Agriculture, Industry and the Ecosystems

Basics

Basic features of new agricultural practices during Green Revolution

(a) Intensive cultivation through ‘multiple cropping’ technique

(b) Use of ‘High Yield Variety’ of seeds that gave larger quantities of produce per crop, per hectare

(c) Application of chemical fertilisers to replace the soil nutrients used up by the HYV seeds.

(d) Adequate Irrigation as the chemical fertilisers need more water to dissolve their concentrated nutrient content

(e) Application of chemical pesticides as the High Yield Variety seeds were prone to diseases and pest attacks.

Impact of modern cultivation technique on environment and ecosystem

(1) Indiscriminate and increasing use of chemical fertilisers and pesticides, was harmful. It impacted soil fertility adversely, making it toxic.

Chemical fertilizers need more water to break down the chemicals in the soil. The resultant Salinization, combined with de-forestation, sets in the process of progressive desertification of land

(2) HYV seeds were used of a few crops only, resulting in mono-cultivation of wheat and rice, and decline of other varieties. This reduced the re-building of soil fertility through the natural process. The process involved alternation of crops so that different minerals from the soil could be used by different grains, which retained the natural balance of the soil by allowing exhausted minerals to be re-built.

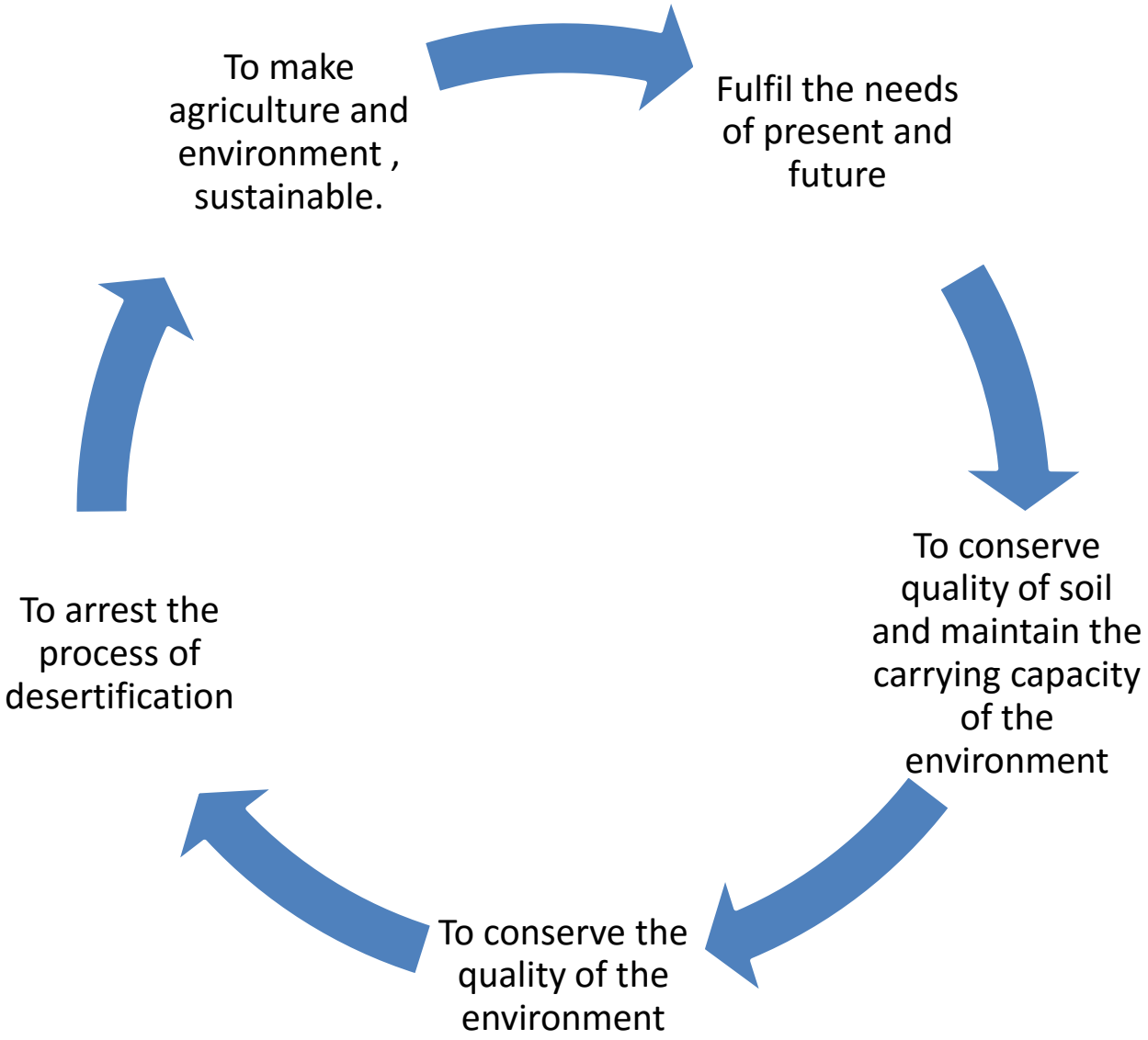
(3) More water was needed by the HYV seeds and chemical fertilizers. This led to irrigation through electrical pumps, that drew out more underground water. This resulted in lowering of the water table under the ground at most places. The exhausted underground water was more than what could be replenished during the rainy season.

