

The role of the agricultural sector in increasing economic growth from an Islamic economic perspective: A study in Deli Serdang Regency, North Sumatera Province, Indonesia

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ABSTRAK

Introduction

The agricultural sector is vital for economic growth in agrarian regions, particularly in Indonesia. Despite its substantial contributions to employment, food security, and regional GDP, the sector faces systemic challenges, including limited technological adoption and inadequate infrastructure. Islamic economics, emphasizing equity, sustainability, and social welfare, offers a promising framework for addressing these challenges.

Objectives

This study explores the role of the agricultural sector in promoting economic growth in Deli Serdang Regency, North Sumatra, from the perspective of Islamic economics. It aims to assess the impact of government interventions and the potential of Islamic financial instruments, such as zakat and waqf, in enhancing agricultural productivity and sustainability.

Method

A qualitative descriptive approach incorporated field observations, semi-structured interviews, focus group discussions, and document analysis. Data were analyzed using interactive qualitative analysis to identify themes and patterns, supported by triangulation to ensure reliability.

Results

The findings reveal that agriculture remains a cornerstone of economic stability in Deli Serdang, contributing significantly to employment and regional development. Government interventions, including subsidies, infrastructure investments, and training programs, have improved productivity but face challenges in equitable implementation. Islamic economic principles, particularly the use of zakat and waqf, offer transformative potential by

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addressing financial and ethical dimensions of agricultural development.

Implications

This study highlights the need for a synergistic approach that integrates Islamic economics with government policies to revitalize agriculture sustainably. The findings contribute to the discourse on ethical and inclusive economic development, offering practical insights for policymakers and stakeholders.

Originality/Novelty

By integrating Islamic economic principles into agricultural development analysis, this study provides a unique framework for addressing systemic challenges while promoting sustainability and inclusivity in agrarian economies.

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INTRODUCTION

Indonesia, as one of the world's leading agrarian nations, possesses abundant natural resources, ranging from fertile agricultural land to diverse ecosystems (Clough et al., 2016; Henley, 2008; Nugroho et al., 2022). These resources form a solid foundation for economic development and food security, particularly through the agricultural sector. Despite rapid urbanization and industrialization, agriculture remains a critical sector, employing a significant portion of the population and contributing to national GDP. Historically, agriculture has also been the backbone of rural livelihoods, promoting economic stability and reducing poverty (Adebayo et al., 2021; Fuglie, 2004; Liu & Yamauchi, 2014; Manning, 2000; Prastiyo et al., 2020; Tran et al., 2017). However, global shifts in economic priorities have often marginalized this sector, emphasizing the urgent need for its revitalization. Numerous studies have underscored agriculture's strategic importance, highlighting its contributions to food sovereignty, raw material supply for industries, and socio-economic equity in Indonesia's vast archipelago.

Recent literature has drawn attention to the multi-dimensional role of agriculture in economic systems. For example, some studies emphasized the sector's ability to absorb labor and provide a social safety net, particularly during economic crises (Jayasuriya & Shand, 1986; Setiawan, 2016; Silvey, 2001; Sparrow et al., 2020; Thorbecke, 1991; Yamauchi, 2016). Likewise, other studies highlighted agriculture's role in driving regional GDP growth (Alam et al., 2016; Awokuse & Xie, 2015; Oktavia et al., 2016; Shahbaz et al., 2013), especially in provinces with abundant agricultural resources such as North Sumatra. However, its declining share in GDP underscores structural challenges, including limited technological advancement, insufficient government support, and inadequate market integration. Addressing these issues has become a

national priority, especially given Indonesia's dependence on agricultural exports and the sector's potential to bolster economic resilience in the post-pandemic era.

The central issue in this research stems from the agricultural sector's declining economic contribution, especially in provinces like North Sumatra, where agriculture historically played a pivotal role. The underutilization of this sector is not just an economic concern but a socio-political one, as it directly impacts rural livelihoods and national food security. The challenges faced by the sector include inadequate government policies, low technology adoption, and a lack of institutional support for smallholder farmers. These systemic barriers hinder agricultural productivity and diminish its potential to contribute to regional development effectively. Given this context, the research explores how integrating Sharia economic principles with agricultural policies could offer sustainable solutions to these persistent issues.

