



Zero Budget Natural Farming - A Game Changer for Farmers

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Introduction

According to FAO, by 2050 the world needs to increase overall food production by 70 percent to keep up with the growing global population and the changes in consumption driven by expanding the middle class. At the same time, India is expected to be the most populous country in the world by 2030, with 1.51 billion people. Under such conditions, ensuring food security for the populace would be one of the biggest concerns for the country. Therefore, adopting of any farming practices or production technologies at large scale which are not scientifically proven and/or might have a negative effect on crop yield may pose serious concerns on the national goal of ensuring food and nutritional security. 'Green Revolution' technology (intensive use of HYV seeds, chemical fertilizer and irrigation) adopted in the mid-1960's helped in overcoming the food shortage in the country. However, intensification of agriculture had led to considerable adverse environmental impacts, soil degradation, and eutrophication of land and water bodies, Green House Gas (GHG) emissions and biodiversity losses.

Natural farming is an ecological farming approach established by MASANOBU FUKUOKA (1913–2008), a Japanese farmer and philosopher, introduced in his 1975 book *The One Straw Revolution*. Natural Farming (NF) is a unique chemical-free farming method that is considered to be an agro-ecology-based diversified farming system, which integrates

crops, trees and livestock, allowing functional biodiversity (LVC, 2010; Rosset and Martinez-Torres, 2012).

What is Zero Budget Natural Farming

There are many working models of natural farming around the world. The Zero Budget Natural Farming (ZBNF) is most popular model in India. Zero Budget Natural Farming was originally promoted by an agriculturist Sh. Subhash Palekar in the mid-1990's, who have been awarded one of the highest civilian awards of India, Padma Shri in 2016. Subhash Palekar's Zero Budget Natural Farming is a unique method of farming which requires absolutely no monetary investment for purchase of key inputs like seeds, fertilizers and plant protection chemicals from the market. The farmer can grow hardy local varieties of crops without application of fertilizers and pesticides. All that the system requires is native breed of cattle which in any case forms an integral part of farming families in rural areas. It is claimed that one cow is sufficient to take up this method of farming on thirty acres of land. Since it is a zero budget farming no institutional credit would be required and dependence on hired labour is also reduced to bare minimum. It is also contemplated to promote soil health, improves soil organic carbon even without the need of adding a huge quantity of FYM (Farm Yard Manure) as in the case of organic farming and thus help in attaining sustainable agriculture with the reduced carbon footprint. The



in the backdrop of declining fertilizer response and farm income.

Why Natural Farming?

Natural Farming is Environment Friendly

Natural Farming is a sustainable farming. It makes all inputs from natural materials, observes the law of the Nature and respects the rights of crops and livestock. It heals the soil damaged by chemicals, herbicide and machines. Where Natural Farming is practiced, the soil and water become clean and ecology is recovered. It is even being used as a tool to fight desertification.

Natural Farming Respects Life

Natural farming opposes human exploitation on life. This farming believes that respecting the nature of the life is the best way to achieve top quality and yield. In this method the disease is prevented rather than curing with medicines. Similarly healthy animals are reared rather than making animals healthy by feeding those hormones and antibiotics. Crops and livestock reared by Natural Farming are very healthy. They have almost no disease. Natural farming fields / crops / orchards show especially strong resistance to climatic fluctuation.

Natural Farming Produces High Quality Produce

Natural Farming products have high quality, good taste and better yield. People commonly think that by converting to organic farming you will have lower yields, lower quality and smaller sized fruits. However in Natural Farming it is the opposite and we get

COMPARISON AMONG 3 FARMING PRACTICES		
Specific inputs used		Merits + Demerits
<ul style="list-style-type: none"> Farm Yard Manure (FYM) Vermicomposting Bio fertilisers Panchagavya HYV/ Hybrid seeds Biological pest and diseases management 	<p>Organic Farming</p>	<ul style="list-style-type: none"> Chemical free Eco friendly Assured market for contract farmers Premium price Huge quantity of FYM Yield reduction during conversion period Stringent procedure Expensive for consumers
<ul style="list-style-type: none"> Indigenous cow centric Jeevamritha & FYM Ghanajeevamritha Beejamritha Mulching Inter- / mixed/ poly-crops Local cultivars seeds Home made materials (Kasayams) for pests & diseases control - Agneyastra, Neemastra, etc. 	<p>Natural Farming</p>	<ul style="list-style-type: none"> Regular & better farm income from intercrop Lower production cost Less use of FYM/Inputs Improved family health-non-use of pesticides & food diversity Improved soil health Chemical free produce Need of indigenous cow dung & urine Possibility of lower yield Cumbersome practices More farm engagement No established market/certification
<ul style="list-style-type: none"> Synthetic fertilizers Farm Yard Manure Chemical pesticides, herbicides HYV/Hybrid seeds Heavy Irrigation Intensive tillage Farm mechanization Mono-cropping systems 	<p>Chemical Farming</p>	<ul style="list-style-type: none"> High yield potential Convenience in farming Less price for customers Easy input availability Market well-established Rising cost of production Health hazard for farmers & consumers both Unsustainable system Loss of biodiversity Pests resurgence

