

Introduction to Environmental Sciences (FEC-7) (Assignment 1) (slot-2)

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1) Biodiversity and its types :-

Biodiversity means the number and variety of species, it is the diversity of plant and animal in a particular region or in the world.

There are 3 types of biodiversity and they are :-

i) Genetic diversity :-

Living things contain in their cells, the basic instructions (which are called genes) for their own development. Many of these instructions result in physical characteristics that affect the way organisms interact with their environment. Variations in such characteristics within the same species give rise to genetic diversity. A significant level of variation must be ~~present~~ present for a species to adapt to an ever-changing ecosystem.

ii) Species Diversity :-

It is a measure of the diversity within an ecological community that incorporates the

number of species in a community and the evenness of species abundance.

Communities with more species are considered to be more diverse. Evenness measures the variation in the abundance of individuals per species within a community. Communities with greater evenness are considered to have greater species diversity.

iii) Ecosystem Diversity :

It indicates the variation in the functions of ecosystem. It tells about trophic levels, energy flow, ~~and total~~ food and total stability of ecosystems. The ecosystems can be of various types as governed by the species composition and the physical structure. Following are a few examples.

(a) Terrestrial ecosystems

(b) Aquatic ecosystems

(c) Artificial or man-made ecosystems.

Hotspots of Biodiversity

A biodiversity hotspot is a biogeographic region that is both a significant reservoir of biodiversity and is threatened with destruction. For ~~an~~ example, forests are considered hotspot of biodiversity.

The areas on earth which exhibit high species richness as well as high species endemism are termed as hotspots of biodiversity.

To qualify as a hotspot, an area must satisfy the following criteria:

- (i) It must support 0.5% of the global plant species.
- (ii) It must have lost more than 70% of its original habitat.

⇒ There are 34 hotspots of biodiversity on global level, out of which the following are present in India:

- a) The Western Ghats
- b) The Eastern Himalayas.

About 1 billion people live in these hotspot areas.

Many of these areas also suffer from overexploitation of land due to excessive agriculture, hunting, logging and climate change. Thus, hotspots are in need of sincere conservation actions.

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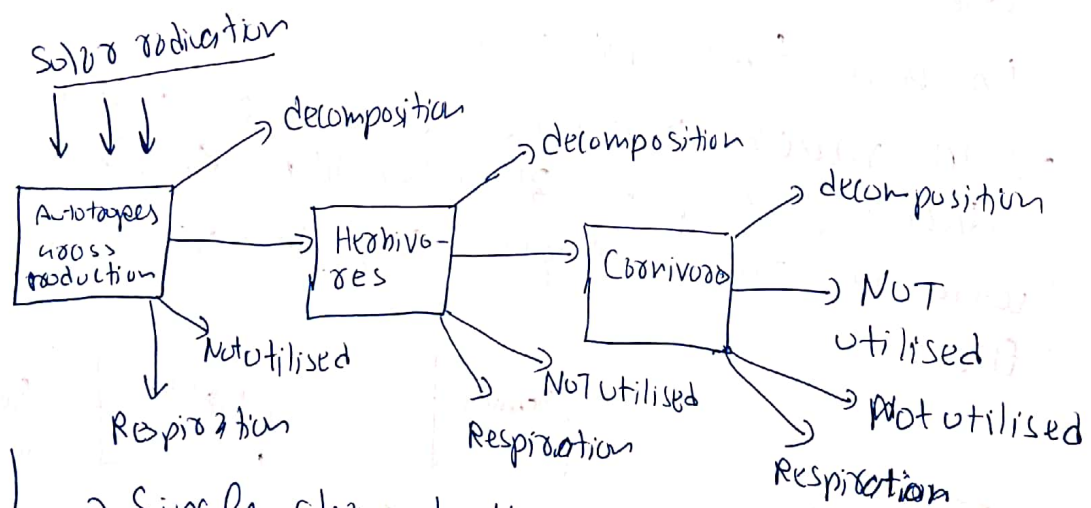
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Energy flow model in ecosystem

Flow of energy in an ecosystem takes place through the food chain and it is this energy which keeps the ecosystem going. The flow of energy through various trophic levels in an ecosystem can be explained with the help of various energy flow models.

i) Single channel/chain energy flow:

The flow of energy takes place in an unidirectional manner through a single channel of green plants or producers to herbivores and carnivores.



→ Single channel flow of energy.

There is unidirectional flow of energy. The energy captured by autotrophs does not revert back to solar input but passes to herbivores; and that

Which passes to herbivores does not go back to autotrophs but passes to consumers, due to overflow of energy, the system would collapse if the primary sources of energy (i.e., sun) were cut off.

