

Soil conservation assignment



**ASSIGN
BUSTER**

INTRODUCTION Soil is the precious gift of nature to the mankind. All the plant family, animal kingdom and human society at large depend upon soil for their sustenance directly or indirectly. Ironically, soil is the most neglected commodity on the earth. Shifting cultivation on the hill slopes, non-adoption of soil conservation techniques, and over exploitation of land for crop production due to population stress, leads to enormous soil erosion. It will take hundreds of years to form an inch of soil, but in no time it gets washed away down the slope due to erosion.

SOIL CONSERVATION Soil Conservation is the process by which the loss of soil is checked, reducing the velocity of run-off through erosion control measures for maximum sustained crop production and for protection of human life. So conservation of soil is essential for sustenance of human life on the earth. **DEFINITION** Soil conservation is set of management strategies for prevention of soil being eroded from the earth's surface or becoming chemically altered by overuse, salinisation, acidification, or other chemical soil contamination. **OBJECTIVE OF SOIL AND WATER CONSERVATION**

Enhancing and sustaining productivity of available land stock for primary production systems of crop cultivation livestock rising and forest management. ? Generating additional employment opportunities and income through secured livelihood in rural areas. ? Maintaining beneficial relationship between land and water cycles and deter / moderate hazards of droughts and flood. ? Retarding Watershed degradation caused by deforestation, soil erosion, sedimentation, land degradation and hydrologic deterioration of the watersheds. ? Locating, reclaiming and developing culturable wastelands, fallows other than current fallows and degraded lands

to meet increasing and competing demands for additional land stock for various sectors. **IMPORTANCE OF SOIL CONSERVATION** Most people know that they need clean air and clean water to stay healthy. Fewer people realize that their well-being also depends on the health of the soil. Soil supports the growth of most of our food and fibre, so its productivity is a major factor in the economies of Canada and other nations. But soil also has a much broader, global role. Soil acts as a filter, cleaning air and water. It exchanges gases with the atmosphere and thus influences the global climate.

Soil receives organic wastes and recycles their nutrients back to plants; it also holds and breaks down some toxic wastes. Because soil plays such a key role in world health, economics and environmental stability, we must conserve it and use it in a sustainable manner. **DIFFERENT MEASURES FOR SOIL CONSERVATION** Mechanical Soil Conservation measures Mechanical measures include various engineering techniques and structure. These practices aim at some objective as follows: ? To divide a long slope of land into a series of shorter ones in order to reduce the velocity of run off water. To retain the water in the land for long period so as to allow maximum water to be absorbed and held in the soil and less water flows down the slope of the land at non-erosive velocity. ? To protect the soil against erosion by water. The important mechanical soil conservation measures are as follows: Contour bunding Contour bunding consists of building earthen embankment at intervals across the slope and along the contour line of the field. A series of such bund divide the area into strips and act as barrier to the flow of water. As a result, the amount and velocity of run-off are reduced, resulting

reducing the soil erosion. Contour bunding is made on land where the slope is not very steep and the soil is fairly permeable. Contour bunds are also called level terraces, absorption type terraces or ridge type terraces. Contour bunding works are carried out over wide areas in many parts of India, notably in Andhra Pradesh, Gujarat, Karnataka, Maharashtra and Tamil Nadu.

Terracing A terrace is an embankment or ridge of earth constructed across the slope to control runoff and to minimize soil erosion. A terrace reduces the length of the hillside slope, thereby reducing sheet and rill erosion and preventing formation of gullies.

