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A Sustainable Approach to Agriculture and Rural Development: An Analysis of Zero Budget Natural Farming Technique

[1]Urvashi Khandal , [2]Dr. Lakhan Raghuvanshi , [3]Rajshri Gaur

[1]Research Scholar, Journalism and Mass Communication, Manipal University Jaipur,

Email id: khandalurvashi1997@gmail.com

[2]Assistant Professor, Journalism and Mass Communication, Manipal University Jaipur,

Email id: Lakhan.raghuvanshi@jaipur.manipal.edu

[3]Research Scholar, Journalism and Mass Communication, Manipal University Jaipur,

Email id: rajshrigaur19@gmail.com

Abstract:

Zero Budget Natural Farming (ZBNF), a cutting-edge farming method, promotes organic and sustainable agricultural practices while using as few outside inputs as possible. ZBNF helps to mitigate climate change by enhancing soil health, water conservation, and storage of carbon while making it affordable for small-scale farmers. Moreover, the article examines the potential of ZBNF for addressing Sustainable Development Goals (SDGs), including zero hunger, responsible consumption and production, climate action, life on land, no poverty, decent work, economic growth, and clean water and sanitation. ZBNF can help achieve these goals by putting a strong emphasis on organic farming, biodiversity preservation, and minimal environmental impact. In this article, ZBNF's concepts practices, and possible advantages in terms of economy as cost-effectiveness, ecological sustainability, and increased farmer income are all briefly discussed. We also consider the difficulties and chances presented by ZBNF as a practical alternative to traditional farming.

Keywords: Zero Budget Natural Farming (ZBNF), SDG, Natural Farming, Economic Sustainability.

Introduction:

Zero Budget Natural Farming (ZBNF) is a farming method developed by agriculturist Subhash Palekar in India who was born in 1949 in the small village of Belora in Vidarbha, Maharashtra, and belongs to a farming-based family. He was engaged in Zero Budget Natural Farming, the very first time that forgoes the use of pesticides and chemical fertilizers. In 2016, he received the Padma Shri, the fourth-highest civilian honour in India.ZBNF emphasizes the application of natural farming techniques without the use of chemical fertilizers, pesticides, or genetically modified seeds. ZBNF aims to restore the ecological balance of farmland while ensuring the economic well-being of farmers.It entails no investment in agricultural production. An ecological farming method is natural farming that involves employing resources that are already present in the environment. Everything a plant needs to grow is present in the area surrounding its roots. Only 1.5 to 2.0% of the nutrients in our fertile soil are obtained directly from it; the other 98 to 98.5% are taken from air, water, and sun radiation(ZBNF, 2023).Natural farming is defined as cropping without the use of chemicals and relying on a diverse agroecological method of farming that incorporates crops, trees, and cattle.Natural farming emphasizes the use of on-farm inputs made by the farmers and allows for the best possible use of functional biodiversity(Zhang, Yan, Zhang, & Menjivar, 2018). The indigenous race of cows, known as the Desi cow, is also coveted and plays a significant role in natural farming. Other cattle's urine and dung can also be utilized to create mixtures that promote ecological or natural processes which take place on or around farms(National Centre for Organic and Natural Farming, 2023).

Zero Budget Natural Farming (ZBNF) has been promoted in India's policy think tank by Niti Aayog, since 2018(Kapoor, 2021). ZBNF is a type of natural farming in which no outside inputs are required; instead, the earnings from growing supplementary crops are used to offset the expense of raising the primary crop(ibid). Additionally, soil fertility and water efficiency are given significant attention. Through the Paramparagat Krishi Vikas Yojana (PKVY, traditional agricultural mission) and Rashtriya Krishi Vikas Yojana (RKVY, national farming development mission), Niti Aayog has urged state governments to promote ZBNF(shobhana, 2019; Kapoor, 2021).

Natural Farming as SDG of Nation:

"Natural farming practices- Socio-economic-environment- friendly farming will support in achieving the UN- Sustainable Development Goals by 2030".(Niti Aayog, 2023)

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The Sustainable Development Goals could be accomplished with the help of agroecological practices like Natural Farming, which is an economical and environmentally responsible alternative. They can ensure improved income and financial stability by lowering input costs, which will assist fight poverty, promote gender equality, and maintain sustainable patterns of production and consumption.Through improved production, crop diversity, everydayfostering of a variety of nutrients, and income-creating crops, ZBNF would guarantee food security and eradicate hunger(Nagbhushan & Gupta, 2018; Niti Aayog, 2023).