Islamic economic principles, rooted in values of equity, sustainability, and collective welfare (Alfaihani, 2024; Asutay, 2013; Kader, 2021), provide a unique framework for addressing challenges in agriculture. Several studies have examined how these principles could be applied to enhance agricultural productivity and economic growth. For instance, some studies noted that investments in agriculture aligned with Sharia principles could promote equitable resource distribution and sustainable practices (Yasmeen et al., 2024; Zain et al., 2024). Similarly, Nasution & Yusuf (2018) highlighted the compatibility of Islamic values with modern economic goals, advocating for policies that prioritize social welfare over short-term profits. These insights suggest that integrating Islamic economics with agricultural development could address systemic inefficiencies while promoting ethical practices.

Previous research has also provided specific solutions for improving agricultural productivity and economic impact. Government interventions, such as providing subsidies and technological support, are crucial for revitalizing the sector (Heliaantoro & Juwana, 2018; Hidayati et al., 2016; Lubis et al., 2024; Sudjono, 2011). Additionally, other studies demonstrated the effectiveness of community-based agricultural programs in fostering rural development and economic stability (Hasibuan et al., 2022; Surya et al., 2020; Watts et al., 2019; Wibowo et al., 2013; Wulandari & Inoue, 2018). These initiatives align with Sharia principles by emphasizing collective responsibility, equitable resource allocation, and sustainability. Furthermore, other studies underscored the importance of agro-industrial integration, which not only adds value to agricultural products but also creates employment opportunities and stimulates regional economic growth (Dewi et al., 2022; Fatah, 2007; Neilson et al., 2020; Ruml et al., 2022; Sarma et al., 2022).

The current body of literature highlights several gaps that this research aims to address. While many studies focus on technical and economic aspects of agriculture, few examine the integration of Sharia principles in agricultural development comprehensively. Additionally, the specific challenges faced by regions like Deli Serdang in North Sumatra, which possess significant agricultural potential but face structural and policy-related barriers, remain underexplored. The interplay between religious principles and economic practices in shaping sustainable development

strategies is another area that requires further investigation. This study seeks to bridge these gaps by providing an in-depth analysis of the agricultural sector's role in economic growth from an Islamic economic perspective.

This research aims to explore the potential of integrating Sharia economic principles into the agricultural sector to enhance its contribution to economic growth in Deli Serdang Regency, North Sumatra. The study's novelty lies in its focus on the intersection of religion and economics, providing a holistic approach to addressing agricultural challenges. By combining qualitative case studies with theoretical insights from Islamic economics, this research offers a unique perspective on sustainable development. The findings are expected to contribute not only to academic discourse but also to practical policy-making, providing a roadmap for revitalizing Indonesia's agricultural sector in alignment with ethical and economic goals.

LITERATURE REVIEW

The Role of the Agricultural Sector in Economic Growth

Agriculture remains a cornerstone of economic development, particularly in agrarian economies such as Indonesia. The sector plays a multifaceted role by providing food security, generating employment, and acting as a critical contributor to GDP. Agriculture directly impacts economic growth by serving as a significant source of income for rural communities and a provider of raw materials for industries (Hagblade et al., 2002, 2010; Loizou et al., 2019; Ratag et al., 2016; Sari & Bangun, 2019; Tampun et al., 2015). The sector's ability to sustain labor markets, particularly in rural areas, further underscores its economic significance. For instance, Deli Serdang Regency in North Sumatra benefits from agriculture's contributions to employment and regional GDP, demonstrating the sector's pivotal role in supporting economic stability.

The economic contribution of agriculture extends beyond its immediate outputs. As highlighted previous studies, agricultural activities stimulate other sectors, including manufacturing and trade, by providing essential inputs and creating demand for industrial products (Dethier & Effenberger, 2012; Johnston & Mellor, 1961; Oktavia et al., 2016; Pingali & Rosegrant, 1995). This interconnectedness fosters a synergistic relationship between agriculture and other economic sectors, thereby amplifying its impact on national and regional development. Furthermore, empirical evidence from various regions in Indonesia suggests that robust agricultural performance can act as a buffer during economic crises, stabilizing income levels and ensuring food availability.

However, despite its evident importance, agriculture's share in GDP has been on a gradual decline. This trend is often attributed to structural changes in the economy, including shifts toward industrialization and services. Nonetheless, the sector remains indispensable for ensuring equitable development and addressing rural poverty. Some studies emphasize that investing in agriculture can yield long-term economic benefits, particularly when aligned with sustainable practices and inclusive policies (Adenle et al., 2018; Lefore et al., 2021; Nasution & Yusuf, 2018; Piñeiro et al., 2020).

