Sustainability strategies of Young Agrosociopreneurs in supporting National Food Security

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Abstract. The sustainability of youth-led agrosociopreneurship enterprises represents a strategic element in strengthening national food security and accelerating inclusive rural economic development. This study aims to assess the sustainability level of young agrosociopreneurs (ASP) and to formulate strategic priorities that contribute to economic, social, and environmental dimensions. A quantitative approach was employed through a survey of 226 young ASPs in Subang and Cianjur Regencies, West Java, Indonesia. Business sustainability was measured using indicators related to economic performance, social impact, and environmental stewardship. Data analysis was conducted using Importance Performance Map Analysis (IPMA), facilitated by SmartPLS software. The findings indicate that ASP capacity, role effectiveness, and social capital significantly influence business sustainability. However, certain variables with high importance demonstrated low performance, particularly in digital technology utilization. Based on these results, strategic interventions should focus on enhancing ASP capacity and effectiveness through socially embedded approaches and improved access to digital tools. This study provides empirical insights for policy formulation and youth entrepreneurship development programs in the agricultural sector. It also contributes to the scholarly discourse on community-based business sustainability models within the broader context of sustainable agricultural development and national food system resilience.

1 Introduction

The sustainability of agribusiness enterprises is a crucial concept in addressing the increasingly complex challenges within the economic, social, and environmental spheres. Agribusiness sustainability comprises three primary dimensions. Firstly, the economic

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dimension underscores the significance of financial viability and profitability to ensure the survival and growth of agribusinesses [1, 2]. Secondly, the social dimension emphasizes community well-being and public engagement, highlighting the role of social support in strengthening agribusiness networks and fostering community solidarity [3]. Thirdly, the environmental dimension pertains to minimizing adverse impacts on ecosystems and promoting the prudent use of natural resources to ensure long-term sustainability [4].

In the context of agricultural regeneration and sustainable development, the role of youth—particularly young agrosociopreneurs—is increasingly vital [5, 6]. Young people tend to be more open to innovation and emerging technologies, granting them significant potential to develop creative solutions to food security challenges [3]. Research indicates that youth engagement in agricultural entrepreneurship not only enhances productivity but also drives the adoption of more sustainable and environmentally friendly farming practices [7]. Moreover, young agrosociopreneurs, through their social capital and networks, are well-positioned to facilitate the exchange of information and resources essential for promoting sustainable agricultural practices and reinforcing food security within their communities [8].

Capacity building among young people in agricultural social entrepreneurship is a key factor determining the success of their role. Adequate technical, managerial, and social competencies are necessary to drive positive change within farming communities [3, 9]. However, young people often face significant barriers, particularly limited access to essential knowledge and skills. This makes well-designed and continuous education and training programs crucial in equipping them for success [9]. Through such initiatives, young farmers can become better prepared to adopt digital technologies in their agricultural practices and to seize emerging opportunities for sustainable business development [10].

The adoption of digital technologies in agriculture by younger generations has become an urgent necessity in the era of the Fourth Industrial Revolution. Digital tools and platforms offer a range of solutions that enable young farmers to manage their enterprises more efficiently, enhance productivity, and optimize resource use [11]. However, the adoption process is not without challenges, such as inadequate internet access, limited digital literacy, and a lack of specialized education on agricultural technologies [7]. Thus, government support in the form of digital training, improved technological infrastructure, and appropriate policy frameworks is essential to overcome these barriers [11].

In conclusion, the sustainability of youth-led agribusiness can be achieved through a synergistic integration of digital technology, appropriate education, and strong social support. The role of young agrosociopreneurs extends beyond merely increasing productivity or profitability; they are instrumental in crafting innovative and sustainable solutions that address the pressing social, economic, and environmental challenges facing contemporary agricultural communities [3]. The integration of these three elements will be pivotal in strengthening national food security and realizing sustainable agricultural development.

While numerous studies have explored the intersection of youth and agriculture, few have explicitly examined how youth contributions impact food security. Much of the existing research on agripreneurship remains fragmented—focusing largely on either economic or technological aspects in isolation. Furthermore, many successful practices and innovations initiated by young people remain undocumented and lack systematic analysis. Responding to these gaps, this research pursues two interrelated aims: (1) to rigorously assess the sustainability performance of youth-led agrosociopreneurship enterprises across economic, social, and environmental pillars; and (2) to establish a hierarchy of strategic priorities that can bolster those sustainability outcomes—especially through capacity-building, social capital enhancement, and digital-technology integration.

