ANALYZING THE EVOLUTION OF LIBRARY AND INFORMATION SCIENCE PUBLICATIONS AT KHUSHAL KHAN KHATTAK UNIVERSITY, KARAK: PATTERNS, TRENDS, AND CONTRIBUTIONS THROUGH A CONTENT ANALYSIS APPROACH (UP TO 2024)

Aftab ahmad Khan
Iqra Atif
Muhammad Ahsan Mahboob
Inayat ur Rahman
Muhammad Adnan
Sobia khan
Ahtesham Wajid
Global Climate-Change Impact Studies Centre (GCISC), MOCCEC
University of the Witwatersrand, Johannesburg, South Africa
University of Agriculture, Faisalabad, Pakistan
National engineering Services of Pakistan
National University of Science & Technology

Abstract

Soil salinization is a very common land degradation process, particularly in arid and semi-arid regions. Under harsh climatic conditions where evaporation is more than precipitation, soluble salts are accumulated in the soil, influencing soil properties with ultimate decline in productivity. In this study soil salinity prediction model is developed based on integrated satellite remote sensing data followed by site observations and geospatial methods. Different spectral indices including Simple Ratio, Normalize Difference Vegetation Index, Soil Adjusted Vegetation Index and Moisture Stress Index were calculated from original bands of Landsat images. Field survey was conducted in Shorkot, Punjab to collect the soil samples and were tested in lab. The results showed that maximum and minimum values of EC was 138.2 and 0.613 dSm^{-1} respectively. Out of 31 samples 9 samples were found with EC value ≤ 4 and 22 samples represent the saline soils. Combining these satellite based indices and field EC variables into one model yielded the best fit with R^2 =0.89. Out of the total area, 9.2% and 18% were identified as moderately and slightly saline, respectively. This shows that a very fine scale spatial variability analysis and modeling of surface soil salinity of large areas is possible using satellite remote sensing data.

Key Words: Electrical conductivity; GIS; Prediction model; Salinity model; Salinity index, KKKUK

1. BACKGROUND OF THE STUDY

The education of Library & Information Science (LIS) in Pakistan has knowledgeable considerable development, knowingly contributing to the groundwork of specialists for the progressing field of information organization. Presently, 14 academic organizations nationally offer LIS programs, encircling credential courses to PhD degrees. Of these, four are in the commercial zone, while the remaining ten are in the public sector, demonstrating the cooperative commitment of both commercial and governmental institutions to develop specialized skill in Library and Information Science (LIS).

Punjab is at the front of the state with six LIS departments, while Sindh and Khyber Pakhtunkhwa both have three LIS departments. Both Baluchistan and the centralized capital, Islamabad, hold a remarkable LIS department, hence enabling the convenience of LIS education countrywide. The current formation of two fresh Library and Information Science departments in Punjab highlights the rising demand for information professionals. A prominent development transpired in KP with the founding of the Department of Library & Information Science at Khushal Khan Khattak University, Karak, in 2014. This department offers three educational programs: Bachelor of Science in Library and Information Science (BS-LIS), a postgraduate Master of Philosophy (MPhil) program, and a Doctor of Philosophy (PhD) program in Library and Information Science (LIS). Thesis writing is compulsory for BS and MPhil students, while it is optional for MLIS students, providing academic suppleness to meet diverse student necessities.

Khushal Khan Khattak University is the foundational public-sector institute in Khyber Pakhtunkhwa to launch an MPhil program in Library & Information Science, representative a prominent attainment in the field. The formation of this department was envisioned to address the increasing need for talented librarians and information administrators, providing graduates with the essential abilities to professionally manage both conservative and digital information structures.

The instant development of LIS education in Pakistan highpoints its indispensable meaning in the contemporary information organization arena. As technology progressively renovates the convenience and protection of knowledge, the demand for expert information specialists is intensifying. LIS institutes countrywide are satisfying this mandate while also improving the nation's academic and specialized progression.

1.2 OBJECTIVES OF THE STUDY

1. To investigate the research output of undergraduate (BLIS), postgraduate (MLIS), and MPhil scholars in the Department of (LIS) at Khushal Khan Khattak University, Karak.
2. To examine the thematic focus of theses and approved MPhil synopses, identifying prevailing and emerging research trends in the field of LIS.
3. To evaluate the quality and consistency of key components, such as titles, abstracts, keywords, and references, in students' research outputs.
4. To assess the adherence to institutional guidelines for thesis formatting and referencing practices.
5. To identify gaps and provide recommendations for improving research practices, methodologies, and access to academic resources within the department.

1.3 RESEARCH QUESTIONS

1. What are the key areas of research focus among BLIS, MLIS, and MPhil students at Khushal Khan Khattak University, Karak?
2. How do the research productivity and output of BLIS, MLIS, and MPhil students at Khushal Khan Khattak University compare across different academic programs?

3. What are the main challenges faced by LIS students at Khushal Khan Khattak University in conducting research and writing academic papers?
4. How do students' bibliometric practices (e.g., keyword selection, referencing, citation style) align with international research standards?
5. What is the role of digital libraries and knowledge management in the research interests of LIS students at Khushal Khan Khattak University?

1.4 SIGNIFICANCE OF THE STUDY

The significance of this study lies in its potential to provide valuable insights into the research productivity and academic practices of LIS students at Khushal Khan Khattak University, Karak. By assessing the current research trends, challenges, and areas for improvement, the study aims to identify gaps in LIS education and offer recommendations for enhancing research methodologies, training, and access to global resources. The outcomes may donate to the preparation of more dynamic teaching approaches and strategies that strengthen the growth of LIS education, in the end endorsing the progression of talented information specialists in Pakistan. Furthermore, the study will enable the integration of traditional LIS subjects with evolving tendencies such as digital libraries and information management, confirming that students are effectively prepared for the developing information setting.

2. REVIEW OF THE LITERATURE

Okeji (2019) studied the research productivity in Library & Information Science (LIS) in Nigeria from 2000 to 2018, finding 1,106 documents. In 2011, the highest productivity was renowned, with 151 documents (13.65%), although more than one-third of the research (35%) was dispersed in Library Philosophy and Practice. The University of Ibadan was the furthermost productive institute, producing 195 publications (17%), though Baro, E. Emmanuel, was the most prolific author with 29 articles. An examination of authorship designs specified that 47.6% (n = 527) of the research was led by a single author, while 36% (n = 398) was co-authored by two personalities. A difference in output was experiential post-2011 (Okeji, 2019).

Ahmad, Sheikh, and Rafi (2019) conducted a bibliometric study of LIS research from 2003 to 2017, indexed in the Web of Science database. Their findings showed a growing trend, with publications increasing from 200 in 2014 to 450 in 2017. The United States was the leading contributor, producing 39% (n = 1,453) of the research, followed by England (215 publications) and Canada (198 publications). Articles in the *Journal of Medical Library Association* received the highest citation impact. Of the top 10 productive institutions, six were based in the United States, with Indiana University ranking first. Thelwall, M., from England, was identified as the most prolific author, publishing 29 articles (Ahmad et al., 2019).

