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Title

G*eographic research techniques*

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Geographic research techniques

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SUMMARY.



In all domains of scientific research, researchers rely on basic steps that serve as a starting point for achieving subsequent steps and objectives of research. Geographical science research requires consideration of the methods and techniques used when preparing a research topic. This course provides in-depth knowledge of methodologies related to geographic research, applied planning, and sustainable development. These are grouped into his three main areas.

- *Definition and meaning of scientific research in geography.*
- *Geographic Data Collection and Modern Information Technology Tools.*
- *Principles For Conducting and Discussing Scientific Research Projects in Geography.*

ملخص:

في كل مجالات البحث العلمي يستند الباحث على مراحل أساسية تمثل البداية التي ينطلق منها في إنجاز الخطوات والأهداف اللاحقة من البحث، فكلما كان إنجاز تلك الخطوات سليما ووضحا ووفق أسس علمية منطقية، انعكست آثار ذلك على النتائج التي يتوصل إليها الباحث في نهاية بحثه.

للبحث العلمي الجغرافي منهجية وتقنيات يجب مراعاتها عند القدوم على إعداد بحث أكاديمي. لذا يهدف هذا المقرر إلى التمكين من مناهج وتقنيات البحث الجغرافي التي نلخصها في ثلاثة محاور رئيسية :

- *اكتساب مهارة البحث المكتبي وتكنولوجيا المعلومات الحديثة .*
- *التمكن من تقنية وأدوات البحث الميداني، وإصدار الاستبيان .*
- *اكتساب العناصر الأساسية لتقديم عمل بحثي أكاديمي ومناقشته .*

Geographic research techniques

FOREWORD

From its beginnings, geography has been underpinned by the use of techniques and tools for spatial representation and for communicating research findings and results in the form of drawings. Since the first maps of the Greeks, the 'drawn' representation of the world has evolved and become increasingly complex in the course of technological progress. Today, the field of cartography has expanded beyond simple maps of places to include thematic and scientific disciplines far beyond pure geography, such as economics, history, and tourism.

Maps have become not only a spatial representation but also a research, empirical, and decision-making tool. Conversely, new technologies that were initially foreign to the rigid traditional geographic cartography have greatly changed cartography. Aerial photography first appeared in the early 20th century and developed especially after World War II. Photointerpretation and technology are no longer just for the military and government sectors but are also open to a wider, photo-hungry audience. Geography has rapidly integrated and adapted new technologies related to the digital processing of spatial information. These have been computer-aided cartography (CAD), georeferenced database management, and geographic

Geographic research techniques

information systems since the late 1970s, and spatial remote sensing and GPS positioning since the 1980s.

Thus, advances in spatial analysis methods and tools have created the potential for geographers to intervene in ever wider areas, working at the level of a holistic spatial approach, from countries to entire continents. There is the possibility to compare across large amounts of information in the sense of a thematic approach or to enter locations as thematic criteria. This working tool will play an important role in the development and management of sensitive areas where degradation phenomena that lead to degradation of ecosystem dynamics are prevalent.

Geographical research methods aim to increase our comprehension of the Earth's physical and human environments, offer insightful information about spatial patterns and processes, and encourage the use of evidence-based decision-making in a range of contexts. The goal of geographic research methodologies is to examine spatial linkages and patterns on the surface of the Earth. This aids researchers in finding patterns, and variations in natural and social events. Many students place a high value on conducting research projects, writing a thesis and dissertation, and reports, which enables

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them to develop and put to use many of the skills and strategies they have learned from studying geographic search methods.

This course focuses on teaching geography research tools and strategies. The aim is to introduce students to academic and professional research methods. Our aim is not to produce a complete step-by-step guide to completing a research project but rather to provide a sufficient introduction to methodological approaches so that students can identify the approach they desire and pursue it independently, to provide good work.

Our goal is to further develop the geographic skills of our students using the latest methods in this course and improve their level of knowledge and performance This allows students to move from the theoretical stage to the practical stage of applying modern geographic research methods and using tools appropriately.

Unit I

Basic Research Methodology

In

Geography

Unit outcomes***At the end of this unit, you will be able to:***

- *Understand the meaning and basic concepts of geography:*
- *Recognize the extent of geography and its relationship to other disciplines.*
- *Discuss different approaches to geographic studies.*
- *Understand the functionality of the most important tools in geography.*

Key terms

- *Physical geography* -*Human geography* -*Holistic synthesis*
- *Sustainability* - *Approach* - *Geographic Tools*
- *Cartographic Process* - *Questionnaire survey* - *Geographic Data*

Brain-Storming

- How do geographers study geography and geographic phenomena?*
- What are the methods and approaches that they employ?*
- What tools do they use?*

I- Definitions and Overview of Scientific Research

Scientific research is a methodical and exacting process of inquiry to advance knowledge, comprehend natural phenomena, testing ideas, and theories in a variety of academic subjects. It has an organized approach and adheres to particular principles and procedures. Scientific research contributes to the following

- 1. Determine the cause and extent of the problem Example: The occurrences of hunger, flood, epidemics, etc.*
- 2. Communicate new information and new knowledge*
- 3. Visualize the gap between the real world and the formulated theory.*
- 4. Collecting more data provides a basis for additional research to validate findings or further investigate the issue.*
- 5. Strengthen your critical observations and strengthen your ability to predict.*
- 6. Allow us to make rational decisions.*
- 7. Serve as an aid to policy making.*

What does Geography Mean?

*Geography is an interdisciplinary subject. It is closely related to various fields of both natural and social sciences. For example, **physical geography** is closely related to the natural sciences and **human geography** is closely related to the social sciences. Knowledge and information in geography and other sciences are compatible and interdependent. Geography helps us understand how the world is changing. (See Michael Pidwirny & Scott Jones Chapter 1: Introduction to Physical Geography 1999), By studying geography, you will conceive:*

- **How places and landscapes are formed.***
- **How people and their environments interact.***

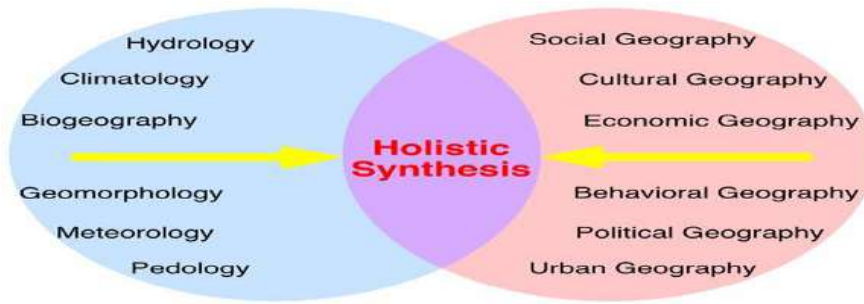


Fig.1 Major subdisciplines of physical and human geography.

Source : (<http://www.physicalgeography.net/fundamentals/1b.html>)

Physical Geography	Human Geography
Rocks and Minerals	Population
Landforms	Settlements
Soils	Economic Activities
Animals	Transportation
Plants	Recreational Activities
Water	Religion
Atmosphere	Political Systems
Rivers and Other Water Bodies	Social Traditions
Environment	Human Migration
Climate and Weather	Agricultural Systems
Oceans	Urban Systems

Table.1 Some of the phenomena studied in physical and human geography.



Fig.2 Physical geography and human geography are two different fields of study.

III-The nature of research in geography

The geographic focus has changed over time as technology advanced and knowledge grew in both breadth and methodology. The location of sites and

peoples has long been a topic of study in geography. Geography began to emphasize the geographical features and inhabitants of locations in the 18th century. Geographical research in the middle of the 20th century concentrated mostly on:

- Focus on the spatial distribution of phenomena.
- The patterns and interactions that emerge.
- The distribution of people about how natural resources are used and how long they can last. Geographical research has recently started to address sustainability and environmental challenges, such as hunger, global warming, poverty, and the sustainable development of our ecosystem. Sustainability was defined by the World Commission on Environment and Development in 2013 (see Thomsen, C. Thomsen, C. 2013. Sustainability World Commission on Environment and Development Definition)



Fig.3 The concept of sustainability in today's world.

Source :(<https://link.springer.com/referenceworkentry>)

IV-Research approaches in geography

The variety of research methodologies and approaches used in geography reflects the discipline's diversity. To explore many facets of the Earth's physical and human contexts, geographers frequently combine quantitative and qualitative methodologies. done in many different ways Method. (See Gomez & Jones, 2010;

Clifford, Cope, Gillespie & French, 2016). *Geography Educational* The following are some of the main research techniques frequently applied in geography:

1. Descriptive Approach

Descriptive Approach - This is the idea that the world is made up of a series of locations, each of which is researchable and unique¹. It usually includes describing the physical aspects of the area and its characteristics.

2. Topical Approaches

Geographical topical approaches refer to particular theme areas or topics of interest. These methods center on discovering and examining geographical occurrences connected to specific subjects or themes. The following are some typical geographic topical approaches:

- Environmental Geography.*
- Urban Geography.*
- Rural Geography.*
- Tourism Geography.*
- Population Geography.*
- Political Geography.*

These geographical topicals enable researchers to focus on particular areas of interest while advancing knowledge of how people interact with their environments on local, regional, and global scales. Within these subject areas, researchers frequently use interdisciplinary approaches to tackle challenging geographic concerns.



Map 1: Distribution of world religions.

Source :(<https://www.bpsgroverteacher.com/>)

3. Diachronic Approaches

With a focus on historical change and evolution, diachronic methods of geography entail the study of spatial phenomena and processes over time. These methods place a strong emphasis on the examination of how geographic characteristics, such as landscapes and patterns, have changed or evolved. Our grasp of long-term trends, historical context, and the dynamics of change in a variety of geographic phenomena is aided by diachronic research in geography. Here are some of geography's most important diachronic strategies:

- Land-Use Change Studies - Urban Evolution - Biogeographical Evolution

To comprehend present spatial patterns, trends, and issues, diachronic techniques offer a historical perspective.

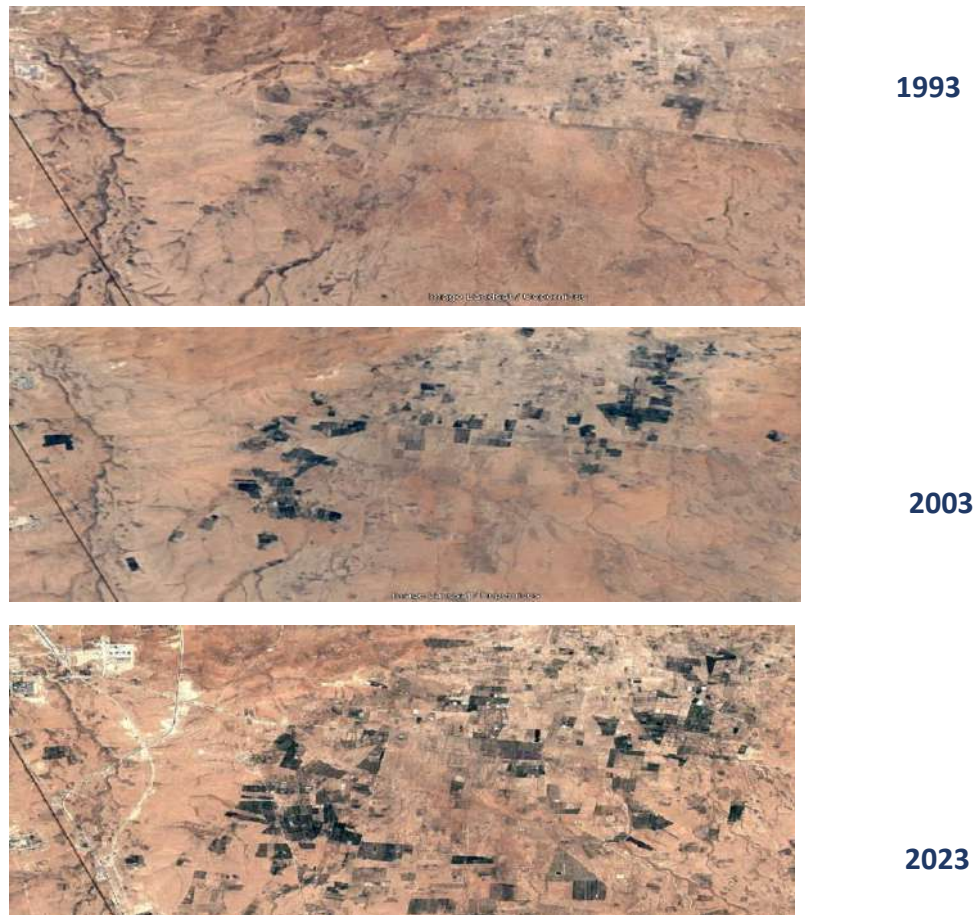
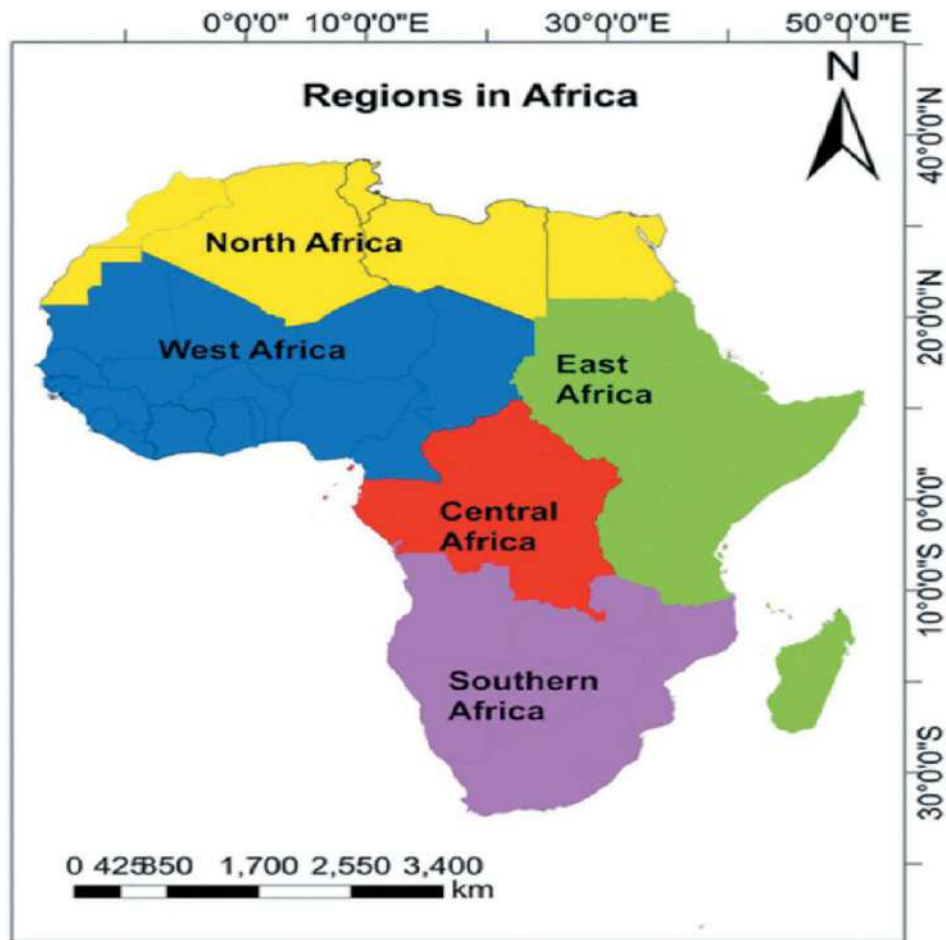


Fig.4 Agricultural land development in steep areas, Djelfa (1993- 2023)

3. Regional Approaches

Geographers use these methods to study the spatial layout of regions, comprehend the forces that shape them, and respond to a variety of regional research issues. Geographical definitions of regions can be based on several factors, including geographic ones (such as mountains and rivers), cultural ones (such as languages and religions), or even ones that are based on administrative boundaries (such as states and international blocs).