(4) Lack of drainage in the fields resulted in water logging due to excessive water used. Water logging in areas that receive scanty or moderate rains, brings up salts to the surface of the soil, causing the problem of salinization. This is caused because as excessive water in the fields moves up the layers of the soil, it draws salt from the lower levels and deposits it on the top layer of the soil.

Environmental Impact of Large Dams and Hydro Power Projects

1	Loss of Habitat for villagers and tribal people due to vast areas getting inundated by diversion of rivers during construction.
2.	Diversion of water through a tunnel for power generation, results in adverse impact on aquatic ecosystem and safety of vulnerable species .
3.	About 4.5 million hectares of forest land has been submerged in 116 hydro projects between the two decades from 1980 to 2000. This has cause irreversible loss to biodiversity and ecological balance.
4.	The down stream flora and fauna is adversely impacted due to reduction in the flow of quantum of water beyond a dam. This starves the river ecosystem food chain.
5.	Water logging due to overflow of canals from the dam, causes salinity of soil and destruction of natural vegetation
6.	During excessive rains, water is suddenly released from the dams , causing loss of crops and damage to the entire ecosystem.
7.	The Hydel power lines, for transmission of power from the hydro project to the urban centres, passes through reserved forest areas. These generate high radiation and cause inestimable damage to the forest ecosystems.
8	Reservoir induced earthquakes are cause due to weight of the reservoir. 17 out of 75 such earthquakes have occurred in India

Measures to save the Ecosystem- Basic Objectives



Steps for conservation of water, soil, forests and grasslands of India

(1) Government Initiatives: on change in water policy with emphasis on small irrigation projects in place of large hydro projects.

(2) Develop a proper water management policy, through decentralisation of water management, effective water conservation schemes, involving the local population in conservation of water

(2) Proper Watershed Management techniques in every local ecosystem, with emphasis on rainwater harvesting. It is estimated that currently approximately 8% rainwater is harvested through Watershed Management.

(2.1) Rainwater harvesting involves construction of long trenches and earthen check dams to hold the rain water flowing down the trenches.

(2.2) Afforestation to secure the top soil and prevent it from being washed away during rains. (3.3) Terrace farming bunding to conserve top soil.

(3) Conservation and management of Soil:

(3.1) Restoring soil fertility through higher use of organic fertilizers, green manure, organic pest management.

(3.2) Planned Rotation of different crops in succession on the same land, in place of a single crop.

(3.3) Mixed cropping under which two or more crops are cultivated at the same time on the same land. These have different durations and use different nutrients of the soil , and improve soil fertility. (3.4) Inter cropping or Strip cropping in which different kinds of legumes are planted in rows along with perennial crops.

(4) Conservation of forests: Joint Forest Management through Village Forest Committees. This has been an effective method in restoring 4.05 million hectares of degraded forest land by 40,300 village committees.

(4.1) Plantation and Social Forestry combine quick growth variety of trees that can grow in semi-arid and arid soil. Such plants prevent desertification and meet the fuel needs of villagers.

Thus, for protecting the local agro- ecosystem, social forestry has been a useful method. It includes extension of forest cover through re-forestation, planting of trees along roadsides, canals, railway tracks, common lands in villages / blocks / districts.

(5) Organic farming: is a holistic agricultural production management system that promotes the overall conservation and sustainable use of land resource. It is part of (5.1) Sustainable agriculture, through the use of organic manure comprising of bio-composts, vermi- composts, cow dung in place of chemical fertilizers. Certain micro-organisms, such as bacteria, blue- green algae are used as nitrogen fixers and supply nutrients to the soil. (5.2) Green manure involves growing a cover crop of ferns and clover which is a three leaved small plant growing wild on uncultivated land. These contain nitrogen fixing bacteria in their leaves. When the plants dry up and decompose the nitrogen re-fixes the fertility content of the soil. (5.3) Bio-herbicides are chemicals used for reducing the growth weeds in the crops. Under this certain insects are induced that feed on the weeds. (5.3.1.) Certain crops such as soya bean, millet, sunflower, barley, alfa alfa, do not allow weeds to grow near them. The effectiveness of 'neem' and ' turmeric' as bio-pesticides.