

Farm, Ferment and Flourish: Harnessing Bio-Inputs for Natural Farming

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SUMMARY

Natural farming is an integrated and sustainable approach in agriculture that emphasizes minimum soil disturbance, soil cover, crop diversification, intercropping, livestock integration, recycling of farm residues and the use of locally available farm-based inputs. It aims to improve soil health, conserve natural resources, reduce dependence on external chemical inputs and production costs and enhance the resilience of farming systems to climatic and biological stresses. Bio-inputs are an important component of natural farming and include Beejamrutha, Jeevamrutha and Ghana Jeevamrutha for seed treatment, soil biological activity and nutrient management, along with Brahmastra, Neemastra and Agni Astra for natural insect-pest management. The use of locally prepared inputs and ecological pest-management practices supports biodiversity, nutrient recycling and greater resource-use efficiency. Overall, natural farming promotes healthy soils, biodiversity conservation, farm-resource recycling and preventive pest management, thereby providing a low-cost and resource-efficient approach to sustainable agricultural production.

INTRODUCTION

Agriculture is a diverse and integrated activity that includes the production of food crops such as finger millet, rice, maize and pulses, as well as fruits and vegetables. It also comprises allied activities such as beekeeping, sericulture and livestock rearing. Modern agricultural production requires appropriate technologies for cultivation, harvesting, processing, storage and marketing. Agricultural development is closely associated with rural development because a large proportion of the rural population depends on agriculture and a substantial share of agricultural production originates from rural areas (FAO, 2020). Considering the changing conditions and limited resources available to small and marginal farmers in India, natural farming is emerging as a sustainable agricultural approach that emphasizes the efficient use of locally available resources. Natural farming is an integrated farming system that aims to restore soil health, improve the quality of water and air and produce nutritious food. It is also considered an important approach for addressing the challenges associated with climate change and declining soil fertility (Wezel *et al.*, 2020). Natural farming is essentially a chemical-free farming approach that integrates crops, trees and livestock with functional biodiversity. It promotes low-cost farm inputs prepared from locally available resources such as cow dung, cow urine and plant-based extracts. Practices such as crop residue recycling, mulching, crop diversification and intercropping form important components of this system (Kumar *et al.*, 2020).

Major techniques and practices of natural farming

The important practices of natural farming include:

- Minimum soil disturbance or minimum tillage to reduce physical, biological and chemical disturbances to the soil.
- Covering the soil with vegetation or naturally available organic materials.
- Integrating livestock into the farming system wherever possible.
- Recycling crop residues and farm wastes within the farm.
- Using locally prepared farm-based inputs.
- Adopting crop diversification and intercropping.
- Maintaining soil cover to conserve moisture and promote biological activity.

Principles of natural farming

Natural farming is based on several fundamental principles:

1. Care and management of the five natural elements - soil, air, water, space and fire.
2. Considering soil as a living system rather than merely a physical medium for crop growth.
3. Integration of plants, animals and human beings within the farming system.
4. Promotion of biodiversity and sustainable agriculture.

5. Adoption of climate-resilient agricultural practices.

Bio-inputs in natural farming

Bio-inputs are farm or biologically derived preparations made using beneficial microorganisms, plant materials, animal-based materials or natural extracts. They are used for improving soil biological activity, enhancing nutrient availability, promoting plant growth and managing insect pests and diseases.

The major benefits of biological inputs include:

- Improvement in soil structure.
- Enhancement of biological activity in soil.
- Improvement in water-holding capacity.
- Better crop growth and plant health.
- Support for natural pest and disease management.
- Conservation of soil quality.
- Reduction in dependence on external agricultural inputs.

Bio-inputs used in natural farming can broadly be grouped into:

1. Bio-inputs for soil health and nutrient management.
2. Bio-inputs for insect-pest and disease management.

Bio-inputs for soil health and nutrient management

1. Beejamrutha

Beejamrutha is a traditional seed-treatment preparation used in natural farming which contains Water (20 litres), Cow dung (5 kg), Cow urine (5 litres), Lime (50 g) and Rhizosphere soil (one handful).

Preparation

Take 5 kg of indigenous cow dung and wrap it in a clean cloth. Suspend or immerse the cloth containing the cow dung in 20 litres of water and leave it for about 12-14 hours so that the soluble portion of the cow dung is extracted into the water. Separately, dissolve 50 g of lime in 1 litre of water and allow it to settle. Mix the prepared lime solution with the cow-dung extract. Add one handful of rhizosphere soil and 5 litres of cow urine. Mix the preparation thoroughly and leave it for another 8-12 hours. The resulting preparation can be used as Beejamrutha for seed treatment.