Map.2: Map of Africa showing its five main regions

4. Inductive Approaches

*Research methodologies known as inductive approaches use reasoning from particular facts or situations to develop larger generalizations or ideas. In other words, these methods start with specific and in-depth information or evidence and work their way up to drawing more generalized and abstract conclusions. To come up with theories or hypotheses for exploratory study, inductive reasoning is frequently used. Therefore, when researchers take an inductive approach, they start with a set of **observations** and move from those specific **experiences** to a more general set of descriptions of those experiences. In other words, move from data to **theory** or from concrete to general. (Barbara P and al.2015.)*

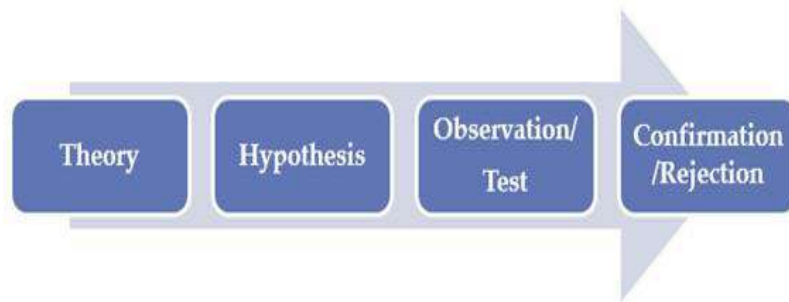


Fig.5 General procedure for the deductive approach.

5. Quantitative Approaches

Quantitative geography is a subfield and methodological method of geography that develops tests and makes use of mathematical and statistical strategies to research and version geographic phenomena and patterns. (See Robin Flowerdew and David Martin, Methods in Human Geography 2005 University of St Andrews University of Southampton).

We can summarize it as follows.

- ***Inferential quantitative approach*** - about the characteristics.
- ***Experimental quantitative approach*** - it manipulates the effect of one variable on another.
- ***Simulation (model) approach*** - developing an artificial environment to represent the real environment.

6. Qualitative Approaches

Comparative to quantitative geography, qualitative geography is more descriptive. To gather information and comprehend the complexity and diversity of human geography, qualitative geography uses techniques including ethnography, interviews, and participant observation.

It is only used to discuss new theories and is not intended for use by other researchers. We frequently use group interviews (face-to-face, questionnaires, and personal observations) to gather data.

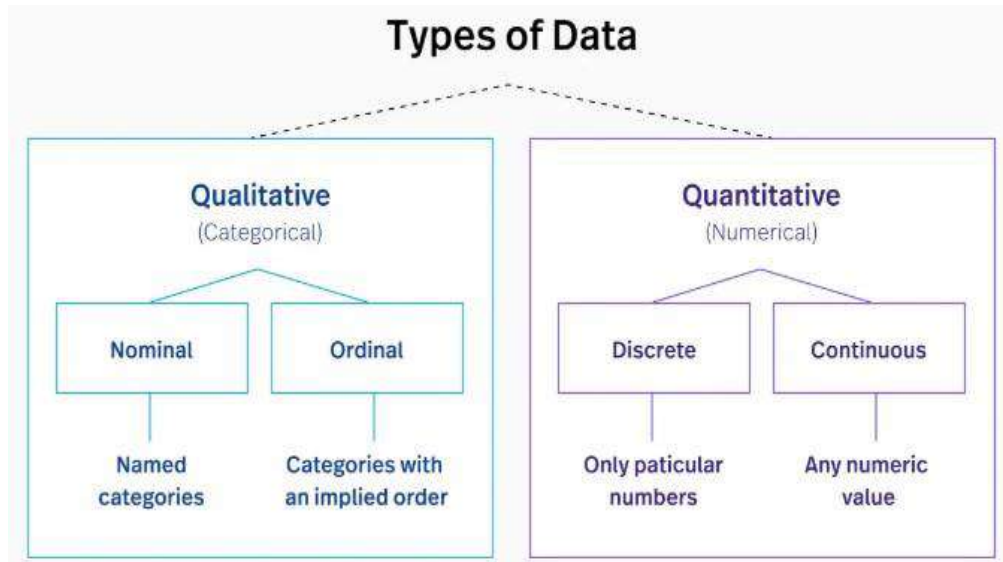


Fig.6 Difference Between Quantitative and Qualitative Data.

Source : (<https://www.bachelorprint.eu/methodology/mixed-methods-research/>)

7. Mixed Method Approaches

Research using mixed methodologies involves gathering and analyzing both quantitative and qualitative data for the same topic. When the objective is to learn more about a subject before gathering quantitative data, this sort of study is employed. This can be done, for instance, by asking people in the area questions about how they interact with their surroundings and then utilizing surveys to examine and quantify those interactions. (Creswell, John W 2009. Chapters 2 and 3; Qualitative, quantitative, and mixed methods approach.)

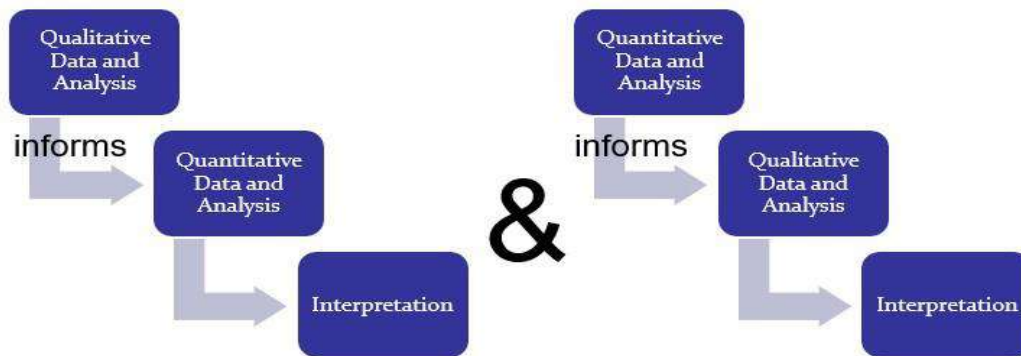


Fig.7: Four-phase project (two data collection series)

Source : (<https://www.bachelorprint.eu/methodology/mixed-methods-research/>)

V-Geographic Research Stage

To prepare, carry out, and present their research, researchers often go through several stages. These steps provide the research process structure and make sure that it is carried out methodically and properly. The main phases of geographic research are as follows:

1. **Data search** is the first step in obtaining specific results.
2. **Preprocessing and laboratory examination:** This refers to the stage of carefully classifying, structuring, and classifying field study and bibliographic material.
- 3- **Analysis and Interpretation:** This is the stage in which the findings of geographical investigations are interpreted and presented after fact-checking and fact-checking, respectively.

VI-Data Collection Tools

To learn more about the Earth's physical and human ecosystems, geographers employ several data collection techniques. Traditional techniques and cutting-edge technology are all included in these products. The type of data

required, the study's geographic scope, and the research objectives all influence the choice of data-gathering methods. Geographers can gather, analyze, and interpret data using these strategies and instruments for data collection, which is essential for geographic research since it helps us understand the physical and social systems on Earth. The research objectives and the particular geographic phenomenon being studied will influence the tool selection.

Here are some categories of instruments frequently used in geography for data collection:

VI-1. Procedural tools:

In geography, procedural tools refer to the methods and techniques used to process and analyze geographic data. These tools help researchers and geographers manipulate, transform, and analyze spatial and non-spatial data to extract meaningful insights, patterns, and information. Here are some common procedural tools used in geography:

-Web Mapping and Visualization Tools.

-Survey Questionnaires and Interviews.

-Observations (Fieldwork).

-Phyto ecological surveys.

-Remote Sensing.

-statistic data.

Question 11

Yes or No Type:

- Geography is a difficult subject. Yes, No

Types of short answers

: Science deals with things

Past events are.....

Marking from a list of suggested response.

The student is enrolled in the teacher's High school with average grades.

- 10/20

- 12/20

- 14 or more

Ranking: Rank the options in order of importance. What made you want to study geography?

- advice from a friend

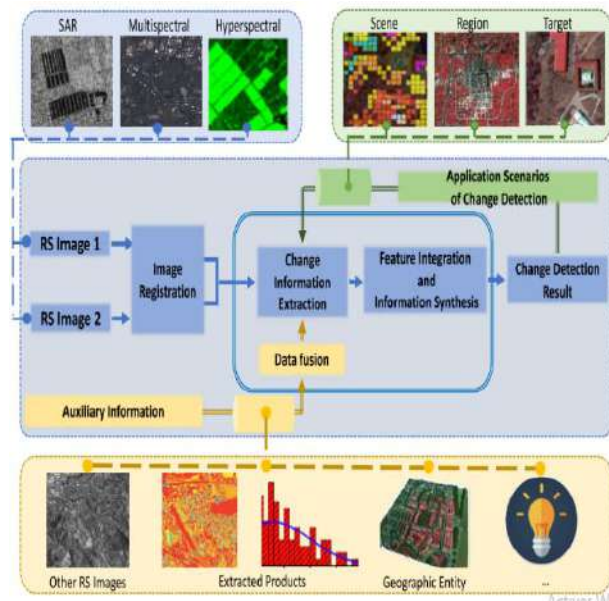


Figure 08 Procedural tools for collecting and inventorying data

VI-2. Automatic and electronic measurement tools:

Geographers can gather precise, real-time, digital data about geographic phenomena and features using automatic and electronic measurement tools, which are devices and technology. With their precision, economy, and capacity for handling enormous datasets, these tools have completely changed the way geographic data is collected. The following are a few instances of automatic and electronic measurement devices frequently used in geography:

- Geodetic GNSS Receivers.
- Laser Scanners (LiDAR).
- Unmanned Aerial Vehicles (UAVs or Drones).
- Seismic Sensors.
- Automatic Traffic Counters.



Figure. 09 Automatic and electronic measurement tools

With the aid of these automated and electronic measurement technologies, geographic research has evolved tremendously, allowing geographers to gather precise data in real-time across a range of scales and specialties.

VI-3. Soft computer tools:

In geography, the term "soft computing tools" refers to a group of computer approaches and techniques that are applied to handle complicated and ambiguous geographic data, resolve spatial issues, and arrive at well-informed conclusions in geographical study and applications. Soft computing approaches are especially helpful in situations when the existence of ambiguous or inaccurate data makes it difficult for them to be effective (for interpreting, simulation, and analyzing data). Here are some examples of common soft computing techniques used in geography:

- *Spatial Data Mining Tools.*
- *Machine Learning Algorithms.*
- *Case-Based Reasoning (CBR).*
- *Artificial Neural Networks (ANN).*

- **Tabulation of Dat:** *The raw data is condensed and presented in a tabular format for further study. Thus, setting the table is a crucial first step. The three aggregation methods are digital and manual or Hebrides.*

- **Charts:** *In several graphs, data and statistical factors are transformed to provide derived data that can be used to understand earth events. Charts translate the geographic data being displayed using a range of visual encoding techniques, including location, length, area, angle, and color. Be careful to use the appropriate charts if you need to illustrate your data. The most popular chart and graph interface types are shown below:*

- *Line Chart.*
- *Pie Chart.*
- *Density Maps.*
- *Scatter Plot.*
- *Bubble Chart.*
- *Treemap*

VII-ACTIVITIES**Activity :1**

What do the queries "where," " Why is it there" and "how are they arranged" concern? Prepare the homework at home, then show the class the outcomes.

Answers to these fundamental questions are analytical and descriptive. The "where" response provides a descriptive location for an item or phenomena. Similar to this, the answer to "Why is it there?" tries to explain the factors that influence the phenomenon's location. On the other hand, the question "How are they arranged?" is mostly analytical. The solution shows how the phenomenon under investigation is distributed regionally. Geography seeks to capture our reality and the daily economic, political, and cultural activities we engage in. The science of geography looks at how our physical and human surrounds affect us.

Activity:2

Do you think there are endless possibilities in geography? Why or why not?

Discuss the geographical points in groups and present your findings to the class.

- ✓ *Indeed, the geography is very wide. However, this does not mean that its scope is unlimited. The main focuses of geography are:*
- ✓ *Earth, its position in space and its movement.*
- ✓ *The various physical features that make up the Earth's surface, the forces that cause them, and their changes from place to place and over time.*
- ✓ *Various relationships between humans and the natural environment. Also, interdependence and mutual influence.*

- ✓ *The state of the lower parts of the atmosphere and the resulting meteorological conditions, as well as their spatial distribution and variability.*
- ✓ *The elements that give the Earth and its varied landforms shape.*
- ✓ *Human economic activity and its effects on the environment.*

As a result, it is reasonable to draw the conclusion that despite having a broad scope, geography has some areas on which it focuses.

Activity :3

What distinguishes the regional from the systematic approaches? What are each's flaws and advantages? With a classmate, talk about this matter.

As opposed to regional techniques, thematic or systematic approaches apply certain geographic elements or occurrences to designated geographic units. For instance, taking factors like temperature, topography, and culture into consideration, it investigates the distribution of particular elements throughout nations, continents, or the entire world.

That is to say, the theme method merely aims to provide a broad or shared understanding of the phenomenon under study in terms of how it is distributed and connected to the local society.

For instance, climatic geography, soil geography, and population geography.

The regional approach to geography focuses on regions, places, or other clearly defined geographical entities. The study investigates several geographical elements in this area. The area being studied may consist of a continent, a subcontinent, or several nations sharing similar geographical characteristics.

Examples include the geography of North Africa, Asia, or any other continent.

NOTE:

A region is a space or area made up of comparable or uniform geographic elements.

The similarity could be either physical (climate, landscapes, etc.) or cultural-anthropogenic (religion, language, economic activity, etc.). Regions vary in area. The size of a region is a function of the study's purpose. Regions called micro are relatively small, and those called macro are relatively large.

Dividing the world into regions is a difficult task. However, we may construct a region based on any one element or interrelated elements.

FOCUS

Two separate fundamental methods can be used to conduct geographic investigations. These are the Systematic (Topical) Approach and the Regional Approach.

*- **The REGIONAL** method examines the various traits of each world region (realm). It divides the world into geographical areas, each of which has unique characteristics that set it apart from others. Then, using this method, each geographic phenomenon in that area is studied.*

*-On the other hand, **SYSTEMATIC** geography addresses a single subject and examines its geographical variations throughout the entire world. Although geographers employ these two fundamental methods, regional and systematic, they are not always distinct from one another. Instead, these strategies overlap and are tied to one another.*

Activity :4

- What two strategies have been used to organize geographic knowledge?
- What distinguishes the systematic from the regional approaches?
- Are the two methods distinct from one another? If not, why not?
- Which methodology would be most appropriate for a study of wheat and citrus distribution in Algeria? Why?

Activity :5

Write a few words describing the interactions between people and the environment while attempting to respond to the questions below.

1- Do people's lifestyles depend on their immediate surroundings? If not, why not?

3. Can people modify their surroundings to fit their needs? How?

School of Determinism

What is the foundation of the environmental determinism philosophy?

Up to World War I, it was the most popular notion. It promoted the idea that people's daily activities are directed by or determined by their physical environment.

A philosophy known as environmental determinism bases its claims on the notion that the environment has an impact on how people live. It holds that the environment governs how people behave.

It is predicated on the idea that disparities in people's economic practices, cultural norms, and social structures as well as physical distinctions between individuals are caused by the physical characteristics of particular geographic

regions. Thus, rather than emphasizing how individuals affect the environment in reverse, environmental determinists frequently concentrate on how the physical world affects people. This point of view strongly influenced nineteenth-century geographic writings, and its effects were still felt in the twentieth century.

The Greek and Roman academics developed the concept of environmental determinism. They asserted that factors such as climate, relief, soil, and other aspects of the physical environment determine people's modes of living. Many scientists concur that Charles Darwin's 1859 publication of "The Origin of Species" set the groundwork for the idea of the impact of the environment on people and other organisms. Demolins (1901 and 1903) proposed a similar idea, stating that "the flourishing of society is based on the environment."

Determinists also view people as passive agents whose attitudes and decision-making processes are determined by external physical circumstances. Geographers, who supported a new school of thought known as environmental possibilism, sharply condemned this outlook. Charles Darwin, Demolins, F. Rutzel, and other well-known academics were among those who advocated for the school of determinism.

Activity :6

- 1. Do you support the concept of environmental protection? If not, why not?*
- 2. Explain why environmental possibilists have harshly challenged the environmental determinism concept in a few sentences.*

Environmental Possibilism

What do you understand by environmental optimism? How is it distinct from the theory of environmental determinism?

By Febvre's theory, the school of possibility was established. His followers contend that since people have control over the environment, they are qualified to assess its advantages. They contended that there are just options rather than requirements.

This viewpoint's proponents underline that there are reciprocal interactions between people and the environment. They claim that individuals can modify their environment in order to improve their quality of life.

