

(Review Article)

Exploration of Different Study on Organic and Chemical Cultivation in Agricultural Sector

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Abstract

Healthy food is crucial in the modern world, but farmers and market vendors are employing more chemicals, which is polluting the waterways overall. Farmers are primarily using more chemical fertilizers, which have an impact on the soil, resources, animals, plants, and human health. They're all contaminated because of inorganic farming. Therefore, the key is to avoid using chemicals in marketing and to use less chemical fertilizers to increase yields. Consequently, this lowers the risk of developing cancer, heart attacks, strokes, and many other illnesses. Enhancing organic yields is crucial because it will encourage the government to get involved, take the initiative to encourage farmers to use organic fertilizers, market organic products separately, and encourage government websites to offer free certification and additional subsidies to organic farmers. The article outlined the key benefits of adopting organic farming, the ways in which it differs from chemical farming, and how it protects the ecology and climate.

Keywords: Healthy food, organic yields, inorganic farming, Soil health, Environment effect.

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1. Introduction

India is credited with pioneering organic farming through the development of environmentally friendly techniques including crop rotation, mix farming, and mix cropping. Originally used by Lord Northbound in 1940, the phrase "organic farming" has been more well-known in the past ten years as a possible remedy for modern agricultural problems [1]. This is not only essential for farmers but also a societal requirement from the standpoint of the customer [2].

In Bangladesh's agricultural sector, one of the main issues with land degradation that has a negative impact on agricultural land production is soil salinity. Saline water and salinization are the main contributing factors to disasters such as storms, tidal surges, flash floods, and tidal variation because they cause large amounts of saline water to arrive, overwhelm, and inundate coastal areas [3, 4].

The 2018 World of Organic Agriculture report [5] states that although 30 percent of the world's organic producers are based in India, the country only uses 2.59% of all organic agricultural lands. Pesticides, herbicides, fungicides, insecticides, and fertilizers are used in chemical farming, which pollutes water and endangers the environment. The environmental effects of these substances are significant even at low concentrations. Data on pesticide exposure spanning 20 years show connections to brain disorders, degenerative illnesses, problems with fetal development, congenital defects, and human cancer [6]. In developing nations, the overuse of pesticides for the last thirty years has resulted in serious health issues for people [7]. By creating a favorable perception, organic farming stands out as a special method that strikes a balance between environmental sustainability and consumer safety [8].

Below a certain level of salt, agricultural systems can block salt without changing their properties and feedbacks. The implementation of flexible farming technologies such as salt-tolerant rice varieties, preparation of cropping the calendar, or controlling irrigation and water infiltration work effectively to prevent salt damage to rice and rice-shrimp systems [9, 10]. More solutions can be the development of early warning systems as well as awareness of salt infiltration into water to reduce exposure systems at high-salt events. Structural

adaptation measures such as the construction of a protective infrastructure and development of irrigation networks, as well as application of ecosystem-based adaptation measures such as mangroves reforestation and rehabilitation of wetlands, can also reduce magnitude of salt infiltration. One of the dangers of structural steps is modification of exposure to risks and focus on one part of strength that may lower the quality of some of the strength components and all over time due to depletion of biodiversity, duplication of activity, and spatial variability [9-12].

When compared to concentrated organic manure, the levels of nutrients in farm yard manure (FYM) and green manure are lower [13] and well-decomposed mixture of dung, urine, farm litter, and residual components. The studies highlight compost, which is created by the anaerobic breakdown of considerable waste materials such as vegetable waste, weeds, stubble, garbage from sugarcane, sewage sludge, animal waste, and industrial refuse [14].

To improve the physical structure and fertility of the soil, green manuring entails ploughing and adding undigested green plant tissues. For this reason, green manure crops like Sun hemp, Dhaincha, Cowpea, Cluster Bean, Senji, and Berseem are frequently used [15]. Several studies show that organic soils perform better than conventional soils across a range of soil health parameters. Compared to conventionally managed soils, organically managed soils display better levels of biological activity, improved soil stability, increased biomass, and higher variety. These soils also have higher aggregate stability, porosity, and water-holding capacity, which gives them an advantage in yield during harsh weather conditions like droughts and floods. This implies that organic farming might be more adaptable to climate change [16].

2. Approaches to organic farming

Crop rotation, composting, green manures, mechanical pest management, and biological pest control are the main techniques used in organic farming.

Using this agricultural approach, farmers grow a variety of crops in rotation to keep the soil healthy rather than planting the same crop on the same plot of land each year. This is an excellent farming practice that organically refills the soil by



allowing different plants to add different nutrients to it. By upsetting their habitat, this method aids in the control of pests, weeds, insects, etc. [11].

Green manure this is the term for dead plants that have been pulled out and blended into the soil. As nutrients, these plants contribute to increase the fertility of the soil [17].

One of the best organic farming practices' natural fertilizers is compost. It is a recycled organic matter that has been greatly enhanced with nutrients to promote crop output and soil quality [18].

A novel technique known as "Polyculture" is popular right now. With polyculture, different crops can be grown at the same time to meet the growing global demand for food. However, traditional farmers were accustomed to following a method known as "monoculture," in which a single crop was grown in a specific area [19].

The most important ingredient for cultivation is soil. After crops are cultivated, the soil loses nutrients and becomes less healthy. Therefore, managing the soil is essential to replenishing it with the nutrients it needs. Primarily, organic farming aims to improve soil quality through natural methods. Because of this, organic farming concentrates on employing bacteria - which are found in animal waste - to assist raise the soil's nutrient content and make it more productive [20].

