Scientific Innovation Magazine
ISSN : 2584-1157

NATURAL FARMING: NEED OF THE HOUR

Maksudan[1]*, Hem Prakash Verma[2] and Asnath Prerna Minz[3]
[1]*PhD Research Scholar, Department of Fruit Science, Indira Gandhi Krishi Vishwavidyalaya Raipur (C.G.)
[2]PhD Research Scholar, Department of Agriculture Extension, Indira Gandhi Krishi Vishwavidyalaya Raipur (C.G.)
[3]M.Sc. (Hort.) Department of Fruit Science, Indira Gandhi Krishi Vishwavidyalaya Raipur (C.G.)
E-mail: mvmadhu.verma116@gmail.com

Abstract

Natural Farming can be defined as "chemical-free and livestock-based farming". Soundly grounded in agro-ecology, it is a diversified farming system that integrates crops, trees and livestock, allowing the optimum use of functional biodiversity. Concerning soil fertility, soil microbes play an important role, they involve in a nutrient cycle like C & N cycle which are required for plant growth (Lazarovits, 1997). Microorganisms play an important role in the conversion of unavailable forms of nutrients to available form in the plant root zone. The modern form of natural farming is new concept. However, it is being popular in the world speedily especially in developed countries. Natural farming system is an alternative and appropriate management system would help to improve soil health environment thus increase the productive levels and improve quality of fruit crops. India has tremendous potential to grow crops & fruit naturally and emerge as a major supplier of organic products in the world's organic market.

Key words: Natural farming, agro-ecology, soil fertility, microorganisms and organic market

INTRODUCTION

Natural Farming can be defined as "chemical-free and livestock-based farming". Soundly grounded in agro-ecology, it is a diversified farming system that integrates crops, trees and livestock, allowing the optimum use of functional biodiversity. Natural Farming holds the promise of enhancing farmers income while delivering many other benefits, such as restoration

of soil fertility and environmental health and mitigating or reducing greenhouse gas emissions. Natural Farming builds on natural or ecological processes that exist in or around farms.

Sixty percent of the Indian population will experience severe food deficiencies by 2050. Increased food production is urgently needed, but the high cost of production, fluctuating prices in the market are driving farmers into debt. Zero budget natural farming (ZBNF) is the best solution to reduce the input cost of farmers. The word zero budget means “no credit” and natural farming means “growing of crops without chemicals”.

This farming approach was introduced by Masanobu Fukuoka, a Japanese farmer and philosopher, in his 1975 book The One-Straw Revolution.

It is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators, genetically modified organisms and livestock food additives. This system up on crop rotations, use of crop residues, animal manures, legumes, green manures.

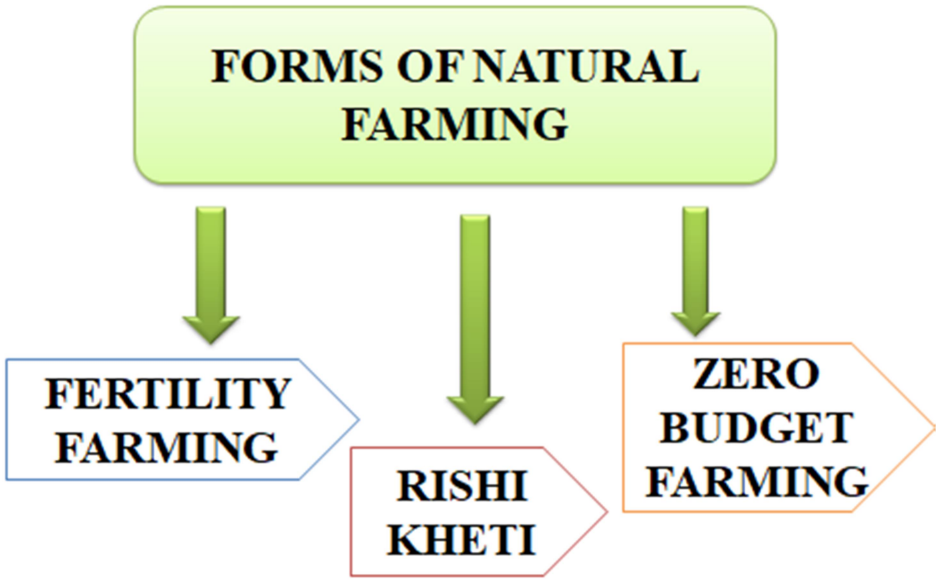
Internationally, Natural Farming is considered a form of regenerative agriculture a prominent strategy to save the planet. It has the potential to manage land practices and sequester carbon from the atmosphere in soils and plants, where it is actually useful instead of being detrimental.