The Role of Government in Enhancing Agricultural Growth

Government intervention is crucial in optimizing the agricultural sector's potential. Policies that address structural barriers, improve access to resources, and enhance technological adoption can significantly boost productivity and economic contributions. Effective governmental support includes providing subsidies (Indriasari & Sani, 2019; Lepa et al., 2019), facilitating access to credit (Rozci & Laily, 2023; Sholikhati, 2023), and investing in infrastructure such as irrigation systems and storage facilities (Bahri et al., 2021; Elmanuah & Santoso, 2024; Nuraisyah Nst et al., 2024). These measures not only improve agricultural outputs but also enhance the sector's resilience to external shocks, such as climate change and market fluctuations.

One of the key areas where government intervention is critical is in the dissemination of modern agricultural technologies. Technological advancements in agriculture, such as precision farming (Chlingaryan et al., 2018; Weiss, 1996; N. Zhang et al., 2002) and sustainable irrigation systems (Khan et al., 2006; Levidow et al., 2014; Oweis & Hachum, 2006; Playán & Mateos, 2006; Pretty & Bharucha, 2014), can significantly increase yields and reduce production costs. However, the adoption of such technologies often requires financial and technical support, which underscores the need for targeted government programs. Moreover, policies that prioritize education and training for farmers can bridge the knowledge gap, enabling them to adopt innovative practices and optimize resource use.

In addition to resource allocation and technological support, governments play a vital role in creating an enabling environment for agricultural growth. This includes establishing regulatory frameworks that promote fair trade, ensuring market access for smallholder farmers, and fostering public-private partnerships. Other studies emphasize the importance of integrating agriculture with agro-industrial activities (Dewi et al., 2022; Doronina et al., 2016; Egea et al., 2018; Mukhametgaliev et al., 2020; Prokhorova et al., 2016; Y. Zhang et al., 2018), which not only adds value to raw agricultural products but also generates employment opportunities and stimulates regional economic growth.

Islamic Economic Perspective on Agriculture and Its Impact on Growth

Islamic economics offers a unique framework for understanding and enhancing the agricultural sector's role in economic development. Rooted in principles of equity, sustainability, and social welfare, the Islamic perspective emphasizes the moral and ethical dimensions of economic activities. As highlighted by previous studies (Imamah et al., 2024; Karman et al., 2023; Muttaqin, 2018; Muzakky et al., 2024; Z. Zuhdi, 2008), agriculture is viewed as both a means of livelihood and a form of worship, underscoring its spiritual significance in Islamic teachings.

From an Islamic economic standpoint, agriculture is considered a vital component of societal welfare. Quranic verses and Hadiths frequently emphasize the importance of cultivating the land, not only for economic benefits but also as an act of stewardship. The concept of *khalifah* (stewardship) implies that humans have a responsibility to care for the earth and use its resources sustainably. This perspective

aligns with modern sustainability goals, advocating for practices that balance productivity with environmental preservation.

The integration of Islamic principles into agricultural policies can address systemic challenges such as inequality and resource mismanagement. Islamic economics promotes equitable resource distribution and prioritizes the welfare of marginalized communities (Abbas & Aravossis, 2024; Ali et al., 2024; Khalidin, 2024; Zauro et al., 2024; F. Zuhdi, 2021; Zuhilmi, 2024), including smallholder farmers. Mechanisms such as *waqf* (endowment) and *zakat* (almsgiving) can be leveraged to provide financial support for agricultural development, ensuring that resources are allocated to those most in need.

The impact of Islamic economics on agriculture extends beyond financial mechanisms. It also influences the broader socio-economic landscape by fostering ethical practices and community-oriented development. Previous studies (Muthoifin et al., 2024; Nasution & Yusuf, 2018; Obaidullah, 2015) highlight that agricultural policies grounded in Islamic principles can promote social cohesion and reduce disparities, contributing to more inclusive economic growth. Additionally, the emphasis on sustainability and accountability in Islamic economics aligns with global efforts to address climate change and ensure food security.

