

## PROJECT WORK

**CLASS:** IX Class

**SUBJECT:** Biology

**LESSON:** Soil Pollution

**NAME OF THE PROJECT:** Soil conservation – A medicine for soil health

**STRATEGY:** Group

**GROUP LEADER:**

**GROUP MEMBERS:** work allotment

SN	GROUP MEMBERS	DIVISION OF WORK

**GUIDE TEACHER:** K. Manjula, SA (Bio)

**DURATION:** 4-5 days



**AIM:** To understand the importance of soil conservation and adaptations of different practices to sustain soil fertility.

**OBJECTIVES:**

- Collecting and discussing about the usage of chemical fertilizers and its adverse effects on soil pollution.
- Collecting information about usage of chemical fertilizers and its adverse effects on soil fertility and need of soil conservation from our teacher with well prepared questioner.
- Collecting information from internet, magazines, and text book about the loss of soil fertility, reasons for the loss of soil fertility, its implications on the food production.
- Analyzing the importance of soil conservation for sustainable soil fertility.
- Concluding the different types of soil conservation methods.

**TOOLS:**

- Table showing the chemicals used in the crop land.
- Questioner to our teacher

**PROCEDURE:**

In the last lesson when we discussed about the usage of chemical fertilizers, we learnt that they may gain the high yield for few years, but in long run the soil fertility is lost. In this regard we would like to learn how the fertilizers bring about changes in the soil profile, soil fertility etc. At first we collected some primary information regarding the usage of chemical fertilizers, insecticides, pesticides and herbicides and tabulated them as below.

FERTILIZERS	INSECTICIDES	PESTICIDES	HERBICIDES
NPK	Organo phosphates	Thuricide	Weed
Urea	Fevelerate	Fungicide	preventerroundup
Ammonium sulphate	Bayer advkingprid	Carbamate pesticide	NTRO
Ammonium nitrate	Bag A Bug	Pyrithriod pesticide	Saude

We also interacted with our teacher about the effects of these chemicals on soil fertility and also about the soil conservation.



### QUESTIONER

1. **How these chemicals affect the soil fertility?**
  - Since these are chemicals they cannot degrade into the soil. These chemicals are prepared by adding some toxic substances like cadmium, arsenic, etc. These chemicals reduce the efficiency of soil.
2. **What are the other reasons for loss in the soil fertility?**
  - The soil erosion, tillage practices, grazing deforestation, etc are some of the other reasons for loss in soil fertility.
3. **What may be the implications of loss in soil fertility?**
  - The loss in soil fertility leads to reduced crop yield, soil pollution, etc.
4. **What are the preventive measures to avoid loss in soil fertility?**
  - The adaptation of soil conservative methods helps to sustain the soil fertility.
5. **What is soil conservation and what are they?**
  - Preventing the loss in soil fertility is known as soil conservation. Plantation, sustainable agricultural practices, usage of organic manure, maintaining soil PH, etc are some of the soil conservative methods.

After the interaction with the teacher we have also gathered information from the internet and aggregated as follows

#### INTRODUCTION:

**Soil as a natural resource:** Soil is one of the most important natural resource. It is a mixture of minerals, organic matter, gases, liquids, and countless organisms that together support the life on the earth.

It is a medium for the growth and also habitat for several organisms. Soil is formed in the process of weathering with associated erosion.

**Fertility of the soil:** Soil fertility refers to the ability of the soil to sustain agricultural plant growth I.e. to provide plant habitat and result in sustained and consistence yields of high quality. The fertile soil supplies essential plant nutrients and soil water in adequate amounts.

#### Reasons for the loss in soil fertility:

**Soil erosion:** The wearing away of top soil due to factors such as water, wind and tillage of agricultural land. The fertile soil is being flooded away along with the water. The upper layers of soil contain most nutrients required for plant growth. Due to soil erosion the plant's growth is reduced. There are several natural reasons for soil erosion such as floods, waves, etc,. But majorly the human activities like unsustainable agricultural practices, deforestation, roads and urbanization, climatic changes due to pollution are leading to soil erosion.



**Usage of chemicals in agriculture:** Usage of chemical fertilizers, herbicides, insecticides and pesticides extensively lead to degradation of fertility and biotic compounds of soil.

Ex: Nitrogen containing fertilizers can cause soil acidification when added. This leads to decrease in nutrients availability. Some toxic elements such as cadmium, fluoride, radioactive elements, etc also accumulate in the soil. High levels of fertilizers may cause the breakdown of symbiotic relation between plants & mycorhyzal fungi. Usage of chemicals in the agricultural practices removes the useful micro organisms & pests which nurture the soil fertility. It also leads to bioaccumulation and biomagnifications.

#### **ANALYSIS:**

Since the soil is one of the natural resources, it is an important aspect to consider the soil conservation practices. The soil is also crucial for many aspects of human life as it provides food, filters air & water and helps to decompose biological waste into nutrients for new plant life. Soil conservation is the management technique to prevent the soil loss due to erosion and usage of chemicals. It is aimed to preserve the soil fertility for sustainable plant growth & bio mass. There is a great need to create awareness about the adverse effects of usage of chemical fertilizers. Majorly the human activities are creating damage to the soil health. If the soil is fertile, we can gain the high yield. So the soil conservation is the basic techniques to sustain the soil health.

#### **CONCLUSION:**

So one has to adopt soil conservation methods for sustainable soil health.

