



## Feed the Future Tanzania Kilimo Tija Activity

### Technical Bulletin: Mulching

#### INTRODUCTION

This technical bulletin aims to provide comprehensive guidance on the practice of mulching in Tanzanian farming. Mulching involves the application of organic or inorganic materials to the soil surface around crops to conserve soil moisture, suppress weeds, improve soil health, and enhance crop productivity. This bulletin is designed to assist government extension agents, private sector stakeholders, and Tanzanian farmers in adopting effective mulching practices for sustainable agricultural production.

#### WHAT MULCHING IS AND WHAT IT DOES

Mulch is a layer of material applied to the surface of the soil. Mulching is the process of applying a layer of organic materials, such as crop residues, straw, grass, tree leaves, and wood chips, or inorganic materials, such as plastic mulch, to the soil surface around plants. Mulch serves multiple purposes:

- a) **Soil Moisture Conservation:** Mulch acts as a protective barrier, reducing water evaporation from the soil surface and minimizing moisture loss. This helps to maintain soil moisture levels, especially during periods of drought, resulting in improved crop water use efficiency.
- b) **Weed Suppression:** A layer of mulch prevents sunlight from reaching weed seeds, inhibiting their germination and growth. This natural weed control method reduces competition for nutrients, water, and light, thus minimizing the need for herbicides and manual weeding.
- c) **Soil Temperature Regulation:** Mulch acts as an insulating layer, moderating soil temperatures by reducing heat transfer from the sun and preventing temperature fluctuations. This is particularly beneficial in extreme weather conditions, protecting plant roots from heat stress or cold damage.
- d) **Soil Health Improvement:** Mulch decomposes over time, enriching the soil with organic matter and nutrients. This enhances soil structure, increases water infiltration and retention, promotes beneficial soil microbial activity, and improves overall soil fertility.
- e) **Erosion Control:** Mulch provides a protective layer that reduces soil erosion by preventing raindrop impact and surface runoff. This helps to retain topsoil and prevent nutrient loss, especially on sloping or vulnerable land.

#### IMPORTANCE OF MULCHING IN TANZANIAN FARMING

Mulching is highly valuable in the context of Tanzanian agriculture for several reasons:

- a) **Water Scarcity:** Many regions in Tanzania face water scarcity, especially during dry seasons. Mulching helps to conserve soil moisture, reducing the dependence on irrigation and ensuring better water management for crop production.
- b) **Weed Management:** Weeds compete with crops for resources and can significantly reduce yields. Mulching acts as a natural weed suppressant, reducing the need for labor-intensive manual weeding and the use of herbicides, thus minimizing production costs.
- c) **Soil Conservation:** Soil erosion is a major challenge in Tanzanian agriculture, leading to nutrient depletion and reduced soil productivity. Mulching plays a crucial role in controlling erosion, preserving topsoil, and maintaining soil fertility.





- d) **Sustainable Farming Practices:** Mulching aligns with sustainable agricultural principles by reducing reliance on synthetic inputs, improving soil health, and promoting ecosystem balance. It contributes to long-term soil sustainability, crop resilience, and environmental stewardship.

## TYPES OF MULCH MATERIALS

- a) **Organic Mulch:** Organic materials such as crop residues, straw, grass clippings, leaves, or compost are commonly used as mulch. These materials contribute to soil organic matter, nutrient cycling, and microbial activity, improving soil fertility and structure over time.



Figure 1: Organic mulch  
Photo: Fintrac Inc.

To prepare organic mulch, gather organic materials that are suitable for mulching, such as crop residues (such as maize stalks, sugarcane bagasse, or rice straw), grass clippings, leaves, hay, or compost. If you have larger organic materials, such as maize stalks or branches, it's beneficial to shred or chop them into smaller pieces. This accelerates the decomposition process and makes the mulch easier to spread. Depending on the crop, organic mulching is typically applied to small plot farms. Organic mulches are readily available, cost less than inorganic mulches, are easy to apply, and become fertilizer when they decompose. However, its application is laborious and attracts and harbors insects and pests such as ants.

- b) **Inorganic Mulch:** Inorganic mulch options include plastic films, geotextiles (industrial synthetic permeable material), or stones. These materials provide effective weed suppression, moisture retention, and soil temperature regulation. However, their use should be carefully considered to avoid negative environmental impacts and potential soil degradation.