Bridging the Gaps in Existing Literature

While the existing body of literature underscores the critical role of agriculture and the importance of governmental and ethical frameworks, several gaps remain unaddressed. For instance, most studies focus on technical and economic dimensions, with limited exploration of how Islamic principles can be systematically integrated into agricultural policies. Furthermore, there is a lack of region-specific analyses that consider unique socio-economic and cultural contexts, such as those in Deli Serdang Regency.

This study seeks to fill these gaps by examining the intersection of Islamic economics and agricultural development in a localized context. By integrating theoretical insights with empirical data, the research aims to provide a comprehensive understanding of how the agricultural sector can be revitalized to support sustainable economic growth. The findings are expected to contribute to both academic discourse and practical policy-making, offering a roadmap for aligning agricultural practices with ethical and economic goals.

METHOD

Research Approach

This study employs a qualitative descriptive approach, aiming to provide an in-depth understanding of the agricultural sector's role in economic growth from the perspective of Islamic economics. Qualitative research is particularly suitable for exploring complex social, economic, and cultural phenomena, allowing the researcher to examine relationships, processes, and contextual factors. The descriptive component enables a detailed depiction of the dynamics within the agricultural

sector in Deli Serdang Regency, North Sumatra. Furthermore, the research adopts a case study approach, focusing on this specific region to gain localized insights while addressing broader theoretical questions.

Research Location and Duration

The research was conducted in Deli Serdang Regency, a region in North Sumatra known for its substantial agricultural potential and contributions to the provincial economy. Covering an area of 2,497.72 square kilometers, Deli Serdang is characterized by diverse agricultural activities, including crop production, horticulture, and livestock farming. This location was selected due to its representative significance in showcasing the challenges and opportunities within Indonesia's agricultural sector. The study spanned a duration of six months, allowing adequate time for data collection, analysis, and validation.

Research Subjects and Scope

The study focuses on three primary groups of subjects:

1. Government officials, particularly representatives from the Department of Agriculture in Deli Serdang, to provide insights into policies, programs, and challenges faced by the sector.
2. Farmer groups and individual farmers actively engaged in agricultural activities to understand their experiences, practices, and perspectives.
3. Community stakeholders, including local agricultural cooperatives and trade associations, to explore the broader socio-economic impacts of agricultural policies.

By encompassing a diverse range of participants, the study aims to capture the multifaceted nature of the agricultural sector and its interplay with Islamic economic principles.

Data Sources

Data for the study were collected from both primary and secondary sources. Primary data were obtained through field observations, interviews, and focus group discussions with the aforementioned subjects. These interactions were designed to elicit detailed responses regarding the role of agriculture, government interventions, and the application of Islamic economic principles. Secondary data included official government reports, agricultural statistics, academic articles, and other relevant documents to provide contextual and theoretical support for the analysis.

Data Collection Techniques

1. Field Observations
Field observations were conducted to gain a first-hand understanding of agricultural practices and their socio-economic implications. This involved visiting farms, irrigation systems, and local markets to observe processes and interactions within the agricultural value chain.

2. Semi-Structured Interviews

Interviews were conducted with key informants, including government officials, farmer group leaders, and individual farmers. A semi-structured format was used to allow flexibility in exploring specific themes while ensuring that core research questions were addressed. This method facilitated a deeper understanding of participants' experiences and opinions regarding the integration of Islamic economic principles into agricultural practices.

3. Focus Group Discussions

Focus group discussions were organized with farmer groups to gather collective insights on common challenges, opportunities, and perceptions. These discussions also enabled the triangulation of data obtained from individual interviews.

4. Document Analysis

A thorough review of policy documents, agricultural reports, and academic literature was conducted to contextualize the primary data and provide a foundation for analysis. Documents such as the agricultural development plans for Deli Serdang Regency and national statistics on agricultural performance were critically analyzed to align empirical findings with existing knowledge.

Data Analysis

The study employed qualitative interactive analysis, a method that integrates data collection and analysis processes to ensure iterative refinement of insights. This approach involved four interconnected stages:

1. **Data Collection:** Gathering detailed and contextual data through the aforementioned techniques.
2. **Data Reduction:** Summarizing and categorizing the collected data to identify key themes, patterns, and relationships.
3. **Data Presentation:** Organizing the reduced data into coherent formats, such as tables and narrative summaries, to facilitate interpretation.
4. **Conclusion Drawing and Verification:** Synthesizing findings to answer the research questions, supported by iterative validation through member checks and expert reviews.

