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NATURAL FARMING: A SUSTAINABLE APPROACH TO CROP PRODUCTION

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ABSTRACT

Sustainable crop production is based on a healthy environment and natural resources such as soil, water, etc. that are dependent on a range of inputs and crop protection techniques. Conventional farming practices have led to soil degradation due to the overuse of chemical fertilizers and pesticides. This has adversely affected soil microflora and fauna, while also increasing production costs. Natural farming offers a solution by minimizing external inputs, reducing pollution, and enhancing soil fertility through techniques like zero tillage and mulching. The protection of the soil structure by zero tillage and efficient conservation of soil moisture by mulching result in the savings of irrigation water.

INTRODUCTION

Natural farming is considered a sustainable approach to crop production, aiming to mitigate the negative impacts of conventional agriculture on the environment and natural resources (De, 2022). It encompasses agroecological principles to conserve biodiversity, combat climate change, and improve livelihoods. Studies demonstrate that practices like Zero Budget Natural Farming (ZBNF) can yield higher outputs while reducing reliance on synthetic pesticides and fertilizers (Kumar et al., 2023). Moreover, natural farming enhances soil structure, microbial activity, and species diversity (Sarah et al., 2023), thus promoting long-term resilience in production systems. However, further research is required to fully understand and validate its benefits.

Natural farming is an evergreen agricultural method, that gives high yield and high-quality production at minimum cost, as well as purity of the environment (water and air) and natural form of the land, in which the use of chemicals is minimized and long-term sustainable development is achieved. Farming is done using stable, traditional methods. Natural farming completely eliminates the market purchase of inputs required for farming by the farmers. In this method of farming, all the necessary inputs for farming are collected by the farmer from the resources available in or around the house.

MAIN COMPONENTS OF NATURAL FARMING

1. *Jeevamrit*

A solution made from a mixture of cow dung, urine of an indigenous breed and other ingredients like jaggery, pulse flour and live soil increases the number of microorganisms in the soil. This natural farming is different from conventional farming because in this, cow dung and urine are not used as organic fertilizer but as a bio-fermenter. This sourdough increases the number and activities of beneficial microorganisms and local earthworms in the soil to the best level and makes available to the plants the essential nutrients previously unavailable in the soil. This protects plants from harmful bacteria and increases the amount of 'organic carbon' in the soil.

2. *Beejamrit*

By applying micro-organism-based coating on seeds and saplings using indigenous cow dung, urine and quicklime-based components, their new roots are protected from seed or soil-borne diseases. An increase in the germination capacity of seeds has been observed with the use of *Beejamrit*.

3. *Achadana*

To preserve the moisture available in the soil, its upper surface is covered with some other crop or crop residues. This process not only increases the amount of humus, protection of the upper surface of the soil, water storage capacity of the soil, micro-organisms and nutrients required for plants but also controls weeds.

4. *Vapasa* (airflow into the ground)

This *vapasa* is the result of the use of biocides and covering in the land. By using and covering the soil with *Jeevamrit*, the structure of the soil improves and 'humus' is formed at a faster rate. This ultimately starts the process of good water management in the land. The crop neither fails in heavy rains nor does it falter in the event of drought.

5. Intercropping

The cost of the main crop should be taken out from the production of inter/co-crop and the main crop should be taken as net profit.

PRINCIPLES OF NATURAL FARMING

1. Intercropping: Planting such a crop between the rows of the main crop which supplies nitrogen to the soil and compensates the farmer for the cost of cultivation.
2. Ploughing: Deep ploughing is not done in natural agriculture. Because it reduces the fertility of the land. As soon as the temperature reaches 36^0 degrees, carbon starts rising from the soil and the formation of humus stops, due to which the fertility of the soil reduces.

3. Ridges and rows: Ridges and drains are made in the rows between crops, in which rainwater is stored and maintains the availability of moisture in the field for a long time. During the prolonged rainy season, these drains and bunds help in draining excess water accumulated in the fields.
4. Direction of crops: In natural agriculture, the direction of plants is North-South so that the plants get sunlight for a longer time. By increasing the distance from one plant to another, plants receive more energy from the sun. From which plants build their bodies. This reduces the possibility of any kind of insect attack on the plants and nutrients are also stored in balanced quantities in the plants. If the direction of plants is North-South, the production increases by 20 per cent
5. Activities of local earthworms: Through this farming method, local ecology is created in the soil due to which the activities of local earthworms that have gone to sleep increase.
6. The dung and urine of any cow of the Indian breed are considered best in this farming method because the number of beneficial microorganisms in it is many times more than any other animal or cow species.
7. Desi seeds: seeds play an important role in natural agriculture because native seeds take less nutrients and give more production.

