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Natural Farming: Need of Future

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Chemical farming is facing difficulties in reduced quality, production and increased costs. Monoculturing of crops results in the depletion of topsoil layer, soil fertility, groundwater purity, beneficial microbes and it is finally making the crop plants vulnerable to parasites and pathogens. Environmental pollution by chemical pesticides and other inputs is posing a serious threat worldwide. Their continuous usage of harmful chemicals may destroy the beneficial soil micro flora and fauna. Intensive use of inorganic chemical fertilizers and pesticides resulted in the contamination of soil, surface and ground water with harmful chemicals and accumulation of heavy metals. Uptake of heavy metals like Cd, Cu, Mn and Zn by plants is proportionate to the increasing level of soil contamination (Devarinti S. R. 2016). People who consume these plant products are at risk of adverse effects on health as well as soil microbes which are beneficial for crop growth and productivity. The plant growth promoting rhizobacteria (PGPR), mycorrhiza and cyanobacteria promote plant growth and also protect them against pathogens. Considering all of those problems concerning soil, plant, and animal health along with environmental pollution. Therefore, there is a need to move towards the natural farming which is economically viable and environmentally feasible. This article focused on actual concept of natural farming, its principle, advantages and constraints face by the farmers. It gives the present fact, scenario, solutions and an alternative to decreased rising problems in Indian agriculture.

Natural Farming is a "Livestock based chemical- free" traditional farming method. It is regarded as a varied farming system based on agroecology that includes livestock, trees, and crops with functional biodiversity. It is mostly centered on recycling biomass on-farm, with a focus on biomass mulching, using cow dung-urine formulations, keeping the soil aerated and exclusion of all synthetic chemical inputs. It is anticipated that natural farming will lessen reliance on commercial inputs. It is regarded as cost effective farming method with potential to boost rural development and employment.

Keywords: agroecology, synthetic, livestock, biodiversity, cyanobacteria, rhizobacteria

Concept of natural farming

The natural farming is a "Chemical free farming" also referred to as "the Fukuoka Method" it means the natural way of farming or "do-nothing farming". It is an ecological farming established by Japanese farmer and philosopher Masanobu Fukuoka (1913–2008) introduced the term in his book *The One-Straw Revolution*. Natural farming it is a sustainable farming practices that aims to work with nature instead of trying to change it. It focuses on improving soil fertility without relying on synthetic chemical inputs. It is based on simple principle of utilizing low-cost and local inputs with zero utilization of chemicals. Continuous application of cow dung + urine-based combinations is the main approach along with efficient farm waste recycling, leguminous intercrops as soil cover, pre-monsoon dry seeding,

minimizing irrigation and balancing soil air and moisture by irrigating at noontime. The farmer serves merely as a facilitator; the real work done by nature herself (Devarinti S. R. 2016). Natural farming also offers a solution to various problems such as food insecurity, farmers distress, health problems arising due to pesticide residues in food and water and climate change.

Current scenario of Natural farming in India

Andhra Pradesh, Gujarat, Himachal Pradesh, Odisha, Madhya Pradesh, Rajasthan, Uttar Pradesh, and Tamil Nadu are some of the states that have taken the initiatives in promoting natural farming (Fig.1). In India, natural farming currently occupies more than 10 lakh hectares.

