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Organic Farming

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Abstract

Organic farming is an agricultural production management system that excludes all synthetic off-farm inputs and instead relies on on-farm agronomic, biological, and mechanical practices. This sustainable approach focuses on methods such as crop rotations, the use of crop residues, animal manures, off-farm organic waste, and mineral-grade rock additives to maintain soil fertility and health. Organic farming also employs biological systems for nutrient mobilization and plant protection, reducing or eliminating the need for synthetic chemicals. By embracing these natural processes, organic farming aims to foster a resilient and self-sustaining agro-ecosystem. One of the key principles of organic farming is promoting and enhancing biodiversity. This includes not only the variety of plants and animals on the farm but also the diversity of microorganisms in the soil. A diverse microbial population is essential for the breakdown of organic matter, nutrient cycling, and the suppression of soil-borne diseases. Through practices like crop rotation and the use of cover crops, organic farming encourages ecological balance, which supports healthy, productive soils and reduces the need for external inputs. In addition to boosting biodiversity, organic farming emphasizes the importance of biological cycles. For instance, natural predators are used to control pests, and organic matter is returned to the soil to improve its structure and nutrient content. These practices help create a closed-loop system where the farm becomes more self-reliant and less dependent on external resources. Moreover, organic farming practices help improve water retention, reduce soil erosion, and increase carbon sequestration, which benefits the broader environment by mitigating climate change.

Keywords: Organic farming, sustainable agriculture, biodiversity, crop rotation, agro-ecosystem, biological cycles, soil health, pest control, nutrient mobilization, environmental sustainability.

INTRODUCTION

Organic farming is an agricultural system that avoids the use of synthetic chemicals, fertilizers, and pesticides, focusing on maintaining ecological balance through natural methods. It promotes sustainability by relying on biological, agronomic, and mechanical techniques such as crop rotation, the use of animal manures, organic waste, and mineral-grade rock additives to improve soil health. These practices aim to enhance biodiversity, strengthen biological cycles, and improve agro-ecosystem resilience. Organic farming is not only beneficial for maintaining soil fertility and protecting the environment but also offers healthier food options, free from synthetic residues. By incorporating sustainable farming practices that reduce the dependency on off-farm inputs, organic agriculture supports long-term environmental health. Its holistic approach involves the use of biological systems for pest control, nutrient mobilization, and plant protection, reducing the reliance on external chemicals [1]. This system helps preserve the natural cycles of ecosystems and contributes to mitigating climate change through improved carbon sequestration and water conservation. Additionally, organic farming plays a critical role in supporting local biodiversity by creating habitats for beneficial organisms and reducing environmental pollution.

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Methods

The study employs a comprehensive review of existing literature on organic farming practices, highlighting methods and principles used in organic agriculture. The methodologies discussed in the paper include:

1. *Agronomic Practices:* These include crop rotations, green manuring, and the use of compost and animal manures to enhance soil fertility and structure. Integrated pest management and biological pest control methods are also explored, focusing on the exclusion of synthetic pesticides.
2. *Ecological Farming Techniques:* The study also looks into practices such as the conservation of biodiversity and the protection of the farm ecosystem by encouraging the natural predators of pests, thus reducing the need for chemical pest control.
3. *Soil and Water Management:* The importance of soil fertility maintenance through organic inputs like compost and vermicompost is discussed. Methods for preventing soil erosion, such as mulching and contour farming, are also emphasized. Water conservation techniques, including judicious irrigation and rainwater harvesting, are considered in the context of sustainable organic farming.
4. *Certification and Standards:* An in-depth examination of the organic certification process, including compliance with regulatory mechanisms, documentation of farm activities, and labelling of organic products, is presented to highlight the legitimacy of organic practices.

Organic farming, sustainable agricultural system that uses ecologically based pest controls and biological fertilizers derived largely from animal plant wastes and nitrogen-fixing cover crops.

Modern organic farming was developed as a response to the environmental harm caused by the use of chemical pesticides and synthetic fertilizers in conventional agriculture, and it has numerous ecological benefits.

The term “organic farming” was coined by Lord Northbound in 1940. The concepts of organic agriculture were developed in the early 1900s by Sir Albert Howard, F.H. King, Rudolf Steiner, and others who believed that the use of animal manures, cover crops, crop rotation, and biologically based pest controls resulted in better farming.