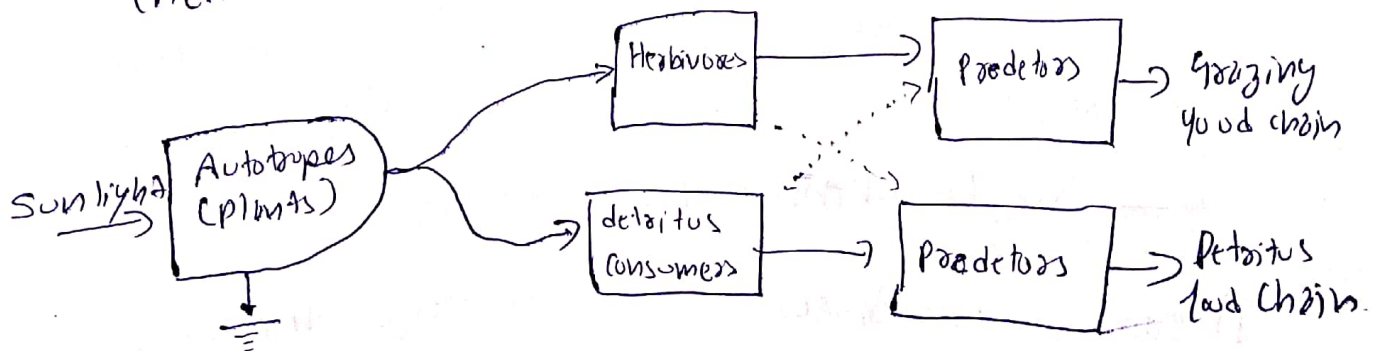
At each trophic level, there occurs progressive decrease in energy. This is accounted largely by the coupled with unutilized energy.

ii) Y-shaped / two channel energy flow model

⇒ It relates to the basic stratified structure of ecosystem:

⇒ The direct consumption of living plants and dead organic matter are usually separated in both time and space.

⇒ The macro consumers and micro consumers differ greatly in size, metabolism & relations and in the techniques required for studying them

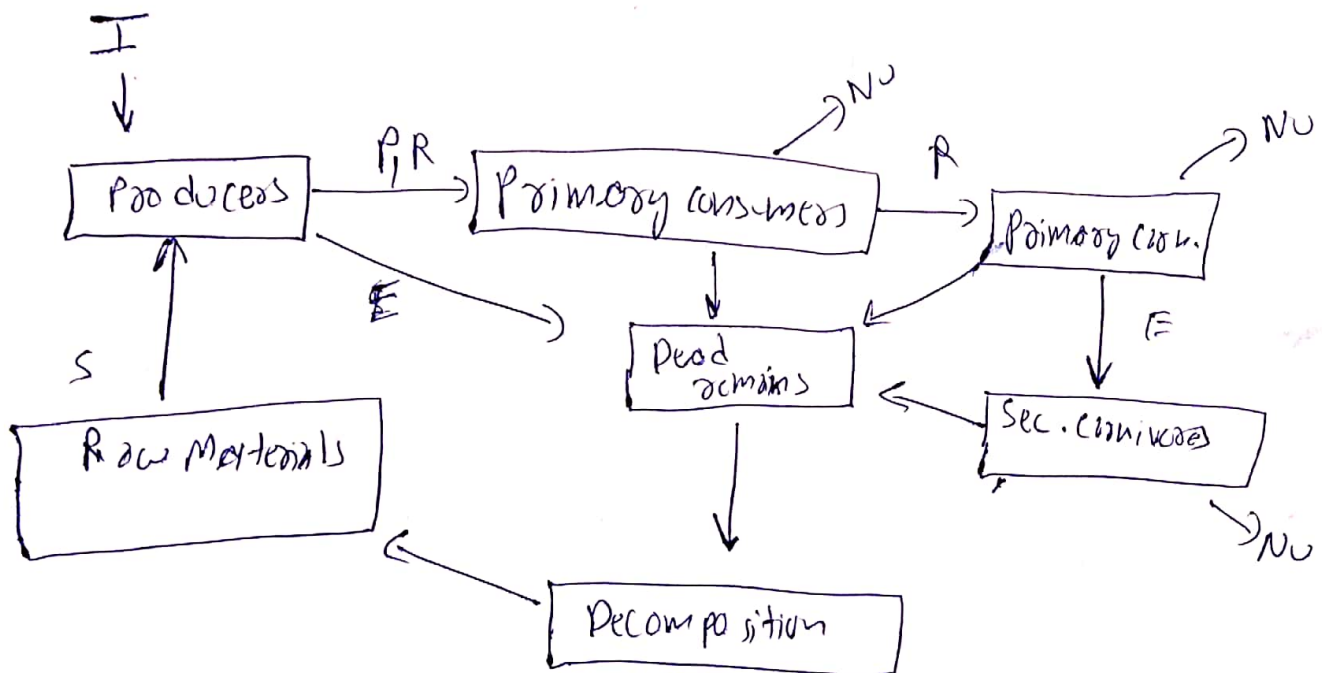


⇒ The grazing and detritus food chains are interconnected.

Moreover, not all food eaten by grazers is actually assimilated, as some (feces containing undigested material) is diverted to the detritus pathway.

③ Universal energy flow Model

It was given by e.p. Odum by combining both single and Y-shaped models which are both applicable to terrestrial and aquatic ecosystem and this combined model is known as Universal energy flow model. In this model, I- Incident solar rays; A-Assimilated energy; P-net production; G-growth; B-Biomass; R-Respiration; S-stored energy; E-Excreted energy; NU-unutilized energy



=> It can ~~be~~ represent ~~a~~ a series population in which case the appropriate energy inputs and links with other species would be shown as a conventional species ~~would be shown~~ oriented food levels.

=> The model can represent a discrete energy level in which case the biomass and energy channels represent many populations supported by the same energy source.
