

INTRODUCTION

One of the most significant biotic barriers to worldwide agricultural productivity is weeds. They host insects and pathogens and compete with crops for resources including sunlight, water, minerals, and space. Both the quantity and quality of agricultural product are decreased by weeds, which also raises the overall cost of cultivation. Weeds and pathogens are the two factors that have the greatest potential to reduce crop productivity, and it is estimated that they damage Indian agriculture productivity more than USD 11 billion annually. Crop yield losses caused by weeds differ depending on the type of weeds and crops, weed population, weed emergence time, critical period of competition, etc., and if uncontrolled, can even result in a 100% yield loss.

Due to rising agricultural wage costs and the emigration of rural labour to cities, manual weeding, which used to be the most popular method of weed management in developing nations, is becoming less widespread. Herbicide use is quickly replacing the technique of hand weeding. Herbicide-resistant weeds, however, have developed as a result of the unscientific practise of relying excessively on herbicides with comparable mechanisms of action. There are already more than 500 distinct cases of weeds that are resistant to herbicides. These problems and worries have compelled and inspired agronomists to create new environmentally friendly weed control techniques like brown manuring and to think about the possibility of combining these with herbicide use.



Fig 1: Concept of brown manuring

BROWN MANURING: AN EFFECTIVE WEED MANAGEMENT PRACTICE

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WHAT IS BROWN MANURING?

Brown manuring (BM), sometimes known as "no-till" green manuring, is a method of applying a selective herbicide to desiccate the green manure crops prior to flowering rather than cultivating them. The current BM method involves planting of green manure crops, especially legumes, alongside the main crop during the first 25 to 30 days after sowing before desiccating them with a selective herbicide. The desiccated green manure crops are left standing on the field with the primary crop without being incorporated and are allowed to degrade in the soil. This kind of green manuring is known as "no-till" green manuring. Due to the herbicide spray that causes the dried-out leaves of green manure plants to turn brown, the practise is known as brown manuring.

CONSIDERATIONS FOR CHOOSING BROWN MANURE CROPS

The selection of the brown manure crop is crucial since intense competition with major crops could have negative impacts and reduce productivity. To accomplish resource use optimization, the main crop and the brown manure crop should ideally have complimentary resource use and niche difference in space and time. The best crop species are those that can fix atmospheric nitrogen and aid in maximising weed management while lowering input costs and risk. Aside from price and ease of access, other recommended qualities include quick crop growth and high dry matter output in a short period of time, strong competition with target weeds, and high ground cover to preserve moisture and minimize wind erosion.

Because cereals may consume some of the nitrogen that legumes biologically fix, the pairing of cereals with legumes is considered to have multiple advantages, including increased yield, preservation of soil fertility, sustainability of production, and increased ecosystem services.

CROPS USED FOR BROWN MANURING

Leguminous crops: Crops enrich the soils with both organic matter and nitrogen. With the aid of the bacteria in their nodules, legumes can absorb nitrogen from the atmosphere. Legumes are also preferred for usage as green manuring crops. Example: Sunnhemp, Dhaincha, Green gram, Cowpea, Lentil etc.

Non-leguminous crops: Non-leguminous plants that mainly add organic matter to the soil are employed as a green manuring crop. The use of non-legumes for green manuring is somewhat restricted. Example: Niger, Wild indigo etc.

BENEFITS OF BROWN MANURING

- ✓ Brown manuring is an environmentally benign weed control method that reduces weed growth and population during the early phases of crop growth..
- ✓ Legume brown manuring crops use biological nitrogen fixation (BNF) to supply nitrogen to component crop plants, which allows for the replacement of a substantial portion of nitrogenous fertiliser.
- ✓ It raises the soil's organic carbon content and earthworm population.
- ✓ Enhances the physicochemical characteristics of the soil (soil structure, organic carbon, bulk density, and pH)..
- ✓ Brown manuring can prevent runoff, reduce wind erosion, and maintain soil moisture..
- ✓ Brown manuring results in increased crop productivity and financial advantage for farmers because it improves soil fertility, reduces weed competition, and has other positive effects.
- ✓ When used in conjunction with brown manuring, herbicide/ herbicides significantly increased the yield of protein and the amount of protein in grains.



CONCLUSION

Brown manuring is a revolutionary and environmentally beneficial method of controlling weeds that not only eliminates weeds but also strengthens the soil, retains soil moisture, increases crop output, and provides farmers with additional financial rewards. The technique has to be made more well-known among farmers because it is affordable and simple to adopt, making it suitable for marginal farmers who lack access to resources.