ADVANCES IN GEOGRAPHICAL RESEARCH

Making the Complex Simple

Seventh Weeks Online International Workshop with Live Practice On

AN INTEGRATED MCDM APPROACH FOR DROUGHT VULNERABILITY ASSESSMENT IN ARCGIS

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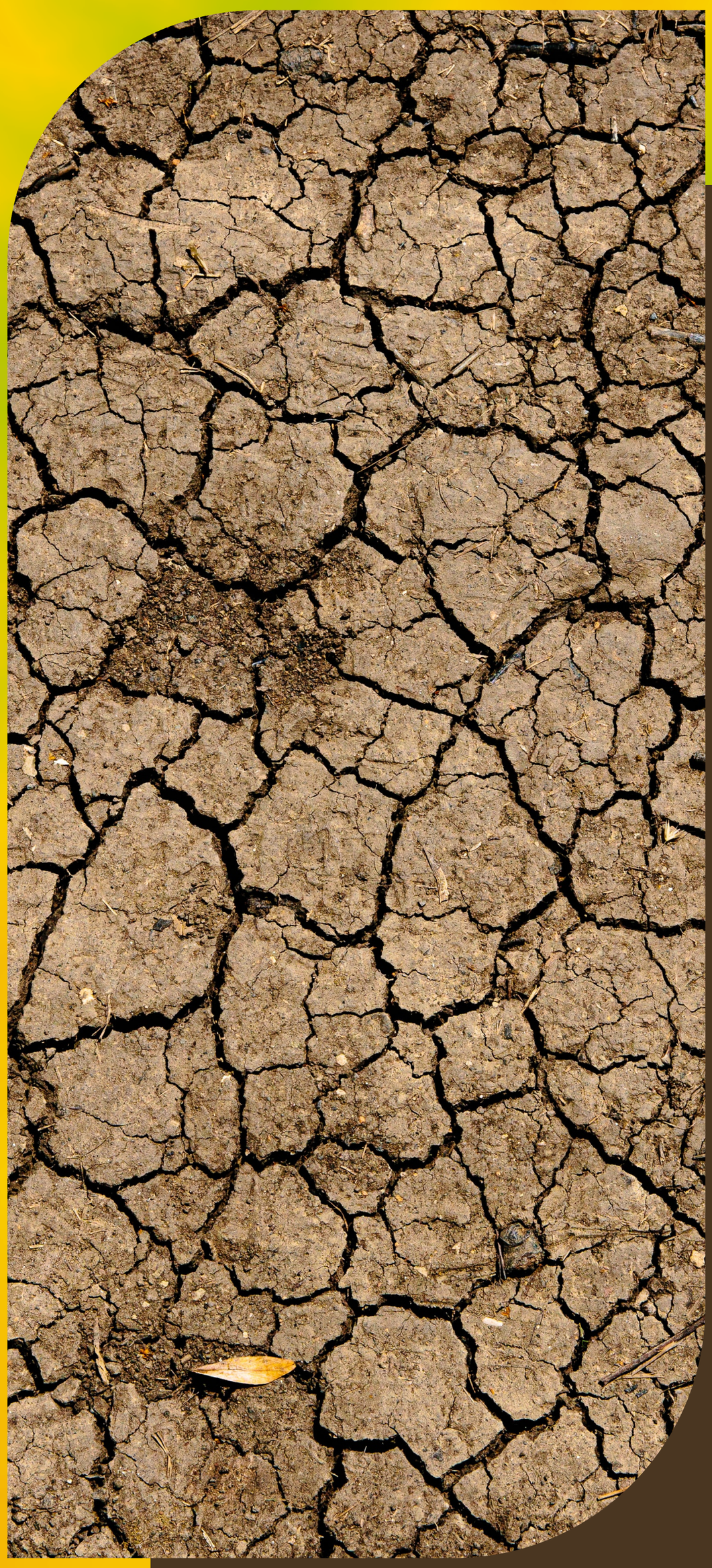
About Workshop

