



## Zero Budget Natural Farming – Boon or Bane to Farmers

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**ABSTRACT:** Zero Budget Natural Farming (ZBNF) is a technique for chemical-free agriculture that is based on traditions from ancient India. The ZBNF method starts from zero, with no production costs, and completely eliminates the use of synthetic chemicals like fertilizers and pesticides. Smallholder farmers cannot adopt organic farming since it requires expensive certification procedures and significant quantities of FYM/organic fertilizers. It promotes multiple cropping, year-round soil cover, and the use of a mixture comprised of cow dung and urines to activate the soil system's microorganisms. It has been found that ZBNF decreases the cost of production and increases the farm income. ZBNF also faces the severe criticism like, it will create negative impact on farmer's income as well as food security. It is necessary to move away from chemical farming, but appropriate research must be conducted to evaluate its productivity, quality, and impact on soil nutrition. This review paper will give insight about the practices under ZBNF, government initiatives to promote ZBNF, the effect of ZBNF on crop yields and criticism about ZBNF.

**Keywords:** Zero Budget Natural Farming, Cost of production, Farm income, Ecology.

### INTRODUCTION

Providing food for a population of nine billion people by the middle of the century is one of the most important issues facing humanity. Agricultural output more than tripled worldwide between 1960 and 2015 (FAO, 2017). Initially, Green Revolution technology helped to boost yields and revenues in comparison to conventional methods (Panneerselvam *et al.*, 2011). Due to the ensuing intensive, high-input agriculture that depends on chemical pesticides, fertilizers, and irrigation, there is proof of environmental deterioration and adverse health effects linked to synthetic chemical exposure (Bhattacharyya *et al.*, 2015). Agroecology and sustainable intensification are two examples of more ecologically oriented solutions that have emerged as a result. These solutions have been marketed as substitute methods of agricultural production that are more in line with the Sustainable Development Goals (SDGs) of the UN.

Organic agriculture helps to reduce poverty and ensures food security through a variety of factors like; increasing yields in locations with low inputs, biodiversity and natural resources conservation on the farm and in the surrounding environment (Masoodi *et al.*, 2022).

Shanmuka *et al.* (2024) revealed that natural farming was a form of regenerative agriculture, it may have unique practices and philosophies that set it apart from other regenerative farming systems.

The term "Zero Budget" refers to not utilizing any credit and not spending any money on inputs that must be acquired because the word budget refers to expenses. Natural farming entails using only natural methods and no chemicals (Fukuoka, 2009). The short-term intercrops balance out the main crop's expense, resulting in a total cost of zero. It corresponds to agro-ecological concepts including soil fertility and health improvement, nutrient recycling, biomass reprocessing, diversification, improved biological activity, and minimal loss of natural resources like water and nutrients (Sain *et al.*, 2020). As a result, farmers do not need to buy fertilizer and pesticides to ensure that their crops grow healthily. Crops only absorb 2-4% of the nutrients they need as nutrition; the other 96% is acquired via air, water, and solar energy (Palekar, 2010).

National Sample Survey Organization (2020) reported that more than half of all farmers are in debt, and about 70% of households in the agricultural sector spend more than they make. Around 90% of households in states like Tamil Nadu, Andhra Pradesh, and Telangana are in debt, with each having an average of Rs. 1 lakh in debt. To fulfil the Central government's promise to double farmers' income, ZBNF can be implemented. Green Revolution had negative effects such soil erosion, biodiversity losses, growing agricultural costs, etc. whereas ZBNF depends more on soil biology than soil chemistry (Kumar *et al.*, 2020).

Environmental health was the prime importance for organic farming. It has the nature friendly approach and it act as a natural tool for the environmental protection and sustainable development (Bordoloi and Arunachalam 2022).

Duddigan *et al.* (2022) present findings from field experiments in Andhra Pradesh comparing ZBNF with conventional and organic farming systems. Their study

provides insights into ZBNF's effects on crop yields across different districts and crops. Khan *et al.* (2022) discussed ZBNF as a pathway toward sustainable agriculture. The study highlighted ZBNF's potential to reduce production costs and enhance soil fertility through practices like mulching and the use of natural fertilizers, contributing to improved soil health and reduced environmental impact.

**Table 1: Four pillars of ZBNF - Palekar (2010).**

Sr. No.	Pillars	Preparation	Benefits
1.	Jivamrita	It is composed of the cow-dung (20 kg), urine (5-10 l), jaggery (20 kg) and dicot flour (2 kg) and is applied to the crops with each Irrigation cycle	acts as a catalytic agent that promotes the activity of microorganisms in the soil, as well as increases earthworm activity
2.	Bijamrita	It is basically made up of water (20l), cow dung (5kg), urine (5l), lime (50gm) and just a handful of soil	a seed treatment, equipped in protecting young roots from fungus as well as from soil-borne and seed-borne diseases
3.	Acchadana	It could be done by soil mulch, straw mulch or live mulch	It conserves soil moisture, by reducing evaporation
4.	Whapasa	The irrigation should be reduced and irrigation should be practiced only at noon, in alternate furrows	Whapasa is the condition where there exist both air molecules and water molecules present in the soil.

**PRACTICES UNDER ZBNF**

**Intercropping & Crop rotation:** Leguminous crops, millets, cereals, vegetables, fruit trees, medicinal plants etc. form the component crops of intercropping system. Diversification of cropping system is another important practice of ZBNF as it breaks the habitat and consequently the build-up of pests and diseases (Biswas, 2020)

**Plant protection:** Bio-pesticides (*Nemastra*, *Agniastra*, *Bramhastra* etc.) made through natural or organic or bio-products are effective in controlling various seed, soil and air borne diseases as well as insects like aphids, jassids, mealy bugs, white flies etc., (Biswas, 2020).