Several studies have examined LIS research productivity in Pakistan. Anwar (1981) reviewed 56 Master's theses produced at the University of Punjab from 1975 to 1981, presenting the findings in a report titled *Research Report*. Hussain and Jan (2017) analyzed the research output of the Department of Library and Information Science at Sarhad University between 2014 and 2017, applying bibliometric methods. They found that undergraduate students produced 58% of theses, while postgraduate students contributed 40%. The study recommended enhancing female participation in research and providing training in topic selection, research design, and report writing (Hussain & Jan, 2017).

Sheikh and Jan (2017) reviewed MPhil and Ph.D. theses produced by LIS schools in Pakistan up to 2015. They reported that 12 LIS schools were operational, five of which offered advanced degrees. By 2015, 19 Ph.D. and 125 MPhil degrees had been awarded. A lack of Ph.D.-qualified faculty was identified as a significant barrier to expanding

MPhil and Ph.D. programs. The study recommended institutional collaboration and government support to encourage and promote LIS professionals (Sheikh & Jan, 2017).

Jabeen (2015) analyzed 18,371 documents published in 40 core LIS journals from 2003 to 2012, using data from the Web of Science. She found a high prevalence of single-author publications (70%) and noted that 43% of the research originated from U.S.-affiliated authors. Universities contributed more research compared to non-academic institutions (Jabeen, 2015).

Mittal (2011) investigated LIS research trends in India, analyzing 1,408 documents produced by Indian authors from 1990 to 2010, indexed in LISA. The study identified 4,735 co-occurrence descriptors, highlighting trends such as library practices, user education, and user studies. Maharana and Das (2014) examined the contributions of Indian authors to LIS research indexed in the Web of Science from 1999 to 2013. Indian authors produced 141 documents, constituting 1.11% of global LIS research, and ranking 13th globally. The two-author pattern (40.71%) was predominant, followed by 36% single-author contributions. M. P. Satija was identified as the most prolific author, publishing five articles (Mittal, 2011; Maharana & Das, 2014).

Mahmood and Shafique (n.d.) scrutinized the background of LIS research in Pakistan, emphasizing the necessity for research-qualified workforces. Through papers from the Higher Education Commission and Pakistan's Ministry of Education, along with meetings with senior Library & Information Science (LIS) authorities, they highlighted the need for backing, value assurance, inducements, and the cultivation of a research philosophy to progress LIS Library & Information Science in Pakistan (Mahmood & Shafique, n.d.).

Lastly, Warraich (2010) evaluated the MLIS prospectus at Punjab University, focused on student perceptions and hindrances. The study employed a survey technique to find communication and information technology expertise as imperative complications. Commendations included the outline of information technology courses and the improvement of lab amenities to progress scholar fulfillment (Warraich, 2010).

3. RESEARCH METHODOLOGY

This mixed-method research examined the study output of BLIS, MLIS, and MPhil students at Khushal Khan Khattak University in Karak, Pakistan. A quantifiable bibliometric study of thesis and synopses, along with qualitative understandings from student and staff input, make available a detailed viewpoint on research tendencies and academic principles.

Data from BLIS 7 MLIS thesis, along with MPhil ASRB-approved synopses, were inspected for titles, keywords, summaries, and references, with outcomes methodically organized in Excel and showed in tables. Qualitative explanations acknowledged issues and prospects for improvement. Outcomes lead recommendations to progress research developments, organizational accuracy, and source accessibility within the department.

3.1 POPULATION

This mixed-method strategy includes 16 academic institutes in Pakistan that offer Library and Information Science (LIS) education, with their instructors, administrative personnel, current LIS scholars, and alumni. Additionally, specialized librarians through other sectors who have undergone LIS training are involved. The study contains representatives, university administrators, and employers of Library and Information Science alumni, such as libraries and information centers. This diverse cohort enables a wide scrutiny of LIS education in Pakistan, participating quantitative data on academic tendencies and student outcomes with qualitative understandings into complications, openings, and the changing necessities of the LIS profession.

3.2 DATA ANALYSIS

QUANTITATIVE ANALYSIS

The extracted data were exposed to bibliometric study. Descriptive statistics were used to examine designs in titles, keywords, summaries, references, and research themes. Data were methodically organized into tables for simple presentation and evaluation amongst BLIS, MLIS, and MPhil stages.

QUALITATIVE ANALYSIS

Responses from prearranged interviews or examinations were methodically coded and thematically scrutinized to discern predominant complications and tendencies. The qualitative data supplemented and clarified the quantitative results, offering a more systematic understanding of research output.

The combined quantitative and qualitative studies offer an inclusive perception on research tendencies and academic principles, resulting in applied commendations for improving research processes and resources within the department.

4. DATA ANALYSIS AND RESULTS

This section outlines the conclusions concerning the research productivity of the Department of Library & Information Science (DLIS) at Khushal Khan Khattak University, Karak, through 2024. It examines the central tendencies in publications, staff research productivity, and student contributions through thesis and dissertations. Data were collected from departmental archives, institutional sources, HEC-accredited papers, and records. The section highlights principal research themes, staff-student teamwork, and opportunities for improvement, present an eloquent representation of the department's academic growth and encouragement.

TABLE 4.1: DLIS PROGRAMS AND DURATION

Degree program	Duration	Program Level	Typical Entry Requirement	Focus Area	Notes
BS-LIS	4 Years	Undergraduate	Intermediate FSc / A-Level	Core LIS, Information Literacy, Digital Libraries	Includes thesis/project in final year
MPhil-LIS	2 Years	Postgraduate	BS-LIS Equivalent	Research Methods, Advanced LIS Topics	Mandatory research thesis
PhD-LIS	3 Years	Doctoral	MPhil-LIS Equivalent	Original Research, Advanced LIS Theories	Focus on publication and conference participation

The department highlights existing Library and Information Science tasks, encircling digital library management, knowledge organization, artificial intelligence integration, and user education creativities. This highlighting not only meets local library necessities but also resembles with universal research developments, preparing graduates for leadership positions in academic, public, and dedicated libraries.

4.2 FACULTY RESEARCH PRODUCTIVITY

4.2.1 COMPARATIVE OUTPUT: DLIS VS OTHER DEPARTMENTS

Between 2012 and 2019, a bibliometric analysis of Khushal Khan Khattak University revealed that the DLIS department produced 62 research outputs. This positioned the

department second in research productivity, just behind Management Sciences, demonstrating an active research culture despite its relatively recent establishment. The department's research output reflects both faculty dedication and an institutional emphasis on scholarly activity.

TABLE 4.2: DEPARTMENT RESEARCH OUTPUT (2012–2019)

Department	Research Outputs	Rank	Share of Total University Output (%)	Notes
Management Sciences	105	1	27%	Leading department in research publications
Library & Information Science	62	2	16%	Rapidly growing output despite recent establishment
Social Sciences	55	3	14%	Moderate output in comparison
Natural Sciences	48	4	12%	Focused more on laboratory-based research
Arts & Humanities	42	5	11%	Emphasis on qualitative research
Education	39	6	10%	Emerging research culture
Others	45	-	10%	Includes multidisciplinary outputs

4.2.2 AUTHOR-WISE OUTPUT IN LIS DISCIPLINE

A closer look at faculty-specific contributions reveals that a small number of faculty members are responsible for the majority of departmental research.

