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Distance Learning Programme (DLP)

WORLD GEOGRAPHY

(UPSC MAINS)

drishti

WORLD GEOGRAPHY

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Introduction of Geography

Chapter 1

Geography is the study of the physical features of the earth and its atmosphere, and of human activity as it affects and is affected by these, including the distribution of populations and resources and political and economic activities.The concern of geography is to look for the causal relationship between any two phenomena or between more than one phenomenon. The geographical phenomena, both the physical and human are highly dynamic. They change over time as a result of the interactive processes between ever changing earth and arduous and ever-active human beings.

Nature has influenced different aspects of human life. Its imprints can be noticed on food, clothing, shelter and occupation. Human beings have come to terms with nature through adaptation and modification. With the gradual development of technology, human beings were able to loosen the shackles of their physical environment. With the help of technology, human beings moved from the stage of necessity to a stage of freedom. They have put their imprints everywhere and created new possibilities in collaboration with nature. Thus, we now find humanized nature and naturalized human beings and geography studies this interactive relationship.

Geography as a discipline is related to space and takes note of spatial characteristics and attributes. It studies the patterns of distribution, location and concentration of phenomena over space and interprets them providing explanations for these patterns. It takes note of the associations and inter-relationships between the phenomena over space and interprets them providing explanations for these patterns. It also takes note of the associations and inter-relationships between the phenomena resulting from the dynamic interaction between human beings and their physical environment.

Approaches of Geographical Study

The major approaches to study geography are- (i) Systematic and (ii) Regional. The systematic approach was introduced by Alexander Von Humboldt, a German geographer (1769-1859). The regional approach was developed by another German geographer Karl Ritter (1779-1859).

- In the systematic approach, a phenomenon is studied world over as a whole, and then the identification of typologies or spatial patterns is done. For example, if one is interested in studying natural vegetation, the study will be done at the world level as a first step. The typologies such as equatorial rain forests or softwood conical forests or monsoon forests, etc. will be identified, discussed and delimited.
- In the regional approach, the world is divided into regions at different hierarchical levels and then all the geographical phenomena in a particular region are studied. These regions may be natural, political or designated region. The phenomena in a region are studied in a holistic manner searching for fixed patterns across diverse areas.

Branches of Geography (Based on Systematic Approach)

Physical Geography

It is further divided into following branches

- Geomorphology: It is devoted to the study of landforms, their evolution and related processes.
- Climatology: It is related to the study of structure of atmosphere and elements of weather and climates and climatic types and regions.
- Hydrology: It studies the realm of water over the surface of the earth including oceans, lakes, rivers and other water bodies and its effect on different life forms including human life and their activities.
- Soil Geography: It is devoted to study the processes of soil formation, soil types, their fertility status, distribution and use.

Human Geography

It is further divided into following branches:

- Social/Cultural Geography: It encompasses the study of society and its spatial dynamics as well as the cultural elements contributed by the society.
- Population and Settlement Geography (Rural and Urban): Population Geography studies population growth, distribution, density, sex ratio, migration and occupational structure etc. Settlement geography studies the characteristics of rural and urban settlements.
- Economic Geography: It studies economic activities of the people including agriculture, industry, tourism, trade, transport, infrastructure, and services, etc.
- Historical Geography: It studies the historical processes through which the space gets organized. Every region has undergone some historical experiences before attaining the present day status. The geographical features also experience temporal changes and these form the concerns of historical geography.
- Political Geography: It looks at the space from the angle of political events and studies boundaries, space relations between neighbouring political units, delimitation of constituencies, election scenario and develops theoretical framework to understand the political behaviour of the population.

Biogeography

The interface between physical geography and human geography has led to the development of Biogeography which includes:

- **Plant Geography:** It studies the spatial pattern of natural vegetation in their habitats.
- **Zoo Geography:** It studies the spatial patterns and geographic characteristics of animals and their habitats.
- **Ecology/Ecosystem:** It deals with the scientific study of the habitat characteristics of species.
- Environmental Geography: The concerns world over leading to the realization of environmental problems such as land degradation, pollution and concerns for conservation has resulted in the introduction of this new branch in geography.

Branches of Geography (Based on Regional Approach)

- Regional Studies/Area Studies Comprising Macro, Meso and Micro Regional Studies
- Regional Planning Comprising Country/Rural and Town/ Urban Planning
- Regional Development
- Regional Analysis

There are two aspects which are common to every discipline, these are:

- **Philosophy:** It includes Geographical Thought as well as Land and Human Interaction/ Human Ecology.
- **Methods and Techniques:** It includes (a) Cartography including Computer Cartography; (b) Quantitative Techniques/Statistical Techniques; (c) Field Survey Methods; (d) Geoinformatics.

