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Zero Budget Natural Farming

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Abstract

Zero Budget Natural Farming (ZBNF) means that farmers need not purchase fertilizers and pesticides from market in order to ensure the healthy growth of plants. It is a sustainable method of farming practices that help the farmers in retaining soil fertility, it rejuvenates soil health to ensure a chemical free agriculture and low cost of production and thereby doubling the income of the farmers. While the technique promotes chemical-free agriculture, data regarding its effectiveness is still not sufficient. It is one of the most promising farming option/ method under uncertainty of extreme weather conditions. It is a low cost and climate resilient farming practices where all the inputs are locally available as it does not promote various intercultural operations and consequently the involvement of hired manual labours. It requires lesser effort and time to practice than organic farming activities.

Introduction

Zero Budget Natural Farming (ZBNF), as the name implies, is a method of farming where the cost of growing and harvesting crop plants is zero. The concept of ZBNF was first promoted by a Maharashtrian Agriculturist, Padmashri Subhash Palekar, in the mid-1990's as an alternative solution to the Green Revolution's methods driven by chemical fertilizers and pesticides and intensive irrigation, is now getting more popular highlight from a back to the basics agrarian movement. Zero Budget Natural Farming (ZBNF) is alternative low-input, climate-resilient farming practices that have emerged in India and worldwide to reduce input costs and higher yields for farmers from locally available sources/ inputs by eliminating the use of chemical fertilizers and improved soil fertility (Bharucha *et al.*, 2020). Palekar have examined that the cost of external inputs such as pesticides and fertilizers were the leading cause of indebtedness and suicides among the farmers worldwide. By implementing the traditional methods of farming the costs of production and high interest rates for credit could be reduced significantly. According to the Food and Agriculture Organization of the United Nations, a zero budget natural farming is alternative solution to cut down farming expenditure drastically which could help in breaking the debt cycle of the farmers globally (Singh *et al.,* 2018).

Principles of ZBNF

Zero Budget Natural Farming aims at cultivating plants by promoting self-reliance to farmers while protecting the environment and stimulating harmony between animals, humans and plants for a sustainable development. The fundamental principle underlying natural farming is to guides the farmers in practicing sustainable farming that helps in retaining soil fertility to ensure chemicals-free agriculture and to ensure low cost of production.

- Year round crop production.
- Minimal disturbance of soil.
- Biostimulants as necessary catalysts.
- Pest management through botanical extracts.
- No synthetic fertilizers, pesticides, herbicides.
- Freely available resources in nature.
- Minimizes the risk of failure.
- Continuity of income source.
- Non toxic production.

Fundamentals Practices of Zero Budget Natural Farming

The pillars of natural Farming are described below:

- Jeevamruta/ Jivamrita/ Jeevamrit
- Beejamruta/ Bijamrita/ Beejamrit
- Acchadana/ Mulching
- Waaphasa/ Moisture
- Ghanjeevamrit
- Neemashtra
- Agniashtra
- Brahmashtra
- Mixed leaf extract (decoction)
- Chilli-garlic extract
- Dashparni extract

Jeevamruta/ Jivamrita/ Jeevamrit

Jeevamrit is used as preventive measures against fungal and bacterial diseases. This can be applied through irrigation water or through foliar spray and can be stored for one year (Khadse and Rosset, 2019). It can be prepare in a plastic drum of 250 litres capacity, in that add 10 kg of fresh cow (indigenous) dung with 10 litres of indigenous cow urine, 2 kg of Jaggary, 2 kg pulse flour (besan, Chickpea flour) and 150 g of soil from undisturbed bunds/ forest in 200 litres of water and mix thoroughly. Keep the drums in shade covering with gunny bag/ cotton cloth/ plastic mosquito net. Stir the mixture for 5-10 minutes for twice a day *i.e.*, morning & evening with wooden stick. Jeevamrit is ready for application at 9th day and it can be applied up to 12th day from its preparation. The mixture of Jeevamrit culture attracts and enhances the activities of the other beneficial micro-organisms which are already present in the soil (Khadse and Rosset, 2019). 200 liters of Jeevamrit is sufficient for one acre of land. Apply twice a month with irrigation water or as 10% foliar spray.