These geographers concur that the environment may have an impact on people's activities, but they think we can control these impacts by using our knowledge and expertise. Possibilists contend that without mentioning the impact of the environment, it is difficult to explain the differences between human civilization and its history. The school of possibility, which acknowledges that people may alter their environment utilizing the most recent or superior technologies, is now widely acknowledged.

Activity:7

Discuss in small groups what humankind has already done to alter the environment to better suit their way of life.

Example: Agricultural rehabilitation has been used by humans to convert desert wastelands into fertile agricultural land.

The Quantitative Revolution

The quantitative revolution was what? What impact did it have on the importance of geography?

One of the four significant developments in the history of geography was the quantitative revolution. Regional geography, environmental determinism, and critical geography made up the other three.

Geography has traditionally been a descriptive science that tries to explain how items are distributed on the surface of the globe. The "where" of geographical elements was the main focus of the discussion. However, socioeconomic, physical, and political aspects and processes were spatially organized and environmentally connected at the beginning of the 1950s. For a specific time and location, the results they produced are supported by evidence. As a result, a more theoretical, abstract approach to geographical research has developed, and this new approach was developed by the analytical method of inquiry. used exact mathematical formulas that were inspired by the physical sciences. The "Quantitative Revolution" in geography began to have an impact on academic geography departments and prominent geographic organizations.

What advancements in geography has the quantitative revolution brought about?

Geographers and statisticians from Europe and the US started the revolution. The quantitative revolution boosted the use of statistical methods in order to introduce "scientific thinking" to geography. It placed particular emphasis on computer-assisted geographic research and multivariable analysis. Different mathematical techniques were used in the methodologies,

which were more accurate than the descriptive techniques of regional geography.

The quantitative revolution was an answer to the 1950s crisis. The difficulties geography encountered in the late 1940s and early 1950s led to the crisis.

Among the biggest obstacles were:

- ✓ *Geographical theories were dismissed as just descriptive and unscientific. There is no explanation for why processes or occurrences occur in geography, contrary to what some have claimed.*
- ✓ *The study of geography was not helpful in problem-solving. As a result, it was considered to be solely instructional.*
- ✓ *Questions about the nature of geography continued to be raised. For instance, some individuals were unsure if geography was a science, an art, a subject in the humanities, or a social science.*

The approaches used in geographical research underwent a quick transformation as a result of the revolution. Due to this modification, descriptive geography gave way to empirical law-making geography. This led to conflict between academics from various schools, such as those who backed the descriptive approach and others who supported quantitative methods.

NOTE:

The invention of the computer and its capacity for data processing quickly served as the impetus for the quantitative revolution. Quantitative geographers "went radical" and studied geographers using computers, statistics, and mathematical models.

The following are a some of the methods that were crucial to geography during the quantitative revolution:

- Descriptive data analysis.*
- Statistical inference.*
- Equations and models based on fundamental mathematics, such as gravity models.*
- Statistical models that make use of probability theory.*

The analytical approach to research enabled the creation of logically sound generalizations on the spatial characteristics of precisely described events occurring in various environmental and cultural contexts. Tested hypotheses, models, or theories can serve as the basis for generalizations.

The use of the analytical technique made geography a more law-giving science and less acceptable was the idea that it was an idiographic topic of study. In the 1980s, this process got started.

Activity:8

Applied geography: what is it? When did this school of thought first emerge?

Since the first humans descended upon the planet, geography has been used. The geographic locations of the resources that they needed for survival were well known to primitive humans and those who came after them. However, there was limited chance of using geographic knowledge to address geographic issues.

The latter decades of the 20th century saw a significant advancement in geography. As a result, applied geography emerged as a field of study that may be used to address political and socioeconomic issues. The quantitative revolution served as the foundation for applied geography. Geographical knowledge became more useful when applied geography took off.

Numerous geographers are employed today in a variety of positions, including urban planners, GIS analysts, environmentalists, cartographers, location analysts, transportation planners, developing-nation specialists, public transportation planners, highway planners, university facility planners, transportation logisticians, and demographic analysts.

NOTE

Applied geography is the use of geographic analysis in business, government, non-profit organizations, etc. Applied geography solves problems and aids in decision-making.

Content review

- 1. What does environmental determinism mean in one?*
- 2. What does environmental optimism entail?*
- 3. How did the quantitative revolution occur?*
- 4. How does applied geography work?*
- 5. Talk about how geography has evolved as a result of the quantitative revolution.*

Activity:9

What academic disciplines relate to geography? Please make an effort to recall the lessons you studied in previous grades.

As you may have noticed, geography is related to numerous academic fields. They include sociology, economics, political science, history, demography, and the study of biology, meteorology, geology, and astronomy.

Can you explain how geography links to each of the aforementioned disciplines? How does each relate to the specific areas of geography study?

As was already mentioned, geography and the social and natural sciences are strongly related. They learn information from geography, and it clarifies some concepts from those fields. See how these other sciences relate to geography:

***Biology:** is a science that deals with all forms of life, including their classification, physiology, chemistry, and interactions. As biogeography is the study of plant and animal distribution, it is linked with biology.*

***Meteorology:** is the scientific study of the earth's atmosphere, especially its patterns of climate and weather. Hence, it is related to the sub-field of geography called climatology.*

***Geology:** is the study of the earth's interior makeup. It investigates the forces that cause structural changes to the earth. It also looks into the background of those changes. Geomorphology and soil geography are two geography subfields that are connected to geology.*

***Astronomy:** The scientific study of the cosmos, particularly the movements, locations, sizes, compositions, and behaviors of celestial objects. Astronomy is a science that informs many of the concepts taught in geography classes about the cosmos, and particularly the solar system.*

***Economics:** is the study of how products and services are produced, distributed, and consumed. Economic geography is closely tied to this area of study because it is focused on economic activity.*

Political Science: The study of political institutions and organizations, particularly governments, is known as political science. Strong ties exist between this field of study and political geography.

History: A systematic and organized study of previous political, social, and economic occurrences in human civilization is called history. History aids in future projection. It has a close relationship with historical geography because it is historically focused.

Demography: The study of human populations, including their number, growth, density, dispersion, and statistics on births, marriages, illnesses, and deaths, is known as demography. Demography and the set of knowledge we study in population geography are connected in some way.

Physics: physics is the study of matter, energy, and the interactions between the two.

Sociology: Sociology is the study of how human societies came into being, how they have evolved, how they are organized, and how individuals and groups behave in them. The two are related to cultural geography.

Activity: 10

In a few sentences, we'll go over some geographical ideas and themes connected to the following fields:

- ✓ *Geology*
- ✓ *Demography*
- ✓ *Economics*
- ✓ *Political science*

Why do we refer to geography as being inter-disciplinary?

Activity : 11*True or False*

- 1- *The ability to irrigate deserts to make them agriculturally productive areas lends credence to the idea of environmental possibility.*
2. *Geography is less useful today than it was in the past.*
- 3- *The determinist perspective holds that people are powerless to alter or have an impact on the environment.*
- 4- *Systematic geography is the study of a region's fundamental traits.*
5. *Geographical information can be derived from the facts and principles of the natural sciences.*

Activity: 12

1-Which of the following opinions do you accept?

- A. *Geographical definitions are static.*
- B. *There is no single definition for geography as a discipline.*
- C. *There is no connection between geography and other academic fields.*
- D. *There are no changes that can be made to the definition of geography.*

2- Which of the following statements about geography is correct?

- A. *The earth's surface is evenly covered in physical phenomena.*
- B. *Humans and environments only interact in one direction.*

C. Every aspect of the natural environment has an impact on how its inhabitants live.

D. Environmental modification is not something that humans can do.

3- The essential idea of possibility is:

A. The mutual interaction between people and nature.

B. It is impossible for humans to change their surroundings.

C. In the link between humans and the environment, society plays a passive role.

D. The environment is always having an impact on people.

4- Which of the following best describes determinism?

A. Self-reliance.

B. Individuals from colder regions are more resilient and braver than those from warmer regions.

C. People have the ability to change their surroundings.

D. Examines how human actions relate to social structure.

Activity: 14

Briefly respond to the following questions.

What exactly is geography?

What distinguishes regional geography from systematic geography?

What distinguishes environmental determinism from environmental possibility?

What does applied geography entail? What historical context led to its emergence?

-Talk about the connection between geography and the other social sciences.

-What sparked geography's quantitative revolution?

-What is the geosphere, exactly?

-What fundamental issues does geography in the second half of the 20th century address?

- According to geographers, "Geography is not solely the study of place names, lengths of rivers, heights of mountains, etc." Shortly describe it.

UNIT CONCLUSION

In this chapter, we have described the nature of geography. We defined geography. Discussed its scope, and its approaches, examined its thought, and examined its relationship with other sciences.

Geography is a systematic study of the spatial distribution of phenomena on the surface of the earth and of the two-way interaction between the natural and human environments.

The scope of geography is very wide. It attempts to study many parts of the geosphere: the lithosphere, hydrosphere, atmosphere, anthroposphere, and biosphere.

Geographical studies are conducted based on two basic approaches. Regional geography and systematic geography. The first studies all aspects of phenomena found in a region, while the latter investigates a single phenomenon globally. Applied geography solves, many different socio-economic and environmental problems.

Geography is highly integrated with other disciplines. It shares a wide range of information with the social and natural sciences.

Unit II

***Geographic Data Collection
(Primary and Secondary) And Modern
Information Technology Tools.***

Unit outcomes

At the end of this chapter, you should be able to:

- *Explain the term data in research.*
- *Explain the types of data (Primary data and secondary data).*
- *Describe the questionnaire.*
- *Describe the Interview.*
- *Describe the Survey.*
- *Knowledge of the most modern and widely used geographic instruments*

Key terms

- *Observation* - *Secondary Data* - *Geographic Tools*
- *Geographic Information System* - *Primary Data* - *Annotated References*
- *Cartographic Process* - *Questionnaire* - *Geographic Data*
- *Remote Sensing* - *Interview* - *Global Navigation Satellite System (GNSS)*

Brain-Storming

- *How do geographers collect data and what tools do they use?*
- *What techniques and approaches do they use?*

Introduction

Geographic Tools (GT), among other terms, were covered in the first chapter: mapping, surveying with questionnaires, geographic information systems, and remote sensing. You've seen how you test hypotheses with data. A case study requires field data collection. You must collect data from individuals who are referred to as subjects or respondents. This data can be used to test your theories as temporary solutions to issues or challenges that arise during your investigation. This chapter will first examine data gathering in research before moving on to various tools and data collection procedures.

I-Steps and Procedures for Collecting Data.

Since information data and use have become very complex as a result of the enormous growth of information, a researcher requires complete information whenever they want to fulfill their research objectives. For this, the researcher requires different types of tools to preserve, organize, and access data needed to carry out their research tasks. Relevant bibliographical research (Secondary data) and Surveys and questionnaires are two similar tools used in collecting (primary data) and are key elements of any work academic project dissertation or doctoral thesis. For several reasons:

- Provides conceptual context for research.*
- Acquire, deepen, and organize your knowledge in your chosen field of study.*
- Helps define and focus research goals*

Additionally, its goals are to:

- A description of the state of the art for each topic.*
- Identify strengths and weaknesses, and potential gaps in current knowledge.*
- Understand how the research question is positioned within the subject context.*

II-Types of Data Used in Research Investigations

Various forms of data are utilized in geographic research investigations to investigate and analyze various aspects of the Earth's surface, the environment, and human activities. Primary data and secondary data are two main categories that apply to these data kinds. The following are some typical data types used in geography research:

II-1 Secondary Data Collection (Bibliography)

Secondary sources of information provide the data generated from main sources, which is the definition of secondary data. These are details, information, or figures that are not original to you as a researcher or investigator. Books, periodicals, newspaper articles, and other studies that are available from libraries are examples of items that are taken from other people's archives and documentation. (As stated by Gupte 1979).

Before selecting the best strategy, you must take into account several elements. The goal, issue, and study hypothesis, as well as the amount of research time needed, are some of these variables.

Data previously gathered and taken into consideration for reuse for new inquiries for which the collected data was not initially intended can be deemed secondary data (Vartanian, 2010). All the sources utilized to complete the assignment's research are listed in the bibliography. Text that inspired your thoughts but that you didn't directly mention in your work is acceptable. References allow you to:

- Continue where earlier researchers left off and discover what they did to further scientific understanding, refine research techniques, and leave a lasting scientific legacy.

- To build a theoretical and cognitive framework, and get an understanding of the subjects and research areas. Make an action plan and decide on, then adjust, strategies for resolving the issue. openness to many disciplines, scholars, and the advancement of research.

II-1-1 List of Annotated References.

Annotated bibliographies, usually referred to as annotated references, are a crucial component of academic writing and research. Annotated references

assist researchers in maintaining track of pertinent information and their own opinions about it by providing a summary and evaluation of each source.

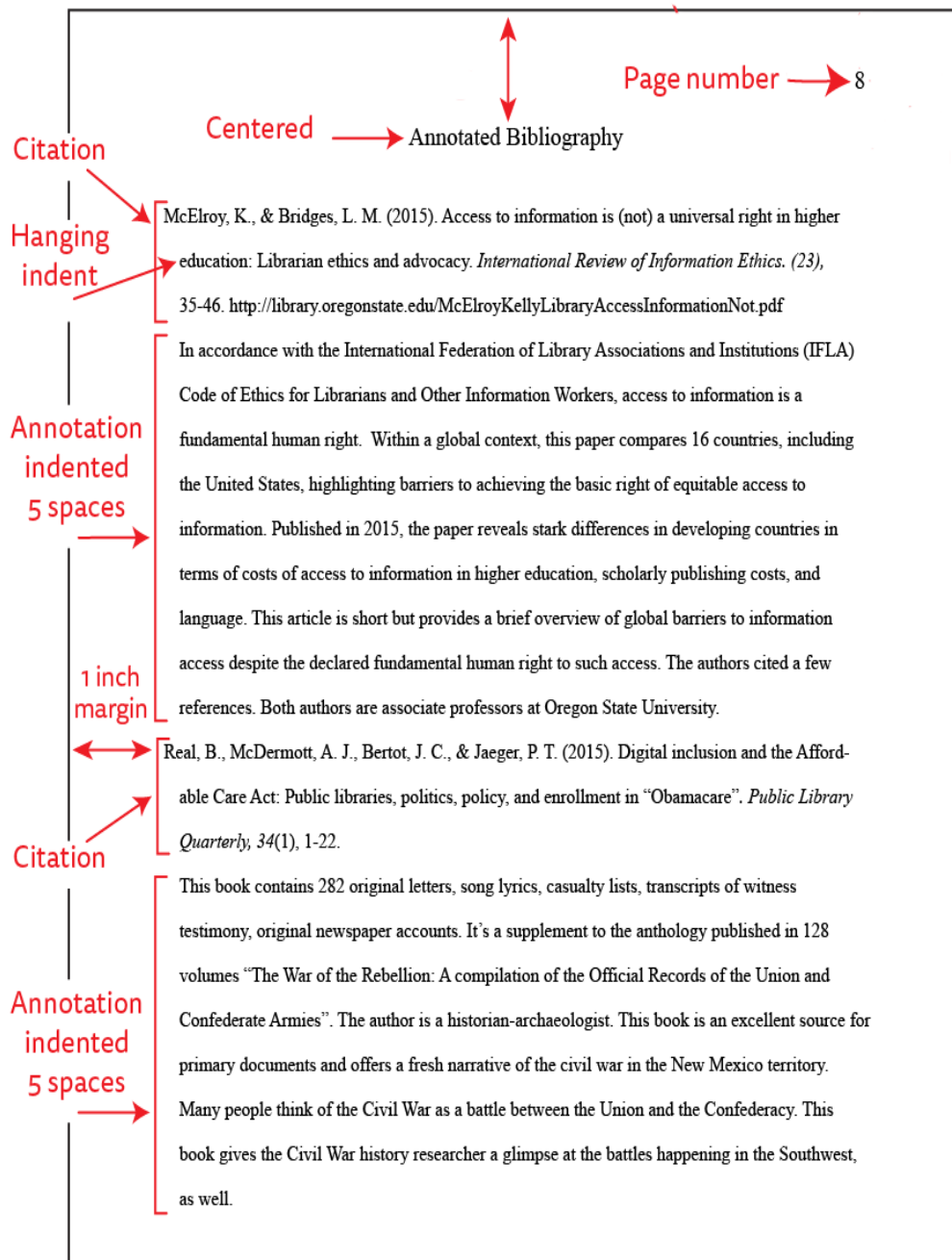


Fig.11 example of annotated bibliography format.

