

Environment and Studies related to Environmental Sciences: The Overview of Allied Areas

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Environment and Studies related to Environmental Sciences: The Overview of Allied Areas

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ABSTRACT

Environment of any system is one of the important and valuable concerns for the time being. There are different areas related to the Environment; few are directly concerned with the term/nomenclature 'Environment' viz. Environmental Science, Environmental Studies, Environmental Management, Environmental Engineering etc and few are indirectly or without using the term/nomenclature 'Environment' viz. Agriculture, Geography, Geology, Earth Science, etc. Environment is actually the study of the environment of a system, also solutions to environmental related problems. Environmental Professionals and scientists introduced a systems approach regarding analysis of environmental and allied problems. It is worthy to note that, the key elements of effective environmental scientists and professionals include the ability and analysis to relate space and time relationships including the quantitative analysis. Internationally in academics various Environment related programs have been emerged and started in the academic institutes. Since 1960's and 1970's Environment became an advanced field of study and research. Environment is closely related to the Physical Science, Biological Sciences, Information Sciences, Social & Engineering Sciences as well. This is a conceptual work and kind of case study on 'Environment' with an objective to overview and analyse various components, allied branches, research areas, and educational programs related to Environment and Information Science & Technology.

Keywords: Physical Environment, Biological Environment, Earth Science, Bio Sciences, Environmental Engineering, Environmental Management, Globalization.

1. INTRODUCTION :

Environment is one of the important names and concern. All of us within the Environment and there are different living and non-living things within Environment. Environment is a kind of Science that deals with different areas of the Natural Sciences [1], [5]. Different organizations and institutions have provided various definitions on Environment and among these the National Center for Education Statistics (United States) has defines Environmental Science as an academic program and in following manner:

“A program that focuses on the application of biological, chemical, and physical principles to the study of the physical environment and the solution of environmental problems, including subjects such as abating or controlling environmental pollution and degradation; the interaction between human society and the natural environment; and natural resources management. Includes instruction in biology, chemistry, physics, geosciences, climatology, statistics, and mathematical modeling” (Source: NCES). There are different components of Environmental Science and among these important are depicted in Fig: 1 herewith.

2. OBJECTIVE :

The core aim and objective of this Chapter is to include (but not limited to the following)—

- To learn about the basics of Environments including basic nature, characteristics and stakeholders of the Environment.
- To know about the field of study and research related to the nomenclature of Environment and allied branch itself.
- To learn about the allied branches related to the Environment and Allied Sciences in brief manner.
- To find out the components of Environmental Sciences and allied branches; worldwide and in India.
- To find out some of the educational programs related to Environment and Information Science & Technology in a brief manner.

