

Natural Farming in India: Concept and Current Scenario

S.R.K. Singh¹, Sushil Kumar², Gyanendra Pratap Tiwari² and Sarvesh Tripathy³

1. Director ICAR-ATARI, Zone IX, Jabalpur

2. Subject Matter Specialist, Krishi Vigyan Kendra, Jaora-Ratlam-457340

3. Senior Scientist & Head, Krishi Vigyan Kendra, Jaora-Ratlam-457340

Corresponding Author's Email : sarveshtrpathy@gmail.com

ABSTRACT

Agriculture is an important sector in India. Most of the farmers heavily depend on inorganic external chemical inputs such as fertilizers and pesticides that contaminate groundwater and other water dependent ecosystems, reduce soil fertility over time. The continuous use of pesticides and chemicals is a serious problem for the health of farmers across India. Hence, the only approach to deal with this ever rising problem is natural farming. Natural Farming is a chemical free traditional agro-ecology based diversified farming system, popularly known as zero budget natural farming, is an innovative farming approach. It is low input based, climate resilient and low cost farming practices as all the inputs (insect repellents, fungicides and pesticides) are made up of natural herbs and locally available inputs, thereby decreasing the use of non-natural fertilizers and industrial pesticides. In recent years, several countries, including India, have deduced the potential of natural farming and have taken steps to promote its adoption. The principal methods of natural farming include crop rotation, green manures and compost, biological pest control and mechanical cultivation. Mainly, there are four pillars of Zero Budget natural farming i.e. Jivamrita , Bijamrita , Acchadana (Mulching) and Whapasa. Shri Subhash Palekar, the person behind the origin of concept of Zero Budget Natural Farming (ZBNF) also suggested use of Sour buttermilk (Khatti Lassi) and Sonthastra as Fungicides and use of Agniastra, Brahmastra, Neemastra, Dashparni ark. Saptdhanyankur ark for imparting shining in fruits, vegetables and seeds.

Keywords: Agroecology, Acchadana, Beejamrit, Jeevamrit, Natural farming, Soil fertility.

INTRODUCTION

Ministry of Commerce (2021) reported that India's share increased to 2.1 per cent in 2019 from 1.71 per cent in 2010 in world agricultural exports. In 1960s, the country achieved its significant agricultural growth after Green Revolution. The main aim of Green Revolution technology in India was to increase agricultural production mainly by substituting typically hardy plant with high-response and hybrids varieties, use of fertilizers and plant protection chemicals, irrigating more cultivated land by investing heavily on large irrigation systems and merging of agricultural holdings (Sebby, 2010). The mono cropping system, increased the frequent use of fertilizers and pesticides which caused considerable damage to the soil's biological operation, crop diversity, increased cost of cultivation, deteriorated groundwater level, loss of flora-fauna, increased human diseases and

decreased soil fertility. As a concern, farmers with small farms invest in these costly inputs exposed to high financial risks and pushed them in the debt cycle (Eliazer *et al.*, 2019). People have become aware about the possible ill effects of polluted air, water and food due to excessive use of chemical fertilizers and pesticides for crop production (Conway and Pretty, 1991). Disproportionate uses of chemical fertilizers and pesticides have caused impaired food safety and quality and adverse effect on human and animal health (Musa, 1976). Concerns over these problems in sustainability of environment and agriculture prompted scientists to reevaluate the modern chemical farming systems and seek appropriate alternative practices to ensure more sustainable food production and environment maintenance. Recently organic agriculture has received more attention all over the world (Hasumi, 1991; Lampkin, 1990; Rasmussen, 1995). In addition

to organic agriculture, natural farming is also gaining popularity in India.

Padam Shri awarded agriculturist Subhash Palekar suggested a chemical-free and climate-resilient method of farming during 2006 in India, in Maharashtra to end the problems arising after the Green Revolution by introducing the concept of Zero Budget Natural Farming (ZBNF). This method was popularized when farmers started adopting it and there after many scientists and researchers found that natural farming is a good substitute to chemical farming that directly or indirectly impacts sustainable development positively (Tripathi and Tauseef, 2018). The aim of natural farming is to lower the cost of production to almost zero (Khadse et al., 2017). The central government has applied a policy to encourage farming methods throughout India.

