

Zero – Budget Natural Farming (ZBNF)

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SUMMARY

Zero-budget farming along with being eco-friendly also gives cost savings on seeds, fertilizers, and plant protection agents. It aids in preserving the health of the soil since ongoing crop residue retention replenishes soil fertility. The control of pests and illnesses is another important aspect of low-budget natural farming crop production systems. Understanding how various parts of a certain ecosystem interact is crucial for effective pest control in ZBNF. The new agricultural approach has helped farmers escape the debt trap and given them renewed confidence to turn farming into a financially successful endeavor. In order to succeed, policy intervention is required. The difficulties and possibilities are two parameters that highlight the systems' gaps to researchers, scientists, and extension workers as well as their benefits to adopters.

INTRODUCTION

According to the United Nations Department of Economic and Social Affairs, India's population is expected to grow from 1.2 billion (2010) to 1.6 billion (2050), accounting for 10% of the world's population on the planet (Smith et al., 2020). To address food shortage in a densely populated area, crop production efficiency must be raised. According to NSSO data, about 70% of agricultural households spend more than they make, and more than half of all farmers are in debt. Debt levels are near 90% in states like Andhra Pradesh and Telangana, with each household carrying an average debt of 1 lakh.

The increasing use of synthetic fertilizers and water for irrigation since the green revolution has undoubtedly led to enhanced productivity but at the same time has raised a lot of concerns. Modern chemical-based agriculture has raised production costs or reduced crop output for a variety of causes. Growing commercial crops like rice, wheat, cotton, and sugarcane year after year depletes soil fertility, soil vitality, groundwater table, and most importantly, the number of soil beneficial microorganisms. Continued use of chemical fertilizer, agricultural residue burning, and pesticide spraying can all contribute to global environmental contamination. Continued use has reduced soil micro and macrofauna, which may have a direct impact on the C-N ratio and nitrification activity (Shaikh & Gachande, 2015). Pesticides and chemical fertilizers can pollute the soil profile and seep into groundwater, particularly heavy metals such as Cd, Cu, Mn, and Zn. This heavy metal is taken up by plants and stored in sink sections for a longer period of time. Ultimately, people who ingest these plant products have substantial health consequences. Another concern is about the marginal or tiny landholdings of the majority of Indian farmers. If they spend more money on inputs and do not achieve a good output because they are unable to manage the occurrence of pests and diseases, as well as severe weather circumstances, the cost of production rises. For sustainable food production, a lot of different approaches are being practised currently. Out of these, the concept of Zero Budget Natural Farming (ZBNF) has gained a lot of popularity recently.

Zero-Budget Natural Farming

Zero budget means no credit or no expenses, that is, no credit and no money spent on purchased agricultural inputs. Natural farming is another term for chemical-free agriculture based on traditional Indian practices. In other words, natural farming emphasizes the value of the synergistic effect of plant and animal products on crop establishment, soil fertility, and microorganisms.

For the first time in Japan, M. Fukuoka began his work on natural farming, and his findings revealed that natural farming produces yields comparable to chemical farming while preventing soil erosion and preserving soil fertility for a longer period of time (Devarinti, 2016).

Natural farming reduces the number of external inputs that cause the soil's natural processes to deteriorate, improves soil aeration and water retention, and enhances microbial population. In contrast to the green revolution, Padma Shri awardee Mr. Subhash Palekar first adopted this zero-budget natural farming approach in the 1990s in India. He earned his bachelor's degree in agriculture and is an agriculturist from Maharashtra. He claimed that farmers in India were becoming more indebted and committing suicide owing to the increased expense of these foreign inputs, as well as the effects of herbicides and pesticides and the burning of residues.

He, therefore, focused on low-input agricultural technology that should be readily available on farms and shouldn't be detrimental to the health of the soil. He also launched the idea of natural farming for the first time in Karnataka. In several Indian states, he has persuaded more than 50 lakh farmers to engage in what he prefers to refer to as "Zero Budget Natural Farming (ZBNF)". According to the FAO, one lakh farming households in Karnataka, where it was first implemented in 2002 (Khadse, A., & Rosset, P .M. 2019), are already practicing zero-budget natural farming. It was initially more popular and frequently done in states like Andhra Pradesh, Kerala, Uttarakhand, Himachal Pradesh, Chattisgarh, and Telangana. According to the ZBNF program's official website, Andhra Pradesh converted 204,000 acres of land over 3,015 villages with 523,000 farmers to ZBNF by August 2019 (RySS, 2018).

What Characterizes Zbnf As“ Need Of Hour”?

The Indian agriculture economy is in trouble as The backbone of our nation, our farmer are not receiving remunerative prices and is becoming indebted as a result of the soaring cost of inputs. The farmer today is trapped in a vicious circle as a result of many dynamics and aberrant circumstances. Overall, a lethal confluence of debt, crop failures, suicides, poverty, and migration to metropolitan regions has severely degraded the standard of living in rural communities. For instance, even though agriculture employs between 55 and 60 percent of India's workers, its GDP contribution is only 16%. In a summary, the causes that made ZBNF 'need of hour' are

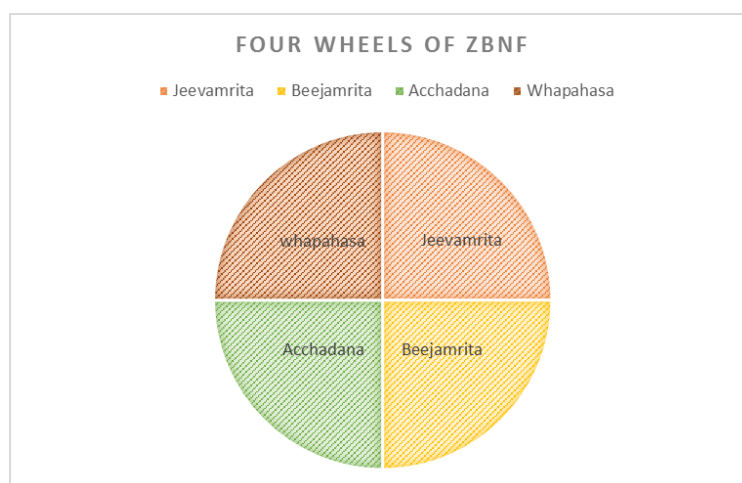
1. Rising input costs for transportation.
2. Unstable market prices.
3. High wages for workers.
4. Abenrations monsoon
5. significant proportion of farmer suicides
6. Expanding environmental worries and an unstable ecosystem
7. A shift in customer desire for food safety, etc.

