

Organic Farming for Sustainable Agricultural System

Paper Submission: 15/02/2021, Date of Acceptance: 26/02/2021, Date of Publication: 27/02/2021

Abstract

Agriculture is the key sector for economic development for most developing countries. In this paper organic farming is discussed as an alternate for sustainable crop production. The main objective of this paper is to review the impact of modern agricultural technology and to promote the organic farming for sustainable development. Organic farming can provide quality food without affecting soil health and environment. Organic farming and organic food production have some basic rules having no use of chemical fertilizers or synthetic drugs and no use of genetically modified organisms. It prevents from soil erosion and promotes biodiversity. It is a system defined and designed to produce Agricultural products by the use of methods and substances that maintain the integrity of organic agriculture in India.

Keywords: Sustainable Development, Soil health and genetically modified (GM).

Introduction

Organic farming is a method which prohibits the use of almost all synthetic inputs and chemical fertilizers. It is the process of producing food naturally. The main objective of organic farming is to protect the earth's resources and to provide safe and healthy food. In modern age, increasing pollution level in every sphere of life is the key challenge in sustainable development of our environment. Modern agricultural practices contribute in environmental pollution. Organic farming supports a natural way of crop cultivation by using environment friendly. According to Food and Agriculture Organization, "sustainable agriculture is the successful management of resources for agriculture to satisfy changing human needs while maintaining or enhancing the quality of environment and conserving natural resources"

Objective of the Study

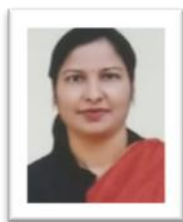
1. To keep agricultural production at sustainable level.
2. To reduce the cost of Agricultural production.
3. To improve soil health and to reduce soil erosion.
4. To promote the organic farming for sustainable development.

The general principles of organic production from the Canadian Organic Standards (2006),(1) include the following:

1. Protect the environment, minimize soil degradation and erosion, decrease pollution optimize biological productivity and promote a sound state of health.
2. Maintain long-term soil fertility by optimising conditions for biological activity within the soil.
3. Maintain biological diversity within the system.
4. Recycle materials and resources to the greatest extent possible within the enterprise.
5. Provide attentive care that promotes the health and meets the behavioural needs of livestock.
6. Preparing Organic products, emphasising careful processing and handling methods in order to maintain the organic integrity and vital qualities of the products at all stages of production.
7. Rely on renewable resources locally organised agricultural systems.

Organic farming is a production system which depends on the maximum use of organic materials, crop residue, animal residue, legumes, on and off farm wastes, growth regulators, bio pesticides and discourages use of synthetically produced agro inputs for maintaining soil productivity and fertility.

Adverse Effect of Agro-Chemicals on Soil, Water, Food and Atmospheric Environment, Heavy use of agrochemicals by many



Aparna

Assistant Professor,
Dept. of Economics
Govt. PG College,
Noida, UP, India

developed and underdeveloped countries, there are many adverse effects on soil, water, food and atmospheric environment which are reviewed below:

Fertilizer Pollution

There has been intensive fertilizer used for the last few decades in developed countries. Application of N₂ fertilizers such as urea and ammonia sulphate to soil produces acid. Over use of N₂ fertilizers leads to swindling of earthworms from the particular area. Absence of earthworms results in the loss of soil fertility. Health hazards as heavy metals enter in the food chain through soil. Fertilizers contain heavy metals as impurities. The excessive application of Rock phosphate produce lead and cadmium into the soil. Analysis of several commercial fertilizers commonly used revealed that a combination of low analysis and state fertilizers can add more lead and cadmium to soil. High analysis and mixed fertilizers nitrogen loss to the atmosphere through identification may contribute to 'greenhouse gases' in the atmosphere thereby exacerbating the problems of breaking down of ozone layer. Nitrogen losses can be particularly high from intensively cultivated and fertilized land whether the fertilizer is from organic or inorganic.