2. Jeevamrutha

Jeevamrutha is one of the important liquid bio-inputs used in natural farming for improving soil biological activity and nutrient availability. It contains ingredients such as Cow dung (10 kg), Cow urine (10 litres), Jaggery (2 kg), flour (2 kg), Rhizosphere soil (one handful) and Water (200 litres).

Preparation

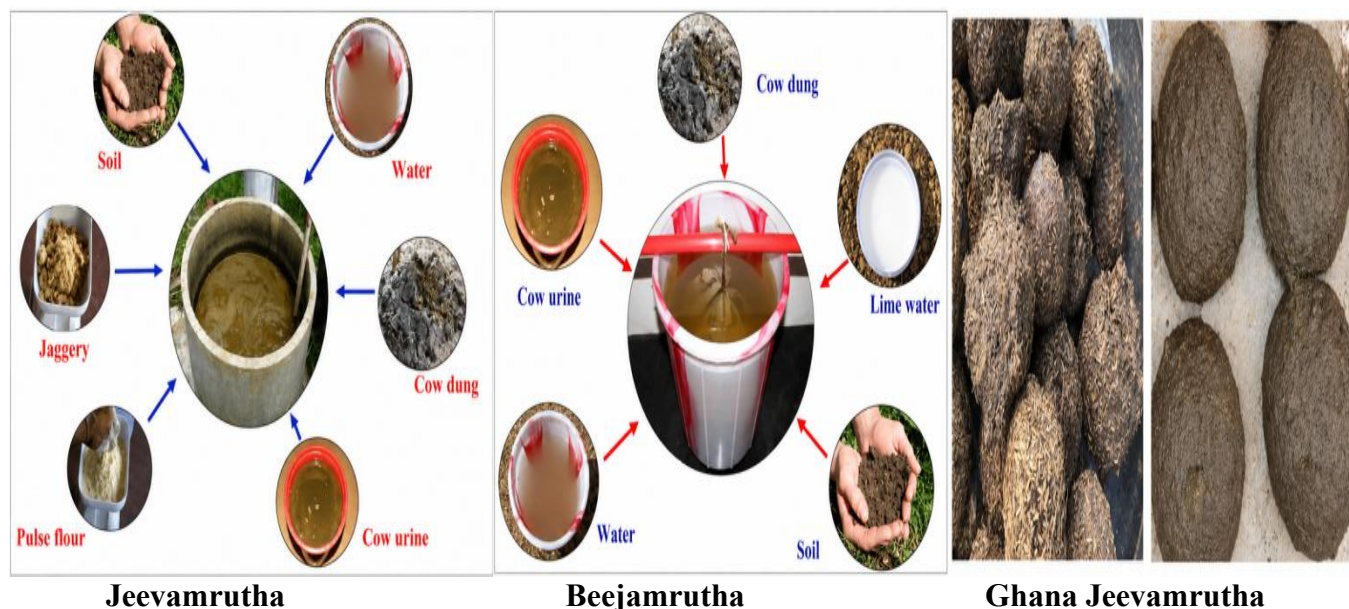
For preparing Jeevamrutha sufficient for approximately one acre, take 200 litres of water in a plastic barrel. Add 10 kg of indigenous cow dung and mix thoroughly. Add crushed jaggery and mix well. Then add flour and indigenous cow urine. Add one handful of rhizosphere soil and mix the preparation thoroughly. Cover the barrel with a gunny cloth and keep it undisturbed for about three days for fermentation. The mixture should be stirred approximately three times a day using a wooden stick. The barrel should be kept in shade or partial shade and protected from direct sunlight and rain.

3. Ghana Jeevamrutha

Ghana Jeevamrutha is a solid form of Jeevamrutha that can be prepared and applied to the soil. It contains ingredients *viz.*, Cow dung (100 kg), Cow urine (10 litres), jaggery (2 kg), flour (2 kg) and Rhizosphere soil (2 handfuls).

Preparation

Spread 100 kg of cow dung on a clean surface. Sprinkle cow urine over the dung to provide adequate moisture. Powder 2 kg of jaggery, dissolve it in water and mix it with the cow dung. Add 2 kg of flour and mix thoroughly. Add two handfuls of soil collected from around healthy plants or the rhizosphere. Cover the mixture with a wet gunny cloth and keep it in the shade for about 24 hours. After this, form the material into larger lumps and dry them in shade for approximately 21 days. Once completely dried, powder the material and store it in bags.



