NAUMAN UL HAQ

REMOTE SENSING AND GIS SPECIALIST

H#23, Street 05, Sector E, DHA 2
Islamabad, Pakistan
m: +92.3349122348
naumanulhaq88@gmail.com

PROFESSIONAL SUMMARY

Remote Sensing and GIS Specialist with 10+ years of experience applying Earth observation and geospatial analytics to agriculture, climate resilience, disaster risk reduction, and natural resource management. I lead the development of geospatial methodologies, manage multi-stakeholder technical workflows, and provide strategic guidance to national partners and field teams. My experience spans land cover mapping, crop type monitoring, flood impact assessments, climate pattern analysis, sampling design, and multi-criteria evaluations. I deliver actionable spatial products like maps, dashboards, spatial models, technical briefs, reports and concept notes that support evidence-based planning, implementation, and reporting. Experienced in working with government institutions and major international development organizations (UNFAO, ADB, USAID), with a strong ability to coordinate teams, mentor staff, and translate complex geospatial datasets into practical insights for policy, operations, and decision-making.

TECHNICAL PROFICIENCIES

Desktop Version: ArcGIS Pro, ERDAS Imagine, and QGIS

Cloud Platform: Google Earth Engine, and Google Colab

Programming: Python, JavaScript, and SQL

Integrated Development Environment: Visual Studio and Jupyter Notebook

Data Visualization: ArcGIS Online, Tableau, PowerBI and Adobe Illustrator

PROFESSIONAL EXPERIENCE

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO), *ISLAMABAD, PAKISTAN*

Remote Sensing And GIS Specialist May 2024 – Present

- Provide technical leadership in applying GIS and Earth observation for integrated soil, land, and water management in agriculture, aligned with national strategies and global geospatial standards
- Undertake GIS and RS capabilities needs assessment within the country to identify areas for improvement.
- Conduct GIS and RS assessment and provide technical guidance and support to project staff on GIS and RS data collection, processing, and analysis.
- Assist in the acquisition, processing, and interpretation of satellite imagery and other geospatial data crucial for national projects.
- Facilitate inter-agency collaboration across government and development partners to integrate geospatial evidence into agricultural policy and project implementation.
- Deliver training sessions to project staff and national counterparts on GIS and RS techniques and tools based on their specific needs.
- Produce high-quality maps, spatial analyses, and reports as required to support project objectives.
- Ensure adherence to international standards for land monitoring, including documentation, metadata, legend preparation, and classification, validation, and accuracy assessments.
- Develop Geodatabases and identify appropriate GIS datasets/tools and sources for food security and agriculture applications.
- Provide support to global and regional geospatial initiatives/projects and facilitate their launch in Pakistan.
- Play a pivotal role in national capacity development by preparing guidance materials on geospatial information and remote sensing, and country-specific knowledge sharing materials.
- Assist in the development and publication of geospatial datasets related to soil, land and water resources, agro-climatic resources, vegetation, crop production, and emergency impact assessment.
- Contribute to the innovation of technical digital agricultural solutions to enhance the generation of timely geospatial data for agricultural monitoring.
- Support the implementation and deployment of innovative data collection systems integrating field and remote sensing methods, improving geospatial data timeliness and quality for agricultural monitoring.

- Disseminate geospatial data and metadata through various media formats such as digital and paper atlases, map layouts, and posters.
- Prepare technical and scientific reports, papers, and guidelines documenting project activities, results, conclusions, and recommendations.
- Undertake any other tasks as required to support the successful execution of project objectives.
- Support the collation, standardization, analysis and reporting of geospatial data and metadata from multiple sources in support to the FAO Hand-in-Hand initiative.

ASIAN DEVELOPMENT BANK (ADB)*, ISLAMABAD, PAKISTAN*

Remote Sensing And GIS Specialist – Consultant Aug 2022 – May 2024

TA-6721 REG: Using Frontier Technology and Big Data Analytics for Smart Infrastructure Facility Planning and Monitoring

