

Review Article

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Natural Farming: New Horizon of the Agricultural Sector

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ABSTRACT

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Chemical farming is not good for the soil health and the soil is becoming unfertile day by day. Chemical farming also harms to the environment. People's health is also deteriorating due to chemical farming product. Such farming is also causing economic loss to the farmers so the natural farming is only way to recover from this type of severe problems. Most of the things in natural farming are made by the farmers using the residue of their farms and animal husbandry. The four main principles used in natural farming are Bijamruta, Jivamuta, Achhadan and Wapsa. In natural farming, different leaf extracts are used for pest control. Thus the quality of farm produce is also increased as the farm is completely chemical free.

Introduction

The policy of new liberalization of India's economy is inaccessible and costly for small and marginal farmers to privatized seeds, pesticides and farm implements. Expensive hybrid seeds, pesticides, rising fuel costs and volatile market prices are currently a major concern for Indian farmers. Small and marginal farmers having debt and many farmers are committing suicide because of it. This is a big problem for Indian farmers and a serious issue for the agro-industry. People's health is also deteriorating due to chemical farming. In view of the harmful effects of chemical farming, the newly introduced

agricultural technology among the farmers is Natural Farming, also called Zero Budget Natural Farming (ZBNF). It had its first success in India, especially in Karnataka where it was first developed (Kumar, 2016) and is now spreading rapidly across in India. Natural farming is a new approach of farming where the cost from growing the plants to harvesting is minimum. Natural farming promises to reduce farmers' dependence on farm credit and production costs and ending the debt cycle for frustrated farmers. Thus in natural farming farmers cultivate using the residue of their own farm and animal husbandry. So that farmers do not have to take expensive seeds, pesticides from market.

This method of farming was introduced by Shri Subhash Palekar for which he was awarded Padma Shri in 2016. Subhash Palekar natural farming campaign was started in the state of Karnataka by the Karnataka's Rajya Raita Sangha (KRRS). Subhas Palekar was trained in natural farming by Tao in this campaign and most of the farmers of the Sangha were engaged in natural farming and encouraged other farmers to do natural farming as well. In which a model farm has been prepared by the progressive farmers of the union who are seeing other farmers taking inspiration to do such farming. It can be said that the farmers of the organization are promoting natural farming and trying to reach out to every farmer in the state. Palekar was invited for training in this state of Gujarat during the year 2019 by the state government in which seven farmers from each block and one ATMA project staff were trained and this training programme was live broadcasted through BISAG. One farmer from each village of Gujarat state prepared as master trainer and they are promoting natural farming on their own villages.

What is natural farming?

The concept of natural farming was put forward by Mr. Subhas Palekar. Mr. Subhas Palekar is a native of Amravati, a small village in the state of Maharashtra. Palekar is also entitled as "Krishi Ka Rishi" by many farmers of Mysore. Primary success in Andhra Pradesh is encouraging. Who conducted experiments on his farm and stated that the constant use of chemicals affects the fertility of the soil and makes the farm unfertile. In 1966-88, Palekar conducted many experiments on his farm and after a lot of hard work, he introduced natural farming to the farmers in which he showed that barren land could be recovered by using the dung and urine of Deshi (Indian) cows. So he prepared a solution using cow dung, urine,

pulse flour, jaggery and fertile soil which was given the name Jivamruta by him. The cow having less milk production, the more beneficial its dung is towards soil regeneration (Babu, 2008). One acre of land requires 10 kg of dung per month. The average cow gives 11 kg of dung per day, so dung from one cow can be enough to fertilized in 30 acres of land per month (Palekar, 2014). Thus the cost of farming is reduced.

Saurabh Tripathi *et al.*, (2018) revealed that natural farming is resource efficient as it minimises the use of financial and natural resources while increasing crop yield. By restoring the quality of soil and water-related ecosystems, it decouples agricultural productivity and growth from ecosystem degradation and biodiversity loss.

The big problem for Indian farmers is that they are constantly mired in debt due to high production costs. In such times natural farming will help farmers to overcome their dependence on loans and sharply reduce production costs so that a ray of hope appears in the mental stress of farmers (Mural, 2016). Palekar has written and published books in 60 different languages. As mentioned four pillars in natural farming are basically, Bijamrut, Jivamut, Achhadan and Vapsa which are mentioned in the table 1.

Palekar also gave the formulas of Agnistras, Brahmastra, Nimastra for pest control, which are mentioned in Table 2.

Other important principles are intercropping, Contours and bunds, local species of earthworms. which are mentioned in Table 3.

