsil Boundary
- ▬▬▬▬▬▬ District Boundary



Analytical Hierarchy Process (AHP)

- Basically AHP used for assigning weight to different criteria, sub **criteria** and Alternatives

Criteria		
Toxified Elements	Point Source	Non-Point Source
Chemical Industries	Leather and Garments	Glass Factories
Textiles	Paper Mills	Engineering Works
Fertilizers	Plastic Industries	Marble and Granite
Shoes Factories	Hygienic Products	Foam Industries

Analytical Hierarchy Process (AHP)

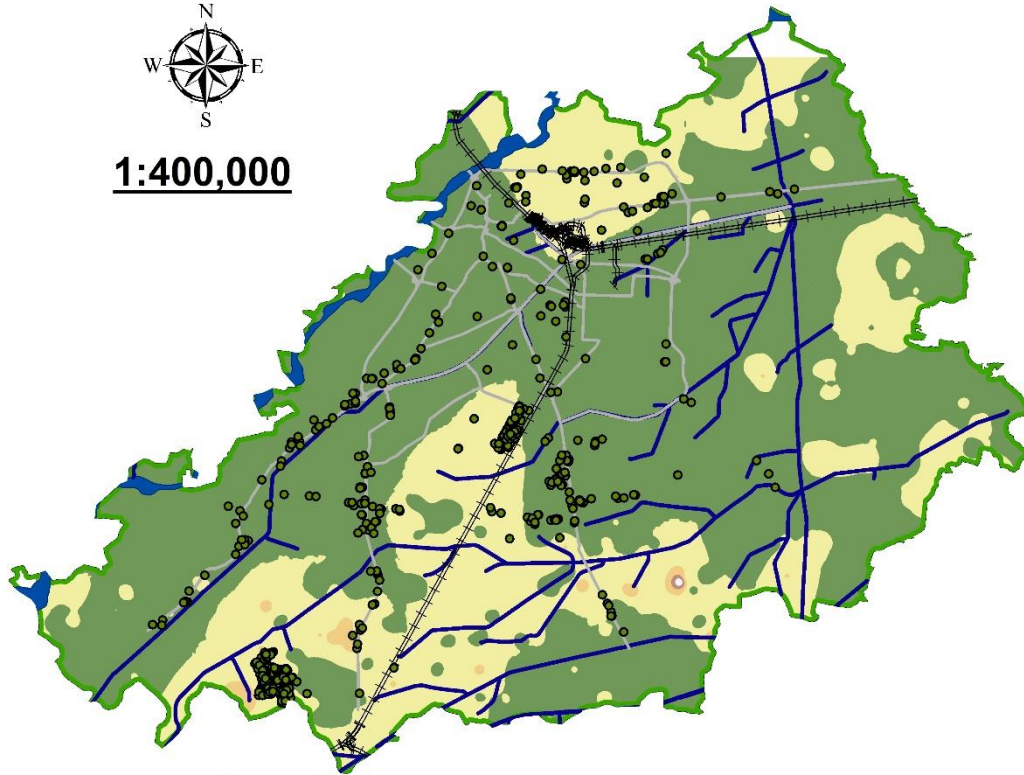
Main Criteria of Water Pollution			
	Toxified Elements	Point Source	Non-Point Source
Toxified Elements	1	1	3
Point Source	1	1	3
Non-Point Source	0.33	3	1
Sum	2.33	5	7

Normaliztion				
Toxified Element	Point Source	Non Point Source	Sum	Avg.
0.429184549	0.2	0.428571429	1.057756	0.352585
0.429184549	0.2	0.428571429	1.057756	0.352585
0.141630901	0.6	0.142857143	0.884488	0.294829
			3	1