Data Validation

To ensure the reliability and validity of the findings, the study incorporated several strategies:

1. **Triangulation:** Cross-referencing data from multiple sources, including interviews, observations, and documents, to enhance accuracy and credibility.
2. **Member Checks:** Sharing preliminary findings with participants to verify interpretations and address potential misunderstandings.
3. **Peer Review:** Engaging academic peers and experts in Islamic economics and agricultural studies to review the research process and findings.

Ethical Considerations

The research adhered to ethical guidelines to protect the rights and welfare of participants. Informed consent was obtained from all participants, ensuring they were aware of the study's objectives, methods, and potential outcomes. Anonymity and confidentiality were maintained throughout the research process to safeguard sensitive information. Additionally, the study received approval from relevant academic and governmental institutions, ensuring compliance with ethical standards and local regulations.

RESULTS

Overview of the Agricultural Sector in Deli Serdang Regency

Deli Serdang Regency, located in North Sumatra, plays a pivotal role in the region's agricultural output, contributing significantly to the province's economic stability and growth. Covering a vast area of 2,497.72 square kilometers, the regency is endowed with fertile soil and a climate conducive to diverse agricultural activities, including the cultivation of crops, horticulture, and livestock farming. The agricultural sector serves as a primary source of employment and income for a substantial portion of the population, accounting for 14.17% of the labor force in 2020. Despite its strategic importance, the sector faces challenges, including limited technological adoption, inadequate infrastructure, and fluctuating market conditions.

The agricultural sector's contribution to the Gross Regional Domestic Product (GRDP) of Deli Serdang has been noteworthy, even though its relative share has seen a decline due to structural shifts in the economy. According to regional statistics, agriculture remains one of the leading contributors to the GRDP, underlining its centrality in the local economy. This dual role of providing economic stability and serving as a significant employer underscores the sector's potential to drive sustainable growth, provided its challenges are adequately addressed.

The Role of the Agricultural Sector in Economic Growth

Agriculture in Deli Serdang serves as a cornerstone of the local economy, demonstrating its capacity to support regional development through multiple channels. First, the sector ensures food security by supplying staple crops such as rice, maize, and horticultural produce. The steady availability of these commodities not only fulfills local demand but also supports regional trade and exports, contributing to economic stability. Second, the sector's integration with downstream industries creates a value chain that amplifies its economic impact. For instance, the production of palm oil and rubber, key commodities in Deli Serdang, feeds into manufacturing sectors, thereby creating additional employment and revenue streams.

Third, agriculture serves as a social safety net for rural communities, particularly during economic downturns. Its resilience during periods of crisis, such as the COVID-19 pandemic, highlights its role in stabilizing incomes and mitigating the impact of broader economic contractions. Despite these contributions, the sector faces

constraints such as outdated farming methods and limited access to credit, which hinder its full potential.

Government Interventions in Supporting Agriculture

The local government in Deli Serdang has implemented various programs and policies aimed at bolstering the agricultural sector. Key interventions include providing subsidies for seeds and fertilizers, facilitating access to affordable credit, and offering training programs to enhance farmers' skills. For example, agricultural extension services have been introduced to disseminate modern farming techniques and promote sustainable practices. These initiatives aim to address systemic inefficiencies, improve productivity, and foster resilience against external shocks such as fluctuating commodity prices and climate variability.

Additionally, infrastructure development has been prioritized to support the sector. Investments in irrigation systems, storage facilities, and transportation networks have been made to reduce post-harvest losses and improve market access for farmers. According to data from the Department of Agriculture, these measures have contributed to modest improvements in productivity and income levels among farming communities. However, challenges remain, including the equitable distribution of resources and the need for better coordination among stakeholders.

The government has also emphasized the importance of integrating agriculture with other sectors, such as agro-industries, to add value to raw agricultural products. Policies promoting public-private partnerships have been introduced to attract investments and foster innovation in the sector. Despite these efforts, the implementation of government programs often faces bottlenecks, including bureaucratic inefficiencies and limited reach to remote farming areas.

Islamic Economic Perspective on Agriculture

Islamic economic principles offer a unique framework for addressing the challenges faced by the agricultural sector in Deli Serdang. The principles of equity, sustainability, and social welfare inherent in Islamic economics align closely with the objectives of agricultural development. This study highlights how these principles can be operationalized to enhance productivity and foster inclusive growth in the sector.

