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Factors Affecting Smallholder Farmers' Well-being: A Systematic Review

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Abstract
The agricultural management challenges faced by smallholders differ between developed and developing countries and can significantly impact their well-being. This study aims to identify the factors that affect the well-being of smallholders by conducting a systematic literature review using the Preferred Reported Item for Systematic Review and Meta-Analysis (PRISMA) methodology. The authors selected 30 articles from Scopus and Web of Science that identified three main factors driving well-being: technology, optimal resource utilization, and insurance. Two additional factors were also identified: market pricing and tax policy. Our findings indicate that these factors primarily affect economic well-being, followed by social well-being. However, the COVID-19 pandemic had an additional impact on smallholders' well-being, as it disrupted the food chain and caused labor shortages due to travel restrictions. Smallholders had to rely on e-commerce to sell their products, which resulted in losses and difficulty obtaining agricultural inputs. The absence of agricultural insurance worsened the impact on smallholders' well-being. To safeguard their well-being, this study suggests encouraging local labor participation, increasing investment in human capital, adopting e-commerce marketing, offering agricultural insurance against disasters, and providing or increasing subsidies to smallholders.

Keywords: smallholders, farmers, well-being, agriculture, marketing

Introduction

The economic well-being of smallholders is a crucial aspect of sustainable development and global food security. Smallholders, who are typically small-scale farmers and producers, play a significant role in meeting the growing demand for food and contributing to local and global economies. However, smallholders often face significant challenges in accessing markets, credit, and technology, and are vulnerable to the impact of climate change and other external shocks. The economic well-being of smallholders is important because it is linked to poverty reduction, food security, and rural development. Smallholders are often the backbone of rural economies and contribute to the livelihoods of millions of people worldwide. However, the challenges facing smallholders are significant, including access to land, water, and other resources, as well as inadequate infrastructure and institutional support (Zhong et al. 2020).

The agricultural industry is a crucial economic sector that plays a significant role not only in developing nations but also in developed countries. Its significance goes beyond ensuring food security as it also provides raw materials to various industries, creates employment opportunities,

and contributes to a country's economic growth and gross domestic product (GDP), and ultimately to the global economy (Al Salmi et al. 2020; Giller 2020; Zhong et al. 2020). The World Bank (2022) reports that agriculture contributes approximately 4% to the world's GDP, while in developing countries, it accounts for more than 25% of their GDP.

The agricultural sector faces distinct challenges in developed and developing countries. Developing countries, in particular, face the challenge of ensuring the welfare of their populations (Ma et al. 2021). In these countries, low levels of food security can result in inadequate access to safe and nutritious food, which can negatively impact people's health and well-being (Staatz et al. 2009). Additionally, the agricultural sector serves as a critical source of income and employment for local communities (Fani et al. 2021). For example, in Malaysia, the oil palm industry provides employment opportunities not only in plantations but also in downstream processing, which contributes significantly to the country's economy. Any challenges that the agricultural sector faces can, therefore, have a profound impact on the well-being of the population (Tambi et al. 2021).

Compared to developing countries, the agricultural challenges in developed countries are more focused on the demand and supply of agricultural products, the impact of technological advancements on output and prices, the relationship between domestic agriculture and international trade, and farm income (Say et al. 2018; Qiang et al. 2019). Oversupply of agricultural products leads to price pressure in developed countries. Additionally, industrial consolidation has created economies of scale, reducing the production costs of goods. However, this has also led to dependence on subsidies and increased the poverty gap between rural and urban residents in some developed countries. Therefore, governments must manage the demand and supply of agricultural products in a well-organized manner to overcome this imbalance. However, it is crucial to consider the benefits and drawbacks before implementing any measures. Furthermore, technological advancements in the agricultural sector have not been fully utilized in some developed countries, as high-tech machines and tools are still being developed despite already having cultivated plantations for some time (Nowak 2021).

The COVID-19 pandemic posed new challenges to agricultural management in both developing and developed countries. It originated in Wuhan, China, in December 2019 and rapidly spread, impacting global economic and agricultural structures (Okolie and Ogundeji 2022). The pandemic caused major disruptions to the agricultural sector, destabilizing the food supply chain. Grigorescu et al. (2022) and Mugabe et al. (2022) have identified three specific areas within the agricultural sector where COVID-19 has had a significant impact on the food supply chain.

