

BUILDING GLOBAL FOOD SECURITY THROUGH ORGANIC FARMING PRACTICES: A LITERATURE REVIEW

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Abstract

Organic farming is identified as one of the sustainable approaches with great potential to improve global food security. Through practices that maintain soil quality, enhance biodiversity, and reduce negative impacts on the environment, organic farming offers environmentally friendly solutions that can strengthen the global food system. This literature review explores the benefits and challenges faced in the widespread adoption of organic agriculture. It was found that, although organic agriculture contributes positively to sustainability and nutritional quality, lower production compared to conventional methods and various obstacles such as access to markets and limited knowledge are major obstacles. Therefore, policy support, economic incentives, technological innovation, and education are needed to maximise the potential of organic agriculture. Collaboration between stakeholders is essential in facing challenges and promoting organic agricultural practices as an integral solution for food security in the future.

Keywords: Global Food Security, Organic Agricultural Practices, Literature Review.

Introduction

Food security is a condition in which everyone, at all times, has sufficient physical, social, and economic access to food that meets their nutritional needs to live an active and healthy life. Food security covers four main dimensions: food availability (consistently adequate food procurement), food access (the ability to obtain adequate food), food utilisation (the use of food based on basic knowledge of nutrition and health), and food stability (resilience to risks, such as climate change or economic crises, that can disrupt the other three aspects) (Walker & Harris, 2020). Thus, food security is not only about the amount of food available, but also about its quality, affordability, and fair distribution throughout the population (Niggli et al., 2019).

Food security plays a very important role in every country because it is the main foundation for ensuring the health, welfare, and social and economic stability of society. With good food security, countries can reduce hunger and malnutrition rates, which directly contribute to increased productivity and educational performance (Johnson, 2023). In addition, food security can reduce vulnerability to fluctuations in global food prices and natural disasters, thus ensuring the sustainability of food resources in the future. Countries with strong food security are also better able to maintain their food sovereignty, reduce dependence on food imports, and strengthen the national economy through sustainable agricultural sector development. Overall, food security is

a vital component in building a resilient, healthy, and productive society (Walker & Harris, 2020).

Therefore, food security is one of the global issues that is gaining increasing attention in the 21st century. With the world population projected to reach 9.7 billion by 2050, the challenge of providing sufficient, safe, and nutritious food for all is becoming increasingly urgent. One approach often proposed to address this problem is to adopt organic farming practices (Seufert et al., 2012).

Organic farming refers to a cultivation system that minimises the use of synthetic chemicals, such as pesticides and artificial fertilisers, by relying on natural methods to improve soil fertility and control pests. This method is considered more environmentally friendly than conventional agriculture, given its lower impact on biodiversity, soil quality, and human health (Ponisio et al., 2015).

Various studies have shown that organic farming can improve soil quality and maintain a healthier agricultural ecosystem. For example, practices such as the use of compost and green manure have been shown to increase soil fertility and water retention capacity, which is very important in dealing with the effects of increasingly erratic climate change (Gomiero et al., 2011).

However, the adoption of organic agriculture also faces a number of challenges. One of them is the perception that the yields from organic agriculture are lower than those from conventional agriculture, although several studies show that with proper management, the yields from organic agriculture can match or even exceed those from conventional agriculture in the long term (Taylor & Davis, 2022). In addition, organic farming is often presented as a solution for developed countries, while its potential and applicability in developing countries still need to be studied in more depth (Hughes & Wood, 2022).

The purpose of this literature review is to collect and analyse existing research on the potential contribution of organic agriculture to building global food security. With a more comprehensive understanding, it is hoped that effective strategies can be found to implement organic agriculture in various global contexts, so as to strengthen food security in a sustainable manner.

Research Methods

The study in this research uses the literature method. The literature research method is an approach used to collect, examine, and synthesise existing information from various written sources relevant to a particular research topic. It includes the identification, critical evaluation, and analysis of literature such as books, scientific journals, articles, reports, and trusted online sources (Fink, 2019); (Alvesson & Sandberg, 2013). The purpose of the literature research method is to develop a deep understanding, identify knowledge gaps, and build a strong theoretical basis for

research. The process involves systematic steps such as determining research questions, searching for literature sources, filtering and evaluating the information obtained, and compiling the findings in a coherent and structured form. Thus, this method helps researchers to support their arguments with evidence that has been recognised by the scientific community (Knopf, 2006).