Natural Farming (NF) is a unique chemical-free farming/ agro-ecological diversified farming method which is based on the philosophy of working with natural cycles and processes of the natural world (Fukuoka, 1985). This also includes crops, trees, livestock and promoting functional biodiversity. In India, Natural farming is promoted as Bharatiya Prakritik Krishi Paddhati Program under centrally sponsored scheme – Paramparagat Krishi Vikas Yojana. Natural Farming has two major axes, one agronomic and the other structural. On the other hand, it is about improving soil fertility by relying of 'natural products' (Jeevamrutha, Bijamrita and Neemastra), adopting intercropping and mulching (Palekar, 2006) rather than spending money on synthetic agrochemicals such as pesticides and fertilizers.

Natural Farming opposes use of external inputs or synthetic fertilizers. On the other hand, Natural Farming is about de-linking farmers from external inputs and credit markets to create autonomy by not purchasing anything from external actors and especially from corporations (Rosset and Martínez-Torres, 2012). The main aim of these natural approaches is to enhance soil quality by maintaining organic matter and its microbial

community. Natural farming allows a wide range of sustainable practices such as composting, mulching, crop rotation, intercropping, green manuring and livestock integration which creates a holistic system of farming which is self-regulating and sustainable. Among various methods, the of natural farming, the most popular one is Zero Budget Natural Farming. Data from National Sample Survey Office show that more than 50% of the farmers are in debt due to the high cost of farm inputs such as fertilizers and pesticides. To realize the goal of increasing farmers income, the farm expenditures are need to be brought down and natural agricultural practices such as ZBNF have to be encouraged to reduce dependence of farmers on the external expensive inputs.

Four wheels of Zero Budget Natural Farming

Four wheels of Zero Budget Natural Farming are Bijamrita, Jeevamrutha, Acchadana (Mulching) and Whapasa, which are the integral part of the method (Table 1). The detail illustration is as follows:

Bijamrita or microbial coating of seeds, seedlings or any plant material using cow dung and urine based formulations (a seed treatment); it protects the crops from harmful soil-borne pathogens and young seedlings from soil-borne and seed-borne disease. It also contains growth hormones like IAA and GA3 (Sreenivasa *et al.*, 2010)

Jeevamrutha is a fermented microbial culture made with cow dung, cow urine, jaggery, pulse flour, water and natural /forest soil. The application of which is said to provide nutrients, promote the activity of soil flora and fauna like microbial and earthworm activity, and helps to prevent fungal and bacterial plant diseases. It is suggested that Jeevamrutha is only needed for the first 3 years of the transition, after which the system becomes self-sustaining (Sreenivasa *et al.*, 2010). For those farmers who do not have access to water or labor, a dry version of Jivamrita called Ghanajivamrita is prescribed; this can be prepared once and stored for a year.

Contrary to conventional agriculture, Palekar believes that the soil already has all the nutrients necessary for plant growth, and thus no external inputs need to be added; instead, the existing nutrients have to be “unlocked” and made bioavailable via jiwamruta (Palekar, 2005) - this idea is called Annapurna by Palekar.

Acchadana or mulching (soil, straw and live) applying a protective layer on the soil surface in order to prevent water evaporation, and contribute to soil humus formation; it also creates microclimate suitable for microbial growth which is essential for humus formation and nutrient transformation in monocotyledons (like millets- which provide

nutrients like potash or phosphate) and leguminous dicotyledons (like beans help in nitrogen-fixing) (Palekar, 2006). Straw mulching is also promoted, using dry crop residue which prevents the requirement for weeding-related labor.

Whapsa, or soil aeration through a favourable microclimate by reducing irrigation or irrigation during noon. Palekar (2006) says that watering of plant, only when the sun is high at noon for optimum whaaphasa formation. Palekar claims that up to 90 per cent of water use can be reduced through ZBNF practices making it ideal for rain-fed farming.