In this online workshop and live practice, you can learn the complete process (A-Z) from scratch to production. How to select parameters and why, download raster and vector data, processing data, images in ArcGIS environment, justification of variables, step by step guide of **SPI, CRITIC, WASPAS** and **SAW** models in excel, produced prediction map applying **CRITIC, WASPAS** and **SAW** methods in Drought Vulnerability zonation using ArcGIS. Moreover, you will also learn validation of the susceptibility map using advanced techniques such as **MAE, MSE, RMSE, ROC-AUC.**

SPI (Standardized Precipitation Index) is a widely used index to characterize meteorological drought on a range of timescales. On short timescales, the SPI is closely related to soil moisture, while at longer timescales, the SPI can be related to groundwater and reservoir storage. The SPI can be compared across regions with markedly different climates. It quantifies observed precipitation as a standardized departure from a selected probability distribution function that models the raw precipitation data. The raw precipitation data are typically fitted to a gamma or a Pearson Type III distribution, and then transformed to a normal distribution. The SPI values can be interpreted as the number of standard deviations by which the observed anomaly deviates from the long-term mean. The SPI can be created for differing periods of 1-to-36 months, using monthly input data. For the operational community, the SPI has been recognized as the standard index that should be available worldwide for quantifying and reporting meteorological drought.



CRITIC (Criteria Importance Through Inter-criteria Correlation) a useful method that identifies the objective weight of MCDM problems based on contrast intensity and the conflicting character of the evaluation criteria proposed by Diakoulaki, Danae, George Mavrotas, and Lefteris Papayannakis (1995).

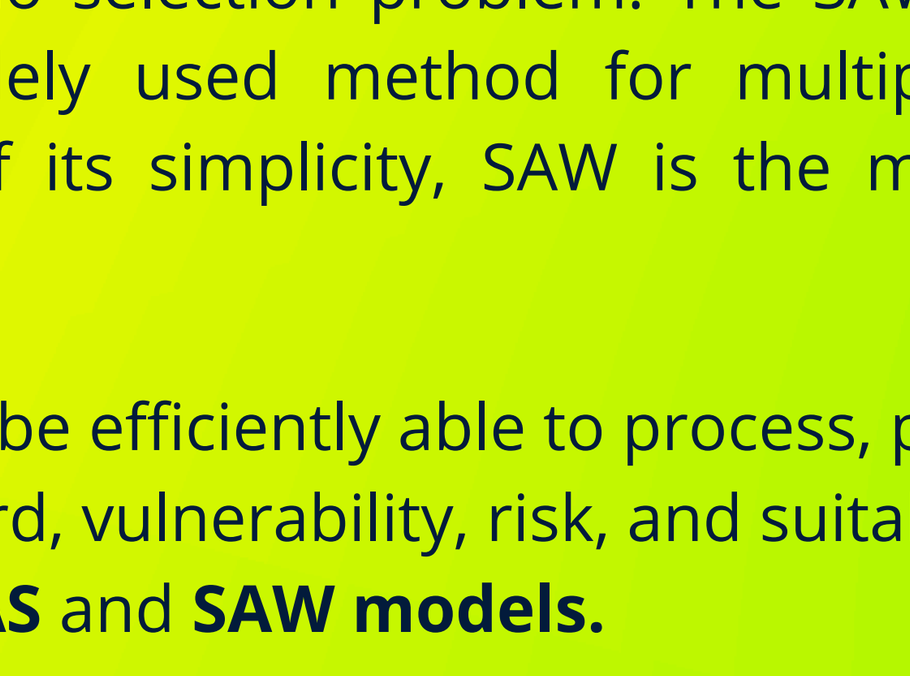
WASPAS method (weighted aggregated sum product assessment) is one of the MCDM methods. It was developed by Zavadskas et al. The WASPAS method is a unique combination of Weighted Sum Model (WSM) and Weighted Product Model (WPM) which are two well-known MCDM methods. The WSM method determines overall score of an alternative as a weighted sum of the criteria values while WPM determines score of an alternative as a product of the scale rating of each criterion to a power equals to the weight of given criterion. In addition to these methods WASPAS tries to reach the highest accuracy of estimation by optimizing weighted aggregated function.