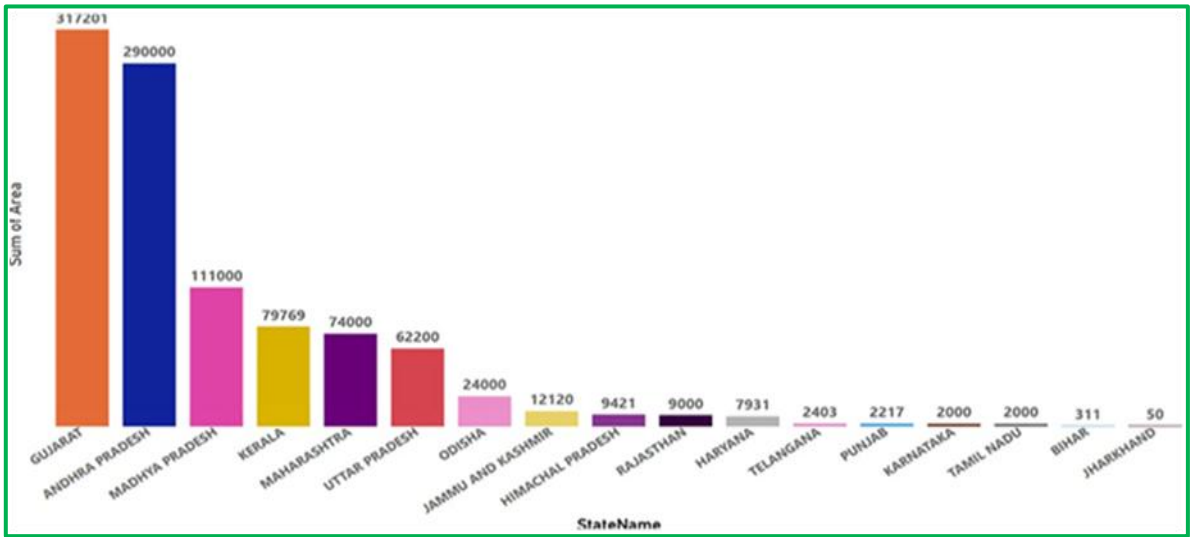

Fig.1. Total area under natural farming in India (Source: National Mission on Natural farming management and knowledge Portal, 2023)

Principles of Natural Farming

- No external inputs (synthetic fertilizers and pesticides)
- Minimal disturbance of soil
- Use indigenous seed
- Mixed cropping, intercropping
- Integration of trees into the farm
- Soil and moisture conservation
- Integration of animals in to farming
- Increasing organic residues on the soil
- Pest-management through botanical extracts

The main aim is to increase the steady build-up of organic matter in a natural way as if in forest eco system. The main moto is “Once the soil health is taken care it will take care of all the life on the earth”. (Sugathy *et. al.*, 2023).

Features of Natural Farming

1. Natural farming principles states that plants receive 98% of their nutrients from sunlight, water and air. In addition, remaining 2% can be fulfilled by high-quality soil with a large number of beneficial microbes (As in natural systems and forests).
2. Organic mulch when constantly applied to the soil which produces humus and promotes the growth of beneficial microbes. Organic mulches *viz.*, bark chips, grass clippings, wheat or paddy straw, plant leaves, compost, rice hulls, sawdust and other agricultural wastes that can naturally decompose and it increase the water holding capacity of soil. It also provides the soil with nutrients as it breaks down. It also improves water use efficiency of soil and a mulched layer restricts the weed growth by obstructing light penetration to the soil surface. (Prem Ranjan *et. al.*,2017).

3. Adoption of diversified cropping system, intercropping and crop rotation.
4. To increase soil microflora, farm-made bio-cultures called "Jeevamrit, Beejamrit" etc. are put to the soil instead of fertilizers. Jeevamrit, Beejamrit are made up from very little cow manure and urine of desi cow breed. (Sreenivasa *et al.*,2009.)
5. Recycling the naturally available nutrients in fields. In addition to providing numerous other advantages including restoring soil fertility and environmental health and mitigating or lowering greenhouse gas emissions, it has the potential to increase farmers income.
6. Only Indian breed cows dung and urine (Gomutra) are needed for the system. Desi cow is apparently the purest as far as the microbial content of cow dung and urine is considered. Cow dung and urine is very useful in this system as a biofertilizer and biopesticide as it can kill number of pesticide resistant bacteria, viruses and fungi. The use of cow urine provides better alternative to synthetic chemicals. The preparations like Neemastra, Bramhastra, Agni Astra, Darek Astra etc. are utilized by preparing a concentration of cow's urine with extracts of some medicinal plants. These serve as a insect repellents are harmless for humans. They are successfully replacing the chemical pesticides for enhancing natural immune systems of plants and also enhance the growth of a plant. Therefore, the products act as a "Tonic" for plants. (Sunil Mansinghka)
7. In natural farming, chemical and organic fertilizers are not used to the soil. In fact, for the soil and plants not give any external fertilizers.
8. In natural farming, decomposition of organic matter by microbes and earthworms is encouraged right on the soil surface itself, which gradually adds nutrition in the soil.
9. Natural, farm made pesticides like Dashparni ark, Neem ark and Agni astra are used to control pests and diseases in field. Grainge and Ahmed (1988) listed about 2400 plant species with pesticidal properties (insecticide, acaricide, nematicide, fungicide etc. which are distributed in 189 plant families). Neem oil 3% and neem seed kernel extract (NSKE) 5% with liquid soap 0.05% was proven to be effective against major pests of rice, sucking pests of cotton and vegetable. Neem cake applied at 250 kg/ha at last ploughing before sowing has been found effective against cotton stem weevil, soil insects, soil pathogens and nematodes of many crops.
10. Weeds are considered essential and used as living or dead mulch layer. These mulches also improve soil fertility by nitrogen addition, decrease soil erosion, soil moisture conservation, increasing microbial population and soil organic carbon status. (Bhadu and Kaswan 2022). Gbadamosi *et. al.*, (2003) found that dry grass mulches were used to control weeds in vegetables, which reduced weed growth upto 78 per cent.
11. Multi-cropping is encouraged over single crop method.