Natural Farming products may attract premium price & be placed between Conventional & Organic

higher yield and better quality produce. Natural Farming products have much higher nutritional contents, Protein, amino acid, crude fat and other essential nutrients were about 300 percent higher than ordinary products. Chemical residue such as nitrate is almost undetectable in natural farming produce.

Farming Inputs are made by Farmers

Most important aspect of Natural Farming is that the farmers make what they need. Fertilizers, soil improvers, pest controllers, disease cure are all made by the farmers themselves using only natural materials based on the Nutritive Cycle theory. This farming does not involve buying materials from the market and using them on the farm.



In this only those inputs are made on the farm which is required by the farm thereby saving money and getting better response. Our fields, hills, forests, rivers, oceans and all surroundings are full of useful materials that can be effectively used in our farming; but we only need to open our eyes. This is why Natural Farming can be a powerful tool for the third world farmers who cannot afford to buy expensive imported farming inputs. Our important inputs include Indigenous Microorganism (IMO), Fermented Plant Juice (FPJ), Oriental Herbal Nutrient (OHN), Lactic Acid Bacteria (LAB), Fish Amino Acid (LAB), Watersoluble Calcium (WCA), Water-soluble Calcium Phosphate (WCP) and Insect Attractant (IA). All these inputs are produced at the farm easily and cheaply and moreover they are highly effective.

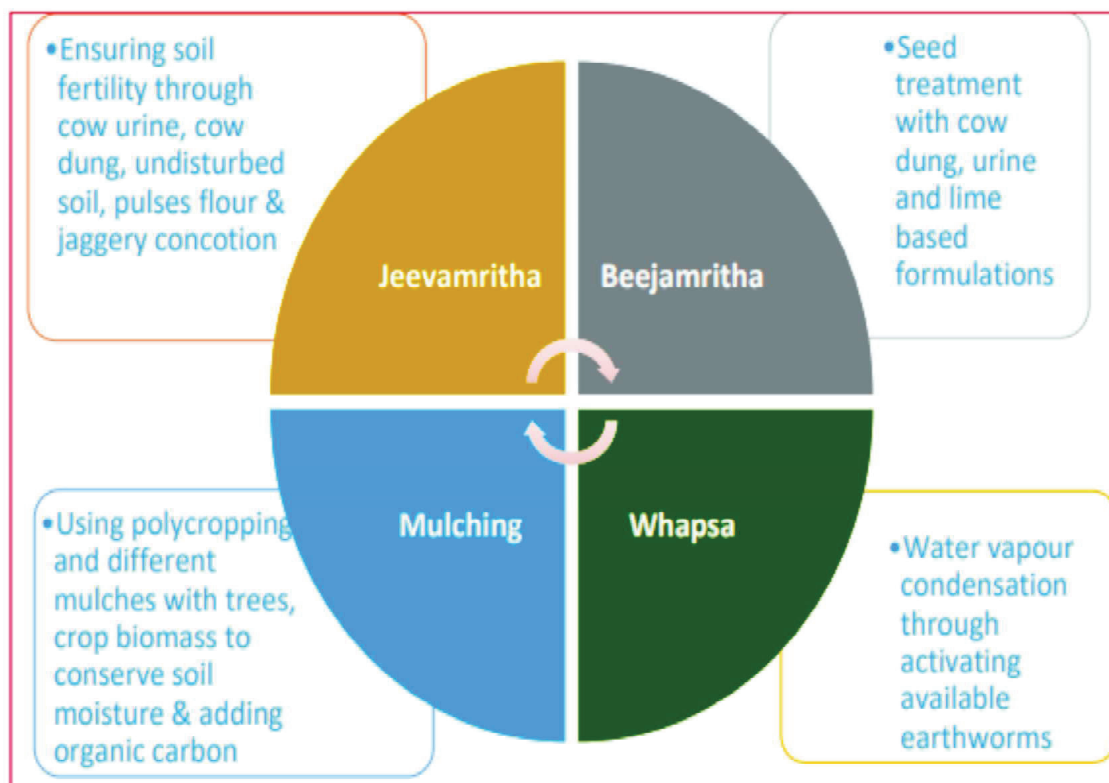
According to Sh. Subhash Palekar, the ZBNF/NF has following 4 essential Principles

Principles

(a) Jeevamritha/ Jeevamrutha: It is a fermented microbial culture. It provides nutrients, but most importantly, acts as a catalytic agent that promotes the activity of microorganisms in the soil, and also increases the population of native earthworms.

