



Green Manuring: Reviving a Traditional Practice for Sustainable Agriculture

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With the increased population pressure on the limited agricultural land for food and other demand, farmers look for alternative agricultural methods such as use of chemical fertilizer, pesticides and other chemical input in order to raise their productivity. Continuous use of chemical fertilizers and pesticides to curb the problem of food deficit has been regarded as primary cause of soil degradation, health hazard and other environmental pollution. Deterioration of the soil quality leads to loss in soil organic matter, soil erosion and depletion of nutrient flow and availability which ultimately have negative consequences to environmental as well as human health. Trend of soil degradation can be reversed by and adopting of recommended management practices and conversing to a restorative land use. Due to this reason, the application of organic amendment such as animal/farmyard manure, green manure, compost, vermicompost, biofertilizers and byproduct with high nutrient content etc. to the soils has become a common environment friendly practice for soil quality restoration, maintaining soil organic matter, reclaiming degraded soils as well as supplying the plant nutrients. The application of green manures to soil is considered a good management practice in any agricultural production system.

Green Manuring: A Simple Idea With Big Benefits

Green manuring is the practice of growing specific crops and incorporating them into soil before it reaches full maturity. The primary goal of green manuring is to enrich organic matter and restore nutrients for the next crop. It stimulates soil microbial growth and activity, leading to the subsequent mineralization of plant nutrients and an overall increase in soil fertility and quality. Both leguminous and non-leguminous plants are used as green manures. Leguminous green manures can fix large quantity of atmospheric nitrogen and provide useful amounts of organic matter to the soil. Non-leguminous green manures only can increase the organic matter in soil and do not fix atmospheric nitrogen.

Why Green Manuring Matters Today?

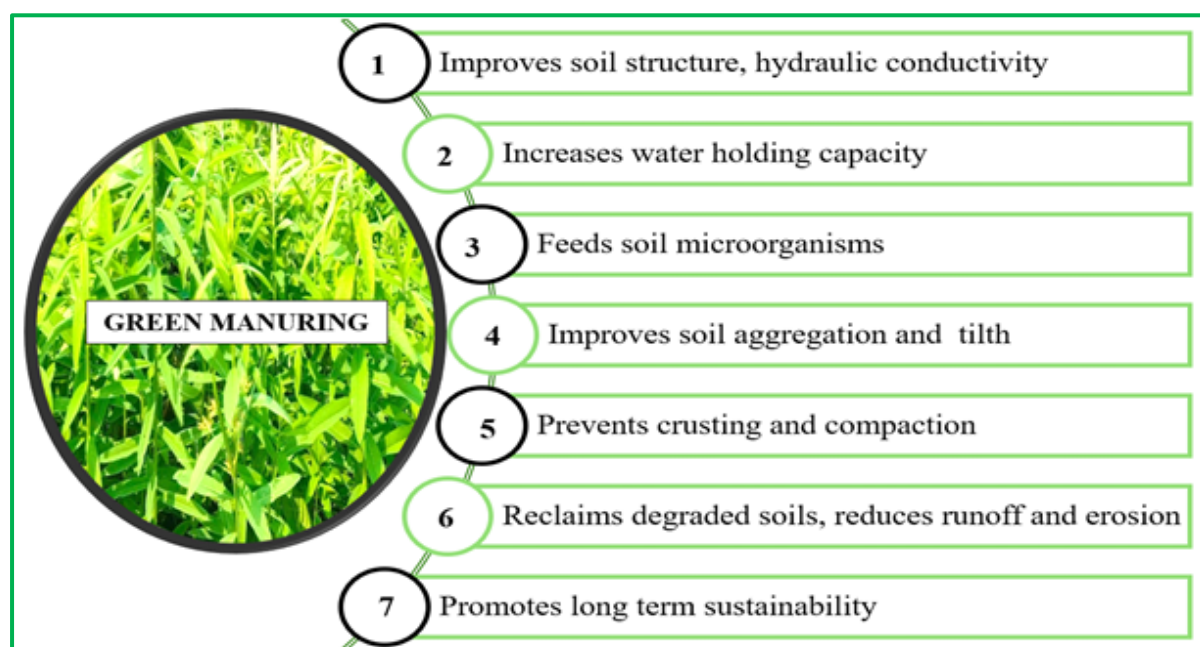
Green manuring is gaining importance in modern agriculture as a sustainable approach to improving soil health, maintaining soil fertility and mitigating the effects of climate change. It involves growing suitable green manure crops, particularly legumes and incorporating them into the soil to enhance nitrogen availability and increase soil organic matter. This practice reduces dependence on synthetic fertilizers, lowers input costs and improves soil physical properties including soil structure, porosity and water holding capacity. Furthermore, green manuring contributes to weed suppression, reduces soil erosion, enhances soil biological activity and promotes carbon sequestration through the addition of plant biomass to the soil.

Thus, integrating green manuring into cropping systems can improve soil productivity, strengthen resilience to water stress and support sustainable agricultural production.