- Collaborated with provincial crop reporting services (CRS) departments to review the present system, identify opportunities/potential areas for data analysis process improvement, and provide technical assistance in the implementation of GIS and Remote Sensing technology including satellite imagery, geospatial datasets and methodological approaches on provincial and national scale.
- Improved agricultural reporting, data flows and field data collection with ICT by creating and implementing tools through an integrating approach of field and remote sensing, resulting in increased data accuracy and accessibility.
- Performed crop type classification and area estimation using the advance technologies like Spectral Matching Technique, Decision Tree Algorithms and Machine Learning (Random Forest) using cloud computing platform Google Earth Engine (GEE).
- Performed crop health monitoring analysis on bi-weekly basis and prepare bulletin during cropping season and generate maps for Ministry of National Food Security and Research (MNFSR) and four provincial agriculture departments (Crop Reporting Services, or CRS).
- Conducted yield estimation by establishing the correlation between NDVI and other spectral bands with the actual crop yield. Implement machine learning (ML) algorithms to predict the yield for wheat crops.
- Performed rangeland management analysis comprises assessing various factors such as rangeland identification, changes over time, soil degradation, and land use land cover.
- Acquired data from various sources and surveys and execute the geospatial data analysis by improving data flows and data quality.
- Frequent development of data visualization using digital maps, web maps, graphs, tables and charts by cartographic skills and geo-infographics to support existing and planned projects using ArcGIS Pro, ArcGIS Dashboards, Adobe Illustrator, MS Power BI, MS Excel etc. and ensuring data quality and control.
- Led capacity building programs and cross-institutional coordination with national and provincial agencies, advancing the operational use of geospatial data for agricultural planning and infrastructure monitoring.
- Actively contributed to the development and publishing of consultant reports and geospatial datasets encompassing ground truthing field data, crop production, and related information.
- Managed the GIS and Remote Sensing team's workload and priorities to ensure that goals are met and projects are completed on time by ensuring data quality and control.
- Engaged regularly with and maintain a collaborative partnership between government officials, project managers, individual consultants, and GIS & Remote Sensing staff, while actively contributing to capacity development programs, training sessions, and workshops for government departments, ensuring continuous skill enhancement and effective project support.

FINNISH CONSULTING GROUP (FCG), *ASIAN DEVELOPMENT BANK PROJECT, ISLAMABAD, PAKISTAN*
GIS Specialist – Consultant Apr 2022 – Dec 2022
TA-9866 PAK Preparing the Punjab Agriculture Markets Development Project – Output 1 – Feasibility and Project Design Study

- Coordinated and planned GIS activities to align with project goals for the TA-9866 PAK project.
- Facilitated the preparation, maintenance, and provision of geographic information and digital maps for reports, presentations, and informed decision-making.
- Collected, processed, and evaluated diverse geographic data, including vector, raster, and thematic data from multiple sources.
- Constructed and edited GIS shapefiles and geodatabases to streamline data management.
- Conducted spatial analysis to derive valuable insights.
- Maintained and updated the geo-database system for efficient data archiving.

PARC AGROTECH COMPANY (PVT) LIMITED (PATCO), *ASIAN DEVELOPMENT BANK PROJECT, ISLAMABAD, PAKISTAN*
Remote Sensing Specialist – Consultant Mar 2021 – Nov 2022
TA-6663 PAK Strengthening Food Security Post–COVID-19 and Locust Attacks

- Consult the stakeholders including government line departments and policy think-tanks to understand the limitation in remote sensing technologies for finalizing the scope of the work.
- Produce crop area estimation (using machine learning, spectral matching technique and decision tree algorithms) using remote sensing
- Work with the Ministry of National Food Security & Research (MNFSR) and provincial Crop Reporting Services (CRS) teams to demonstrate RS technology to complement the existing CRS system
- Assess the current CRS data collection system and conduct needs assessment for strengthening ICT-based crop reporting data collection.
- Conduct ground truthing in four provinces of Pakistan for two seasons (Kharif and Rabi)
- Prepare a report presenting the methodology, accuracy of remote sensing, crop area and yield estimation and challenges to adopting it as a decision support tool in policymaking
- Prepare manual for training of provincial CRS staff

CENTRE FOR AGRICULTURE AND BIOSCIENCE INTERNATIONAL (CABI), *ASIAN DEVELOPMENT BANK PROJECT, ISLAMABAD, PAKISTAN*
GIS & Data Management Analyst Nov 2020 – Aug 2022
TA 9838-PAK Enhancing Technology-Based Agriculture and Marketing in Rural Punjab

- Provide technical inputs of advanced data management using GIS, remote sensing, etc. for TA studies/surveys;
- Prepare maps using GIS and other relevant skills and technologies for TA studies and surveys as required;
- Assist TA study and survey activities by preparing reports, presentation materials and documents in the advanced design format;