(i) Preparation of Jeevamritha: Put 200 litres of water in a barrel - Add 10 Kg fresh local cow dung - Add 5 to 10 litres aged cow urine - Add 2 Kg of Jaggery (a local type of brown sugar) - Add 2 Kg of pulses flour and - Add a handful of soil from the bund of the farm. Stir the solution well and let it ferment for 48 hours in the shade.

(ii) Application: Jeevamritha is ready for application. The 200 litres of Jeevamritha is sufficient for one acre of land. During the 48-hour fermentation process, the aerobic and anaerobic bacteria present in the cow dung and





urine multiply as they eat up organic ingredients (like pulse flour and jaggery). A handful of undisturbed soil acts as inoculate of native species of microbes and organisms. Jeevamritha also helps to prevent fungal and bacterial plant diseases. It should be applied to the crops twice a month in the irrigation water or as a 10% foliar spray. The preparation is stored up to a maximum of 15 days and used in the field either through spray or mixing with irrigation water.

(b) Beejamritham: It is a treatment used for seeds, seedlings or any planting material. Beejamritha is effective in protecting young roots from fungus as well as from soilborne and seed-borne diseases that commonly affect plants after the monsoon period.

(i) Preparation of beejamritha: Mix local cow dung, considered to be natural fungicide, and cow urine (as anti-bacterial liquid), lime and soil. The dung is tied in a cloth and is kept in urine for about 12 hours. The dung is removed from cow urine, cow dung is squeezed and urine is added with about 50 grams of lime.

(ii) Application: Add beejamritha to the seeds of any crop; coat them, mixing by hand; dry them well and use them for sowing. For leguminous seeds, just dip them quickly and let them dry.

C. Acchadana – Mulching: Three types of mulching have been suggested under ZBNF:

(i) Soil Mulch: This conserves the topsoil during cultivation and does not destroy it by tilling. It promotes aeration and water retention capacity in the soil. Therefore, deep ploughing should be avoided.

(ii) Straw Mulch: Straw material usually refers to the dried biomass waste of previous crops. Any type of dry organic material will decompose and form humus through the activity of the soil biota which is activated by microbial cultures.

(iii) Live Mulch: Here multiple cropping patterns of monocotyledons and dicotyledons are grown in the same field, to supply all essential elements to the soil and crops. Dicot group like pulses are nitrogen-fixing plants. Monocots like rice and wheat supply other elements like potash, phosphate and sulphur.

(d) Whapasa-moisture: The advocates of ZBNF counter the over-reliance on irrigation in green revolution farming. Whapasa is the condition where both air molecules and water molecules present in the soil. Thus, irrigating only at noon, in alternate furrows, may fulfill the moisture requirement of the crops, a significant decline in the need for irrigation in ZBNF.

Other Important Principles of ZBNF

Intercropping: It is an important practice in ZBNF in which there is a close association between the crops and trees growing on the farm. According to Palekar this crop and tree association works well for the south Asian context.

Contours and Bunds: To preserve rain water, Palekar explains in detail how to make the contours and bunds in the farm. Further this preserved rain water should be efficiently used so as to enhance the productivity and WUE of different crops.

Local Species of Earth Worms: Palekar opposes the use of vermicompost. He claims that the revival of local deep soil earthworms (anecic) through increased organic matter is most recommended. He opposes the use of *Eisenia foetida* saying that this is the surface feeder (epigeic) which only feeds on the organic biomass and does not eat and burrow the soil. As a result they cannot convert the deep soil in to casting, which is the richest stock of minerals necessary for plant growth. They feed on organic matter, as the result, the mulching of the organic matter on the soil is totally destroyed. They also accumulate large



quantity of heavy metals in their bodies which is further transferred to the soil in the form that can be easily absorbed by the crop.

Cow Dung: According to Palekar, dung from the local cow *Bos indicus* (humped cow) is most beneficial and has the highest concentrations of micro - organisms as compared to European cow breeds such as Jersey and Holstein. The entire ZBNF method is centred on the Indian cow, which historically has been part of Indian rural life. He says that one local cow can meet the requirements of natural farming for 30 acres of land. Palekar says that cow dung should be used as fresh as possible while the urine used should be as old as possible as they are more effective.