Importance of Physical Geography

Physical geography includes the study of lithosphere, atmosphere, hydrosphere and biosphere. Each element is important for human beings. Landforms which are dealt under lithosphere provide the base on which human activities are located. The plains are suitable for agriculture and human settlements. Plateaus provide forests and minerals. Mountains provide pastures, forests and are sources of rivers. Climate, which is dealt under atmosphere, influences our agricultural practices, house types, clothing and food habits. Temperature and precipitation ensure the density of forests and quality of grassland. In India, monsoonal rainfall sets the agriculture rhythm in motion. Precipitation recharges the groundwater aquifers which provide water for agriculture and domestic use. Oceans which are dealt under hydrosphere are the store house of resources. They are rich in fish and other sea-food as well as mineral resources. The study of physical geography is emerging as a discipline of evaluating and managing natural resources. Accelerated pace of resource utilization with the help of modern technology has created ecological imbalance in the world. Hence, study of physical geography and a better understanding of physical environment is essential for sustainable development.

Origin of Universe, Earth & Life

Chapter 2

The term "evolution" usually refers to the biological evolution of living things. But the processes by which planets, stars, galaxies, and the universe form and change over time are also types of "evolution." In all of these cases there is change over time, although the processes involved are quite different. There are different theories propounded at different points of time that attempt to explain the origin and evolution of the universe stars and planets. These theories can be categorized as: Early Theories and Modern Theories.

Early Theories

- **Gaseous Mass Theory:** This theory was propounded by **Immanuel Kant** in 1755. Kant suggested that there were small masses which he termed as nebula. Over the time there was gravitational pull between the masses leading to the increase in angular velocity of the nebula and consequent rise in centrifugal force, which led to the formation of concentric rings and these concentric rings later, formed planets. The theory was challenged as it failed to explain the source of such a large scale gravitational force.
- **Nebular Hypothesis: Laplace** revised Kant's theory in 1796 which is known as nebular hypothesis. The hypothesis considered that the planets were formed out of a cloud of material associated with a youthful sun, which was slowly rotating. The theory featured a contracting and cooling proto-solar cloud – the proto-solar nebula. As the nebula cooled, there was increase in velocity and rotation resulting into contraction of gaseous cloud. The planets were formed from the condensed material.

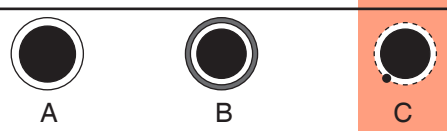

Fig: *Nebular Hypothesis*

A: Nebula bulges at Equatorial Zone
B: Bulged section separated from ring
C: Ring coalesce to form globe which rotate around nebula in its orbit

Tidal Hypothesis: This theory was proposed by **Jeans** (1919) and **Jeffrey** (1929), and it is based on Newton's gravitational law. According to this hypothesis, as a very large star progressively approached closer to the sun, a gaseous tide (wave) was produced on the surface of the sun due to the gravitational pull of the star.

When the star began to move away, the gaseous tide (wave) was detached from the body of the sun. The cigar shaped filament (mass of wave) soon broke into:

- ten pieces, nine of which formed nine planets, earth being one of them;
- the remaining piece broke into small pieces forming planetoids.

- **Inter-stellar Dust Cloud Hypothesis – Otto Schmidt (1943):** According to this hypothesis, large quantities of gas and dust particles were found scattered in the universe known as gas and dust cloud. The sun captured some gases and dust particles by its own gravitational pull. The cloud of dust and gas then started revolving around the sun. The heavier particles of gas cloud and dust particles combined and got collected

near the cloud heap. The cloud cover took the form of a vast flat saucer. After collision, the particles started consolidating by condensation. Then, it took the form of asteroids. These asteroids began to revolve round the sun within the disk of dust particles. The asteroids grew in size by absorbing the remaining scattered gas and dust particles by their gravitational force. These asteroids subsequently turned into planets.

Modern Theories (Origin of the Universe)

- **Big Bang Theory:** This theory originated in 1929 when Edwin Hubble discovered that everything in the universe is moving away from everything else. Hubble explained this by theorizing that the universe was expanding in every direction.