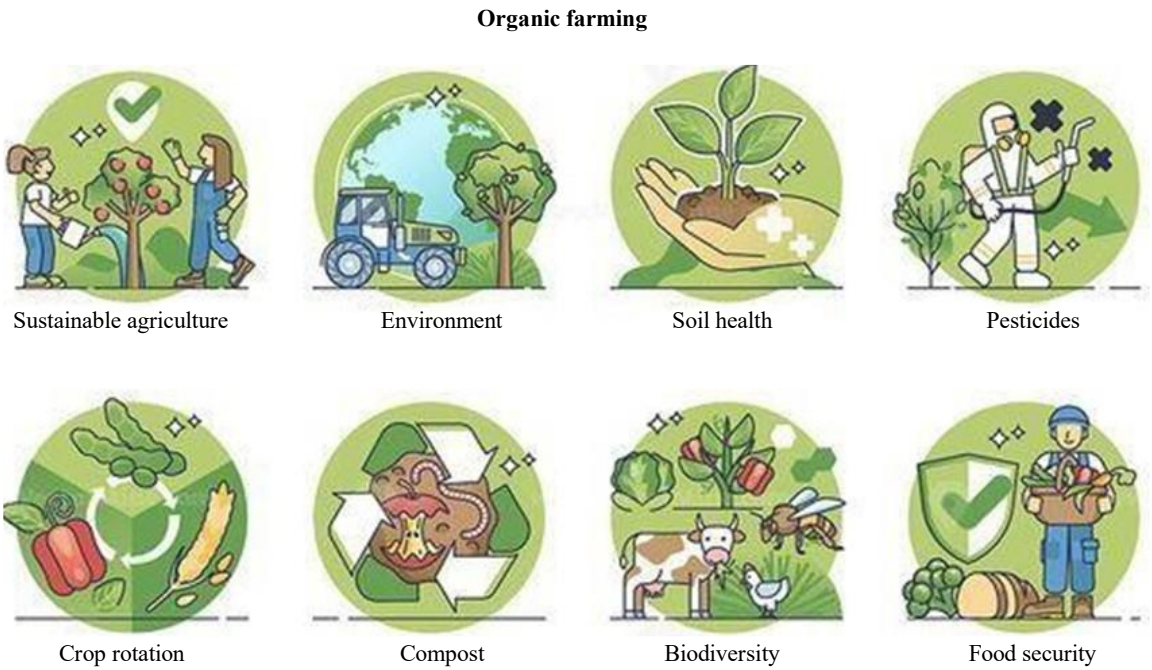

Figure 1. Key principles of organic farming: emphasizing sustainable agriculture, environmental protection, soil health, reduced pesticide use, crop rotation, composting, biodiversity, and food security.

TYPES OF ORGANIC FARMING

Pure Organic Farming

It involves the use of organic manures and biopesticides with complete avoidance of inorganic chemicals and pesticides.

Farmers use all the technology they can get to make their life easier and to make more food. They still don't include some big amounts of Integrated organic farming systems chemicals or pesticides.

Integrated organic farming

It involves integrating techniques aimed at achieving ecological requirements and economic demands such as integrated pest management and nutrients management.

Figure 2. Principles of Organic Farming." Nurture Organics.

MAIN PRINCIPLES OF ORGANIC FARMING

- To work as much as possible within a closed system, and draw upon local resources.
- To maintain the long-term fertility of soils.
- To avoid all forms of pollution that may result from agricultural techniques.
- To produce foodstuffs of high nutritional quality and sufficient quantity.
- To reduce the use of fossil energy in agricultural practice to a minimum.
- To give livestock conditions of life that confirm to their physiological need.
- To make it possible for agricultural producers to earn a living through their work and develop their potentialities as human being. https://academicjournals.org/journal/INGOJ (Changing scenario of organic farming in India: An overview- written by H.M. Chandrashekar)

The four pillars of organic farming are –

1. Organic standards.
2. Certification/Regulatory mechanism.
3. Technology packages.

Market Network

https://academicjournals.org/journal/INGOJ (Changing scenario of organic farming in India: An overview- written by H.M. Chandrashekar)