According to the International Agency for Research on Cancer, contact with toxic chemicals such as dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyl (PCB), and gamma hexachlorocyclohexane (lindane) can be "probably carcinogenic to humans(World Health Oraganization, 2015).The technique could help to lower the prevalence of harmful or inorganic chemicals utilised for agricultural purposes that is associated with non-communicable diseases such as both acute and chronic neurological damage, asthma, and even cancer.Substituting such outside supplies with locally generated natural concoctions, inoculums, and decoctions can reduce food contaminates (Nagbhushan & Gupta, 2018).

Due to the strain of low revenues and challenging repayment of loan installments, many farmers suffer from mental illness and depression.Due to debt and insolvency, over 80% of Indian farmers commit suicide(Tiwary, 2017).

ZBNF minimizes the requirement for credit for cultivation because it eliminates the need for external chemical inputs, allowing farmers to produce equal or greater yields with less loan.As an outcome, ZBNF farmers might have been enabled to boost their families' food security by access to food and nutrition.Data from late 2017'sbyRySS-led CCEs show that'Farmers who adopted ZBNF technique for producing groundnuts had on average a 23 per cent higher yield than the others who werenot implementing the same. ZBNF paddy farmers have had on average a 6 per cent higher yield'(Tripathi, Nagbhushan, & Shahidi, 2018).These higher production are the outcome of environmentally friendly agricultural methods, which also strengthen the competence of farmers for adaptation to climate change. The approach has encouraged and supported the creation of farm ponds for water storage and the construction of dead furrows to slow runoff in drought-prone zones.Natural farming practices that conserve water and protect the environment help make water more available, manage it sustainably, and reduce CO2 emissions at various points throughout the agricultural value chain.This method not only protects the environment but also promotes biodiversity, reduces farmer debts, and ensures food security. ZBNF empowers farmers with low-cost techniques that are accessible to all, including marginalized and resource-constrained communities. By adopting ZBNF, we can make significant strides toward achieving sustainable development goals by fostering ecological balance, enhancing livelihoods, and preserving our planet for future generations.

Sustainable Development Goals targeted through ZBNF:

Zero Budget Natural Farming (ZBNF) is an agricultural practice that aims to achieve sustainable and regenerative agriculture while minimizing or eliminating the use of external inputs like chemical fertilizers, pesticides, and seeds. ZBNF can contribute to several Sustainable Development Goals (SDGs) through its principles and practices. Here's how ZBNF can help achieve some of the SDGs:

1. **SDG 2: Zero Hunger:** ZBNF promotes organic farming, it helps in enhancing soil fertility and biodiversity, leading to increased crop yields and improved food security. It also reduces the dependency on costly external inputs, making farming more economically viable for small-scale farmers.

2. **SDG 12: Responsible Consumption and Production**: ZBNF promotes organic and natural farming methods, reducing the use of synthetic fertilizers, pesticides, and genetically modified organisms. It encourages sustainable agricultural practices and the consumption of organic produce, contributing to responsible production and consumption patterns.

3. **SDG 13: Climate Action:** ZBNF focuses on improving soil health and water conservation, which contributes to climate change mitigation. Organic farming methods increase carbon sequestration in the soil, reduce greenhouse gas emissions, and enhance the resilience of farming systems to climate change.

4. **SDG 15: Life on Land:** ZBNF emphasizes biodiversity conservation by promoting agroecological practices. By avoiding chemical inputs and preserving traditional seed varieties, ZBNF helps maintain diverse ecosystems, supports pollinators, and protects soil organisms, contributing to the preservation of biodiversity.

5. **SDG 1: No Poverty and SDG 8: Decent Work and Economic Growth**: ZBNF reduces the cost of cultivation by eliminating the need for expensive external inputs. This makes farming more affordable for small-scale farmers and reduces their dependency on loans and debts. Additionally, ZBNF promotes decentralized and community-based approaches, creating opportunities for rural employment and entrepreneurship.

6. **SDG 6: Clean Water and Sanitation:**Mulching and water conservation techniques in ZBNFhelp retain soil moisture and reduce water usage.It reduces the risk of chemical runoff polluting water and promotes effective water management.

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To achieve the SDGs through ZBNF, it is crucial to provide support to farmers in terms of training, capacity building, access to resources, and market linkages. Governments, organizations, and communities need to collaborate to create enabling policies, invest in research and development, and promote awareness about sustainable farming practices like ZBNF.

