Enhancement Centre

ArcGIS Application in Statistics and Census Training.

Geospatial Analysis, Visualization, Spatial Relationships & Dashboard Development

Introduction

The geospatial and statistical professional communities are significant contributors of information used as evidence in decision-making processes across many public and private sectors. With the increasing complexity of national and global challenges, the need to understand the economic, social, and environmental interrelationships is becoming critical. Today, there is a clear recognition of the need and value of linking geospatial and statistical information to improve the relevance of the evidence on which decisions will be made.

GIS and Remote Sensing provides the facilities for decision-makers to manipulate, analyze, and visualize geospatial data. All the facilities augment the core tools utilized in spatial analysis throughout the analytical process (exploration of data, identification of patterns and relationships, construction of models, and communication of results) One major problem inhibiting the implementation of geospatial technologies is the lack of trained manpower. Without properly trained personnel with vision and commitment to any GIS project, it may not be sustainable (Shalaby et al., 1996).

Aim and Objectives

Aim

The training program aims to empower trainees, offering them the opportunity to gain new innovative skills in geospatial analysis, visualization, and spatial relationships using ArcGIS applications. This will not only enhance their individual capabilities but also significantly impact the division's work.

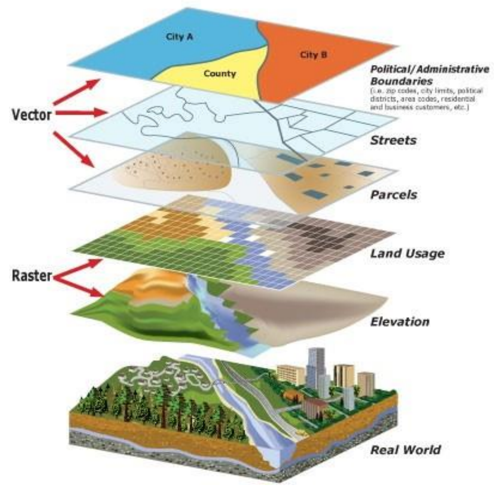
Objectives

- To represent Geospatial data and analyze spatial relationships using ArcGIS
- To conduct Network-Based Analysis
- To conduct Hotspot Analysis and create Heat maps using ArcGIS
- To create a dashboard that monitors real-time field observations

Expected outcome

At the end of the training, participants are expected to gain innovative knowledge in the following:

- Analyze Geospatial data using GIS and remote sensing
- Creating nearest Neighbour Analysis using route event
- Do Mapping Clusters
- Creating ArcGIS Dashboards to monitor field activities



Course Design

This practical training will include individual assessment exercises, GIS and remote sensing to analyze geospatial data, and ArcGIS dashboard development.

Course Content

The Training course will consist of the following modules:

- Geospatial data and spatial relationships
- Heat maps and Hotspot Analysis (Clustering)
- ArcGIS dashboard development
- Sampling Design and Weighting

Training Topics

1. **Geospatial data and spatial relationships**

- Introduction to Spatial Statistics in ArcGIS
- Measuring Geographic Distributions
- Analyzing Patterns
- Modeling Spatial Relationships with Linear Regression in ArcGIS

2. **Hotspot Analysis**

- Introduction to statistical cluster analysis
- Optimize Hot Spot and optimized outliers analysis
- Hot Spot and Cluster and Outlier Analysis
- Introduction to Space-Time Analysis
- Creating a Space-Time Cube
- Space-Time: Finding Temporal Trends
- Space-Time: Time-Series Clustering

3. **ArcGIS dashboard**

- Organizing field activities with ArcGIS Dashboards and Experience Builder
- Organizing field activities with ArcGIS Field Maps Early Access

4. **Sampling Design and Weighting**

4.1 Sampling

- Sample Size Calculation
- Stratification and Sample Allocation
- Subsampling and Sampling approaches over time
- Sample Designs calculation for household Surveys
- Dual frame survey design

4.2 Weighting

- Overview of weighting
- Unknown eligibility and scale to frame
- Non-response adjustments and Adjustments for Multiplicity
- Calibration approaches
- Weight trimming
- Overview of tools and software for sampling, weighting and estimations

Target Participants

Participants with basic knowledge of GIS and cartography are expected to attend.

Duration of training

The training will be conducted over ten days and will consist of presentations/interactive sessions from expert trainers and an exchange of views on emerging GIS issues.

Deliverables

- Build Capacity on data management and dashboard development
- Develop staff skills to support Users adequately.
- Increased staff performance and output in the use of GIS and remote sensing
- Training certificates and comprehensive Report.

DAY	THEMATIC AREA	TOPIC
Day 1	Geospatial data and spatial relationships	• Introduction to Spatial Statistics in ArcGIS • Measuring Geographic Distributions • Analyzing Patterns
Day 2	Geospatial data and spatial relationships	• Modelling spatial • Relationships with Linear • Regression in ArcGIS
	Hotspot analysis	• Introduction to statistical cluster analysis • Optimize Hot Spot and optimized outliers analysis • Hot Spot and Cluster and Outlier Analysis
Day 3	Hotspot analysis	• Introduction to Space-Time Analysis • Creating a Space-Time Cube • Space-Time: Finding Temporal Trends • Space-Time: Time-Series Clustering
Day 4	ArcGIS Dashboards	• Organizing field activities with ArcGIS Dashboards and Experience Builder
Day 5	ArcGIS Dashboards	• Organizing field activities with ArcGIS Field Maps Early Access
Day 6	Sampling Design	• Sample Size Calculation
Day 7	Sampling Design	• Stratification and Sample Allocation • Subsampling and Sampling approaches over time
Day 8	Sampling Design	• Sample Designs calculation for household Surveys • Dual frame survey design
	Weighting	• Overview of weighting • Unknown eligibility and scale to frame

DAY	THEMATIC AREA	TOPIC
Day 9	Geospatial data and spatial relationships	• Non-response adjustments and Adjustments for Multiplicity • Calibration approaches • Weight trimming
Day 10		Overview of tools and software for sampling, weighting and estimations
	Tools & Software	