Beejamruta/ Bijamrita/ Beejamrit

Beejamrit is used for treating seed, seedling and young planting material. It is useful in protecting young roots from fungus as well as soil borne and seed borne diseases. It can be made by taking 5 kg of indigenous fresh cow dung in a cloth and bound it by tape and hang this in 20 liters of water for 12 hours. Take one litre water and add 50 g lime in it, keep for a night. Squeeze this bundle of the cow dung in water 3 times to extract material. Add the soil from undisturbed bunds/ forest in the solution and stir it well. Add 5 liters of indigenous cow urine in the solution & add the lime water and stir it well. Beejamrit is ready to treat the seeds. Bijamrit is added to the seeds of any crop by mixing it with hand, shade dried and then sowed. For leguminous crop the seeds are just dip and dry them quickly. Like Jivamrita, Bijamrit also contains some beneficial bacteria which are not only helpful for plant protection but also in stimulation of plant growth and development (Smith *et al*., 2020).

Acchadana/ Mulching

Mulching is the process of covering the top soil with crop wastes/ dried leaves or with cover crops. It protects the top soil from erosion; it improves soil aeration, conserves soil moisture, increases water retention capacity of the soil, and encourages soil fauna as well as soil nutrient status and controlling weed growth.

Whapasa/ Moisture

Whapasa is the condition where both air and water molecules are present in the soil. Good aeration is required in the soil for proper plant growth and development. It improves soil aeration, thus improves humus content, good water holding capacity and soil structure which is most suitable for crop plant growth especially during drought periods.

Ghanjeevamrit

Ghanjeevamrit enriches the soil with beneficial organisms that fixes/ mobilizes NPK. It is used for increasing soil fertility. Ghanjeevamrit is prepare by mixing 100 kg of indigenous cow dung (air dried for 4-5 days), add 1 kg of jaggery, 1 kg pulse flour, 3 litres of indigenous cow urine and add 250 g of soil from undisturbed bunds/ forest. After adding all the materials, this can be prepared likes cakes and stored. After 10 days of its preparation, this can be used in fields. Prior to sowing Ghanjeevamrit is applied @ 250 kg ha^{-1} as per recommended dose. Best until 6 months and store in cool and dry place.

Neemashtra

Neemashtra is liquid based formulation of neem and cow urine. Neemashtra are easy to prepare in the farm within 2 to 4 days. Fresh neemashtra is sprayed on crops to control insect-pests like aphids, jassids, mealy bugs, thrips, whiteflies, small caterpillars and other sucking pests. Liquid formulation can be made by mixing 5 kg of fresh neem leaves/ 5 kg of neem seed kernels (3-8 month old). Crush the materials to make fine/ small pieces. Mix the crushed leaves/ kernels in 100 litres of water in a plastic drum. Mix 5 litres of

indigenous cow urine and 1 kg of indigenous cow dung. Mix the content thoroughly with the help of a wooden stick for 2-3 minutes. Cover the mouth of drum with a fine mesh or cloth and spray on one acre crop. 250 litres of solution is required for spraying one hectare of crop.

Agniashtra

Agniashtra is a botanical formulation prepared by using neem leaves, chilli fruits, garlic and cow urine. It is used to manage stem borers, fruit borers and other different types of caterpillars of the crop. Take half kg each of green chilli and garlic and 5 kg of fresh neem leaves. Crush all the three materials to make a fine paste. Add crushed materials in 20 litres of indigenous cow urine and mix it thoroughly. Boil the content with intermittent stirring with wooden stick for about 20 minutes. Cool the content for about 48 hours. Filter the content with fine cotton cloth. 5-6 litres of Agniashtra are sufficient for spraying in one hectare of crop after dilution in 250 litres of water.