2 Methodology

This study employed a quantitative approach using a survey method to assess the sustainability levels of young agrosociopreneur (ASP) enterprises in West Java Province, specifically in the districts of Subang and Cianjur. The selection of these locations was based on their agricultural profiles, which represent zones with significant potential and dynamic farming activities relevant to the development of young agrosociopreneurs.

The target population comprised all young agrosociopreneurs operating within the designated areas. A purposive sample of 226 respondents was selected to capture a diverse range of demographic characteristics and levels of agricultural enterprise engagement. Prior to its deployment in the main survey, the structured questionnaire underwent a pilot psychometric assessment ($n = 30$). All items demonstrated statistically significant item–total correlations ($p < 0.05$), confirming satisfactory construct validity. Internal-consistency reliability was likewise robust, with Cronbach's $\alpha = 0.927$—well above the 0.70 threshold recommended for social-science instruments. These results establish the instrument's validity and reliability, justifying its use in the subsequent full-scale data collection. The instrument was designed to measure key sustainability variables across three dimensions: economic performance (including business growth, productivity, and profitability), social impact (community well-being, health, and social cohesion), and environmental management (natural resource conservation, pest control, and environmentally friendly practices).

Variables were measured using a Likert scale, allowing respondents to provide quantitative assessments of various aspects of their enterprise sustainability. Field data collection was conducted by a research team in collaboration with locally recruited enumerators who possessed strong contextual understanding of the local social and cultural environment, thereby ensuring the accuracy and quality of the data.

Data were analyzed using Importance-Performance Map Analysis (IPMA), operated through the latest version of the SmartPLS software. IPMA was selected for its ability to map variables according to their relative importance and performance, thus enabling the identification of strategic intervention priorities for enhancing ASP sustainability. This analysis not only examines the structural relationships between variables but also provides actionable insights for policymakers and practitioners by highlighting which areas require immediate strengthening.

The entire research process adhered strictly to ethical research principles, including obtaining informed consent from participants, ensuring data confidentiality, and guaranteeing voluntary participation without any form of coercion.

3 Results

This study involved a total of 226 young agrosociopreneurs (ASPs) from the districts of Subang and Cianjur in West Java. The measurement of enterprise sustainability across the three core dimensions—economic, social, and environmental—revealed that, overall, the sustainability index falls within the low to moderate category, with an average score of 46.21%.

The economic sustainability index stood at 50.17%, indicating that ASPs have been able to generate profit, enhance productivity, improve product quality, and increase employment compared to previous periods. This suggests that the economic aspect of their businesses is relatively stable, although there remains considerable room for improvement to reach a higher level of sustainability.

From a social perspective, the sustainability index reached 50.18%, demonstrating that ASPs are not solely profit-oriented but also contribute positively to community well-being, public health, and social harmony. Active community participation in sustainability

programs emerged as a key supporting factor in strengthening social bonds and fostering collaboration among community members.

Conversely, the environmental sustainability index recorded the lowest score, at 38.97%, underscoring the urgent need for greater attention to environmental management. This includes addressing issues such as soil fertility, water quality, and the control of pests and diseases, all of which are essential to ensure that agricultural enterprises operate in an environmentally responsible and sustainable manner.

The construct validity and reliability tests produced satisfactory results, with all key variables meeting the required thresholds for validity (Average Variance Extracted > 0.5) and reliability (Composite Reliability > 0.7). The tested variables included: individual characteristics, external support, learning level, intensity of ICT usage, social capital, ASP capacity, level of independence, role effectiveness, and enterprise sustainability level (see Table 1).

The Importance-Performance Map Analysis (IPMA) revealed the key variables influencing the sustainability of ASP enterprises by assessing both their importance and performance. Among these, social capital ranked highest in terms of performance (72.33%) and importance (0.141), followed by the capacity of ASPs and the effectiveness of their roles, both of which also demonstrated high importance values. In contrast, the utilization of information technology, despite being relatively important (importance score: 0.061), showed a notably low performance level (30.29%), indicating a significant gap between the critical role of digital technology and its actual application in daily business practices (see Table 2).

