

Method of Preparation of Various Inputs Used in Natural Farming

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OPEN ACCESS

Keywords

Agniastra, Beejamrit, Brahmastra, Jivamrit, Neemastra

How to cite this article:

Sarma, H. H. and Dutta, S. K. 2024. Method of Preparation of Various Inputs Used in Natural Farming. *Vigyan Varta* 5(7): 88-94.

ABSTRACT

Natural farming emphasizes harmonizing with nature rather than opposing it. It promotes the use of natural predators, compost, animal dung, and locally available organic resources to enhance soil fertility, manage pests, and boost crop yields. The approach has gained global traction due to its environmental and socio-economic benefits. Components of natural farming are Beejamrit, jivamrit, Whapasa, Acchadana and plant protection. Neemastra, Agniastra, Brahmastra, Dashaparni ark and natural fungicides are used as plant protection measures. Preparation of these inputs is very crucial for proper growth and development of crops grown under this technique. Natural farming minimizes soil and water pollution, preserves biodiversity, and mitigates climate change impacts by reducing reliance on chemical pesticides and fertilizers. Countries like India have increasingly recognized and supported natural farming practices. Despite its benefits, challenges such as limited farmer awareness, inadequate access to organic inputs, and the need for supportive policies and infrastructure remain hurdles to widespread adoption.

INTRODUCTION

Natural farming embodies a comprehensive approach to sustainable agriculture. Rooted in principles that prioritize soil and human health while promoting biodiversity, it integrates traditional Indian practices with modern

ecological concepts. This chemical-free farming method emphasizes optimizing farm resources through reduce-reuse-recycle strategies. It is characterized by its agroecological foundation, combining crops, animals, and trees to maximize their synergies.

Central to natural farming are practices like on-farm biomass recycling, mulching, and the use of cow dung-urine formulations to enhance soil fertility naturally, without synthetic chemicals. It promotes the use of on-farm inputs produced by farmers and emphasizes the optimal utilization of functional biodiversity. Central to this approach is the indigenous Desi cow breed, which plays a pivotal role. Utilizing dung and urine from various cattle breeds, farmers can create mixtures that enhance ecological processes on farms. When implemented effectively, natural farming not only boosts farmers' income but also offers additional benefits such as mitigating greenhouse gas emissions, restoring soil fertility, and promoting environmental health. This method relies on leveraging existing ecological processes within and around farm. Natural farming prioritizes soil and human health, biodiversity, and sustainable farming practices. It offers a compelling solution to meet the increasing demand for pesticide-free and eco-friendly food, benefiting both farmers and the environment (Sarma *et al.*, 2023).

According to a survey conducted by LVC (La Via Campesina), ZBNF (Zero Budget Natural Farming) has proven effective not only in terms of agronomic and financial advantages but also in various other positive outcomes reported by a majority of participants. These include increased crop yields, preservation of soil health, diversity in seed types, improved product quality, enhanced household food security, increased income, and better health over time. Indian farmers, facing significant concerns such as high farm expenses and heavy reliance on loans, commonly found these issues mitigated through the adoption of ZBNF methods (Bharti, 2017). During a recent field survey, farmers practicing natural farming were queried about the crop yields of their main produce over the past three years. The goal was to determine if there had been

any notable changes in yields from adopting natural farming methods. The results indicated that the production levels of nearly all crops have remained steady over the last three years in the states of Andhra Pradesh, Karnataka, and Maharashtra (Kumar *et al.*, 2020). This approach aims to reduce reliance on external inputs, making it economically viable while potentially boosting employment and rural development. Embracing natural farming principles represents a significant step towards fostering sustainable and harmonious interactions with our environment.

The generic principles that govern Natural farming are mentioned below:

1. A thriving soil microbiome is essential for optimal soil, plant, animal, and human health.
2. It is advisable to keep the soil covered with crops throughout most of the year to maximize its health and productivity.
3. Farms or fields should aim for crop diversity, ideally growing at least eight different crops annually to enhance soil health and resilience.
4. Minimizing soil disturbance is crucial; therefore, adopting practices like no-till farming or shallow tillage is recommended.
5. Integrating animals into farming systems is vital for promoting natural farming methods and enhancing soil fertility.
6. A healthy soil microbiome plays a pivotal role in maintaining and enriching soil organic matter, and bio stimulants are essential for stimulating this process.
7. Bio-stimulants in India primarily involve fermenting animal dung, urine, and

uncontaminated soil to enhance soil health and crop productivity.