There are different types of terraces as follows:

- ? **Bench terracing:** It consists of transforming relatively steep land into a series of level or nearly level strips or steps running across the slope. The soil materials that are excavated from the upper part of the terrace are used in filling the lower part and a small bund is also raised along the outer edge of the terrace to check the downward flow of rainwater and also soil erosion.
- ? **Channel terrace:** It consists of making wide but shallow channels across the slope of the land either exactly on contour line or with a slight grade (0.1 to 0.5 per cent). In this process, the excavated soil is placed along the lower edge of the channel in the form of a low ridge.
- ? **Narrow based terrace:** It consists of making a number of narrow based ridges or bunds at a distance of 1m to 2m across the slope of the land at suitable intervals in high rainfall areas.
- ? **Broad based ridge terrace:** It consists of making wide but low bunds on the contour lines by excavating soils from both sides of terrace. This is practiced in areas where the rainfall is relatively low.
- ? **Contour trenching:** It consists of making a series of deep pits (i. e. 2ft. wide and 1ft. deep) or trenches across

the slope at convenient distance. The soil excavated from the trenches is deposited on the lower edge of the trenches where forest trees are planted.

Land Development Land development consists of leveling and bunding to enable control of soil erosion and production of more remunerative crops.

Diversion Bund The uncontrolled discharge from the hillocks cause heavy soil erosion in uplands down below. So a diversion bund is put along the foot hill zone along the contour with proper safe disposal system to protect the land from soil erosion. **Gully control** The gullies are formed due to soil erosion in all types of lands.

A gully control measure consists of construction of series of check dams across the gully. There?? may be brush wook, check dams, rock fill check dams and masonry check dams according to the severity of the problem. These are supported by vegetative measures. The gullies threaten to engulf adjoining valuable lands and at times damage the roads and buildings. By gully control measures, the land is protected and in most cases reclaimed for cultivation. **Watershed Development** The watershed is the geohydrological unit discharging the run-off to a particular point. The soil conservation measures on watershed basis have proved to be more effective.

Hence treatment measures on watershed basis from top to bottom down to the drainage line are taken up under watershed development programme with active participation of the people of the locality. It consists of basic activities like nursery, training, research etc and conservation and production system in arable and non-arable land, drainage line treatment and live stock management. **Agronomic soil conservation measures:** Use of Vegetation Crops and vegetables which cover the ground surface well and

have extensive root system reduce soil erosion. Plant canopy protect the soil from the adverse effect of rainfall.

The grasses and legumes produce dense sod which helps in reducing soil erosion. The vegetation provides organic matter to the soil. As a result, the fertility of soil increases and the physical condition of soil is improved.

Following cropping systems help in controlling soil erosion. Crop rotation

Crop rotation is planned sequence of cropping. Rotation of crop is an important method for checking erosion and maintaining productivity of soil.

A good rotation should include densely planted small grain crops, spreading legume crop etc. which may check soil erosion. Strip Cropping It consists of growing erosion permitting crop (e. . Jowar, Bajra, Maize etc.) in alternate strips with erosion checking close growing crops (e. g. grasses, pulses etc.).

Strip cropping employs several good farming practices including crop rotation, contour cultivation, proper tillage, stubbles mulching, cover cropping etc. It is very effective and practical means for controlling soil erosion, specially for gently slopping land. It may be of different types as follows: ? Contour strip Cropping: Contour strip cropping is the growing of erosion permitting and erosion resisting crops alternately in strips across the slope and on the contour line.

This practice is useful because it checks the fast flow of run-off water increases the infiltration of water in the soil and prevents soil erosion. ? Field

Strip Cropping: Strips of crop are parallel to the general slope of the land. ?

Wind Strip Cropping: Strips of crop are across the direction of wind

regardless of contour. ? Buffer Strip Cropping: In this, the severally eroded portion of land is permanently kept under grass and contour strip cropping is

practices in the rest of the area. Cultivation of proper crops Cultivation of row crop in sloppy lands permits soil erosion.

In this field, the crops particularly cereals, fodder crop etc. should be broadcasted and the plants remain haphazardly in field. As a result, the movement of water gets obstacle and more water is absorbed in the soil, thus reducing soil erosion. Mixed and intercropping (Cowpea-Vigna catjang, with cotton ??? Gossipum Sp, maize ??? Zea mays with soyabean ??? Glycine max etc.) practice checks the soil erosion and avoids the risks of the crop failure. The land should not be kept without crop There is very scope of soil erosion if there are no crops on the land.