MANAGEMENT SYSTEMS INTERNATIONAL (MSI), *USAID PROJECT, ARLINGTON, VIRGINIA*
Data/GIS Analyst – Consultant Oct 2020 – Sep 2021
Project: Monitoring and Evaluation & Learning Services (MELS) in the Middle East & North Africa (MENA)

- Conduct document reviews
- Collate and analyze source data
- Draft data collection instruments and analyze the GIS datasets for geospatial analytics
- Produce digital maps, graphs, charts and tables that synthesize information to convey findings ensuring high-quality outputs by utilizing data visualization techniques

XS SOLUTIONS, *RAWALPINDI, PAKISTAN*
GIS & Remote Sensing Specialist – Consultant Jan 2020 – Oct 2020

- Develop, plan, lead, and participate in research projects applying remote sensing, geospatial analysis, earth science knowledge, and analysis skills to solve project tasks for ongoing and new projects
- Be able to deal with issues encountered in data processing and analysis to ensure scientifically-valid data collection.
- Evaluate, select, and apply the results of data collected and research projects undertaken.
- Describe and share any concerns about the results or methodology, and recommend or implement countermeasures.
- Identifying appropriate remote sensing datasets and methods to produce accurate measurements of environmental conditions such as land use and agricultural practices.
- Perform the data analysis process (e.g. crop area analysis etc.) and the map development.
- Prepare communication materials related to RS and GIS in the context of monitoring crops and forest.
- Developing efficient and reproducible workflows to implement best practices for data acquisition, pre-processing, and analysis

EXPERIENCE INTERNATIONAL INC.(EI), *USAID PROJECT, ISLAMABAD, PAKISTAN*
GIS Officer May 2015 – Dec 2019
Project: Pakistan Performance Management Support Contract (PERFORM)

- Determine guidelines that specify which source material can be used.
- Define map content and layout, as well as production specifications.
- Conduct spatial and statistical analysis on Remotely sensed data using analytical tools and methods.
- Collect, compile, and analyze the corporate GIS spatial and attribute datasets; perform data entry, editing, format conversion, and quality control; review data for completeness, accuracy, and data mapping to produce the product related to GIS and information management.
- Implement products like digital maps and geo-infographics to support planning and decision-making with strong attention to detail and high quality deliverables.
- Design and develop geospatial databases and data archives.
- Interface with clients and team members to ascertain project purpose, need and information required during data collection and geospatial product development ensuring full accuracy and efficiency when completing tasks.
- Create compelling visual presentations with graphs, charts, tabular summaries and other illustrations and maintain their quality control for various project and technical reports.
- Translate complex analysis in a clear, precise and informative way with both technical and non-technical clients.
- Tableau development/visualization experience, including designing and developing reports.
- Facilitate development discussions with team members for the growth and addressing issues.
- Optimize image classification through machine learning using Google Earth Engine.

EXPERIENCE INTERNATIONAL INC.(EI), *USAID PROJECT, ISLAMABAD, PAKISTAN*
GIS Assistant Jul 2014 – Apr 2015
Project: Monitoring and Evaluation Program (MEP)

- Updated and maintained GIS databases using techniques such as coordinate geometry, keyboard entry of tabular data, manual digitizing of maps, scanning or automatic conversion to vectors, or conversion of other sources of digital data.
- Extracted data from different sources; transformed the data into the required format.
- Interpreted aerial/Ortho photographs.
- Operated GID equipment, software, and products.

- Processed satellite and aerial imagery using remote sensing technologies.
- Modified the GIS Request Recorded regularly to ensure effective tracking of the map requests.
- Provided GIS-related support to the project departments.
- Coordinated and led GIS training/workshops.

EXPERIENCE INTERNATIONAL INC. (EI), *USDA PROJECT, ISLAMABAD, PAKISTAN*
Mobile Data Collection Specialist (Survey Developer) May 2013 – Jul 2014
Project: Pakistan Agriculture and Cold Chain Development Project (PACCD)

- Created customized data collection forms for mobile using Kobo Toolbox.
- Collected and embedded GPS coordinates in a form through mobile.
- Delivered comprehensive training to the Pakistan Agriculture and Cold Chain Development Monitoring and Evaluation Team on usage of mobile devices, review, export, and import of collected data.
- Configured Android Devices to streamline data collection.
- Tested the system; provided technical advice and assistance to PACCD users.