8. Increasing the quantity and diversity of organic residues returned to the soil—such as crop residues, cow dung, and compost—is critical for soil enrichment.
9. Effective pest management should prioritize agronomic practices aligned with Integrated Pest Management principles and resort to botanical pesticides only when necessary.
10. Avoiding synthetic fertilizers and biocides is crucial as they can disrupt soil regeneration processes and are not conducive to sustainable agriculture practices.

Preparation of natural inputs used in natural farming are as follows:

1. Beejamrit:

Preparation and application: Beejamrit, a traditional seed treatment method, involves a careful process using natural ingredients to enhance seed quality and promote healthy crop growth. To prepare Beejamrit, start by suspending 5 kg of cow dung in water for up to 12 hours, while simultaneously mixing lime with water overnight. The next morning, squeeze the soaked cow dung bundle into the water three times to extract its essence thoroughly. Stir in approximately 1 kg of local soil and add 5 litres of desi cow urine along with the lime-water mixture. This solution is then used to coat seeds of various crops by hand, ensuring they are well-covered before drying them thoroughly for sowing. For leguminous seeds with delicate coats, a quick dip suffices. It not only enriches seeds with nutrients and beneficial microorganisms but also aligns with sustainable

agricultural practices by avoiding synthetic chemicals and supporting soil health and plant resilience.

Benefits: Beejamrit, an age-old agricultural practice, serves as a sustainable method for treating seeds, seedlings, or any planting material. Its primary function lies in safeguarding young roots from fungal infections. It functions as a fermented microbial solution rich in beneficial microbes essential for plant health. When applied as a seed treatment, it aims to foster colonization of these microbes on the roots and leaves of germinating seeds. This colonization, in turn, supports robust plant growth and development. By harnessing natural processes and avoiding synthetic chemicals, Beejamrit aligns with principles of sustainable agriculture. Its application not only enhances seed vigour but also contributes to soil health and ecosystem resilience. This traditional technique represents a holistic approach to farming, promoting biodiversity and reducing dependence on external inputs, thereby supporting long-term agricultural sustainability.

2. Jivamrit:

Preparation and application: Jivamrit, a natural agricultural solution, requires a careful blending of ingredients in 200 litres of water: 10 kg of fresh cow dung, 5-10 litres of cow urine, 50 grams of lime, 2 kg of jaggery, 2 kg of pulses' flour, and 1 kg of uncontaminated soil. After thorough mixing, the mixture ferments for 48 hours in shade, stirred twice daily with a wooden stick, continuing for 5-7 days. This process enhances microbial activity beneficial for plant growth. Once ready, it is applied fortnightly by either direct spraying on crops or mixing with

irrigation water, focusing on individual fruit plants for optimal effect. The solution remains viable for up to 15 days, promoting soil health, plant vigor, and overall crop resilience naturally, in line with sustainable farming practices

Benefits: It functions as a biostimulant that enhances soil microbial activity and promotes the activity of microorganisms on plant foliage when applied as a spray. It acts as a catalyst for microbial processes, priming the soil for increased microbial diversity and activity essential for nutrient cycling and plant health. Additionally, Jivamrit stimulates the population growth of native earthworms, which play a crucial role in soil aeration and nutrient distribution. By fostering a balanced microbial ecosystem both in the soil and on plant surfaces, it supports sustainable agricultural practices by reducing reliance on synthetic inputs and enhancing overall soil fertility and crop resilience. Its biostimulant properties contribute to improved plant vigor, disease resistance, and nutrient uptake, thereby promoting healthier and more productive crops naturally. Regular application of Jivamrit ensures sustained benefits by maintaining a thriving soil ecosystem and optimizing plant-microbe interactions essential for agricultural sustainability.

