

comprising the envelope of land, air and water around the globe which supports the life of all biota (plants and animals) on the earth surface.

Thus, we include the study of all such physical elements and factors in physical geography which provide suitable habitats for the living organisms of the biosphere (plants and animals including man). It may be mentioned that the quality of biosphere is determined by the physical environment, the quality of which in itself is determined by the interactions between endogenous forces (coming from within the earth) and exogenous forces (originating from the atmosphere i.e. denudational processes which include the processes of erosion and weathering).

The solid earth's surface (crust) provides different types of habitats to living organisms of the biospheric ecosystem. Different reliefs (tectonically originated) are created (like mountains and hills, plateaus, lakes, plains etc.) on the earth's surface by endogenous forces which introduce diversity in the habitats. The outer solid crustal surface also provides nutrients to the biosphere. On the other hand, atmosphere provides essential elements (namely carbon, hydrogen, oxygen, nitrogen etc.) to the biosphere and gives birth to different types of climate on the earth's surface. The exogenous processes originating from the atmosphere on one hand help in the circulation and exchange of heat between the atmosphere and the earth's surface, on the other hand they create different types of landforms through their denudational works and these landforms in turn further introduce diversity in the habitats produced by endogenous forces. Thus, physical environment affects life forms (plants and animals) of the biosphere while man also modifies and changes physical environmental conditions through his economic activities.

1.2 SCOPE OF PHYSICAL GEOGRAPHY

It is evident from the foregoing discussion on the nature of physical geography that the detailed consideration of four components of the earth viz. lithosphere, atmosphere, hydrosphere and biosphere, are included in physical geography wherein characteristic features of these compo-

nents are studied spatially and temporally.

First, the origin, age and structure of the interior of the earth, isostasy and evolution of continents and ocean basins are studied in order to understand the characteristic features of the aforesaid four components. The study of forces or movements of the earth, both endogenous (originating from within the earth) and exogenous (originating from the atmosphere) becomes significant to understand the interactions between these two forces and resultant features. In fact, endogenous forces (termed as constructive forces) coming from within the earth, create reliefs of varying dimensions on the earth's surface (e.g. mountains, folds, faults, volcanic cones etc.) which provide habitats for living organisms of the biospheric ecosystem on the one hand, and present initial reliefs for the interplay of exogenous forces originating from the atmosphere, termed as destructive forces (denudational processes e.g. fluvial, marine, glacial, aeolian, periglacial etc. processes and weathering agents) on the other hand. The study of evolution of continents and ocean basins and their drifting (continental drift as evidenced by plate tectonics) helps in the understanding of evolution and dispersal of plants and animals.

The characteristics, origin and distribution of constructional reliefs namely mountains, faults, folds etc. are thoroughly investigated. The distribution, characteristics and origin of vulcanicity and landforms resulting therefrom are studied as physical features and natural hazards which adversely affect both human being and plants and animals.

The study of features resulting from the interactions between endogenous and exogenous forces involves the discussion of mode of denudational processes (weathering and erosion), hitherto termed as geomorphic processes, their mechanism of operation (mechanism of erosion, transportation and deposition by running water-river, groundwater, sea waves, wind, glacier and periglacial agent) and resultant landforms.

✓ The study of **hydrospheric component** involves the consideration of reliefs of the ocean basins (continental shelves, submarine canyons,

continental slope, deep sea plains, ocean deeps etc.); thermal characteristics of ocean water; salinity (composition of seawater, sources and distribution of oceanic salinity); ocean deposits; ocean tides; ocean currents and coral reefs and atolls (their distribution and origin, coral bleaching etc.).

✓ The study of **atmospheric component** includes the discussion of composition and structure of atmosphere, elements of weather and climate, insolation and heat balance, terrestrial radiation balance and anthropogenic factors causing imbalance, air temperature, air pressure and winds (permanent or planetary winds, seasonal and local winds), characteristics and origin of monsoon, humidity and precipitation, airmasses, frontogenesis, cyclones and anticyclones, world climate etc.

✓ The study of **biospheric component** involves the consideration of components of biosphere (both abiotic and biotic), soil system, ecological production and energy flow in the biospheric ecosystem, circulation of elements in the ecosystem, biogeochemical cycles, evolution, dispersal and extinction of plants and animals, biomes and man, ecosystem stability and man, man and atmospheric environment (global radiation balance, ozone depletion, greenhouse effects and global warming), man and environmental processes, man-induced soil erosion and sedimentation, environmental degradation and pollution, extreme events, hazards and disaster, environmental planning and management, global environmental problems and international co-operations.

It is evident from the aforementioned discussion that the scope of physical geography includes the consideration of systematic study of physical environment as well as the study of interactions between man and physical environment. Major changes have taken place in the subject matter and methodology of physical geography due to following factors :

(1) Universal desire to make physical geography more meaningful and applicable for human welfare and to integrate it more intimately with

human geography in order to redefine and to keep the discipline of geography intact and to make it more relevant to society.

(2) More attention of man towards natural hazards and disaster and greater emphasis on the evaluation of adverse impacts of human activities on physical environment and environmental problems resulting therefrom and remedial measures therefor.

(3) Greater emphasis on instrumentation and measurement of operation of different geomorphic processes and mathematical analysis of data derived through field and laboratory studies.

(4) More attention towards the study of certain aspects of physical geography e.g. ecosystem and ecological stability and instability, hydrology, plate tectonics etc.

(5) Recent trends of increasing emphasis on micro-temporal scale (i.e., graded and steady state time scale) in place of macro-temporal scale (i.e., cyclic time involving geological time i.e., millions of years) and on shorter microspatial scale (10 to 100 km²) in place of large or macro-spatial scale (mega scale, millions of square kilometres) in the study of geomorphic and environmental processes to make such study more relevant to society in order to solve immediate environmental problems.

1.3 DEVELOPMENT OF PHYSICAL GEOGRAPHY

The discipline of physical geography has evolved through successive stages of its development in terms of methodology and approaches to study. After taking its birth in the philosophical ideas and reports of ancient thinkers, philosophers and historians of the ancient seats of civilization and culture e.g. Greece, Rome and Egypt, the science of physical environment attained its present status wherein different components were added from time to time. Previously physical geography concerned with only three components i.e., lithosphere, hydrosphere and atmosphere but biosphere has been recently added to this discipline. It is desirable that the historical develop-