



# UNLOCKING THE POWER OF MULCHING: ENHANCING SOIL HEALTH AND PLANT GROWTH

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Mulching is a sustainable agricultural practice that involves covering the soil with a layer of organic or synthetic material. This method offers numerous benefits, including moisture retention, weed suppression, soil temperature moderation, and improved soil structure. By minimizing evaporation and erosion, mulching conserves water and nutrients, promoting plant growth and reducing the need for irrigation and fertilization. Overall, mulching proves to be an effective and eco-friendly approach to enhance crop productivity and soil health.

## INTRODUCTION

Mulching is a commonly employed agricultural and gardening method wherein a layer of organic or inorganic material is applied to the soil surface. This covering serves multiple vital functions, including the conservation of soil moisture, inhibition of weed proliferation, regulation of soil temperature, enhancement of soil structure, and mitigation of soil erosion. The widespread adoption of mulching across the globe underscores its manifold advantages for agricultural and horticultural practices.



## TYPE OF MULCHING:

Typically, two types of mulch are commonly employed.

**Organic mulch-** Organic mulches consist of natural materials of agricultural origin that decompose naturally. Examples include bark chips, grass clippings, wheat or paddy straw, plant leaves, compost, rice hulls, and sawdust, among others.



**Fig: Organic and Inorganic/Plactic Mulch**

**Inorganic mulch-** Inorganic mulches comprise synthetic substances such as plastics, landscape fabrics (Geotextiles), stones, and rocks. They are commonly chosen due to their non-decomposing nature, or slow decomposition over prolonged periods, resulting in reduced replacement expenses. It is found in the two types

- Transparent polythene sheet.
- **Coloured polythene sheet:** coloured polyethylene sheets should incorporate shades of blue, black, and milky white.



**Fig: Coloured Polyethylene Mulching Sheets**

### **Other types of mulch**

- Stone mulch- It is more common in the ornamental potted plants.
- Aluminium foil and Paper mulch - It is not more common in horticulture crops.



**Fig: Stone Mulch**

# DIFFERENT MULCHING MATERIALS IN AGRICULTURE

The perfect mulch would be readily accessible, affordable, and easy to manage.

1. Thin polyethylene is suitable.
2. Crop residue like straw, which is not commercially used and not appreciated by animals, can be utilized.
3. Rice husks were previously used, but nowadays, many organic types of mulch are available, such as organic waste, sugarcane leaves, orchard leaves, straw, soybean, cacti, etc.
4. Stone mulch can be used for potted ornamental plants.
5. Plastic sheets, generally transparent polyethylene, can be used.
6. Black sheets have been found to be superior for mulching purposes.
7. Mulching is carried out in two phases: at the nursery stage and in the field stage. Tomato, potato, chilli, eggplant, onion, okra, carrot, French bean, lettuce, and similar crops are highly suitable for mulching.



## DEPTH OF MULCHING:

When it comes to mulching, it's essential to follow these basic depth recommendations:

- Annual flower beds and perennial: Aim for 1 to 2 inches.
- Shrubs and bushes: Apply a layer of 2 to 3 inches.
- Vegetable: Keep it moderate, with 1 to 2 inches of mulch.
- In annual crop thin mulch is sufficient and in perennial crop mulch should be thick. Regarding plastic mulch in earlier days 200 to 300 Gauge thick plastic are apply but now a day advancement and adoptability the thickness of plastic is show now 50 to 150 Gauge.
- Out of the low density polythene sheet (LDPE) is more common. It is most suitable for most of the crop due to its durability. In case of LDPE it is more common thin that is why after one season it is damage.

# EFFECT OF MULCHING

Mulching represents a prevalent technique in crop cultivation, exhibiting various impacts on the crops.

## 1. Soil environment

- **Conserving soil moisture-** Various types of mulch exhibit distinct effects; for instance, organic mulches like sawdust or fine straw tend to absorb water more effectively. Conversely, wheat and pea straw, categorized as hard mulch, possess relatively lower water absorption capacities. When the soil is unevenly levelled, the presence of hard mulch may lead to water stagnation issues.
- **Soil structure-** Mulched soil retains its soft and friable texture compared to exposed soil, which tends to become hard and compact following rainfall or irrigation. While this effect is temporary, the long-term structural integrity of the soil remains relatively unchanged.
- **Maintaining soil temperature-** Organic mulch exhibits a temperature buffering effect, reducing the variance between daytime and night time temperatures. Dark-coloured plastic mulch typically retains higher temperatures compared to transparent mulch.
- **Carbon dioxide concentration-** Photosynthesis relies on it, yet its existence in soil also plays a crucial role in facilitating proper root growth and aiding in the decomposition of compost or manure.
- **Biotic population-** Reports indicate that beneficial microorganisms, including aerobic bacteria, fungi, and actinomycetes, thrive under decomposing mulch. Incorporating crop residue as mulch has been shown to support these organisms, leading to improved soil texture and an increase in earthworm populations.



## 2. Effect of mulch in crop production:

The mandatory use of mulch in nurseries has been enforced due to its ability to improve germination rates, particularly prevalent in tuber crops. However, its usage is less prevalent in indirect season crops or crops that are closely spaced together.

## 3. Effect on vegetative growth-

In mulched soil, vegetative growth tends to thrive exceptionally well.

## 4. On the crop maturation/harvesting-

Additional research has been conducted regarding the utilization of plastic mulch, revealing that it contributes to earlier crop maturation.

## 5. On the crop field-

In the study, it was noted that crops belonging to the Solanaceae and Cucurbitaceae family's exhibit higher yields.

## 6. Quality of produce-

Improving soil quality in vegetable production yields superior underground processes and higher-quality above-ground produce, offering benefits to the overall environment.

## 7. Plant protection

- **Weed control-** After mulching the soil less production weed has been reported.
- **Insect and disease control-** In a field taste mulch play an important role in reduce the population of aphid and reduce the incidence or attack of cucumber mosaic virus.

# ADVANTAGES OF MULCHING

1. Conserving moisture directly or indirectly, which reduces evaporation, minimizes weed growth, and saves soil water.
2. Regulating temperature, providing warmth in winter and cooling effects in summer.
3. Preventing soil erosion by creating a protective barrier against heavy rainfall.
4. Enhancing populations of beneficial organisms such as earthworms, actinomycetes, and bacteria.
5. Improving fruit size and colour by creating an optimal microclimate.
6. Enhancing soil texture.
7. Boosting soil fertility.
8. Controlling weeds effectively.

# DISADVANTAGES OF MULCHING

1. Additional labour is needed for both applying and removing the mulch.
2. Lack of awareness about proper removal can lead to over-moisture, potentially harming crops.
3. Early mulching after transplanting can stunt seedling growth, especially during warm seasons, potentially leading to plant death.
4. Woody mulch may attract termites, posing a risk to the integrity of the mulch and potentially causing damage.

In conclusion, mulching stands as a powerful ally in nurturing soil health and promoting robust plant growth. Its multifaceted benefits, including moisture retention, weed suppression, and nutrient enrichment, underscore its importance in sustainable gardening practices. Embracing mulching techniques fosters resilient ecosystems and bountiful harvests for generations to come.