Jeevamrutha

Beejamrutha

Ghana Jeevamrutha

Bio-inputs for insect pest and disease management

Plant-based preparations are important components of natural pest management. The major preparations are Brahmastra, Neemastra and Agniastra along with other locally prepared botanical extracts.

1. Brahmastra

It contains ingredients like Neem leaves (5 kg), Bitter gourd leaves (2 kg), Lakkhi leaves (2 kg), Auda/Audala leaves (2 kg), Guava leaves (2 kg), Parthenium leaves (2 kg), Pongamia leaves (2 kg), Custard apple leaves (2 kg), Lantana leaves (2 kg), Datura leaves (2 kg), Pomegranate leaves (2 kg) and Cow urine (20 litres)

Preparation

Select any five of the available plant materials from the listed leaves and grind them properly. Add approximately 20 litres of indigenous cow urine to a large earthen or suitable metal vessel. Add the crushed leaf mixture and boil thoroughly. After repeated boiling, approximately 15 litres of extract remain. Remove the vessel from the heat and allow it to cool for 2-4 days. Stir the preparation approximately three times a day using a wooden stick. After the preparation has cooled and settled, filter it through a cloth and store the filtered extract in another container. It can be stored for several months. For application, approximately 6 litres of Brahmastra may be mixed with 200 litres of water and sprayed on the crop. It is recommended for the management of sap-sucking insects and fruit and pod-boring insects.

2. Neemastra

It contains ingredients such as Neem leaves (5 kg), Cow urine (5 litres), Cow dung (1 kg) and Water (100 litres).

Preparation

Take 5 kg of fresh or dried neem material and grind it thoroughly. Add the powdered material to 100 litres of water. Add 5 litres of cow urine and mix well. Cover the preparation and keep it for approximately 48 hours. Stir it three times a day. After 48 hours, filter the preparation through a cloth. The filtered preparation is diluted as required and sprayed on the crop. It is mainly recommended for managing the sucking insects and young caterpillars.

3. Agniastra

It contains ingredients viz., Neem leaves (5 kg), Green chilli (0.5 kg), Garlic (0.5 kg) and Cow urine (20 litres).

Preparation

Take 20 litres of cow urine and add 5 kg of fresh neem leaves. Add 500 g of crushed green chilli and 500 g of crushed garlic. Mix all the ingredients thoroughly in cow urine and boil the preparation. After three to four boils, remove it from the heat and allow it to cool for about 48 hours. Filter the preparation through a clean cloth. The resulting extract is ready for crop application. Dilute approximately 20-30 ml of the preparation in one litre of water and spray on the crop. Agniastra particularly recommended for managing insects that live on or around plant stems, including larger and younger caterpillars.



Neemastra

Agniastra

Brahmastra

Natural insect-pest management

Natural farming emphasizes preventive and ecological approaches to insect-pest management rather than depending exclusively on external pesticides (MoA&FW, 2025).

Important preventive practices, curative and ecological approaches include:

- Selection of suitable and locally adapted varieties.
- Use of healthy and safe seed or planting material.
- Adoption of mixed cropping systems.
- Proper irrigation and water management.
- Conservation and encouragement of natural enemies of insect pests.
- Adoption of the appropriate sowing time.
- Maintaining the recommended spacing between plants.
- Removal and destruction of severely damaged plant parts.
- Minimize the use of external pesticides.
- Maintain natural enemy populations in the field.
- Establish diversified cropping systems such as mixed cropping.
- Grow alternative or supplementary host plants that provide food and shelter to beneficial insects.
- Provide suitable flowering plants for adult beneficial insects.
- Use plant-based extracts and decoctions such as Brahmastra, Neemastra and Agniastra for insect and disease management.

CONCLUSION

Natural farming offers an integrated approach to sustainable agriculture by combining soil health management, biodiversity conservation, crop diversification, livestock integration and the use of locally prepared biological inputs. The approach emphasizes reducing dependence on external chemical inputs and making better use of resources available within the farm. Preparations such as Beejamrutha, Jeevamrutha and Ghana Jeevamrutha are used for seed treatment, soil biological activity and nutrient management, while botanical preparations such as Brahmastra, Neemastra and Agniastra are used for natural insect-pest management. The success of natural farming depends on maintaining healthy soils, conserving beneficial organisms, recycling farm resources and adopting preventive approaches to pest and disease management. When these practices are integrated with suitable crop varieties, proper water management, crop diversification and timely field operations, they can contribute to a more resilient and resource-efficient farming system. Natural farming therefore provides an important pathway for promoting sustainable agricultural production while strengthening farmer's capacity to make use of locally available resources.

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