Table 1. Measurement model evaluation with Smart PLS

Variable	Indicator	Outer loading	Cronbach's Alpha	Composite Reliability	AVE
Respondent Characteristic	Social motivation	1.000	1.000	1.000	1.000
External Support	Government	0.720	0.686	0.822	0.608
	Community	0.830			
	Extension workers	0.785			
Learning levels	Content Alignment	0.727	0.649	0.810	0.589
	Process Accuracy	0.864			
	Learning Frequency	0.703			
Intensity of Information Technology Utilisation	IT Access	0.801	0.349	0.754	0.606
	IT Utilization Frequency	0.755			
Social Capital	Trust level	0.809	0.729	0.742	0.648
	Collective action	0.755			
	Network	0.849			
Capacity of Young Agrisociopreneurs	Technical	0.739	0.823	0.876	0.587
	Manajement	0.846			
	Marketing	0.794			
	Social	0.716			
	Innoovation	0.728			
Independence levels of young agrosociopreneurs	Resilience	0.822	0.729	0.831	0.552
	Compertitiveness	0.741			
	Collaboration	0.701			
	Adaptability	0.701			

Table 1. Measurement model evaluation with Smart PLS (*continue*)

Variable	Indicator	Outer loading	Cronbach's Alpha	Composite Reliability	AVE
The effectiveness of role young agrosociopreneurs	Linker	0.872	0.916	0.937	0.749
	Catalysator	0.843			
	Motivator	0.853			
	Farmer Cooperation	0.885			
	Adoption of Innovation	0.874			
Business sustainability levels	Economy	0.832	0.744	0.855	0.664
	Social	0.873			
	Environment	0.732			

The IPMA quadrant mapping, as illustrated in Fig. 1, further clarifies these dynamics. Social capital and ASP capacity were positioned in Quadrant I (high importance–high performance), signifying that these are key strengths that must be maintained and further enhanced. Conversely, the use of digital technology fell into Quadrant IV (high importance–low performance), identifying it as an area requiring immediate strategic attention and targeted intervention to elevate its effectiveness. Other variables that appeared in Quadrant II (low importance–high performance) and Quadrant III (low importance–low performance) are to be prioritized based on their respective influence and current performance levels.

Table 2. The importance and performance scores of variables that influence sustainability young agrosociopreneur (ASP)

Variable	Important (X)	Performance (Y)
X1. Respondent Characteristic	0.003	64.317
X2. External Support	0.059	61.655
X3. Learning levels	0.003	60.689
X4. Intensity of Information Technology Utilisation	0.061	30.290
X5. Social Capital	0.141	72.327
Y1. Capacity of Young Agrisociopreneurs	0.275	66.237
Y2. Independence levels of young agrosociopreneurs	0.082	62.101
Y3. The effectiveness of role young agrosociopreneurs	0.292	56.923
Average	**0.114**	**59.317**

Overall, the findings underscore the critical importance of strengthening capacity, social capital, and the role effectiveness of ASPs as key agents of change who significantly contribute to enterprise sustainability. At the same time, the utilization of digital technology emerges as a major challenge that must be addressed to enhance the competitiveness and long-term viability of young agrosociopreneur enterprises in the future.