Pesticide Pollution

By using different types of poisonous substances as pesticides contribute downwards imbalance in the eco system and pollutes the environment. Pesticides are used to control various pests and create harmful effect on soil and food. If the credits of pesticides include enhanced economic potential of food and fibre and amelioration of vector-borne diseases then their debits have resulted to serious health implications to man and his environment. There is now overwhelming evidence that some of these chemicals do pose a potential risk to humans and other life forms and unwanted side effects to the environment.(2)

Bad Effect in Farmer's Health

The increased use of herbicides have bad effect on farmers health. While herbicide technology has made remarkable progress in terms of developing safe herbicides that are less toxic to human beings, this may affect farmers health by chemical poisoning after applying herbicides. Heavy use of pesticides causes a more direct problem on farm workers. Epidemiological data shows that workers who handle pesticides more than 20 days a year have an increased risk of developing certain type of cancer. Agro chemicals are known to find their way in the blood systems of human beings through the mouth, nose, intact skin and the eyes. Several adverse health effects are known to result from exposure to pesticides including temporary acute effects like irritation of eyes and excessive chronic diseases like cancer, reproductive and developmental disorders. Effects on the central nervous systems (CNS) like restlessness, loss of memory, convulsions and coma are also common. In addition, effects on parasympathetic and sympathetic nervous system have been widely reported including respiratory paralysis which is fatal.(3)

Concept of Organic Farming

Organic farming is one of the widely used methods which are thought of as the best alternative to avoid the ill effects of chemical farming. According to US Department of Agriculture, "it is a system that is designed and maintained to produce agricultural products by the use of methods and substances that maintain the integrity of Organic Agricultural products until they reach the consumer. This is accomplished by using substances to fulfill any specific fluctuations within the system so as to maintain long-term soil biological activity, ensure effective peak management, recycle waste to return nutrients to the land, provide attentive care for farm animals and handle the Agricultural products without the use of extraneous synthetic additives or processing in accordance with the act and the regulations in this part". There are numerous benefits of organic farming. Organic farming is beneficial for environment and it is the most sustainable system that is also widely applicable. It reduces pollution incidents, energy use and greenhouse gas emissions. There are numerous apparent health benefits through the avoidance of the use of agrochemicals. It also has social benefits and more people are usually employed on organic farms. Many of the practices of organic farming make positive use of biodiversity. Thus biodiversity is given an economic value which means that conservation is not at odds with the economic pressures on the farmer and therefore much more secure.

Principles of Organic Farming

Organic farmers emphasize using only organic fertilizers for fertility maintenance. The major widely used term "Organic Farming" describes two major aspects of alternative agriculture

The substitution of manure and other organic matter as organic fertilizers.

The use of biological pest control instead of chemical pest control.

Organic agriculture is not based exclusively on short-term economics but also considers ecological concepts. It utilizes appropriate technology and appropriate traditional farming methods. This form of farming can also be called sustainable form of farming for sustainable agriculture. The principles of this method are:

1. Organize the production of crops and livestock and the management of farm resources so that they harmonize rather than conflict with natural system.
2. Use and develop appropriate technologies based upon and understanding of biological systems.
3. Achieve and maintain soil fertility for optimum production by relying primarily on renewable resources.
4. Use diversification to pursue optimum production.
5. Use decentralized structures for processing, distribution and marketing of products.
6. Strive for equitable relationship between those who work and live on the land.
7. Maintain and preserve wildlife and their habitats.

Components of Organic Farming

There are missions throughout the organic literature of differences between organic and

conventional systems with respect to their effects on soil physical properties, nutrient flow within the soil, crop health and nutritional value of the harvested crop. Different components of organic farming are as follows

Crop and Soil Management

Organic farming system encourages use of rotations and measures to maintain soil fertility. Green manuring and intercropping of legumes is another important aspect for biological farming systems not only in regard to weed control but also in reducing the leaching of nutrients and reducing soil erosion. A green cover throughout most of the year is one of the main goals of such farming methods. Depending on the green manure mixture of the legumes used for under sowing, there may be an increased soil organic matter and soil N₂ as well as in other nutrients.

On Farm Waste Recycling

Increased price of chemical fertilizers have enabled organic wastes to regain an important role in the fertilizer practices on the farm. Good manure management means improved fertilizers value of manure and slurry and less nutrient losses. Composting of all organic wastes in general and of farmyard manure is important in organic farming.

Non Chemical Weed Management

Weed management is one of the main concerns in organic agriculture. Generally, all aspects of arable crop production play an important role in a system approach to problems. The elements to consider in preventing weed problems are crop rotation, green manuring, manure management and tillage. Mulching on a large scale by using manure spreaders may also be useful in weed control.