The soil erosion decreases in different way of cropped land. Afforestation Afforestation means growing of forests where there were no forests before owing to lack of seed trees or due to adverse factors such as unstable soil, aridity or swampiness. Along with afforestation, reforestation should be undertaken which means replanting of forests at places where they have been destroyed by uncontrolled forest fires, excessive felling and lopping. Afforestation is the best means to check the soil erosion. Lutz and Chandler (1946) cited the following points in support of vegetational check erosion as follows: ?

Infiltration of water is favoured due to high porosity of soil under vegetation. Percolation of water helps in preventing the soil moisture which accelerates further growth of the vegetation. ? Surface accumulation of organic matter increases the water holding capacity of the underground soil. ? Root system of vegetation holds the soil mechanically and provides stability of the

underground soil. ? It gives the protection against wind. The forest vegetation shields the soil from direct effect of drought, snow and rain.

Mulching: ?? Mulches of different kinds such as leaves, straws, paper, stubbles, etc. minimize evaporation and increase the absorption of moisture and protect the surface of the land against the beating action of rain drops. Later on they decay to form humus which improves the physical condition of soil. Natural mulching also helps in the infiltration of water and the reduction of evaporation. Organic manure: Organic manures improve the soil structure. The crumb and granular structure increases the infiltration and permeability in the soil and conserve the soil water. Consequently soil erosion decreases. Control of grazing Grazing increases the soil erosion.

But the grazing cannot be completely stopped in all areas. So the restricted and rotational grazing may be helpful in checking soil erosion to some extent. The area open to grazing for sometimes should be closed for the following year to facilitate regeneration of forests and to maintain thick ground vegetation. Good tillage Tillage is the mechanical manipulation of soil by different kinds of implements. Tillage makes the soil loose and friable which helps in retention of water. The special method of tillage practices should be followed for the conservation purposes.

Tillage may consist of several types of soil manipulation such as ploughing, harrowing, cultivation etc. SOIL CONSERVATION PRACTICES Soil conservation practices are commonly used in forestry during harvesting and replanting operations. The quality of agricultural soils can also be maintained (conserved) or even improved by using soil conservation practices. Examples of these include adding organic material (e. g. , manure) and inorganic

amendments (e. g. , limestone), using conservation tillage (reduced tillage or no-tillage systems), reducing the amount and frequency of use of summer fallow, rotating CROPS and growing legumes (e. . , clover). The type of farming activity that takes place on an area of land, be it pasture or cultivation of forage or fiber crops, cereals, oilseeds, berry fruits or vegetables, depends on the type of soil, the climate and whether crops are grown under natural rainfall or irrigation. The more any land use disturbs the land's natural ecology, the greater its effect on soil quality. On pasture lands, agricultural management practices include restricting the density of animal stocking, using rotational grazing (resting fields after they have been grazed), controlling weeds, and protecting vegetation and banks along water courses.

On cultivated lands, soil management practices include crop selection and rotation, choice of tillage methods (leaving crop residues on the surface or plowing them into the soil), controlling the traffic patterns of tractors and machinery, determining rates of fertilizers and other soil amendments to apply, controlling pests and managing water. Crops that provide high-density and year-round ground cover offer greater protection against soil erosion than row-cropping or cropping systems that include extensive use of cultivated fallow.

Minimizing the amount of tillage used for weed control or seedbed preparation reduces the breakdown of soil structure (the arrangement of soil particles into granules or clods), and keeps more plant residues on the soil surface compared to more intensive tillage. This helps maintain soil tilth and control soil erosion. Reducing the rate of oxidation of soil organic matter can

<https://assignbuster.com/soil-conservation-assignment/>

contribute to increasing the amount of carbon stored in the soil, which is an important factor in reducing the greenhouse gas effect (the accumulation of carbon dioxide and other gases in the atmosphere).