The COVID-19 pandemic had a significant impact on agricultural production and income, particularly in developing countries. Curfew orders and travel restrictions resulted in labor shortages, which led to agricultural output not being harvested. This situation also put pressure on storage facilities since agricultural goods are highly perishable, causing smallholders to suffer losses. Farmers also found it difficult to procure agricultural inputs like fertilizers and pesticides, which had a profound impact on agricultural production and income.

Another effect of the pandemic was a shift in consumer demand. Food consumption rates outside of the home declined, and demand shifted towards ready-to-eat meals for easy storage,

driven by e-commerce. Some manufacturers began producing smaller quantities for home use rather than in bulk for deliveries to supermarkets. This shift in demand put pressure on the food chain and directly challenged farmers in selling their agricultural products, particularly smallholders who relied on markets, supermarkets, and restaurants.

The pandemic also disrupted the food supply chain. Preventative measures to curb the spread of COVID-19 caused delays in transport and logistics services due to border closures and tightened inspection procedures. There were also restrictions on import and export inspections, ultimately affecting the availability of agricultural goods. Airline services were also disrupted since more commercial flights were needed to deliver perishable food products like fruits and vegetables. Port closures caused delays in product transport from exporting to importing countries, resulting in container prices rising. These disruptions affected not only the delivery of food products but also impacted agricultural inputs for production.

The pandemic's impact on the agricultural sector has affected small-scale farmers in particular, who make up more than 80% of the world's farms (Fan and Rue, 2020). One visible effect has been on their well-being, which is a combination of positive emotions, satisfaction, purpose, and positive relationships (Ruggeri et al., 2020). Well-being can also be defined simply as a positive feeling (Coffey et al., 2016), and Csikszentmihalyi and Seligman (2000) proposed five indicators of well-being, known as PERMA: positive emotions, engagement, relationships, meaning, and achievement. These indicators are important as they are naturally acquired by humans and are positively related to physical health, job satisfaction, life satisfaction, and organizational commitment (Kern et al., 2014). Measuring well-being involves both subjective (SWB) and objective (OWB) aspects (Alatartseva and Barysheva, 2015). SWB measures human feelings and considers universal needs, genetic predispositions, and economic, social, and natural environments, and is usually obtained through questionnaires or interviews. In contrast, OWB is evaluated through measurable data and is often used to identify levels of health, employment opportunities, socio-economics, politics, environment, and security.

According to Bakar et al. (2015), the sustainability of well-being can be achieved through economic and social well-being. It is because these two types of well-being are interdependent. Figure 1 shows the well-being sus tainability flow chart introduced by Bakar et al. (2015). The sustainability of well-being applies to humans, that is, people and communities, and the environment encompassing awareness, participation, and lifestyle. Previous research has identified numerous factors that impact well-being. To contribute to this body of knowledge, the present study aimed to identify factors that affect the well-being of small-scale farmers using a systematic literature review (SLR). Unlike previous studies, this research also examined the impact of the COVID-19 pandemic on small-scale farmers' well-being, based on the identified factors. The findings of this study offer valuable insights and a preliminary understanding for future researchers. Moreover, the results can inform policy formulation by governmental and non-governmental organizations that seek to enhance the well-being of small-scale farmers and other communities.

Research Method

In this study, the authors employed a systematic literature review (SLR) methodology to accomplish their research objectives. The SLR approach involves identifying, evaluating, and summarizing relevant research studies (Mariano et al., 2017). The study employed the PRISMA method, which is a widely used protocol for selecting literature from research databases. Petticrew and Roberts (2008) have highlighted the benefits of using the PRISMA method, including the ability to define research questions systematically, identify appropriate inclusion and exclusion criteria, and conduct a comprehensive search across multiple databases.