How Does Zbnf Function?

Initiatives like ZBNF employ organic techniques to maintain and enhance soil health, manage pests, and boost yields. Additionally, a farmer will be able to grow his own seed, and natural fertilizers are made from resources like cow dung and urine.

ZBNF primarily seeks to cultivate crops by encouraging farmers' independence, conserving the environment, and fostering peace between people, animals, and plants for sustainable development. According to this practice's self-nourishing and symbiotic nature, substantial inputs like chemical fertilizers and pesticides are unnecessary and can be replaced with natural inputs.

Four wheels of ZBNF



Four main wheels of ZBNF that is listed in fig.1 (Palekar, 2014).

Four wheels of ZBNF system

Wheels of ZBNF	Advantage
Jeevamrita It is a type of natural fertilizer made from urine, cow dung, soil, flour, jaggery	1. Resistance against pests and diseases 2. Good yield 3. No harm to the soil
Beejamrita It is a type of seed-coating method made from urine, cow dung, and lime	1. Germination rate is increased 2. The soil around the seed is purified 3. Protect the seed from seed-borne pathogens
Acchadana Covering the soil on the top with some crop residues	1. Preventing weeds 2. Soil water retention is increased 3. Promotes soil fauna
Whapahasa Improving soil structure by making changes in water management	1. Soil structure is improved 2. Water availability 3. Improved resilience to drought

Other principles of ZBNF

1. Intercropping / multi-cropping / mixed cropping: In the same piece of a land combination of monocot and dicot plants or, long and short life-span species can be taken. It protects the soil from nutrient and moisture exhaustion as well as minimizes the risks for the farmer who is able to enjoy continuity of yield throughout the year. In case of a crop's failure, he can also rely on the other crops.

2. Contours and bunds: It helps to harvest and preserve rainwater and promote maximum efficacy for different crops. Local species of earthworms: The revival of local deep soil earthworms through increased organic matter is most recommended in ZBNF than vermicomposting, Cow dung: The dung and urine of indigenous humped cows have a greater concentration of microbes and are beneficial compared to European cow breeds like Holstein

Insect-Pest Management

Pests and diseases cause the majority of crop damage, with weeds coming in second place in terms of yield loss. A significant problem in natural farming is managing this loss. Compounds that eliminate or manage the insect population in agriculture fields are made using plant extractions. A combination of buttermilk, cow milk, pepper powder, neem seed, and green chilies is used to make several plant protection products (Palekar, 2016). The findings of certain studies on naturally extracted chemical-free substances are explained.

They are **Agniastra, Brahmastra, neemastra, and Coconut-buttermilk ghol.**

Advantages of ZBNF

In ZBNF there is no not need to purchase any inputs, hence production costs are nil. As there are no fertilizers or pesticides utilized, farm input costs are almost minimal or negligible. ZBNF farms were able to endure drought and flood conditions for a considerable amount of time.

On the same plot of land, adding additional crops and border crops can increase yield and also sometimes provide nourishment

Concerning ZBNF in general, improvements in soil, biodiversity, livelihoods, water, climate resilience, women's empowerment, and nutrition are noted, along with decreased water and electricity use, improved farmer health, preservation of local ecosystems and biodiversity, and non-leaving of toxic residues in the environment.

Disadvantages of ZBNF

The demand for labor has soared. Compared to conventional farming, Animal manure is in great demand. On a national level, the number of cattle in India could not accommodate this amount of manure application

Given that the demand for and consumption patterns of high-value products are continually shifting in farming, better technologies and significant investment are needed. Natural farming does not employ well-

developed heavy machinery or implements because doing so compacts the soil, even without the use of tractors. Weakened agricultural market infrastructure: Natural items have no value in wide areas, despite being priced similarly to goods made chemically.

Possibilities for adopting ZBNF

Post-green revolution, the use of high-yielding cultivars, chemical fertilizers, and pesticides affects soil health by depleting the soil of nutrients, reducing the number of helpful microbes, and accumulating hazardous compounds in the soil profile, which also contaminates groundwater. All of these have a detrimental effect on both the environment and human health. Due to the burning of crop leftovers, which lowers the organic matter content of the soil and increases air pollution, organic matter is the primary source of plant nutrients. Environmental sustainability is necessary to protect the environment for the next generation in light of this growing globalization. Even though they are not making much money from it, farmers still have to deal with high input expenses in commercial farming. Better options are provided by natural farming to address these issues. By improving soil microbial richness and water retention capabilities, this method helps drought-prone areas produce consistently high yields. Using fewer chemical fertilizers improves water quality and increases availability during extreme weather events by reducing runoff into rivers and wetlands.

Future potential of ZBNF

The scientist at (NAAS) tells that there is no proper scientific validation of ZBNF. So, more concentration is needed on ecosystem service, economic viability, and sustainability in the long run. where additional study is required to better understand how ZBNF affects the amount of nitrogen available to plants and how soil carbon varies.

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