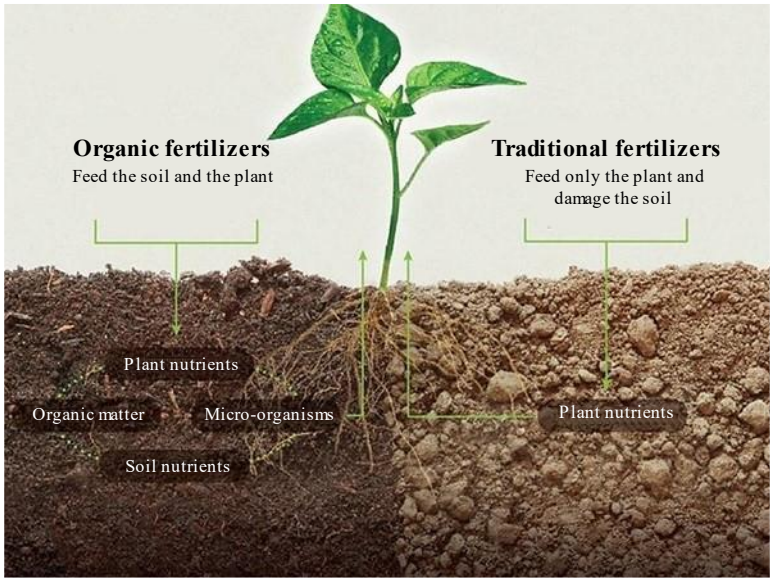

Figure 3. Feed the soil plant and damage plant.

BENEFITS OF ORGANIC FARMING

Better Taste and More Nutrition

Fruits and vegetables that are organically raised have a much better taste than other mechanically farmed ones [2]. This is due to the fact that they are given a much longer time to develop and are not pumped with artificial things.

Reduces Pesticide and Chemical Residue in Soil

Organic farming minimizes the use of pesticides and chemicals thereby reducing the major environmental issues like soil erosion, air pollution, water pollution etc.

Promotion of Biodiversity

Crop rotation to build soil fertility and raising animals naturally helps promote biodiversity, which promotes greater health across all living species.

Consumes Less Energy

Avoiding fertilizers contributes to a greater cause of energy conservation. This is because manufacturing synthetic fertilizers consumes a significant amount of energy.

Long-term Sustainability

Organic farming is a long-term, sustainable approach to food production. It takes a proactive and preventative approach.

Familiarity with the techniques

The farmers can easily understand and adapt to the techniques of organic farming that deploys traditional knowledge.

MINIMUM REQUIREMENTS FOR ORGANIC FARMING

Conversion

The time between the start of organic management and certification is called conversion period. The farmers should have a conversion plan prepared if the entire field is not converted into organic at a time. In that case, it is necessary to maintain organic and nonorganic fields separately. In the long run the entire farm including livestock should be converted into organic. The conversion period is decided based on the past use of the land and ecological situation. Generally, the conversion period is two years

for annual crops and three years for perennial crops [3,4]. However, the conversion period can be relaxed based on the verification by certification agency if the requirements are fully met. During conversion, steps should be taken to maintain bio-diversity etc.

Mixed Farming

Animal husbandry, poultry, fisheries, etc. should be practised in addition to agricultural farming. Shifting cultivation is not allowed. Integrated organic farming system model is being developed at Meghalaya and Coimbatore centres under Network Project on Organic Farming.

Cropping pattern

Crops are grown. Crop rotation should cover green manure as well as fodder crops. In case of perennial crops, cover crops like Kolinji (Tephrosia purpurea) should be grown to protect the soil.

Monocropping should be avoided. Crop rotation should be followed if annual crops are grown. Intercropping should be practised when perennial

Planting

Species and varieties cultivated should be adapted to soil and climatic condition and resistant to pests and diseases. Seeds/Planting materials should be procured from organic source. If not available, chemically untreated seeds/planting materials can be used one time.

Use of genetically engineered seeds or planting materials such as tissue culture, pollen culture, transgenic plants is not allowed.

Manurial Policy

Soil fertility should be maintained/enhanced through raising green manure crops, leguminous crops etc. The residues of plants after harvest should be incorporated into the soil as far as possible.