SAW (Simple Additive Weighting) method is a well -known method relying on the linear utility function for multi-criteria evaluation (Hwang, Yoon 1981, Rozman et al. 2016, Vico 2017). Churchman and Ackoff (1954) first utilized the SAW method to cope with a portfolio selection problem. The SAW method is probably the best known and widely used method for multiple attribute decision making MADM. Because of its simplicity, SAW is the most popular method in MADM problems

After completing this course, you will be efficiently able to process, predict, and validate any data related to hazard, vulnerability, risk, and suitability assessment using the **CRITIC, WASPAS** and **SAW models.**

Keywords:

- Excel
- ArcGIS
- R-studio
- SPI
- CRITIC
- WASPAS
- SAW
- Drought
- Mapping
- Prediction



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WHAT YOU WILL LEARN

- Step by step procedure from data download, handling, selection, produce prediction map to validation
- Comprehensive understanding of **SPI, CRITIC, WASPAS** and **SAW models** and its Interface with Various Decision-Making Interfaces
- Instructors continuous support, taking your hand step-by-step to develop high-quality prediction maps using real data

BENEFITS FOR YOU

- During this workshop, participants can prepare, process, predict and validate any data related to hazard, vulnerability, risk, and suitability assessment using the analytic.
- Live WhatsApp Chatting
- e-Certificate will be provided
- Publication support from SCOPUS Index Journal
- 1:1 sessions with expert
- Provide supporting resources like ppt, code, research articles
- Access recorded class videos any times
- Easy Payment Gateway such as Debit card, credit card, UPI etc. (international payment also acceptable)

COURSE CONTENT

Section 1: Introduction

1. Introduction to Multicriteria Decision Making Model
2. Literature Review
3. Understanding of Drought
4. Understanding of Drought Vulnerability Index
5. Selection of relevant Criteria

Section 2: Selection of study Area

1. How to select study area
2. How to prepare location map of the study area
3. How to prepare flow diagram

Section 3: Data acquisition and thematic layers preparation in ArcGIS

1. Download Satellite data
2. Download Vector data
3. Preparation of topographic indices
4. Preparation of remote sensing indices
5. Preparation of Climatic indices

Section 4: Calculation of SPI

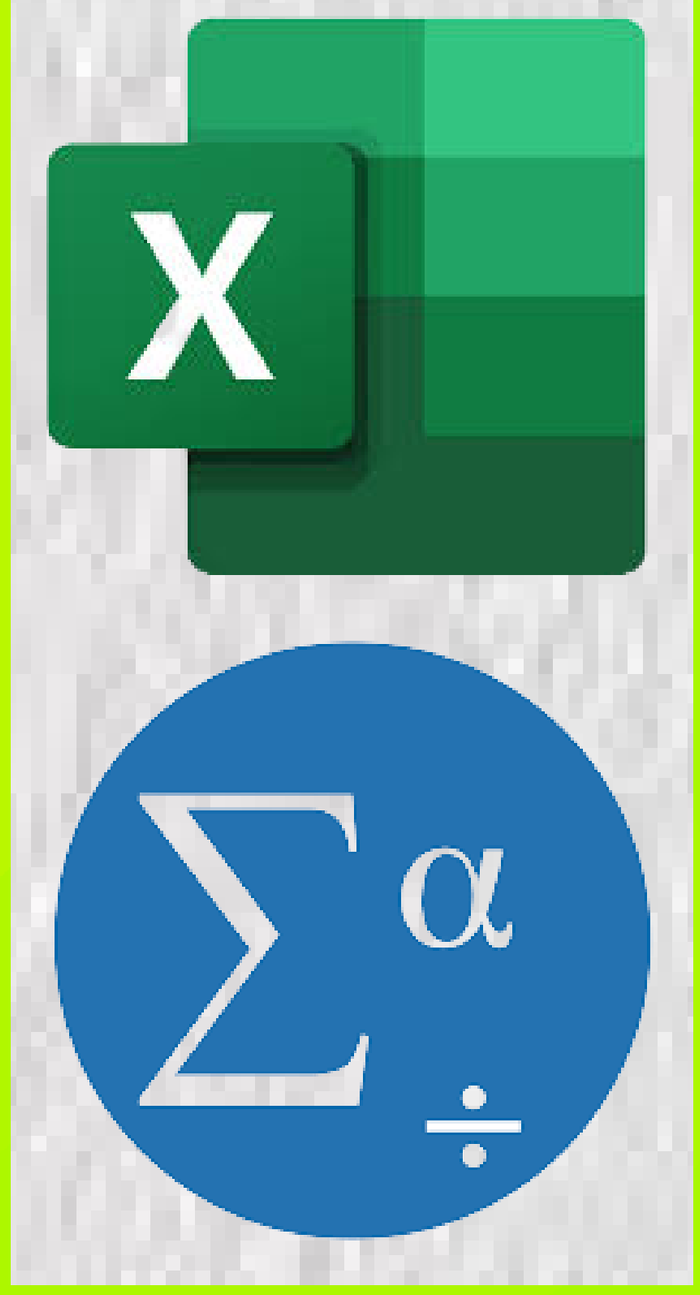
1. Understanding SPI
2. Data download
3. Data Processing
4. Calculation of SPI using R software
5. Calculation of drought frequency
6. Calculation of drought intensity
7. Thematic layers preparation