EDUCATION AND CREDENTIALS

- **M.S. in Remote Sensing and Geo-Information Science** | Institute of Space Technology, Islamabad, Pakistan, 2019
- **M.S. in Embedded Systems and Control** | University of Leicester, UK, 2012
- **B.S. in Computer Engineering** | COMSATS University, Abbottabad, Pakistan, 2011

PUBLICATIONS & TECHNICAL REPORTS

Peer-Reviewed Publications:

- Yamano, Takashi., Gumma, Murali Krishna., Panjala, Pranay., **UlHaq, Nauman**., Fahad, Muhammad., Sato, Noriko., Arif, Babur Wasim., Saeed, Umer. (2024) "Applying Spatial Analysis to Assess Crop Damage: A Case Study of the Pakistan 2022 Floods" Asian Development Bank (ADB) [https://www.adb.org/publications/spatial-analysis-crop-damage-pakistan]

Technical Reports:

- **UlHaq, Nauman**., Wasim, Babur., & Saeed, Umer. (2024) "Ground Truthing Survey Data of Crop Type in Pakistan (Rabi 2022–Kharif 2023)" Asian Development Bank (ADB) [https://data.adb.org/dataset/ground-truthing-survey-data-crop-type-pakistan-rabi-2022-kharif-2023]
- **UlHaq, Nauman**., Wasim, Babur., & Saeed, Umer. (2024) "Data Description Report of Ground Truthing Surveys for Rabi and Kharif Seasons (2022–2023), Pakistan" Asian Development Bank (ADB) [https://www.adb.org/projects/documents/pak-54319-001-dpta]
- **UlHaq, Nauman**., & Fahad, Muhammad. (2023). "Real-Time Crop Monitoring Using Remote Sensing Technology - Estimating Crop Damage During the 2022 Floods in Pakistan" Asian Development Bank (ADB) [https://www.adb.org/projects/documents/pak-54319-001-tacr-1]
- Fahad, Muhammad. & **UlHaq, Nauman.** (2023). "Automation of a Spectral Matching Technique for Crop Area Estimation" Asian Development Bank (ADB) [https://www.adb.org/projects/documents/pak-54319-001-tacr-0]

Knowledge Products:

- Baldassarre, Giuseppe., **Ul Haq, Nauman.**, Shafiq, Sidra., Vata, Flavio., Ghosh, Amit., Mushtaq, Fatima., Dadhich, Gautam., Bajwa, Amina., & Henry, Matieu. (2025). *Geospatial Flood Impact Assessment for August–September 2025 in Punjab, Sindh, and Khyber Pakhtunkhwa, Pakistan*. Food and Agriculture Organization of the United Nations (FAO).
  [Punjab: https://openknowledge.fao.org/items/b3340185-2f8f-444b-9795-ea3512f774ca]
  [Sindh: https://openknowledge.fao.org/items/fb92c557-615a-4c61-a197-c2ebd92b32f0]
  [KP: https://openknowledge.fao.org/items/32a5a117-80f8-4038-acd9-040ae5e53a61]
- **Ul Haq, Nauman**, Jalal, Rashed., & Henry, Matieu. (2025). *Geospatial Assessment of Wheat Cultivation Area during Rabi Seasons (2022–2024) in Punjab, Pakistan*. Food and Agriculture Organization of the United Nations (FAO). [https://openknowledge.fao.org/items/168eaf08-84df-43be-8a75-64c124d6da56]
- **UlHaq, Nauman.** (2024). *Geospatial Assessment of Rangeland and Livestock Resources in Khyber Pakhtunkhwa, Pakistan. Cartographic products utilizing ESRI Land Cover (10m) for rangeland extraction (2.74 million ha) integrated with livestock census data (2021) for concept note development.* Asian Development Bank (ADB). [Sample: https://drive.google.com/file/d/1OX_660MVLio021ohYELx-SJP92q5F6Pm/view?usp=sharing]
- **UlHaq, Nauman**. & Fahad, Muhammad. (2022-2024). *Seasonal Crop Type Mapping and Area Estimation Reports of Punjab, Sindh, KP, and Balochistan provinces of Pakistan using machine learning and remote sensing techniques. Delivered to Ministry of National Food Security and Research (MNFSR) and four Provincial Crop Reporting Services departments.* Asian Development Bank (ADB). [Sample: https://drive.google.com/file/d/1Ict2HnEE0sJpzeuY7kdFGOD02LyvbW_d/view?usp=sharing]
- **UlHaq, Nauman**. (2022-2024). *Bi-weekly Crop Health Monitoring Bulletins of Punjab, Sindh, KP, and Balochistan provinces of Pakistan. Comprehensive crop stress monitoring reports using NDVI and decision tree algorithms. Regular operational delivery to MNFSR and four provincial Crop Reporting Services departments during cropping seasons.* Asian Development Bank (ADB). [Sample: https://drive.google.com/file/d/1oiM1yXPjKk8rofmfCLQis8LYJs5OYAj3/view?usp=sharing]