One of the key insights from this perspective is the role of *zakat* (almsgiving) and *waqf* (endowment) as financial instruments to support agricultural development. For instance, *zakat* can be utilized to provide interest-free loans to smallholder farmers, enabling them to invest in modern equipment and sustainable practices. Similarly, *waqf* can be employed to develop community-based agricultural infrastructure, such as irrigation systems and warehouses. These mechanisms not only address financial constraints but also promote social equity by ensuring that resources are distributed to those most in need.

The concept of *khalifah* (stewardship) in Islamic teachings emphasizes the ethical use of resources and the responsibility to care for the environment. This aligns with the principles of sustainable agriculture, which aim to balance productivity with environmental preservation. By integrating these values into agricultural policies and

practices, Deli Serdang can create a model of development that is both economically viable and ethically sound.

Furthermore, Islamic economics advocates for community-oriented development, which can strengthen social cohesion and foster collective action among farmers. Initiatives such as cooperative farming and shared resource management reflect these values, providing a framework for addressing structural barriers and enhancing the sector's resilience.

DISCUSSION

The Multifaceted Role of Agriculture in Economic Growth

The findings of this study underscore the integral role of agriculture in the economic development of Deli Serdang Regency and its broader implications for Indonesia's economy. Agriculture acts as a cornerstone of economic stability, providing employment, ensuring food security, and generating revenue through its integration with downstream industries. As highlighted by Martauli and Astuti (2021), the sector's contributions to Gross Regional Domestic Product (GRDP) and labor absorption make it indispensable for fostering inclusive growth, particularly in rural areas.

Despite its importance, the declining contribution of agriculture to GRDP reflects structural challenges, including shifts toward industrialization and inadequate technological adoption. This trend aligns with national patterns, where agriculture's share in GDP diminishes as economies diversify. However, this decline does not negate agriculture's potential as a driver of economic growth. Studies such as those by Oktavia et al. (2016) emphasize that with strategic interventions, agriculture can act as a catalyst for regional development by creating value-added opportunities and supporting industrial growth.

The case of Deli Serdang further illustrates this dynamic. The region's reliance on agriculture for employment and trade highlights its vulnerability to systemic inefficiencies, such as fluctuating commodity prices and limited market access. Addressing these issues requires a multi-pronged approach that considers both macroeconomic policies and localized strategies tailored to the region's unique socio-economic conditions.

Government's Role in Enhancing Agricultural Productivity

Government intervention is pivotal in overcoming the barriers faced by the agricultural sector. In Deli Serdang, the government has implemented various initiatives, such as providing subsidies, improving infrastructure, and offering training programs to enhance farmers' productivity. These measures align with the recommendations of Hasibuan et al. (2022), who argue that targeted support for smallholder farmers is essential for unlocking the sector's potential.

One of the critical areas of government involvement is infrastructure development. Investments in irrigation systems, transportation networks, and storage facilities have shown promise in reducing post-harvest losses and improving market accessibility. However, challenges persist, particularly in ensuring the equitable

distribution of these resources. The rural-urban divide often leaves remote farming communities at a disadvantage, limiting their ability to benefit from government programs fully.

Another important aspect is the promotion of technological adoption. As Tamba et al. (2019) note, modern agricultural technologies, such as precision farming and sustainable irrigation systems, can significantly boost yields and reduce production costs. In Deli Serdang, efforts to disseminate these technologies through agricultural extension services have had a positive impact, although their reach remains limited. Expanding these programs and integrating them with digital solutions, such as e-marketplaces, could further enhance their effectiveness.

Moreover, the government's emphasis on integrating agriculture with agro-industrial activities reflects a strategic shift toward value-added production. Policies encouraging public-private partnerships have facilitated investments in processing facilities, enabling farmers to command better prices for their produce. However, the success of these initiatives depends on effective coordination among stakeholders and the removal of bureaucratic bottlenecks.

Islamic Economics as a Framework for Agricultural Development

The application of Islamic economic principles provides a novel framework for addressing the challenges faced by the agricultural sector. Rooted in values of equity, sustainability, and social welfare, Islamic economics emphasizes the ethical dimensions of economic activities, aligning closely with the objectives of sustainable agriculture. As Mutaqqin (2018) highlights, agriculture is viewed as both an economic endeavor and a spiritual obligation, underscoring its dual significance in Islamic teachings.