Modern chemical - based agriculture now a day’s increased the cost of production or reduced crop yield due to various reasons (Intawongse & Dean, 2006; Ayansina & Oso, 2006; Sreenivasa *et al*. 2010; Singh *et al*. 2011). Growing of commercial same crop year after years such as rice, wheat, cotton, and sugarcane results in the depletion of soil fertility, topsoil infertile, soil vitality, groundwater, and mostly on soil beneficial microbes population.

FEATURES

Scientific Innovation Magazine
ISSN : 2584-1157

1. **Chemical Free:** Natural farming refers to the type of agriculture in which the use of chemicals like pesticides, fertilizers, growth regulators, food additives, genetically modified organisms are entirely shunned.
2. **Use of Alternatives Systems** in place of chemical based inputs, natural farming utilizes methods like crop rotation, use of green manures and compost and biological pest control.
3. **Additional Practices:** Natural farming systems can be complemented with practices like crop rotation (planting different crops sequentially), mulching, intercropping (planting different crops simultaneously in a field) and seed soaking with liquid manure, to increase the yields in a field.



FERTILITY FARMING:- In 1951, Newman Turner advocated the practice of "fertility farming", a system featuring the use of a cover crop, no tillage, no chemical fertilizers, no pesticides, no weeding and no composting.

RISHI KHETI :- In India, natural farming of Masanobu Fukuoka was called "Rishi Kheti" by practitioners like Partap Aggarwal. The Rishi Kheti use cow products like cow dung, butter, milk, curd and its waste urine for preparing growth promoters. The Rishi Kheti is considered to be non-violent farming without any usage of chemical fertilizer and pesticides. They obtain high quality natural or organic produce having medicinal values.

ZERO BUDGET NATURAL FARMING:- Prime Minister Modi announced on 19th November 2021 that the new farm laws enacted in 2019 was repealed in the winter session of Parliament. He also added that the government has decided to implement zero-budget natural farming. Subhash Palekar, an Indian farmer from the village of Belora in the district of Amravati in the Vidarbha region of Maharashtra, came up with the "Zero Budget Natural Farming" model.

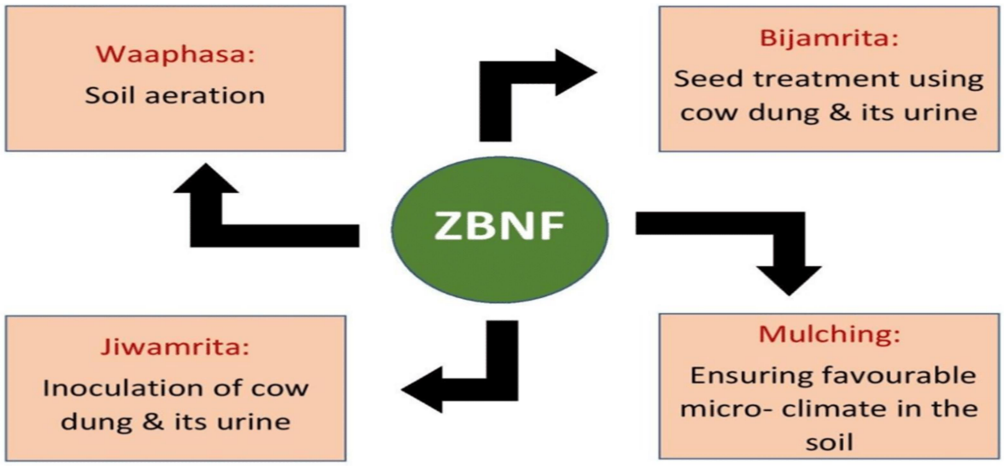
Zero budget natural farming is a method of chemical-free agriculture drawing from traditional Indian practices. It is a unique model that relies on Agro-ecology. It aims to bring down the cost of production to nearly zero and return to a pre-green revolution style of farming.