3. Ghanjeevamrit:

Preparation and application: It is prepared by combining 100 kg of sun-dried indigenous cow dung, 1 kg of jaggery, 1 kg of pulse flour, 3 litres of indigenous cow urine, and 250 grams of soil sourced from undisturbed bunds or forests. These ingredients are mixed thoroughly to form cakes, which are stored after preparation. After a

maturation period of 10 days, Ghanjeevamrit is ready for application in fields. It is recommended to apply it at a rate of 250 kg per hectare before sowing, ensuring optimal soil enrichment. The product maintains its efficacy for up to 6 months when stored in a cool, dry place

Benefits: It enhances soil fertility by introducing beneficial microorganisms that aid in the fixation and mobilization of NPK nutrients.

4. Acchadana (Mulching):

There are two types of mulching techniques:

A. Crop Residue Mulch: This involves using dried vegetation and farm stubble, such as biomass waste, to cover the soil. It serves to protect the soil from harsh weather conditions like intense sunlight, cold, and rain. Additionally, residue mulching helps in safeguarding seeds from birds, insects, and animals.

B. Live Mulch: Live mulching entails planting short-duration crops alongside the main crop in a multi-cropping or intercropping pattern. This method recommends alternating monocotyledonous and dicotyledonous crops within the same field to ensure a balanced supply of essential nutrients. Monocots like wheat and rice contribute nutrients such as potash, phosphate, and sulphur, while dicots such as pulses are beneficial as nitrogen-fixing plants. By diversifying nutrient sources in this manner, the practice reduces the reliance on specific types of plant nutrients.

Benefits: Mulching contributes to moisture conservation, moderates soil temperature around plant roots, mitigates soil erosion, minimizes runoff, and suppresses weed growth.

5. Whapasa: Whapasa refers to the combination of 50% air and 50% water vapor found within the gaps between soil particles. This microclimate within the soil is crucial for soil organisms and roots, providing essential moisture and nutrients. Irrigation should be minimized, focusing exclusively on midday watering in alternate furrows. It improves water availability, optimizes water-use efficiency, and strengthens resistance to drought.

Preparation of plant protection inputs

1. Neemastra:

Preparation and application:

Neemastra, a natural pesticide preparation, requires 200 litres of water, 2 kg of cow dung, 10 litres of cow urine, and 10 kg of finely ground neem leaf paste or neem seed pulp. In the initial step, combine water with cow urine and cow dung in a drum, followed by adding the neem paste or pulp. Stir the mixture clockwise using a long stick and cover it with a gunny bag, keeping it shaded away from sunlight and rain. Stir the solution twice daily in a clockwise direction. After 48 hours, the Neemastra solution is ready for use and can be stored for up to 6 months without dilution. Before application, filter the solution through a muslin cloth and apply it directly to crops through foliar spraying, effectively harnessing neem's natural pesticidal properties in organic farming practice.

Benefits: Neemastra effectively manages a range of pests in agriculture, specifically targeting sucking pests such as jassids, aphids, whiteflies, and small caterpillars. Regular application of Neemastra through foliar spray ensures sustainable pest management while preserving soil health and promoting crop resilience naturally.

Its efficacy in controlling a variety of pests underscores its importance as a viable alternative in integrated pest management strategies, supporting eco-friendly agricultural practices globally.

2. Brahmastra:

Preparation and application:

Brahmastra, a potent botanical pesticide, requires 20 litres of cow urine mixed with 2 kg each of finely prepared pastes from neem leaves, karanj leaves, custard apple leaves, castor leaves, and datura leaves. The preparation process begins by boiling this mixture on low heat until it forms one or two layers of foam. Stirring should be done clockwise, and the vessel covered with a lid during boiling. After the second foam forms, the boiling is halted, and the solution is left to cool for 48 hours, allowing the release of alkaloids from the leaves into the urine. Once cooled, the solution is filtered through a muslin cloth and stored in earthen pots or plastic drums, preferably in shaded areas, where it can be stored for up to 6 months. For application, dilute 6-8 litres of Brahmastra in 200 litres of water for foliar spraying on crops. Adjust the dilution ratio based on the severity of pest infestation, ensuring effective pest control while adhering to sustainable and organic farming practices.

Benefits: This natural insecticide is derived from leaves containing specific alkaloids known to deter pests effectively. It targets all types of sucking pests and concealed caterpillars found within pods and fruits.

