Of all our resources, land is the most tangible one. Land, by definition, is the solid part of the earth's surface. It is a finite resource, so great care should be taken to preserve it. Land has been put to many new uses, apart from traditional ones.

These are the general uses of land:

- Agriculture and horticulture
- Housing
- Laying of roads and railway lines
- Industries
- Mining of mineral resources
- A container for holding water
- For fodder, cattle grazing, forest wealth for timber, fuel, etc.

The above flow chart gives an over-view of India's land classification. The total area of the country is 329 million hectares. Of these 266 million hectares are available for potential use. But in reality, the land has been subjected to varying degrees of degradation.

As per the sixth plan document, out of 266 mha. available for potential use, 175 mha. are degraded due to one or more of the reasons mentioned below:

- Land suffering from serious water and wind erosion - 150 mha.
- Land affected by salinity & alkalinity - 7 mha.
- Land affected by water-logging - 6 mha.
- Land affected by shifting cultivation - 3 mha.
- Land affected by miscellaneous factors - 9 mha.

CAUSES OF LAND DEGRADATION

Excessive population pressure on land

India's population of over 900 million people is more than that of the whole world prior to the Industrial Revolution.

Deforestation

India loses 1.3 million hectares of forests per year. One of the major causes of desertification is the cutting down of trees. According to the National Remote Sensing Agency (NRSA), India had less than 11.4% of area under forests as per the 1992 observation. But the more recent satellite pictures show that the forest cover is now less than 10%.

Erosion

Loss of vegetative cover has made land more susceptible to erosion. Agents of erosion like wind and water have left vast tracts of land barren. Water erodes top soil to an extent of around 12,000 million tonnes (mt) per annum. The loss of top soil represents a permanent depletion of the resource base. The annual loss caused by the erosion of top soil through water comes to Rs.12,000 crores.

Over-irrigation

Big irrigation projects no doubt have brought prosperity to millions of farmers. But, due to over-enthusiasm, many farmers have resorted to successive cropping and over-irrigation, thereby leading to water-logging and consequent salinisation and alkalinisation. This situation mainly arises due to poor drainage.

Floods and Droughts

It is ironical that in India both floods and droughts occur regularly and alternately. According to the National Commission on Agriculture (1976), there are three types of drought:

- Meteorological drought caused by a marked decrease in rainfall.
- Hydrological drought caused by prolonged meteorological drought and its consequent effects on water sources.
- Agricultural drought caused by insufficient rainfall to support crops.

35% of the land is drought-prone and receives rainfall of less than 750 mm. Another 18.5% of the land receiving 750-1000 mm. falls in the transitional zone. The remaining 46.5% receiving rainfall of over 1000 mm. falls under the humid zone.

The impact of drought leads to shortage of fodder, shortage of drinking water, loss in agricultural production, and a general decline in living standards.

Drought is both man-made and environment-induced. Man has played a key role in the creation of drought-prone areas due to his over-exploitation of natural resources like forests, degradation of grazing lands, excessive withdrawal of ground water, silting of tanks, rivers, etc.

Floods, on the other hand, are caused by heavy rains in a very short period. Each situation could have been altered had there been good vegetal cover. Vegetation helps in reducing run-off, increasing infiltration and reducing soil erosion.

The land area prone to floods has doubled from 20 million hectares to above 40 million hectares in the last ten years.

Grazing

India possesses an area which is just a fortieth of the total land area of the world supporting 197 million cattle, and ranking first in the world for cattle population. To support such an immense cattle population we have only 13 mha. as pasture land. This has led to serious problems as animals have encroached into forest lands and even agricultural lands. Due to lack of green fodder, animals are pushed to the fringes of reserve forests and are thus destabilising the forest vegetation. Land degradation due to overgrazing leads to desert-like conditions which, in turn, reduce animal productivity and increase the economic pressure on human beings who depend on animals for their livelihood. Grazing would not be a problem if the dung of the animals is left as fertilizer. Unfortunately, it is removed to be used as fuel, to be sold to intensively farmed areas, etc.