<https://www.bibliography.com/examples/annotated-bibliography-writing-guide>

Annotations can be summaries, ratings and observations, or all three, for each source notes are typically 250-500 words. Here's a quick rundown of the guidelines:

- Right-aligned page number*
- Running header (Optional)*
- two- or three-centimeter margins*
- Double spaced*
- The title "Annotated Bibliography" centered*
- Hanging indent for second and subsequent lines of the citation*

II-1-2 Storage of Annotated References:

Annotated bibliographies can be stored on the standard paper card, which is constructed of cardboard and is only printed on one side.

It's crucial to maintain a consistent organizational structure when saving annotated references so that you can quickly access them while writing research papers, essays, or reports and dissertations. To avoid data loss, you should also think about routinely backing up your reference storage system.

II-2 Digital Sources References

Digital reference more commonly called a virtual reference, is a service by is conducted online, and the reference transaction is a computer-mediated communication. Digital libraries are a vital tool among scientific instruments and one of the main mysteries of the information revolution. Reference works include textbooks, atlases, bibliographies, biographical

It's crucial to adhere to a certain citation style when using digital sources in academic or research papers, depending on the specifications of your

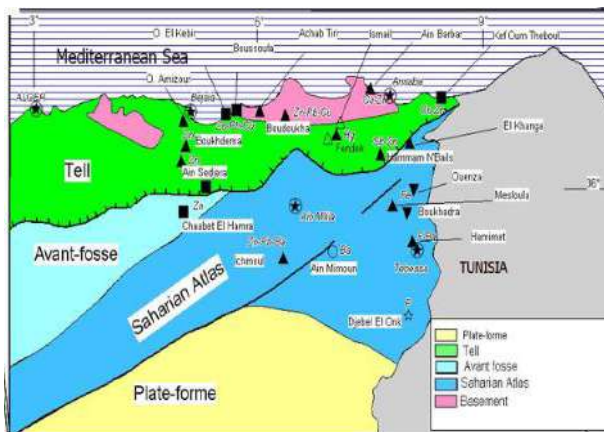
institution or publication. Depending on the type of source (such as a website, online article, or social media post) and the particular citation style you are using, the method for citing digital sources may change. Here are a few typical digital source categories and how to cite them:

- Website.
- Online Article.
- Online Forum or Discussion Board.

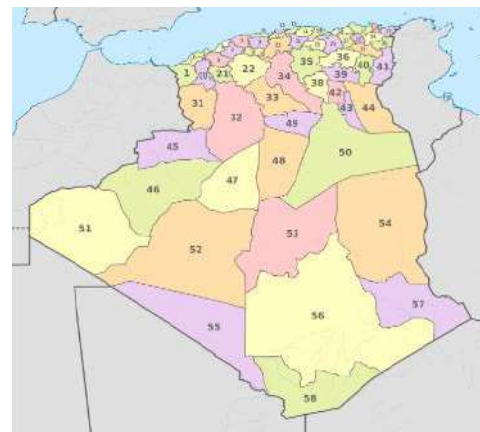
Always review the precise instructions for the citation style you're using, as different formats may have different formatting and punctuation requirements. Make sure the URL or DOI is correct and usable as well.

II-3 Secondary cartographic data collection:

The study region should be covered by all topographic and topical maps (geological, soil, population distribution, etc., at different scales), whether they are printed or digital. you must do it.



Geological map of eastern Algeria



Algeria administrative division map

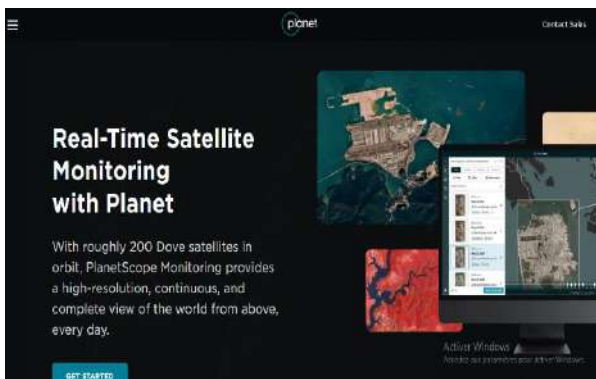
Figure. 12 vector and raster data Maps.

Paper copies will be used to mark pre-selected sites for various geographic claims during site visits. The digital version, notably under Mapinfo and Arcgis for example, can extract or update new maps using various computer

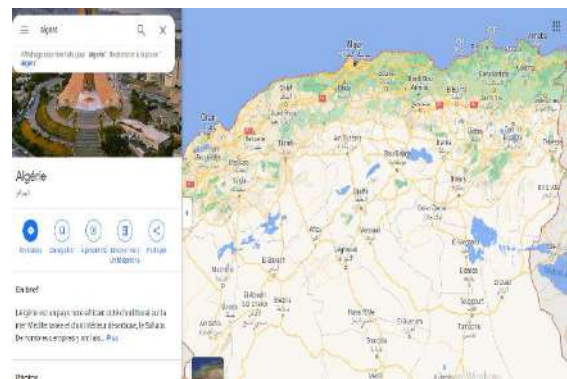
applications. Maps and satellite photos are common forms of geographic data. Maps offer more than just geographic details about a region, such as elevation, land type, annual rainfall, and soil type. Vector data and raster data are the two different types of GIS data. Each type of data has a unique format. Thematic information and spatial information are the two distinct parts of geographic information.

II-4 Existing Spatial Data Sources:

Several governmental entities and other organizations frequently provide spatial data in a variety of forms that the general public may easily consume by building Mapping mashups.



planet.com



Google Street.



Earth explorer



Google Earth.

Figure. 13 Examples of existing spatial data sources.

A mashup is a web page that takes data from two different sources or sets and combines them. There are only two mashup examples that pull data from Vancouver Open Data and overlay it on Google Maps.

II-3 Primary Data Collection (Fieldwork Skills and Methodology)**3-1 Definition of Primary Data:**

This is any factual or statistical information that you, the researcher, produce for the project's objectives. These are purported accounts of incidents and phenomena from eyewitnesses. These details are taken directly from the individuals themselves. Primary data are any information or data aggregated in this manner. (In line with Gupte (1979). Fieldwork enables researchers to learn more about the natural and human phenomena they are studying, to comprehend the issues at hand, to create reliable and controlled working procedures, and to establish their research's credibility. The following concepts, which serve as the foundation for geographic field research, can be summed up:

- A license to undertake duties in the security service should be prepared in advance.*
- Create field trip plans to assess the range of study possibilities, including whether to map at various scales.*
- According to planning priorities and strategic sites, choose sample locations. In this manner, you will have adequate time and a clear and firm notion of the topic you wish to explore.*
- Selecting the method of transportation since every task takes planning and consideration before execution to be completed with the least amount of time and money.*
- Think about getting the right people ready to assist with fieldwork.*
- Prepare any specialized tools. Field shoes, a rucksack filled with essentials, a camera, a cell phone, and an extra battery are the most crucial items.*

3-2 Observation method:

Because it is a part of science and is one of the components required for the expansion and development of science as a whole, observation serves as the primary source for learning about a variety of scientific topics. Today, observation is a common study strategy for social scientists, natural scientists, engineers, computer scientists, and many other disciplines.

It also provides a method for precisely and deliberately obtaining knowledge, accumulating experience, and comprehending scientific phenomena. Scientific observations must contain the following elements:

- Before making observations, researchers should gather background knowledge about the phenomena they are studying.*

For him to be able to logically translate what he is looking at, researchers must be conscious and reasonable in everything they do.

- It is crucial that researchers have prior experience in the field and that they select precise strategies for capturing the events they are witnessing.*

- The researcher should formulate questions and hypotheses regarding the scientific problem before beginning the observation process.*

- Researchers must possess the necessary skills to carry out analytical tasks and measure data and information. Whether it be qualitative or quantitative.*

- Goals should be made from the observation process by researchers. This aids in increasing focus.*

Note

Even if several people experience the same phenomenon, their ultimate interpretations will vary.

3-2-1 Various observation techniques:

Observational techniques collect relevant data during project development and use it for further analysis. When it comes to observational research, you have three different types of observation: Organized observation, Spontaneous observation, and Common observation. Here are the meanings of each sighting type, their differences, and the pros and cons of each sighting type.

A -Spontaneous observation (naturalistic observations) This is a type of observation that does not require prior goals or planning. This method involves physically visiting a location or site to gather information

At the beginning of scientific observation, experts consider spontaneous or simple observation. As shown in photo .01.



Photo 1. The phenomenon of erosion in its forms in steppe zones (Djelfa).

Through simple and spontaneous observations, geomorphologists discover phenomena of all kinds of erosion and host rock collapse in natural environments subjected to a variety of difficult natural conditions.

B -Organized observation (controlled observations) This was a planned observation that was preceded by the planning, identification, and purpose of several other observations connected to the geographic phenomena. The term

"experimental observation" refers to observation that is carried out by precise guidelines offered by experts in the subject and may be connected to lab experiments. As shown in the following image by extracting samples from each stratum that makes up the piece, as seen in photo 02, researchers can learn more about the wall's erosion and collapse process. The researcher in geography should control and manage the following through this observation or organization: We observe the following, for instance:



Photo 2. A valley stream in a steppe region. (Djelfa)

- *The section's overall thickness. Types of plants that grow on the ground.*
- *Establish the connection between surface morphology and plants.*
- *Determine the thickness of each layer as well as the number of layers that make up the section.*
- *Ascertain the color and makeup of the particles in each layer.*
- *Measurements of surface water movement.*
- *Constructing an inspection area cross-sectional view.*

C -Common observation (participant observations) In participatory observation, researchers are called participatory observers, meaning they participate in group activities while observing group behavior and interactions.

D - Individual observation (Non-Participant Observation): Geographers have the option of remaining objective observers and refraining from taking part in the environment they are researching. When a researcher wishes to have the least possible impact on the events being examined, they frequently choose this method because it is more objective.

3-2-2 Observation evaluation:

An important element in the research process in geography is the evaluation of observations since it ensures the accuracy, reliability, and validity of the information gathered through the observation method. Here are some important factors to take into account while assessing geographic observations:

Objectivity and Bias: Evaluate the observations' level of objectivity. When collecting data, researchers should make an effort to eliminate subjectivity and personal bias. Make sure that the observer's experience and viewpoint do not unreasonably affect the data collection procedure.

***Consistency:** Assess the observations' consistency. The observation process was it conducted consistently using the same standards and procedures? The results of random or inconsistent observations may not be accurate.*

***Accuracy:** Confirm the observations' accuracy. Compare the observed data to established norms, known facts, or information from other sources. Find any inconsistencies or mistakes in the data.*

***Validity:** Take the accuracy of the observations into account. Are the phenomena or elements of the environment being investigated accurately*

represented by the observations? Check to see if the instruments and methods of observation you selected were suitable for your research's goals.

Errors in Data Gathering: *Locate and correct any possible sources of data gathering errors. Misreadings, misinterpretations, and device faults can all lead to errors. Reduce and record these flaws to learn how they might affect the data.*

Data archiving: *Make sure the observational data is correctly stored and saved for future use and prospective study replication.*

Researchers can increase the reliability of their conclusions and enrich the body of knowledge on the topic by carefully analyzing observations in geography. Additionally, for others to evaluate the authenticity and dependability of the data, a thorough presentation of the evaluation procedure in research publications is crucial.

3-2-2-1 Benefits (Advantages):

This observation helps researchers get more precise scientific information from secondary data. When researchers cannot use questionnaires or interviews in the context of scientific research, observation is the best solution, when researching the physical and human surroundings of the Earth. These advantages consist of:

Real-time Information: *Observations give us information about dynamic processes and events that are happening right now. Geographers can observe and record environmental changes as they take place, which is crucial for researching phenomena like weather, erosion, and land-use changes.*

Spatial Understanding: *Geographers can gain a spatial grasp of geographical features and processes by making observations. Researchers can better understand the size, form, topography, and spatial linkages of a place or site by physically visiting it.*

Hypothesis Generation: *By producing hypotheses or research questions, observation can act as the first step in the research process. Observational data can spark additional inquiry and analysis, resulting in a more targeted and focused study.*

Teaching and Learning: *In geography, observation is a useful teaching tool. By undertaking practical research, it enables students to improve their fieldwork methods, critical thinking skills, and observational skills.*

In conclusion, observation is essential to geography because it gives researchers access to direct, current, and contextualized data that improves spatial comprehension and advances our understanding of both the physical and human environments on Earth. Due to these advantages, observation is a crucial tool for geographic investigation and analysis.

3-2-2-2 Defaults (Disadvantages):

Even though observation is a useful study technique in geography, it also has significant drawbacks and restrictions. When planning their investigations, researchers should be mindful of these limitations.

Researchers must be their censors and accurately and properly communicate the knowledge of their observations because the information they gather through observation is inherently subjective.

Compared to other scientific research methods, observations require more time. Observations in scientific research, particularly those connected to scientific investigations, need higher financial expenditures than other scientific research instruments, for instance, surveys, tests, and prediction approaches.

When participants believe that researchers are watching them and collecting data, they may intentionally alter their behavior.

3-3 Questionnaire and Interviews:

Sometimes it is very difficult for a researcher to gain all of the necessary information through observations. Two widely used research techniques in geography are questionnaires and interviews, particularly in the social sciences and human geography. These techniques enable data collection directly from individuals or groups and can offer insightful information on a range of spatial phenomena. Many geographic studies use a combination of both methods to triangulate data and provide a more thorough understanding of the research topic. Both questionnaires and interviews have their strengths and weaknesses, and the choice between them depends on the research objectives, the nature of the data needed, and available resources.

3-3-1 What is the difference between a questionnaire and an interview?

Interviews are subjective, but questionnaires are objective. In an interview, the interviewer will pose open-ended queries to the subject. Closed questions, on the other hand, are asked through surveys. Respondents to surveys receive factual information.

3-3-2 Interview:

a conversation or interview with one or more people that includes questions
It's a fantastic approach to learn more about folks. The following details are provided in this section: How to conduct a successful interview, including selecting the appropriate candidate, interview technique, interview recording, interview location, and interview transcript. The tips mentioned above can assist you in managing interviews more effectively.

- Set the tone for the interview by engaging the candidate in a casual and engaging chat.

- *Be approachable, reassuring, and supportive, and urge the other person to respond to inquiries.*
- *Begin by asking straightforward, neutral questions before introducing more upsetting or emotionally charged inquiries.*
- *Stay focused on the question and give the sample or respondent a chance to completely express themselves while maintaining the focus of the conversation.*
- *Refrain from expressing surprise or wonder at certain responses, as well as refrain from condemning or feeling embarrassed.*
- *Use short, carefully chosen language to explain problems instead of using complete sentences, which could confuse the questioner.*
- *Researchers are willing to take notes and can utilize models to compose answers.*
- *No audio recording devices may be utilized without the investigator's permission, however*

3-3-3 Questionnaire:

Questionnaires are a series of regular, logically ordered sequences designed to collect the data necessary for researchers to study a particular geographic phenomenon and to test the validity and accuracy or fallacy of hypotheses. These questionnaires have a variety of structures, from full-fledged to rating-based, from checkboxes to free-text responses. It is generally believed that research is quick and easy to conduct, regardless of its structure. This is not always the case. To get valuable answers practically, it is important to clarify what the survey is about and how the answers can help further develop and implement learning innovations. Think about examining the results. Above are some guidelines that can help you better manage your interviews.

3-4 Questionnaire from picture:

Direct questions are replaced with descriptive images and graphics. A good technique to learn more about a certain geographic area, phenomenon, or landscape is to create a quiz based on a picture. This type of survey is intended for children with special needs. Making a geography questionnaire from a photograph can be a fun and useful method to get respondents interested in learning about geographic characteristics and phenomena. It enables you to obtain important information and insights about the area or topic of interest. To construct a geography questionnaire from a photo, follow these steps:

Choose the Image: Pick a photograph or image that depicts the geographical phenomenon or feature you want to investigate. Make sure the image contains sufficient information and context to enable responders to respond to your questions correctly.

Create a list of questions: that are related to the picture's recognizable qualities. Depending on the kind of data you wish to gather, these questions might be either open-ended or closed-ended.