Principles of Zero Budget Natural Farming:

Zero external input: ZBNF discourages the use of chemical fertilizers, pesticides, and other external inputs, relying instead on natural resources and locally available materials.

Mulching and soil fertility: Mulching with crop residues, leaves, or organic matter helps retain soil moisture, improves fertility, and prevents weed growth.

Seed selection and preservation: ZBNF promotes seed selection from the best-performing plants and encourages farmers to preserve indigenous seeds.

Nutrient management: The technique focuses on improving soil health through the application of natural fertilizers like cow dung, cow urine, and compost.

Bio-diverse farming: ZBNF advocates for cultivating a diverse range of crops to enhance soil fertility, attract beneficial insects, and reduce pest incidence(N.P.Pillai & Keskar, 2023).

Zero Budget Natural Farming Methods:

Zero Budget Natural Farming (ZBNF) employs a range of methods that focus on utilizing natural resources and minimizing external inputs. Here are some key methods used in ZBNF(ZBNF, 2023):

Jeevamrutha and Beejamrutha (Nectar of life):

Jeevamrutha is a fermented microbial solution made from cow dung, cow urine, jaggery, pulse flour, and water. It contains beneficial microorganisms that enhance soil fertility and plant health. Beejamrutha, on the other hand, is a seed treatment solution derived from the same ingredients. It protects seeds from pests and diseases, promotes germination, and improves seedling vigor.

Bijamrita/beejamrutha(Seed Treatment)

Bijamrita is a seed treatment method where seeds are soaked in a solution made from cow dung, cow urine, jaggery, and water. This treatment enhances seed health and vigor, improving their germination and resistance to pests and diseases.

Acchadana (Mulching):

Acchadana is a protective paste made from cow dung, cow urine, and clay. It is applied to seeds before sowing, providing them with a protective coating and further preventing damage from pests and diseases.

Mulching involves covering the soil surface with organic materials such as crop residues, leaves, or straw. This layer acts as a protective barrier, reducing weed growth, conserving soil moisture, and improving soil fertility. Mulching also promotes the activity of beneficial soil organisms and prevents erosion.

Waaphasa (Soil aeration)

For plants to grow and thrive, the soil must have adequate aeration. The ZBNF idea is against the use of vermicompost because it transfers the most prevalent composting worm, the European Red Wiggler, to Indian soil, which damages the soil and groundwater by absorbing harmful metals

Crop Rotation and Intercropping:

ZBNF emphasizes the practice of crop rotation and intercropping. Crop rotation involves systematically changing the crops grown in a particular area over time. It helps break pest and disease cycles, reduces nutrient depletion, and improves soil health. Intercropping refers to growing different crops together in the same field, utilizing space and resources more efficiently. It provides ecological balance, reduces pest pressure, and maximizes yield.

Natural Pest and Disease Control:

ZBNF encourages the use of natural methods to control pests and diseases. This includes the use of trap crops, which are plants that attract pests away from the main crop, reducing damage. Additionally, insect-repellent plants, such as marigolds or neem, can be intercropped to repel pests. Biological control agents, like beneficial insects or organisms, are also introduced to control pest populations naturally.

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Nutrient Management:

ZBNF focuses on enhancing soil fertility through the application of natural fertilizers. Cow dung and cow urine are commonly used in ZBNF as they provide essential nutrients to the soil. These materials can be combined with other organic matter, such as crop residues or compost, to create nutrient-rich soil amendments.

These methods collectively aim to create a balanced and sustainable farming system that relies on natural resources and minimizes external inputs. By adopting these practices, farmers can improve soil health, reduce costs, and promote a healthier environment for both crops and ecosystems (Agarwal, 2019).

Benefits of Zero Budget Natural Farming:

Ecological sustainability: ZBNF practices contribute to soil conservation, water management, and biodiversity conservation, reducing the negative environmental impacts associated with conventional agriculture.

Cost-effectiveness: By minimizing the use of external inputs, ZBNF reduces farmers' dependence on expensive chemical fertilizers and pesticides, resulting in lower production costs.

Increased farmer income: ZBNF has shown promising results in enhancing farmers' income by increasing yield, reducing input costs, and accessing premium organic markets.

Improved soil health and fertility: ZBNF practices improve soil structure, organic matter content, and nutrient availability, leading to sustained agricultural productivity.

