

Zero Budget Natural Farming – A step towards Sustainable Agriculture: A Review

Sai Madhav Elisetty¹, Hina Upadhyay* and Vullaganti Sai Surya Gowthami²

¹*Department of Agronomy, Lovely Professional University, Phagwara, Punjab.

²Ph.D. Scholar, Acharya N.G. Ranga Agriculture University, Bapatla, Andhra Pradesh

Abstract

In India after green revolution, the use of chemical fertilizers and pesticides in India has increased. The excessive application of chemicals having adverse impact on environment, soil, human health and purity of ground water. In this situation, ZBNF system was adopted to reduce the use of chemical fertilizers and pesticides. Zero Budget Natural Farming (ZBNF) was practiced and promoted by Subhash Palekar in India. The 4 pillars of ZBNF are 1. Beejamruth 2. Jeevamruth 3. Mulching 4. Whapasa. The other key principles like pest management, intercropping and contour bunds, etc. ZBNF is expected to remain an ideal farming strategy. It has been proposed that residue-free farming may be a good middle ground between organic and chemical-intensive farming. Natural farming has the potential to mitigate pollution from our agroecosystem as well as maintaining production/income and efficiency.

Keywords: ZBNF, Jeevamruth, Beejamruth, Sustainable agriculture

Introduction:

India is a diverse country with a wide range of climatic conditions and natural resources, and it is mainly an agriculturally dependent country in order to deal with the current demographic crisis (Pinipilli, 2019). There is a need to ensure the sustainability of natural resources without depleting them, especially in agriculture. In India after green revolution, the use of chemical fertilizers and pesticides in India has increased. These expensive and over use of chemicals are showing impact on farmers in reducing income and increasing of debts. The excessive application of chemicals having adverse impact on environment, soil, human health and purity of ground water.

Since seeing the many negative consequences of using pesticides in agriculture, farmers are increasingly turning to zero-budget natural farming (ZBNF). It has gained widespread popularity in southern India, especially in Karnataka, where it originated (Kumar, 2012). It is now rapidly spreading across India.

Mr. Subhash Palekar, a Padma Shri recipient, pioneered this zero-budget natural farming method in the Indian 1990s as an antidote to the Green Revolution (Korav *et al.*, 2020). ZBNF is the method of farming without any investment or very less for external inputs Also called as Low Budget Farming. Via diversification, microbial activities, nutrient recycling, and beneficial biological interaction, ZBNF is gaining traction in

restoring soil quality for long-term crop production. Overall, biofertilizers play a major role in plant growth and production, making them an essential and important method for organic and sustainable agriculture (Upadhyay *et al.*, 2020). Alternative low-input agricultural practices have sprouted up around the world, providing producers with lower input costs and better yields, chemical-free food for consumers, and improved soil fertility. ZBNF is a low-input, climate-resilient farming solution that allows farmers to use low-cost, locally sourced inputs while eliminating artificial fertilizers and pesticides for long-term agroecosystem management (Upadhyay *et.al.*, 2019 & 2020)

The 4 pillars of ZBNF:

1. Beejamruth
2. Jeevamruth
3. Mulching
4. Whapasa

1. Beejamruth :

This is the one of the traditional methods and also a totally scientific method to treat the seeds before sowing. Farmers have been treating their seeds with local cow urine, cow dung, and a small amount of soil from the farm's bund or land since time immemorial (as stated even in our textbooks and other ancient literature, such as the Vedas). For preparation of Beejamruth we need 20 l water, 5 kg desi cow dung, 5 l desi cow urine, 50 gm of lime and one handful of soil from bund. As a result, in Natural Farming (ZBNF), seeds are prepared with a combination of cow manure, cow dung, and other locally available products that are equally good at avoiding seed-borne diseases (Sreenivasa *et al.*, 2010).

2. Jeevamruth

It is a microbial liquid that has been distilled. It encourages rapid biological activity and earthworm activity in the soil, thus making nutrients available to the crop (Devarinti SR ,2016). Jeevamruth is a 200-liter mixture of 10 kg of desi cow dung, 10 liters of desi cow urine, 2 kg of jaggery, and 2 kg of gram flour. Keep the jar in the shade for 48 hours to enable fermentation to occur. Jeevamruth is ready to use after 48 hours. One acre of land needs 200 liters of jeevamruth. For best results, apply twice a month at 15-day intervals. Jeevamrutha also helps to avoid bacterial and fungal plant diseases. Palekar claims that Jeevamrutha is only needed for the first three years of the transition, after which the system will be self-sufficient. These are cheaper, productive method of fertilizer application. It is essential to understand the valuable parts of bio fertilizers and execute its application to present day farming practices (Elisetty *et al.*,2020).