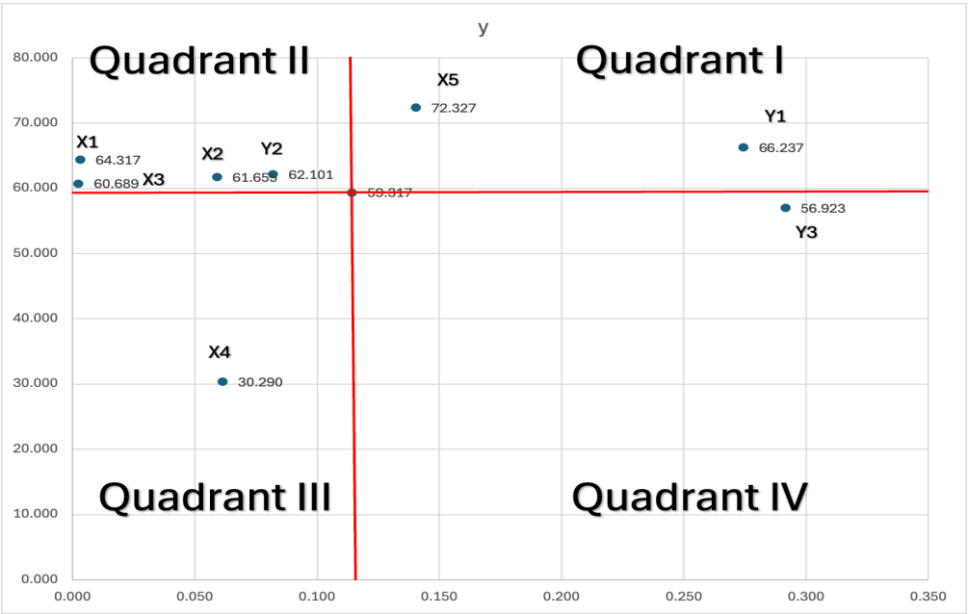

Fig. 1. Young agrosociopreneur (ASP) business sustainability strategy

4 Discussion

The findings of this study confirm that the sustainability of young agrosociopreneurs (ASPs) in Subang and Cianjur districts remains in the low to moderate range across economic, social, and environmental dimensions. This aligns with previous literature emphasizing that youth-led agribusiness ventures continue to face considerable challenges in achieving optimal sustainability [1, 3]. The particularly low environmental sustainability index points to the urgent need for more prudent management of natural resources, ensuring that agricultural activities are not only economically viable but also environmentally responsible.

A key contribution of this study lies in the identification of ASP capacity, role effectiveness, and social capital as pivotal factors significantly influencing enterprise sustainability. These capacities—spanning technical, managerial, marketing, social, and innovation skills—are in line with social entrepreneurship theory as proposed by D'Silva *et al.* (2020), which posits that capacity development serves as essential capital for driving positive transformation within farming communities [9]. The role effectiveness of ASPs as agents of change reinforces scholarly assertions that young people possess great potential to facilitate local socio-economic transformation through entrepreneurial action [5, 8].

High levels of social capital further underscore that social networks, trust, and collective action are critical foundations for sustaining community-based enterprises. This finding is consistent with Kote *et al.* (2024), who highlight social capital as a primary enabler of success in community-oriented ventures [3]. With strong social capital, ASPs are better positioned to forge partnerships and collaborative networks, which are indispensable for navigating both market and environmental challenges.

One of the more concerning findings, however, is the low performance of digital technology utilization, despite its relatively high importance. This disconnect reveals a clear gap between the potential of digital technologies and their actual application on the ground. Barriers such as limited access, lack of digital literacy, and inadequate educational support are key constraints to the adoption of digital solutions among young ASPs [11, 7].

These results affirm that although digital technologies are critical to improving efficiency and competitiveness in agriculture, they cannot be fully leveraged without systemic support in the form of training, infrastructure, and enabling policy [10]. The implications of these findings are significant for the design of policies and programs aimed at developing youth entrepreneurship in the agricultural sector. Policymakers and stakeholders must establish comprehensive capacity-building programs, addressing not only agricultural technical skills but also management, marketing, and digital literacy. Furthermore, strengthening social capital—through the creation of partnership networks and entrepreneurial communities—should form an integral part of youth ASP development strategies [5].

Beyond that, a community-based approach that positions young ASPs as agents of change must be reinforced, enabling them to act not only as economic actors but also as catalysts for social and environmental transformation. This study highlights the critical need for the simultaneous integration of economic, social, and environmental dimensions in order to achieve truly holistic and sustainable agricultural development.

That said, the study has certain limitations. The geographic scope was confined to only two districts in West Java, which limits the generalizability of the findings. Moreover, the quantitative survey method used was less effective in exploring deeper qualitative aspects, such as the sociocultural dynamics and personal motivations that influence ASP success. Future research employing qualitative or mixed-methods approaches is strongly recommended to gain richer insights into internal community dynamics and individual-level drivers.

Thus, this study makes a valuable contribution to the understanding of community-based sustainability models in the agricultural sector and provides an empirical foundation for the development of more effective policies and programs. It reinforces the vital role of the younger generation as a pillar of national food security and as key actors in shaping a sustainable agricultural future.

5 Conclusion and recommendations

This study concludes that the sustainability of young agrosociopreneur (ASP) enterprises in the districts of Subang and Cianjur remains at a low to moderate level across economic, social, and environmental dimensions. The key factors influencing enterprise sustainability are the capacity of ASPs, the effectiveness of their roles as change agents, and the presence of strong social capital. However, a significant gap was identified in the area of digital technology utilization, which, despite its recognized importance, continues to underperform and poses a major obstacle to enhancing sustainability.

