Muhammad Waqas

PhD Applicant



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- scholar.google.com/citations

PROFILE

Remote Sensing & GIS researcher with strong expertise in geospatial data science, remote sensing applications, and machine learning for climate change, hydrology, and sustainable agriculture. Experienced in integrating multi-source satellite data (Sentinel, SAR, optical) with advanced spatial analysis to address environmental and agricultural challenges. Published work on soil erosion modeling and active groundwater and ecosystem monitoring research. Passionate about advancing geospatial methods to support sustainable development, climate resilience, and evidence-based resource management.

PROFESSIONAL EXPERIENCE

GIS Editor
Neo Space Group
01/2025 – present | Riyadh, Saudi Arabia

- Developed **ArcPy automation scripts**, reducing manual GIS processing time by **40%** and improving efficiency.
- Extracted and processed **satellite and Sentinel data**, enabling accurate analysis and visualization for multiple projects.
- Conducted **big data management**, handling and optimizing **terabyte-scale geospatial datasets**.
- Designed and implemented **geospatial data schemas** to standardize workflows and improve data quality.
- Created schemas for **UVMap, VMap1, VVOD, ETOD, and DVOF**, ensuring compliance with international geospatial standards.
- Developed **conversion tables** that enabled seamless **cross-platform GIS data integration**, improving interoperability.
- Converted **OpenStreetMap (OSM) data for the entire world** from **PBF format into Topographic Data Store (TDS) format**, supporting defense and enterprise-scale applications.
- Converted GIS datasets into **Vector Product Format (VPF)** for integration into legacy and enterprise GIS systems.
- Ensured accuracy and consistency in geospatial datasets, achieving **99% validation success rate** during QC checks.

GIS & RS Specialist
SAWIE Ecosystems
03/2023 – 12/2024 | Islamabad, Pakistan

- **Automated geospatial analysis workflows**, reducing manual processing time by **45%** and increasing overall accuracy.
- Managed and analyzed **large-scale geospatial datasets** using **R, Python, and Google Earth Engine**, improving analysis efficiency by **50%**.
- Applied advanced RS & GIS methodologies to solve **complex agricultural and environmental problems** with **high-accuracy solutions**.
- Implemented **machine learning models**, extracting actionable insights from multi-source geospatial data with **>90% classification accuracy**.
- Conducted **in-depth GIS analysis**, delivering insights that improved **project decision-making timelines by 30%**.
- Specialized in **CropScan Mapping (NDVI)** for crop health monitoring, increasing assessment precision by **40%**.
- Developed **cloud removal techniques**, ensuring **95% usable imagery** for agricultural monitoring projects.

EDUCATION

MS RS & GIS
PIR MEHR ALI SHAH ARID AGRICULTURE UNIVERSITY
10/2020 – 07/2023 | Rawalpindi, Pakistan
Subjects Studied: Advanced Remote Sensing and Digital Image Processing, Geospatial Data Modeling, Advanced Research Methods, Advanced GIS & Spatial Analysis
CGPA- 3.72/4.00

BS Geo-Informatics
PIR MEHR ALI SHAH ARID AGRICULTURE UNIVERSITY
09/2016 – 09/2020 | Rawalpindi, Pakistan
Subjects studied: Spatial Data Analysis, Web GIS, Advanced Remote Sensing Techniques, Spatial Decision Support System, Computer Programming for GIS Development, Spatial Data Infrastructure, Programming for Image Analysis, Remote Sensing Applications
CGPA- 3.33/4.00

ACADEMIC PROJECTS

Weeds Identification Using Image Processing and Deep Learning Techniques
Master Thesis of RS & GIS

Agriculture Drought Monitoring and Hazard Assessment Using Google Earth Engine for Sindh

Site Specific Soil Management Zoning

Quantification of Green Houses Gases at Urban Level Using Sentinel 5P, A Case Study of Lahore
Final Year Project of BS Geo-Informatics

Flood Mapping and Damage Assessment Using Sentinel 1 SAR Data in Google Earth Engine for District Layyah

Object Base Image Classification for Islamabad

Supervise Classification Using Cart Classifier and Google Earth Engine, A Case Study of Islamabad

Cotton Yield Forecasting Of District Sahiwal

Crime Mapping Using ARCGIS, A Case Study of Boston

Forest Gain and Loss Calculation Using Google Earth Engine, A Case Study of Ostergotland

- Delivered geospatial solutions that provided **timely and accurate agricultural data** for stakeholders, enhancing decision-making efficiency by **35%**.
- Conducted **field surveys for organic cotton mapping**, integrating ground-truth with satellite data for improved validation.

GIS Associate
GreenAge Services
08/2022 – 02/2023 | Islamabad, Pakistan
- Play a key role in Cadastral Mapping to maintain accurate land parcel information.
- Model parcel fabric for efficient land record management.
- Contribute to the automation of land records to enhance data accessibility.

Teaching Assistant
Pir Mehr Ali Shah Agriculture University
02/2022 – 06/2022 | Rawalpindi, Pakistan
- Assist the Teacher in Practicals of Applied Remote Sensing and GIS.
- Preparation of Lecture & Exam.
- Grading Papers and Exam.
- Getting the feedback from students.

GIS Assistant
GreenAge Services
03/2021 – 01/2023 | Islamabad, Pakistan
- Play a key role in Cadastral Mapping to maintain accurate land parcel information.
- Model parcel fabric for efficient land record management.
- Contribute to the automation of land records to enhance data accessibility.

GIS Intern
Sustainable Development Policy Institute
09/2020 – 10/2020 | Islamabad, Pakistan
- Worked on the NSER project for Clusters 2&3, focusing on Linear Feature Digitization.
- Digitized linear geographic features to support project goals and data accuracy.