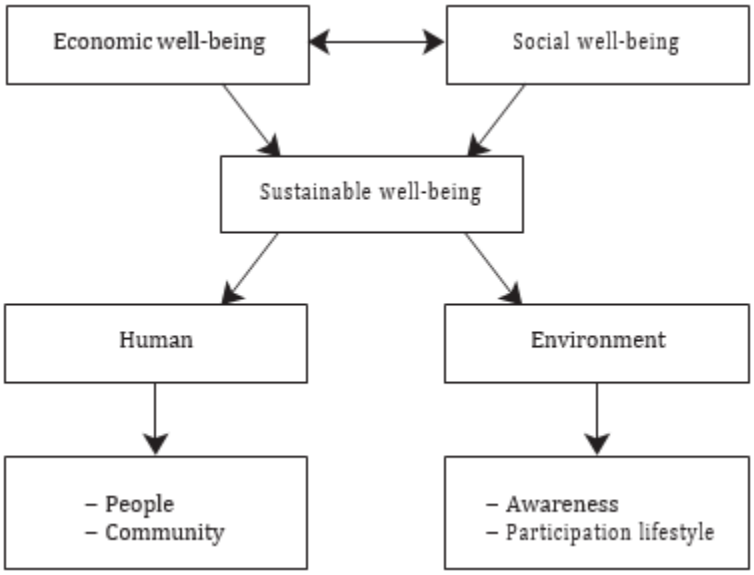

Figure 1. Well-being and sustainability flow chart (Bakar et al., 2015)

Shaffril et al. (2020) and Müller et al. (2020) have corroborated all three advantages. Consequently, the study sought to address the research question of identifying factors that impact smallholders' well-being by utilizing the PRISMA method. Figure 2 presents a summary of previous research studies found through the PRISMA-based literature search.

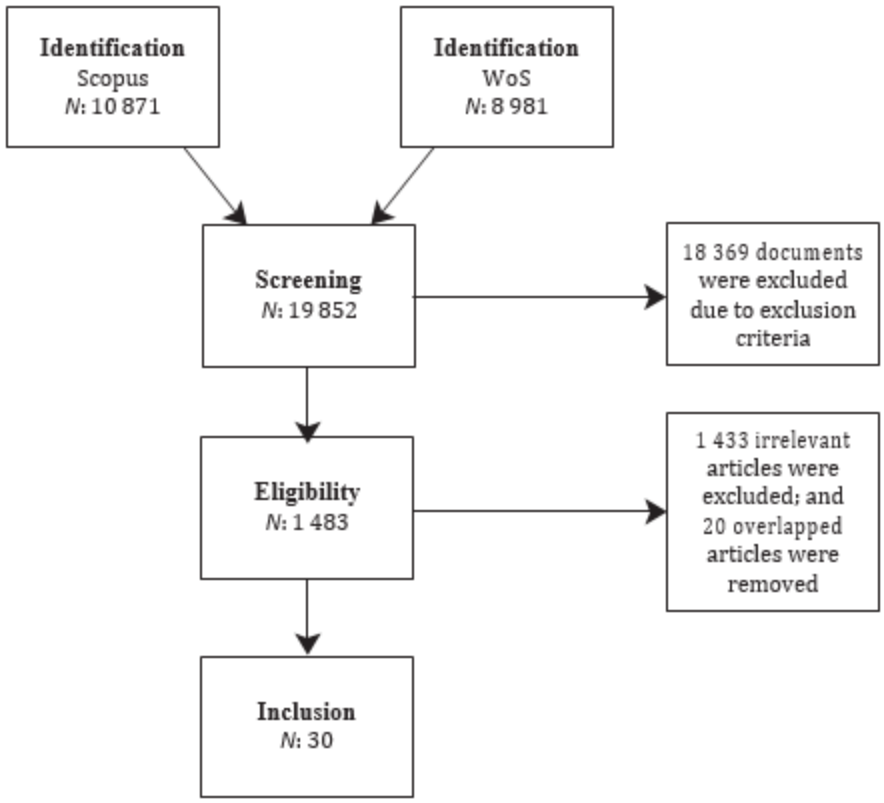

Figure 2. Preferred Reported Item for Systematic Review and Meta-Analysis (PRISMA) (Shaffril et al., 2020) and (Müller et al., 2020)

Figure 2 depicts the four stages involved in PRISMA, which include identification, screening, eligibility, and inclusion. Nevertheless, prior to conducting a literature search using the PRISMA approach, it is crucial for the writer to first identify the relevant keywords. The aim is to make the database searches more straightforward and efficient. The writer utilized the keywords "factor," "well-being," and "smallholder" during the identification stage and incorporated them into a series of search strings, as illustrated in Table 1.