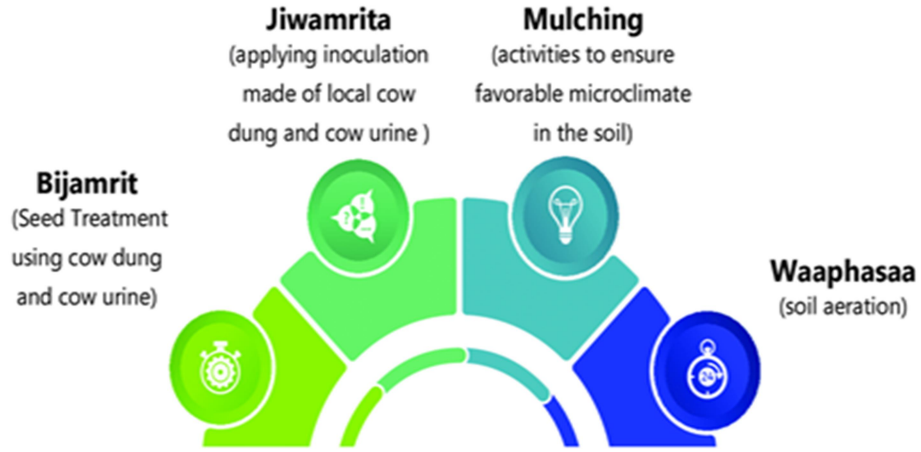
The word zero budgets mean no credit or no expenses, without any credit and without spending any money on purchased agricultural inputs. Another term natural farming is a method of chemical-free agriculture drawing from traditional Indian practices. In other sense, natural farming shows the importance of the synergistic effect of both plant and animal products on crop establishment, to build soil fertility and microorganisms (smith *et al*., 2020).

Pillars of ZBNF

Concerning soil fertility, soil microbes play an important role, they involve in a nutrient cycle like C & N cycle which are required for plant growth (Lazarovits, 1997). Four main pillars run the ZBNF cycle. (Palekar, 2014).

Scientific Innovation Magazine
ISSN : 2584-1157





1. **Jivamrita/Jeevamrutha:** Microorganisms play an important role in the conversion of unavailable forms of nutrients to available form in the plant root zone. The microbes present in jeevamrutha helps nonavailable form to dissolved form when it is inoculated into the soil. It also helps as antagonism to (biological control) pathogens (Glick & Bashan, 1997). PGPR, cyanobacteria, and Solubilizing Bacteria (PSB), mycorrhizal fungi, Nitrogen-fixing bacteria are some important microbes present in the product (Chen *et al*.,1995). it requires 20 kg cow dung, 5-10 litre urine, 2 kg dicot flour are well mixed and this add-in irrigation tank at regular intervals of 15 days until the soil is enriched or spray 200 litre of jeevamruth twice in a month. It provides nutrients, microbial population, and helps to prevent fungal and bacterial plant diseases. It requires only 1st three years cycle after that system that self sustaining.

According to Mr. Palekar, only one cow is needed for 30 acres of land that should be a local desi cow not imported Jersey or Holstein because of imported cow dung and urine contains more pathogens and desi cow dung contains 300 to 500 crores of effective beneficial microbes.