One of the key contributions of Islamic economics is its focus on financial inclusion. Mechanisms such as *zakat* (almsgiving) and *waqf* (endowment) can be leveraged to provide financial support to marginalized farmers, enabling them to invest in modern equipment and sustainable practices. For instance, *zakat* funds could be directed toward providing interest-free loans, while *waqf* could be utilized to develop community-based infrastructure, such as irrigation systems and warehouses. These approaches not only address financial barriers but also promote social equity by ensuring that resources are distributed to those most in need.

The concept of *khalifah* (stewardship) further aligns Islamic economic principles with sustainable agriculture. This principle emphasizes the ethical use of resources and the responsibility to preserve the environment for future generations. By integrating these values into agricultural policies and practices, Deli Serdang can create a development model that balances productivity with environmental sustainability. This approach is particularly relevant in addressing the region's vulnerability to climate change and its impact on agricultural outputs.

Furthermore, Islamic economics advocates for community-oriented development, which can strengthen social cohesion and foster collective action among farmers. Cooperative farming and shared resource management reflect these

values, providing a framework for addressing systemic inefficiencies and enhancing the sector's resilience. Studies by F. Zuhdi (2021) and Nasution & Yusuf (2018) underscore the potential of such initiatives to transform rural economies and promote inclusive growth.

Challenges in Implementing Sustainable Solutions

While the integration of government interventions and Islamic economic principles offers a promising framework for agricultural development, several challenges must be addressed to ensure its success. First, the effective implementation of policies requires robust institutional capacity and coordination among stakeholders. In Deli Serdang, bureaucratic inefficiencies and limited outreach to remote communities often hinder the delivery of support programs. Strengthening local institutions and enhancing their capacity to manage and monitor agricultural initiatives is essential for overcoming these barriers.

Second, the adoption of Islamic economic mechanisms, such as *zakat* and *waqf*, requires greater awareness and understanding among stakeholders. While these instruments have significant potential, their implementation is often constrained by limited institutional frameworks and a lack of integration with existing policies. Developing clear guidelines and building partnerships with religious and community organizations can help operationalize these mechanisms effectively.

Third, the transition to sustainable agricultural practices poses challenges related to resource availability and farmer capacity. Modern technologies and practices require initial investments that may be beyond the reach of many smallholder farmers. Providing targeted financial assistance and training programs can address these gaps, enabling farmers to adopt innovations that enhance productivity while minimizing environmental impact.

Opportunities for Future Development

Despite these challenges, the findings highlight several opportunities for revitalizing the agricultural sector in Deli Serdang. The increasing global demand for sustainable and ethically produced agricultural goods presents a significant market opportunity for the region. By aligning agricultural practices with Islamic economic principles and international sustainability standards, Deli Serdang can enhance its competitiveness and attract investments.

The integration of technology into agricultural practices also holds promise. Digital platforms, such as e-marketplaces and mobile-based advisory services, can bridge the gap between farmers and markets, reducing transaction costs and improving profitability. Additionally, advancements in precision farming and agro-processing technologies can address systemic inefficiencies and unlock new revenue streams for farmers.

Collaboration among stakeholders, including government agencies, private sector actors, and community organizations, is critical for leveraging these opportunities. Public-private partnerships can drive innovation and investment in the

sector, while community-based initiatives can ensure that development benefits are equitably distributed.

Toward a Holistic Development Model

The findings of this study underscore the need for a holistic and integrated approach to agricultural development. Combining government interventions with Islamic economic principles offers a framework for addressing structural challenges while promoting sustainability and inclusivity. For instance, policies that integrate financial support mechanisms, such as *zakat* and *waqf*, with government subsidies can create a more equitable development model. Similarly, fostering collaboration among stakeholders can create synergies that enhance the sector's overall impact.

In conclusion, the discussion highlights the critical role of agriculture in Deli Serdang's economic growth and the potential of Islamic economic principles to address systemic challenges. By adopting a comprehensive approach that combines policy interventions with ethical frameworks, the region can unlock the full potential of its agricultural sector, ensuring sustainable development and improved livelihoods for its farming communities.