Soil management that returns plant nutrients to the soil at the rate of their removal by crops will help maintain soil fertility. Reduced use of pesticides on erosion-prone soils, or use of pesticides accompanied with effective soil conservation measures, reduces the risk of contaminated sediments getting into surface water. ACCEPTANCE OF SOIL CONSERVATION PRACTICES Soil conservation practices have been increasingly adopted on Canadian farms over the last decade. In 1996, the area managed by no-till practices accounted for approximately 16% of cropland.

This area has since increased to approximately 45%. Soil-conserving tillage practices (conservation tillage and no-till combined) now represents over 80% of Canadian cropland. Nationally, the amount of farmland under summer fallow, which had decreased by more than half between 1981 and 2001, has further decreased by 25%. Agriculture and Agri-Food Canada (AAFC) has developed a series of Agri-Environmental Indicators for use in tracking the trends relating to soil conservation and environmental sustainability.

AAFC reported on the trends in these indicators for the period 1981 to 2001 (the most recent period for which statistical information is available) in Environmental Sustainability of Canadian Agriculture: Agri-Environmental Indicator Report Series – Report #2 in 2005. Trends in all the soil-quality indicators showed considerable improvement between 1981 and 2001. The

majority of the cultivated land in Canada is in the very low risk class for erosion. Canadian cropland has gone from a net source to a net sink of CO₂ gas due to increased carbon sequestration and increasing levels of soil organic matter.

Moreover, the share of land at risk to salinisation has also decreased over this period. This general improvement does not apply to all soils, however, and there remain significant areas of farmland at risk of degradation.

Nevertheless, the AAFC provided evidence that the health of our agricultural soils can indeed be maintained and even improved with the right care. From this data, three general trends have emerged. First, conservation-oriented farming practices are required to maintain soil health, particularly in areas of intensive cropping and where soils are marginal for agriculture.

Secondly, soil health can be maintained or is improved in regions where land use and management practices have been tailored to address soil resource and climatic influences that may combine to produce local problems of soil degradation. Finally, declines in soil health occur rapidly, often most dramatically in the first 10 years following conversion of undisturbed land to agriculture, but improvements to soil quality take place slowly and at greater cost than maintaining a good soil in top condition.

SOIL CONSERVATION SCHEMES Scheme No. 1 Conservation of Soil in Andaman & Nicobar Islands. The Major work proposes under Soil conservation Work on 50 % loan ??? cum-subsidy for individual land holdings. The other work proposes soil conservation work on watershed basis is planned to take up comprehensive soil conservation work for conservation

development and sustainable management of natural resources with holistic approach in the small watershed areas.

This proposes treatment of all exiting Nallahs in upper middle & lower riches including construction of check dams, Sunken ponds, Contour trenches, contour Bunds, so that the run off is reduced, more water is allowed to percolate in the soil, Water table is increased and moisture loss is minimized. In addition to this soil survey works and analysis of soil samples @ 12000 per year and issue of Soil Health Card @ 1000 per year has been aimed. Under the scheme No. 1 Improvement of wasteland in tribal areas of Nicobar group of Islands, Repair & Maintenance of Various Soil Conservation Farms has also been proposed. Scheme No. 2

Reclamation of Saline affected Land, Stream Bank Erosion, Preservation of Gravel deposit & drainage. Due to the land surrounded by sea and other various limitation factors like intrusion of Saline Water in the allotted cultivable land causing soil salinity, stagnation & water logging in the low lying paddy areas, deposition of gravels carried from different gullies & nallahs and its deposition on the flat agriculture land in the foot hills, About 2000 Ha of land has become unfit for cultivation. To eliminate the above problem, the department has proposed to take up various reclamation measures to bring more area under cultivation.

