

# Ecology

- The term *ecology* was coined by the German biologist **Ernst Heinrich Haeckel** in 1866 in his work titled *oecologie* in which he broadly defined ***ecology*** as the science of the relations of living organisms to one another and the external world (D.Worster 1985; Odum).;
- Etymologically, the term *ecology* is derived from two Greek words *oikos* (“household”) and *logos* (the study of) which share the same root word as *economics*.
- Thus, the term implies the study of the economy of nature.

- Also making important contributions were plant geographers, especially **Alexander von Humboldt**, who was deeply interested in the “how” and “why” of vegetational distribution around the world.
- **Humboldt** travelled widely and through his writings on plant geography (1807) and enthusiasm for nature had a major influence on Charles Darwin (D.Worster 1985).
- Modern ecology, in part, began with **Charles Darwin**. In developing his theory of evolution, Darwin stressed the adaptation of organisms to their environment through natural selection.
- A number of key theoretical ideas current in ecology owe their first formulation to Darwin's *The Origin of Species* which proposed an evolutionary explanation for the diversity of the world's biological organisms.

- Ecology is the study of the relationship of plants and animals to their physical and biological environment.
- The physical environment includes light and heat or solar radiation, moisture, wind, oxygen, carbon dioxide, nutrients in soil, water, and atmosphere.
- The biological environment includes organisms of the same kind as well as other plants and animals.

- Because of the diverse approaches required to study organisms in their environment, ecology draws upon such fields as climatology, hydrology, oceanography, physics, chemistry, geology, and soil analysis.
- To study the relationships between organisms, ecology also involves such disparate sciences as animal behaviour, taxonomy, physiology, and mathematics.
- An increased public awareness of environmental problems has made *ecology* a common but often misused word.
- It is confused with environmental programs and environmental science.
- Although the field is a distinct scientific discipline, ecology does indeed contribute to the study and understanding of environmental problems.

- **Political Ecology**
- The term "political ecology" was first coined by Frank Thone in an article published in 1935 in *The Science Newsletter*.
- Since then, it has been widely used in the context of human geography and human ecology, but with no systematic definition.
- Anthropologist Eric R. Wolf gave it a second life in 1972 in an article entitled "Ownership and Political Ecology," in which he discussed how local rules of ownership and inheritance "mediate between the pressures emanating from the larger society and the exigencies of the local ecosystem"

- Historically, political ecology has focused on phenomena in and affecting the developing world.
- Since the field's inception, "research has sought primarily to understand the political dynamics surrounding material and discursive struggles over the environment in the third world".
- Scholars in political ecology are drawn from a variety of academic disciplines, including geography, anthropology, development studies, political science, sociology, forestry, and environmental history.
- The diversity in the field has made a unified definition difficult.
- However, we shall look at representative definitions of political ecology.

- **Political ecology** is the study of the relationships between political, economic and social factors with environmental issues and changes.
- **Hempel (1996)**-Political ecology is the study of interdependence among political units and of interrelationships between political units and their environment...concerned with the political consequences of environmental change.
- **Watts (2000)** – To understand the complex relations between nature and society through a careful analysis of what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods.
- **Sutton (2004)** - political ecology is “the study of the day-to-day conflicts, alliances, and negotiations that ultimately result in some sort of definitive behavior; how politics affects or structures resource use”

- Political ecology's broad scope and interdisciplinary nature lends itself to multiple definitions and understandings.
- More recently, political ecology has realised links with gender studies and social movement analyses.
- However, common assumptions across the field give it relevance.
- Raymond L. Bryant and Sinéad Bailey (1997) have developed ***three fundamental assumptions*** in practicing political ecology:

- First, costs and benefits associated with environmental change are distributed unequally.
- Changes in the environment do not affect society in a homogenous way: political, social, and economic differences account for uneven distribution of costs and benefits.
- Political power plays an important role in such inequalities.

- *Second*, this unequal environmental distribution inevitably reinforces or reduces existing social and economic inequalities.
- In this assumption, political ecology runs into political economies as any change in environmental conditions must affect the political and economic status quo.
- *Third*, the unequal distribution of costs and benefits and the reinforcing or reducing of pre-existing inequalities hold political implications in terms of the altered power relationships that are produced.

- **Scholarly Divergences in the Meaning of Political Ecology**
  - **First**, some authors have approached *political ecology* by explaining environmental problems as the interaction of biophysical processes, human needs and wider political systems.
- Blaikie and Brookfield (1987:17) wrote:
  - The phrase “political ecology” combines the concerns of ecology and a broadly defined political economy. Together this encompasses the constantly shifting dialectic between society and land-based resources, and also within classes and groups within society itself.

- ***Secondly***, there is the “politics of ecology” in the sense of political activism in favour of Deep Green environmentalism and its critique of modernity and capitalism.
- Atkinson (1991) wrote:
  - Political Ecology is both a set of theoretical propositions and ideas on the one hand and on the other a social movement referred to as the “ecology movement” or, latterly, the Green movement (Atkinson, 1991:18).