CERTIFICATE OF PARTICIPATION

- One Country One Priority Product (OCOP): International Capacity Building Workshop on Geographic Indications Environmental & Sustainability (GIES) for Special Agriculture Products (SAPs) Development – Institute of Geographic Sciences and Natural Resources Research (IGSNNR) Chinese Academy of Sciences (CAS), and UNFAO (July, 2024)
- Introduction to WaPOR – IHE Delft and UNFAO (September, 2024)
- Digital Sustainable Agriculture: Harnessing Robotics and IoT to Enable Farmers for a Sustainable Future - LUMS (July, 2023)
- Crop Yield Assessment using Remote Sensing and Crop Simulation Models – ADB, ICRISAT and CIGAR (November, 2021)
- Mapping Geospatial Products using Machine Learning Algorithms for Supporting Insurance Products – ADB, ICRISAT and CIGAR (July, 2021)
- Python for Scientific Calculation, Spatial Data Handling, and Remote Sensing – Institute of Space Technology (February, 2020)
- Big Geospatial Data Analysis using Google Earth Engine – Geo-Spatial Works (July, 2018)

CERTIFICATE OF RECOGNITION

- Data-Driven Innovations in Agriculture: FAO's Role in Advancing Sustainability – DataFest Pakistan,

Islamabad (October 2024)
- One Country One Priority Product (OCOP): Regional Organization Group (ROG) Meeting, Beijing, China (September 2024)
- Building Stakeholder Capacity in Remote Sensing: Crop Health Monitoring, Islamabad (June, 2023)
- Building Stakeholder Capacity in Remote Sensing: Crop Type Mapping Using Spectral Matching Technique, Islamabad (2022, 2023)

SELECTED FLAGSHIP INITIATIVES

Solar Panel Detection Using AI and Remote Sensing (2024–2025) – FAO Pakistan
Supervising the application of deep learning models to detect solar panels from satellite imagery for renewable energy mapping and estimate the potential water abstraction. Leading technical development and inter-agency knowledge sharing.

National Wheat Monitoring using Remote Sensing and Machine Learning (2022–2025) – FAO Pakistan
Led multi-year wheat crop area monitoring using Google Earth Engine, delivering district-wise wheat area estimates trends across Punjab and Sindh. Outputs were used to support food security planning and policy dialogues.

Flood Impact and Crop Damage Assessment (2022 and 2025) – ADB and FAO Pakistan
Produced rapid flood assessment using Sentinel-1/2 data and NDVI-based damage classification. Results supported government and donor response planning during the 2022 flood emergency.

Modernization of Provincial Crop Reporting Services with Crop Type Mapping and Ground Truth Integration (2022–2024) – ADB
Trained four provincial CRS departments in Machine Learning (Random Forest) and Spectral Matching based crop classification. Coordinated large-scale ground truthing campaigns for Rabi and Kharif seasons across four provinces, integrating field data with satellite imagery to improve classification accuracy and enhance CRS data workflows.

Land Cover and Rangeland Analysis – National & Subnational Scale - ADB
Generated multi-year land cover maps and supervised classification to support rangeland monitoring

PROFESSIONAL AFFILIATIONS

- Pakistan Engineering Council (Serial No. COMP/8064)
- IEEE Registered Member (Membership#: 92392539)
    - IEEE Geoscience and Remote Sensing Society Membership

APPLIED TECHNICAL COMPETENCIES

- Geospatial analytics for policy support and planning
- Sustainable land and water resource monitoring using Earth observation
- Remote sensing-based crop type mapping, area estimation and yield estimation using machine learning
- Development of spatial indicators and decision-support layers
- Capacity development and training delivery for government counterparts
- Inter-agency coordination and technical backstopping using GIS/RS data