Section 5: Preparation of WASPAS model

1. Introduction to WASPAS
2. Steps Involved in WASPAS
3. WASPAS: Drought vulnerability using Microsoft Excel
4. Model runs in ArcGIS
5. Area Calculation of each class
6. Export maps

Section 6: Preparation of SAW model

1. Introduction to SAW
2. Steps Involved in SAW
3. SAW: Drought vulnerability using Microsoft Excel
4. Model runs in ArcGIS
5. Area Calculation of each class
6. Export maps



Section 7: Integrated objective-subjective MCDM models

1. Introduction to CRITIC
2. Steps Involved in CRITIC
3. CRITIC:Drought vulnerability using Microsoft Excel

4. CRITIC- WASPAS: Drought vulnerability using Microsoft Excel
5. CRITIC- SAW: Drought vulnerability using Microsoft Excel
6. Model runs in ArcGIS
7. Area Calculation of each class
8. Export maps

Section 8: Model Validation

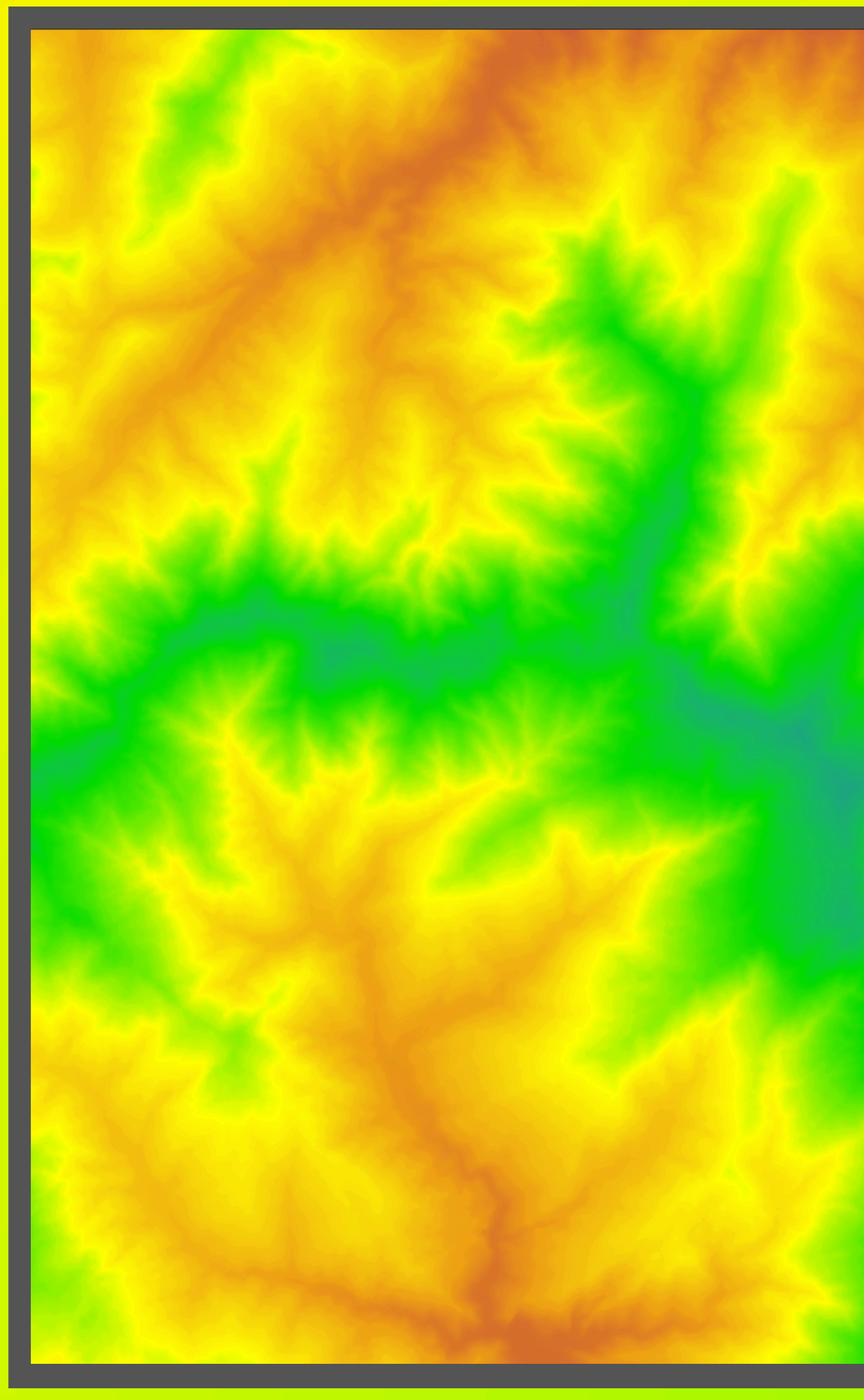
1. Mean Absolute Error (MAE)
2. Mean Squared Error (MSE)
3. Root-Mean-Squared Error (RMSE)
4. ROC-AUC

Section 9: Final preparation for publication

1. Preparation of Tables
2. Preparation of Figures
3. Preparation of final layout

Section 10: Valedictory Session

1. Feedback
2. Final layout of article



WHO THIS COURSE IS FOR:

1. Students, researchers and professionals of Natural hazards, Environmental Science, Ecology, Engineer and Geography
2. Students, researchers and professionals who interested in multicriteria decision-making analysis using GIS Data
3. Students, researchers and professionals who work on any MCDM model like Hazards, vulnerability and risk [flooding, landslides, drought], susceptibility [Groundwater potentiality, Stress zonation, vulnerability] and Suitability [Agricultural suitability, Irrigation suitability]
