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ORGANIC FARMING: A PRIMER

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ABSTRACT

Organic farming or agriculture is a production system that largely avoids the use of chemical fertilizers and pesticides. It is a system that sustains the health of soils, ecosystems, and people. It generally prohibits products of genetic engineering and animal cloning, synthetic pesticides, and synthetic fertilizers. It occupies a unique position in the world's agricultural systems. This paper provides a brief introduction to organic farming, its principles, advantages, and disadvantages.

KEYWORDS: Organic farming, organic agriculture, organic food.

INTRODUCTION

Agriculture has been the key sector for the economic development for most nations. Farming can be both challenging and exciting. It is going through a period of change. Organic farming (OF) is agriculture that makes healthy soils, healthy plants, healthy food, and healthy environments a priority in crop production. Organic farming has been practiced in the US for over a century. It was developed in response to the environmental harm caused by the use of chemical pesticides and synthetic fertilizers in conventional farming. Organic farmers and their supporters have been the most vocal advocates for a fully integrated agriculture. The principal reason for farming organically is the concern farmers have for the environment.

The main goal of organic production is to develop enterprises that are sustainable and harmonious with the environment. Organic farming promotes the use of crop rotations, crop diversity, use of crop residues, animal manures, legumes, green manures, off farm organic

wastes, biofertilizers, and mechanical cultivation. The objective is to work in harmony with nature.

The International Federation for Organic Agriculture Movement's (IFOAM) definition of Organic agriculture is based on four principles.[1]

- *The Principle of Health*: Organic agriculture should sustain and enhance the health of soil, plant, animal, and human as one and indivisible.
- *The Principle of Ecology*: Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them, and help sustain them with the help of it.
- *The Principle of Fairness*: Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.
- *The Principle of Care:* Organic agriculture should be managed in a precautionary and responsible manner to protect the health and well being of current and future generations and the environment.

Conventional Farming

The focus of conventional farming is economic profit and the volume of the food produced. Conventional farming is capital-intensive; it requires energy and manufactured inputs. It uses equipment, fertilizers, pesticides, and hybrid seeds to get more production and productivity from crops. The intensive use of the land depletes the soil and the nutrients in food grown from it. Current conventional farming is not sustainable. It is a perfect storm for environmental fallout and food insecurity.

A conventional farmer's goal is to entirely eliminate weeds from his fields by applying powerful chemical treatments. Thus, conventional farming involves growing and nurturing crops with the use of chemicals especially fertilizers, herbicides, and pesticides in agricultural production. In the face of the Green-revolution system, conventional farming allows the agricultural production capacity to be significantly increased. However, such intensive agricultural systems disturb natural habitats and lead to less biodiversity.[2] In recent years, use of chemicals has become a cause for serious concern because they ultimately cause pollution and degradation of the environment. They also contaminate ground and surface water. Thus, the bane of the conventional farming system is the incessant and indiscriminate use of chemicals.

Farming for food production has come to a crossroads: while conventional farming needs to improve environmental performance, organic farming needs to increase the production volumes. Organic farming is a sustainable approach to food production, an alternative to ecologically unsound practices of conventional farming. It is a system in which use of agro-chemicals is completely excluded.[3] It is regarded as a solution to the problems currently impacting the agricultural sectors of industrialized nations.

Organic Concepts and Principles

Organic farming is a modern, holistic/whole approach that affirms the concept that the health of the soil, plants, insects, animals, and human beings are linked. The aims for organic farming are conserving environment and natural resources, encouraging sustainable agriculture, increasing long-term soil fertility, improving the quality of food products, respecting animal welfare, avoiding chemical pollution, and conserving biodiversity.