TABLE 4.3: DLIS FACULTY PUBLICATION SHARES

DLIS Faculty Member	Publications	Percentage Share	Cumulative Share (%)	Research Focus Areas	Notes
Dr. Saeed Ullah Jan	79	22.83%	22.83%	LIS Education, HRM, Bibliometrics	Most prolific author; supervises majority of thesis
Dr. Ghalib Khan	35	10.12%	32.95%	Digital Libraries, Information Literacy	Significant contribution in emerging LIS trends
Dr. Muhammad Hussain	24	6.94%	39.89%	AI in Libraries, User Education	Focused on applied LIS research
Mr. Izhar Muhammad	7	2.02%	41.91%	Knowledge Management	Limited but focused contributions
Dr. Rahim Jan	4	1.20%	43.11%	AI Integration, Library Technology	Emerging researcher

Muhammad Shahab	3	0.87%	43.98%	Library Development	Initial research contributions
Others (per study)	194	56.02%	100%	Various LIS Topics	Remaining faculty and students contributions

4.2.3 FOCUS OF DLIS THESES (2015–2020)

The department has witnessed an increasing number of thesis submissions, particularly during 2017–2021. A substantial portion of these theses were supervised by Dr. Saeed Ullah Jan, highlighting the critical role of faculty mentorship in fostering student research productivity.

TABLE 4.4: THESIS OUTPUT BY STUDENT LEVEL (UP TO 2020)

Student Program	Thesis Outputs	Percentage Share of Total	Primary Research Themes	Supervising Faculty	Notes
BS-LIS	39	68.4%	Library Status, Information Literacy, Emerging LIS Trends	Dr. Saeed Ullah Jan, Dr. Ghalib Khan	Majority produced between 2017–2020
MPhil-LIS	18	31.6%	AI in Libraries, User Education, Digital Transformation	Dr. Saeed Ullah Jan, Dr. Muhammad Hussain	Focused on applied and research-intensive studies
Total	57	100%	-	-	Represents all recorded student thesis up to 2020

4.2.4 RECENT NOTABLE PUBLICATIONS

DLIS faculty and students have contributed to several notable publications, reflecting current trends in LIS research:

1. **Integration of Artificial Intelligence Tools in Academic Libraries of Khyber Pakhtunkhwa** (2025) – Co-authored by Dr. Rahim Jan, Dr. Muhammad Hussain, Muhammad Shahab, and MPhil scholars; published in The Critical Review of Social Sciences Studies.
2. **Factors Affecting Human Resource Management Practice in University Libraries** (2023) – Authored by Dr. Saeed Ullah Jan; published in Sarhad Journal of Management Sciences.
3. **The User-Education Programs in the University Libraries of Khyber Pakhtunkhwa:** A Quantitative Study (2020) – Authored by DLIS staff and students; published in Library Philosophy and Practice.

These publications highlight a shift toward integrating AI, user education programs, and organizational management in LIS research, demonstrating the department's alignment with global trends.

4.3 STUDENT RESEARCH OUTPUT

although student journal publications are limited, available records indicate meaningful contributions through thesis work.

- **BS-LIS students** contributed 39 thesis-level research outputs.
- **MPhil-LIS students** contributed 18 thesis research outputs.

TABLE 4.5: STUDENT THESIS OUTPUT

Student Program	Thesis Outputs	Percentage Share of Total	Primary Research Themes	Supervising Faculty	Notes
BS-LIS	39	68.4%	Library Status, Information Literacy, Emerging	Dr. Saeed Ullah Jan, Dr. Ghalib Khan	Majority produced between 2017–2020
MPhil-LIS	18	31.6%	AI in Libraries, User Education, Digital Transformation	Dr. Saeed Ullah Jan, Mr. Muhammad Hussain	Focused on applied and research-intensive studies
Total	57	100%	-	-	Represents all recorded student thesis up to 2020

The relatively limited student-authored journal publications indicate a need for targeted mentorship and support for publishing in peer-reviewed journals. Encouraging collaborative publications between faculty and students could strengthen departmental research visibility.

4.4 DISCUSSION & INTERPRETATION

4.4.1 ACTIVE RESEARCH CULTURE

DLIS shows a resilient research philosophy, with 62 noted outputs from 2012 to 2019, engaging it second amongst university departments. This achievement is particularly important considering the department's contemporary initiation in 2015, reflecting instantaneous growth in academic productivity and institutional support for exploration.

4.4.2 FACULTY-LED SCHOLARSHIP

Research productivity in DLIS is mainly faculty-led. A select group of remarkably creative staff associates, including Dr. Saeed Ullah Jan, Dr. Ghalib Khan, and Mr. Muhammad Hussain, has made the mainstream of research outcomes. Their effort includes several LIS disciplines, with AI, digital libraries, HRM, and bibliometric studies. Staff mentorship has proven vital in guiding scholar research and thesis direction, hence improving departmental productivity.

4.4.3 GROWTH IN THESIS ACTIVITY

From 2017 to 2021, the department had a noteworthy growth in thesis productivity, specifically under the supervision of Dr. Saeed Ullah Jan. These thesis distillate on existing Library and Information Science themes, including information knowledge, digital library growths, and advanced technology applications, exemplifying a advanced research method.

4.4.4 EMERGING RESEARCH THEMES

Current study highlights a rising importance on technological incorporation, user-

centric facilities, and administrative organization within libraries. This thematic evolution imitates the department's equivalence with local demands and universal developments, promising that research results are relevant and significant.

4.4.5 STUDENT VISIBILITY GAP

While the productivity of student thesis is substantial, the number of student-authored journal publications is still limited. Bridging this gap through workshops, mentorship, and research collaboration could raise the department's academic importance and strengthen its research values, letting students to make more extensive contributions to intellectual networks.

5. CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

This study scrutinized the research publication tendencies and overall output of the Department of Library & Information Science at Khushal Khan Khattak University, Karak, from 2015 to 2024. The outcomes specify a constant, albeit asymmetrical, increase in academic assistances from instructors and students similar. Staff publications, particularly those by senior and doctorate staff, revealed significant development in both quality and quantity, including contributions to peer-reviewed journals and conference records. Students following MPhil and PhD degrees publicized an growing assignation in academic writing, but research productivities at the BS level were mainly imperfect to development reports and thesis.

Despite this positive growth, the department's research visibility at the national and international level is still limited. Challenges such as restricted access to high-impact journals, limited research funding, and insufficient cross-institutional collaboration hinder its broader academic impact. Nonetheless, the gradual rise in productivity reflects a promising trajectory for future development if systematic support and institutional backing are strengthened.