CONCLUSION

This study highlights the critical role of the agricultural sector in driving economic growth in Deli Serdang Regency, North Sumatra, through the lens of Islamic economics. The findings demonstrate that agriculture is a cornerstone of regional development, contributing significantly to employment, food security, and Gross Regional Domestic Product (GRDP). However, systemic challenges such as limited technological adoption, inadequate infrastructure, and market inefficiencies hinder its full potential.

The research further illustrates the transformative potential of Islamic economic principles, including *zakat* and *waqf*, in addressing these challenges. By promoting financial inclusion, equitable resource distribution, and sustainable practices, Islamic frameworks align with the goals of inclusive and ethical agricultural development. Government interventions, such as subsidies and infrastructure investments, are essential complements to these frameworks, ensuring broader access and impact.

The study contributes to the existing body of knowledge by integrating Islamic economic principles into the analysis of agricultural policies, offering a holistic model for sustainable development. Its implications extend to policymakers, highlighting the need for synergistic strategies that combine ethical values with practical interventions. Future efforts should focus on scaling innovative practices and fostering collaboration among stakeholders to further enhance the sector's contributions.

Limitations of the Study

While this research provides valuable insights into the agricultural sector's role in economic growth, several limitations warrant acknowledgment. First, the study's qualitative approach, while offering depth and context, may limit the generalizability

of its findings. Data collected from Deli Serdang Regency may not fully represent the conditions of other regions with different socio-economic or cultural contexts.

Second, the reliance on interviews and focus group discussions could introduce biases, as participants' responses might reflect subjective perceptions rather than objective realities. While triangulation methods were employed to mitigate this, the study would benefit from complementary quantitative analyses to validate and expand its findings.

Third, the integration of Islamic economic principles, such as *zakat* and *waqf*, was explored conceptually but not operationalized in real-world scenarios. This limits the study's ability to provide empirical evidence of their practical effectiveness in transforming the agricultural sector.

Finally, time constraints limited the exploration of emerging technologies and their specific applications in the agricultural context of Deli Serdang. These limitations suggest the need for broader, multi-regional studies incorporating mixed methodologies to provide a more comprehensive understanding of the issues addressed.

Recommendations for Future Research

Future research should build on this study by employing mixed-method approaches that combine qualitative insights with quantitative analyses. This would enhance the reliability and generalizability of findings, offering a more nuanced understanding of the agricultural sector's dynamics across different regions.

Studies exploring the operationalization of Islamic economic instruments, such as *zakat* and *waqf*, in agricultural development are particularly needed. Examining their implementation in real-world contexts could provide empirical evidence of their feasibility and impact. This would also allow for the development of practical guidelines for policymakers and stakeholders.

Further, research on the integration of emerging technologies, such as precision agriculture and digital platforms, could identify scalable solutions to systemic inefficiencies in rural farming communities. Evaluating their cost-effectiveness and potential for widespread adoption would be invaluable.

Lastly, interdisciplinary studies combining Islamic economics with environmental sciences could address the pressing issue of sustainability in agriculture. Exploring the interplay between ethical frameworks and climate-resilient practices would contribute to global discussions on sustainable development. These avenues for future research could significantly enhance the agricultural sector's role in fostering inclusive and sustainable growth.

Author Contributions

Conceptualization	I.F.T., M.B., & Y.	Resources	I.F.T., M.B., & Y.
Data curation	I.F.T., M.B., & Y.	Software	I.F.T., M.B., & Y.
Formal analysis	I.F.T., M.B., & Y.	Supervision	I.F.T., M.B., & Y.
Funding acquisition	I.F.T., M.B., & Y.	Validation	I.F.T., M.B., & Y.
Investigation	I.F.T., M.B., & Y.	Visualization	I.F.T., M.B., & Y.
Methodology	I.F.T., M.B., & Y.	Writing – original draft	I.F.T., M.B., & Y.

Project administration I.F.T., M.B., & Y.

Writing – review & editing I.F.T., M.B., & Y.

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Informed Consent Statement

Informed consent was obtained before respondents answered the interview.

Data Availability Statement

The data presented in this study are available upon request to the corresponding author.

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Conflicts of Interest

The author declares no conflicts of interest.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the authors used ChatGPT, DeepL, Grammarly, and PaperPal to translate early version of the article from Bahasa Indonesia into American English and to improve the clarity of the language and readability of the article. After using these tools, the authors reviewed and edited the content as needed and took full responsibility for the content of the published article.

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