

# UNIT EIGHT

## GEOGRAPHICAL ENQUIRY AND MAP MAKING

### Introduction to Geographic Research

#### Geographical Enquiry:

Geographical enquiry involves actively exploring and studying various aspects of Geography. In the 21st century, this method should incorporate essential skills and technologies, such as Geographic Information Systems (GIS), Remote Sensing, and advanced statistical techniques. These tools help in addressing local and global environmental and socioeconomic challenges.

#### Skills and Technologies:

- **GIS and Remote Sensing:** Useful for mapping, data analysis, and understanding spatial patterns.
- **Fieldwork and Data Analysis:** Collecting and analyzing first-hand or secondary data to understand physical and human environments.

### Fundamentals of Research in Geography

#### What is Research?

- **Definition:** Research is a systematic process of inquiry to solve problems or discover new facts through organized and objective efforts.
- **Key Components:**
  - Inquiry to obtain useful information
  - Scientific approach
  - Systematic and objective search for reliable knowledge

#### Purpose of Research:

1. **Exploration:** Investigating new phenomena and generating questions.
2. **Explanation:** Understanding why phenomena occur and their shapes.
3. **Description:** Documenting and characterizing phenomena.
4. **Understanding:** Comprehending processes and interactions.
5. **Prediction:** Forecasting future outcomes and behaviors.

## Features of Geographic Research

### Nature of Geographic Research:

- **Integration of Disciplines:** Geography connects social sciences, biophysical sciences, and humanities.
- **Research Methods:** Include both historical and modern techniques to study spatial patterns, interactions, and phenomena.

### Historical Context:

- Early focus: Locations of places and people.
- Eighteenth-century focus: Physical and human characteristics.
- Mid-20th century focus: Spatial distributions, patterns, and forces.

## Research Approaches and Methodologies

### Research Approaches:

1. **Quantitative Approach:** Uses numerical data and statistical analysis to test theories. Examples include:
  - Temperature variation with altitude
  - Land value changes with distance from city center
2. **Qualitative Approach:** Involves descriptive data and non-numerical analysis to gain insights. Examples include:
  - Historical/Narrative research
  - Ethnographic research
  - Case studies
  - Action research
3. **Mixed Methods Approach:** Combines quantitative and qualitative techniques in a single study to address complex issues.

### Research Methods vs. Methodology:

- **Methods:** Techniques for collecting and analyzing data (e.g., surveys, experiments).
- **Methodology:** The philosophy or logic behind choosing specific methods (e.g., why a particular method is used, assumptions made).

## Research Design

### Components of Research Design:

- **Problem Statement:** Clear definition of the research problem.

- **Procedures:** Techniques for gathering and analyzing information.
- **Population:** The group or area being studied.
- **Data Analysis:** Methods used to process and interpret data.

## Basic Elements of Research

### Research Process:

1. **Problem Identification:** Clearly define the research question.
2. **Data Collection:** Gather relevant data.
3. **Analysis:** Analyze the data using appropriate methods.
4. **Reporting:** Present findings and interpretations.

By understanding these fundamentals, students can effectively conduct geographic research and address various environmental and socioeconomic issues.

## Research Problem Identification and Formulation

### 1. Identifying and Formulating the Research Problem

- **Identification:** Start by choosing a broad topic related to your field of interest.
- **Formulation:** Refine this topic into a specific research problem. This involves:
  - **Understanding:** Deeply grasp the problem through discussions and literature review.
  - **Sources:** Look at professional experience, theoretical insights, literature, and recent changes.

### 2. Problem Statement

- **Purpose:** Define the problem's context and the approach to be taken.
- **Sources:**
  - Professional experience
  - Theory-based inferences
  - Literature and reports
  - Changes in technology or society

### 3. Objectives

- **General Objective:** What you aim to achieve overall.

- **Specific Objectives:** Break down the general goal into detailed, actionable parts.
- **Benefits:**
  - Focuses the study
  - Avoids unnecessary data collection
  - Organizes the research phases

#### 4. Research Questions

- **Purpose:** Direct your research and focus on specific aspects.
- **Attributes:**
  - Formulated as questions
  - Specific and clear
  - Includes key variables
  - Operationalizable

#### 5. Literature Review

- **Purpose:** Place your research in context and build on existing knowledge.
- **Functions:**
  - Avoid duplication
  - Credit previous work
  - Demonstrate understanding
  - Identify gaps and provide a theoretical basis

#### 6. Research Design

- **Purpose:** Outline the framework for your study, including methods, timeline, and resources.

#### 7. Determining the Sample

- **Population:** The entire group you want to study.
- **Sampling:**
  - **Probability Sampling:** Each member has a known chance of selection (e.g., random, stratified).
  - **Non-Probability Sampling:** Selection based on non-random criteria (e.g., convenience, judgment).

#### 8. Data Collection

- **Sources:**
  - **Primary:** Collected firsthand (e.g., surveys, interviews).

- **Secondary:** Previously collected data (e.g., government reports, academic journals).

## 9. Data Analysis and Interpretation

- **Quantitative Data:** Focus on validity and reliability.
- **Qualitative Data:** Analyze as you go, refining your understanding based on emerging results.
- **Methods:**
  - Depends on your research type and preferences

## 10. Results

- **Presentation:**
  - State observations clearly, including both positive and negative results.
  - Avoid interpretation; focus on presenting detailed data.

## 11. Discussion

- **Purpose:** Analyze patterns, relationships, and deviations.
- **Focus:**
  - Major patterns and trends
  - Exceptions and underlying causes
  - Comparison with previous studies
  - Significance of findings

## 12. Conclusions

- **Purpose:** Summarize the main findings and their importance.
- **Guidelines:**
  - Address the original problem
  - Highlight new insights and their implications

## 13. Recommendations

- **Purpose:** Suggest actions or further research.
- **Content:**
  - Remedial actions
  - Directions for future studies

# GIS Data and Map Making Using GIS

## 1. GIS Overview

- **Components:**
  - **Digital Data:** Geographic information
  - **Hardware:** Computers for storage and processing
  - **Software:** Programs for handling data
- **Applications:** Creating and analyzing maps, performing spatial analysis

## 2. Gathering GIS Data

- **Sources:**
  - **Primary:** Directly collected (e.g., field surveys)
  - **Secondary:** Existing data (e.g., published reports)

## 3. Data Generalization

- **Concepts:**
  - **Classification:** Grouping data by attributes
  - **Simplification:** Removing unnecessary details
  - **Exaggeration:** Highlighting key features
  - **Symbolization:** Using visual symbols to represent data

## 4. Data Representation

- **Methods:**
  - **Natural Breaks:** Groups data into homogeneous classes
  - **Equal Intervals:** Divides data into equal ranges
  - **Quantile:** Divides data into percentiles
  - **Standard Deviation:** Shows deviations from the mean
- **Normalization:** Adjusting data for comparison across different units (e.g., rates, percentages).

## 5. Reflective Activity

- Consider how GIS technology and data representation impact your understanding and analysis of geographic data.