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# **Lecture-1**

**(For B.Sc. (H) Physical Science, Computer Science,  
Electronics, and Anthropology)**

## **Chapter 3: Natural Resources**

### **Topics to cover**

#### **Food resources**

Today our food comes almost entirely from agriculture, animal husbandry and fishing. Although India is self-sufficient in food production, it is only because of modern patterns of agriculture that are unsustainable and which pollute our environment with excessive use of fertilizers and pesticides. Most of our large farms grow single crops (monoculture). If this crop is hit by a pest, the entire crop can be devastated, leaving the farmer with no income during the year. On the other hand, if the farmer uses traditional varieties and grows several different crops, the chance of complete failure is lowered considerably. Many studies have shown using alternatives inorganic fertilizers and pesticides. This is known as **Integrated Crop Management**.

**World food problems:** In many developing countries where populations are expanding rapidly, the production of food is unable to keep pace with the growing demand. Food production in 64 of the 105 developing countries is lagging behind their population growth levels. These countries are unable to produce more food, or do not have the financial means to import it. India is one of the countries that have been able to produce enough food by cultivating a large proportion of its arable land through irrigation. The Green Revolution of the 60's reduced starvation in the country.

However many of the technologies we have used to achieve this are now being questioned.

- Our fertile soils are being exploited faster than they can recuperate.
- Forests, grasslands and wetlands have been converted to agricultural use, which has led to serious ecological questions.
- Our fish resources, both marine and inland, show evidence of exhaustion.
- There are great disparities in the availability of nutritious food. Some communities such as tribal people still face serious food problems leading to malnutrition especially among women and children.

These issues bring in new questions as to how demands will be met in future even with a slowing of population growth. Today the world is seeing a changing trend in dietary habits. As living standards are improving, people are eating more non-vegetarian food. As people change from eating grain to meat, the world's demand for feed for livestock based on agriculture increases as well.

Poor environmental agricultural practices such as slash and burn, shifting cultivation, or 'rab'(wood ash) cultivation degrade forests. Globally 5 to 7 million hectares of farmland is degraded each year. Loss of nutrients and overuse of agricultural chemicals are major factors in land degradation. Water scarcity is an important aspect of poor agricultural outputs. Salinization and water logging has affected a large amount of agricultural land worldwide. Loss of genetic diversity in crop plants is another issue that is leading to a fall in agricultural produce. Rice, wheat and corn are the staple foods of two thirds of the world's people. Genetic engineering is an untried and risky alternative to traditional cross breeding.

**Food Security:** It is estimated that 18 million people worldwide, most of whom are children, die each year due to starvation or malnutrition, and many others suffer a variety of dietary deficiencies. The earth can only supply a limited amount of food. If the world's carrying capacity to produce food cannot meet the needs of a growing population, anarchy and conflict will follow. Thus food Security is closely linked with population control through the family welfare program. It is also linked to the availability of water for farming. Food security is only possible if food is equitably distributed to all. Many of us waste a large amount of food carelessly. This eventually places great stress on our environmental resources. A major concern is the support needed for small farmers so that they remain farmers rather than shifting to urban centers as unskilled industrial workers. International trade policies in regard to an improved flow of food across national borders from those who have surplus to those who have a deficit in the developing world is another issue that is a concern for planners who deal with International trade concerns. 'Dumping' of under priced foodstuffs produced in the developed world, onto markets in undeveloped countries undermines prices and forces farmers there to adopt unsustainable practices to compete.

**Alternate food sources:** Food can be innovatively produced if we break out of the current agricultural patterns. This includes working on new avenues to produce food, such as using forests for their multiple non-wood forest products, which can be used for food if harvested sustainably. This includes fruit, mushrooms, sap, gum, etc. This takes time, as people must develop a taste for these new foods. Medicines, both traditional and modern, can be harvested sustainably from forests.

# Lecture-2

## Topics to cover

### Forest Resources

Forests are one of the most important natural resources on this earth. Covering the earth like a green blanket these forests not only produce innumerable material goods, but also provide several environmental services which are essential for life.