Table 1
Basic Pillars of ZBNF

Sr. No.	Methods	Preparation	Benefits
1	<i>Jivamrita</i>	For (1acre) It is made from cow-dung (10 kg), urine (5-10 litre), jaggery (1kg) and flour (1kg) and is applied to crops with each irrigation cycle.	It provides nutrients and promotes activity of microorganisms in soil and protect against pathogens.
2	<i>Bijamrita</i>	For (10Kg Seed) it is basically made up of water (2litre), cow dung (500gm), urine (500ml), lime (5gm) and a little quantity of soil.	It is used for seed treatment, protecting young roots from fungus as well as from soil and seed-borne diseases.
3	<i>Acchadana-Mulching</i>	It can be done by soil mulch, straw mulch.	Produces humus, conserves top soil, increases water retention, encourages soil fauna, prevents weeds
4	<i>Whapasa moisture</i>	The irrigation should be reduced and irrigation should be practiced at noon in alternate furrows.	It Increases water availability, water use efficiency, increase resilience to drought

(Bharucha et al. 2020)

Palekar (2015) also prescribes a number of natural fungicides and pesticides made from locally sourced ingredients like neem leaves, chilies, garlic, tobacco, sour buttermilk (Khatti Lassi), Sonthastara etc. as mentioned in Table 2.

As mentioned in Table 3, for pest

management Agniastara, Brahmastra, Neemastra and Dashparni ark are used. Further, Panwar et al., (2013) says that Jungle kikandi is used as gibberellic acid while Saptdhanyankur ark is used for enhancing shining in fruits, vegetables and seeds as mentioned in table 4.

Table 2
Fungicides in ZBNF

SNo.	Name of fungicide	Composition	Benefits
1	<i>Sour Butter Milk (Khatti Lassi)</i>	For (1acre) It is made from <i>Sour Butter Milk (KhattiLassi)</i> (5 litres), Water (200 litres) then mixed and applied to crops by irrigation.	It acts as a fungicide.
2	<i>Sonthastar</i>	Dry Sonth 200 gram, Desi cow milk (5 litre), Water (200 litre)	It acts as a fungicide.

(Palekar, 2015)

Table 3
Pest Management in ZBNF

Sr. No.	Name of Pest Management Formulae	Composition	Benefits
1	Agniastra	It composed of 20 litres Local cow urine, 500 gm Tobacco, 500 gm of Green Chilli, 500gm of Local Garlic, 5kg Neem leaves pulp (crushed in urine). For 1acre spraying, 6-8 litresAgniastra left after boiling is taken in 200 litres water.	It is effective against the pests like leaf roller, stem borer, fruit borer, and pod borer.
2	Brahmastra	It composed of 10 lit local cow urine, 5 kg Neem leaves, Guava, Mango, Neem and Castor (Eranda) leaves pulp crushed (2-2 kg each). It is prepared by crushed and boiled in desi cow urine. For 1acre 2.5-3 litres solution mix in 200 lit water and used as spray.	It is used to control all of sucking pests, fruit borer, and pod borer.
3	Neemastra	It is made up of local cow urine (5 litres), cow dung (5 kg) and neem leaves (5 kg) water (100 litres). It is prepared by mixing all materials and use after 48-72 hours for 1acre.	It is used for sucking pests and mealy bug.
4	Dashparni ark	It composed of 200 litres Water, 20 litres local cow urine, 2 kg Cow Dung, 500 gm Turmeric powder, 500gm ginger paste, 200 gmAsafoetida (Heeng) Powder, 1kg Tobacco powder, 1 kg of Green Chilli paste, 1 kg Garlic paste, 2-2 kg Leaves of 10 plants Castor (Eranda), Neemkarang, Custard apple, Bael, aak, datura, mango, guava, marigold, turmeric. Then mix all material then use this solution for 1acre after 28 days.	It is used to control all of sucking pests

(Palekar, 2015)

Table 4
Other formulations in ZBNF

SNo.	Name of Formulae	Composition	Benefits
1	Jungle kiKandi	One year old cow dung cake 15 kg and 50 litres of water. Mix well in drum and place in shade for 4 days and spray the solution for 1 acre after four days in 200 litres of water.	It acts as growth promoter (gibberellic acid).
2	Saptdhanyankur ark	100 gm of each sesame, green gram, black gram, lobia, coffee, mash, wheat seeds. Soaked and sprouted seeds of these are crushed in 200 litres of water & place it for 2 hrs. After 2 days drain out solution out of it and spray within 48 hrs in 1 acre area in 200 litres of water.	It develops shining in fruits, vegetables and seed crops.