Biodegradable materials of microbial, plant or animal origin shall be applied as manures. (eq. compost, vermicompost, farm yard manure, sheep penning etc.) Use of synthetic/chemical fertilisers is not permitted. The mineral based materials like rock phosphate, gypsum, lime, etc. can be applied in limited quantities when there is absolute necessity [5]. The following products are permitted for use in manuring/soil conditioning in organic fields:

- Farm yard manure, slurry, green manures, crop residues, straw and other mulches from own farm.
- Saw dust, wood shaving from untreated wood Calcium chloride, lime stone, gypsum and chalk.
- Magnesium rock
- Sodium chloride
- Bacterial preparations (Bio-fertilisers), e.g. azospirillum, rhizobium
- Bio-dynamic preparations Plant preparation and extracts, e.g. neem cake
- Vermicompost

The following products shall be used when they are absolutely needed and taking into consideration of factors like contaminations, depletion of natural resources, nutritional imbalances, etc. If proposing for certification, the certification agency may be consulted before using inputs such as FYM, slurry, urine, straw etc. from other farms, blood meal, bone meal, sulphate of potash without preservatives, minerals like basic slag, sulphate of potash, wood ash from untreated wood, and vermicompost from other farms

Pest, Disease and Weed Management

Use of synthetic/chemical pesticides, fungicides and weedicides is prohibited. Natural enemies shall be encouraged and protected. (for e.g. raising trees in the farm attracts birds which kills pests of the crops, nest construction etc.) Products collected from the local farm, animals, plants and micro-organisms and

prepared at the farm are allowed for control of pests and diseases. (eq. Neem Seed Kernel Extract, cow urine spray). Use of genetically engineered organisms and products are prohibited for controlling pests and diseases. Similarly, use of synthetic growth regulators is not permitted. Slash weeding is to be done between the plants. Weeds under the base of the plants shall be cleaned and put as mulch around the plant base. The weeded materials should be applied as mulch in the ground itself [6,7]. The products that are permitted for control of pest & diseases are Neem oil and other neem preparations like Neem Seed Kernel Extract, Chromatic traps, Mechanical traps, Pheromone traps, Plant based repellants, Soft soap and clay. The following products shall be used when they are absolutely necessary and taking environmental impact into consideration. The certification agency shall be consulted before using these inputs.

Bordeaux Mixture

- Plant & animal preparations e.g. Cow urine spray, Garlic extract, Chilli extract Light mineral oils Kerosene
- Natural enemies of crop pests and diseases such as Coccinellids, syrphids, spiders, Micromus, Chrysopa and campoletis were higher under organic management compared to integrated and inorganic management. Coccinellids, which naturally reduce the hoppers and leaf folders was found to be two to three times higher under organic management in cotton, groundnut, soybean, potato and maize crop fields. Similarly, spiders which also control the pests are found to be twice higher under organic management compared to inorganic management. The diversity of arthropod population in soil viz., Collembola, dipluran, pseudoscorpians, cryptostigmatids and other mites population was also found to be higher under organic management compared to integrated and chemical management (Annual Progress Report, 2010-2013, Network Project on Organic Farming, University of Agricultural Sciences, Dharwad, Karnataka).

Soil and Water Conservation

Measures like stone pitching/contour wall construction are to be taken up to prevent soil erosion. In case of saline soils, saline resistant varieties may be grown. Judicious irrigation is to be practised. Mulching is required. Pollution of surface and ground water shall be prevented.

Clearing of primary forest is prohibited. Cleaning of land through straw burning should be restricted to minimum.

Contamination Control

It is necessary to take the following measures to minimise the contamination from outside and within farm. If neighbouring fields are non-organic, a buffer zone should be maintained. The height of buffer crop shall be twice the height of organic crop and the width of the buffer shall be 25- 50 feet. (When chilli is grown as the main organic crop, castor or Agathi (Sesbania) can be grown as buffer crop. The crops from the buffer zone should be sold as non-organic) [8,9]. If the farm is under conversion, equipment's used for conventional areas shall be well cleaned before using for organic areas. Products based on polythene, polypropylene and other polycarbonates are allowed to cover protected structure, insect netting, nursery, drying, etc. subject to the condition that these materials shall be removed from the field after use and they shall not be burnt or put in the soil. Use of polychloride based products like PVC pipe is prohibited.

Processing

Processing technologies like solar drying, freeze drying, hot air chambers are permitted. Irradiation of agricultural produce is not permitted. No synthetic additives/days are to be added during processing.

