

Mulching in organic agriculture, The Philippines

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Summary

The following describes the technique of mulching in organic agriculture. Details on the benefits and why use mulch are given. The selection and source of mulching materials are also provided as well as recommendations while using mulch and its application. A case study of the Fukuoka system of mulching rice fields highlights the benefits of this technology.

- Prevents the soil from heating up too much: mulch provides shade to the soil and the retained moisture keeps it cool.
- Provides nutrients to the crops: while decomposing, organic mulch material continuously releases its nutrients, thus fertilizing the soil.

Figure 1. Sketch on the effects of mulching



Description

1. Why use mulch?

- Protects the soil from wind and water erosion: soil particles cannot be washed or blown away.
- Improves the infiltration of rain and irrigation water by maintaining a good soil structure: no crust is formed, the pores are kept open.
- Keeps the soil moist by reducing evaporation: plants need less irrigation or can use the available rain more efficiently in dry areas or seasons.
- Feeds and protects soil organisms: organic mulch material is an excellent food for soil organisms and provides suitable conditions for their growth.
- Suppresses weed growth: with a sufficient mulch layer, weeds will find it difficult to grow through it.

2. Selection of mulch materials

The kind of material used for mulching will greatly influence its effect. Material which easily decomposes will protect the soil only for a rather short time but will provide nutrients to the crops while decomposing.

Hardy materials will decompose more slowly and therefore cover the soil for a longer time. If the



decomposition of the mulch material should be accelerated, organic manures such as animal dung may be spread on top of the mulch, thus increasing the nitrogen content. Where soil erosion is a problem, slowly decomposing mulch material (low nitrogen content, high C/N) will provide a long-term protection compared to quickly decomposing material.

2.1 Sources of mulching material

Sources of mulching material include:

- weeds or cover crops;
- crop residues;
- grass;
- pruning material from trees;
- cuttings from hedges;
- waste from agricultural processing or from forestry.

2.2 Recommendation while using mulch

Mulching has a lot of advantages, but it can also cause problems in specific situations.

- Some organisms can proliferate too much in the moist and protected conditions of the mulch layer. Slugs and snails can multiply very quickly under a mulch layer. Ants or termites which may cause damage to the crops also may find ideal conditions for living.
- When crop residues are used for mulching, in some cases there is an increased risk of sustaining pests and diseases. Damaging organisms such as stem borers may survive in the stalks of crops like cotton, corn or sugar cane. Plant material infected with viral or fungal diseases should not be used if there is a risk that the disease might spread to the next crop. Crop rotation is very important to overcome these risks.
- When carbon rich materials such as straw or stalks are used for mulching,

nitrogen from the soil may be used by microorganisms for decomposing the material. Thus, nitrogen may be temporary not available for plant growth.

- The major constraint for mulching usually is the availability of organic material. Its production or collection usually involves labour and may compete with the production of crops.

Figure 2. Potential problems related to mulching (photo of a mulch layer)



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3. Application of mulch

If possible, the mulch should be applied before or at the onset of the rainy season, as then the soil is most vulnerable. If the layer of mulch is not too thick, seeds or seedlings can be directly sown or planted in between the mulching material.

On vegetable plots it is best to apply mulch only after the young plants have become somewhat hardier, as they may be harmed by the products of decomposition from fresh mulch material. If mulch is applied prior to sowing or planting, the mulch layer should not be too thick in order to allow seedlings to penetrate it.

Mulch can also be applied in established crops, best directly after digging the soil. It can be applied between the rows, directly around single plants (especially for tree crops) or evenly spread on the field.



3.1 A practical example: the Fukuoka system of mulching rice fields

The Japanese organic pioneer Fukuoka developed a system of growing rice which is based on mulching. White clover is sown among the rice one month before harvesting. Shortly thereafter, a winter crop of rye is sown. After threshing the harvested rice, the rice straw is brought back to the field where it is used as a loose mulch layer. Both the rye and the white clover spring up through the mulch which remains until the rye is harvested. If the straw decomposes too slowly, chicken manure is sprinkled over the mulch. This cropping system does not require any tillage of the soil, but achieves satisfying yields.

Figure 3. Mulch applied in vegetable fields in the Philippines, with recommendations for the application of mulch in key words



4. Further reading

- IFOAM. 2003. Training Manual for Organic Agriculture in the Tropics. Edited by Frank Eyhorn, Marlene Heeb, Gilles Weidmann, p 214, 219-224
- FiBL 2011. African Organic Agriculture Training Manual – Conversion. Version 1.0 June 2011. Edited by Gilles Weidmann and Lukas Kilcher. Research Institute of Organic Agriculture FiBL, Frick

5. Agro-ecological zones

- Tropics, warm

6. Related/associated technologies

- Introduction to organic agriculture: 8359
- Considerations for conversion to organic agriculture: 8363
- Step by step conversion to organic agriculture: 8364
- Water management in organic agriculture: 8366
- Crop planning and management in organic agriculture: 8367
- Nutrient management in organic agriculture: 8368
- Pest and disease management in organic agriculture: 8372
- Weed management in organic agriculture: 8375
- Soil cultivation and tillage in organic agriculture: 8376
- Plant propagation in organic agriculture: 8377
- Animal husbandry in organic agriculture: 8378
- Soil and water conservation practices to reduce soil erosion and enhance water conservation, St. Lucia

7. Objectives fulfilled by the project

7.1 Women-friendly

The technology is easy to use and accessible

7.2 Resource use efficiency

Improves soils quality leading to improved crop yields

7.3 Pro-poor technology

Improved crop yields thanks to the mulching technology provides for an additional source of income and food source.