Database	Keywords
Scopus	[('Factor*' OR 'Cause*' OR 'Influence*') AND ('Wellbeing' OR 'Well-Being' OR 'Welfare*') AND ('Smallholder*' OR 'Farmer*')]
Web of Science	[('Factor*' OR 'Cause*' OR 'Influence*') AND ('Wellbeing' OR 'Well-Being' OR 'Welfare*') AND ('Smallholder*' OR 'Farmer*')]

In contrast to other SLR studies that employed two primary search techniques, manual and advanced (Jaber et al. 2022; Fawadiya and Dhingra 2022), this study solely utilized advanced search techniques. Advanced search methods are generally considered to be more convenient compared to manual techniques since the latter requires a page-by-page search without the use of a search index in the database, usually relying on the Google Scholars database. On the other hand, advanced techniques use the phrase search function and Boolean operators such as 'OR' and 'AND' to combine the relevant keywords. Moreover, advanced search techniques have been shown to identify a greater number of relevant articles than manual search techniques (Kitchenham et al.

2010). This study opted to use Scopus and Web of Science (WoS) databases since they are the most reliable bibliographic data sources and are known for publishing a substantial proportion of research analyses and evaluations for the literature (Pranckutė 2021).

The first step of the PRISMA process is identifying relevant documents. In this stage, the researchers reviewed 10,871 and 8,981 documents from Scopus and WoS databases, respectively. The next stage is screening, where a total of 19,852 documents were evaluated using four criteria. The first criterion focused on the subject of the study, which was limited to Economics, Business, and Accounting. The second criterion selected only empirical journal articles, while other document types, such as conference papers, reviews, and book chapters, were excluded. The third criterion was limited to journals as the primary source for the study since they are highly reliable and offer proof of claims. Finally, the study selected only English articles, as language standardization is crucial to avoid confusion and prevent costly investigations. The third stage involved the removal of overlapping articles from both databases and those that did not fit the study's objectives. This process was manual, involving perusing the titles and abstracts, resulting in the removal of 1,433 articles. The study selected only empirical quantitative articles, leading to the removal of an additional 20 articles due to overlap. The final stage was inclusion, where 30 studies were analyzed after the completion of the PRISMA process.

Findings and Discussion

The study initially outlines the factors that impact the well-being of small-scale farmers, which have been previously examined by researchers. These factors include technology, optimal capital, and insurance, with pricing and tax policies also playing a role. Each of these factors will be discussed in detail, along with their implications for the well-being of smallholders in light of the COVID-19 pandemic.

Technology

The adoption of improved technology can result in a significant increase in production and quality output, leading to higher sales and income for small-scale farmers and ultimately contributing to their well-being. Past researchers, such as Audu and Aye (2014) and Awotide et al. (2016), have observed the positive impact of technology on smallholders' households, including increased income and formal education, as evidenced in case studies from Nigeria, Uganda, and India. The use of technology is not limited to crop production but can also be utilized in commercialized agricultural products, such as overcoming gender inequality in Uganda (Sekabira and Qaim 2017; Adams and Jumpah, 2021).

Moreover, the adoption of technology has resulted in several positive effects, such as social participation, health, business networks, credit access, land ownership, and an increase in family members, as observed in studies by Adams and Jumpah (2021), Hadush (2021), and Ruzzante et al. (2021). However, the COVID-19 pandemic has disrupted the well-being of smallholders in developing countries, where farm management technology is relatively lower and agriculture is labor-intensive. COVID-19 restrictions, such as curfews and travel bans, have led to labor shortages, making it difficult to harvest agricultural produce. This situation is felt in

countries that rely on foreign labor for agricultural purposes, and it has also affected developed countries like the United Kingdom, where there is a significant shortage of seasonal workers due to travel restrictions and the risk of COVID-19 infection among local workers.

Many countries implemented curfews that limited both domestic and international travel, resulting in repercussions for countries relying on foreign labor for agricultural purposes. The shortage of labor has led to significant challenges in harvesting agricultural produce (Olukunle 2013). While developed countries typically have more capital-intensive agriculture, they too faced disruptions in their farm activities due to COVID-19's impact on labor inputs. For instance, the United Kingdom (UK) is currently facing a labor shortage of 80,000 workers, including 60,000 seasonal workers who typically travel to the UK each year (Rama- kumar 2020). The shortage can be attributed to travel restrictions and concerns about the local workforce potentially contracting COVID-19.