Conduct a pilot test: with a small sample of people before distributing the questionnaire to a wider group to make sure the questions are precise, pertinent, and prompt thoughtful responses. Based on the comments, make any adjustments that are required.

4- Advantages and Disadvantages of Questionnaire:

When it comes to the benefits of surveys in research, the benefits are far-reaching.

- Cost savings:*
- Reach people. quickly.*

- Scalability.
- Respondent anonymity.
- Flexibility in when and where respondents can complete the survey.
- Accuracy of data.

A major drawback of limited information depth is that you may not get detailed and nuanced insights from your participants. Surveys are typically based on structured and predefined response options, which may limit the ability of participants to provide detailed responses.

<i>Advantages</i>	<i>Disadvantages</i>
<i>It is economical</i>	<i>Validity and reliability are low</i>
<i>It has greater potential</i>	<i>Poor and late responses</i>
<i>It has greater coverage up to the international level</i>	<i>Not helpful in finding information about the complex emotional person</i>
<i>It is easy to plan and execute</i>	<i>It allows respondents to change their previous answer if it contradicts the after-answer</i>
<i>Respondents can select their language and version</i>	<i>It cannot be used for illiterate and small children</i>

Table 1 Comparison Table for Advantages and Disadvantages of Questionnaire.

5- Characteristics of Questionnaire:

When creating a survey, you should be mindful of its format and ensure that certain requirements are met to enhance and make it more appealing. These terms are outlined as follows:

- *The paper and printing quality of the survey.*

- *Only look for information that cannot be found elsewhere.*
- *Keep it as concise as you can and only include the most crucial information.*
- *Don't lengthen the instrument excessively. the majority of people believe it to be a waste of time.*
- *Reduce the amount of writing needed so that the answers to the questionnaire will be very simple and clear.*

6- Construction of a Questionnaire:

(Henderson and al. 1978) suggested that the process of creating and using questionnaires could be divided into several steps, which are as follows:

- *Identify the purpose of the program and the specific information to capture.*
- *select an answer format.*
- *Identify the respondent's frame of reference.*
- *Identify the respondent's attitude toward the program and the questions facing the respondent.*

7- Questionnaire Type:

Based on two fundamental types of question formats, there are two main sorts of questionnaires. Both closed and open questions are presented here. Depending on the study aims, the characteristics of the geographic phenomena under investigation, and the target audience, many types of questionnaires can be employed in geography. Let's now examine the three primary categories of surveys.

7-1 The Closed Questionnaire:

This is sometimes called a restricted or closed form type. All survey tools that require short ticked answers fall into this category.

<p><u>Question 11</u></p> <p>Yes or No Type:</p> <p>- Geography is a difficult subject. Yes, No</p> <p>Types of short answers</p> <p>: Science deals with things</p> <p>Past events are.....</p> <p>Marking from a list of suggested response.</p> <p>The student is enrolled in the teacher's High school with average grades.</p> <p><input type="checkbox"/> - 10/20</p> <p><input type="checkbox"/> - 12/20</p> <p><input type="checkbox"/> - 14 or more</p> <p>Ranking: Rank the options in order of importance. What made you want to study geography?</p> <p>- advice from a friend</p> <p>- program reputation</p> <p>- Job Availability</p> <p>- Other (please specify)</p> <p><i>Figure.14 The Closed Questionnaire example</i></p>
--

For example, you may be asked to tick "yes" or "no" from a list of suggested answers. Let's look at some concrete examples.

7-2 The Open Questionnaire:

Open-ended surveys are also known as open-ended surveys. Subjects are asked to answer in their own words. See this question again. What made you want

to study geography? You can see that no instructions are given here. The advantage is that the open shape allows for deeper reactions. Respondents may disclose their frame of reference and, where applicable, the reasons for their response. This has the following drawbacks: Respondents put in a lot of effort to fill out the survey, resulting in very low returns. Again, research report elements can be difficult to interpret, tabulate, and summarize. Questions can usually be asked in the form of

Question 12

Please state the reason for.....?

what do you think about.....?

What do you think about?

what do you think about.....?

Figure.15 The Opened Questionnaire example

7-2 Mixed-Method Questionnaires:

By mixing various question kinds and data-gathering techniques, some geographic studies can benefit. To provide a thorough understanding of a geographic phenomenon, mixed-method questionnaires combine closed-ended and open-ended questions. When researching intricate environmental issues, urban planning initiatives, or community development programs, these surveys are frequently employed.

8- Important distinctions between a survey and a questionnaire:

Although they are not the same, surveys and questionnaires are closely related research techniques that are frequently employed in many disciplines, including geography. The following are some key differences between a survey and a questionnaire:

-Survey

Process of collecting and analyzing data

Time-consuming process

Is Conducted

- *Answers are subjective or objective*

Uses both open-ended and close-ended questions

- *Conducted research or studies*

-Questionnaire

Instrument of data collection

Fairly quick process

Is delivered

- *Answers are objective*

Close-ended questions only

Used to collect information on a topic

In summary, the key distinction is that a questionnaire is a particular tool within the survey method whereas a survey is a comprehensive research method that encompasses a variety of data collection strategies. A sort of survey instrument known as a questionnaire is used to gather data through written or electronic sets of questions. Surveys may entail direct interactions between researchers and respondents as well as a wider range of data collection techniques, such as online forms, interviews, and questionnaires.

9- Methods of filling out the questionnaire:

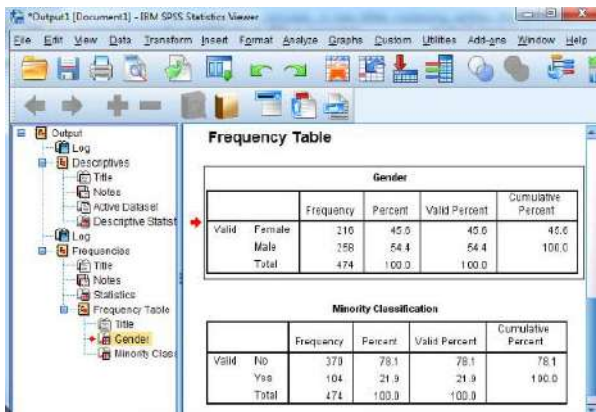
This will depend on the topic matter, the categories, and the tools the researcher has access to (personally, via Google Forms, Excel Files, or specialized software, by email or website, etc.).

10- Unpack and empty the questionnaire:

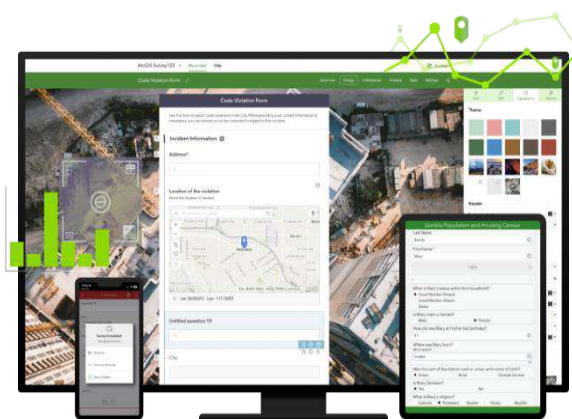
The compilation of the questionnaire necessitates the use of various information processing tools, including SPSS and ArcGIS, to modify, analyze, and interpret the results. Short texts that respondents provide to support an idea or express an opinion are the types of data that need to be manually transcribed.

- *ArcGIS survey:* ArcGIS is a potent survey maker that enables you to create and share surveys among a large audience. It is available in two flavors: While Survey123 Connect allows you to construct surveys using an XLS Form, Survey123 Web allows you to generate surveys rapidly using a drag-and-drop interface.

- *SPSS survey:* Professionals use SPSS because it offers an effective and orderly solution to handle big and complicated data sets and carry out advanced statistical analysis. SPSS is an effective survey builder and may be used for a variety of monitoring and evaluation tasks, such as data management, analysis, and visualization.



SPSS Questionnaire/Survey Data Entry



Building a survey with Web (Arcgis)

Figure.16 ArcGIS and SPSS dynamic survey generator.

II-4 Statistical and Maps Data:

Data from maps and statistics are essential for research and analysis in geography. Although these data sources have various uses, they are frequently

combined to provide a thorough picture of geographic phenomena. Here is a summary of geography's statistical and map data.

II-4-1-Descriptive and Inferential Statistics Data:

Descriptive statistics and inferential statistics, which employ the characteristics of sample and population data to test hypotheses and make conclusions, respectively, are the two main branches of statistics.

Use tables, charts, or graphs to visually display the results, for instance. Using the information at hand, conclude.

II-4-1.1 Types of Descriptive Statistics:

Descriptive statistics are used in geography to summarize and describe data collected from geographic research and analysis. They provide a clear and concise overview of the main characteristics and trends in a dataset. Using descriptive statistics, you may describe your data in terms of its characteristics.

Descriptive statistics often fall into one of three categories:

*- **Frequency:** Distribution The quantity or frequency of data values within particular intervals or classifications is shown through frequency distributions. Geographical data distributions are frequently represented graphically using histograms and frequency polygons.*

*- **Central Tendency:** There are three ways to calculate central tendency:*

Mean

Median

Mode

The results capture the essence of data collection, a sum of all counts or occurrences. Mean refers to the average value that occurs most frequently, the

median designates the middle or center score of the data sample, and the mode signifies the most frequent number.

Mean refers to the average value that occurs most frequently, the median designates the middle or center score of the data sample, and the mode signifies the most frequent number.

*- **Variability:** Variance expresses how widely skewed the mean particular data points are. It offers an understanding of data variability. Analyzing the variation in rainfall levels throughout several months or years is one aspect of geography.*

These descriptive statistics are crucial resources for condensing, representing, and understanding geographic data. They aid scientists and geographers in understanding the traits, trends, and variability of spatial phenomena, which in turn helps decision-makers in a variety of sectors, including regional development, environmental science, and urban planning, make better decisions.

II-4-1.2 Types of Inferential Statistics:

Inferential statistics involve making inferences, predictions, or concluding a population or geographic phenomenon based on a sample of data. These statistical methods aid in the relationship analysis, hypothesis testing, and generalization of regional trends and patterns. Geographers can use these inferential statistical approaches to spot trends, make educated decisions, and create predictive models for a variety of geographic phenomena.

Regression Analysis: Analysis of Regression Models such as ordinal, logistic, nominal, simple linear, and multilinear models are available. In inferential statistics, linear regression is the type of regression that is most frequently utilized.

The response of the dependent variable to changes in the independent variable expressed as units is examined using linear regression.

Hypothesis Testing: Hypothesis testing is the statistical process of concluding the probability distribution of a population using data from a sample. The following tools are included in the models for hypothesis testing:

Test	Sample Size	Distribution	Purpose
Z-test	≥ 30	Normal	Investigate population mean
T-test	< 30	t-distribution	Investigate population mean
F-test	Any	Any	Compare variances of two samples/populations

Tab.4 *The models for hypothesis testing.*

II-4-1.3 Descriptive vs Inferential Statistics: What's the Difference?

Descriptive and inferential statistics have different uses in data analysis in geography, as they do in other disciplines. The major distinctions between descriptive and inferential statistics in the context of geography are described as follows:

Descriptive Statistics	Inferential Statistics
<i>The branch of statistics known as descriptive statistics focuses on providing a description of the population under study.</i>	<i>One type of statistics known as inferential statistics focuses on deriving information about the population as a whole from observations and sample analysis.</i>
<i>It provides details about the raw data that characterize the data in some way.</i>	<i>Based on the information obtained from the population, conclusions about the population are drawn.</i>
<i>It helps you collect, organize, analyze and present data in meaningful ways.</i>	<i>You can compare data, test hypotheses, and make predictions.</i>
<i>It is limited to moderately sized samples or populations and describes known facts.</i>	<i>An attempt is made to draw conclusions about the population.</i>
<i>This can be done using graphs, tables, charts and other visual aids.</i>	<i>Probability helps us achieve this.</i>

Tab.5 *Descriptive vs Inferential Statistics.*

II.5 Mapping Geographic Data:

Remote sensing (RS), geoinformatics (GIS), Global Navigation Satellite System (GNSS), mapping, geographic visualization, and gathering spatial statistics are all examples of geospatial engineering used to understand complex situations and solve global mysteries. It is intended to be used for storing, altering, and analyzing data to make the greatest use of it.



Fig.17 Geospatial Technology Components

II.5-1 Geographic Information System (GIS):

A Geographic Information System (GIS) is a geospatial technology. GIS is a data collection technology used to build customized digital maps. This map has several layers that show the position of all living (people, water sources, trees) and inanimate (buildings, roads, cars) objects.

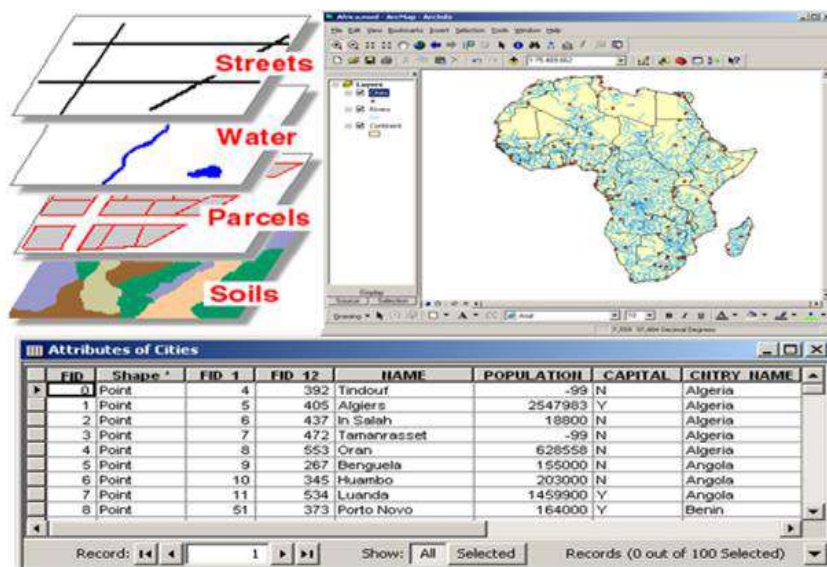


Figure.18 Examples of geographic information systems.

Geographic information system (GIS) data is a type of spatial data. GIS in education assists students in formulating, visualizing, and solving various problems.

What is Geographic Information Science (GISc)? While geographic information systems answer the questions "what" and "where," geographic information science (GISscience) addresses the question "how" and its evolution. How will GIS evolve in the coming years? Geospatial science is most suited to answering this topic.

II.5-1-1 Geographic information system components:

The three main components of Geographic Information Systems are:

A. Data

GIS stores location data as theme layers. Each record has an attribute table that stores information about the feature. The two main types of GIS data are raster data and vector data.

-Raster: Grid data stores data in rows and columns, so it looks like a grid. They can be discreet.

e or continuous. For example, land cover, temperature, and imagery data are often represented as raster data.

-vector: A vector is a polygon with points, and lines. For example, hydrants, contour lines, and administrative boundaries are often vectors.

B. Hardware

The hardware runs GIS software. This can be a powerful server, mobile phone, or personal GIS workstation. The CPU is the mainstay, data processing is final, and GIS also requires two monitors, extra memory, and a powerful graphics card.

C. Software

ArcGIS, MapInfo, and QGIS are the leading providers of GIS software. GIS software specializes in spatial analysis through the use of mathematics in maps. We combine geography and modern technology to measure, quantify, and understand our world.

II.5-1-2 GIS Uses and Applications:

Geographic Information Systems (GIS) are adaptable technologies with several uses and applications in a variety of sectors and businesses. GIS technology collects, analyzes, visualizes, and interprets spatial data, making it useful for decision-making, planning, and problem-solving. Here are some significant GIS usage and applications:

- Education and Research.*
- Remote Sensing and Earth Observation.*
- Natural Resource Exploration.*
- Sociological and demographic research.*
- Major disaster management and mitigation.*

The uses and applications of GIS technology are countless, and these are just a few. GIS is still developing, merging with other technologies like GPS, remote sensing, and big data analytics to offer more complicated cartographic solutions for tackling difficult geographic problems in a range of sectors and professions.