➤ **Thirdly**, there is the use of “ecology” as a metaphor for the interconnectedness of political relations. This metaphor was adopted by the first book with “political ecology” in its title, ***International Regions and the International System: A Study in Political Ecology*** by Bruce M. Russett in 1967, even though the book itself had no discussion of biophysical environmental change or conservation. He wrote:

- I have termed this volume “a study in political ecology.” As ecology is defined as the relation of organisms or groups of organisms to their environment, I have attempted to explore some of the relations between political systems and their social and physical environment (Russett, 1967:vii, emphasis in original).

- **Fourthly**, political ecology has been defined as a more specific analysis of Marxist debates about materialism, justice, and nature in capitalist societies, with the view to achieving a fairer distribution of rights and resources.
- **Finally**, there is the use of “political ecology” to refer in general terms to the politics of environmental problems without specific discussion of “ecology.”

- Bryant (1992:13) for example describes political ecology as an inquiry into “the political forces, conditions and ramifications of environmental change,” and may include studies of environmental impacts from different sources; location-specific aspects of ecological change; and the effects of environmental change on socio-economic and political relationships.
- But essentially, political ecology represents attempts to provide critiques as well as alternatives in the interplay of the environment and political, economic and social factors.

- What can be learnt from the various definitions is that political ecology as a branch of knowledge has three crucial problems as its focus:
  - i. limited resources and their uneven distribution, including the depletion of mineral resources and biosphere reserves ;
  - ii. the relationship between industrialization and pressures on the environment; and,
  - iii. pollution and waste.

- ***i)* Limited resources and their uneven geographical distribution is the most obvious problem.**
- Discussions about the depletion of mineral resources and biosphere reserves have lasted for quite a while.
- Initially they encompassed oil and natural gas, which resulted in the adoption of energy saving measures, as well as the development of the so-called 'new energy sources' (including nuclear and renewable ones).
- It seemed that with the development of technologies and dematerialization of the economy the solution of the problem has drawn nearer.
- But the debate over hydrocarbons has given way to debate over rare materials and rare earth metals.

- For example, that on June 17, 2010, there was a presentation of the results of a 2-year study sponsored by the European Union on the stability of natural resource supply.
- The study identified 14 materials (mainly, rare earth minerals) (such as (antimony, fluorspar, gallium, germanium, graphite, indium, magnesium, rare earth metals, tungsten, etc.) which it classified as critically important for modern high-precision instruments and energy-saving technologies.

- Apart from these rare mineral resources, there is also a problem with water, timber, oxygen and land.
- For example, as part of the bid to reduce the negative consequences of hydrocarbons, emphasis is placed on the production of biofuels.
- However, the production of biofuel will require vast arable territories.
- In the meantime, the European Union, which has set itself a goal of producing 10 percent of the fuel from biological materials by 2020, does not have enough land for that.
- This will encourage it to seek new patterns of cooperation with countries in Africa and Latin America

- **ii) The relationship between industrialization and pressures on the environment.**
- The point is that any new industry contributes to the increase of this load on the environment.
- Dematerialization of industrialized Western economies means the transfer of production, including dirty technologies, to the developing world.
- It turns out that pollution occurs in some countries, while all the benefits from using the goods produced there are enjoyed by the people of others.

- On the other hand, placing high-tech production facilities close to the natural resources changes the current economic balance in the world, creates new jobs, and boosts prosperity in the developing and newly industrialized countries.
- As a result, they get an impetus for development, even though they do not (yet) account for the bulk of consumption.

- **iii) Pollution and waste.**
- Most debatable is the problem of reducing the emissions of gases causing the greenhouse effect, including calls for an international regime that would regulate emissions after 2012, when the Kyoto Protocol expires.
- Today the main emissions are from China and the U.S.
- These two countries are spending not only their own biosphere resources, but also other nations' assets.
- However, as we know, the issue has a historical side to it: for several centuries most of the carbon dioxide emissions occurred in the West, while China and the newly industrialized countries are merely trying to catch up with the golden billion countries in terms of industrial development and, consequently, emissions.

- At the UN climate summit in Copenhagen in December 2009, the major players failed to come to an agreement what principle should underlie the distribution of the burden of greenhouse gas emissions cuts for the period of 2013-2020 (2050).
- If the advocates of historical responsibility get the upper hand, then the West will have to undertake most of the required efforts, including making mandatory tangible appropriations and providing programs for assistance to the developing countries.

- Conversely, if the current level of pollution is chosen as the reference point, then the bulk of the expenses for emission reductions will have to be taken by the developing countries.
- It is also important to see in what way the commitments to reducing emissions will be calculated: in absolute terms in relation to 1990, the way proposed by the Western capitals, or in amounts of GHG per unit of the gross domestic product, in line with Beijing's demands.