5.2 RECOMMENDATIONS

1. **Strengthen Faculty Research Output**
   Allocate research grants, provide incentives, and reduce teaching burdens to enable faculty members to dedicate more time to quality publications.
2. **Enhance Student Research Capacity**
   Organize regular workshops, training sessions, and mentorship initiatives to equip students with the skills necessary for academic publishing.
3. **Expand Research Resources**
   Improve digital library access, subscribe to major indexing databases, and ensure the availability of recent scholarly literature to support faculty and student research.
4. **Encourage Collaborative Research**
   Promote partnerships with other universities and research institutes at both national and international levels to increase co-authored publications and citation impact.
5. **Policy and Institutional Support**
   Develop policies that recognize and reward publications in high-quality, indexed journals while discouraging reliance on low-impact or non-indexed outlets.
6. **Promote Visibility and Dissemination**
   Encourage open-access publishing, conference participation, and the use of institutional repositories to enhance the global visibility of the department's research output.

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Table I: The spectral and spatial resolution of Landsat 8 sensor.

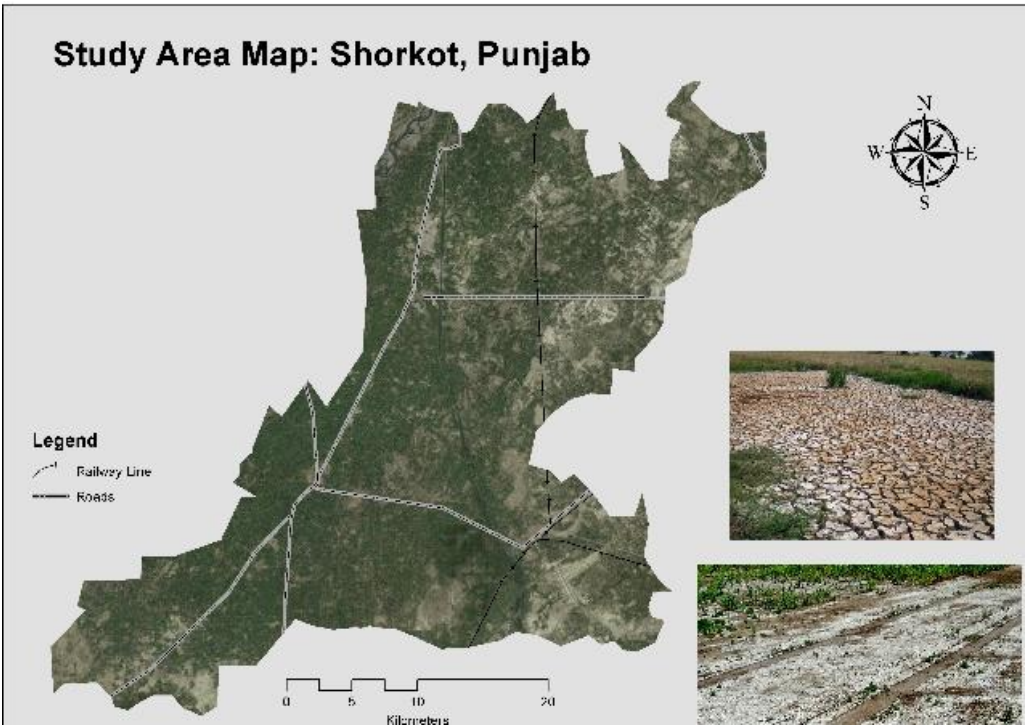| Sr. No	Spectral Band Name	Bandwidth (µm)	Resolution (m)
1	Band 1 Coastal	0.43 - 0.45	30
2	Band 2 Blue	0.45 - 0.51	30
3	Band 3 Green	0.53 - 0.59	30
4	Band 4 Red	0.63 - 0.67	30
5	Band 5 NIR	0.85 - 0.88	30
6	Band 6 SWIR 1	1.57 - 1.65	30
7	Band 7 SWIR 2	2.11 - 2.29	30
8	Band 8 Pan	0.50 - 0.68	15
9	Band 9 Cirrus	1.36 - 1.38	30
10	Band 10 TIRS 1	10.6 - 11.19	30 (100)
11	Band 11 TIRS 2	11.5 - 12.51	30 100)

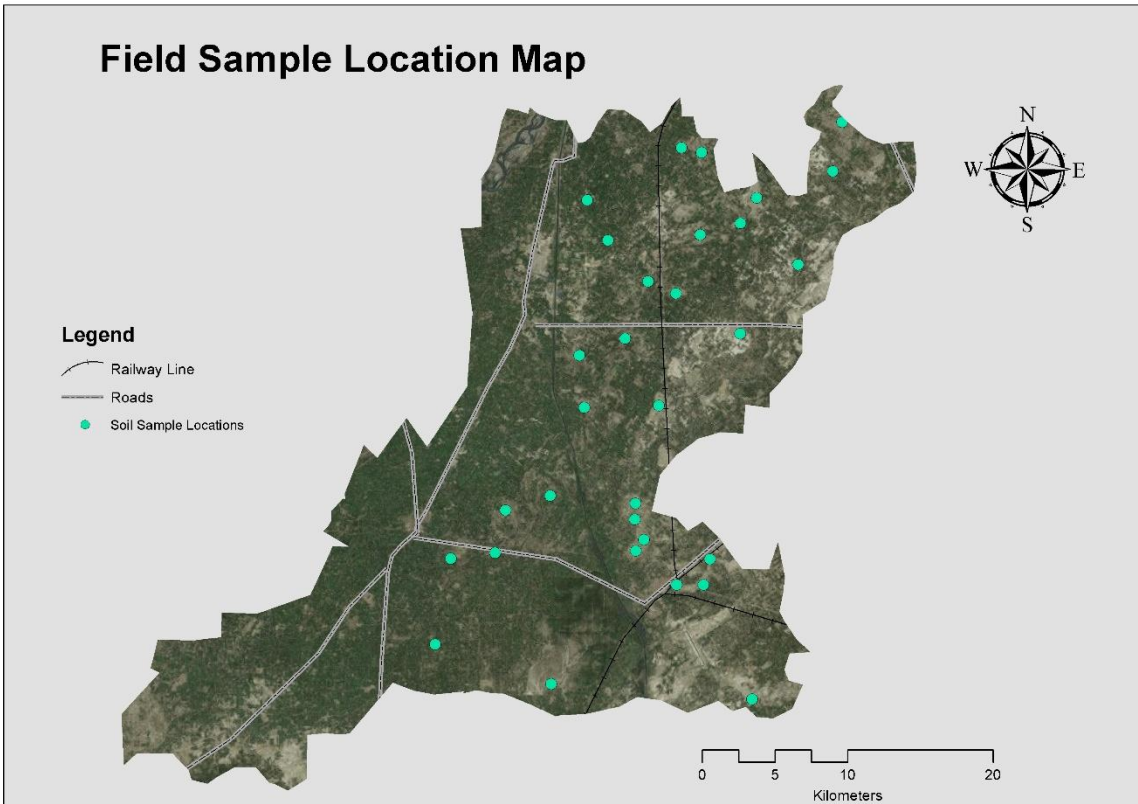**Fig. 1:** Map of study area.