Important Green Manure Crops and Their Role in Improving Soil Fertility

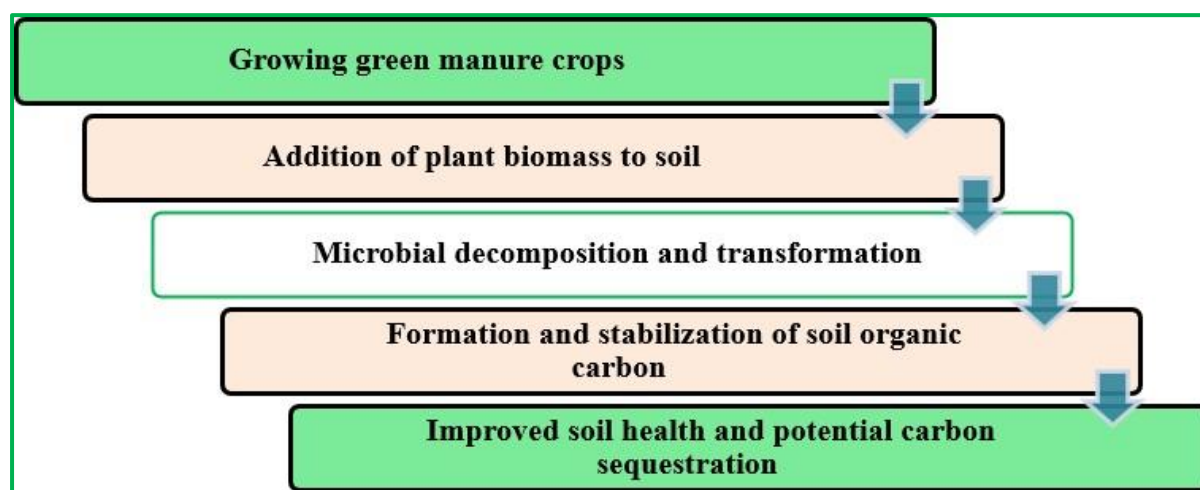
Green manure crops	Botanical name	Main benefits
Sunhemp	<i>Crotalaria juncea</i>	Adds nitrogen and organic matter to the soil
Dhaincha	<i>Sesbania aculeata</i>	Produces abundant green biomass and improves soil fertility
Cowpea	<i>Vigna unguiculata</i>	Adds nitrogen, provides soil cover and helps suppress weeds
Pilipesara	<i>Vigna trilobata</i>	Improves soil fertility and provides green biomass
Green gram	<i>Vigna radiata</i>	Contributes nitrogen and organic matter when incorporated into the soil

How Does Green Manuring Improves Soil Health?



A Natural Path to Building Soil Carbon

Green manuring builds soil carbon through the addition and decomposition of plant biomass. The process involves several interconnected steps which summarised below:



How Farmers Can Adopt It?

Farmers can adopt green manuring by growing suitable leguminous cover crops, such as sunhemp, dhaincha and cowpea, during fallow periods or before the main crop. These crops help protect the soil, recycle nutrients, improve soil structure and contribute organic matter. Crop selection should be based on local climatic conditions, soil type, water availability and cropping requirements.

Challenges and Limitations

Despite its benefits, green manuring faces several practical challenges. It requires additional time, seeds and labour for growing and incorporating the biomass, which may delay the sowing of the succeeding crop. In rainfed areas, inadequate rainfall and limited soil moisture can restrict green manure crop growth. Farmers may also face difficulties in obtaining suitable seeds, especially during peak sowing periods. Furthermore, the benefits depend on crop species, biomass production, soil conditions and decomposition rates. Green manuring may not fully meet the nutrient requirements of the succeeding crop, making balanced fertilization and proper crop management essential.

Future Scope

Green manuring has considerable potential to promote sustainable agriculture by improving soil health, increasing soil organic carbon and reducing dependence on chemical fertilizers. Future efforts should focus on developing high biomass, short duration green manure crops suitable for different agro- climatic regions and cropping systems. Integrating green manuring with conservation agriculture, crop rotation, residue management and integrated nutrient management can further enhance its benefits. Promoting farmer awareness, ensuring the timely availability of quality seeds and demonstrating its long term economic benefits will encourage wider adoption. Green manuring can aid climate-resilient agriculture by enhancing soil carbon storage, improving soil moisture conservation and sustaining long term soil fertility.

Conclusion

Green manuring is an easy, environmentally friendly and economical method for revitalizing soil health and encouraging sustainable farming. Incorporating appropriate green manure crops into the soil allows farmers to enhance soil structure, improve nutrient cycling, boost organic matter and maintain long term soil productivity. Despite obstacles like water shortages, labour needs and restricted seed availability that may hinder its adoption, effective planning and suitable crop choices can aid in overcoming these challenges. Incorporating green manuring into current farming practices can lead to improved soil health, resilient crops and more sustainable agricultural production.

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