PREPARATION METHOD OF NATURAL FARMING COMPONENTS

1. *Beejamrit* (for treatment of 100 kg seeds)

Mix all the ingredients given in Table 1 below well in the drum and after covering this solution with a sack and keeping it in the shade for 24 hours, treat the seeds. Keep in mind that during this time it is necessary to mix this solution for two minutes in the morning and evening.

Table 1. Materials used

S.No.	Materials	Quantity
1	water	20 L
2	Cow urine	5 L
3	Cow dung	5 kg
4	Unsoaked lime	50 gm
5	forest soil	50 gm

*Seeds should be treated 24 hours before sowing

2 *Jeevamrit* (for one acre of land)

Take all the ingredients given in Table 2. in a drum and mix them well in a clockwise direction. After this, cover the drum with a sack and keep it in the shade for 72 hours. Mix the solution for two minutes in the morning and evening.

Table 2. Materials used

S.No.	Materials	Quantity
1	water	200 L
2	Cow urine	10 L
3	Cow dung	10 kg
4	Jaggery	1 kg
5	Pulses floor	1 kg
6	Forest soil	50gm

*This solution should be used within ten days.

3 *Ghanjeevamrit*

Spread local cow dung on a concrete floor, then add jaggery or fruit pulp on it and then mix cow urine with the soil of the pond. Mix all these ingredients well with the help of a shovel dry them in a shady place for two to four days and then use them after grinding them finely.

Table 3. Materials used

S.No.	Materials	Quantity
1	Cow urine	As per requirement
2	Cow dung	200 Kg
3	Jeggary	1 Kg
4	Pulses floor	1 Kg
5	forest soil	50 gm

*It can be used for one year after making it.

4. *Neemastra*

Add cow urine and cow dung along with crushed neem leaves in a drum, mix everything well with the help of a stick and cover the solution with a jute sack. After this, leave the solution for 48 hours and mix it for two minutes in the morning and evening. Spray it after it is ready.

Table 4. Materials used

S.N.	**Materials**	**Quantity**
1	water	100 L
2	Cow urine	5 L
3	Cow dung	1 kg
4	Neem leaf	5 kg

*Neemastra can be used for six months.

5. *Brahmastra* (useful for protecting crops from big caterpillars)

Mix ground leaves (mango, guava, castor leaves) in cow urine and heat on low flame till it boils for about an hour and then keep the solution cool for 48 hours. Mix 2.5 to 3 litres of solution in 200 litres of water and spray it in one acre of crop.

Table 5. Materials used

S.No.	Materials	Quantity
1	Cow urine	20 L
2	Fine ground leaf of Mango, guava, and castor	2-2 kg

*This solution can be used for 6 months.

6 *Agnistra* (to protect the crop from sucking insects)

Mix locally available plant leaves, tobacco powder, chilli sauce and garlic sauce in cow urine and heat it on low flame till it comes to a boil. After this, keep the solution for 48 hours and mix it for 2-3 minutes in the morning and evening. Mix five litres of Agnistra in 200 litres of water and spray.

Table 6. Materials used

S.No.	Materials	Quantity
1	Local plant leaf	5 kg
2	Cow urine	20 L
3	Tobacco powder	500 gm
4	Green Chilly chatani	500 gm
5	Grinded garlic	250 gm

*Agnistra can be used for up to 3 months.

BENEFITS OF NATURAL FARMING:

1. No dependence on the market. All the inputs required in farming are either available in the village or can be prepared at home.
2. Not using chemical-based elements in farming. Control of environmental, soil, and water pollution. It preserves the natural flora and fauna. (Liao *et al*., 2018)
3. To restore soil fertility, soil organic matter and soil carbon. This method increases the number of microorganisms in the soil. (Mouazen, and Palmqvist, 2015)
4. It promotes the use of local seeds which are suitable for the local environment.

5. The cost of farming can be reduced by using plants and natural resources for pest management. (Tao *et al.*, 2015)
6. Intercropping and Multiple Cropping The income from short-duration intercropping provides working capital to the farmers for the main crop and increases the income of the farmers.
7. Including trees in the crop farming model not only provides year-round income but also reduces risk. Continuous green cover improves soil fertility, provides cover and also reduces water loss.
8. Less water is required in natural farming. Covering and withdrawal increases water use efficiency and reduces groundwater requirements (Korav *et al.*, 2020).
9. Under natural farming, crops stand better for a longer period even during drought.
10. In the context of climate change, the natural farming method is the most climate-friendly.

CONCLUSION

Natural farming encourages ecological balance, conserves biodiversity, and lowers greenhouse gas emissions by combining conventional knowledge with cutting-edge science. In addition, it supports smallholder farmer's economic sustainability and is consistent with a number of SDGs. Although natural farming may not appear to be a yield-enhancing technique, it does raise farmers' income through cost savings and long-term sustainability.

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