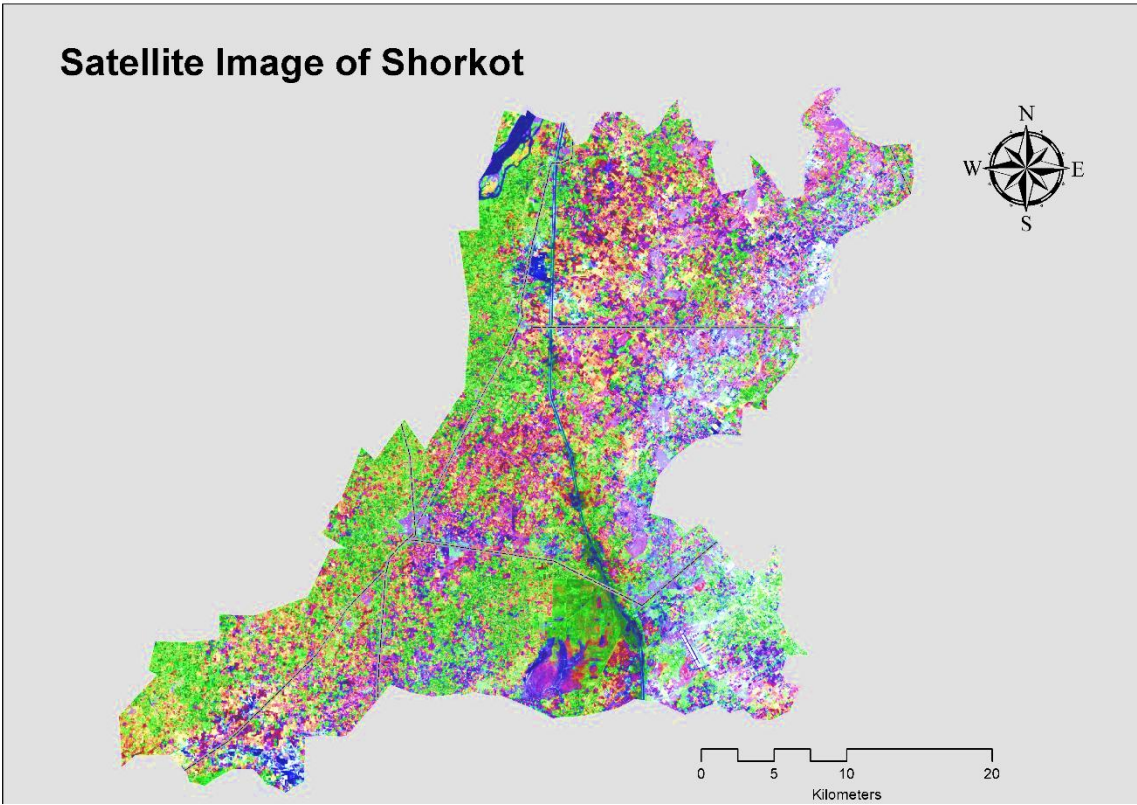**Fig. 2:** Soil sampling locations of the field survey.

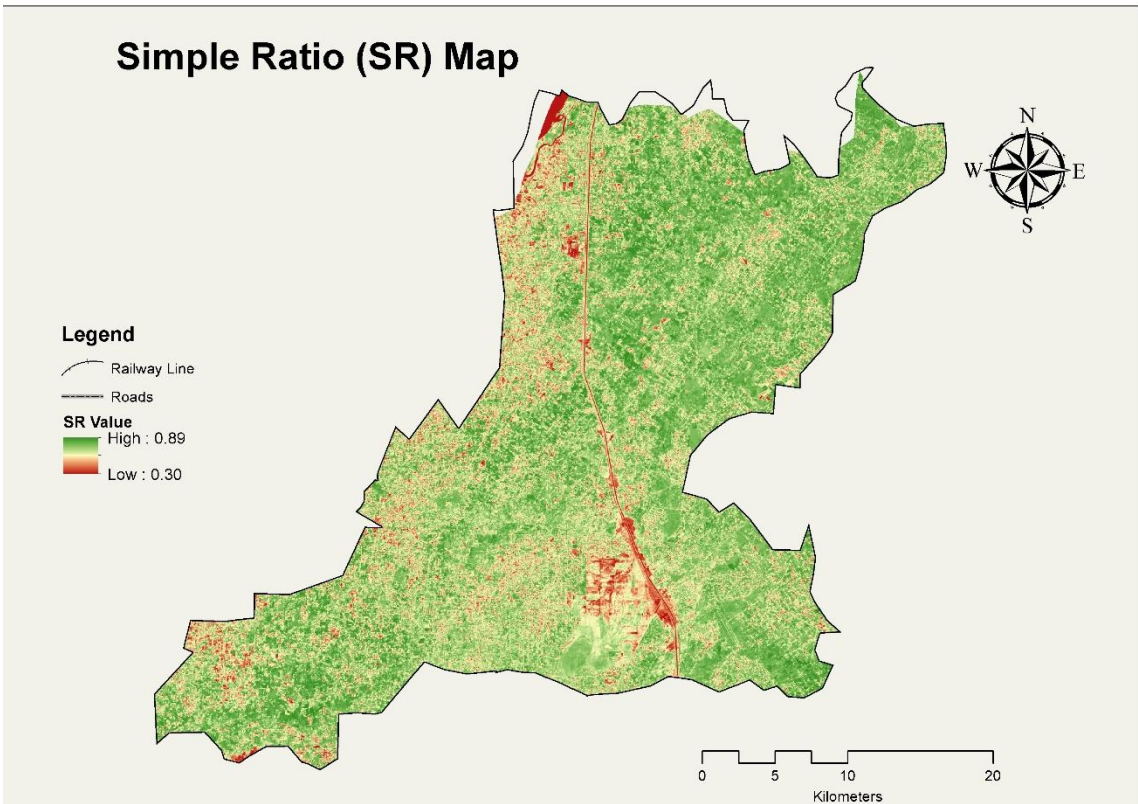**Fig. 3:** False color composite subset of Landsat 8 satellite image for Shorkot region.