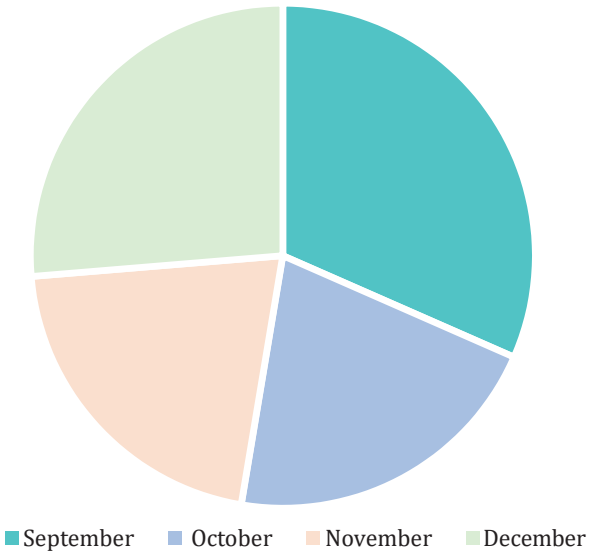

Figure 3. Changes in use of digital technologies by Kenyan smallholders during COVID-19, September to December 2020. Source: 60_decibels (2020)

The change in consumer demand has created immense pressure on smallholders to market their agricultural products, not only in developing countries but also in developed ones. Previously, markets, supermarkets, and restaurants were the primary avenues for selling their products. However, the COVID-19 pandemic forced the closure of these establishments to prevent the spread of the virus, significantly disrupting the existing market system. As a result, smallholders have been compelled to seek alternatives, including transforming their selling methods through e-commerce to meet consumer demand (Måren et al. 2022). The increased usage of digital platforms among smallholders during the pandemic has been noted by Arathoon et al. (2021). For example, a 60_decibels survey conducted on 1,954 smallholders in Kenya from September to December 2020 found that digital usage had increased significantly in September (12% of respondents), decreased to 8% in October and November, but returned to an increase in December (10%) (see

Figure 3). Apart from marketing, smallholders also use digital platforms for agronomic advice. However, this shift poses a significant challenge to smallholders in both developing and developed countries, as around 4 billion people worldwide, mostly in rural areas, lack basic internet connectivity (Graydon and Parks 2020).

Developing and developed nations alike have invested in advanced technologies to overcome the challenges faced by farmers during the pandemic-induced curfew. To address this issue, various initiatives have been undertaken. For instance, in China, a software application has been developed to aid smallholders in their agricultural pursuits. This technology leverages knowledge-graph technology to gather data on plant growth and recognition of plant images. The application enables farmers to manage water, fertilizer, and temperature usage through greenhouse automation without having to be physically present on the farm. Similarly, in countries like Germany, an application has been developed that allows farmers to monitor their crops by simply taking a photograph. This application employs machine learning (ML) and the Internet of Things (IoT) principles to determine patterns of crop efficiency and detect any pest attacks, while also helping smallholders identify land deficiency. Such apps can enhance the well-being of smallholders by improving their farming practices. However, the effectiveness of these applications relies heavily on the availability of high-speed internet in the area

Optimal resources

In order to maximize profits and minimize costs, it is crucial to optimize corporate resources. Similarly, agricultural production can be increased by ensuring the optimal utilization of resources. Various indicators have been employed by previous researchers to determine optimal resources as a determinant of well-being, including efficient farm management, increased investment in human capital, and agricultural inputs. Studies conducted by Ellen and Miet (2014) and Mariyono (2019) indicate that efficient farm management can enhance income levels, create job opportunities, and reduce poverty rates. This finding is further corroborated by Dhehibi et al. (2018), who suggest that when land and water are managed efficiently without causing harm to the environment, smallholders' lives become more prosperous. To prevent soil erosion and nutrient degradation, it is crucial to manage the soil and water used for agricultural activities effectively. However, soil nutrition can be restored through fertilization, which has been shown to improve well-being, including income levels for housewives, food security, and education (Surahman et al. 2019; Hörner and Wollni 2021). On the contrary, poor farm management can lead to a decrease in smallholders' income and jeopardize national food security (Dhehibi 2018)

Another important indicator for determining optimal resources is increasing investment in human capital. According to Wolz et al. (2010) and Moeis et al. (2020), optimizing human capital investment can result in increased income and education levels for smallholder households. Less skilled smallholders require more exposure to the agricultural products they cultivate, and investing in training and courses is a possible means of enhancing their human capital. When smallholders possess greater skills in handling the crops they cultivate, the production and quality of their products are likely to improve, ultimately contributing to their well-being. Additionally, increasing human capital has been shown to boost agricultural productivity, according to Zakaria

et al. (2019). Furthermore, optimal resources for the inputs utilized in agricultural production also play a crucial role in the well-being of smallholders. According to Afolami et al. (2015) and Nsabimana (2021), production can be increased by employing improved inputs, such as diverse seeds, non-organic fertilizers, and pesticides. Efficient use of agricultural inputs by smallholders can lead to higher household incomes and lower consumption costs.