Soil Map of District Lahore

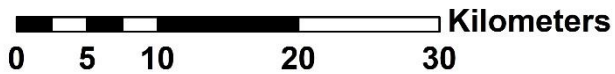


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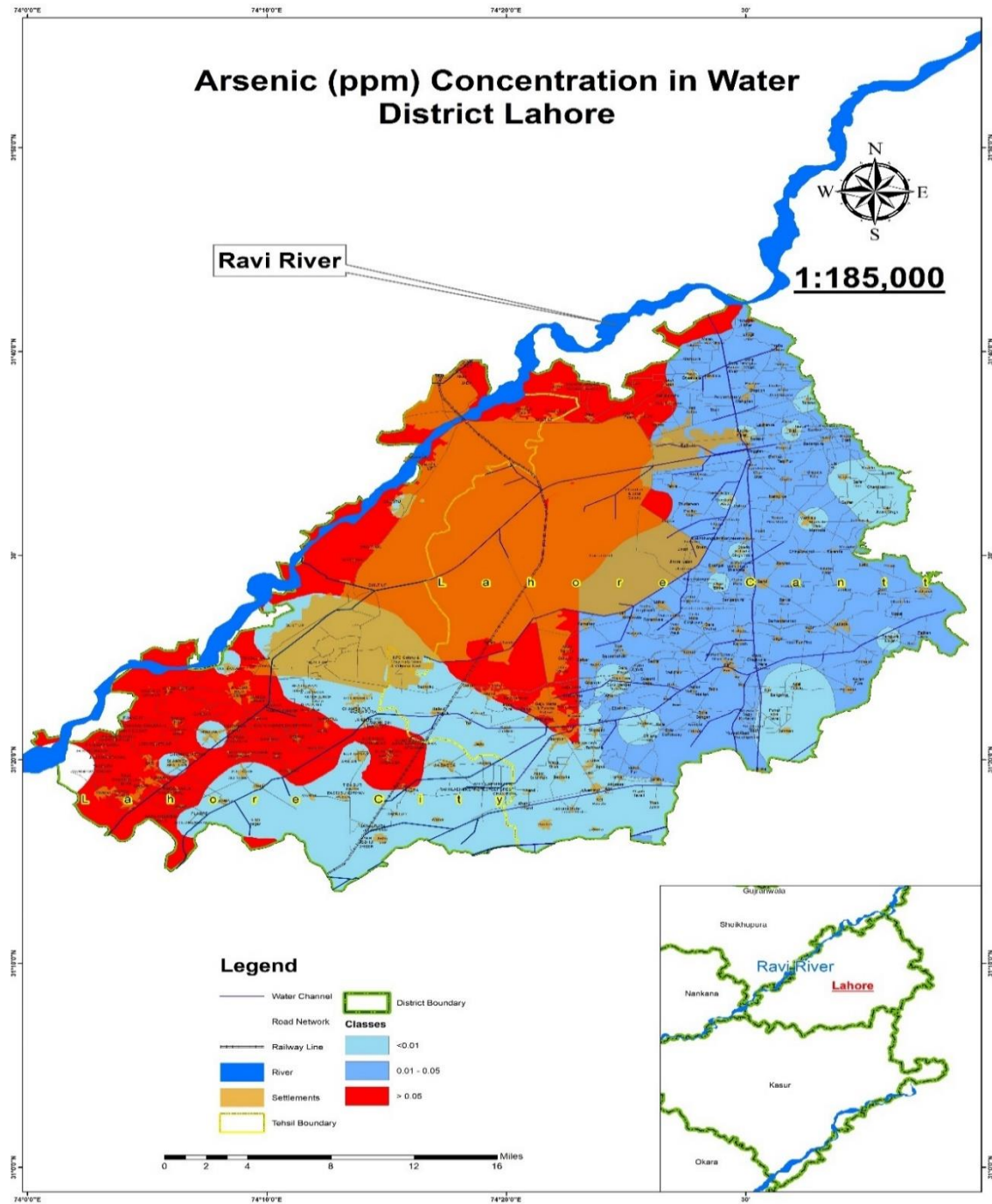
- | | |
|---|--|
| • Industry POI | pH Classes |
| ----- Railway Line |  7.5 - 8.0 |
| — Road Network |  8.0 - 8.5 |
| — Water Channel |  8.5 - 9.0 |
|  River |  9.0 - 9.5 |
|  District Boundary |  9.5 - 10.0 |