Mixed Cropping and Crop Rotation: Zero Budget Natural Farming advocates cultivation of diverse species of crops depending on site specific agro climatic conditions. Mixed cropping provides buffer against total failure of single crop and also widens the income source of farmers. There is stress on inclusion of leguminous crops to ensure replenishment of soil fertility. Crop rotation is also emphasized to discourage build-up of endemic pests. In the scheme of mixed cropping, cereals, millets, leguminous crops, horticulture crops particularly vegetables and even medicinal plants can be included to make farming more lucrative. The system also advocates wider spacing of crops to facilitate inter cropping. Palekar has repeatedly stressed that just as diversity is the rule of nature the farm should also have diverse species.

Plant protections in ZBNF:

According to ZBNF-adopter farmers, when chemical fertilizers are applied to the crops, the vegetative growth of the crop is very good and lush green. This attracts the insects/pests to the crops. While in case of Jeevamritha, the leaves colour is not that much green, and therefore, menace of pests is

limited. However, when infestation occurs, the farmers prepare different types of formulations (Kashayam) made up of locally available plant materials to control the pests. Some of these are:

(a) Neemastra: It is the most commonly used pest controlling solution which is prepared by the farmers. Cow dung, cow urine, neem leaves, and water are used for preparing the neemastra. The neem leaves are grinded into paste and added with water. The solution is directly applied to plants without any further dilution. For this, 5 kg of neem paste is added with around 2-3kg of dung, 10-20 litres of cow urine, handful of soil. The solution is fermented for about 48 hours. It was found that the farmers are making the solution ranging from 100-200 litres depending upon their usage and crops grown.

(b) Brahmastra: It is prepared from five types of bitter leaves. Neem leaves are used along with the other bitter-tasting leaves, like custard apple, chillies, etc. Around 20-30 litres of cow urine is used and is boiled for about 2-3 hours. The solution is cooled for about 12 hours and is filtered using fine cloths. The solution is further diluted with about 15 litres of water for every 1 litre of Brahmastra. The farmers are using 10-20 litres of cow urine and 5kg of neem leaves in preparing Brahmastra.

(c) Agniastra: It is prepared by adding 5 kg of neem paste with around 1 kg of tobacco leaves, 0.5 kg of chillies and 0.5 kilo of garlic paste. These are added in about 25- 30 litres of cow urine and are cooled down for about 24 hours. The solution is then filtered and used. The solution is diluted before applying in the field for every half litre of Agniastra about 15 litres of water is added. Agniastra is considered to be effective against insects like Leaf Roller, Stem Borer, Fruit borer, Pod borer. The pest controlling solutions were also made available to the farmers at NPM (Nutrients Pest management) shops in Andhra Pradesh. Apart



from the abovementioned solutions, there are other pest controlling solutions being used by the farmers. It is being used by the farmers mainly in the paddy crop.

(d) Tutikada rasam: It is prepared from Datura leaves and cow urine. The leaves are boiled in cow urine for 2-3 hours and are cooled then it is filtered using a cloth.

(e) Dashparini Kashyam: It is prepared from ten types of plant leaves. The leaves of Neem, *Agele marmelos*, Calotropis, Senna auriculata, Papaya, Custard apple, Guava, Vitex negundo, castor, Pomegranate, Nerium, Ocimum, Aloevera, Tobacco, Datura, Lantana camara and *Pongamia pinnata* are used in preparing the solution. Green chilli and garlic are also crushed and added and mixed with 20 litres of cow urine. It is kept up to 45 days for fermentation. The solution is filtered and sprayed after dilution. In about 8-10 litres of solution 100 litres of water is added for dilution

Conclusion

The protagonists of ZBNF believe that conventional agriculture or chemical farming contributes to land degradation by adding chemicals in soil and food systems, while agro-ecological system restores soil fertility. After having an exhaustive study of the movement, Munster (2018) believes that the prevalent ambivalence makes Natural Farming a valuable case for the political ecology of agriculture. Nevertheless, the Finance

Minister, Govt. of India has stressed upon the ZBNF practices and appealed the farmers to replicate this innovative model that can help in doubling farmers' income. Furthermore, addressing the 14th Conference of Parties (COP) to the UN Convention to Combat Desertification, the Prime Minister of India mentioned that ZBNF is the way for sustainable agriculture. Finance Minister Nirmala Sitharaman said in her budget speech (2022): "States will be encouraged to revise the syllabus of agricultural universities to meet the needs of natural, zero-budget and organic farming, modern-day agriculture, value addition and management."

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