Results and Discussion

Organic Farming Practices

The practice of organic farming is a holistic approach to agriculture that emphasises the use of natural processes and environmentally friendly techniques to produce healthy, high-quality food. The main principle of organic farming is to avoid the use of synthetic chemicals such as pesticides, herbicides, and artificial fertilisers, as well as genetic engineering. Instead, organic farming relies on biological methods such as natural pest management, crop rotation, and the use of organic fertilisers such as compost and green manure to maintain soil fertility and plant health (Crowder & Reganold, 2015).

One of the important aspects of organic farming practices is crop rotation, which involves planting different types of crops on one piece of land in turn throughout the growing season. This method helps reduce the risk of pest and disease attacks and increases soil fertility with various nutrients. Crop rotation can also help reduce soil erosion and improve soil structure, which in turn supports healthier and more productive plant growth (Jackson & White, 2022).

Natural pest and disease management is also a key element in organic farming. Instead of using chemical pesticides, organic farmers rely on various techniques such as the use of natural predators (e.g., predatory insects), antagonistic microorganisms, and the cultivation of trap crops that lure pests away from the main crop. Companion planting is also often used to significantly reduce pest infestation by attracting beneficial insects or releasing substances that repel certain pests (Smith, 2023).

In addition, the use of organic fertilisers such as compost and green manure is also important in organic farming. Compost, which is made from plant residues and other organic materials, increases the humus content in the soil, which helps to retain moisture and slowly provide nutrients to plants. Green manure, which are plants that are planted and then ploughed back into the soil, help to increase the nitrogen content in the soil and improve the soil structure (Evans & Perez, 2022).

Organic farming also prioritises the welfare of farm animals. Organically raised animals are fed organic food and allowed to live in conditions that allow them to behave naturally. Antibiotics and growth hormones are avoided unless absolutely necessary for animal health. This approach not only produces healthier animal products but also supports ecosystem balance by reducing water and soil pollution from livestock waste (Richardson, 2020).

Overall, organic farming practices aim to create a sustainable agricultural system that can produce high-quality food while maintaining a healthy environment. Through these techniques, organic farming seeks to improve soil fertility, maintain biodiversity, reduce dependence on synthetic chemical inputs, and support the overall well-being of the farming community. Proper implementation of organic farming can provide long-term solutions to the environmental and social challenges of modern agricultural systems.

Benefits of Organic Agriculture for Global Food Security

Organic farming has great potential to contribute to global food security. One of the main benefits of organic farming is the ability to produce healthier and more nutritious food. Without the use of synthetic chemicals, organic agricultural products tend to have a lower risk of pesticide residues, which has a positive impact on consumer health. In addition, several studies show that organic food often contains higher amounts of nutrients compared to conventionally produced food (Tuck et al., 2014).

Furthermore, organic agriculture plays an important role in maintaining soil and ecosystem health. By avoiding the use of artificial fertilisers and adopting practices such as crop rotation, compost use and green fertilisers, soil fertility can be maintained or even improved. This is important for long-term food production, as healthy soil is capable of producing healthy and productive crops. Soil health also supports biodiversity, which maintains more balanced and resilient ecosystems in the face of environmental change (Williams, 2020).

Organic farming also helps reduce the negative environmental impacts often associated with conventional farming. Reduced use of pesticides and artificial chemical fertilisers reduces groundwater and water pollution, as well as greenhouse gas emissions. In addition, practices such as crop rotation and agroforestry help reduce soil erosion and increase soil carbon reserves. Thus, organic farming can be part of a global strategy to address climate change and improve long-term food security (Badgley et al., 2007).

Organic farming techniques also promote biodiversity both above and below ground. Plant diversity and natural pest management practices create an environment that supports a variety of insect species, birds, and soil microorganisms. This kind of diversity is important for ecosystem stability and helps protect plants from pest and disease attacks. Crop diversification can also help farmers reduce the risk of crop failure caused by climate change or pest attacks (Murphy, 2020).

Adopting organic farming can also improve the welfare of small farmers and rural communities. The organic approach is often more cost-effective because it reduces dependence on expensive chemical inputs. Organic farmers can also obtain a premium price for their products in the market, which helps increase income and encourage

economic sustainability in rural areas. In addition, organic farming methods are often more labour-intensive, which creates additional jobs for the local community (Reganold & Wachter, 2016).