These findings highlight that the integrated development of technical, managerial, and social capacities, along with the strengthening of ASPs' roles within their communities, is essential to advancing sustainable entrepreneurship. Furthermore, enhancing social capital through partnership networks and collaborative engagement should be consistently promoted. The utilization of digital technology must become a strategic priority, supported by targeted training programs, improved infrastructure access, and enabling policies to facilitate technology adoption among young farmers.

For future research, it is recommended to conduct in-depth studies using qualitative or mixed-method approaches to explore the sociocultural context, individual motivations, and barriers faced by young ASPs in adopting technology and operating sustainably. Expanding the geographic scope of research is also necessary to ensure that findings are more representative of diverse regional conditions.

From a practical standpoint, the findings of this study are expected to serve as a reference for policymakers and stakeholders in designing more effective agricultural entrepreneurship

development programs, particularly those targeting youth. Integrated support mechanisms—combining capacity building, social capital development, and digital facilitation—are vital to accelerating farmer regeneration and strengthening national food security. In this regard, the role of young agrosociopreneurs as innovative and adaptive agents of change represents a strategic asset in promoting sustainable agricultural development and improving the well-being of rural communities.

References

1. W. Wang, T. Mei, Research on the effect of digital economy development on the carbon emission intensity of agriculture. Sustainability. **16**, 4, 1457 (2024). https://doi.org/10.3390/su16041457
2. C. Bocean, A cross-sectional analysis of the relationship between digital technology use and agricultural productivity in eu countries. Agriculture. **14**, 4, 519 (2024). https://doi.org/10.3390/agriculture14040519
3. P. Kote, M. Yallappa, A. Jabeen, T. Srinatha, S. Prabhavathi, M. Ramasamy, G. Malathi, A scoping review on youth participation in agriculture: Sustainable development, food security, and economic growth. Journal of Scientific Research and Reports. **30**, 5, 947-958 (2024). https://doi.org/10.9734/jsrr/2024/v30i52012
4. J. Lowenberg-DeBoer, Economics of adoption for digital automated technologies in agriculture. Background paper for The State of Food and Agriculture 2022. FAO Agricultural Development Economics Working Paper 22-10 (2022). https://doi.org/10.4060/cc2624en
5. S. Syamsiah, S. Sumardjo, A. Fatchiya, Y. Haryanto, A. Firmansyah, Unveiling the influence of learning and information technology utilization on the independence of young agrosociopreneurs: Capacity as mediating variable. Multidisciplinary Science Journal. **7**, 11, 2025520 (2025). https://doi.org/10.31893/multiscience.2025520
6. S. Sumardjo, A. Firmansyah, L. Dharmawan, Social transformation in peri-urban communities toward food sustainability and achievement of SDGs in the era of disruption. Sustainability. **15**, 13, 10678 (2023). https://doi.org/10.3390/su151310678
7. T. Toumbourou, W. Dressler, A. Sanders, E. Liu, T. Brown, A. Utomo, Who are the future farmers? media representations of youth in agriculture, food security and 'modern' farming in indonesia. Asia Pacific Viewpoint. **64**, 2, 188-208 (2023). https://doi.org/10.1111/apv.12374
8. D. Rose, J. Chilvers, Agriculture 4.0: Broadening responsible innovation in an era of smart farming. Frontiers in Sustainable Food Systems. **2**, 87 (2018). https://doi.org/10.3389/fsufs.2018.00087
9. J. D'Silva, D. Dahalan, Z. Zaremohzzabieh, I. Ismail, S. Lateef, Socio- demographic differences on youth behavioural intention to engage in agriculture. International Journal of Academic Research in Business and Social Sciences. **10**, 15, (2020). https://doi.org/10.6007/ijarbss/v10-i15/8249
10. T. Tian, L. Li, J. Wang, J, The effect and mechanism of agricultural informatization on economic development: based on a spatial heterogeneity perspective. Sustainability. **14**, 6, 3165 (2022). https://doi.org/10.3390/su14063165
11. O. Emeka, I. Christiana, O. Emmanuel, T. Akunna, N. Esther, et al., A Review on digitalization of agriculture and economic business model strategies in the 21st Century. American Journal of Operations Management and Information Systems. **8**, 2, 30-41 (2023). https://doi.org/10.11648/j.ajomis.20230802.12