STRONG TOWER ACADEMY

SS 2 AGRIC SCIENCE

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EFFECTS OF SOME FARMING PRACTICES ON THE SOIL

BURNING

Advantages/Positive Effects

1. It sterilizes the soil by killing harmful pathogens.
2. It destroys weed seeds.
3. It stimulates the growth of fresh grasses especially during dry season.
4. It adds ash which contains calcium, magnesium, sodium and potassium to the soil.
5. The ash released acts as a liming material to the soil.

Disadvantages/Negative Effects

1. It exposes the soil to erosion.
2. It destroys some useful/beneficial soil organisms e.g. earthworm.
3. It destroys much of the organic matter content of the soil.
4. It destroys soil structure.
5. Some soil nutrients e.g. nitrogen, sulphur and carbon are lost to the atmosphere as gases.

GRAZING/OVERGRAZING

Advantages/Positive Effects

1. Animal dung improves the soil structure.
2. Weeds are removed from the soil.

Disadvantages/Negative Effects

1. It leads to soil compaction.
2. Erosion is common.
3. It causes rapid depletion of the vegetative cover of the soil.
4. Soil structure is destroyed.
5. It causes increased water loss from the soil surface.
6. There is poor growth capacity of the vegetative cover.
7. It has adverse effects on the regeneration capacity of the vegetation.

CLEAN CLEARING

Advantages

1. Modern machines can easily be used because there are no obstacles.
2. Weeds are removed from the land.
3. Wide area of land can be cultivated.

Disadvantages

1. It exposes the soil to erosion and loss of nutrients.
2. Soil water easily evaporates and is lost.
3. Direct sunlight on the soil increases the temperature.

4. Loss of organic matter.
5. Soil organisms are destroyed.
6. Use of heavy machines causes soil compaction.

FERTILIZER APPLICATION

Advantages

1. It supplements soil nutrients.
2. It increases the population of soil microbes.
3. It enhances the production capacity of the soil.
4. It stimulates the growth of vegetation, this reducing erosion.
5. It encourages vegetative growth in plants.

Disadvantages

1. Excessive use of acid fertilizers reduces soil pH.
2. Excessive use of fertilizers can affect the activities of soil micro organisms.
3. It can lead to nutrient imbalance in the soil.

ORGANIC MANURING

Advantages

1. It stabilizes soil pH.
2. It supplies soil nutrients.
3. It improves soil water-holding capacity.
4. It improves soil structure.
5. It enhances the activities of soil microbes.
6. It moderates soil temperature.

Disadvantages

1. Pathogens that are detrimental to soil organisms may be introduced.
2. Certain diseases may be transmitted to plants.

CROP ROTATION

Advantages

1. The legumes in the rotation fix atmospheric nitrogen.
2. It reduces the exposure of soil to agents of erosion.
3. Crop cover moderates soil temperature.
4. Crop residues add organic matter and nutrients to the soil.
5. Leaching is prevented.

CONTINUOUS CROPPING: this is a system whereby a land has been under cultivation for at least ten years with less than a year of fallow.

Advantages

1. The soil is covered almost throughout the year, thus preventing erosion.
2. It improves both the aeration and water movement in the soil.
3. It favours oxidation reaction.

Disadvantages

1. Frequent crop removal depletes soil nutrients.
2. When crops are harvested and crop residues are removed, it leads to erosion.
3. Continuous cultivation disturbs the activities of soil organisms.

METHODS OF REPLENISHING SOIL NUTRIENTS

BUSH FALLOWING: this is a process whereby a piece of land which has been used for cultivation for many years has been left uncultivated for 3-5 years. This is to allow the build-up of depleted nutrients in the soil. The leaves of plants drop off, decay and form humus which adds nutrients to the soil.

Importance/Roles

1. Plants nutrients have time to build up as a result of humus formation.
2. It leads to an increase in the number and activities of micro organisms.
3. Erosion is controlled.
4. Leaching can be controlled.
5. Soil texture and structure are improved.
6. Leguminous plants on the land help to fix nitrogen into the soil.

USE OF COVER CROPS: this is a system whereby some leguminous crops (e.g. *mucuna, calopogonium, pueraria, stylosanthes,* melon, *centrosema*) are planted to protect the soil from erosion.

Importance/Roles

1. Provision of protective cover for the soil against erosion.
2. Reduction in the rate of soil moisture loss.
3. Addition of organic matter and nutrient to the soil by decomposition and mineralisation.
4. Nitrogen fixation by the bacteria in the root nodules of the legumes.
5. It improves the soil structure.
6. Improvement of water retention capacity of the soil.

MULCHING: this is the covering of the soil with dead and decaying organic materials or artificial materials e.g. crop residues, grasses etc.

Importance/Roles

1. Reduction in the rate of soil water evaporation.
2. Reduction of the direct impact of solar energy on the soil, thereby regulating soil temperature.
3. Weeds are removed and competition is reduced.
4. Increase in water infiltration into the soil.
5. Addition of organic matter and nutrient to the soil.
6. Prevention of soil erosion.

LIMING: This is the addition of any compound of calcium to the soil to raise the soil pH and reduce soil acidity. Examples of such compounds are limestone($CaCO_3$), quicklime(CaO), slaked lime($Ca(OH)_2$), gypsum($CaSO_4$), dolomite($CaCO_3.MgCO_3$).

Importance/Roles of Liming

1. It reduces soil acidity.
2. It improves soil structure.
3. Calcium (which strengthens plant cell wall) is added to the soil.
4. It enhances the activities of soil organisms.

ORGANIC MANURING: This includes the use of the compost, green manure, farmyard manure.

1. Compost is made from the remains of plants and animals which are stored/piled up in pits and allowed to decay.
2. Green manure involves burying or incorporating or ploughing back fresh growing leguminous plants into the soil.
3. Farmyard manure is made from the urine faeces or dung, bedding materials and other metabolic waste products of domestic animals.

These organic manures contain nutrients and are therefore used in replenishing soil nutrients.

INORGANIC MANURING: This refers to the use of organic fertilizers a.k.a mineral fertilizers which are chemicals that contain essential plant nutrients and are produced in the laboratory. They may be in powdery form, pellet, granules, crystals or even in liquid form.

Recently, organo-mineral fertilizers have been produced. These are fertilizers that have both the component of minerals and organic fertilizer combined during the process of production.

CROP ROTATION: This is a cropping system in which different crops are grown in the same piece of land in a definite order or sequence.