Labelling

The label should convey clear accurate information on the organic status of the product. (i.e. conversion in progress or organic). The labels for organic and conversion in progress products should be

distinguishable by different coloured labels. The details like name of the product, quantity of the product, name and address of the producer, name of certification agency, certification, lot number etc. are to be given in the label. Lot number is helpful in tracing back the product particularly the field no. in which it is grown in case of contamination. Lot no. should include the crop, country, field no, date of harvest and production year.

Packaging

For packing, recycling and reusable materials like clean jute bags, shall be used. Use of bio-degradable materials shall also be used. Unnecessary packaging material should be avoided. Organic and non-organic products shall not be stored and transported together except when labelled

Documentation

Documentation of farm activities is must for acquiring certification especially when both conventional and organic crops are raised [10]. The documents/records such as field map, field history sheet, activity register, input record, output record, harvest record, storage, sales record, pest control records, movement records, equipment cleaning and labelling records are to be maintained.

Certification Process

Certification of organic farms is required to satisfy the consumers that the produce is totally organic. Certification agency conducts the inspection that minimum requirements prescribed for organic agriculture is fully met and issues certificate. The producer makes contact with certifying agency. Certification agency provides information on standards, fees, application, inspection, certification and appeal procedures. The producer then submits application along with field history, form map, record keeping system etc. Then the contract indicating scope, obligation, inspection and certification, sanction and appeals, duration, fee structure is executed. Then the Inspector of agency comes and carries out inspection. The Inspector gives inspection report with his recommendation to the agency, then the agency issues approval or denial of certificate. Certificate is given for current year's harvest only and hence annual certification is required. Organic agriculture is the only solution to nurture the land and to regenerate the soil by going back to our traditional method farming i.e., free from chemicals, pesticides and fertilizers. This is a possible step for sustainable development by choosing not to use chemicals, synthetic materials, pesticides and growth hormones to produce high nutritional quality food and in adequate quantities.

CONCLUSION

Organic farming is a sustainable approach that supports environmental health, improves soil fertility, and reduces dependence on synthetic chemicals. The methods discussed in this study emphasize the importance of using biological and mechanical systems to ensure soil health and agricultural productivity. By fostering biodiversity and maintaining natural biological cycles, organic farming contributes to a resilient agro-ecosystem. Additionally, it supports long-term environmental sustainability, mitigates climate change, and promotes healthier food systems.

Despite challenges in transitioning from conventional to organic farming, such as the certification process and the initial costs of conversion, organic farming offers significant ecological and economic benefits. The holistic approach to farming enhances soil fertility, minimizes environmental pollution, and increases farm resilience to pests, diseases, and climate change impacts. As organic farming continues to grow, it will be crucial to maintain the integrity of certification standards, improve farming practices, and make organic products more accessible to consumers globally.

REFERENCES

1. Elayaraja, M., & Vijai, C. (2020). Organic farming in India: Benefits and challenges. European Journal of Clinical Medicine, 7(11). Available at: www.researchgate.net/publication/348351753_Organic_farming_in_India_Benefits_and_Challenges.

2. Adamchak, R. (2020). Organic farming. Britannica. Retrieved from: www.britannica.com/topic/organic-farming.
3. Chandrashekar, H. M. (2010). Changing scenario of organic farming in India: An overview. International NGO Journal, 5(1), 034–039. Available at: https://academicjournals.org/journal/INGOJ.
4. Gupta, D., & Thakur, M. (2019). Sustainable agricultural practices and their benefits. International Journal of Agricultural Sustainability, 17(3), 45–60.
5. Sharma, P., & Kumar, R. (2021). Advances in organic farming: Methods and outcomes. Journal of Environmental Science and Sustainability, 9(2), 111–120.
6. Yadav, S., & Meena, M. (2018). Organic farming and soil health management. Indian Journal of Soil Science, 15(3), 234–240.
7. Joshi, B., & Srivastava, A. (2020). Certification and regulation of organic products in India. Journal of Agricultural Research, 12(4), 321–329.
8. Thakur, R., & Saini, R. (2017). Integrated pest management in organic farming systems. Journal of Pest Control and Management, 18(5), 200–206.
9. Kumar, N., & Rathi, M. (2022). Organic farming: A sustainable approach for food security. Sustainable Development in Agriculture, 10(2), 88–95.
10. Singh, A., & Chauhan, M. (2020). The role of biodiversity in organic farming. Environmental Conservation and Sustainability Journal, 11(1), 56–62.