3. Mulching

Mulching is the process of coating the top layer of soil with mulch. A definite microclimate is needed for the proper growth, multiplication, and activity of beneficial microorganisms introduced by Jivamrut, there are 3 types of mulching methods.

- a. Soil mulch
- b. Straw mulch

c. Live mulch

Topsoil is coated in soil mulch after planting, and tilling does not kill it. It improves aeration and water preservation in the soil. Deep plowing can be stopped in these systems. Straw mulching provides a microclimate that encourages the activity of microorganisms and local earthworms. When dead matter from living organisms, such as plants and animals, is buried in soil, the organic dry material decomposes and converts into humus. In Live Mulch, there are symbiotic intercrops and mixed crops grown in the same area as monocots and dicots. Plants that fix nitrogen are referred to as legumes.

In soil mulch topsoil is covered during planting, and tilling does not destroy it. It increases soil aeration and water retention. Deep ploughing should be avoided in such type of methods. In straw mulching it creates a microclimate which activates the microorganisms and local earthworms. Burying every living organism's dead matter like plants, animals, etc. in the soil, that organic dry content decomposes and transforms into humus. In Live Mulch with symbiotic intercrops and mixed crops cultivated in the same field with monocots and dicots. Plants that fix nitrogen are known as legumes. Other elements such as potash, phosphate, and Sulphur are supplied by monocots.

4. Whapasa

It means mixture of air and water in the soil particles. Whapasa is the soil microclimate in which soil organisms and roots can live safely due to the availability of adequate air and necessary moisture. There are few other important principles off ZBNF like intercropping, contours& bunds, mixed cropping crop rotation, cow dung, use of local species of earthworms (Palekar, 2006).

Pest Management:

Pest and diseases are major problems in cultivation of crops. And controlling of pest and diseases in natural farming by using natural methods is big challenge. Pest control is an ongoing issue for producers, and it provides an important benefit to the farming community, ZBNF plays an important role in sustainable pest management (Upadhyay *et al.*, 2020 and Chakraborty, *et.al.*, 2021). They are Agniastra, Bramhastra, and Neemastra (Palekar, 2016).

Agniastra:

It is made up of 10 liters of local cow urine, 1 kilogram of tobacco, 500 grams of green chili, 500 grams of local garlic, and 5 kilograms of crushed neem leaves. 2 liters of Bramhastra are mixed with 100 liters of water for spraying. Agniastra is a very effective pesticide against leaf rollers, stem borers, fruit borers, and pod borers.

Bramhastra:

Crush 3 kg of neem leaves, 2 kg of custard apple leaves, 2 kg of papaya leaves, 2 kg of pomegranate leaves, and 2 kg of guava leaves in 10 l of cow urine with some water. To spray one acre of soil, dilute 2-2.5

liters of this solution in 100 liters of water. This approach is extremely effective against sucking rodents and pod/fruit borers.

Neemastra:

This solution is airtight for 24 hours after being prepared with 100 l of water, 5 kg of desi cow dung, 5 kg of neem pulp, and 5 l of desi cow urine. It is ready to use within 24 hours. It works very well against mealy bugs and sucking rodents.

Conclusion:

The external production cost in Zero Budget Natural Farming is zero or very low. This farming system requires no monetary commitment on the part of the farmer for the procurement of seeds, fertilizers, and plant safety chemicals. Natural Farming products are of high quality, have a pleasant flavor, and produce a higher yield. ZBNF is heavily reliant on its four wheels. It is important to understand the relationships of different components in a given environment when monitoring pests in ZBNF. This farming method would have a positive impact on all the natural resources of our environment, soil, and human health, as well as the purity of groundwater also managed. Sustainable land resource management is also a critical factor in reducing the pressures on all-natural resources and ensuring long-term crop production (Upadhyay *et.al*, 2015).

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