Fig. 4: Simple Ratio (SR) map of Shorkot region highlighting the vegetation in green color.
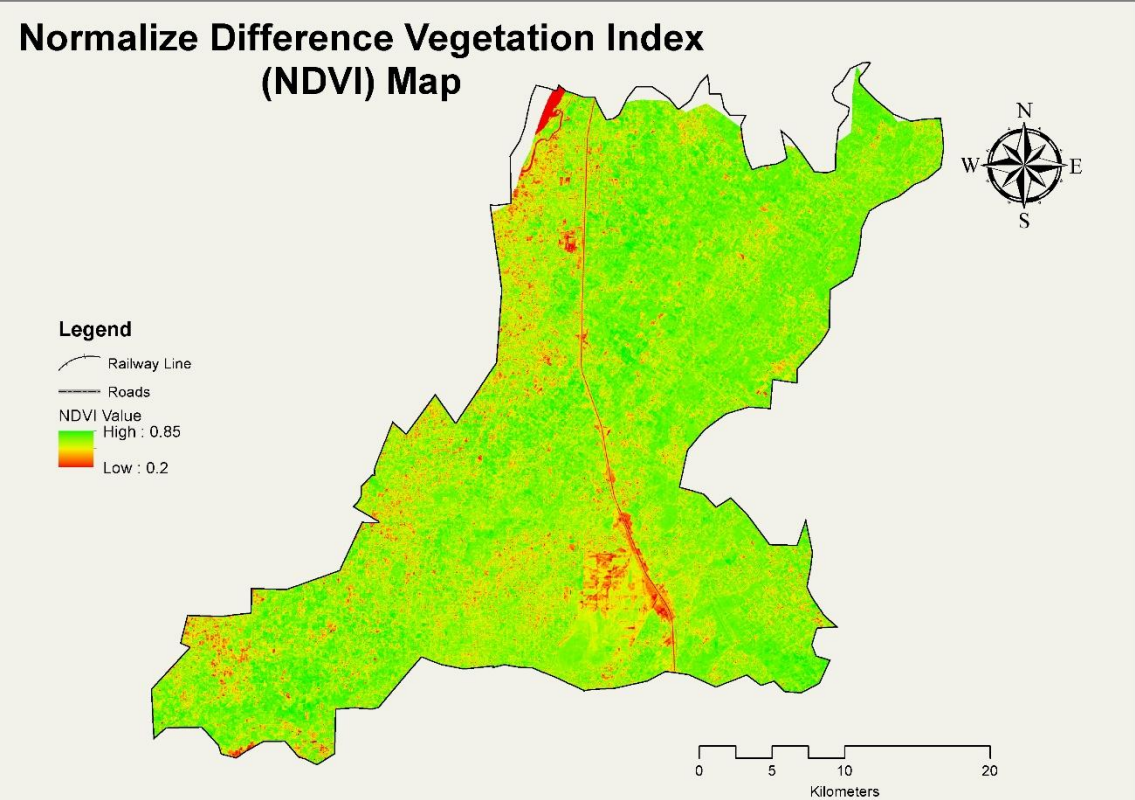
Fig. 5: NDVI map of Shorkot region highlighting the vegetation and other land in transition from green to red color.
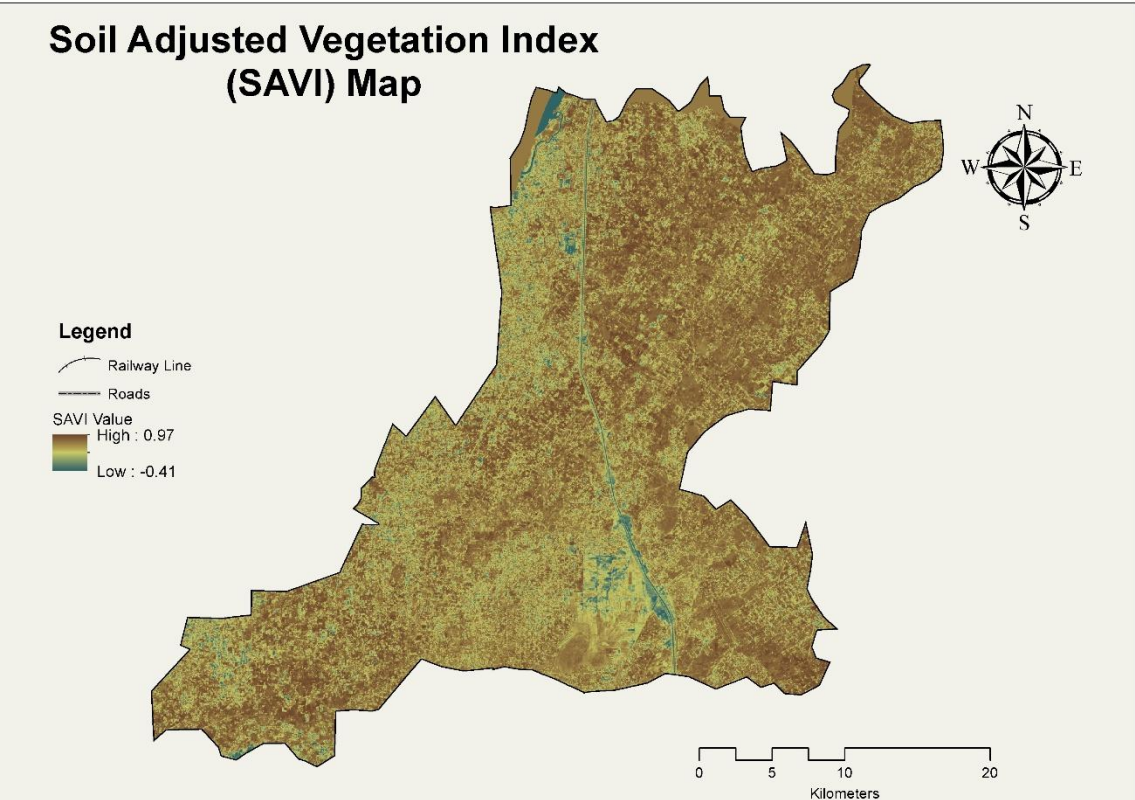

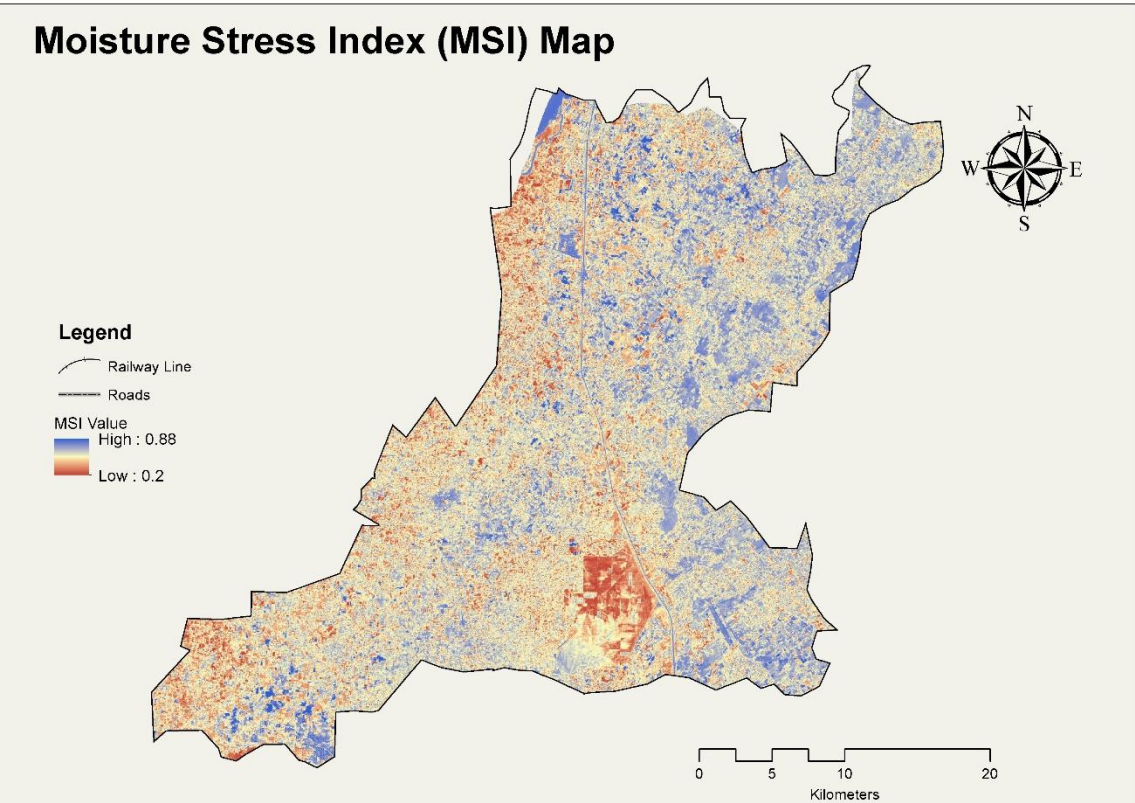**Fig. 6:** SAVI map of Shorkot region highlighting the exposed soil surface and vegetation cover.