GIS Intern
GreenAge Services
07/2019 – 09/2019 | Islamabad, Pakistan
- Responsible for creating and managing Enumeration Areas for various projects.
- Contributed to the digitization of geographic features to improve data accessibility.

GIS Intern
MER Solutions
07/2018 – 09/2018 | Rawalpindi, Pakistan
- Participated in the creation and management of Enumeration Areas to support project objectives.

Soil and Water Quality Assessment Mapping for District Faisalabad

PROJECTS

Makan Project
01/2025 – present
Large-scale project on satellite image processing, automated data extraction, and geospatial data management.
Key Contributions:
- Automated GIS workflows with **ArcPy**, cutting manual tasks by **40%**.
- Processed **multi-source satellite & Sentinel imagery** for land-use and environmental analysis.
- Managed **terabyte-scale datasets** with **99% accuracy and integrity**.
- Designed schemas & conversion tables for **cross-platform interoperability**.
- Converted data into **Vector Product Format (VPF)** for defense and enterprise GIS systems.

Organic Cotton Field Mapping and Monitoring for Sapphire
02/2024 – 12/2024
Precision agriculture project using Sentinel-2 imagery to map and monitor organic cotton fields for compliance with international standards.
Key Contributions:
- Processed Sentinel-2 imagery for **crop health and growth stage assessments**.
- Applied **NDVI and vegetation indices** to ensure certification compliance.
- Integrated **field survey data** with remote sensing outputs for validation.
- Automated monitoring in **Python & GEE**, improving efficiency by **35%**.

Advanced Crop Mapping and Monitoring with Google Earth Engine, Python and Machine Learning
03/2023 – 12/2024
Integrated Sentinel-1 SAR and Sentinel-2 optical imagery with machine learning to enable near real-time crop monitoring and yield forecasting.
Key Contributions:
- Built ML models (Random Forest, CNNs) for crop classification and yield prediction.
- Automated workflows in **Python & GEE**, cutting manual processing by **50%**.
- Applied vegetation indices (NDVI, EVI) for crop growth and anomaly detection.
- Delivered real-time dashboards to support **precision agriculture decisions**.
- Contributed to the digitization of geographic features for data enhancement.

RESEARCH INTERESTS

Climate Change Impact on Hydrological Processes and Agricultural Responses

Natural Resource Management, Sustainable Development, and Resource-Based Urban Studies

Remote Sensing and GIS in Environmental Monitoring and Land Use

Ecosystem Services, Function Analysis, and Sustainability

Big Data, Machine Learning, and UAV Applications in Remote Sensing

Disaster Management and Renewable Energy Resource Assessment

AI-driven remote sensing for agriculture, climate impact assessment, and large-scale geospatial analytics

PUBLICATIONS

Integration of RUSLE Model with Remotely Sensed Data over Google Earth Engine to Evaluate Soil Erosion in Central Indus Basin
Earth Surface Processes and Landforms

SKILLS

ArcGIS Pro | ArcPy | QGIS | Python | R | Google Earth Engine | PostgreSQL | FME | Deep Learning Algorithms | GeoServer | Machine Learning Algorithms | Erdas | ENVI | GPS | GPS RTK | Total Station | JavaScript | Global Mapper | Cadastral Mapping | Field Survey | LaTeX | Microsoft Office Suite | SPSS | PCA

Cadastral Mapping of State lands of Punjab Divisions (Project awarded to Survey of Pakistan by BOR)
03/2021 – 08/2023
Led cadastral mapping for the Survey of Pakistan to modernize land management across the Punjab Divisions.
Key Contributions:

- Supervised a team delivering **high-accuracy land parcel surveys and digital maps**.
- Modeled **parcel fabric** to improve land record management and accessibility.
- Supported automation of cadastral workflows, enhancing **data accuracy and efficiency**.
- Delivered outputs that improved **government land management and transparency**.

INTERESTS

- Chess

LANGUAGES

English ●●●●○
Urdu ●●●●●
Punjabi ●●●●●

REFERENCES

Dr. Muhammad Amin, *Assistant Professor*, PMAS-AAUR
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Dr. Muhammad Naveed Anjum, *Assistant Professor*, PMAS-AAUR
naveedwre@uaar.edu.pk, +923489695638

Dr. Zeeshan Zafar, *Postdoctoral Researcher*, Wuhan University
zams706@whu.edu.cn, +86-131-64630180

CERTIFICATES

Data Science with R Programming |
Introduction to Geospatial Data Analysis with Chatgpt and Google Earth Engine |
Beyond Land Use Maps: GIS For Urban & Regional Planning in Higher Education |
Project Management for Beginners: A Career Roadmap for Project Managers |
Understanding Research Methods |
GIS Survey | Instrument Technician |
Check your GIS Knowledge with Quiz |
Creating a Portfolio using Weebly

CONFERENCES & WORKSHOPS

KP Agri and Food Summit 2023
12/2023

Participation in Pakistan Water Week 2023
12/2023 | Islamabad, Pakistan

National Workshop on Soybean Production in Pakistan
12/2023 | Islamabad, Pakistan

Arid Varsity 22nd Convocation: 4,439 Degrees while 38 students awarded with Gold Medals
06/2022 | Rawalpindi, Pakistan

3- Days Hands on Training Workshop on APSIM: Decision Support Tool for Agricultural Systems Modeling and Simulation
05/2022 | Rawalpindi, Pakistan

GPS & GNSS Training Workshop for Surveyng & Mapping
08/2021 | Rawalpindi, Pakistan

VRT Hands On Training Workshop
12/2020 | Rawalpindi, Pakistan