### Use and overexploitation

Scientists estimate that India should ideally have 33 % of its land under forests. Today we have only about 12 %. Thus we need not only to protect existing forests but also to increase our forest cover. People who live in or near forests know the value of forest resources first hand because their lives and livelihoods depend directly on these resources. However, the rest of us also derive great benefits from the forests which we are rarely aware of. The water we use depends on the existence of forests on the watersheds around river valleys. Our homes, furniture and paper are made from wood from the forest. We use many medicines that are based on forest produce. As agriculture spread the forests were left in patches which were controlled mostly by tribal people. They hunted animals and gathered plants and lived entirely on forest resources. Deforestation became a major concern in British times when a large amount of timber was extracted for building their ships. This led the British to develop scientific forestry in India. They however alienated local people by creating Reserved and Protected Forests which curtailed access to the resources. This led to a loss of stake in the conservation of the forests which led to a gradual degradation and fragmentation of forests across the length and breadth of the country. Another period of over utilisation and forest degradation occurred in the early period following independence as people felt that now that the British had gone they

had a right to using our forests in any way we pleased. The following years saw India's residual forest wealth dwindle sharply. Timber extraction continued to remain the Forest Department's main concern up to the 1970s. The fact that forest degradation and deforestation was creating a serious loss of the important functions of the forest began to override its utilisation as a source of revenue from timber.

**Deforestation:** Where civilizations have looked after forests by using forest resources cautiously, they have prospered, where forests were destroyed, the people were gradually impoverished. Today logging and mining are serious causes of loss of forests in our country and all over the world. Dams built for hydroelectric power or irrigation have submerged forests and have displaced tribal people whose lives are closely knit to the forest. This has become a serious cause of concern in India. One of India's serious environmental problems is forest degradation due to timber extraction and our dependence on fuel wood. A large number of poor rural people are still highly dependent on wood to cook their meals and heat their homes. The National Forest Policy of 1988 now gives an added importance to JFM. Another resolution in 1990 provided a formal structure for community participation through the formation of Village Forest Committees. Based on these experiences, new JFM guidelines were issued in 2000. This stipulates that at least 25 per cent of the income from the area must go to the community. From the initiation of the program, until 2002, there were 63,618 JFM Committees managing over 140,953 sq. km of forest under JFM in 27 States in India. In many States non-timber forest products (NTFPs) are available for people free of cost. Some States have stopped grazing completely, some have rotational grazing schemes which have helped in forest regeneration.

## **CASE STUDY**

### **Joint Forest Management**

The need to include local communities in Forest Management has become a growing concern. Local people will only support greening an area if they can see some economic benefit from conservation. An informal arrangement between local communities and the Forest Department began in 1972, in Midnapore District of West Bengal. JFM has now evolved into a formal agreement which identifies and respects the local community's rights and benefits that they need from forest resources. Under JFM schemes, Forest Protection Committees from local community members are formed. They participate in restoring green cover and protect the area from being over exploited.

**Timber extraction, mining and dams** are invariably parts of the needs of a developing country. If timber is overharvested the ecological functions of the forest are lost. Unfortunately forests are located in areas where there are rich mineral resources. Forests also cover the steep embankments of river valleys, which are ideally suited to develop hydel and irrigation projects. Thus there is a constant conflict of interests between the conservation interests of environmental scientists and the Mining and Irrigation Departments. What needs to be understood is that long-term ecological gains cannot be sacrificed for short-term economic gains that unfortunately lead to deforestation. These forests where development projects are planned can displace thousands of tribal people who lose their homes when these plans are executed. This leads to high levels of suffering for which there is rarely a satisfactory answer.

## **FOREST FUNCTIONS**

### **Watershed protection:**

- Reduce the rate of surface run-off of water.
- Prevent flash floods and soil erosion.

- Produces prolonged gradual run-off and thus prevent effects of drought.

**Atmospheric regulation:**

- Absorption of solar heat during evapo-transpiration.
- Maintaining carbon dioxide levels for plant growth.
- Maintaining the local climatic conditions.

**Erosion control:**

- Holding soil (by preventing rain from directly washing soil away).

**Land bank:**

- Maintenance of soil nutrients and structure.

**Local use** - Consumption of forest produce by local people who collect it for subsistence –

(Consumptive use)

- Food - gathering plants, fishing, hunting from the forest.

(In the past when wildlife was plentiful, people could hunt and kill animals for food. Now that populations of most wildlife species have diminished, continued hunting would lead to extinction.)

- Fodder - for cattle.
- Fuel wood and charcoal for cooking, heating.
- Poles - building homes especially in rural and wilderness areas.
- Timber – household articles and construction.
- Fiber - weaving of baskets, ropes, nets, string, etc.
- Sericulture – for silk.
- Apiculture - bees for honey, forest bees also pollinate crops.
- Medicinal plants - traditionally used medicines, investigating them as potential source for new modern drugs.

**Market use** - (Productive use)

- Most of the above products used for consumptive purposes are also sold as a source of income for supporting the livelihoods of forest dwelling people.
- Minor forest produce - (non-wood products): Fuel wood, fruit, gum, fiber, etc.

which are collected and sold in local markets as a source of income for forest dwellers.

- Major timber extraction - construction, industrial uses, paper pulp, etc. Timber extraction is done in India by the Forest Department, but illegal logging continues in many of the forests of India and the world.

#### References:

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