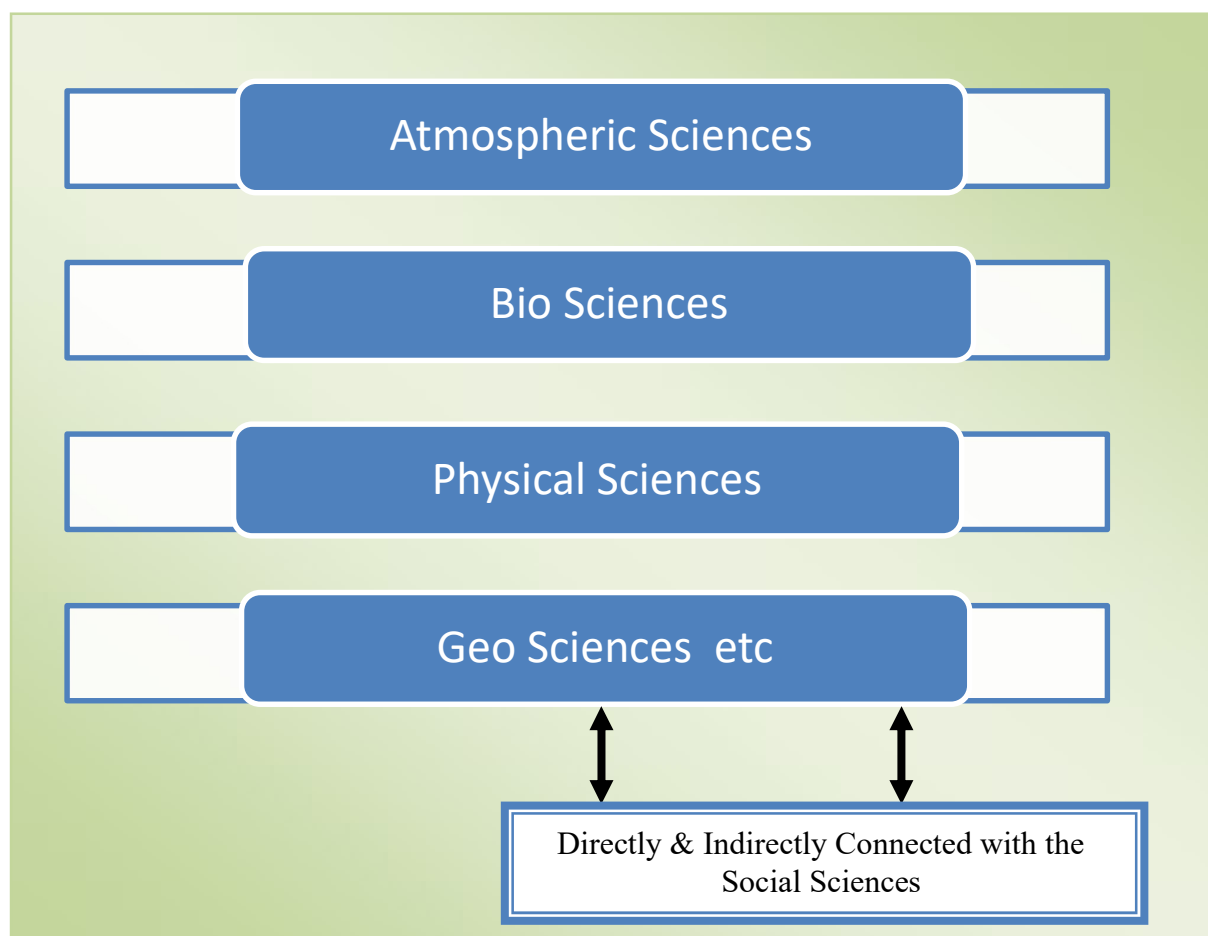


Fig. 1: Few Basic Components of Environmental Sciences

3. ENVIRONMENT :

Environment is a place where different things are stayed together and it can be living or non-living in a manner [2], [3]. Moreover, it includes the physical, chemical and other natural forces. Environment mainly consists of the following as given below one by one—

- Atmosphere,
- Hydrosphere,
- Lithosphere and
- Biosphere.

But it can be roughly divided into two viz. Micro environment and Macro environment. According to few experts in other context it may be classified into two other types—

- Physical
- Biotic environment.

The Merriam Webster Dictionary (www.merriam-webster.com) defines Environment in the following context:

- (1) 'The complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival'
- (2) 'The aggregate of social and cultural conditions that influence the life of an individual or community'.

4. ENVIRONMENT, ENVIRONMENTAL SCIENCES AND ALLIED AREAS :

Environmental Science is a vast field and kind of interdisciplinary cluster and it integrates different kind of sciences viz.

- Physical,
- Biological
- Information.

Further, if we analyzed there are different sub components are major and among these important are ecology, biology, zoology, soil science, agriculture, geology, oceanography, climatology, atmospheric sciences, physics, chemistry, etc [4], [7]. The following few overviews of among these sub fields.

Composition of Environmental Science :

Ecology—The branch Ecology is very close with the Environment and it is mainly treated as a branch or sub field of Environment. Sometimes, in academia & in practice both are used as synonym but in the real context both are related and all within Environment. Ecology is concerned with both biotic and abiotic components. In Ecology the issues and aspects biomass, biodiversity, populations of the organism, species, eco systems, etc normally covered. Even Biology Genetics, Ethology are also valuables aspects. Wildlife Management, Forestry, Natural Resource Management areas also rising in Ecology. In recent past, the applications of Ecology can be seen even in the following—

- Community Health
- Urban Ecology
- Human Ecology

There are changing trends in Ecology with erosion control, flood protection, and many other natural features viz. scientific, historical, economic and this trend is growing [6], [8].