2. **Bijamrita:** It is composed of 20 litre water, 5 kg cow dung, 5 litre urine 50 g lime, and a hand full of soil are thoroughly and store in a tank. It is used as a seed treatment, contains naturally occurring beneficial microorganisms. Research studies showed that inoculating with bijamrith to protect the crop from harmful soil-borne pathogens and young seedlings roots from fungus and soil-borne and seed-borne diseases also help to produce IAA and GA_3 (Sreenivasa *et al*., 2010).

3. **Acchadana/Mulching:** Mulching is of three types followed, they are straw mulch, soil mulch, and live mulch. The growth of cover crops like legumes helps to reduce the weed population and increases water infiltration capacity. By their root nodules fixes atmospheric N into the soil which helps N supply to crops. From these residues retention on the surface of soil increases the microbial degradation process and liberation of N from nitrification. It also supplies organic matter to the soil which contains many micro and macronutrients. Improves seed germination without soil plowing, reduce soil temperature in extreme condition, and increase soil temperature during winter. It conserves soil moisture by reducing evaporation loss of water from the soil layer and retains water for a longer time.

4. **Whapasa – aeration:** The main concern here is conserving water and the precise application of water-based on crop water requirement. Application of water in alternative furrows because of all roots of plants not absorb efficiently, younger horizontal and vertical roots absorb more amount of water than older one and nutrients by older roots. In soil, out of soil mineral and organic matter, there is an equal proportion of water and air present. If a higher amount of water application leads to hold air space in the soil and plant suffers oxygen deficiency it may lead to cause death of plants except waterloving plants like rice. The soil aeration also an important parameter to plant growth so application interval should be longer.

Scientific Innovation Magazine
ISSN : 2584-1157

Benefits of ZBNF

- The cost of production in ZBNF is zero as farmers don't require buying any inputs.
- It consumes only 10 percent of the water that crops consume in conventional methods.
- One cow can produce 10-12 kg fresh dung and it is sufficient to 30 acres of land in one month.
- Higher significant yield found under ZBNF in different cash as well as food crops E.g. 11 % and 40 % high yields of cotton and gulli ragi in ZBNF plots than in non - ZBNF plots.
- Farm input costs are nearly zero or negligible as no fertilizers and pesticides are used.
- ZBNF farms were able to withstand a long time under drought and flood situations.
- Planting more crops and border crops on the same piece of land provide extra dividend and as nutrient sources.

Overall concerning about ZBNF, there is reduced use of water and electricity bill, improved farmers health, maintaining local ecosystems and biodiversity, not leave any toxic residue in the environment, improvements in soil, biodiversity, livelihoods, water, climate resilience, women's empowerment and nutrition.

Difference between organic farming and natural farming

S.No.	Organic farming	Natural farming
1.	Manures like FYM, oilcake, Organic fertilizers compost - vermicompost, dung manure, dung slurry, etc. are used and added to farmlands from external sources.	Decomposition surface retained crop residues as organic matter by microbes and earthworms is encouraged, which gradually releases nutrition in the soil, over the period.
2.	Still, it requires basic agricultural practices like plowing, tilting, mixing of manures, physical weed management, etc. to be performed.	There is no plowing, no tilting of soil and no fertilizers, and no weeding is done just the way it would be in natural ecosystems. It replaced by growing of intercrop, mixed crop mulching, etc
3.	It is still expensive due to the requirement of bulky organic manures as an external source, and it has an ecological impact on surrounding environments.	There is no external source and one of the extremely low - cost farming methods, completely molding with local biodiversity.
4.	It affects the surrounding environment.	It does not & well adopt with local biodiversity, eco - friendly
5.	Certification is mandatory when selling	No need for certificates to grow and

