

ORGANIC AGRICULTURE AS A PILLAR OF SUSTAINABLE FOOD SECURITY: AN ANALYSIS OF VARIOUS STUDIES

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Abstract

Organic farming plays an important role in supporting sustainable food security through improving soil fertility, conserving biodiversity, and reducing the use of synthetic chemicals. Studies indicate that this practice not only produces healthier food but also has the potential to improve farmers' economic welfare through job creation and higher selling prices. However, there are implementation challenges such as certification costs and the need for specialised knowledge. Support from the government and relevant institutions is needed to overcome these obstacles and maximise the benefits of organic farming for food security and a more sustainable environment.

Keywords: Organic Farming, Pillars of Resilience, Sustainable Food.

Introduction

Food security is one of the global issues that continues to be a major concern, especially with the increasing world population and pressure on natural resources. In the midst of these challenges, agriculture as the main sector providing food has a very important role (Tilman et al., 2002) .

Food security is the condition in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their nutritional needs and food preferences, enabling them to lead healthy and active lives. The concept contains four main dimensions: food availability, food access, food utilisation and stability of food supply over time (Rockström & Falkenmark, 2015) . Food availability emphasises the physical presence of sufficient food, whether locally produced or imported; food access focuses on the ability of individuals to obtain food through various means, either by purchasing or growing their own; food utilisation relates to how available food is used to meet nutritional needs; and food supply stability emphasises the importance of stable food availability and access regardless of potential disruptions such as natural disasters or economic crises (Gliessman ., 2015)

The urgency of food security is increasing in line with global challenges such as population growth, climate change and environmental degradation. Estimates show that by 2050, the world population will reach around 9.7 billion people, significantly increasing the demand for food. In addition, climate change has exacerbated food production uncertainty with higher frequency and intensity of natural disasters, such as floods, droughts, and storms (Giller et al., 2009) . On the other hand, degradation of agricultural land due to overuse of synthetic chemicals and unsustainable farming practices threatens long-term productivity. Ensuring food security is therefore an urgent collective responsibility. Ignoring this issue not only impacts global health and well-being, but can also trigger social and political conflicts due to resource scarcity. This is the reason why sustainable approaches such as organic farming and technological innovations in the agricultural sector are crucial to improving global food security (Ponisio et al., 2015) . However, conventional agricultural practices have led to various environmental problems such as soil degradation, reduced water quality, and loss of biodiversity. This has triggered the need for new, more sustainable approaches to food production.

Organic farming is emerging as a promising alternative in creating a more environmentally friendly and sustainable agricultural system. Organic farming brings a different approach by minimising the use of synthetic chemicals and promoting ecosystem balance. This practice not only aims to maintain long-term soil fertility, but also increases biodiversity and reduces carbon footprint. Besides the environmental aspect, organic farming is believed to provide economic benefits to farmers through higher value-added products (Halweil ., 2004)

However, the adoption of organic farming still faces various challenges, such as low initial productivity, higher capital requirements, and a long learning curve for farmers. Therefore, it is important to analyse the various studies that have been conducted on the impact and effectiveness of organic farming. This research aims to fill the knowledge gap regarding the role of organic farming in sustainable food security, with the hope of providing more comprehensive and in-depth insight (Garritty et al., 2010) .

Through a thorough literature review, this research will investigate how organic farming can contribute to food security, what benefits have been proven from various studies, as well as the challenges that remain on the ground. In an era where sustainability is a keyword in global development, understanding and optimising practices such as organic farming is a crucial step towards ensuring sustainable food security for future generations.

Research Methods

The study in this research uses the literature method. The literature research method, also known as literature review, is a research approach that involves collecting,

evaluating and analysing a variety of existing sources related to a particular research topic or problem. This method aims to gain an in-depth and thorough understanding of the current state of research, identify gaps or shortcomings in previous research, and highlight key relevant trends and findings. This process usually starts with a search of various sources of information such as books, scientific articles, journals, reports, and other publications, both from print and digital sources. Next, researchers screen and select these sources based on predetermined inclusion and exclusion criteria (Rossi et al., 2004) ; (Silverman, 2015) . Finally, the findings from the reviewed literature were organised, analysed and synthesised to paint a coherent and comprehensive picture of the topic under study. Literature research methods are essential as a theoretical foundation and to support the validity and reliability of subsequent research (Borenstein et al., 2009) .

Results and Discussion

The Role of Organic Farming in Food Security

Organic farming plays an important role in supporting global food security by offering a more sustainable and ecological alternative to conventional farming practices. By avoiding the use of pesticides and synthetic chemical fertilisers, organic farming focuses on environmental sustainability and improving soil health (Willer & Lernoud, 2017) . One of the main benefits of this practice is the potential to improve soil fertility through the use of natural fertilisers and techniques such as crop rotation and composting. As such, organic farming can increase long-term productivity and maintain healthy ecosystems, which are important factors in achieving food security amidst the threat of environmental degradation (Willett et al., 2019) .