4. Anyone interested in learning Structured Decision-Making Using Step by Step Approach

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ARE THERE ANY COURSE REQUIREMENTS OR PREREQUISITES?

1. Basic Knowledge of Microsoft Excel
2. No statistical background needed
3. Basics knowledge in ArcGIS software and QGIS is optional
4. Interest in GIS prediction maps using real-life Data

REGISTRATION

Registration is compulsory for all the participants using website
Registration Fee Structure

Category	Participants from India	Participants from other than India
Early Bird (Till 31st January, 2022)	INR 6500/-	US $ 100
Standard (Till 11th February, 2022)	INR 8250/-	US $ 125

IMPORTANT DATES

Early Bird Registration	Closes 31st January, 2022
Standard Registration	Within 11th February, 2022
Workshop start	12th February, 2022
Workshop End	27th March, 2022
Time	6- 8 pm (+5:30 GMT)
Date	2 days a Week

ABOUT US

Advances in Geographical Research (AIGR) provides certified professional training, development opportunities and assured innovative research ideas for the next generation of researchers, such as programs and courses in research methodology, Remote sensing, Geo-Informatics and GIS courses, as well as mentoring.

Our motto is making the complex simple. Led by some of the world's leading researchers, who provide key insights from their experience, our training programs support career development and encourage our researchers to excel in their field.

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