Pollution

Pollution of land is caused by disposal of solid waste, refuse from domestic, industrial and agricultural sectors.

Industrial wastes are:

- Chemical residues
- Fly ash from thermal power stations
- Plastics
- Rubber
- Glass
- Discarded metal

Agricultural residues are:

- Pesticides
- Fertilisers

Another major source of pollution not known to the general public is the creation of derelict land due to mining. Roughly 0.8 mha of land in India are despoiled due to open or surface and underground mining activities. Though this problem is highly location-specific and restricted to remote areas, it necessarily warrants attention in terms of wise management of land. Somewhere someone is affected due to mining, and reclamation of such derelict land.

MANAGEMENT OF LAND

- Wastelands should be afforested on a massive scale involving local people. People themselves should select trees that will meet their requirements.
- The demand for timber should be drastically reduced. Substitutes for furniture material and packing cases should be used. This would ease pressure on standing forests.
- Catchment areas or water-sheds must be thickly vegetated. This would hold rain water and recharge springs, rivers, etc.
- Cultivation on hilly slopes should require terracing and bunding along contour lines.
- Tanks should be desilted, check dams constructed and small ponds created to hold run-off water.
- Shifting agriculture should be replaced by settled agriculture.
- Fertilisers and micronutrients should be applied correctly and only if required. Periodic sampling of soils should be done.
- The drainage problems of fields should be attended to.
- Soil fertility should be restored by using cultural practices like mulching
- green manuring
- Introduction of leguminous crops
- more use of organic manure

Too much stress has been given to inorganic fertilisers. But we have to realise that excessive application of inorganic fertilisers is not a healthy way of practising agriculture. Traditional methods of multiple cropping and intercropping to maintain soil fertility have to be given more emphasis. Cereal crops can be mixed with nitrogen-fixers and grown together e.g., maize and beans.

- Grazing of cattle in forests must be checked. Rotational grazing and hand cutting of grass will save pasture lands. Stall feeding has to be implemented. Creation of more pasture lands and reclamation of wastelands for pasture development through propagation of new grasses and application of optimum fertilisers need to to be implemented.
- Most important, local communities must be educated on the need to leave the dung alone, rather than burning it for fuel or selling for cash. It will regenerate the land, paying rich dividends in the long run.
- The location of industries must be carefully studied. Industries, like thermal power stations and dams, should not displace prime agricultural land.
- The unplanned or haphazard growth of urban development must be checked. 20% of the world's population lives in cities. By the year 2000 A.D. this will rise to 34%.

What can you do ?

The solutions to our problems are not easy and straight forward. They are complex and inter-connected. As an individual one can contribute in one's own small way. The solutions can be tackled at either a micro or a macro level.

MICRO LEVEL ACTIVITIES

- First and foremost, be prepared to act. Analyse your life and your situation, whether you are contributing to any problems. Think and find out how you can overcome that. For example, if you have been throwing garbage on the streets, don't do it. Put it in the bin. Set an example. Others will follow.
- Farmers must be educated on the right agricultural methods to be adopted (see Management of Land).
- Local agricultural extension workers need support and training.
- A small pressure group can be formed to influence local panchayats.
- The media must be informed about local problems.
- A village can be adopted to take up a community development project as a pilot project.
- A small village/school level plant nursery can be started.
- A few saplings may be planted and maintained by the villagers. If these are commercial trees, the villagers will have a greater incentive. The pattas/ownerships of the trees can be handed over to women who can be motivated to involve themselves in tree cultivation.

MACRO LEVEL SOLUTIONS

- Collective participation in water and land management programmes by
- Tree planting on a large scale on barren land
- Contour bunding
- Construction of small water reservoirs
- Control of grazing
- Desilting of tanks
- Influencing the Government on major issues such as the location of heavy industries that would displace or disrupt the lives of the people.