Fig. 7: MSI map of Shorkot region highlighting the areas with high and low moisture content.
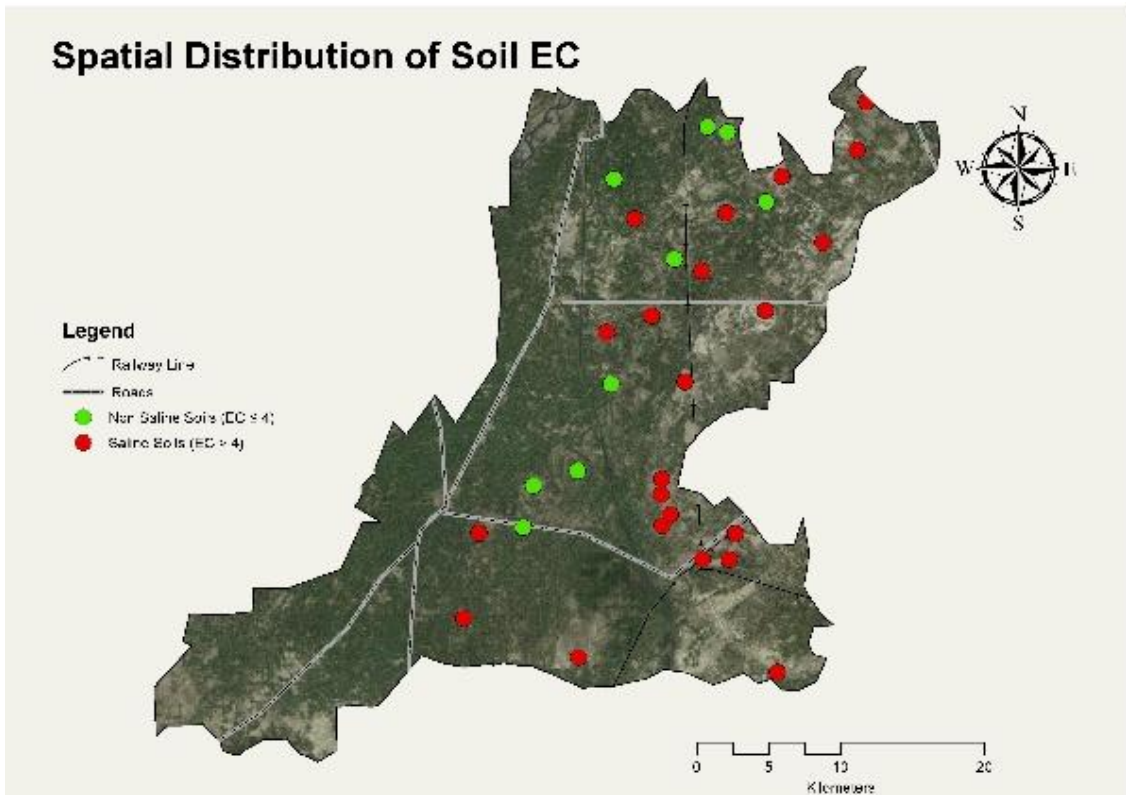
Fig. 8: Spatial distribution of soil samples with respect to their EC values.
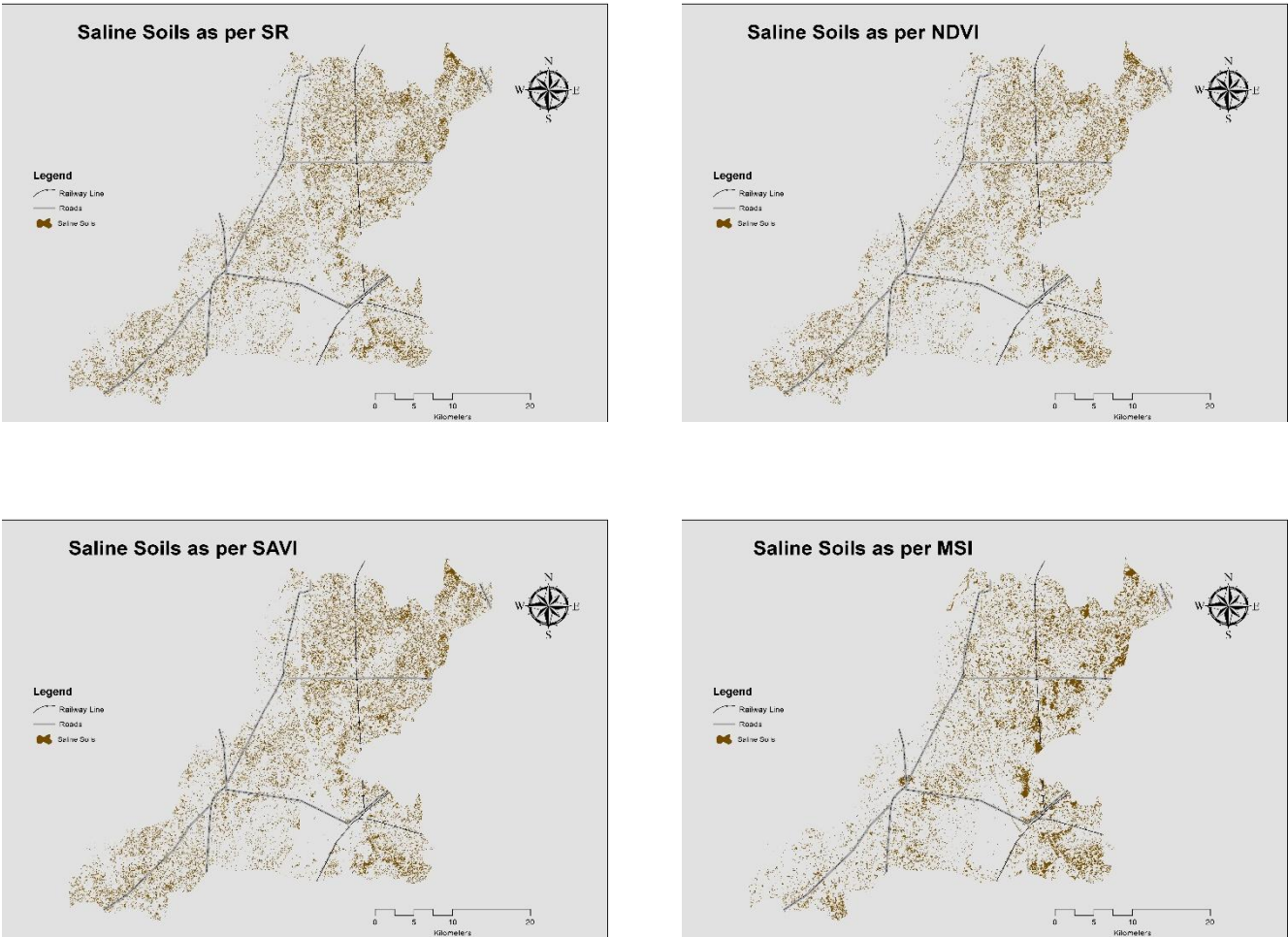
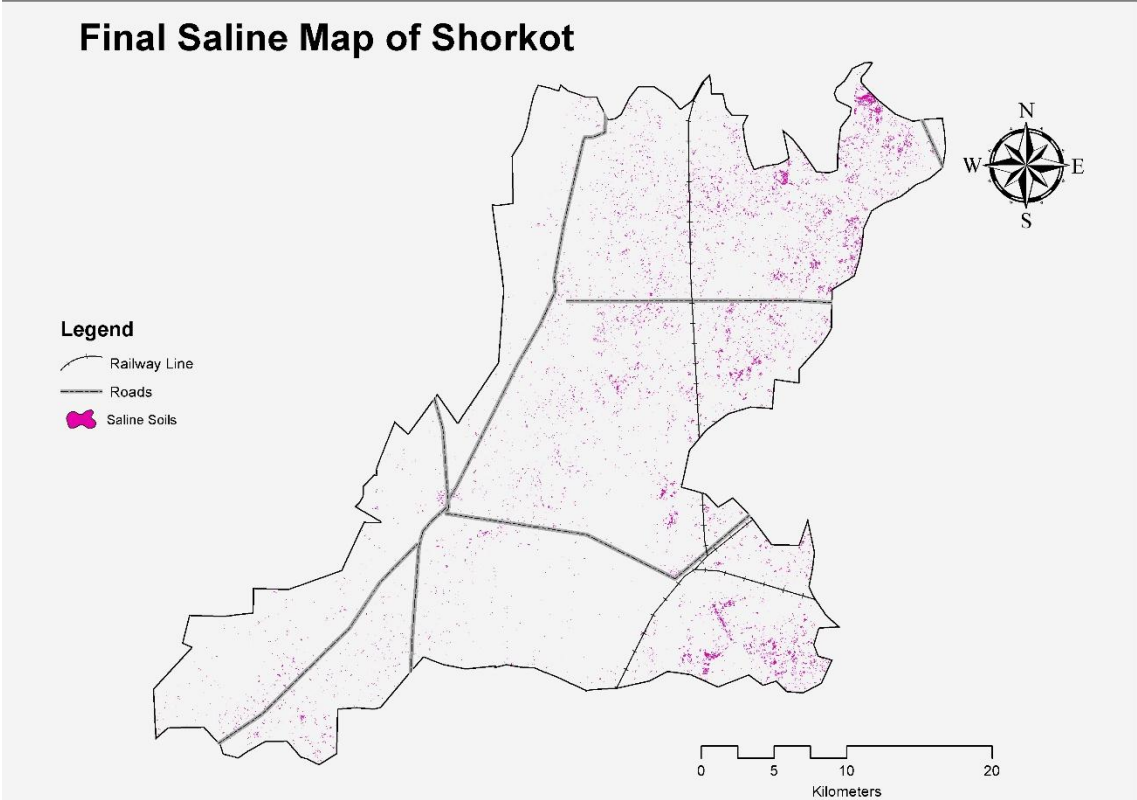**Fig. 9:** Soil salinity maps derived from band rationing images.