(Panwar et al. 2013)

Principle of Natural Farming:

Natural farming is an ecological farming system based on sound agronomic husbandry. It is the predominant certified organic farming method in India, gaining recognition around the world for its emphasis on food quality, soil health, pest control, and related sustainable farming topics. The breakdown of organic matter by microorganisms

and earthworms is fostered right on the soil surface itself in natural farming, which gradually provides nutrition to the soil over time. The basic principles of natural farming is as follow-

1) No or minimum soil disturbances: That is, no or minimal ploughing or turning of the soil. For centuries, farmers have assumed that the ploughing is essential for growing crops. Though, minimal soil

disturbance is fundamental to natural farming. The earth cultivates itself naturally by means of the penetration of plant roots and the activity of microorganisms such as small animals and earthworms.

2) No chemical fertilizer/pesticides: Human beings/Farmers interfere with nature and try as they cannot heal the resulting wounds. Their offhand farming practices trench the essential nutrients from soil and the result is yearly depletion of the land. If left to itself, the soil maintains its fertility naturally, in accordance with the orderly cycle of plant and animal life. The sensible method to disease and insect control is to grow vigorous crops in a healthy environment.

3) Managing weeds without chemicals: Weeds play important role in constructing soil fertility and in balancing the biological community. As a fundamental principle, weeds should be not eliminated but it can be controlled.

Scope of Natural Farming:

As per Niti Aayog member Ramesh Chand, India can double the acreage of chemical-free farming to 15% immediately and grow it to 30% by 2030. Natural farming, with its emphasis on sustainable and eco-friendly practices, holds significant promise for the future of agriculture and its role in a balanced ecosystem. There are many working models of natural farming all over the world, the zero budgets natural farming (ZBNF) is the most popular model in India. In broad terms, Natural Farming can be considered as a prominent strategy to save the planet Earth for future generations ensures better health and it has the potential to manage the various farmland practices and hence sequester the atmospheric carbon in the soils and plants, to make it available for plants. Natural Farming ensures better health, rejuvenates soil health, improved agro-biodiversity as well as helps in the changes in soil structure with the help of organic carbon, no/low tillage and plant diversity are supporting plant growth and also natural farming impacts many farmers positively by imparting resilience to the crops against weather extremities

Importance of Natural Farming:

Several studies have reported that the effectiveness of natural farming is in terms of increase in production, sustainability, saving of water, improvement in soil health and farmland ecosystem. The main objectives of Natural farming is to increase farmer's income by maximizing production factors such as labor, soil, equipment and by avoiding the use of fertilizer, herbicides and pesticides to optimize production potential and thus provide abundant, high quality, healthy food at the best price. The ideal rule is to enrich the level of organic matter into the soil, which supports microbial life, and therefore the soil's fertility. On the other hand, conventional farming does not aim to optimize yields through the use of inputs, which requires extensive cultivation over larger areas to produce the desired quantities and destroys the quality of soil rather than preserving and improving. The important step in natural farming are conservation of crop diversity, no tillage, watershed management, efficient water management, integrated nutrient management, integrated weed management, integrated pest management and crop diversification

Current Scenario of Natural Farming in India:

Natural farming is a chemical free farming method utilizing livestock based and locally available resources. In India, many states have already adopted natural farming practices in their farming system and have developed successful models. Currently, natural farming is adopted by eight states of the country, viz. Andhra Pradesh, Chhattisgarh, Kerala, Himachal Pradesh, Jharkhand, Odisha, Madhya Pradesh and Tamil Nadu. As of now, more than 38 lakh hectares of land under natural farming across India, 17.31 lakh hectares is under cultivation in [Madhya Pradesh](#) alone. It is evident that Natural Farming lowers the need for man-made inputs and instead delivers a style of farming that is less expensive financially and is climate resilient by enhancing the ecological conditions in each and every site (Veluguri *et al.*, 2021).