3. Agniastra:

Preparation and application: Agniastra, a potent organic insecticide, requires 200

litres of cow urine combined with 2 kg of neem leaf paste, 500 grams of tobacco powder, 500 grams of green chili paste, 250 grams of garlic paste, and 200 grams of turmeric powder. To prepare, stir the mixture clockwise and cover it while boiling until foam forms. Remove from heat and allow it to cool in shade for 48 hours, stirring twice daily during fermentation. After this period, filter the solution through a fine muslin cloth and store it. Agniashtra remains effective for up to 3 months when stored correctly. For application, dilute 6-8 litres of Agniashtra in 200 litres of water for spraying on crops. Adjust the ratio depending on the severity of pest infestation, ensuring thorough coverage and effective pest control while maintaining organic farming practices.

Benefits: It is used to control all sucking pests and caterpillars.

4. Dashaparni ark (Kashaya):

Preparation and application: Dashaparni, a potent botanical pesticide, is prepared using a blend of natural ingredients. Begin by combining 200 litres of water with 20 litres of cow urine and 2 kg of cow dung in a drum, allowing it to stand covered for 2 hours. To this mixture, add 500 grams of turmeric powder, 200 grams of ginger paste, and 10 grams of asafoetida, stirring clockwise and covering overnight. The following morning, incorporate 1 kg of tobacco powder, 2 kg of hot green chili paste, and 500 grams of garlic paste, stirring thoroughly with a wooden stick and covering for 24 hours in shade. After this, add pastes made from any 10 types of leaves selected from a specified list**. Stir well, cover, and leave for 30-40 days for fermentation, ensuring alkaloids from

the leaves dissolve into the mixture by stirring twice daily. After 40 days, filter the solution through muslin cloth for application. Dilute 6-8 liters of the prepared Kashayam in 200 litres of water for effective spraying on crops, adjusting the concentration based on pest severity, thereby supporting sustainable and organic farming practices.

**Specified list: Neem leaves – 3 kg, Leaves of *Pongamia pinnata* – 2 kg, Leaves of *Annona squamosa*– 2 kg, Castor leaves (*Ricinus communis*) – 2 kg, Datura leaves (*Datura metel*)- 2 kg, Leaves of *Calatropis procera* – 2 kg, Leaves of *Vitex negundo* – 2 kg, Leaves of *Datura stramonium* – 2 kg, Leaves of *Nerium indica* – 2 kg, Leaves of *Hibiscus rosa* – 2 kg, Mango leaves (*Mangifera indica*) – 2 kg, Leaves of *Lantana camara* – 2 kg, Leaves of *Casia tora* – 2 kg, Leaves of Guava (*Psidium guava*) – 2 kg, Leaves of Pomegranate (*Punica granatum*) – 2 kg, Leaves of Drumstick (*Moringa oleifera*) – 2 kg, Leaves of Coffee (*Coffea arabica*) – 2 kg, Leaves of Mahua (*Maduca indica*) – 2 kg, Coco leaves (*Theobroma cacao*) – 2 kg, Leaves of *Acacia nilotica* – 2 kg, Leaves of *Psoralea corylifolia* – 2 kg, Leaves of Bitter Gourd (*Momordica charantia*) – 2 kg

Benefits: Dashaparni ark serves as a versatile alternative to Neemastra, Bramhastra, and Agniashtra, offering comprehensive pest control capabilities tailored to the severity of infestations.

5. **Natural fungicide:** A fungicide made with cow milk and curd has proven highly effective against fungal infections. To prepare, ferment 3 liters of milk into curd, allowing a grey fungal layer to develop over 3 to 5 days. After removing the creamy layer, churn the curd thoroughly,



mix with water, filter, and apply as a spray on infected crops.

CONCLUSION

Natural farming stands out as a sustainable agricultural approach rooted in ecological principles and the use of on-farm resources. By prioritizing soil and human health, enhancing biodiversity, and reducing reliance on external inputs like synthetic pesticides and fertilizers, it offers numerous environmental and socioeconomic benefits. Emphasizing the role of indigenous cattle breeds and promoting biomass recycling, natural farming restores soil fertility, mitigates greenhouse gas emissions, and fosters environmental resilience. However, challenges such as limited awareness, access to organic inputs, and policy support remain. Embracing natural farming is crucial for fostering sustainable agriculture and harmonious coexistence with our planet.

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