	organic products.	sell natural farming products
6.	Conversion of land from chemical farming to organic requires more 3 to 6 years depends on soil health.	There is no period to converting chemical farming to natural farming but yield stability or gaining benefit starts after the 3-year cycle.
7.	In organic farming, organic fertilizers and manures like compost, vermi-compost, cow dung manure, etc. are used and added to farmlands from external sources.	In natural farming, neither chemical nor organic fertilizers are added to the soil. In fact, no external fertilizers are added to soil or give to plants whatsoever.
8.	Agro practices: Organic farming still requires basic agro practices like ploughing, tilting, mixing of manures, weeding, etc. to be performed.	In natural farming there no ploughing, no tilting of soil and no fertilizers, and no weeding is done just the way it would be in natural ecosystems.
9.	Organic farming is still expensive due to the requirement of bulk manures, and it has an ecological impact on surrounding environments.	Natural agriculture is an extremely low-cost farming method, completely molding with local biodiversity.

Role of Natural farming in fruit crops:

1. **Mango**

- Growing of legumes for green manuring or as inter / cover crops as per requirement in young orchards.
- Application of organic manures (30-40 kg/tree) through NADEP, vermin/biodynamic after fruit harvest in trench 1.5 meter away from the trunk in 10 or more than 10 years old trees.
- Mulching after application of 100 g Cow Pat Pit (CPP,) spraying of cow horn manure (BD-500) / 3% of Panchagavya/ 20% Jeevamrita/Amritpani.
- Two foliar spraying of biodynamic liquid manures/ vermi-wash at the interval of 15 days after fruit harvest for proper growth and development.

2. **Citrus**

- Fertilization in citrus is a cultural practice with great importance as it affects significantly the quality of fruit.

- The effects of organic versus conventional farming systems on internal and external characteristics of citrus, with particular emphasis on vitamin C content.
- Fruits of different orchards were harvested at physiological maturity and showed that mineral fertilization led to fruits with greater weight and diameter, a thicker peel and a more intense colour.
- Fruits from organic farming had more soluble solids and a lower maturation index as compared to conventional production.
- The highest concentrations of vitamin C were in fruits from organic farming, but the response depended on species and cultivar.

CONCLUSION:

- The modern form of natural farming is new concept. However, it is being popular in the world speedily especially in developed countries.
- Natural farming system is an alternative and appropriate management system would help to improve soil health environment thus increase the productive levels and improve quality of fruit crops.
- India has tremendous potential to grow crops & fruit naturally and emerge as a major supplier of organic products in the world's organic market.

REFERENCES:-

Ayansina, A.D.V. and Oso, B.A. 2006. Effect of two commonly used herbicides on soil microflora at two different concentrations. African Journal of Biotech 5, 129-132.

Chen, C., Bauske, E.M., Musson, G. and Rodríguez, K.R. 1995. Biological control of Fusarium wilt on cotton by use of endophytic bacteria Biological Control, 5, 83-91.

Glick, B.R. 1995. The enhancement of plant growth by free-living bacteria. Can. J. Microbiol, 41, 109-117.

Glick, B.R. and Abd Bashan, Y. 1997. Genetic manipulation of plant growthpromoting bacteria to enhance biocontrol of phytopathogens. Biotech Adv., 15, 353-378.

Intawongse, M. and Dean, J.R. 2006. Uptake of heavy metals by vegetable plants grown on contaminated soil and their bioavailability in the human gastrointestinal tract. Food Additives and Contaminants. 23, 36-48.

Lazarovits, G. 1997. Rhizobacteria for improvement of Plant Growth and Establishment. HortScience., 32, 188- 192.

Palekar, S. 2014. http://www.palekarzerobudgetspiritual farming.org.

Singh, J.S., Pandey, V.C. and Singh, D.P. 2011. Efficient soil microorganisms: A new dimension for sustainable agriculture and environmental development. Agri Eco Envi., 140, 339-353.

Smith, J., Yeluripati, J., Smith, P. and Nayak, D.R. 2020. Potential yield challenges to scale-up of zero budget natural farming. Nature sustainability, Analysis: 1-6.

Sreenivasa, M.N., Naik, N.M. and Bhat, S.N. 2010. Beejamruth: A source for beneficial bacteria. Karnataka J Agric Sci., 17, 72-77.