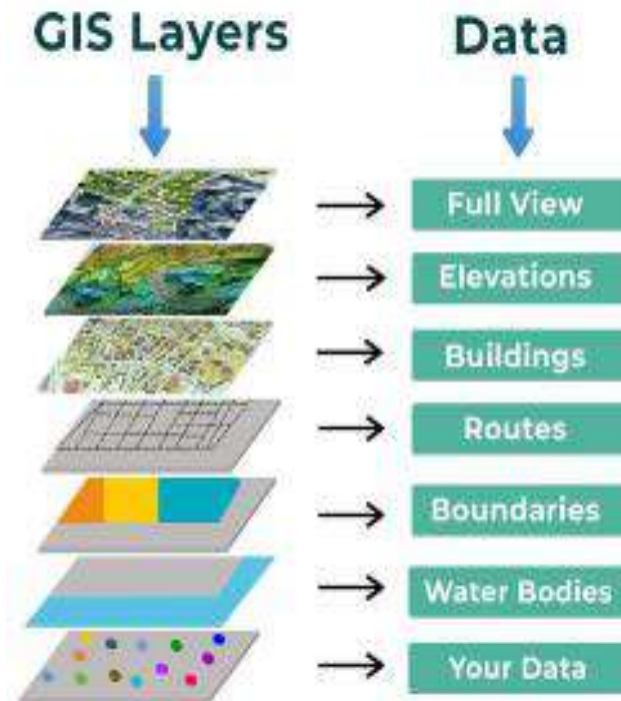


Fig.19 GIS Project examples.

II.5-1-3 Steps in designing a geodatabase:

To effectively store, manage, and analyze geographical data, designing a geodatabase in geography requires rigorous planning and organization. The four main steps of Geographic Information Systems (GIS) are:

- Create geodata.
- Managed by database.
- Analyze and find patterns.
- View on map.

II.5-1-4 Cartography:

Map design, production, and interpretation are all aspects of cartography. Cards with the right design can be effective geography tools. Knowledge of graphic design, computer science, mathematics, statistics, and, of course,

geographic information systems may be necessary for cartographic work. A map's objective is to express a specific message by reducing the complexity of the real world. The viewer should be able to quickly and easily understand maps. The principles of cartography serve as a roadmap for cartographers. (2012), (Slocum, McMaster, Kessler, Howard, 2009), and Joshua Stevens et al.

II.5-1-5 The Cartographic Process:

The process of map abstraction includes at least five major (interdependent) steps: (a) selection, (b) classification, (c) simplification, (d) exaggeration, and (e) symbolization (ref: Muehrcke and Muehrcke, 1992).

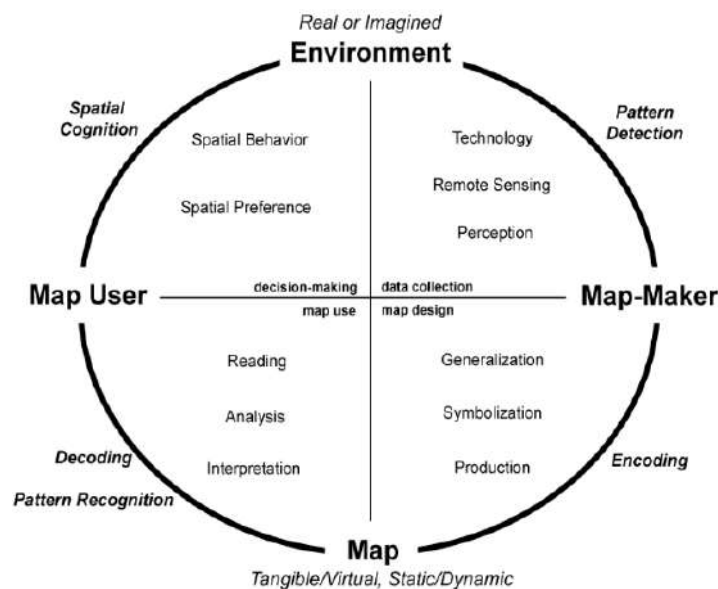


Figure.20 The Cartographic Process.

II.5-2 Global Navigation Satellite System (GNSS):

The GNSS system (Global Navigation Satellite System) makes it possible to indicate a position in three dimensions thanks to a constellation of satellites. Used in multiple applications (terrestrial, marine, and air), GNSS receivers struggle to provide real-time position solutions that meet the desired standards of accuracy, integrity, and availability, especially in civil aviation. For this reason, augmentation systems have been developed to improve the performance of satellite positioning. Information is collected at each reference/ground station,

transmitted to a central location, and broadcast throughout the region using geostationary satellites (SBAS). SBAS systems are essential for applications where accuracy and completeness are critical and serve as a complement to the original GNSS signal.



Figure 21 Triangulation principle for positioning the receiver on the ground

II.5-3 Remote Sensing (RS):

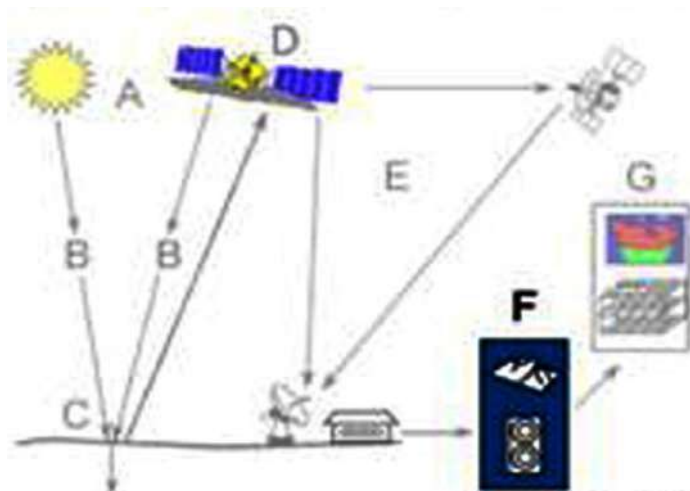
Remote sensing is a set of scientific means that utilizes the properties of electromagnetic waves reflected and transmitted from terrestrial components and uses sensing or imaging devices to obtain information about terrestrial objects and phenomena without physical contact. It is divided into two parts:

- Passive detection relies on a source of solar radiation that is sent to the earth's surface and absorbed by various objects, while electromagnetic radiation is reflected and received by objects and recorded as data.*
- Active Sensing There is an artificial source that produces electromagnetic waves that are reflected off the surface of the earth and received as digital data by sensors aboard satellites.*

II.5-3-1 The Elements of Remote Sensing:

Using sensors aboard satellites, aircraft, drones, or ground-based instrumentation, remote sensing is a technology that gathers data about the Earth's surface and atmosphere from a distance. It entails the identification and evaluation of electromagnetic radiation (light) reflected or emitted from surfaces of the Earth as well as objects above them. Elements of the remote sensing process extract meaningful information from Figure 22.

1. Energy Source (A)
2. Radiation & Atmosphere (B)
3. Interaction with Targets (C)
4. Recording of Energy by Sensor (D)
5. Transmission & Reception (E)
6. Interpretation and Analysis (F)
7. Application (G)

**II.5-3-2 Types of Satellite Images:**

Satellites in orbit around the Earth take pictures that are used for a variety of things, such as Earth observation, weather forecasting, environmental

monitoring, and other things. Depending on the resolution, spectral bands, and intended use of the images, different categories can be assigned to them. Here are a few typical satellite image types:

ASTER Satellite Sensor (15m):

Aster satellite sensor is one of the five state-of-the-art instrument sensor systems on board the Terra satellite that was launched on December 18, 1999, at Vandenberg Air Force Base, California, USA. Aster is a 15-meter, 14-band multispectral resolution instrument. It can be used for land cover and change detection, calibration, validation, and land surface studies.



Figure. 23 ASTER Satellite Image Algerian

- Sentinel-2A Satellite Sensor (10m) :

Sentinel-2A satellite sensor was successfully launched on June 23, 2015, from a Vega launcher from the spaceport in Kourou, French Guiana. Sentinel-2A satellite is the first optical Earth observation satellite in the European Copernicus program and was developed and built under the industrial leadership of Airbus Defence and Space for the European Space Agency (ESA).



Figure. 24 Sentinel-2A Satellite Image Algerian Sahara *Figure. 25 Sentinel-2A Satellite Image central Algerian*
 - **ALSAT-2A:**

Alsatsat-2A, the second Earth observation satellite On July 12, 2010, the Algerian Earth observation satellite Alsatsat-2A was successfully launched in Chennai (South-East India).

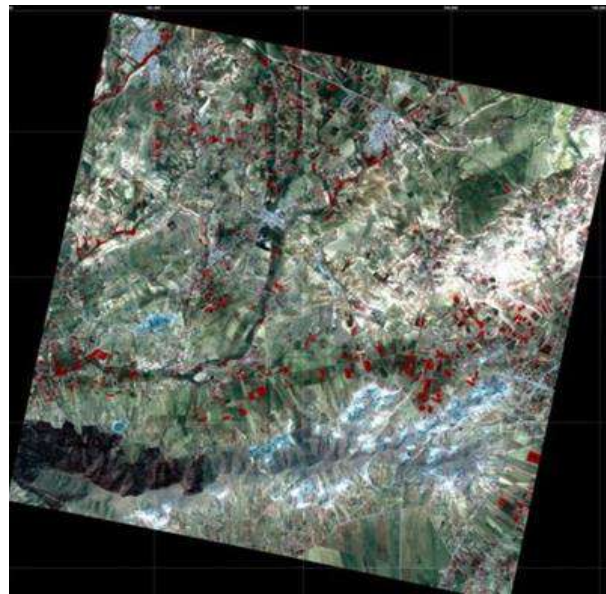


Figure. 26 Alsatsat-2A Satellite Image Algerian SETIF

Since then, Alsatsat-2A has supplied more than 40,000 products until the end of 2016, details of which are presented in the table below.

It is a high resolution of 2.5 m in panchromatic mode, and 10 m in multispectral mode covered by the following 04 spectral bands: blue, green, red, and near-infrared.

- SPOT-6 Satellite Sensor (1.5m):

SPOT-6 satellite sensor built by AIRBUS Defence & Space was successfully launched on September 9, 2012, by a PSLV launcher from the Satish Dhawan Space Center in India. Watch the video of SPOT-6 the satellite launch.



Figure. 27 SPOT6 Satellite Image-Algiers, Algeria,2012



Figure. 28 SPOT 6 Satellite Image - Algiers, Algeria,2012.

- Aerial photography:

In geography, aerial photography is a useful method for obtaining high-resolution pictures of the Earth's surface from a distance. Photographs of the ground are taken from an airplane or other elevated platforms (drones) in this technique. Numerous geographic tasks, such as mapping, land use planning, environmental monitoring, disaster assessment, and urban development, can be accomplished with aerial photography.



Figure. 29 Aerial photography of the Bouira region.

Stereo pairs of two images of the same region obtained from slightly different angles are frequently used in aerial photography. Accurate mapping requires the use of this stereo imagery to build three-dimensional models of the terrain.

Aerial photography is still a useful tool for geography, and technological improvements like digital cameras and remote sensing capabilities have increased its usefulness in a variety of geographic applications.

II.5-3-3 The Importance of Remote Sensing in Geographical Studies:

Geographic studies benefit greatly from remote sensing photography because it gives a visual record of the spatial properties of the area covered by the imagery at the moment the data was captured.

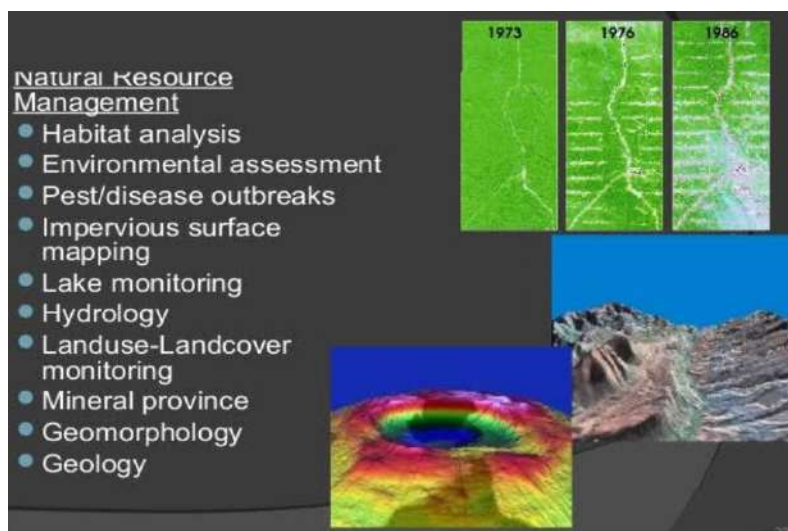


Figure.30 Application of Remote Sensing.

The ability to examine phenomena for observation, document their evolution and change, and produce precise maps has increased the use of remote sensing imaging in geographic research. The diversification of the use of remote sensing as data and information sources for model construction and spatial hypothesis selection is largely influenced by so-called quantitative trends in geography.

II.5-3-4 Types of image spatial resolution classification:

Today satellite imagery can be generally classified into three “buckets” of spatial resolution:

Low resolution: over 30 m/pixel (e.g., NASA Terra & Aqua MODIS Satellites)

Medium resolution: 5-30 m/pixel (e.g., USGS/NASA Landsat 8 Satellite)

High resolution: 1-5 m/pixel (e.g., Planet Labs Rapid Eye Satellite)

Very high resolution: <1m/pixel (e.g., Maxar’s Worldview Satellites)

II.5-3-5 The types of display resolution:

Resolution is indicated by how many pixels a monitor displays, and it will be one of the following:

- *1280 x 1024 Super-eXtended Graphics Array (SXGA)*
- *1366 x 768 High Definition (HD)*
- *1600 x 900 High Definition Plus (HD+)*
- *1920 x 1080 Full High Definition (FHD)*
- *1920 x 1200 Wide Ultra Extended Graphics Array (WUXGA)*



Figure.31 variations in an image's pixel resolution.

II.5-3-6 Image Classification Techniques in Remote Sensing:

The classification of pixels or regions within remote sensing data into preset classes or categories is done using image classification techniques. Urban planning, vegetation mapping, land cover classification, and environmental monitoring are all tasks that need the use of these tools. In remote sensing, picture classification is accomplished using a variety of techniques:

- The three main types of image classification techniques in remote sensing are:
- Unsupervised image classification
- Supervised image classification
- Semi-supervised classification (Hebrides):

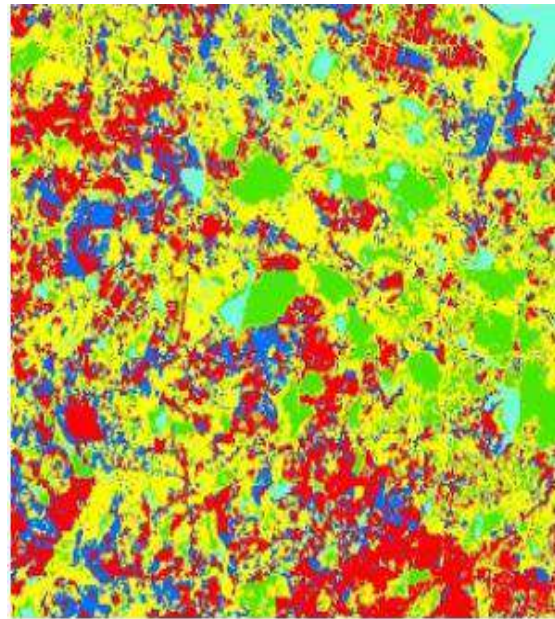
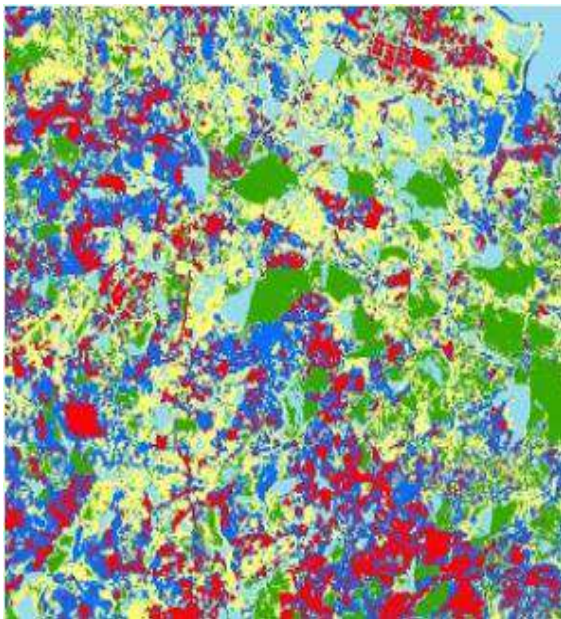


Figure. 32 Unsupervised image classification Figure.33 supervised image classification

Unsupervised and supervised image classification are the two most common approaches. However, object-based classification has gained more popularity because it's useful for high-resolution data. After choosing a clustering algorithm, decide how many groups to generate.