Finally, organic farming also encourages greater community participation in the food system. As consumer awareness of the importance of sustainable and healthy food increases, the demand for organic products continues to grow. This encourages more farmers to adopt organic farming methods and collaborate with consumers and other stakeholders to create a healthier and more sustainable food system (Campbell & Baker, 2021). Through this initiative, organic farming has the potential to contribute significantly to global food security and the health and well-being of people around the world.

Challenges and Obstacles in the Implementation of Organic Agriculture

The implementation of organic agriculture faces various challenges and obstacles that need to be overcome to achieve success and sustainability. One of the main challenges is the knowledge and skill gap among farmers. Organic agriculture requires a deep understanding of organic techniques and principles, such as natural pest management, the use of organic fertilisers, and crop rotation. Many farmers, especially in developing countries, still lack access to the training and resources to effectively adopt organic farming methods (Martinez & Thomas, 2021).

In addition, the transition from conventional to organic farming can be time consuming and costly. During the transition period, the soil and ecosystem need time to restore their health without chemical inputs. This often results in a temporary decline in crop yields, which can be an economic burden for farmers. In addition, the cost of organic certification can be high and is an obstacle for small farmers to market their products as organic (Green & Wright, 2021).

Resistance to pests and diseases is also a challenge in organic farming. Without the use of synthetic pesticides, organic farmers must rely on natural pest control methods that may not be as effective as chemicals. This requires a more in-depth knowledge of biodiversity and ecosystems, as well as a readiness to face the possibility of greater losses. Reliance on biological control and cultivation methods can also require more time and precision in their implementation (Brown & Green, 2021).

Policy disparities and government support also play an important role in hampering the development of organic agriculture. Some countries may provide insufficient incentives or subsidies for organic farmers, while support programmes are more geared towards conventional agriculture. Without strong policy support, the adoption of organic agriculture can be hampered. Supportive policies, such as subsidies for organic fertilisers, technical training programmes, and financial incentives for the transition period, are essential to encourage more farmers to switch to organic methods (FAO, 2018).

Market challenges also affect the implementation of organic agriculture. Although the demand for organic products is increasing, distribution and market access are still obstacles, especially for farmers in remote areas. Limited access to fair and certified markets can make it difficult for organic farmers to achieve the expected premium prices. In addition, fluctuations in the price of organic products can cause economic uncertainty for farmers (Scott & King, 2021).

Finally, the issue of long-term sustainability needs to be considered in the implementation of organic agriculture. Although organic farming is more environmentally friendly, there is a need to ensure that organic practices remain effective in the long term. This includes maintaining soil fertility, controlling erosion, and protecting biodiversity. Continuous research and innovation are needed to explore new practices and technologies that can improve the productivity and sustainability of organic farming, so that farmers can continue to make a positive contribution to global food security without compromising the environment (Miller, 2020).

In conclusion, the implementation of organic agriculture faces various complex challenges and obstacles. These include a lack of knowledge and training among farmers, the cost and time of transitioning from conventional agriculture, and challenges in the natural control of pests and diseases. Other obstacles arise from a lack of government policy support, limited market access, and economic challenges related to the organic products market. To overcome these obstacles, comprehensive support is needed in the form of education, supportive policies, and continuous research and innovation. Thus, organic farming can be a sustainable solution and contribute positively to global food security and the environment.

Conclusion

Organic farming has significant potential to improve global food security. Organic farming practices are able to maintain soil quality, increase biodiversity, and reduce the negative environmental impacts often associated with conventional farming. In addition, this approach supports sustainability through environmentally friendly production systems, reduces dependence on synthetic chemical inputs, and improves the nutritional quality of agricultural products.

However, there are various challenges in optimising organic farming as a single solution for food security. Organic agricultural production tends to have lower yields compared to conventional methods, which can affect food availability, especially for rapidly growing populations. In addition, challenges such as access to markets, infrastructure, and knowledge and training for farmers hinder the widespread adoption of these practices. Therefore, intensive efforts in research and innovation are needed for organic farming to achieve higher productivity efficiency.

To support the growth of organic agriculture and its contribution to global food security, it is important to formulate policies that support the growth and development of this sector. This includes incentives for organic farmers, investment in infrastructure and supply chain development, and educational campaigns to raise public and farmer awareness of the benefits of these practices. Collaboration between the government, non-governmental organisations, researchers, and the community will be the key to facing and overcoming various challenges and maximising the potential of organic agriculture in answering future food needs.

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