There is a constant demand from the affected cultivators for the allotment of alternative land where the above-mentioned problem exists. Instead of compensatory allotment of land it has been proposed to reclaim the above mentioned land through various measures like Saline reclamation bunds,

Construction of sluice gates, Improvement of Drainage, Control of Stream Bank erosion & gravel deposition, Construction of check dams etc. in a big way by the Soil Conservation wing of the department of Agriculture. FOREST RESOURCE MANAGEMENT

Recent years have seen a number of changes in the management of forests. There is a major shift towards a more decentralized and people oriented forestry. Responding to scarcities, villagers have started organizing themselves to reverse degradation and restore productivity. The result has been a renewal of degraded ecosystems. The destruction of natural forests for timber, cropland, fuelwood, pasture, urbanization have had an impact on many poor rural families who are dependent on forest resources for fuel, fodder, food, medicine, housing etc.

The deterioration of forests has accelerated soil erosion, sedimentation of rivers, increased flooding, and overtaxed the land's capacity to regenerate and sustain. It is now being recognized that local communities need to be involved in establishing sustainable forest management systems.

Governments are opening a number of opportunities for sustainable forest management and biodiversity conservation by decentralizing authority and responsibility for resource management in different parts of the world.

In the Asia-Pacific, attention is to community-based forest management programs and the devolution of management responsibilities on some forestry activities to local government units in the Philippines, land and forest allocation programs in China, Laos, Vietnam, transfer of use rights to forest user groups in Nepal, Joint Forest Resource Management programs in

India, and privatization of forest plantations in New Zealand. Similar processes are underway in other parts of the world.

The various initiatives have led to greater access and control of forest resources by local people, in turn resulting in improvement in forest protection and management and reducing pressure on resources. Substantial areas of degraded forests have been rehabilitated and new forests planted. Local people have started supporting forest conservation where they have been able to reap financial returns from benefit-sharing schemes. JOINT FOREST RESOURCE MANAGEMENT IN INDIA In India Joint Forest Resource Management (JFRM) has emerged as an important intervention in management of forest resources.

In many parts of India, small village groups have started to protect and reclaim degraded forestlands through collective action. The Joint Forest Resource Management Programme seeks to develop partnerships between local community institutions and state forest departments for sustainable management and joint benefit sharing of public forest lands. The primary objective of JFRM is to ensure sustainable use of forests to meet local needs equitably while ensuring environmental sustainability.

The central premise is that local women and men who are dependent on forests have the greatest stake in sustainable forest management. The official ground for JFRM was prepared by the National Forest Policy of 1988 which envisaged people's involvement, particularly of women, in meeting their basic forest related needs and in managing their local resources. This was followed in 1990 by a circular from Ministry of Environment and Forests

providing guidelines for involvement of Village Communities and Voluntary agencies in regeneration of degraded forests.

The National Forest Policy of 1988 and the JFRM resolution of 1990 combined with state level resolutions acknowledged the need to give greater rights and authority to community groups. The policy envisages a process of joint management of forests by the state government and the local people, who would share the responsibility for managing the resource and the benefits accruing from this. Under Joint Forest Resource management (JFM) village communities are entrusted with the protection and management of nearby forests.

These communities are required to organize forest protection committees, village forest committees, village forest conservation and development societies. The guidelines provide for rights to usufruct and non-wood forest products and percentage share of final harvest to organized communities willing to help regenerate depleted forest and waste lands. Around 19 states have issued enabling orders for implementation of JFRM. A project has been drawn up by the Ministry of Environment and Forests to conserve degraded forests.

Known as the National Forest Programme- India (NFP), it evolves programme in accordance with the provisions of the National forest policy and integrates the proposed forestry development programme in the country within the framework of the five-year plans. The Ministry has formulated a comprehensive plan for the next 20 years by integrating proposals of the respective states. It is a comprehensive prospective work programme to

bring 33 % area under forest/tree cover in a phased manner within 2020 A.

D.

The scheme involves assisting the states to set up forest protection forces as well as to assist the JFRM cell and involve people in eco-generation activities. The Centre has also stressed the need to reduce incidence in forest fires and increase the forest base in India. There are many cases of communities protecting natural forests either on their own initiative or with the encouragement of forest department. Communities in many parts of rural India are organizing into formal and informal groups for forest protection and management in states of Orissa and Bihar, Rajasthan, Gujarat, Karnataka, Haryana, Madhya Pradesh and Punjab.

