



Enhancing drought resistance through Guinea grass mulching, Jamaica

Source

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Summary

Guinea grass mulching is one of the local drought-mitigation strategies adopted in the low-rainfall areas of Jamaica. After the land preparation dried guinea grass is applied in a matted form over the area to be cultivated.

This practice helps crop to survive during the dry season without having to recur to irrigation. Moreover, this technique enhances soil moisture for germinating seeds and allows for a better crop establishment and nutrient uptake.

Description

Drought has become more frequent in some areas of Jamaica, which increases the vulnerability of farmers whose livelihoods depend on agriculture. While there is a general perception that negative effects of droughts can be mitigated through appropriate technologies, their actual adoption is often hampered by the availability of resources.

One widely adopted agricultural practice is guinea grass mulching, by which land after it has been prepared for cultivation is covered with dried guinea grass. It is done before sowing to ensure that moisture is conserved,

weed is controlled, soil erosion, run-off and soil temperature are reduced, soil structure is improved and volatile fertilizer material is retained.

1. Implementation of the technology

For its implementation the following steps are required

1.1 First Step

Harvest guinea grass before flowering (seeding), because when the seeding begins, the Guinea grass stem becomes more liquefied and thus more difficult to break down as mulch.

There are also a higher proportion of stems to leaves after seeding, and it is the leaves that account for the bulk of the matting that forms mulch. Timing is therefore critical when harvesting the guinea grass.

1.2 Second Step

Secure sufficient amount of grass to adequately cover the area prepared for cultivation.

To provide a mat that will not break down before the cropping season is over, it is recommended to use 46



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cubic meters of dried grass per hectare of prepared land.

1.3 Third Step

Apply fertilizers and any other soil treatment, especially if fertilizer will be broadcast and incorporated into the soil.

1.4 Fourth Step

Prepare holes for sowing seeds or for transplant.

1.5 Fifth Step

For ease of preparation the dried grass to be used should be piled in the vicinity of the land to be treated. Dried grass is to be removed from the heap, and the leaves arranged length-wise in a single direction over the prepared area, completely covering the soil. The process is to be repeated in the opposite direction, forming a matt.

1.6 Sixth Step

Mulching operation is now complete and crop production activities may now proceed as usual.

2. Advantages of mulching

1. It allows crop production during dry periods in areas where this would not be possible without irrigation. The process reduces evapotranspiration and traps soil moisture within the mulch environment and makes it available for an extended period for the establishment of crops. In the early stages of seed germination, condensation on the mulch provides moisture for germinating seeds. Mulch also keeps the root environment cool, allowing better crop establishment and nutrient uptake;
2. It suppresses weed growth, reduces competition for soil nutrients and reduces cost of weed control;
3. It reduces soil loss from wind erosion, when soil structure is disturbed during harrowing or other traditional forms of land preparation. Mulching protects the soil from splash and rill erosion by reducing the impact of rainfall on the surface and prevents the development of rills;
4. The presence of mulch on the surface helps to deflect direct sunlight from the root zone of crops thus resulting in lower temperature in the root zone and more efficient utilization of soil nutrients;
5. It facilitates improvement in soil structure by preventing deterioration of soil surface. Incorporation of organic matter into the soil structure. This helps to bind soil particles together, thus improving structure and moisture-holding capacity;
6. It reduces the exposure to high temperature by the application of mulch, thus allowing greater availability of nutrients to plants. Many inorganic fertilizers, especially those with high nitrogen content and some organic manures (such as poultry manure), volatilize if left exposed to high temperature;
7. It ensures a more even coloration between the parts of vine crops, such as melons and pumpkins that rest on the ground and the rest of the crop, and thus mulching improves their marketability. Mulching also prevents scarring of crops by providing a cushion for vine crops; and
8. The improvement of soil properties achieved will benefit the resilience of farmers against climate variability and adverse climate events (droughts, floods, etc.). Also, it will improve the potential of the soil to increase the crop yield.



Figure 1. Guinea Grass Mulching - Southern St. Elizabeth, Jamaica



3. Validation of the practice

This technology was tested in mixed coastal plantation farming systems in Jamaica.

4. Agro-ecological zones

- Tropics, warm

5. Objectives fulfilled by the project

- Resource use efficiency; and
- pro-poor technology.