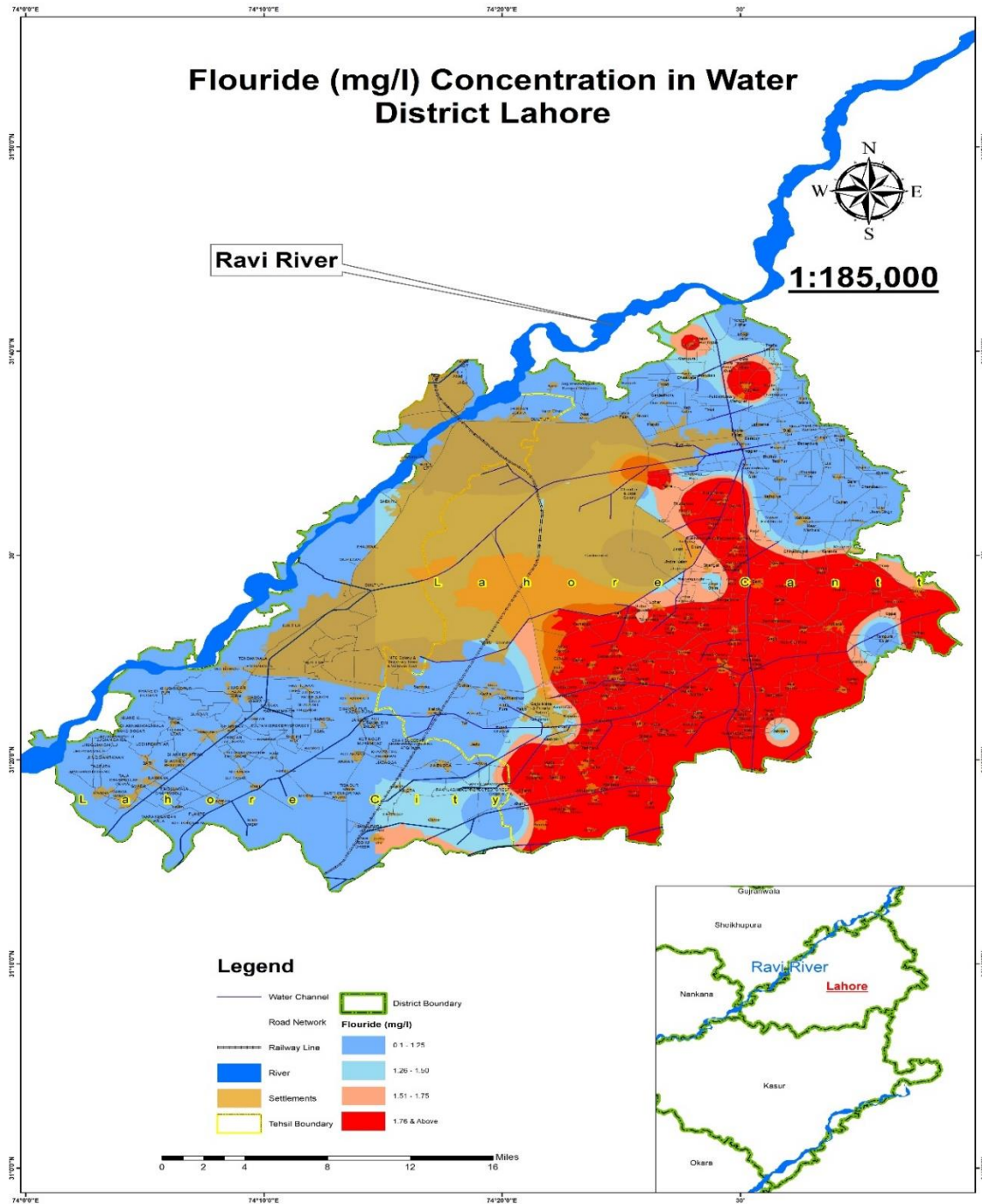
WHO Standards

Sr. #	Parameters	WHO Standards
1	Total Dissolved Solids (TDS)	1000 mg/L
2	Arsenic (As)	0.05 ppm
3	Fluoride	1.5 mg/L
4	Nitrate	50 mg/L
5	Nitrite	0.3 mg/L

