



Zero-Budget Natural Farming

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Abstract

The neo-liberalization of the Indian economy has led to a deep agrarian crisis that makes small-scale farming an unviable vocation. Despite the increase in production, Indian farmers increasingly find themselves in a vicious cycle of departments because of the high production costs, the volatile crop prices, and the reduction of demand in the international market due to agro-chemicals residues. Under such conditions, natural farming practices promise to end a reliance on loans and reduce production costs, ending the debt cycle for desperate farmers and producing healthy and residue-free fruits

Keywords: Natural farming, Mulch, Multiple cropping

Introduction

Zero Budget Natural Farming (NF) is purported to be disruptive farm practice addressing farmers' major concerns of the rising production cost. It envisages ecological or regenerative agriculture approaches under which the application of any chemicals to soil biosystems is prohibited. It relies on soil biology rather than soil chemistry by encouraging multi-cropping, all-year soil cover and adding a formulation of cow dung and urines to activate the soil system's micro-organisms.

Alternative farming practices such as Natural farming or ZBNF were classified as organic farming models in the Economic Survey (2019). It also emphasizes that the primary goal of ZBNF is to eliminate agrochemicals and sustain agricultural production through eco-friendly processes that are in sync with nature. ZBNF restores soil fertility and the organic matter requires less water and promotes a climate-friendly agriculture system.

Principles of natural farming

Natural inputs- Toxic-free, freely available resources in nature

Low-inputs- No use of chemicals and fertilizers, promotes natural catalyst of biological processes in the soil and natural protection from diseases

Mulching- Soil protection creates a conducive environment for biological processes in the soil

Multiple cropping- Minimizes the risk of crop failure, continuity of income source

Four Pillars of Natural Farming

ZBNF, like agroecology, aims to enhance nature's own processes and eliminate external inputs, debt and dependency. The practices of ZBNF include effective spacing of crops, contouring and bunds to conserve water; intensive mulching; the addition of microbial cultures to enhance decomposition and nutrient recycling; use of local seeds; integration of

crops, trees and livestock (mainly cows); extensive intercropping; and crop rotations, among others. Below we describe the so-called pillars of ZBNF.

1. Jivamrita/jeevamrutha 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, as well as increases earthworm activity; 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). A handful of undisturbed soil is also added to the preparation, as inoculate of native species of microbes and organisms. Jeevamrutha also helps to prevent fungal and bacterial plant diseases. Palekar suggests that Jeevamrutha is only needed for the first 3 years of the transition, after which the system becomes self-sustaining (Palekar 2005).

How to prepare jeevamrutha: Put 200 liters of water in a barrel; Add 10 Kg fresh local cow dung and 5 to 10 liters aged cow urine; Add 2 Kg of Jaggery (a local type of brown sugar), 2 Kg of pulse flour and a handful of soil from the bund of the farm. Stir the solution well and let it ferment for 48 hours in the shade. Now jeevamrutha is ready for application. 200 liters of jeevamrutha is sufficient for one acre of land.

Jeevamrutha Application: Apply the jeevamrutha to the crops twice a month in the irrigation water or as a 10% foliar spray.

2. Bijamrita/beejamrutha is a treatment used for seeds, seedlings or any planting material. Bijamrita is effective in protecting young roots from fungus as well as from soil-borne and seed-borne diseases that commonly affect plants after the monsoon period. It is composed of similar ingredients as jeevamrutha - local cow dung, a powerful natural fungicide, and cow urine, a strong anti-bacterial liquid, lime, soil.

Bijamrita Application as a seed treatment: Add Bijamrita 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.

3. Acchadana - Mulching. According to Palekar, there are three types of mulching:

a. Soil Mulch: This protects topsoil during cultivation and does not destroy it by tilling. It promotes aeration and water retention in the soil. Palekar suggests avoiding deep ploughing.

b. Straw Mulch: Straw material usually refers to the dried biomass waste of previous crops, but as Palekar suggests, it can be composed of the dead material of any living being (plants, animals, etc). Palekar's approach to soil fertility is very simple – provide dry organic material which will decompose and form humus through the activity of the soil biota which is activated by microbial cultures.

c. Live Mulch (symbiotic intercrops and mixed crops): According to Palekar, it is essential to develop multiple cropping patterns of monocotyledons (monocots; Monocotyledons seedlings have one seed leaf) and dicotyledons (dicots; Dicotyledons seedlings have two seed leaves) grown in the same field, to supply all essential elements to the soil and crops. For instance, legumes are of the dicot group and are nitrogen-fixing plants. Monocots such as rice and wheat supply other elements like potash, phosphate and sulphur (Palekar 2006).