Challenges and Future Prospects:

Knowledge dissemination and training: Widespread adoption of ZBNF requires effective training programs and extension services to educate farmers about its principles and practices(Jebaraj, 2019).

Scaling up and policy support: Government support through policies, incentives, and infrastructure development is essential to encourage large-scale adoption of ZBNF(Nirmal, 2019).

Market demand and certification: Developing organic markets and certification systems will provide better incentives for farmers practicing ZBNF(Reddy, Reddy, & Reddy, 2019).

Labor-Intensive: Compared to conventional farming, ZBNF practices are labor-intensive, especially in the beginning. Manual weeding, composting, and other natural processes may require more time and labor.

Crop Selection Criteria: ZBNF may not be appropriate for all crops. Without chemical inputs, some crops can be more vulnerable to pests or illnesses. Crop varieties must be carefully chosen by farmers in accordance with ZBNF standards and local demands.

Disease and pest control:ZBNF uses natural approaches to control pests and diseases, which can sometimes not be as successful as chemical-based pesticides and herbicides. It can be challenging to find natural pest and disease management methods that are effective.

Scale and Commercial Viability: As ZBNF is frequently practised on a small scale, farmers may find that it is not profitable. It can be difficult to expand ZBNF operations while upholding its fundamental values.

Time and Patience:ZBNF seeks to gradually enhance soil health and ecosystem balance. This requires time and patience. Farmers may therefore need to exercise patience while they wait for the soil to rejuvenate to offer long-term advantages.

Market Access: Finding consumers and getting access to markets for ZBNF produce may be challenging depending on the area and market demand. Market demand may be impacted by consumer awareness of and appreciation for organic and chemical-free products.

Monitoring and Adaptation: In order for ZBNF implementation to be successful, farmers will have to monitor the weather, crop conditions, and soil health on an ongoing basis.

Lesser yielding capacity: Regarding the assertion (by ZBNF proponents) that ZBNF produce is of higher quality than conventional produce, it is true that ZBNF produce is without a doubt free of pesticide residue, but because ZBNF farmers did not receive a premium price for their produce, their expectation of a higher price for ZBNF produce was unmet, and as a result, they returned to conventional farming methods using chemical fertilizers as needed.

It is impossible for the country to negotiate on supplying nutrient supplies to end the silent hunger and the unethical continuation of an abundant number of stunted children and anemic mothers(NAAS, 2019). But contrary to it, there is a firm conviction that fostering methods that mainly depend on varieties of crops with naturally low producing ability would be

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adverse to India's address to achieve the Sustainable Development Goals (SDGs), specifically 1 and 2, and the target of doubling the income of farmers.It is very evident that ZBNF is a misconception and not the complete truth because it is not backed by any scientific data. This form of farming was practiced in the country prior to independence, which experienced numerous famines that resulted in deaths from starvation and hunger(Seigel, 2018).The National Academy of Agricultural Scienceshas the considered opinion that ZBNF, which represents one of the many such practices used in India prior to the 1950s when a maximum of 50 Mt. of crop grains were produced, offers no potential for an extra benefit obtained by either the farmer or the consumer, making ZBNF a production technology lacking in justification or acceptability(NAAS, 2019).

Conclusion:

To see agriculture in business oriented profitable approach Zero Budget Natural Farming offers a sustainable and economically viable alternative to conventional farming practices. Providing food free from contamination and with high nutritional values is need of an hour. In addition, it promotes ecological sustainability, reduces production costs, and enhances farmers' income. The long-lasting impacts of chemical farming may have higher yields than ZBNF but this initial transition to adopting new technique will not yield favourable outcomes(Duddigan et al., 2022).Only after sufficient mulching and a restoration of soil biological activity will the results become obvious. Farmers must therefore exercise patience and perseverance(Saxena et al., 2022). However, the successful adoption and scaling up of ZBNF require concerted efforts from farmers, policymakers, and other stakeholders to overcome challenges and create an enabling environment. The government would help 1 crore (100 million) farmers make the switch to natural (or chemical-balanced) farming during the following three years, according to Budget 2023. In order to encourage states and Union Territories to promote alternative fertilisers and a balanced use of chemical fertilisers, it was announced in the budget that the PM Programme for Restoration, Awareness, Nutrition, and Improvement of Mother Earth (PM PRANAM) will be implemented(SIRU, 2023). With the right support, ZBNF has the potential to revolutionize agriculture, promoting a healthier and more environmentally friendly approach to food production.

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