Organic farming is strictly regulated by national and international laws. The International Federation of Organic Agriculture Movements (IFOAM) has produced a set of international organic standards with the collaboration of people from many countries. The general principles of organic farming were laid down by IFOAM in 1992.[4,5]:

- To produce food of high nutritional quality in sufficient quantity.
- To interact in a constructive and life enhancing way with all-natural systems and cycles.
- To encourage and enhance biological cycles within the farming system, involving micro-organisms, soil flora and fauna, plants and animals.
- To maintain and increase long term fertility of soils.
- To use, as far as possible, renewable resources in locally organized agricultural systems.
- To work, as far as possible, within a closed system with regard to organic matter and nutrient elements.
- To work, as far as possible, with materials and substances which can be reused or recycled, either on the farm or elsewhere.
- To give all livestock living conditions which will allow them to perform the basic aspects of their innate behavior.
- To minimize all forms of pollution that may result from agricultural practices.
- To maintain the genetic diversity of the agricultural system and its surroundings, including the protection of plant and wildlife habitats.

- To allow agricultural producers a living according to the UN human rights; to cover their basic needs and obtain an adequate return and satisfaction from their work, including a safe working environment.
- To consider the wider social and ecological impact of the farming system.

The principles are concerned with how farming and food production ought to be done. They can serve as a guide as to where the development is to be controlled or stopped, evaluate the development, and avoid unwanted consequences.

Organic farming methods are regulated and legally enforced by many nations. Farmers must be certified for their produce and products to be labeled "organic." The number of US farmers seeking organic certification from the federal government is increasing.

Food labels do tell us something useful about food and where it came from.

Any food that is labeled as organic must meet basic requirements to become certified. For a product to be certified organic, it is required to meet specific standards[6]:

- Organic crops cannot be grown with synthetic fertilizers, synthetic pesticides or sewage sludge.
- Organic crops cannot be genetically modified or engineered.
- Animals must eat only organically grown feed.
- Animals must have access to the outdoors and pasture.
- Animals cannot be cloned.

Organic Farming Methods

Organic farming is the type of farming in which crops develop from natural resources having complete nutritive value and preventing attack of the crop/plants from pests. Some of the methods developed for organic farming have been borrowed from more conventional farming. There are several ways by which organic farming is practiced. Some of these methods include:

1. *Soil Management*: To grow healthy food requires healthy soil. Green manuring, cowpea, green gram, etc. are effective for improving the organic matter content of soil. The plants feed from the soil organically. Soil management controls the supply of nutrients to crops, and subsequently to livestock and humans. Soil fertility is fundamental in determining the

productivity of all farming systems. This is the ability of a soil to provide nutrients, water, aeration, and stability for plant growth.[7]

2. *Weed Management*: Weed is the unwanted plant that grows in farm lands. Since chemical herbicides cannot be used in organic farming, weeding can be done only manually. Weed management is based on routine physical cultivation, crop rotations, and planting cover crops. Weeds can be controlled by grazing, tillage, mowing, and cutting. Organic weed management promotes weed suppression, rather than weed elimination.
3. *Pest Control*: Organic farmers are restricted by regulations to using natural pesticides and fertilizers. In addition to pesticides, organic pest control integrates biological, cultural, and genetic controls to minimize pest damage. One strategy to combat harmful pests is to build the population of beneficial insects, whose larvae feed off the eggs of pests. Birds, bees, and other natural predators assist in natural pest control.
4. *Crop Rotation*: Crop rotation is the back bone of organic farming practices. Growing the same crops in the same location year after year reduces soil fertility. Organic farmers do not grow the same crops on the same section of land year after year. They also find that crop rotation helps control pests on certain fields.
5. *Crop Diversity*: This involves cultivating a variety of crops simultaneously. This is distinct from the ancient practice of monoculture in which only one type of crop was cultivated.
6. *Livestock*: Livestock products can also be produced organically. Organic livestock production prohibits the use of animal byproducts in feed. The emphasis of organic livestock production is to optimize production systems in order to avoid animal health problems.

These organic farming methods are becoming popular in the agricultural sector due to their various benefits. Organic farming aims to operate within a closed system for organic matter and nutrients as shown in Figure 1.[8]

Organic Food

Organic production yields organic food, plant, and livestock. Organic foods refer to products that are grown naturally or produced by methods that comply with the standards of organic farming. They are not only environment friendly, they are also healthy. The term “organic food” (OF) refers to the way agricultural products are grown and processed. They are crops that are grown without the use of harmful pesticides, irradiation, fertilizers, and other

synthetic materials. Organic foods include fruits, vegetables, cereals, and animal products. Organic food consumption may reduce overweight, obesity, and the risk of allergic disease.[9] Consumer demand for "healthier" food has been considered one of the major factors influencing increased consumer demand for organic food. This perception is probably reflected in the lower consumption of livestock products.

