

**TOPIC-MEANING AND SCOPE OF
BIOGEOGRAPHY
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- How do organisms and environment interact with each other?
- How has the pattern of plant and animal assemblages come about?
- What is the role of humanity in altering these interactions and patterns?

QUESTIONS ASKED BY BIOGEOGRAPHERS:



MEANING:

- Broadly speaking, biogeography is concerned with the study of biosphere.
- More specific and traditional definition of biogeography states that it is concerned with the description and explanation of patterns of distribution of plant and animal life and with understanding of changes in distribution that have taken over the past and how it is taking place today.
- Biogeographers play a very vital role in decoding the complex relationship between the biotic and abiotic components of environment in spatial and temporal perspective.



- Like geography itself, there is an osmotic relationship between biogeography and various other disciplines from life sciences and social sciences. The scope and fields of biogeography is not clearly marked.
- Using the words of Dansereau, biogeography “studies the origin, distribution, adaptation and association of plants and animals.” But Dansereau discussing about the scope of biogeography says “ it extends across the fields of plant and animal ecology and geography, with many overlaps into genetics, human geography, anthropology and the social sciences. All of these together form the domain of biogeography.”

SCOPE OF BIOGEOGRAPHY:



DESCRIPTION.....IS IT REALLY AS EASY AS IT SOUNDS??

- In studying the present and past distributions of life, biogeographers have two main tasks: description and explanation.
- Describing where a plant or animal species occurs today may seem to be a simple task but this is very misleading.
- So far, about 1.7 million living species of plants and animals, and other organisms have been identified. It is estimated that an additional 4 to over 20 million remain undiscovered by modern science.
- It is even more difficult to reconstruct the past distributions of organisms because we must rely on fossil records that are often incomplete and difficult to interpret.



- To explain exactly how present and past distributions are controlled by the complex geographic, environmental, and historical factors that affect all organisms presents the most challenging task.
- In order to understand how the physical and biological environment controls the distribution of plants and animals today, biogeographers must be skilled and oriented with concepts and techniques in disciplines such as:
 - **physiology** - a branch of biology that deals with the functions and activities of life or of living matter such as organs, tissues, or cells and of the physical and chemical phenomena involved,
 - **anatomy**- the branch of biology concerned with the study of the structure of organisms and their parts.
 - **ecology**- a branch of science concerned with the interrelationship of organisms and their environments

EXPLANATION OF PAST AND PRESENT DISTRIBUTIONS...HOW??



CONTD.....

- **pedology** – the study of soils
- **climatology**- the study of climate and how it changes over time. It helps better understand the atmospheric conditions that cause weather patterns and temperature changes over time.
- **limnology** -the study of lakes and
- **oceanography**- applies chemistry, geology, meteorology, biology, and other branches of science to the study of the ocean, especially relevant today as climate change, pollution, and other factors are threatening the ocean and its marine species.



CONTD.....

- In order to study how plants and animals were distributed in the past, biogeographers must have some basic knowledge of
- **geology**- study of the Earth, the materials of which it is made, the structure of those materials, and the processes acting upon them
- **paleontology**- concerned with **the study of fossil animals and plants.**
- **evolutionary biology**- a branch of **biology** that is primarily concerned with the **evolution** of species and the processes which resulted in the diversity of life on earth .



EMPLOYMENT POTENTIAL/SCOPE FOR A BIOGEOGRAPHER???

- Given the synthetic/multi-disciplinary nature of the field, biogeographers are employed in many different university departments, including geography, biology, geology, paleontology, and anthropology.
- Biogeographers can also be found working in park services, forestry services, environmental services, conservation groups, and private consulting firms.



SUB-DISCIPLINES OF BIOGEOGRAPHY??

- It is evident from the above discussion that biogeography is multi-disciplinary which encompasses a major part of natural sciences. To understand biogeography in a graphical way, the discipline can be further divided into following sub-disciplines.

1. **Phytogeography**:-

It studies the present and past distributions of plants.

- ## 2. **Zoogeography**:-
- It examine the present and past distributions of animals.



CONTD....

3. **Ecological biogeography:-**

It is the biogeographic study of the present day relationships between organisms and the environment.

4. **Historical biogeography:-**

It studies past distributions and the evolution of life.

5. **Analytical biogeography:-**

It is concerned with developing general rules that explain how geography affects the evolution and distribution of plants and animals and how past distributions and evolutionary history are reflected in modern distributions.

6. **Conservation biogeography:-**

It is concerned with the application of lessons learnt from the above given sub disciplines on how to protect and restore the natural environment.



THE PROBLEMS OF BIOGEOGRAPHY

There are many puzzling but interesting problems which a biogeographer seeks to answer. Following is the list of a few questions:

1. Why do certain species live where they do? Have they always been there? For example, why are the kangaroos endemic to Australia? Why are there no polar bears on Antarctica when all the requisites for their survival are there? Why does the southernmost tip of Africa have a very diverse flora but not an equally distinctive fauna? How does geographic gradient decide the type of flora and fauna? These are only a few of many fascinating questions asked and solved by biogeographers.
2. How do plant and animal kingdoms respond to the environment and interact with each other?

3.



THE PROBLEMS OF BIOGEOGRAPHY

CONTD....

3. They explore the relationship between the living and the non living entities which leads to many discoveries which have practical aspects. For ex. The relationship between plant life and kind of mineral deposit inside can be very economically viable outcome.
4. A biogeographer can seek answers to questions such as impact of technological developments and its violation of the ecological principles on the ecosystem. They can guide humanity in exploring ways to live sustainably on the earth without harming the planet and in turn themselves



TOOLS AND TECHNIQUES ADOPTED BY BIOGEOGRAPHERS ??

- Modern biogeography often makes use of Geographic Information System(GIS), to understand the factors affecting organism distribution, and to predict future trends in organism distribution. It helps in making comparative studies of changes which occur in their distributional aspects. Often mathematical models and GIS are employed to solve ecological problems that have a spatial aspect to them.
- Global Production Efficiency Model (GLO-PEM) uses satellite-imaging gives "repetitive, spatially contiguous, and time specific observations of vegetation". These observations are on a global scale.
- Coral reefs are used to understand the history of biogeography through the fossilized reefs through carbon dating.



REFERENCES:

- Cox, C. B. and Moore, P. D. (2000) *Biogeography: An Ecological and Evolutionary Approach*, 6th edn. Oxford: Blackwell.
- MacDonald, G. (2003) *Biogeography: Introduction to Space, Time and Life*. New York: John Wiley & Sons.
- Robinson, H. (1972) *Biogeography*, 1st edn., pp-3-15.



THANK YOU