CONCLUSION

Due to declining share of pie and poor returns to the farmer, and food and nutritional insecurity of the farmer among others and poor agricultural production, widening gap between agricultural and non- agricultural sector, agricultural debt being non-serviceable as also being inadequate and untimely, increasing risk and vulnerability is real. According to the present situation the only solution is Natural Farming, which has undoubtedly made an indelible mark on farming in India that resonates with principles of

agro ecology and addresses the concerns of the twin-dimensions of the risk. The most adopted and popular practice among the farmers is the use of Jeevamrutha, beejamrita and other plant protection materials. Natural Farming has increased market price of the product as it is popular for low carbon diet and also has reduced the input cost. The concept behind this farming is that, soil is Annapurna (rich in nutrients) and it doesn't require anything from outside. So by adopting this farming every individual of the country will be able to get chemical free food and save the people from many diseases and improve soil health.

REFERENCES

- Bharucha Z P, Sol Bermejo Mitjans & Jules Pretty (2020). Towards redesign at scale through zero budget natural farming in Andhra Pradesh, India. *Inter. Journal of Agricultural Sustainability* 18(1): 1–20.
- Conway G.R. and Pretty J.N. (1991). *Unwelcome Harvest: Agriculture and Pollution*. Earthscan Publications Ltd, London.
- Eliazer NAR, Ravichandran K, Antony U. (2019). The impact of the Green Revolution on indigenous crops of India. *J Ethn Foods* 6 (1):1–0.
- Fukuoka M (1985). *The Natural way of farming. The theory and practice of Green Philosophy*. The Japan Publications, INC., Tokyo. p 227
- Hasumi T. (1991). *Devotions to Organic Agriculture*. Nippon Keizai Hyoronsha, Tokyo, 357pp.
- Khadse, A., P. Rosset, H. Morales, and B. G. Ferguson. (2017). Taking agroecology to scale: the Zero Budget Natural Farming peasant movement in Karnataka, India. *The Journal of Peasant Studies*, 1–28.
- Lampkin N. (1990). *Organic Farming*. Farming Press, Ipswich, UK. pp.557-573 & 608-610.
- Ministry of Commerce (2021). *Agriculture in India: Information about Indian Agriculture and Its Importance*. Available online at: .
- Musa S. (1976). *Horrible Food Pollution*. Kodansha, Tokyo, 220 pp.
- Palekar, S. (2005). *The philosophy of spiritual farming I*. 2nd ed. Amravati: Zero Budget Natural Farming Research, Development and Extension Movement, Amravati, Maharashtra, India.
- Palekar, S. (2006). *The principles of spiritual farming II*. 2nd ed. Amravati: Zero Budget Natural Farming Research, Development and Extension Movement, Amravati, Maharashtra, India. [http:// www.vedicbooks.net/principles-spiritual-farming-volume-p-14779.html](http://www.vedicbooks.net/principles-spiritual-farming-volume-p-14779.html).
- Pawar VR, Tambe AD, Patil SP. (2013). Effects of different organic inputs on yield, economics and microbial count of Sweet Corn (*Zea mays* Var. *Saccharata*). *Eco. Environ. Conser.* 19(3):865-868.
- Rasmussen J. and Ascard J. (1995). Weed control on organic farming systems. pp. 49-67.
- Rosset, P.M., and M.E. Martínez-Torres. (2012). Rural social movements and agroecology: context, theory, and process. *Ecology and Society* 3, no. 17 [online].
- Sebby, K.. (2010). *The Green Revolution of the (1960)'s and Its Impact on Small Farmers in India*. Environmental Studies Undergraduate Student Thesis. Available online at:
- Sreenivasa, M.N., Nagaraj M. Naik and Bhat, S.N. (2010). Beejamruth: A source for beneficial bacteria. *Karnataka J. Agric. Sci.*, 17(3): pp.72-77.
- Tripathi, S., and Tauseef, S. (2018). *Zero Budget Natural Farming, for the Sustainable Development Goals*. Andhra Pradesh.
- Veluguri, D., Bump, J. B., Venkateshmurthy, N. S., Mohan, S., Pulugurtha, K. T., & Jaacks, L. M. (2021). Political analysis of the adoption of the Zero-Budget natural farming program in Andhra Pradesh, India. *Agroecology and Sustainable Food Systems*, 45(6), 907- 930.
- Vogtmann H. (1984). *Organic farming practices and research in Europe*. pp19-36.

.....