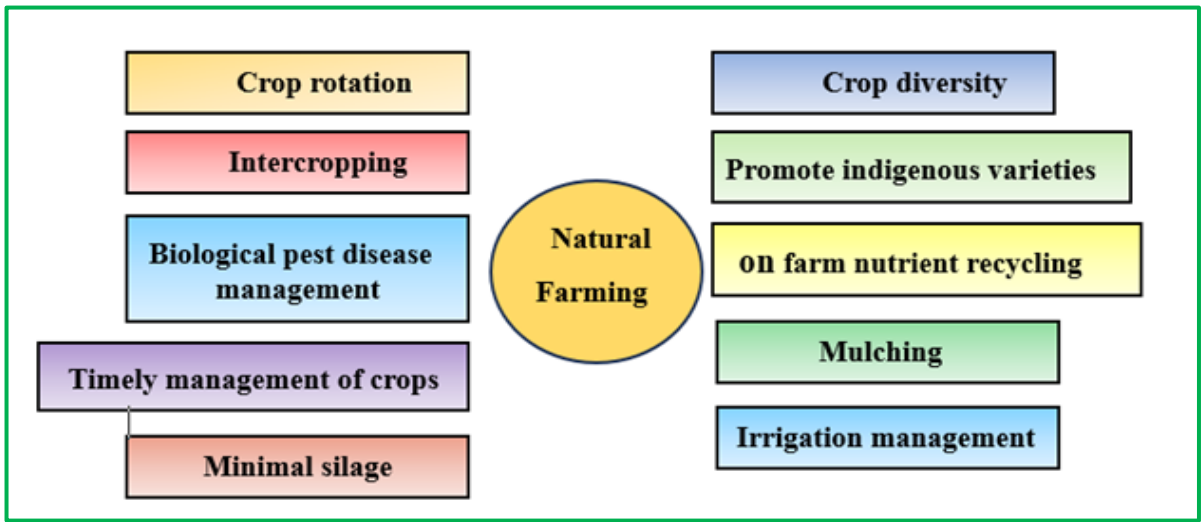

Fig 1. Components of Natural Farming

a) Multicropping

b) Mulching (Achhadana)

Advantages of Natural farming

- **Increase Yield:** Natural farmers reported yields that were comparable to those of conventional farmers. Higher yields per harvest were also recorded in a number of instances.
- **Promotes Better Health:** Natural farming eliminates health risks and hazards because it doesn't utilize any synthetic chemical inputs. The food provides better health benefits because it has a higher nutrition quality.
- **Environment Conservation:** Natural farming enhanced agrobiodiversity, better soil biology and more cautious water use with much lower carbon and nitrogen footprints.
- **Increased Farmers Income:** Natural Farming aims to make farming viable and aspirational by increasing net incomes of farmers on account of cost reduction, reduced risks, similar yields and incomes from intercropping.
- **Employment Generation:** Natural farming generates employment on account of natural farming input enterprises, value addition, marketing in local areas, etc. The surplus from natural farming is invested in the village itself.
- **Minimal Water Utilized:** Natural farming maximizes the amount of "crop per drop" by using a variety of crops that support one another and cover the soil to prevent unnecessary water loss through evaporation.
- **Minimized Cost of Production:** Natural Farming aims to drastically cut down production costs by encouraging farmers to prepare essential biological inputs using on-farm, natural and homegrown resources.

Challenges in Natural Farming

1. Major challenges in natural farming are the difficulty in controlling weeds, as the practice avoids the use of chemical herbicides. Farmers need to use labor-intensive manual weeding or natural methods, which can be inefficient and time-consuming, increasing labor expenses and effort. In addition, as natural farming does not employ synthetic pesticides, diseases and pests present serious difficulties. Farmers must adopt alternative organic pest management techniques, which may not always be as effective, leading to potential crop losses. (Dhivya *et.al.*,2024).
2. Another critical challenge is the delay in receiving certification for natural farming. Certification is essential for farmers to market their produce as organic or natural and to access higher-value markets. Farmers may face difficulties to obtain premium prices for their goods without prompt certification, which could restrict their earning potential and discourage others from using natural farming methods.
3. Additionally, diseases and pests offer serious challenges that need for constant adaptation and careful management ensuring that our produce remains healthy and free from harm. Natural farming might be more vulnerable to irregular weather patterns, such as drought or unseasonal rains, as it depends on biodiversity and soil health to sustain crops, rather than external inputs like chemical fertilizers and pesticides (Dhivya *et.al.*,2024).

Conclusion

Agriculture is facing difficulties due to the continuous change in climatic situations. The constant use of chemical fertilizers and pesticides has resulted in decreased soil health, reduce microbial population and environmental pollution. Natural farming is better alternative to chemical farming can increase the soil microbial population and add nutrients to greatly improve soil health. Increased agricultural yield and quality, optimal resource use, lower production costs and guaranteed crop sustainability. Therefore, Natural farming is the best agricultural method in the future.

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