4. Whapasa - moisture: Palekar challenges the idea that plant roots need a lot of water, thus countering the over reliance on irrigation in green revolution farming. According to him, what roots need is water vapor. Whapasa is the condition where there are both air molecules and water molecules present in the soil, and he encourages reducing irrigation, irrigating only at noon, in alternate furrows ZBNF farmers report a significant decline in need for irrigation in ZBNF.

Practices followed in natural farming

1. Organic seed treatments

- Beejamrutha/ Panchagavya

2. Nutrient replenishment using organic formulations

- Liquid Jeevamrutha, Ghanajeevamrutha and Beejamruth

3) Mulching with organic materials

Advantages

Prevent soil and wind erosion

- Slow down rainwater run-off
- Slow decompose
- Adds organic matter
- Food for the soil fauna
- Improves root growth
- Increases the infiltration of water
- Improves the water-holding capacity of the soil
- Decaying organic matter also becomes a source of plant nutrients
- Maintains a more even soil temperature

4. Proper maintenance of soil moisture and air-Waphasa

Waphasa refers to the proper maintenance of soil air and soil moisture. It helps to provide proper soil aeration, thus helping in the respiration of soil fauna and plant root growth and also helps in maintaining the soil structure.

5) Conservation horticulture practices

A set of cultural practices that aims to proper resource management and conserve both soil and environmental health

Practices

Reduced tillage / minimum tillage

- No burning of crop residues
- Permanent crop and weed residue mulch
- Continuous cropland use
- Crop rotations and cover crops

Advantages

Water retention

- Increase in organic matter
 - Reduce soil erosion
- Micro-organism enhancement
- Saves money
 - Soil evaporation reduction
 - Improved soil fertility
 - Weed control

6) Multiple cropping

Multiple cropping is the practice of growing two or more crops on the same land during a single growing season. It is a form of polyculture.

Need

- ❖ As per the Agriculture census 2015-16, the average size of operational holding declined to 1.08 hectares in 2015-16 as compared to 1.15 hectares in 2010-11
- ❖ The small and marginal holdings (<2 ha) now constitute 86%, while the large holdings (>10 ha) are merely 0.57% of the total land holdings.

Advantages

Better source utilization

- Mutualism

- Increase yield per unit of land
- Increase the crop biomass
- Reduces pest and disease attack
- It helps to maintain the soil fertility
- Insurance against crop failure

7. Pest and disease management using cow and natural plant-based preparations/ Extracts

Concepts of pest management under natural farming

- No use of pesticides like insecticides and fungicides
- Pest management using natural plant preparations

Respect for life- No harm to non-target organisms

- Altering / modulating insect behavior
- Producing residue-free fruits
- Trap crops and border crops (Gholamnezhad, 2019)

Indian scenario of natural farming

The Government has been promoting natural farming in the country through the schemes such as Rashtriya Krishi Vikas Yojana (RKVY) (2007) and Paramparagat Krishi Vikas Yojana (PKVY) (2015)

- India's Legislature advancing natural farming in the nation from 2015-16 through the traditional agricultural development plan is committed schemes and the National Agricultural Development Plan.

Future thrust

Systematic research should be conducted at ICAR institutes/SAUs

- Creating awareness through training and demonstration by KVK's
- Certification of Natural Farming produce
- Encouraging Farmer's Producers Organizations (FPOs) based on Natural farming

Conclusion

An increase in the cost of production and an increase in global demand for residue-free healthy food products has driven some farmers from conventional intensive practices to sustainable fruit

production practices, which can considerably reduce the input cost and decrease the environmental pollution caused by the injudicious use of agrochemicals. Hence, natural farming practices could be one of the options to sustain fruit production in harmony with nature.

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