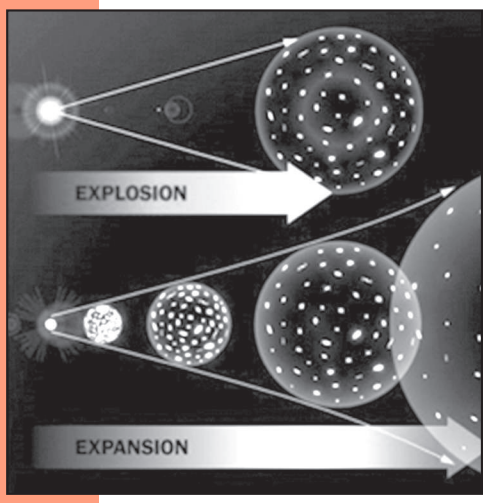

Fig: *Big Bang Theory*

Stages in Development of Universe:

- Initially all matter forming the universe existed at one place in the form of a "tiny ball" (singular atom) with an unimaginably small volume, infinite temperature and infinite density.
- At the Big Bang the "tiny ball" exploded violently. This led to a huge expansion. The event of big bang is believed to have taken place approximately 13.7 billion years ago.
- The expansion continues even to the present day. As it expanded, some energy was converted into matter. There was particularly rapid expansion within fractions of a second after the bang. Thereafter, the expansion has slowed down. Within first three minutes from the Big Bang event, the first atom began to form.
- Within 300,000 years from the Big Bang, temperature dropped to 4,500 Kelvin and gave rise to atomic matter. The universe became transparent.

Major Evidences which Support Big Bang Theory:

- According to **Hubble's Law,** galaxies are moving away from us at speeds proportional to their distance. This phenomenon was discovered by Edwin Hubble (1929). This observation supports expansion of the universe and also suggests that the universe was once compacted at a point.
- The phenomenon of **Red Shift** also supports the theory. As the distance between earth and galaxy increases, the light appears to shift towards the red end of the spectrum. Red colour has the highest wavelength among visible spectrum. Further away the galaxy, greater the red shift.
- As the universe was initially very hot, we should be able to find some remnant of this heat. In 1965, Radio-astronomers Arno Penzias and Robert Wilson discovered a 2.725 degree Kelvin (-270.425 degree Celsius) Cosmic Microwave Background Radiation (CMBR) which pervades the observable universe. Both of them shared Nobel Prize for Physics for their discovery in 1978.
- Light elements like Hydrogen and Helium found in abundance in the observable universe also support the Big Bang theory.

- **Steady State Theory**: In 1940s, Sir Fred Hoyle and others developed an alternative mathematical model of the universe that did not start in a massive expansion as in Big Bang Theory. According to them, matter is continuously created at a rate that keeps the average density of the universe same as it expands. Though the Steady State theorists' ideas are largely discredited today, their research pushed the Big Bang supporters to back up their theory with evidence.

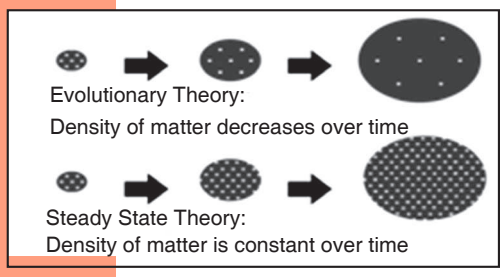

Fig: *Steady State Theory*

Formation of Stars

The distribution of matter and energy was not even in the early universe. These initial density differences gave rise to differences in gravitational forces and it caused the matter to get drawn together. These formed the bases for development of galaxies. A galaxy starts to form by accumulation of hydrogen gas in the form of a very large cloud called nebula. Eventually, growing nebula develops localized clumps of gas. These clumps continue to grow into even denser gaseous bodies, giving rise to formation of stars. The formation of stars is believed to have taken place 5-6 billion years ago.

Formation of Planets

The stars are localized lumps of gas within a nebula. The gravitational force within the lumps, leads to the formation of a core to the gas cloud and a huge rotating disc of gas and dust develops around the gas core. In the next stage, the gas cloud starts getting condensed and the matter around the core develops into small-rounded objects. These small-rounded objects by the process of cohesion develop into what is called planetesimals. Larger bodies start forming by collision, and gravitational attraction causes the material to stick together. Planetesimals are large number of smaller bodies. In the final stage, these large number of small planetesimals accrete to form a fewer large bodies in the form of planets.

The Earth's Evolution

The earth has reached its present form through several phases. From a ball of swirling dust and clouds, it passed through a molten stage. Light substances floated up from deep inside to lie upon its fiery surface. There, they cooled and hardened. So the earth gradually gained the skin of solid rock that makes up most of the earth's crust. As the earth's interior continued to cool, it contracted and the outer crust wrinkled forming ridges and basins. Meanwhile, still lighter substances floated up above the crust and formed an atmosphere of gases. With the cooling of the hot gaseous substances in the atmosphere, massive cloud formation took place. It brought heavy downpour for thousands of years. As a result, the great basins on the earth's crust were filled with water. Thus, oceans were formed.

Evolution of Lithosphere

The earth was mostly in volatile state during its primordial stage. Due to gradual increase in density, temperature inside increased. As a result the material inside started getting