**Water for all:** Water is a basic necessity for all forms of terrestrial and aquatic It is available in the form of several water bodies like oceans, lakes and ponds. Rain is a very important source of water. Rain in India largely occurs during the monsoons. This means that most of the rain falls in few months of the year and replenishes water bodies. Inspite of good rains, the failure to sustain availabilities of underground water is due to:

- lack of sufficient vegetative cover on the ground because which, only little rainwater seeps into the ground and gets stored as groundwater.
- the high yielding varieties of crops require much amount of water for irrigation.
- untreated sewage -and industrial wastes discharged into the rivers and lakes reduce the availability of usable water.

**Management of Water Resources:** Following practices have been made to manage the water resources:

- Dams, tanks and canals are used since many years to meet the minimum requirements for both agriculture md daily needs.
- Regulation of use of water stored in dams. Optimum cropping pattern based on water availability.

Kulhs of Himachal Pradesh.

- Parts of Himachal Pradesh had evolved a local system of canal irrigation called Kulhs over four hundred years ago. The water in streams was diverted to the fields in the villages farthest from the source of Kulh, then to villages progressively higher up. In this way, water was shared between many villages, but after the Kulhs was taken over by the irrigation department. Most of them became non-functional and there was no peaceful sharing of water as before.

**Dams**: They are the barriers constructed across rivers to hold the water. These are large reservoirs of water, that ensures the age of adequate water for different uses.

Purpose and Uses of Dams: Water stored in dams can be used for different purposes are given below:

1. For irrigation.
2. For the generation of electricity (hydroelectric power).
3. To control floods as dams store water during rainy season.
4. Supply of water to great distance (to the place where required) through the canal system e.g. Indira Gandhi Canal has brought greenery to considerable areas of Rajasthan. Indira Gandhi Canal starts from the Harike Barrage at Sultanpur. a few kilometres below the confluence of the Satluj and Beas river in Punjab state.

**Narmada Bachao Andolan**: Narmada Bachao Andolan (Save the Narmada) was a protest against raising the height of Sardar Sarovar Dam on the river Narmada.

Criticism about Large Dams:

1. Social Problems: because they displace large number of peasants and tribals without enough compensation or rehabilitation.
2. Economic Problems: because they utilise large amount of public money without the generation of proportionate benefits.
3. Environmental Problems: because they contribute enormously to deforestation which leads to the loss of biological diversity.

**Mismanagement of Water Distribution**: Mismanagement of water distribution has largely led to the benefits being taken by a few people only. There is no equal distribution of water. People close to the water reservoirs grow water intensive crops like sugarcane and rice while people farther downstream do not get any water. The natives who have been promised benefits that never arrived are added to discontented list of people who have been displaced for building of the dam and its canal network.

**Water harvesting**: It means capturing rainwater where it falls or capturing the run-off water in a local area.





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Watershed Management: Watershed management aims at scientific conservation of soil and water in order to increase the biomass production. The aim is to develop primary resources of land and water to increase the production of secondary resources of plants and animals for their use in a way that will not result in ecological imbalance. The advantages of watershed management are that it increases the production and income of watershed community, reduces droughts and floods and increases the life of downstream dam and reservoirs.

**Conventional Methods of Water Harvesting:** In India, different communities use hundreds of indigenous water saving methods to capture every trickle of water that had fallen on their land.

These methods are:

- Digging of small pits and lakes.
- Put in place simple watershed systems.
- Building small earthen dams.
- Constructing dykes, sand and limestone reservoirs.
- Setup rooftop water collecting units.

**Traditional Water Harvesting System:** In largely level terrain, the water harvesting structures are mainly crescent-shaped earthen embankments or low, straight concrete and rubble checkda.ms built across seasonally flooded gullies. Monsoon rains fill ponds behind the structures. Only the largest structures hold water year round and others usually get dry in six months or less after the monsoons.

Their main purpose however, is not to hold surface water, but to recharge the ground water beneath.

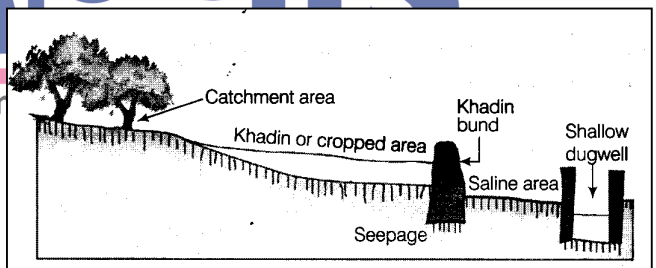
The various advantages of water stored in the ground are:

- It does not evaporate, but spreads out to recharge wells.

It provides moisture for vegetation over a wide area.

- It does not provide breeding grounds for mosquitoes like stagnant water collected in ponds or artificial lakes.
- The groundwater is also relatively protected from contamination by human and animal waste.

**Coal and petroleum** : Coal and petroleum are the most important source energy. These are the largest conventional fossil fuels in addition to carbon contain hydrogen, nitrogen and sulphur.



Traditional water harvesting system–an ideal setting of the Khadins system

Coal: It is a combustible organic fuel that occurs inside Earth.

Petroleum (petro = rocks and oleum = oil) It is a naturally occurring liquid composed of organic chemicals. It is found in large quantities below the surface of the Earth.

**Formation of Coal and Petroleum**

Coal and petroleum were formed from the degradation biomass millions of years ago and hence, these are resources that will be exhausted in the future. As per estimation, our known petroleum resources will

**Some Water Harvesting Systems in India**

| | |
|---|---|
| Khadins, tanks and Nadis | Rajasthan |
| Bandharas and Tals | Maharashtra |
| Bundhis | Madhya Pradesh and Uttar Pradesh |
| Ahars and Pynes | Bihar |
| Kulhs | Himachal Pradesh |
| Ponds | Kandi belt of Jammu |
| Eris (tanks) | Tamil Nadu |
| Surangams | Kerala |
| Kattas | Karnataka |

last about forty years and the coal resources will last for another two hundred years.

**Uses of Coal & Petroleum:** Coal and petroleum both are used as energy source different purposes. Coal is used in thermal power plant, steam engine, etc. Petroleum and its products like diesel, petrol, kerosene, are used in vehicles, ships, aircrafts and household purposes like cooking.

**Pollution by Coal & Petroleum**: When coal and petroleum are burnt, the products like carbon dioxide, water, oxides of nitrogen and oxides of sulphur are released into air. When combustion takes place in insufficient air (oxygen), carbon monoxide is formed instead of carbon dioxide. The oxides of sulphur, nitrogen and carbon monoxide are poisonous at high concentrations among these products - Carbon dioxide is a greenhouse gas. The increase in amount of carbon dioxide in the atmosphere will lead to intense global warming. Thus, we need to use these resources judiciously.

**Conservation of Coat and Petroleum**: General practices to reduce the consumption of coal petroleum are as follows:

- Switch off the lights, fans, television and electrical appliances when not needed.
- Use energy efficient appliances to save electricity.
- Use stairs to climb at least up to three floors a building.
- Public transport system needs to be improved, so that people can use them instead of using their personal vehicles.
- On cold days, an extra sweater can be used instead of heating device like heater or sigri.

**An overview of natural resource management:** sustainable management of natural resources is a difficult task. In addressing this issue, we need to keep an open mind with regard to the interests of various stakeholders. People act with their own best interests as the priority, but it leads to misery for a large number of people and a total destruction of our environment is slowly occurring. Going beyond laws, rules and regulations, we need to minimize our requirements individually and collectively, so that the benefits of development can reach to everyone and to all generations to come.





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