Panwar *et al.*, (2013) reported that the use of FYM 5 t / ha + vermicompost 2.5 t / ha + jivamruta 2 times (30 and 45 days) has resulted in significant increase in production

of sweet corn and green fodder. Jannora *et al.*, (2014) reported that the use of organic fertilizers increased nodules, plant weight, photosynthesis rate, nitrogen fixation as well as nitrogen levels in many crops. Ramesh and Rao (2009) have also reported that organic nutrition can maintain soil health due to various micro-organisms in the soil. Rao *et al.*, (2013) observed that the mobility of various soil fertility parameters such as soil organic carbon, available phosphorus, available potassium was observed to significantly increase the use of organic manure in maize and sunflower crops. Khadse *et al.*, (2017) surveyed 97 farmers who adopt natural farming and the reasons for adopting subsistence farming include family health (54%), environmental factors 2%, reduction in production costs (38%), reduction in financial debt (30%) and many other reasons. Reduces pathogen infestation by up to 3%, production costs by 21% and credit requirements by 93%. The Andhra Pradesh government (GOAP) had invited Palekar to conduct training camps in January, 2016 and September 2016. 48565 farmers were participated for natural farming training. GOAP, 2017 reported that paddy production in natural farming increased to 6416 kg / ha as compared to 5816 kg / ha in non-natural farming. And the cost has been reduced to 5000-15000, so the net additional income from natural farming in paddy is 14000-25000 kg / ha. The highest positive balance of soil nitrogen was associated with application of neem leaf manure followed by neem leaf manure + Panchagavya spraying. Reduced losses of N from neem leaf manuring due to presence of nitrification inhibitors in neem leaf manure. Nitrification inhibiting alkaloids released from neem leaf manuring checks the faster rate of N mineralization (Srinivasulu Reddy, 1988). Tiftonell and Giller, (2013) revealed that the right Natural Farming strategy in a country, a precise understanding of yield, efficiency and/or product quality and

value gaps, i.e., how large they are, where they occur, and what their biophysical and socioeconomic causes are, is needed at sub national and local levels. Progress has recently been made in establishing better methodologies for yield gap analysis, mapping the yield gaps of major crops at global and regional scales, and understanding their different contexts. Although this is encouraging, a lot more remains to be done to obtain a deep understanding of yield and efficiency gaps in the world's major agricultural systems, at a scale that enables people to use this knowledge for concrete action in farmers' fields. Advantages of natural farming has low cost, no chemical consumption, use of local seeds, low water requirement, zero budget facilitates income throughout the year and reduces risk. It is also mentioned here that natural farming exemplifies agro-ecology. A survey conducted by suggests that natural farming not only works from an agronomic point of view, but also brings a variety of social and economic benefits. Most of the adopters respond that by using natural farming, they have seen improvements in yield, soil conservation, seed diversity, product quality, domestic food autonomy, income and health.

Palekar does not use the term 'agroecology' for natural farming. Yet we believe that natural farming exemplifies the principles of agricultural science. As La Via Campesina points out. A number of names exist for natural farming. It is based on almost all the same principles. We are concerned with the key ecological and political principles that underlie Natural Farming, and we find those to be consonant with agroecology (La Via Campesina 2013).

Because agroecology is based on careful observation of ecological processes. Natural farming does not support local farming which includes a cropping system that may involve

different types of inputs. Every farmer should adopt the principles of natural farming through their own cultural and ecological context (La Via Campesina, 2013). While

natural farming promotes the substitution of chemical inputs with others (Rosette and Altieri, 1997).

Table.1 Basic pillars of natural farming

Sr. No.	Method	Preparation	Benefits
1.	Jivamrita	It is made from cow-dung (20kg), urine (5-10 L), jiggery (20kg) and flour (2kg) and is applied to crops with each irrigation cycle.	It provides nutrients, but it also acts a catalytic agent which promotes activity of microorganisms in soil, as well as increases earthworm activity. It also helps to prevent from fungal and bacterial diseases.
2.	Bijamrita	It is basically made up of water (20 L), cow dung (5kg), urine (5 L), lime (50g) and a handful soil.	It is a seed treatment, equipped in protecting young roots from fungus as well as from soil-borne and seed-borne diseases.
3.	Acchadana-Mulching	It can be done by soil mulch, straw mulch.	It conserves soil moisture, by reducing evaporation.
4.	Wapsa moisture	The irrigation should be reduced and irrigation should be practiced at noon in alternate furrows.	It is condition where air molecules and water molecules present in soil.

