JUST AGRICULTURE
multidisciplinary e-Newsletter

Mulching: A Bon to Indian Agriculture

Vishal Navnath Game
Assistant Professor, Maratha Vidya Prasarak Samaj's KDSP College of Agriculture, Nashik

ARTICLE ID: 66

Introduction:

As we know, currently world is facing the issue of global warming. Global Warming is a gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by increased levels of carbon dioxide, chlorofluorocarbons, and other pollutants. In simple language global warming is an effect of unusually rapid increases in Earth's average surface temperatures over the past 100 years mostly because of greenhouse gases released by humans and nature burning fossil and natural fuels. With the rather aggressive onset of last summer, it is increasingly obvious that climate change is not just an inconsequential topic of debate between politicians and environmental activists. Here at ground level we are experiencing the classic signs of increased temperatures and lower rainfall more regularly and more persistently. Due to the industrialization and urbanization there is increase in global temperature over the years which disturb the balance of agro-ecological systems.

Large amount of Green House Gases are been emitting from the land surface. Therefore, it is needed to develop new eco-friendly agricultural practices for sustainable food production. According to the assessment of Intergovernmental Panel on Climate Change (IPCC), agriculture is the second largest source of green house gases emissions, accounting for about 13.5% of global anthropogenic emissions. Farming and field management indirectly affect productions and emissions of green house gases by changing the soil environment. Thus, it is essential to find ways to effectively reduce green house gases emissions while improving crop productivity. Thus covering of soil surface by any material could potentially serve the purpose by reducing soil evaporation, conserving moisture, controlling soil temperature, reducing weed growth, and improving microbial activities. Thus these material used to cover the soil surface can be called as Mulches. These mulches could provide economical, aesthetic, and environmental advantages to agriculture and landscape.

JUST AGRICULTURE
multidisciplinary e-Newsletter

The word mulch has been derived from the German word molsch means "easy to decay". Mulching is referred as spreading various covering materials on the surface of soil to minimize moisture losses and weed population and to enhance crop yield. Mulches could potentially minimize water runoff, improve infiltration capacity of soil, restrain weed population via shading, and perform as obstacle in evapotranspiration.

Mulching has also some other positive environmental effects such as temperature regulation of soil and plant roots, minimum nutrient losses, cut down soil erosion and compactness, and improved physical conditions of soil. Mulches conserve the soil moisture, enhance the nutrients status of soil, control the erosion losses, suppress the weeds in crop plants, and remove the residual effects of pesticides, fertilizers, and heavy metals. Mulches improve the aesthetic value of landscapes and economic value of crops. The selection of mulching material is important with respect to crop type, management practices, and climatic conditions. The appropriate mulching technique could provide the benefits to the agro-ecological systems. Therefore, the impacts of low-cost, eco-friendly, and biodegradable mulching materials on soil microbes, nutrient balance, plant growth, and soil erosion should be explored in the future.

Types of Mulches:

Mulch is any covering material including either organic or inorganic applied on the soil surface to reduce evaporation losses.

1. **Organic Mulches**: Any organic material which is use to cover the soil surface we can call it as a organic mulch. Organic mulch material includes dry grass, crop straw, dry leaves, crop residue, sugarcane trash, bark, saw dust and compost. As these has capacity to degrade easily due to attract of insects, slugs and cutworms that eat them and it will help to degraded rapidly and also it add some amount of organic matter and nutrient in soil. The example of organic mulches and their uses are given below:

   - **Dry grass:** This is one of the most abundantly and easily available mulch materials across the country. I also add some amount of nitrogen to the soil if incorporated fresh. It also provides some organic matter in the soil. But, if we add green grass material it has capacity to develop its root system it will harm to crops growth and development. Therefore, use of dry grass as mulch material is beneficial.

JUST AGRICULTURE
multidisciplinary e-Newsletter

- **Crop Straw:** Straw of different crops are common mulching materials used as mulches on soil surface for moisture conservation. Paddy and wheat straw and other crop residues like stubbles, sugarcane trash, groundnut shells, cotton shells etc. can be also used as a mulching material. Though straw is poor in nutrient value but after decomposition, it makes soil more fertile. Straw mulches reduce both the amount of energy absorbed by the soil and its movement above the soil and hence reduce evaporation.
- **Dry leaves and crop residue:** Dry leaves are easily and abundantly available material which is good for mulching. These dry leaves are good for protecting dormant plants during winter by keeping them warm and it help to initiate germination during cold season but dry but due to light weight they may be blown away even by light wind. To reduce these problems weight material that help to reduce wind problem. Wood bark can be also used as a mulching material for different crops
- **Saw dust and Compost:** Saw dust obtained from furnishing products is very poor in nutritive value as it contains only half the nutrients of straw. It decomposes slowly. Being acidic in nature, it should not be used in acidic soils. Compost is one of the best mulch materials. It increases microbial population, improves the soil health and adds some amount of nutrients. As it is very fine and full of nutrients, so it doesn't have much weed suppressing ability.

2. **Inorganic Mulch**: Any inorganic material which is use to cover the soil surface we can call it as a inorganic mulch. Inorganic mulch material includes plastic polythene mulch. Plastic mulches are very effective as mulches for evaporation controls provided cost is not limiting factors. Different plastic mulches such as photo-degradable plastic mulch and biodegradable plastic mulch can be used. Photo-degradable plastic mulch material is easily destroyed by sun light in a shorter period. Bio-degradable plastic mulch film is easily degraded in the soil over a period of time. Several types of coloured plastic polythene mulches can be used for different types of crops as below:
   a. Black polythene mulch: It helps in conserving moisture. This mulch is more effective in controlling weed as it restricts outgoing radiation.

JUST AGRICULTURE
multidisciplinary e-Newsletter

b. Silver polythene mulch: It generally maintains the root-zone temperature cooler. Black and silver-coloured plastic mulches also enhance growth, yield, and quality in most crops than other coloured mulches.

c. Transparent polythene mulch: It increases the soil temperature and preferably used for soil solarisation.

Even if the use of plastic mulch increases yield, quality of crop production, it require close inspection in order to control the insect and pests. The lacuna of polluting soil and arable lans can be overcome by using different types of bio degradable plastic mulches.

Benefits of Mulches:

- Soil mulching is an effective method to increase crop yield because it could conserve soil moisture and temperature.
- Mulching is having significantly positive effect on crop yield; it is also an important factor affecting green house gases productions and their emissions.
- Mulching also has impact soil respiration and alters CO2 mainly by changing the soil surface properties.
- Mulching also helps to manipulate microclimatic conditions.
- Mulching helps is reducing surface soil evaporation and increase soil water content in the root zone.
- The use of drip irrigation with plastic mulch allows one to reduce leaching of fertilizers which improves the fertilizer used efficiency.
- Mulch also helps in minimizing the effect of soil crusting due to rain and sunlight.
- Mulching has also some other positive environmental effects on soil properties and they improve physical conditions of soil.
- Mulches conserve the soil moisture, improve the nutrients status of soil and control the soil erosion losses due to water and wind.
- Mulches suppress the weeds in crop plants, and remove the residual effects of pesticides, fertilizers, and heavy metals.
- Mulches improve the aesthetic value of landscapes and economic value of crops.