3. Pest Management

A wide variety of creatures can be found on agricultural fields; some of these species help crop production, while others pose a threat by interfering with it. For the sake of crop security and soil fertility, the population of dangerous organisms must be controlled. To biologically control pests, organic farmers use natural or mild herbicides and pesticides with a lower chemical content. To further effectively reduce the presence of hazardous organisms in the field, appropriate farm sanitation procedures are put into place [21].

Unnecessary plants that grow in agricultural fields alongside crops are weeds and wild grass. Crop productivity is impacted by these weeds because they absorb the majority of the nutrients present in the soil. Rather than completely eliminating weeds, organic farming techniques try to slow their growth [22, 23].

Health problems result from chemical poisoning

of the soil in chemical farming. Groundwater is considerably overused in chemical product use compared to organic farming. Raising more than one crop offers less flexibility. Productivity increases do not result in a sustained increase in income. Thus, we could draw the conclusion that farmers become more profitable in the short run. Soil fertility and biodiversity will eventually decline if chemical farming persists [24].

4. Advantages and Disadvantages

- Chemical fertilizers are reliable and consistent.
- Fertilizers have the power to quickly transform infertile soil into fertile ground.
- They give the plant just the appropriate amount of nutrients.
- The three NPKs that are essential for plant growth are included.
- They eliminate the need for crop rotation by enabling the growth of the same vegetable plants in the same spot. They are more affordable and easier to use than organic fertilizers.
- The right fertilizer formulation can be made to match the requirements of agricultural soils, resulting in the perfect farming environment.
- Chemical fertilizers affect the microbial population in the soil. Their acidity also changes the pH of the soil, making it acidic, which changes the kind of microorganisms that may live in the soil.
- Because chemical fertilizers are very soluble in water, they do not provide the plant with all the nutrients it requires and instead seep into groundwater. The plant can thus receive fewer nutrients as a result. The water is tainted by leached chemical fertilizer.
- These materials penetrate the earth's surface and mix with the clay to form solid, impermeable layers of hardpan. As a result, the soil becomes compacted. Chemi-



cal fertilizers can promote plant illnesses. Fast-release chemical fertilizers contain more nitrogen than slow-release organic fertilizers. When there is more nitrogen (N) than phosphate, plants produce more.

5. Comparing chemical and organic farming:

A sustainable approach to agriculture is represented by organic farming, which uses a variety of methods including mulching, intercropping, and integrating crops and livestock. Organic farming strictly adheres to its principles, which forbid the use of synthetic inputs and place a premium on maintaining the health of the soil [25]. It is a strong substitute to mitigate the harmful effects of chemical farming. This farming technique uses biological fertilizers and pest management strategies to grow different types of plants in different fields. Organic farming was first introduced to lessen the harmful effects of artificial pesticides and fertilizers. Its goal is to restore, maintain, and improve ecological equilibrium. It maintains soil health, ecosystem health, and human health by balancing science, innovation, and tradition for the good of the environment and human well-being. The organic farming technique relies on the organic matter's natural breakdown, which replenishes nutrients through composting and green manures. In addition to replacing dangerous chemicals with safer alternatives, weed management techniques include tillage, cutting, mowing, and applying heat using organic materials to prevent weed growth. Interestingly, organic farming requires less irrigation and has no negative effects on the quality of the land, air, or water [26].

Intensive farming, also referred to as chemical farming, uses a lot of chemical fertilizers and pesticides in combination with a high labor input and a low crop rotation ratio. In addition to using mechanical cultivation, plant growth regulators, and chemical inputs, this strategy makes use of genetically modified plants that are intended to produce vast amounts of food [27]. Chemical farming is distinguished from organic farming by its chemical-centric approach as opposed to its ecological one. Despite its productivity, it has more negative effects than positive ones, damaging the environment and the natural ecology. There is a rise in the need for irrigation as a result of the negative impacts on the land, air, and water. Chemical farming was first used as a

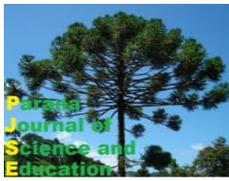
vital solution to deal with low productivity during the industrial revolution, when machines replaced human labor. But as alternatives like organic farming, zero waste agriculture, integrated multitrophic aquaculture, and sustainable farming have become more well-known, it has become less and less common [28, 29].

6. Conclusions

It is difficult to conclude which organic farming is better than chemical farming because there are so many variables to consider. Each system's efficiency and profitability depend on a variety of site-specific elements, crop considerations, market prospects, labor availability, agronomic issues, and farmer managerial expertise, all of which have an impact on the overall performance of the farm. Crop selection and profitability are closely related; they are influenced by governmental support programmers, product demand, and environmental conditions. Even with its acknowledged shortcomings, chemical farming is still the most common approach. A more productive strategy would be to encourage farmers to plant safer and more cost-effective crops while minimizing any downsides, as opposed to engaging in a binary conflict between the two ways. It is important to understand that each approach has advantages and disadvantages. When deciding between chemical and organic farming, we must take into account our preferences: do we value food that is safe and devoid of chemicals, or do we choose more affordable, easily obtainable options even though they can be harmful to our health? Achieving a balance and developing a farming technique that provides food that is both safe and reasonably priced are crucial objectives. We may contribute to a more sustainable and healthy agricultural landscape by encouraging the production of crops with fewer downsides.

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