While some are promoted by state forest departments, some are sponsored by local government or NGO programme e. g. village (gram) panchayats, women's organizations (mahila mandals) and tree growers cooperatives. Forest protection organizations include Groups of Village Elders, Village Forest Protection Committees, Village Councils', Village Youth Clubs, in Orissa, Forest Cooperative Societies in Kangra district of HP, Van Panchayats in UP hills, Forest Protection Committees in West Bengal.

When villagers dependent of forests, have initiated forest protection on their own, the challenge for forest departments is of facilitating the process which implies adapting the official JFRM frameworks to enable forest departments to participate in villager's initiatives. For JFRM to represent participatory forest resource management emphasis on regenerating timber through community protection needs to be shifted to developing sustainable

alternatives for meeting diverse forest produce needs of members of community institutions.

Mechanisms need to be evolved for meeting immediate essential needs of the most dependent members through appropriate forest management interventions. IMPACT There are indicators of the positive impact of JFRM across the country. In many states forests under JFRM are regenerating. Remote sensing data are showing an improvement in quality and area of forests. Studies in Gujarat, Andhra Pradesh, Haryana, Madhya Pradesh and West Bengal have recorded improvements in productivity and diversity of vegetation and increased income to members of community institutions from non timber forest products.

Experiences from West Bengal, Haryana, Orissa, Himachal Pradesh, Andhra Pradesh, Gujarat, Uttar Pradesh, Jammu & Kashmir and Tamil Nadu indicates that participatory forest management offers an important survival strategy for threatened Indian forests. However, for JFRM to be successful, an essential condition is to convince people at the micro planning stage itself about the benefits likely to accrue to them. The villagers around a particular forest block need to be consulted for their views and consent. Given in the following pages are glimpses of some initiatives taken in different states across the country.

While some are promoted by the Forest Resource Department or by NGOs, some are collaborative attempts between government and the rural population or rural population alone to reverse degradation, restore productivity and conserve biodiversity and move towards sustainable

development. CASE STUDY: 1 Joint Forest Management in West Bengal
Participatory action involving the government and local communities for regeneration of degraded forests was initiated as a pilot project at Arabari in West Bengal in 1971-72.

The programme covered an area of 1270 hectares of degraded forests involving 618 families in 11 villages. In the Arabari range of Midnapore district in West Bengal local villagers were motivated to form Forest Protection Committees (FPCs) to protect public sal coppice forest in return for first preference in forestry department employment, free usufruct rights to most NTFPs and a 25% share in net cash benefits from sales of short rotation sal poles when these were ready for harvesting. Initial success led to gradual expansion of the effort to neighboring areas.

Around 3289 Forest Protection Committees are managing 4493 Sq Km hectares of forest land. CASE STUDY: 2 Greening the Forest: Villagers show the way in Karnataka In Davangare district of Karnataka, four km from Kumaranahalli village one hill stands out from other bare hills, as it is covered with vegetation. This hill is a result of transferring forest management to local communities, which has benefited the people dependent on forests for their livelihood and has reversed ecological crisis created by degradation of forests.

What villagers have done is – organised protection of the vegetation from poaching. The village poor are reaping the minor forest produce. The Village Forest Committee (VFC) is responsible for conserving the forest wealth. All the Kumaranahalli households are represented in the VFC. An agreement

was signed by the management committee of the VFC with the State Forest Department to manage a selected area. The committee has power to prosecute and fine for stealing timber or digging sand from the stream. Residents are able to gather leaves, grasses, shrubs and branches.

Tendu leaves, gum, thatch, fruits and berries are some produce with a ready market. The stream that originates in the forested area now carries water for more months than before. Sheeps/goats would be permitted to graze when leaves on tops of the plants grow higher than the animals. There is also a campaign by local groups to educate villagers to claim and manage forest areas, which have been monopolized for long. Villagers in surrounding areas are now being educated on natural regeneration of forests on the Kumaranahalli model.