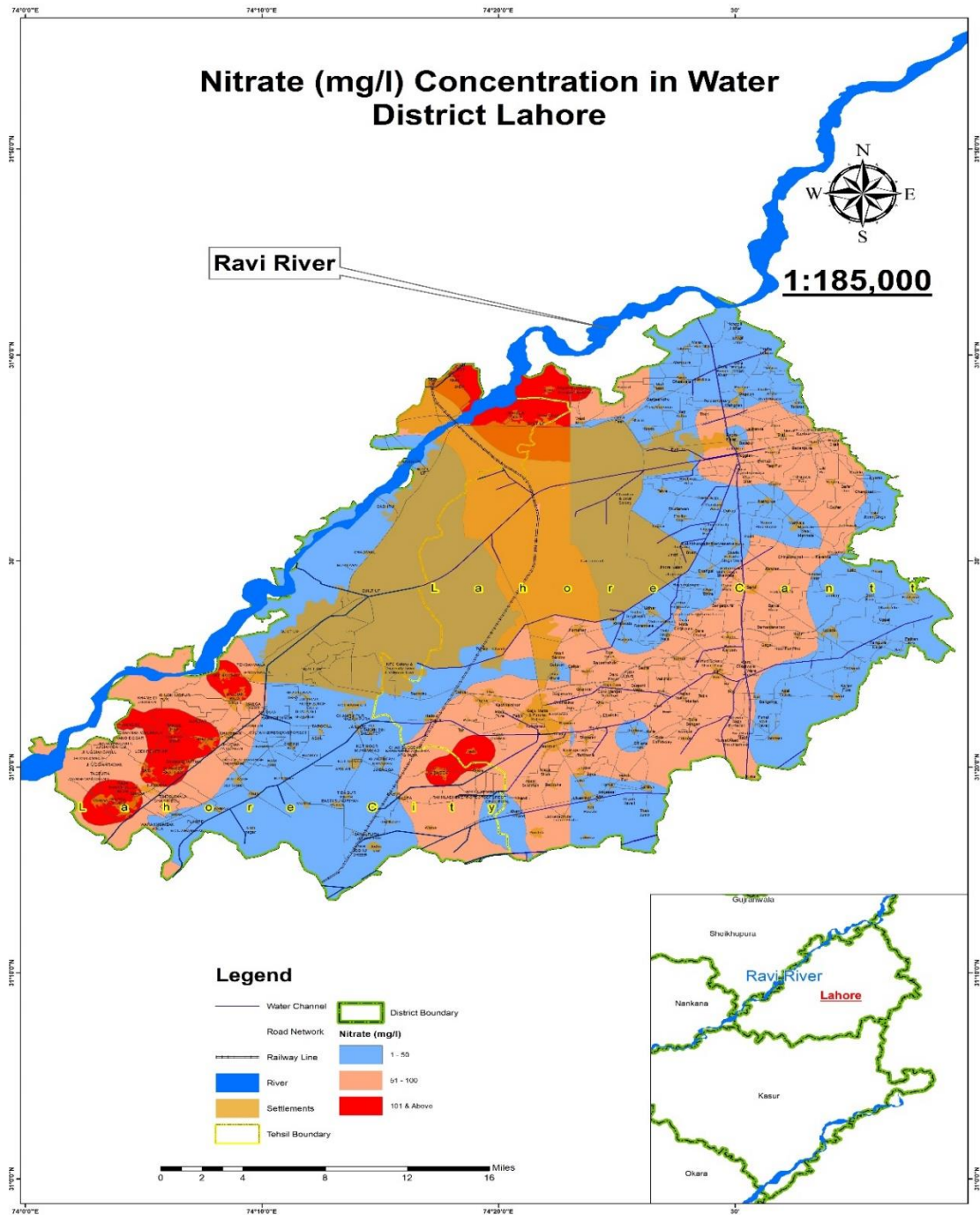
Analysis



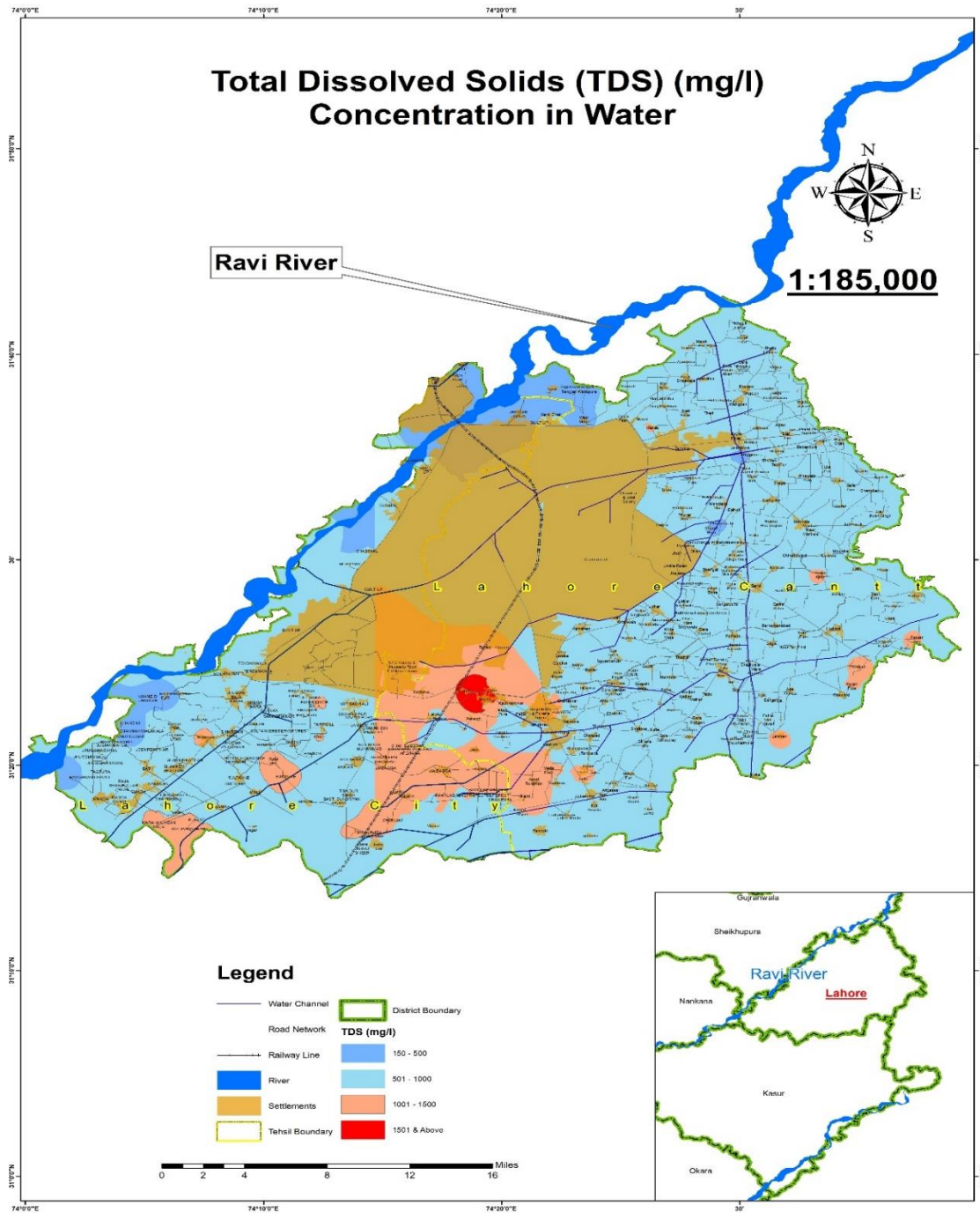
Analysis



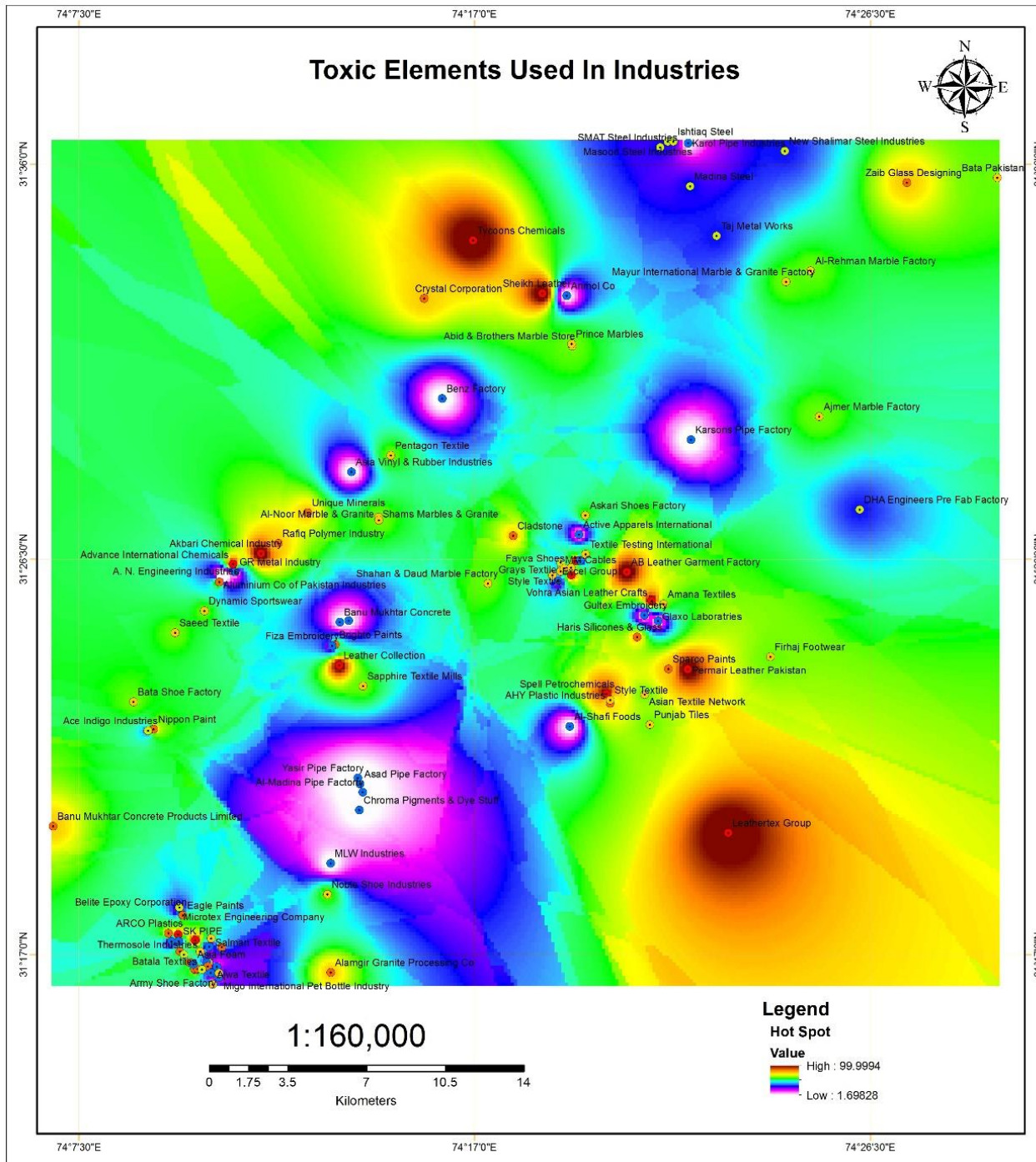
Analysis



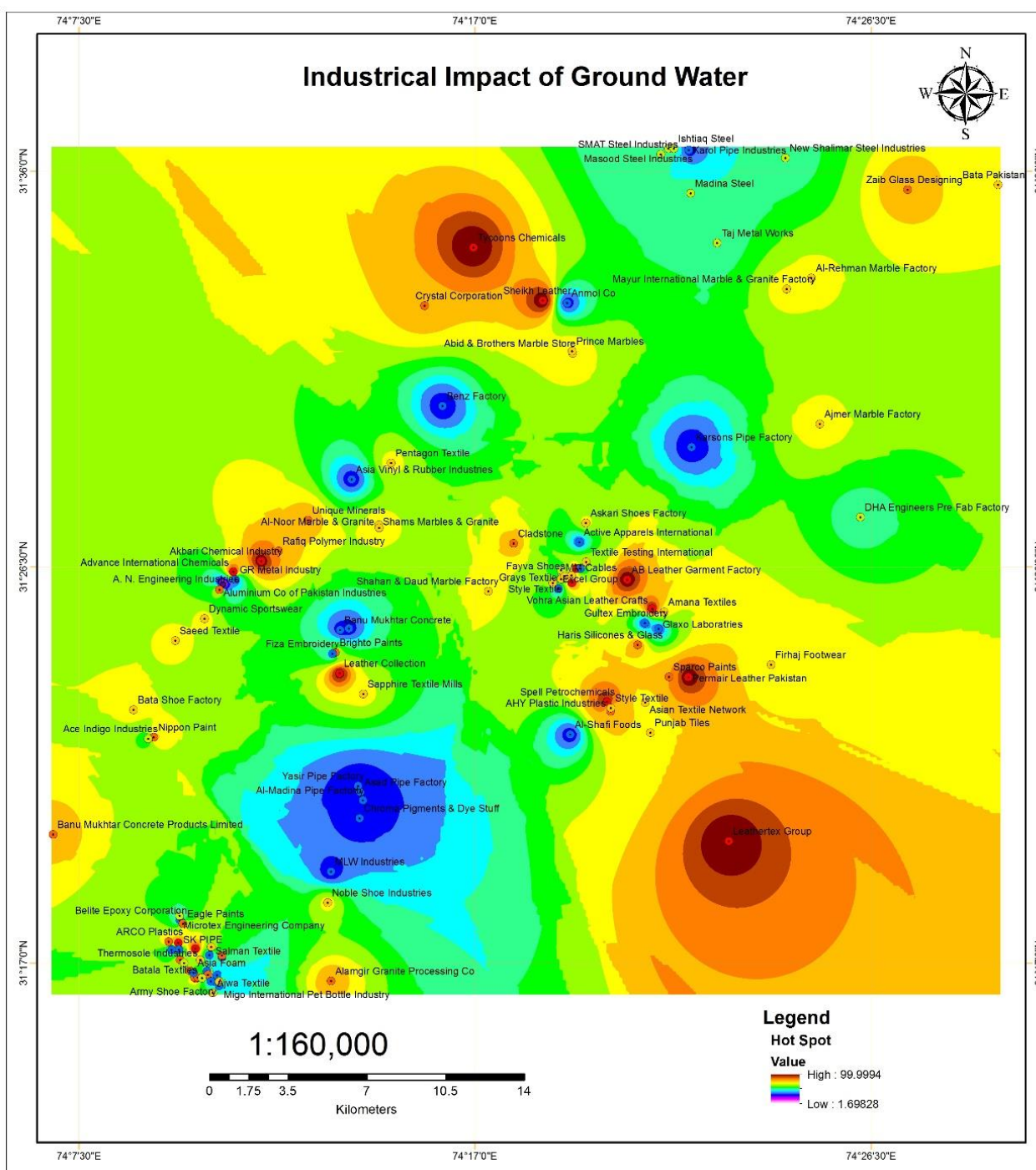
Analysis



Results and Discussions



Results and Discussions



Conclusions

- The results indicated that the concentrations of all parameters were high in groundwater samples of Lahore industrial area.
- The results of the water samples indicated that most of the area is effected by these industrial waste water.
- Soil near these industries disturbed a lot in terms of pH value.
- And agriculture lands show high value of pH due to the excessive use of Pesticides and fertilizers.

Future Research Recommendations

- Finding a way to develop cheap filtration systems and better waste disposal management
- Promote agriculture practices with organic products

THANK YOU