Semi-Supervised Classification: This methodology combines supervised and unsupervised methods of classification. It classifies the entire image using unsupervised methods and a small set of labeled training data.

The particular application, the accessibility of training data, the type of remote sensing data, and the desired level of accuracy all influence the classification technique that is selected. To get the best categorization results for their specific use case, remote sensing experts frequently test out various techniques and fine-tune parameters.

II.5-3-7 Advantages and disadvantages of remote sensing

Depending on the situation and application, remote sensing has several benefits and drawbacks. For remote sensing technology to be used effectively in diverse industries, it is essential to comprehend these benefits and drawbacks. The following are some of the main benefits and drawbacks of remote sensing:

- Advantages of Remote sensing:

A larger area can be sensed remotely in a very easy way and the whole data can be easily processed and analyzed fast by using the computer and that data is utilized for various purposes.

- Data Collection is very easy over a variety of scales and solutions

- Remote Sensing can allow repetitive coverage which generally comes manually when collecting data on dynamic themes like water and Agriculture field

- Remote Sensing can allow covering a very large area.

- Disadvantages of remote sensing:

-Remote sensing requires very specialized training, and analyzing images and repetitive aerial imagery requires a lot of specialized skills.

-Atmospheric interference: The quality of remote sensing data can be impacted by the Earth's atmosphere, which can scatter, absorb, or refract electromagnetic radiation.

- Privacy Issues: When utilized to observe or track human activity, remote sensing technologies might cause privacy issues.

In summary, researchers and practitioners must take into account its limits in terms of data quality, resolution, and processing issues.

III. ACTIVITIES:**Activity 1:**

self-evaluation exercises

I. Create a questionnaire with five open-ended questions.

II. Create a questionnaire with 5 closed-ended questions.

Activity: 2

What are the different categories of written sources?

several sources.

- Scientific journals and publications.*
- Well-liked information sources (newspapers and periodicals).*
- Expert/commercial sources.*
- Book or chapter.*
- The outcomes of a conference.*
- Official records.*
- Dissertations and Theses.*

Activity 3

What is the best technique for a researcher to locate and collect the majority of references, sources, and other papers pertaining to the topic or research area?

Activity 4:

- Generate a set of questions related to the characteristics identified in the following images?*



Figure.34 an illustration of an activity.

- What kinds of landscapes are visible in these images? Do erosion processes or geomorphological signs exist?





- How might these natural occurrences impact the environment or human activities?

Utilization of the land by humans:

Find examples of human activity in the picture.

What effects on the environment do these behaviors have?





Activity 5:

What is the difference between data and information with example?

In other words, data includes numbers, symbols, letters, words, codes, graphics, etc. Information, on the other hand, is data placed in context. Information is used by people in important ways (decisions, predictions, etc.).

Activity 6:

After attentively reading the text, complete the blanks. then give a brief summary, no longer than ten lines. Using the following words.

<i>space, and environment</i>	<i>satellite observation</i>	<i>Simulation</i>	<i>Physical</i>
<i>digital revolution</i>	<i>regional distinctions</i>	<i>Human</i>	
<i>research methodology</i>	<i>scientific approach</i>	<i>Disciplines</i>	
<i>historical configurations</i>	<i>Interdisciplinary</i>	<i>spatial data analysis</i>	

Geophysics, geochemistry, environmental geography, and applied geography (quantitative) are some of the branches of geography that make it unique. **Physical** science (including geomorphology, climatology, oceanography, and biodiversity), **human** geography (including demography, cultural geography, economic and commercial geography, transport geography, regional planning, political geography, industrial geography, and tourism geography), and **interdisciplinary** (including geo-physics, geochemistry, and environmental geography) are some other branches that are included. Each specialized discipline of geography uses a **scientific approach** to identify current problems and identify pertinent answers that are essential for getting the desired outcomes.

Geographical studies are unique from all other **disciplines** since they place a strong emphasis on spatial elements at a certain time or across time. It deals with geographic and regional characteristics and the spatial relationships between them that shape the surface of the world. Geography examines the relationships between locations over time as well as their physical, sociocultural, economic, and political environments. Through the study of place, **space, and environment**, it aims to investigate the link between the earth and its inhabitants by posing the questions where, what, why, and how. By evaluating the spatial shape and patterns of distribution and interactions, geographical inquiries also look at **regional distinctions**, patterns, and relationships to better comprehend both the physical and human worlds.

Modern **simulation** models now assist in predicting potential future spatial changes related to any component being studied, thanks to the **digital revolution** and the use of GIS. In order to adopt suitable policies and planning measures and ensure the smooth operation of the environment and society, this geographic research study is helpful. Over the past century, **research methodology** in geography has seen significant modifications as more geographical concerns have expanded to include both the present-day physical and human environment

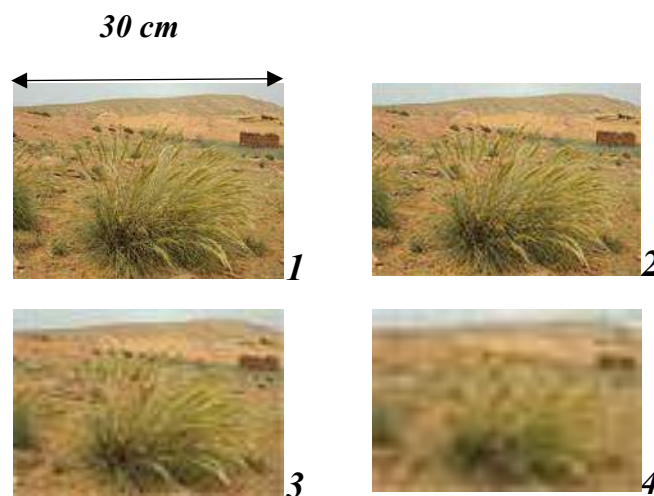
as well as their **historical configurations**, for which the methodologies used have become increasingly more quantitative.

With the advent of **satellite observation** data since the 1970s, the physical branches of geographic study have made enormous advancements. In an effort to understand the historical and current consequences of human societies with their landscapes, parallel breakthroughs in human geography have been made with the use of **spatial data analysis** through quantitative methods and scientific methodology.

Activity 7:

As the number of pixels per unit of length of the structure to be numerically represented rises, the amount of information utilized to describe the structure becomes more significant and the resolution increases. provide a brief explanation and an example of each of the four forms of image resolution.

An image is defined and described by the number of pixels that make up it, not by the number of millimeters. A digital image's height (vertical axis) and width (horizontal axis) are calculated using this measurement; 250 x 200 pixels, for instance, are shortened to 150 100 in the first image, 75 50 in the third, and 50 25 in the fourth.



Examples of image resolutions

UNIT CONCLUSION

Data collection is a very important step in geographic research. It is estimated that data collection typically accounts for 50-70% of the time spent on a given project. Therefore, care must be taken to ensure that geographic data collection is performed as efficiently as possible. This chapter has described the many formats and data sources available. This chapter has also covered various most commonly used geographic tools.

UNIT III

*Principles for Conducting and
Discussing Scientific Research
Projects in Geography*

Unit outcomes

By the end of this chapter, you will be able to;

- *explain what reference is all about*
- *mention the types of information that require references*
- *Understand the meaning and structure of scientific reports*
- *Discuss different types of report*
- *Learn different steps in the preparation of scientific reports*
- *Understand bibliography*
- *Know referencing and footnotes.*

Key terms

- Time Management* -*Research Design* -*Technical Report*
- Preliminary pages* -*Background of the problem* -*discussion*
- Supplementary pages* -*Instrumentation* -*hypotheses*

Brain-Storming

Once the investigation is complete, you will need to compile various reports.

- How to write a report or doctoral dissertation?*
- How long will it take to achieve this?*

Introduction:

In the previous two units, we talked about the importance of research, Next, basic concepts of geography. In this chapter, we examine the final stage of research is to share the results of research activities with the world as part of conducting research. The content of the research report includes a description of the research question investigated, the reasons for investigating the problem, the research methods and methods used, and the results and conclusions of the analysis.

I- Basic principles for the preparation of geographic research:

Scientific research in all literary or scientific fields must be based on a foundational step from which researchers can complete later stages of research.

The preparation of geographic research requires several fundamental ideas. The dependability, correctness, and quality of the study findings are supported by these concepts. Here are some essential guidelines:

I-1 Time Management:

To guarantee that research projects are finished effectively, fulfill deadlines, and deliver high-quality results, time management is essential in geographic research. Researchers who manage their time well can balance many parts of their work, from writing and distribution to data gathering and analysis. Effective time management improves the output of research while also improving the caliber of the research results. It is easier for researchers to handle challenging work and meet project deadlines when they have good time management skills. Below is some advice:

- Study the technical methods that save time.*
- Make a schedule for each study session.*
- Periodically review your progress against your research schedule.*
- Reduce interruptions while conducting research.*

I-2 Define Clear Objectives:

Establishing specific objectives is crucial for directing research efforts and giving the study a purpose in geography, as in any other field of study or research. Making decisions concerning data collecting and analysis and communicating the

anticipated results of the research are all made easier by having clear objectives. Consider the following when defining precise geographic objectives:

- The goals should be clear and definite.*
- When possible, objectives should be measurable or quantifiable.*
- If you have many objectives, arrange them hierarchically.*
- Make sure your goals are in line with the theories or inquiries you've developed for your research. Each aim should address or test these theories or questions in some way.*

I-3 Research Design:

Design your research methodology, including the data collection methods, sample selection, and any experiments or surveys you have carried out. Ensure that your research design is appropriate for your objectives.

Before you start writing your document, having in mind what information you want to include and in what order will help you plan it out. This is called the document or text structure. Developing this structure or framework will save you writing time. This will allow us to provide all the necessary information without unnecessary details. It can also help improve your writing flow.

Geographical scientific research begins with a precise, clear, and thorough formulation and definition of a problematic, and then determines the appropriate kind of information to gather to answer the question posed by the problem.

Therefore, researchers must acquire knowledge and application of various research methods, must not express personal opinions without being backed up by facts of scientific value, and must be open to discussion and discussion.

II- Various steps of preparation research paper:

A report is a formal publishing of conclusions on an issue that calls for particular data and is created by a qualified person or group. Reports are typically written and have to be efficiently produced for future use. Here are the actions:

II-1 Plan for writing a research report:

One of the most important steps in the research process is planning how to write a research report. You can better organize your thoughts, make sure all required details are included, and write more quickly with the aid of a well-structured outline. Writing a research report requires efficient communication. To effectively communicate your research findings and insights to your target audience, write in a clear, succinct, and organized manner.

II-2 Report submission:

Reports have a deadline by which they must be submitted. For instance, certain reports must be presented by certain dates, especially those for university research. It is typically necessary to submit your research report by adhering to the precise directions and regulations given by the organization to which you are submitting it.

III- Type of report:

To disseminate research findings, examine geographic phenomena, or provide information on certain themes, many sorts of reports are generated in geography. Depending on the goal and target audience of your research or investigation, you'll need to choose the right report format. The goals of your study, your intended audience, and the particular geographic area you are investigating will all influence the kind of report you produce. No matter the report type, geography reporting demands clear organization, correct data display, and efficient findings

sharing. There are many types of research reports. The types of research reports are as follows.

III-1. Technical Report:

This is a thorough report of our technical research. It is primarily designed for professionals, including academics, scientists, engineers, and medical personnel. Technical language is used in technical reports, it has a predetermined structure and is divided into several sections with pertinent headings and paragraphs.

III-2. Popular Reports:

Designed for business professionals and other non-technical users. This style of report is intended for commercial and social research because it is written for non-technical individuals, particularly executives of commercial enterprises.

III-3. Research Article:

This is intended for publication in a scholarly journal, specifically one devoted to geography. Academic journals provide a forum for the academic community and are the primary sources of information in their works.

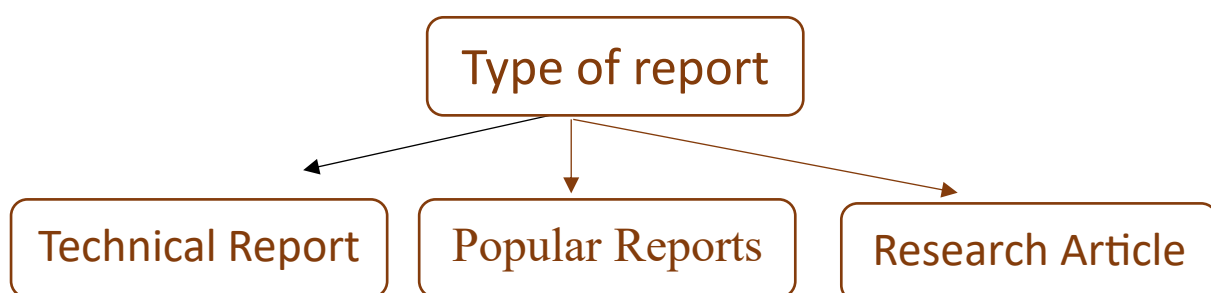


Figure 35 Type of report.

In summary, diverse writing styles call for diverse formatting. Reports are often analyses, appraisals, or justifications based on research. Typically, reports

are prepared in a formal tone. Grammar, spelling, and punctuation must be used correctly when writing academic papers.

IV- Structure of academic report:

The report should have a good structure or overview. The structure shows the different parts of the research report. Here are the different parts of the research report:

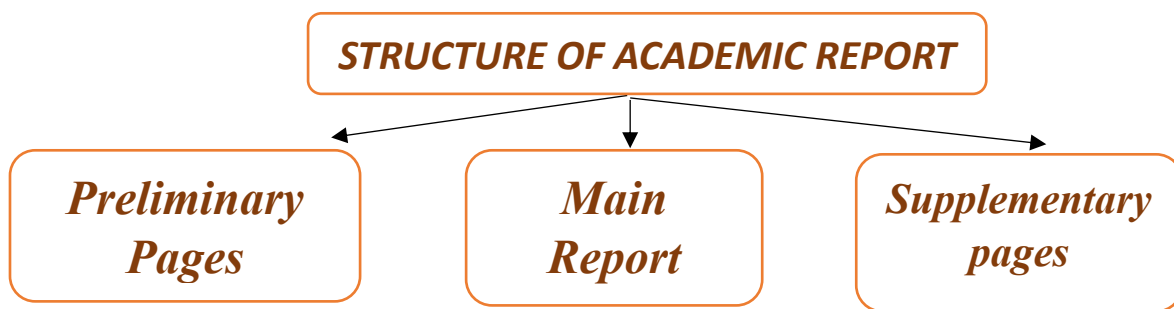


Figure 36 Structure of Academic Report.

1. The preliminary pages:

The opening pages of a research paper in geography, like other academic writing, usually contain several crucial components that give crucial details about the topic and its setting. A research report, thesis, or dissertation usually starts with these introductory pages.

These opening pages serve to introduce your research paper and give readers important details. As a result, you must adhere to the instructions given by your institution outlet when creating the first few pages of your research work.

1-Cover page:

The cover includes the title, student's name, and other details. All these details make it easier for teachers to identify which student submitted each assignment.

2-Dedication page:

Emotional language can be used to recognize individuals or groups of interest to the author or to research.

3-The Acknowledgment Page:

This page expresses our gratitude to everyone who contributed to the research process - conducting the research and writing the report.

4-Abstract:

This is a summary of the research process, describing the purpose of the study, the population, the sample and study method, the instruments used, and the results.

5-Preface(forwarding):

This contains a brief introduction to the research presented in the report. Introduce your topic in a way that is tailored to your target group and prepare your readers for an introduction.

6-Table of Contents:

This lists the chapters, headings, and subheadings of the report in tabular form along with the page numbers on which the various sections of the report are located. Content should be ordered and numbered from the front page to the supplemental pages.

7-The List of Tables:

This is similar to a table of contents. Indicates the page number where the table referenced in the report appears. Each table number and title should be listed in order. Similarly, figures and tables list all figures, their numbers, titles, and the pages on which they appear in the report or on which they appear. Again, the list of attachments must be consecutive in numerical order.