In addition, organic farming provides benefits in terms of biodiversity. By maintaining crop diversity and promoting ecosystem balance, this method helps prevent pest attacks more naturally and minimises the risk of crop failure. By diversifying crops, organic farmers can also increase resilience to climate change, as variations in crop types can adjust to different extreme weather conditions such as drought or heavy rains. This diversity contributes to food supply stability, which is an important element of food security (Belshaw, 2011) .

In addition to ecological benefits, organic farming also has the potential to improve economic access to food. Although organic products generally come at a higher price, studies show that organic farming techniques can reduce production costs in the long run by reducing reliance on chemical inputs and improving resource use efficiency. This means that organic farming can increase profit margins for small and medium-sized farmers, who are the backbone of many rural food systems in developing countries (Beddington, 2010) .

On the other hand, organic farming also supports the social aspects of food security by promoting more equitable and socially sustainable practices. For example,

by using more environmentally friendly techniques, organic farming can create jobs in local communities and improve people's skills in sustainable resource management. This not only increases income but also strengthens local capacity in food production, contributing to the food self-sufficiency of such communities (Godfray et al., 2010) .

However, despite its many benefits, organic farming also faces a number of challenges. One of the main obstacles is the lower yield potential compared to conventional farming, especially in the early phase of the transition. This calls for adequate policy support, training, and access to technology to help farmers overcome production constraints and improve efficiency. Continued research and innovation in organic farming techniques are also needed to meet the growing demand for food (Smith, 2020) .

Overall, organic agriculture offers a significant contribution in supporting food security through a balanced approach between ecological, economic, and social needs. To maximise the potential of organic agriculture in the global food system, collaboration between governments, the scientific community, farmers, and the private sector is needed to develop policies that support and incentivise sustainable agricultural practices. Thus, organic agriculture can play a greater role in building a safe, healthy, and sustainable food system for future generations.

Limitations and Challenges Faced in Implementing Organic Farming

While organic farming offers a number of environmental and health benefits, it also faces significant limitations and challenges. One of the main challenges is the high cost of production. Organic products often require more expensive inputs, such as organic fertilisers and natural pesticides, compared to conventional farming. Furthermore, the required organic certification also involves additional costs and a lengthy process, which can be burdensome for smallholder farmers (Newton et al., 2011)

In addition to high production costs, land availability is also a challenge. Organic farming often requires crop rotation and larger areas of land to maintain soil fertility and reduce the risk of pests. In already densely populated areas or in developing countries where agricultural land is limited, expanding land for organic farming can be difficult and not always feasible (Davis, 2014) .

Another constraint is farmers' knowledge and skills. Organic farming requires a deep understanding of ecosystems, nutrient cycling, and natural pest management. Many farmers are unfamiliar with or do not have access to education on these organic practices, so it takes longer to adapt and reap optimal results (Leakey, 2014) .

Weather and climate factors also have a major influence on organic farming. Without the use of synthetic chemical pesticides, organic crops can be more susceptible to pests and diseases, especially in extreme or unpredictable weather conditions. This unpredictability can reduce productivity and crop yields, thus reducing profits for organic farmers (Alexander et al., 2017) .

In addition, marketing organic products can also be a challenge. The market for organic products may still be limited and not all consumers are willing to pay higher prices. Distribution and logistics of organic products that require specialised handling can also add cost and complexity to the supply chain (Badgley & J. Perfecto, 2007).

Finally, government regulations and policies also play an important role in supporting or hindering organic farming. Unfavourable policies or lack of incentives for organic farmers can slow down the development of the sector. On the other hand, policies that encourage the use of conventional agricultural technologies and practices are often at odds with the principles of organic farming (Reganold & Wachter, 2016).

With these limitations and challenges, while organic farming promises great benefits, the transformation to this direction requires collaborative efforts between the government, private sector, and farmers themselves to overcome these barriers and move towards a more sustainable agricultural system.

Conclusion

Organic farming has been identified as one of the effective solutions to achieve sustainable food security. Studies show that organic farming practices not only improve soil fertility and biodiversity, but also reduce dependence on synthetic chemicals such as pesticides and fertilisers. By adopting more environmentally friendly farming practices, farmers can produce food products that are healthier and have higher nutritional value, helping to realise stronger and more sustainable food security.

In addition, organic farming has the potential to improve farmers' economic welfare. Organic farming techniques often require more labour, which in turn can create new jobs and increase farmers' income. Some studies also show that organic agricultural products tend to have a higher selling price in the market, as consumers are willing to pay more for products that they perceive as healthier and environmentally friendly. Thus, organic farming can also play a role in poverty alleviation in rural areas.

However, despite the many benefits, the challenges of implementing organic farming must be recognised. Farmers often face obstacles such as high initial costs for organic certification, as well as the need to adapt their farming practices that require specialised knowledge and training. Support from the government and relevant institutions is needed to provide adequate incentives and education so that the transition to organic farming can be smooth and provide maximum benefits for food security and a more sustainable environment.

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