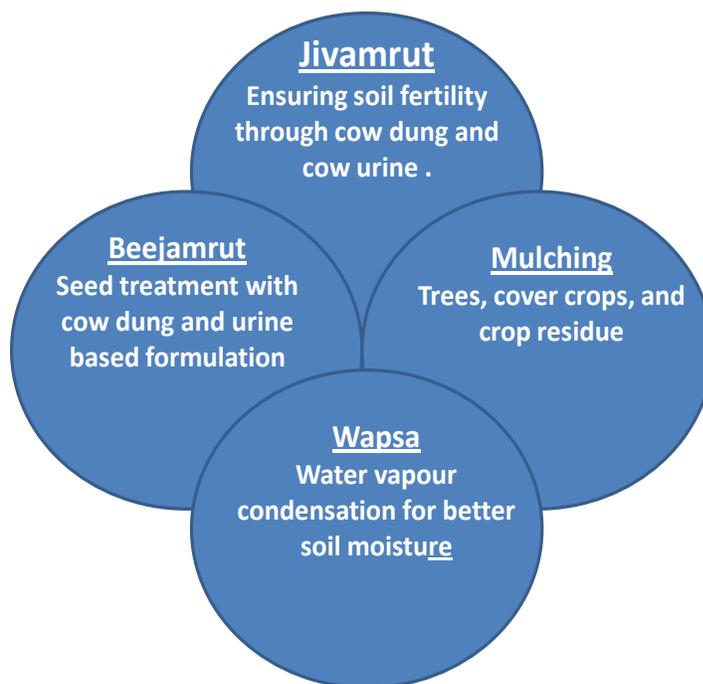
Table.2 Pest management in natural farming

Sr. No.	Name of Pest Mgt. Formulae	Composition	Benefits
1.	Agniastra	It composed of 10 L local cow urine, 1 kg Tobacco, 500gm of Green Chilli, 500gm of Local Garlic, 5kg Neem leaves pulp (crushed in urine). For spraying, 2 L Brahmastra is taken in 100 L water.	It is effective against the pests like leaf roller, stem borer, fruit borer, pod borer.
2.	Brahmastra	It is prepared by neem leaves, custard apple leaves, guava leaves, lantern camellia leaves, pomegranate leaves, papaya leaves and white dhatura leaves crushed and boiled in urine.	It is used to control all of sucking pests, fruit borer, pod borer.
3.	Neemastra	It is made up of local cow urine (5 L), cow dung (5kg) and neem leaves and neem pulp (5kg) fermented for 24 hrs.	It is used for sucking pests and mealy bug.
4.	Dashparni Ark	Neem leaves-5 kg, <i>Vitex negundo</i> leaves-2 kg, <i>Aristolochia</i> leaves - 2 kg, <i>Papaya (Carica papaya)</i> - 2 kg, <i>Tinospora cordifolia</i> leaves- 2kg, <i>Annona squamosal</i> (Custard apple) leaves- 2kg, <i>Pongamia pinnata</i> (Karanja)leaves- 2kg, <i>Ricinus communis</i> (Castor) leaves- 2 kg, <i>Nerium indicum</i> - 2 kg, <i>Calotropis procera</i> leaves-2 kg, Green chili paste- 2 kg, Garlic paste-250 g, Cow dung-3 kg, Cow urine-5 lit, Water-200 lit.	It can be applied as a foliar spray to control insect pest.

Table.3 Other important principles of natural farming

Sr. No.	Name of principle	Benefits
1.	Intercropping	This is primarily how Natural Farming gets its “Zero Budget” name. It doesn’t mean that the farmer is going to have no costs at all, but rather that any costs will be compensated for by income from intercrops, making farming a close to zero budget activity. Palekar explains in detail the crop and tree associations that work well for the south Asian context.
2.	Contours and bunds	To preserve rain water, Palekar explains in detail how to make the contours and bunds, which promote maximum efficacy for different crops
3.	Local species of earthworms	Palekar opposes the use of vermicompost. He claims that the revival of local deep soil earthworms through increased organic matter is most recommended.
4.	Cow dung	According to Palekar, dung from the Bos indicus (humped cow) is most beneficial and has the highest concentrations of micro-organisms as compared to European cow breeds such as Holstein. The entire Natural Farming method is centred on the Indian cow, which historically has been part of Indian rural life.

Fig.1 The four-wheels of natural farming



In conclusion, the experience of studying farmers and field observations during the period gives the following conclusion suggests that natural farming not only works from an agronomic point of view, but also

brings a variety of social and economic benefits. Most of the adopters reported that by adopting natural farming, over time they saw an improvement in yield, soil conservation, seed diversity, quality production. The natural

farming system is mainly suitable for small and marginal farmers mainly due to its ease, adaptability and drastic reduction in production cost. Treatment of bijamruta and jivamruta provides adequate protection against pests and diseases during the early stages of germination. In conclusion, the cost of seeds, fertilizers and plant protection chemicals are significantly reduced. It is assumed that natural farming will relieve the economic burden of the farmers and will give economic backing to the farming. This farming has benefited millions of farmers in India and more and more farmers are now adopting in natural farming.

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