8-Summary Report:

This is the short form of the long investigative report. There is an introduction to all parts of the report.

9-Definition of Terms:

This section is intended to enlighten and inform the reader of the operational meaning of coined or jargon, phrases, or expressions that are otherwise incomprehensible due to unconventional usage. Don't use terms that conventional language gives proper meaning to. The essence of the definition is to ensure that the reader understands the specific meaning ascribed to the term in the study.

10-Keywords:

Keywords are words and phrases that are essential in the research field of geography. Write keywords so that you can easily access this project when searching the web.

2. Main Report:

The central argument of your research paper, thesis, dissertation, or other piece of writing on geography forms its core. It consists of your study's main body of information, such as your research methods, findings, analysis, and discussion. The precise sort of study and the instructions given by your institution's outlet can have an impact on the structure and substance of the primary report. The primary geography report ought to be planned, organized, and written in an easy-to-

understand manner. It should successfully convey to your target audience the methodology and findings of your research.

2.1. Background of the problem:

You need to present your arguments clearly and compellingly to your readers. Problem statement Sometimes this is expressed as a question or question that defines and limits the scope and direction of the researcher's interest in the research topic. Addresses the nature of the research topic or question that requires clarification.

2.2. Research Importance:

This indicates the usefulness of the research. It is hoped that the results of your research will benefit some individuals, institutions, etc. Mention should be made of these beneficiaries and the benefits expected of them.

2.3. Purpose of the study:

You should explain the specific aspects of the problem being investigated in your study and why you are focusing on those aspects. This section provides a brief overview of all items surveyed. In some cases, this section may be confused with research purposes.

2.4. Scope of research:

This indicates the scope intended to cover the topic, geographic area, period, and variables of interest to the researcher. In some cases, this section may be confused with the research overview.

2.5. Review of Literature:

This is research on the subject using literature already available, published, or conducted by other researchers, authors, journalists, etc.

2.6. Study Area:

Here you will find detailed information about the geographic area covered by the researcher's current research.

2.7. Research questions and/or hypotheses:

These are presented to guide and guide researchers, especially in areas such as literature research, data collection and analysis, and discussion.

2.8. Methodology and study design:

A systematic, step-by-step process for conducting research. This includes:

1- Types of data and its sources:

In this section, you must specify how the data was obtained. such as whether research aid was used, and whether permission was obtained before data collection. All details must be reported. It should also indicate whether any equipment used for recording failed during data collection and what steps were taken to correct them. If these details are clarified, it will be useful for training future researchers. These practical details and problems encountered are also used when reporting to conduct the research and make sure you are comfortable with the reality of the research. Therefore, you should report the steps you took to ensure valid data was collected.

2- Data Collection Methods:

Data can be collected in a variety of ways from primary and secondary sources. All methods used by researchers are described in detail.

3- Instrumentation:

This section should describe the means used to collect the data, such as questionnaires, attitude scales, tests, opinion sheets, etc., to demonstrate

their essential characteristics. Reliability metrics and verification procedures should also be provided. If you used standard equipment, you should report this and justify why you thought it was best. It must also prove that all requirements for management have been met.

4- Fieldwork:

Get a detailed report of your fieldwork including dates, days, times, and locations selected by the researcher.

2.9. Analysis and Interpretation:

Analysis is the statistical output of data collected by researchers. Interpretation is understanding the analysis that the researcher has developed based on personal knowledge, literature review, and observations during the investigation. If the type of analysis is not widely known, it should be specified in detail. Note that it is better to use known techniques that are as simple as possible.

2.10. Presentation of results:

Usually, in this section of the report, we should clearly and concisely set out the results using the most illuminative modes of presentation. You can exploit fully the use of tables and figures. All tables and figures should be serially numbered. They must have titles or headings. You should highlight the findings of interest displayed in these using brief verbal descriptions. These should be directly related to the hypotheses and/or research questions. It is always better to organize the data presentation and analysis around the hypotheses and research questions. You have to treat each hypothesis or research question. You have to treat each hypothesis or research question in turn. All the detailed calculations of the data may be included in the appendix.

2.11. Interpretation of results:

This section should make the results more meaningful to the reader by discussing possible explanations for the results. In doing so, you should cite relevant literature and provide compelling evidence that your interpretation contributes to existing theories and knowledge in the field. You should provide your readers with insights gained from analyzing the data.

2.12. The discussion:

The features in this section can be used to assess and interpret meaning and significance, especially about the original hypothesis put forward in the study. Accurate interpretation of fines and their impact requires the use of facts and figures contained in the reviewed literature. You are free to explore, interpret, certify, draw conclusions, justify, or speculate to justify or rationalize your results and findings. Particular emphasis is expected on the theoretical implications of results and the validity of findings, conclusions, and implications.

Differences and similarities between our findings and those of other investigators need to be highlighted, as the reviewed literature indicates, or as conclusions need to be clarified and confirmed.

Negative results, even shocking ones, should be accepted as they are without trying to explain them inappropriately. you should be guided by the following questions to know what the section should contain.

-What contribution did I make to this research?

-How did my research help solve the original problem of the research?

-What conclusions and theoretical implications can be drawn from my research as a contribution to the development of theory and practice?

-What are the notable flaws in the study that might cast doubt on my findings?

Finally, you should use this discussion section to decipher and interpret discoveries, new theories, and even discrepancies in existing theories that you notice in your learning process.

You will also be expected to use the discussion section to integrate and compile the results of research, ongoing research, and previous knowledge related to the results of already completed research and existing theories.

2.13. Recommendations:

Based on the results and conclusions of your research, you can make valuable recommendations that you think are suitable for application in your field of practice, to make your activity process more effective. The overall goal of research is to provide answers to questions and thereby develop new theories to increase knowledge or to develop better theories to increase knowledge, achieve better results, and improve lives. It's about developing better ways to do better. Therefore, you should make clear, relevant, and verifiable recommendations that have actionable value.

13. Conclusion:

In this section, we explored ways to present research reports to the international research community. Follow the guidelines in this unit to create a successful investigative report. The conclusion should be based on research findings only.

3. Supplementary pages (additional details):

Supplementary pages are extra sections or resources that are included in a geography research document, such as a thesis, dissertation, or research paper, to help the reader better comprehend the research. These pages offer useful supplemental information but are not a part of the main report. Depending on the nature of your research outlet. Additional pages should be thoughtfully and

intentionally included, providing value to the research work without distracting the reader.

3.1. The Bibliography or Reference:

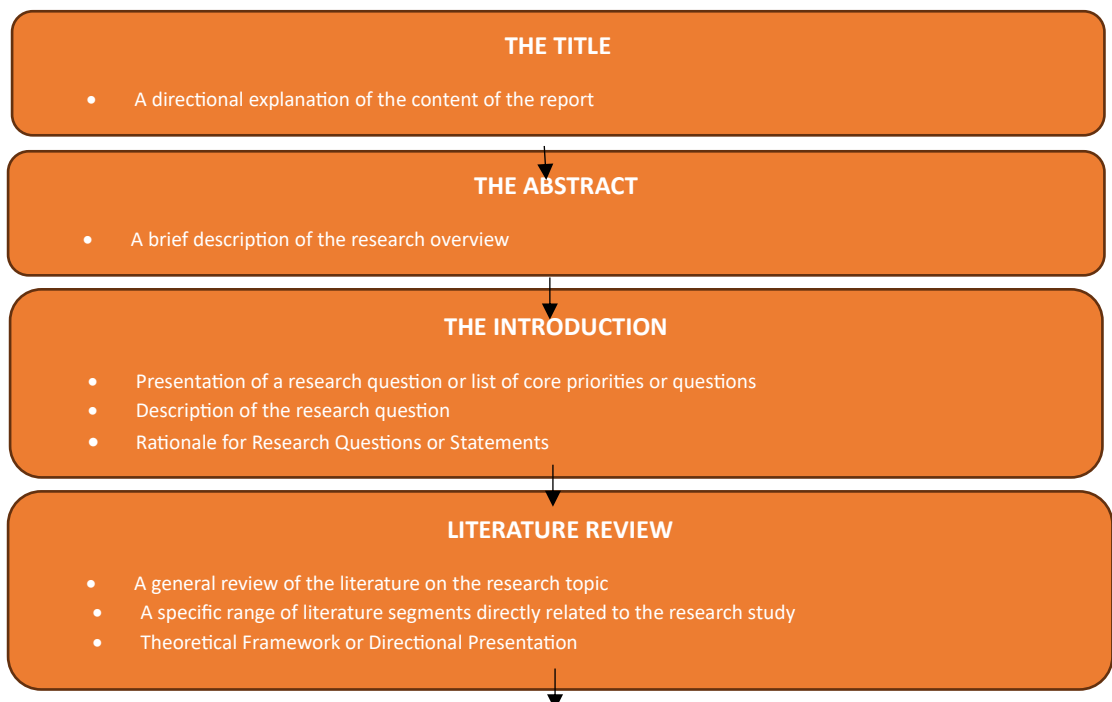
This includes all references cited within the report. Most institutions use an author/date system, with entries ordered alphabetically by author name.

3.2. Appendix:

Appendices contain supplementary material that is not necessarily part of the text itself, but which may be useful in gaining a deeper understanding of the research question, or which is too informative to be included in the main text.

3.3. Index:

a list of items (such as topics or names) treated in a printed work that gives each item the page number where it may be found. As a general overview, the figure below briefly summarizes all the steps in how to write a scientific report under discussion.



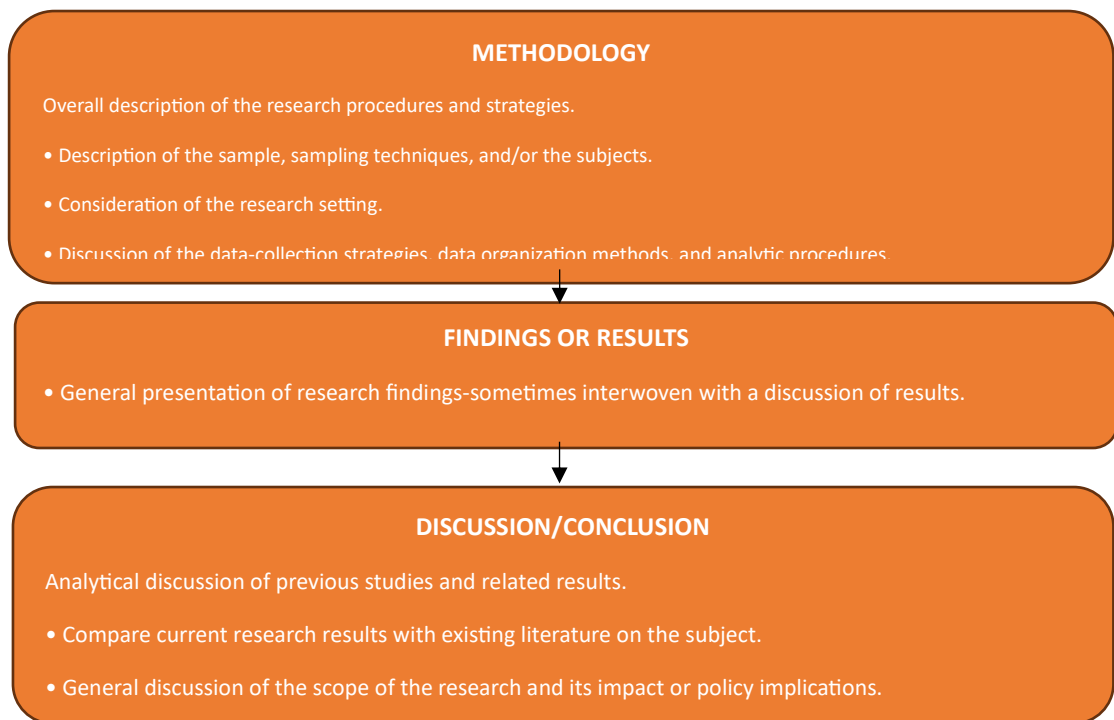


Figure.37 The Basic Scheme of the Traditional Research Report

V- Rules for writing an academic report:

Writing a clear, concise manuscript is a major hurdle for many students, and this goal of achieving a clear, concise, and complete research output is often particularly difficult for younger students.

Good writing blooms from good editing, and good editing starts with listening to feedback and criticism. But it all begins and ends with putting time and effort into writing. Here are some rules for writing academic documents. I avoid informal terms and abbreviations. I avoid emotional or exaggerated language and avoid superfluous words and phrases.

VI-How to prepare for an academic report defense:

The academic report defense is one of the most anticipated moments by students. However, it can be a scary time if students themselves are not ready to face the thesis or dissertation defense. Many students often think that defending

their work is the most difficult step before graduating. This is a preparatory step to reduce students' fears and concerns as they begin to defend their report. There is nothing wrong with following various preparatory steps before presenting your thesis or your dissertation.

VI-1. Read and re-read the thesis content:

The first thing you need to prepare before defending your thesis or your dissertation read the report content many times, not just once but many times to make you more stable and ready. You don't need to memorize everything but you should at least understand the all content. Also, prepare alternative questions that may be asked by the examiners If you feel stuck and unsure about the content of your thesis, ask your supervisor for help immediately.

VI-2. Tips for preparing presentation files properly:

Prepare a presentation file that doesn't have too many slides but also you are required to convey everything from the background to conclusions and suggestions in a short time. Also, prepare small notes regarding what points will be explained during the presentation. You also start practicing and do a presentation simulation with the estimated time mentioned earlier. Don't Forget to Practice Presenting it should be remembered that during the thesis or dissertation defense, students are only given time to present research results for approximately 10 to 15 minutes.

VI-3. Presentation progress:

All presentation materials must be reviewed in the room where the presentation will be made before the reviewers arrive. Once your presentation is complete, you will receive feedback from the examiner including questions, comments, and suggestions. Answer as many of the examiner's questions as possible. If you find it difficult to answer the examiner's questions, answer them to the best of your ability. Avoid arguments that don't make sense or are based on

words that have no theoretical basis. Listen carefully and record the different responses and perspectives of the assessors so that you can use them as a guide during your revisions.

Once you've defended your thesis or dissertation, your work doesn't end there, you must review and complete your work Before submitting your report to the library. Take into account not only the reviewer's comments but also the examiner's comments. Please correct your work immediately. The administration usually specifies a deadline for revisions.

Keep in mind that the defense is a chance for you to demonstrate your achievements in research and knowledge. The purpose of your defense committee is to support your academic success. Once you've made any necessary revisions, you can decide on the best way to publish or disseminate your findings.

VII-Activities:***Activity :1***

Can you distinguish the differences between these tasks?

Writing an essay.

Writing a report.

Writing up research work.

Activity 2:

Consider and explain the causes of these issues in the Algerian agrarian development system research as well as potential remedies that could be employed to address (or at least lessen) these issues.

What would be your share throughout the short and long terms?

Activity 3:

- ✓ *What do you mean when you say "research"? Describe its contemporary importance.*
- ✓ *Describe many research types and describe the fundamental traits of each one.*
- ✓ *Comment on the importance of literature reviews in research.*
- ✓ *Distinguish between research methodologies and research methodology in a succinct manner.*
- ✓ *What purpose does understanding research technique serve?*
- ✓ *Give a succinct description of each phase in the research process.*
- ✓ *What are the main drivers for conducting research?*
- ✓ *What goals does the study hope to achieve?*
- ✓ *What does the term "scientific method" mean? Describe its importance and usefulness in study.*
- ✓ *Describe and discuss relevant features of the scientific method and evaluate its usefulness in the systematic study of human-geographic facts.*

- ✓ *Do you concur that the correct gathering, analysis, and assessment of evidence are the foundation of research?*
- ✓ *What makes a good research question?*
- ✓ *What actions should be taken before creating a research question?*
- ✓ *Discuss various information sources and offer your thoughts on how valuable they are for study.*
- ✓ *Describe the differences between primary and secondary sources.*
- ✓ *Describe the breadth and significance of geographic study in Algeria.*
- ✓ *Outline the key phases of geographic study.*
- ✓ *Comment on the type and reach of scholarly geographic study. Analyze how it might affect the territorial growth.*
- ✓ *Write a concise essay on Algeria's geographic research views and challenges.*

UNIT CONCLUSION

Scientific geographic research begins with precise, clear, and careful framing and definition of the problematic, and then goes through the basic steps of determining the appropriate types of information to gather to answer the problem. In this chapter, we have discussed how to write a scientific report and discuss it scientifically.

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