

## **ENVIRONMENTAL STUDIES**

### **LECTURE-17**

#### **Ecological Pyramids**

An ecological pyramid is the graphical representation of the number, energy, and biomass of the successive trophic levels of an ecosystem. Charles Elton was the first ecologist to describe the ecological pyramid and its principals in 1927.

The biomass, number, and energy of organisms ranging from the producer level to the consumer level are represented in the form of a pyramid; hence, it is known as the ecological pyramid.

The base of the ecological pyramid comprises the producers, followed by primary and secondary consumers. The tertiary consumers hold the apex. In some food chains, the quaternary consumers are at the very apex of the food chain.

The producers generally outnumber the primary consumers and similarly, the primary consumers outnumber the secondary consumers. And lastly, apex predators also follow the same trend as the other consumers; wherein, their numbers are considerably lower than the secondary consumers.

For example, Grasshoppers feed on crops such as cotton and wheat, which are plentiful. These grasshoppers are then preyed upon by common mouse, which are comparatively less in number. The mice are preyed upon by snakes such as cobras. Snakes are ultimately preyed on by apex predators such as the brown snake eagle.

In essence:

**Grasshopper → Mouse → Cobra → Brown Snake Eagle**

#### **Primary Consumers**

They are also called herbivores animals who eat producers or plants. Sometimes, these primary consumers become prey for other animals that sit higher on the food chain. Some of the primary consumers or herbivores living on the land are chipmunks, mice, horses, birds, deer and some insects. Fish, zooplankton, snails, sea urchins are a few marine primary consumers..

## **Secondary Consumers**

These are animals who feed on primary consumers. They usually eat meat and are termed as predators. Lion, hawks, snakes, coyotes, wolves, and spiders are a few terrestrial secondary consumers.

## **Tertiary Consumers**

They are the ones who feed on secondary consumers. They are thus called the top predators. They are also termed as apex predators and have no natural enemies. Naturally, you would assume that humans are at the top of the food chain, but they are not.

## **10 Percent Energy Rule**

Even though primary consumers feed on producers, they are still getting their energy from the sun. The primary consumers feed on plants and break down the food particles to release the energy.

Primary consumers do not get 100% of the sun's energy from the producers or the plants on which they feed. This is because only some amount of the sun's energy is utilised by the plant to synthesise their food.

In fact, they only get 10% of the energy. This is termed as the 10% Rule, which states that only 10 per cent of the energy available gets passed onto the next level of consumers.