Food Quality

Food quality is one of the main issues which concerns both scientist and consumers. Nitrates in water and farm Organic produce desirable components, pesticides residues, keeping quality and psychological imbalances are some of the important aspects of food quality.

Ecological Agriculture

The growing concern about environmental degradation, dwindling natural resources and urgency to meet the food needs of the increasing population are compelling scientist and policymakers to seriously examine alternative to chemical agriculture. One can get a premium price for organically grown crops, the economic returns from the ecological farming system will highly be encouraging. Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. Organic agriculture emphasizes the use of renewable resources and the conservation of soil and water to enhance environmental quality for future generations. Organic food is produced without using most conventional pesticides, fertilizers made with synthetic ingredients.

Benefits of Soil Organic Matter

1. It serves as a slow release of nitrogen, Phosphorus and sulphur for plant nutrition and microbial growth.

2. It causes considerable water holding capacity and thereby helps to maintain the water regime of the soil.
3. It acts as cement for holding clay and silt particles together, thus contributing to the crumb structure of the soil and resistance against soil erosion.
4. Organic constitutes in the humic substances may act as plant growth stimulants.

Conclusion

Most countries have traditionally utilised various kinds of organic materials to maintain or improve the tilth, fertility and productivity of their agricultural soils. However, several decades ago, organic recycling practices in some countries were largely replaced with chemical fertilizers which were applied to high yielding cereal crops that respond to a high level of fertility and adequate moisture including irrigation. Organic farming seems to be more appropriate, it considers the important aspects like sustainability of natural resources and environment. It is a production system which favours maximum use of organic materials crop residue, animal residue, legumes, on and off farm wastages, growth regulators, bio-pesticides and discourages use of synthetically produced agro inputs for maintaining soil productivity and fertility. It is one of the widely used methods which is thought of as the best alternative to avoid the effects of chemical farming. Sustainable agriculture is necessary to attain the goal of sustainable development.

References

1. Ontario 'Ministry of Agriculture, Food and Rural Affairs' available on the world wide web <http://www.omafra.gov.on.ca/english/>
2. Forget G *Balancing the need for pesticides with risk to human health*, In: Forget G, Goodmant, de Villiers A, editors, *Impact pesticides on health in developing countries*, 1993. IRDC, otawa available on the world wide Web <https://www.ncbi.nlm.nih.gov/>
3. Mangauzi R., Mabaera B., and Gombe N., *The Pan African medical Journal, Health effects of agrochemicals among farm workers in commercial farms of Kwekwe district, Zimbabwe available on the world wide Web* <https://www.ncbi.nlm.nih.gov/>
4. Kole RK, Banerjee H, Bhattacharya A, *Monitoring of market fish samples for Endosulfan and Hexachlorocyclohexane* <https://link.springer.com/article/10.1007/s001280159>
5. Savonen C. *Soil micro organism object of new OSU service. Good Fruit Grower*. 1997. also available on the world wide web <https://www.goodfruit.com/a-farm-is-born/>
6. Joshi Mukund. *New Vistas of Organic Farming*, 2010
7. Chand Subhash. And Wani Ahmad Sartaj., *Organic Farming Concepts, Application and Advances*, 2016
8. Suri Shalini, *Organic Farming*, 2012
9. Singh A.K., *Organic Farming*, 2015
10. Jaiswal P.A., Gupta C.N. and Sah B.R. *Organic Farming*, 2011, pp:113-124

11. https://www.devalt.org/newsletter/jan04/of_4.htm
12. <https://krishijagran.com/featured/organic-farming-for-sustainable-agriculture/>
13. <https://www.toppr.com/guides/economics/rural-development/sustainable-development-and-organic-farming/>
14. <https://orgprints.org/id/file/56061>
15. <https://www.agrifarming.in/organic-vegetable-farming-income-profit-cost-yield>
16. Veeresh GK." Introduction In organic Farming Foundation Books, Cambridge University press (2006):1-10
17. Douglass GK(1984) *The Meaning of Agricultural Sustainability*.In: Douglass GK(ed) *Agricultural sustainability in a changing world order*.Westview press, Boulder, Colorado
18. https://agritech.tnau.ac.in/org_farm/orgfarm_introduction.html
19. <http://www.omafra.gov.on.ca/english/crops/facts/09-077.htm>
20. <https://www.tandfonline.com/doi/full/10.1080/13102818.2018.1427509>