The COVID-19 pandemic has significantly affected agricultural output and the income of smallholders, despite having optimal resources. Travel restrictions have resulted in difficulties in obtaining intermediate inputs such as fertilisers and pesticides, leading to a decrease in the purchase of agricultural inputs from abroad. The enforcement of travel restrictions has also caused delays in transport and logistics services, particularly at ports, resulting in losses for smallholders due to a lack of inputs for agricultural activities (Okolie and Ogundeji 2022). Moreover, the pandemic has impacted investment in human capital in the agricultural sector. Previously, investment in human capital focused mainly on face-to-face training and courses related to cultivation techniques. However, with the outbreak of COVID-19, such training and courses have transitioned online. Participation in online training and courses requires smallholders and workers to have skills in operating the platforms used. As a result, before the pandemic, smallholder farmers had limited technical knowledge, and investing in human capital for training and courses was essential to improve their understanding of technology and increase productivity (Quayson et al. 2020).

Insurance

Due to the high predictive accuracy of today's forecasting technology in predicting extreme weather patterns, agricultural insurance has become increasingly attractive to smallholders looking to improve their lives. This insurance serves as an effective tool for protecting smallholders from financial losses, balancing the uncertainty of agricultural allocations, and stimulating sector growth. Research has shown that insurance can also manage the risk of asset impairment, increase household income and consumption, encourage investment, and ultimately lead to the prosperity of smallholders. However, insurance may lead to fewer savings for smallholders as they become less careful about losses due to plant damage. The COVID-19 pandemic had a negative impact on the income of smallholders, as government restrictions to prevent its spread caused losses that were not covered by existing agricultural insurance programs, which only protected against losses caused by extreme weather. Consequently, smallholders had to bear significant losses during the pandemic, which ultimately deteriorated their well-being.

Supplementary factors

Apart from the three primary factors discussed, there are other factors that can impact the well-being of smallholders, market pricing, and tax policy. Market pricing is influenced by the demand and supply interaction in the market. Smallholders act as suppliers of agricultural products and tend to increase their output when there is a price increase. However, if there is a shortage of supply, consumers may be willing to pay more for the product, resulting in a price increase. This situation can occur in both local and global markets, and the income received from the price increase can enhance smallholders' well-being, especially on the global market (Minot and Daniels

2005). During the COVID-19 pandemic, obtaining input materials and defective agricultural products became challenging, leading to price increases due to inflation. This can also improve the well-being of smallholders, but it has an opposite effect on consumers.

Tax policy is another factor that impacts the well-being of smallholders negatively. Taxes imposed on smallholders can increase production costs, ultimately affecting their income (Parry 1999). However, eliminating export taxes can maximize the income of smallholder households (Choeun et al. 2006). On the other hand, subsidies can maintain the well-being of smallholders, especially during the COVID-19 pandemic and endemic phases (Iqbal 2020; Mastronardi et al. 2020; Rozaki 2020). For instance, the Chinese government provided subsidies of USD 937.5 million during the COVID-19 period to vegetable, chicken, and pig farms, raw milk producers, insurance premiums, frozen agricultural product storage, and others to reduce the pressure on survival and business risk (Pan et al. 2020).

Conclusion and Recommendation

The aim of this study is to utilize the SLR method to determine the factors that impact smallholders' well-being. To achieve this goal, 30 articles were sourced from Scopus and WoS databases. The study identified three primary factors that influence smallholders' well-being, namely technology, optimal resource utilization, and insurance. Additionally, two supplementary factors were identified: market pricing and tax policy. The study concluded that these factors initially enhance the economic well-being of smallholders, which, in turn, leads to their social well-being. Sustainable well-being, as discussed by Bakar et al. (2015), can be achieved if both forms of well-being are attained.

The COVID-19 pandemic has presented a significant challenge to smallholders, affecting their agricultural product production and commercialization and, in turn, their well-being. Based on the primary and supplementary factors identified above, the study suggests several policy implications for stakeholders. These include promoting local labor participation, increasing investments in human capital, adopting e-commerce applications for marketing agricultural products, and offering a multi-threat/disaster agricultural insurance scheme. Additionally, providing continuous subsidies or increasing subsidies can alleviate the smallholder's burden resulting from the impact of the rise in commodity prices due to COVID-19.

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