Soil conservation is the management technique to prevent the soil loss due to erosion and usage of chemicals. It is aimed to preserve the soil fertility for sustainable plant growth and biomass. There are different techniques of soil conservation.

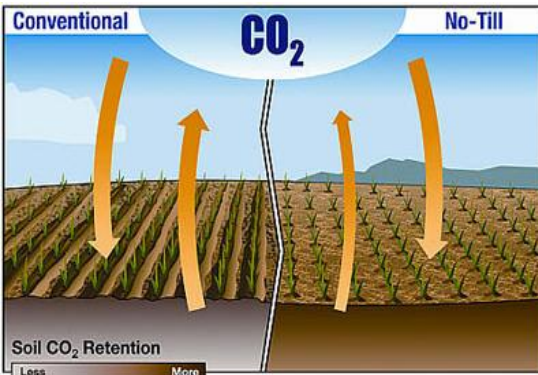
**Aforestation:** As we all know the roots of trees firmly hold on to the soil. As trees grow tall, they also keep rotating deeper into the soil. As the roots of trees spread soil, they contribute to the prevention of soil erosion. Soil that is under a vegetative cover has hardly any chance of getting eroded as the vegetative cover acts as a wind barrier as well. A minimum area of forest land for our country that is considered to be healthy for soil and water conservation is between 33%. The proportion is being 20% for plains & 60% for hilly & mountain regions.

**Terracing:** It is one of the good methods of soil conservation. A terrace is a leveled section of a hilly cultivated area. Owing to its unique structure, it prevents the rapid surface runoff water. Terracing gives the land mass a stepped appearance thus slowing the easy washing down of the soil.



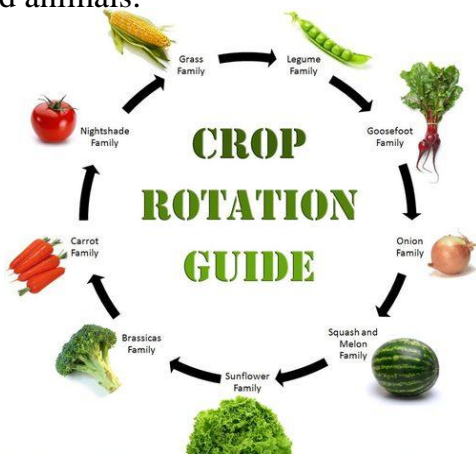
**Reduced till farming:** When soil is prepared for farming by ploughing it, the processes is known as tilling. No till farming is a way of growing crops without disturbing it through tillage. The process of tilling is beneficial in mixing fertilizers in the soil, shaping it into rows and preparing a surface for sowing. But the tilling activity can lead to compaction of soil, loss of organic matter in the soil and the death of organisms in the soil. No till farming is a way to prevent the soil from being affected by these adversities.

**Contour ploughing:** This practice of farming across the slopes takes into account the slope gradient and the elevation of soil across the slope. It is method of ploughing across the contour lines of slope. This method helps in slowing the water runoff and prevents the soil from being washed away along the slope. Contour ploughing also helps in percolation of water into the soil.



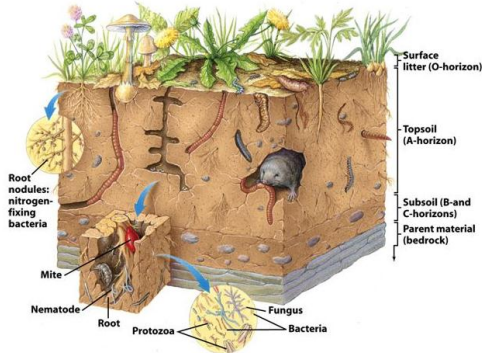
**Crop rotation:** Some pathogens tend to build up in the soil if the same crops are cultivated consecutively. Continuous cultivation of the same crop also leads to an imbalance in the fertility demands of the soil. To prevent these adverse effects from taking place, crop rotation is practiced. It is a method of growing a series of dissimilar crops in an area sequentially. Crop rotation also helps in the improvement of soil structure and fertility.

**Soil PH:** Contamination of soil is due to acid rains and other pollutants can lead to loss of soil fertility, Use a PH indicator monthly and check the level of acids in the soil and treat the soil with the eco-friendly substances. The neutral soil promotes growth of plants and animals.



ACIDIC		NEUTRAL	ALKALINE	HIGHLY ALKALINE										
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Nutrient deficiencies & toxicities (Fe, Mn, Al)					Ideal pH for plant growth			Nutrient deficiencies, toxicities (CO <sub>3</sub> <sup>2-</sup> , HCO <sub>3</sub> <sup>-</sup> , AlO <sub>4</sub> ) & sodicity						
APPLY LIME								CONSIDER TOLERANT SPECIES						

**Soil organisms:** Organisms like earth worms and other benefiting the soil should be promoted. Earth worms through aeration of soil, enhances the availability of macronutrients in the soil. They also enhance the porosity of the soil and promote the fertility of the soil.



Thus the adaptation of soil conservation techniques, we can sustain the fertility of the soil which promotes the high yield in the agriculture.

**OUR EXPERIENCES:** We could learn about the damage that is created in the soil fertility. Soil conservative techniques are conventional to promote the soil fertility.

**ACKNOWLEDGEMENT:** We thank our teacher, K.Manjula mam and all who has cooperated in doing this project work.

**RESOURCES:** Teacher, internet and text book.