Geography—

Geography is a field of Science and Applied Science in nature. It is a kind of study of places and also deals with the relationships between people and also the environment. Geography is devoted to the study of the earth and planet and talks about the lands, features, inhabitants, and phenomena of the. Geography is a kind of systematic study of the Universe. Geography is a broad field and thus multidisciplinary in nature [9], [10]. Geography emerged as an academic discipline in the late nineteenth century and comes with the concentration of the commercial and colonial enterprises and gradually it incorporates with other areas and fields of earth, biology, ecology, economy etc. Geography is classified in a broad way into following two—

- Physical Geography
- Human Geography

Among the techniques of Geography most popular are Cartography, Quantitative Techniques, Qualitative Methods, Remote Sensing, Global Positioning Systems, Geo Information Systems, etc. Today different merged fields and domains are available (within the branches or sub fields) of Geography viz.—

- Geography & Ecology,
- Geography & Earth Sciences,
- Geography & GIS,
- Geography & Forestry,
- Geography & Disaster Management etc.

In Academics, the above areas Geography is also available with Applied Science concentration. And this trend is rising.

Soil Science—

The field of Soil Science was established in 1800's. The field is very close with Geography, Geology and partially with Environmental Science. Soil science deals with soil as a natural resource of the surface such as soil formation, classification and mapping in different sorts viz. physical, chemical, biological, and fertility properties and moreover, these properties in relation to its use and also the management of soils. The branch can be defined with the following two categories viz.—

- Pedology
- Edaphology

Soil Science is an Applied Science field and thus it is practicing with different professionals viz. chemists, geologists, geographers, biologists, engineers, agronomists, microbiologists, sanitarians, archaeologists. Pedology talks about the formation of chemistry, morphology and classification of soil. In respect of Edaphology it concentrates on the influence of soil on organisms, especially plants. Soil Science is also nomenclature as Soil Management, Soil Engineering, etc in academics as well [12], [16], [17].

Geology—

Geology is an Applied Science within Environmental Sciences which concentrate on Earth and the materials by which it is made, the structure and the processes of these materials, etc. Geology is the study of organisms evolution, structures, processes of the earth. The field is also called as Earth Sciences [11], [13], [14].

Modern geology has consisted of different areas as well as viz. hydrology, atmospheric sciences, and planetary science. There are a different kind of areas of Geology viz.—

- Geo Physics
- Petrology
- Stratigraphy
- Crystallography
- Mining geology
- Paleontology
- Hydrology
- Geotechnics, etc

Hence, Geology is the science which is devoted to the study of earth. It deals with earth's surface and with the origin, composition, structure, and inhabitants of the earth.

Oceanography—

The study of physical, chemical, and biological features, nature of the oceans; past, present condition, and its future is mapped with Oceanography. It is not just about study and research but also regulation, norms related to the ocean. It talks about ocean health. Hence in a context, this may be defined as a Sea Science or Marine Science.

Virtually, oceanography affects the ways humans use the sea for a few aspects including transportation, food, energy, water, etc. There are different emerging areas in Oceanography viz.—

- Biological Oceanography
- Geological Oceanography
- Physical Oceanography
- Atmospheric Oceanography

According to a few other Scientists, Oceanography can also be classified into following—

- Biological Oceanography
- Geological Oceanography
- Physical Oceanography
- Chemical Oceanography

Apart from these, the field Sea Science also deals with Paleoceanography; which is talks about the history of the oceans in the context of circulation, chemistry, biology, geology, patterns of sedimentation and biological productivity as well.

Agriculture—

Agriculture can be seen in two ways; first, it can be noted as the process of producing a different kind of food, feed, fiber also other products by the cultivation of certain plants. Agriculture is the science

(as Agricultural Science) of cultivating plants and livestock and also a broad multidisciplinary area that concern with the following—

- Natural and Biological Sciences.
- Economic and Social sciences etc.

Agricultural sciences deal with the study, practice, research, innovation in the following areas as well—

- Horticulture
- Soil science
- Forestry
- Plant breeding
- Plant genetics
- Plant pathology
- Entomology
- Production techniques etc.