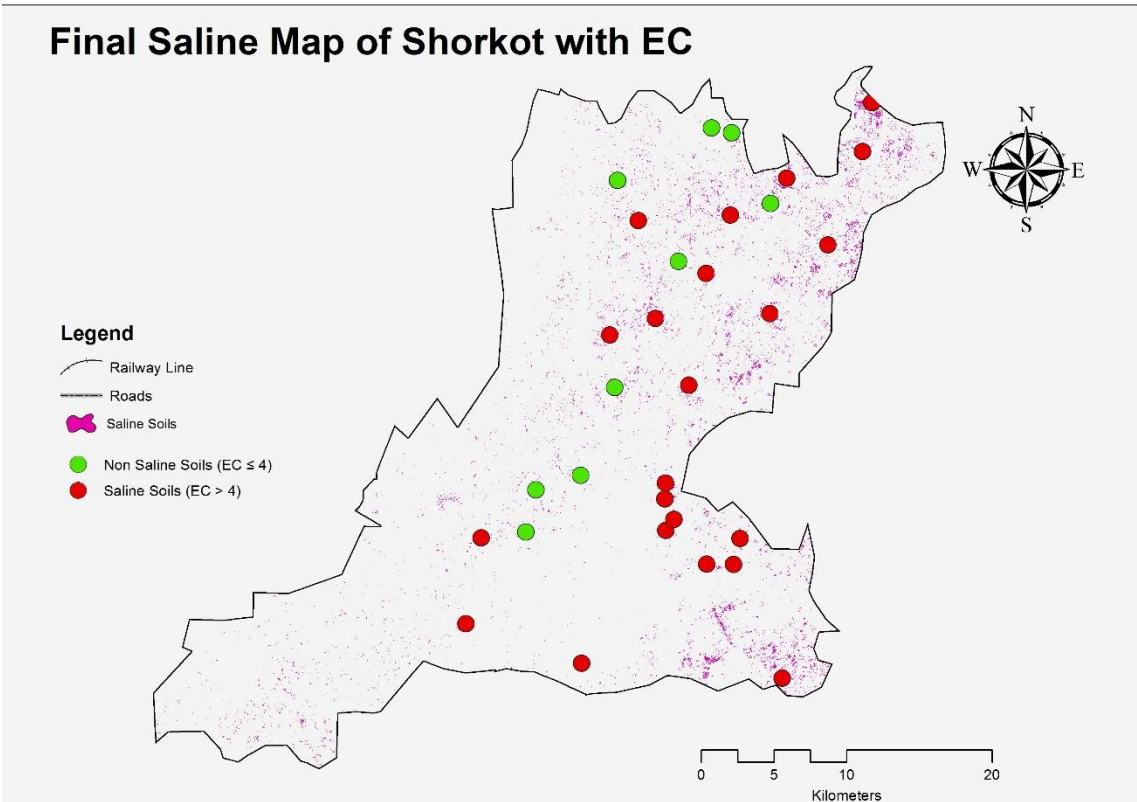**Fig. 10:** Final soil salinity map of Shorkot region.

Fig. 11: Soil salinity map overlayed with factual EC dataset.