**Indigenous Earthworm species:** Addition of vermicompost in to the soil is not promoted in ZBNF, deeper soil has its own indigenous earth worm species which can efficiently enhance soil fertility. Exotic earth worm species specially, *Eisenia foetida* is dangerous as it absorbs toxic metals and contaminates ground water and soil (Mishra, 2018).

**Cow dung:** Faeces of local Indian cows (*Bos indicus*) are only recommended in ZBNF activities as Indian species contain more beneficial micro-organisms (around 3-5 crores) than foreign breeds. One local indigenous cattle breed can cultivate 30 acres of land (Palekar, 2010).

**TIMELINE OF NATURAL FARMING IN INDIA**

**ZBNF – Karnataka Experience:** A prominent member of the Karnataka Rajya Raith Sangha (KRRS) invited Mr. Subhash Palekar to an interaction in 2002, which sparked a series of seminars and training sessions using the ZBNF approach.

Karnataka has begun implementing ZBNF on a pilot basis in an area of 2000 ha in 10 agro climatic zones through the relevant SAUs as demonstrations/scientific experimental trials at farmers' fields and in the research facilities of the relevant universities (Khadse *et al.*, 2017).

**ZBNF – Andhra Pradesh Experience:** Andhra Pradesh started a programme in June 2018 with the goal of being the first state in India to cover 100% of natural farming by 2024. It aims to phase out chemical farming over 80 lakh hectares of land, converting the State's 60 lakh farmers to ZBNF methods (Naik and Ashokkumar 2020).

**Way forward:** NITI Aayog is one of the foremost promoters of ZBNF method. ICAR evaluating the impact on productivity, economics and soil health including soil organic carbon and soil fertility. (Ministry of Agriculture and Farmers Welfare, 2020).

**EFFECT OF ZERO BUDGET NATURAL FARMING ON CROP YIELDS**

The Table 2 indicates that ZBNF has mixed effects (both positive and negative effects) on crop yield in the given circumstances. ZBNF reduces the cost of production but the yield is not up to the mark when compared with conventional farming.

**Table 2: Effect of ZBNF on crop yields.**

Sr. No.	Researcher	Study area	Effect on crop yield	Description
1.	Khadse <i>et al.</i> (2017)	97 farm households practicing ZBNF in Andhra Pradesh	+ve effect on crop yield	91% of them experienced a decrease in production cost & more than 78% of the households witnessed an increase in yield
2.	Mishra (2018)	Paddy, Groundnut, Black Gram, Chilly and Maize growers (ZBNF & Non ZBNF) in Andhra	+ve effect on crop yield	all the crops grown under natural practices had higher yields compared to those produced by means of non-ZBNF practices
3.	Reddy <i>et al.</i> (2019)	Climate Resilient ZBNF growers & Non CRZBNF growers	-ve effect on crop yield (reduced from 6 – 20%)	cost of cultivation is lower by 3 to 41 percent for CRZBNF crops in comparison to the Non-CRZBNF crops in Andhra Pradesh
4.	Duddigan (2022)	ZBNF farmers in Andhra Pradesh	-ve effect on crop yield	4 pillars of ZBNF will improve yield with combination of FYM
5.	Tripathi <i>et al.</i> (2018)	ZBNF & Non ZBNF farmers in Karnataka	-ve effect on input cost, crop yield and net income	Improved quality and taste of the fruits & Crop longevity and storage value also improved
6.	Kumar <i>et al.</i> (2020)	ZBNF & Non ZBNF farmers in 3 states (Andhra, Karnataka, Maharashtra)	-ve effect on crop yield	Natural Farming is not able to achieve higher yield than conventional farming

Kumar *et al.* (2023) revealed that inorganic and integrated nutrient management proved superior to organic farming and natural farming nutrient management in terms of growth attributes (plant height, number of tillers and dry matter accumulation), yield attributes (number of effective tillers and number of grains per panicle) and yield (grain and straw) of transplanted rice.

### CRITICISM OF ZERO BUDGET NATURAL FARMING IN INDIA

ICAR-IIFSR, Modipuram conducted research on ZBNF in several locations of the country and have clearly indicated that yield levels were drastically reduced in rice-wheat cropping system by 59% in wheat and 32% in basmati rice. Results of the three-year Natural Farming Experiment conducted by the UAS-Dharwad indicated a yield decline of at least 30% in soybean-wheat, groundnut-sorghum and maize-chickpea cropping systems. While it was 17% in cotton-groundnut inter-cropping system (Korav *et al.*, 2020).

**NAAS Committee report on ZBNF:** There is no need for the govt to promote ZBNF without proper scientific validation. It will create negative impact on farmer's income as well as food security. Shift from chemical farming is needed but sufficient testing need to be done to assess the productivity, quality, effect on soil nutrition (Prajapati, 2019).

**ICAR Committee report on ZBNF:** ICAR had set up the committee in 2019 to empirically validate the

results of ZBNF. The committee reported that there would be tremendous yield loss if ZBNF is adopted on a large scale which may compromise India's food security. It has recommended adoption of an integrated production system through usage of farm practices such as conservation agriculture. - Hindustan Times dt (22.03.2022).

### CONCLUSIONS

ZBNF reduces the cost of cultivation but it adversely affects the crop yield when compared with conventional farming. There need to be crop specific, location specific package of practices to improve soil health. Scientific validation need to be drawn with the help of research institutions / State Agricultural Universities. Premium price should be given to ZBNF products. Certification of Natural Farming should be created. Adopting diversified cropping system provides year round income. Government needs to take enough steps to familiarize Zero Budget Natural Farming.

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