Allied Nomenclatures and Fields of Environmental Science :

There are few areas which are very much close and sometimes treated as a sub field of Environmental Sciences viz.

Environmental Studies—

Environmental study is a broad field and multidisciplinary in nature. It's a kind of interface of humans and the environment [15], [18], [20]. It is well connected with few other fields viz. physical sciences, economics, commerce, sociology, social sciences to address the environmental related issues. It is thus much social science oriented and close with following fields—

- Anthropology
- Policy Studies
- Planning (Rural & Urban)
- Law
- Economics
- Philosophy
- Sociology

Apart from the Biological Sciences, Natural Sciences, Technologies related to the Environment and nature.

The field is counter the issues, challenges of global climate change aspects, food security, environmental degradation, environmental and social structure also.

However, Environmental science concern about the scientific aspects of the environment and scientific and lab-based research including environmental chemistry, environmental biotechnology, environmental microbiology etc.

Environmental Management—

Environment Management is an interdisciplinary field and mainly concentrated with the application of Management Science to Environmental aspects and affairs. It is an emerging and dynamic concept of environment encompassing a business. It is the planning, processes, preconditions, issues of the implementation of an environmental corporate policy [17], [19]. The following affairs majorly treated as a part of this field—

- Dealing with the aspects of Pollution control
- Enhancing Industrial-Environmental development
- Sustainable organizational accountability
- Increasing environmental transparency.
- Negotiation between management and society through proper environmental practice.
- Green reporting & global economy by Environmental Management
- Aspects of environmental cost and natural and human environments.
- Misuse and scanty use of resources and assets like water.
- Country's economic development including social welfare
- Impressive decision taking in environmental issues and environmental problems.

Environmental Engineering—

Environmental engineering is an Applied Science and a branch of Engineering responsible for the designing, development of tools, techniques and products required for the environment and needed for reducing waste and pollution. Improving environmental conditions, processes, etc are also part of Environmental engineering. Prevent, control, or remediate environmental hazards and pollution control technology are also part of Environmental Engineering. The fields, Environmental Engineering can also nomenclature as follows—

- Eco Technology
- Environmental Technology
- Green Technology
- Clean Technology as well in some sorts.

However, according to the Encyclopedia Britannica, the field “**Environmental engineering**, the development of processes and infrastructure for the supply of water, the disposal of waste, and the control of pollution of all kinds. These endeavours protect public health by preventing disease transmission, and they preserve the quality of the environment by averting the contamination and degradation of air, water, and land resources”

Environmental Statistics—

Environment statistics is the procedures of applications of statistical tools, techniques in natural and environmental activities. Environmental Statistics is the interaction of humanity with the rural and urban environment. The field is close to Environmental Management as well. In many countries, Environmental Statistics is offered as a branch of study, research, programs in different levels.

Environmental Informatics (i.e. IT)—

Environmental Informatics is the integration of the Environment with Information Science/ Technology. It is the applications of Information Science/ Technology or Computing in different aspects of Environment and Ecology. The field is emerging and interdisciplinary in nature and growing internationally as a branch of studies [14], [21]. There are different areas/ nomenclature related with the Environmental Informatics viz.—

- Geo Informatics
- Sustainable Computing
- Energy Informatics
- Ecological Informatics
- Forest Informatics
- Green Informatics/ Computing etc.

It is worthy to note that, the field of Environmental Informatics is applicable not only in Environmental Science related fields and nomenclature but also other small and sub fields viz. Geology, Earth Science, Marine Science, Climatology, Forest Management, Geography, Agriculture, etc.

5. CONCLUSION :

The branch of Environmental Sciences is interdisciplinary in nature and broad due to its scope and periphery. The areas mentioned above are just the core in Environmental Sciences and many are not mentioned in this work and among these important are Climatology, Forest Management, Disaster Management, etc. It is important to note that the branch is emerging and different areas have been added into the field. The field is practicing in different faculties in the academics viz. Sciences, Engineering, Management & Commerce, Social Sciences, etc. Technological interaction with the environment is very important these days and also the use of Computing/ IT in Environment and Ecology itself.

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