



# **FOOD RESOURCES**

# FOOD RESOURCES-PRESENTATION PLAN

1. Important Food Resources
2. Sustainable Agriculture Practices(FAO Def.)
3. World Food problems-How India is able to meet food demands
4. Threats to Food Resources
5. Over Grazing- Reasons & Impacts
6. Agriculture Practices- Shifting cultivation/Modern Agriculture

# Food Resources

- ✓ The main food resources – rice, wheat, maize, barley, oats, pulses, sugarcane, other fruits and vegetables, meat, milk etc.
- ✓ The FAO estimation – minimum calorific intake on a global scale is 2,600 kcal/day.
- ✓ Agriculture, Animal husbandry and fishing – food resources
- ✓ Unsustainable pattern of agriculture in India – excessive use of fertilizers and pesticides, environmental pollution
- ✓ Sustainable agriculture – agriculture that conserves land, water and plant and animal genetic resources, does not degrade the environment, is economically viable and socially adaptable (FAO)



# World Food Problems

- Food production in 64 of the 105 developing countries is lagging behind their population growth levels.
- Green revolution in India (1960's) – reduced starvation(hunger) in the country
- Major problems in India:
  - ✓ Forests, grasslands and wetlands are converted to agricultural use, leading to serious ecological problems.
  - ✓ Great disparity in the availability of nutritious food.

- **THREATS TO FOOD RESOURCES:**
- Changing trend in dietary habits (with improved living standards, people are eating more non-vegetarian food);
- Increase in demand for feed for livestock requires more land per unit food produced – lack of food for the poor
- Degradation of farmland - loss of nutrients and overuse of agricultural chemicals
- Water scarcity – poor agricultural output

# Overgrazing

- Livestock wealth plays a crucial role in the rural life of our country
- The huge population of live stock needs to be fed and the grazing land areas are not adequate.
- Most often, the grazing pressure is so high that its carrying capacity is crossed and the sustainability of the grazing land fails.

# Impacts of Overgrazing

## ➤ Land Degradation

- ✓ Overgrazing removes the vegetal cover over the soil and the exposed soil gets compacted due to which the operative soil depth declines
  - Roots cannot go deep into the soil
  - Adequate soil moisture is not available
- ✓ The humus content of the soil decreases and overgrazing leads to organically poor, dry, compacted soil.
- ✓ Due to trampling by the cattle, the soil loses infiltration capacity which reduces percolation of water into the soil and as a result of this more water gets lost from the ecosystem along with surface runoff.

Thus overgrazing leads to multiple actions resulting in loss of soil structure, hydraulic conductivity and soil fertility.



## ➤ **Loss of useful species**

- ✓ Overgrazing adversely affects the composition of plant population and their regeneration capacity
- ✓ Replacement by secondary species.



# Agriculture

- Slash and burn cultivation or shifting cultivation
- Modern agriculture

The types of agriculture are very different in their process and their outputs in terms of yield as well as their impacts on the environment.

# Modern Agriculture

## MEANING:

- 1. USING HIGH YIELD/HYBRID/GENETICALLY MODIFIED SEEDS
- 2. CONSTRUCTION OF LARGE SIZE DAMS
- 3. USING SYNTHETIC CHEMICALS(FERTILIZERS/PESTICIDES)

# Modern Agriculture and its Impacts

- It makes use of hybrid seeds of selected single crop variety, high-tech equipments and lots of energy subsidies in the form of fertilizers, pesticides and irrigation water.
- The food production has increased tremendously, evidenced by the “green revolution” .

## The Impacts

- ✓ Impacts related to high yielding varieties
- ✓ Fertilizer related problems
- ✓ Pesticide related problems
- ✓ Water logging
- ✓ Salinity problems

# Impacts related to high yielding varieties

- The use of high yielding varieties encourage monoculture.
- In case of an attack by some pathogen, there is total devastation of the crop by the disease due to exactly uniform conditions, which help in rapid spread of disease.



# Fertilizer related problems

## ➤ **Micronutrient Imbalance**

- Most of the chemical fertilizers used in modern agriculture have nitrogen, phosphorus and potassium - essential macronutrients
- Farmers use these indiscriminately to boost up crop growth.

## ➤ **Nitrate Pollution**

- Nitrogenous fertilizers applied in the fields often leach deep into soil and ultimately contaminate the ground water.
- “Blue Baby Syndrome” - nitrate concentration exceeds 25 mg/L

## ➤ **Eutrophication**

- Due to eutrophication, lakes get invaded by algal blooms; these algae grows very fast by rapidly using up the nutrients, they are often toxic and badly affect the food chain.

# Pesticide related problems

## ➤ **Creating resistance in pests and producing new pests**

Some individuals of the pest species usually survive even after pesticide spray.

The survivors give rise to highly resistant generations.

## ➤ **Death of non-target organisms**

Many insecticides are broad spectrum poisons which not only kill the target species but also several non-target species which are useful to us.

## ➤ **Biological magnification**

Many of the pesticides are not biodegradable and keep on accumulating in the food chain, called Bio-magnification.

# Water logging

- Over irrigation of croplands by farmers for good growth of their crop usually leads to water logging.
- Under water logged conditions, pore spaces in the soil get fully drenched with water and the soil-air gets depleted.
- The water table rises while the roots of the plant do not get adequate air for respiration.
- Mechanical strength of the soil declines, crop plants get lodged and crop yield fails.

Preventing excessive irrigation, sub-surface drainage technology and bio-drainage with trees like Eucalyptus are some of the remedial measures to prevent water logging.

# Salinity Problems

- At present  $\frac{1}{3}$ <sup>rd</sup> of the total cultivable land area of the world is affected by salts.
- Indian context - about 7 million ha of land are estimated to be salt affected.
- Saline soils are characterized by the accumulation of soluble salts like sodium chloride, sodium sulphate, calcium chloride, magnesium chloride...

The most common method for getting rid of salts is to flush them out by applying more good quality water to such soils.



# Case Study

## 1. Israel's Drip-irrigated Farming

- Israel began using drip irrigation systems as it is short of water.
- With this technique, farmers have been able to improve the efficiency of irrigation by 95%.
- Over a 20-year period, Israel's food production doubled without an increase in the use of water for agriculture.
- In India, some traditional communities in urban and semi-urban towns used to grow their own vegetables in backyards on wastewater from their own homes.
- Calcutta releases its waste water into surrounding lagoons in which fish are reared and the water is used for growing vegetables.

# Drip-irrigation





## 2. Salinity and water logging in Punjab

- The first alarming report of salt-affected wasteland formation in connection with irrigation practices came from Haryana (then Punjab) in 1858.
- It was reported that several villages in Panipat, Rohtak and Delhi lying in command area of Western Yamuna Canal were suffering from destructive saline efflorescence.
- The “Reh Committee” in 1886 drew the attention of the government on some vital points showing a close relationship between irrigation, drainage and spread of “reh” and “usar” soils.
- The floods of 1947, 1950, 1952, 1954-56 in Punjab resulted in aggravated water logging with serious drainage problems.
- Introduction of canal irrigation in 1.2 m ha in Haryana resulted in rise in water-table followed by water-logging and salinity in many irrigated areas causing huge economic losses as a result of fall in crop productivity.