Figure 2: Plastic mulch  
Photo: Fintrac Inc.



Figure 3: Plastic mulch in pineapple  
Photo Credit: Fintrac Inc.

Inorganic or plastic mulch is applicable in both small and larger farms, depending on the crop and its potential profitability. It is synthetic, relatively durable, and uniform, but is more costly compared to organic mulch. When purchasing inorganic mulch materials, consider factors such as product quality, durability, and appropriateness for each specific cropping system. It is advisable to compare prices, check for any product certifications or recommendations, and ensure that the mulch materials meet the system's requirements.



## ORGANIC MULCHING TECHNIQUES

- a) **Preparing the Soil:** Before mulching, ensure the soil is properly prepared by removing weeds and incorporating any necessary amendments or fertilizers.
- b) **Lay a Weed Barrier:** Before applying the organic mulch, it is advisable to create a weed barrier to prevent weed growth. You can use newspapers, cardboard, or biodegradable fabric as a base layer to suppress weed growth.
- c) **Applying Organic Mulch:** Apply a layer of mulch around the base of plants, extending it to cover the desired area. Aim for a thickness of about 5-10 centimeters (2-4 inches) to provide adequate coverage and insulation. Ensure that the mulch extends a few centimeters away from the plant stems while leaving some space around the stem to prevent excess moisture retention.
- d) **Mulch Maintenance:** Over time, the organic mulch will decompose and settle. Periodically check the mulch layer and replenish it as necessary to maintain the desired thickness. Add fresh organic material to areas where the mulch has decomposed significantly.
- e) **Maintain Mulch-Free Zones:** Leave a small mulch-free zone around the base of young seedlings or delicate plants to prevent excessive moisture retention and potential stem rot. Gradually increase the mulch coverage as the plants mature and establish stronger root systems.
- f) **Water and Monitor:** Water the mulched area as needed, ensuring that the water penetrates the mulch layer and reaches the soil beneath. Regularly monitor the moisture levels, weed growth, and overall health of the plants to make any necessary adjustments.

## INORGANIC OR PLASTIC MULCHING TECHNIQUES

- a) **Preparing the Soil:** Before mulching, ensure the soil is properly prepared by removing weeds and incorporating any necessary amendments or fertilizers. Prepare raised beds and install drip irrigation system.
- b) **Applying Inorganic Mulch:** Plastic mulch is applied on top of raised beds.
- c) **Create Holes in Plastic Mulch:** Holes in the plastic mulch should be properly spaced, depending on the crop and environment. It can be done by hand or a tool (cylindrical iron or iron pipe).
- d) **Transplant:** Transplant seedlings into prepared spaces.



Figure 4: Plastic mulch installation  
Photo Credit: Fintrac Inc.



Figure 5: Holes in plastic mulch  
Photo Credit: Fintrac Inc.



Figure 6: Crop spacing with iron tool  
Photo Credit: Fintrac Inc.



Figure 7: Transplanting on plastic mulch  
Photo Credit: Fintrac Inc.

## MULCHING CONSIDERATIONS

- a) **Crop-Specific Requirements:** Different crops may have specific mulching requirements. Consult local agricultural extension services or experts for crop-specific mulching recommendations.
- b) **Seasonal Adjustments:** Mulching practices may need to be adjusted according to seasonal variations, such as removing or reducing mulch during heavy rainfall to prevent waterlogging.
- c) **Weed Control:** While mulching suppresses weeds, it may not completely eliminate them. Additional weed management strategies, such as intercropping or spot weeding, may be necessary in combination with mulching.
- d) **Mulch Decomposition:** Organic mulches gradually decompose, contributing to soil organic matter. Plan for mulch replenishment to maintain its effectiveness and maximize its benefits.

## CONCLUSION

Mulching is a valuable practice for Tanzanian smallholder farmers to conserve soil moisture, suppress weeds, improve soil health, and enhance crop productivity. By adopting appropriate mulching techniques and materials, farmers can reduce water stress, decrease weed competition, enhance soil fertility, and promote sustainable farming practices. Consider crop-specific requirements, seasonal adjustments, and regular maintenance to optimize the benefits of mulching. Embracing mulching as part of agricultural management strategies can contribute to improved yields, soil conservation, and long-term agricultural sustainability in Tanzania.