Advantages and Disadvantages

The adoption of organic farming provides a number of valuable benefits/advantages which include.[10]

1. It helps to maintain the health of the environment by reducing the level of pollution.
2. It reduces human and animal health hazards by reducing the level of chemical residues in the product.
3. It helps in keeping agricultural production at a sustainable level.
4. It reduces the cost of agricultural production and also improves the soil health.
5. It ensures optimum utilization of natural resources for short-term benefit and helps in conserving them for future generation.
6. It not only saves energy for both animal and machine, but also reduces risk of crop failure.
7. It improves the physical properties of the soil such as granulation, good tilth, good aeration, easy root penetration and improves water-holding capacity and reduces erosion.
8. It improves the chemical properties of the soil such as supply and retention of soil nutrients, reduces nutrient loss into water bodies and the environment and promotes favorable chemical balance.
9. It is often considered to be more socially just and economically sustainable for farmworkers than conventional farming.

Organically grown food tastes better and is healthier than that conventionally grown.

Organic farming methods can increase farm productivity and repair environmental damage. They can produce even higher yields than conventional methods. Organic farming is profitable and personally rewarding. It promotes either self-sufficiency or food security. Organic farm soils usually have higher pH than conventional farm soils.

Some limitations and challenges of organic farming include.[10]

1. Organic manure is not abundantly available and on a plant nutrient basis it may be more expensive than chemical fertilizers if organic inputs are purchased.
2. Production in organic farming declines especially during first few years, so the farmer should be given premium prices for organic produce.
3. The guidelines for organic production, processing, transportation, certification, etc., are beyond the understanding of an average farmer.
4. Marketing of organic produce is also not properly streamlined.
5. Although nearly every crop can be produced organically, some crops are harder to grow organically.
6. Organic production is more labor-intensive than conventional production.
7. Organic products are usually sold for higher prices than non-organic products.
8. Production costs are high because farmers need more workers.
9. Organic farming cannot produce enough food that the world's population needs to survive.

It has been shown that organic farming tends to increase the soil organic carbon (SOC) content. Practicing and mastering organic farming can be most effectively achieved by training and education. In order to convey the importance of organic farming to upcoming generations, education on organic farming should be provided at all levels.[11] More information on organic farming can be found in books in.[12-14]

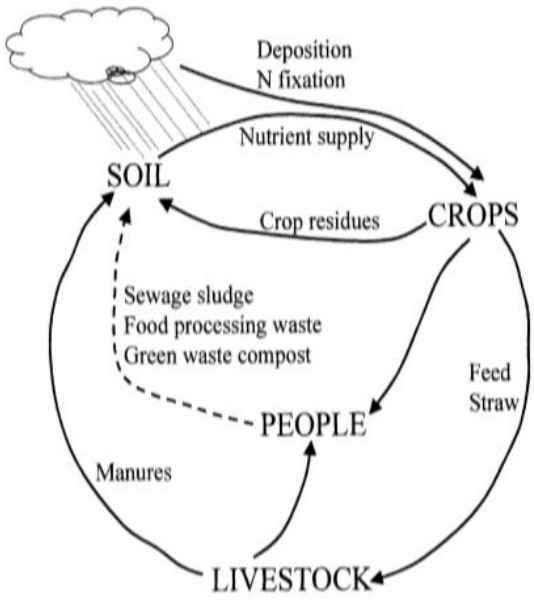

Figure 1: Organic cycle of an organic farming system.[8]

CONCLUSION

Organic farming can be a viable alternative production method for farmers. It is becoming more and more prevalent. It has been embraced by the mainstream and shows great promise commercially, socially, and environmentally. Future organic farming must maintain its environmental benefits, increase yields, and reduce prices while meeting the challenges of climate change and increasing world population. The increase in plant earnings couple with the protection of the environment will be a global task in the future.

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