Brahmashtra

It is a cow urine and botanicals based formulation. It is used as a natural pesticide against large and small insects such as pod borer, fruit borer and sucking pests like thrips, aphids and jassids. Take 3 kg of fresh neem leaves and 2 kg of karanj (*Pongamia pinnata*) leaves. If karanj leaves are not available, take 5 kg of neem leaves and crushed them to fine pieces. Take 2 kg of custard apple leaves and 2 kg of Datura leaves and crushed them to fine pieces. Mix all the above crushed leaves in 10 litres of indigenous cow urine. Boil the mixture for about 20-25 minutes. Cool the mixture for 48 hours. Filter the content with fine cotton cloth. Take 5-6 litres of filtrate and dilute in 250 litres of water for spraying on one hectare. If infection is high use 4% foliar spray. Natural pesticides Brahmashtra can be store for 6 months.

Mixed Leaf Extract (Decoction)

It is also a cow urine and botanicals based formulation prepare by using the leaves of 5 different kinds of trees easily available on the farm *i.e*., custard apple, papaya, pomegranate and guava leaves. Mixed leaf extract is useful to manage sucking pest and different kinds of pod/ fruit borers. Take 3 kg of neem leaves and 2 kg of leaves each of custard apple, pomegranate, papaya and guava. Crush the leaves to fine pieces. Mix all above crushed leaves in 10 litres of indigenous cow. Urine boiled the mixture till the volume becomes half. Cool the mixtures for 24 hours. Filter the content with fine cotton cloth. Fill the filtrate in bottles. 5-6 litres of extract are sufficient for spraying in one hectare of crop after dilution in 250 litres of water.

Chilli-Garlic Extract

As name denotes, it is chili and garlic based formulation with cow urine, neem and basharam (*Ipomea carnea*) leaves. It is useful to manage different kinds of caterpillar *i.e*., leaf rollers, stem, fruit and pod borers. Take 500 g each of hot chilli and garlic bulbs and make their paste. Take 5 kg of neem and 1 kg of besharam leaves and crush them into fine pieces. Mix all above crushed leaves in 10 litres of indigenous cow urine. Boil the mixture till the volume becomes half and cool the mixture for 24 hours. Filter the content with fine cotton cloth. Fill the filtrate in bottles. Take 5-6 litres of filtrate and dilute in 250 litres of water for spraying on one hectare.

Dashparni Extract

Dashparni extract is useful to manage all kind of insect-pests of crops and orchards. It is prepare by mixing 5 kg of neem leaves and 2 kg leaves, each of any 10 plants species mentioned in above table. Take 10 litres of indigenous cow urine, 10 kg of indigenous cow dung, 500 g turmeric powder, 500 g garlic paste, 500 g ginger paste, 1 kg tobacco leaf powder, 1 kg hot chilli paste. Crushed the leaves to fine pieces. Mixed all above ingredients in 200 litres water drum in shade. Shake the mixture thrice a day with the help of a wooden rod and ferment the content for 30-40 days. Filtrate the content with fine cotton cloth. Store the filtrate in containers and it can be used for 6 months. Take 5-6 litres of Dashparni extract and dilute in 250 litres of water for spraying on one hectare crop.

Conclusion

There are several advantages of shifting modern day agriculture to 'back to the basics' approach through zero budget natural farming. ZBNF has been evolved with very positive mentality to benefit farming community. ZBNF movement has improved not only crop yield but also socio-economic status of adopters as it reduces farm expenses to a minimum and makes the farmers self-sufficient (Das and Avasthe, 2020). It's cut down the need of taking loans for farming activities as it completely relies on use of internal inputs. Therefore it minimizes indebtedness and suicide among the small and marginal farming community. The Union Budget 2022-23 has proposed to promote chemical-free natural farming throughout the country, beginning with 5km wide land corridors along the Ganga. The Budget also proposed upgrading curricula in agricultural universities to include courses on ZBNF.

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