DETERMINATION OF SUCCESS CRITERIA FOR AGRICULTURAL SOCIAL STARTUPS IN INDONESIA

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Abstract: It is difficult for social startups to select the most relevant key performance indicators (KPIs) because it is difficult to find a shared impact language to code, classify, and interpret the impact. This study aims to determine key impact performance indicators for assessing success in agricultural social startups in Indonesia. We applied multi-case studies approach to four leading Indonesian agricultural social startups. In total, eight experts consisting of co-founders, human resources managers, and managing partners on each social startup have been asked to assess the importance of success criteria and the performance of the corresponding company in fulfilling the requirements. The analytical hierarchy process (AHP) was applied to determine the relative importance of impact themes and strategic goals. The AHP results showed that smallholder agriculture is the most critical impact theme to achieve as success criteria. Five of the 12 strategic goals with the highest priority were explained as candidates of KPIs: the financial health of farmers, better and stable pricing, social equity and justice, farm profitability, and food availability and diversity. The KPIs developed in this study are anticipated to be utilized by stakeholders involved in the agricultural social startup ecosystems, including practitioners, impact investors, and policy-makers.

Keywords: social entrepreneurship, social impact, social performance, impact assessment, and evaluation

Abstrak: Memilih indikator kinerja utama (IKU) yang paling relevan merupakan tantangan tersendiri bagi startup sosial karena sulit untuk menemukan bahasa dampak yang sama dalam menyepakati, menglasifikasikan, dan menginterpretasikan dampak tersebut. Penelitian ini bertujuan menentukan indikator kinerja dampak utama yang digunakan untuk menilai keberhasilan startup sosial pertanian di Indonesia. Penelitian ini menerapkan pendekatan studi kasus jamak terhadap empat social startup di sektor pertanian. Delapan pakar yang terdiri dari co-founder, manajer SDM, dan manajer mitra pada setiap social startup diminta untuk menilai tingkat kepentingan kriteria keberhasilan dan menilai kinerja perusahaannya masing-masing dalam kaitannya dengan keberhasilan perusahaan memenuhi kriteria tersebut. Metode analytical hierarchy process (AHP) diterapkan untuk menentukan kepentingan relatif dari tema dampak dan tujuan strategis. Hasil AHP menunjukkan bahwa pertanian petani kecil merupakan tema dampak yang paling penting untuk dicapai sebagai kriteria keberhasilan. Lima dari 12 sasaran strategis dengan prioritas tertinggi dipilih sebagai indikator kinerja dampak utama yaitu kesehatan keuangan petani, harga yang lebih baik dan stabil, kesetaraan dan keadilan sosial, profitabilitas pertanian, serta ketersediaan dan keragaman pangan. IKU yang dikembangkan dalam penelitian ini diharapkan dapat digunakan oleh pemangku kepentingan yang terlibat dalam ekosistem startup sosial pertanian, seperti praktisi, investor dampak, dan pembuat kebijakan.

Kata kunci: : e-commerce marketplace, pemasaran, petani digital, robust least squares

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INTRODUCTION

Businesses are meeting increasing demands to address social and environmental challenges (Tabares, 2021). There has been a new, rapidly developing phenomenon in so-called 'social startup', organizations seeking to achieve the social mission through market mechanisms (Costa and Andreaus, 2020; Ebrahim et al. 2014). With an entrepreneurial approach and a social mission at their core, social startups employ innovative strategies to address various social and environmental issues within a for-profit framework (Battistella et al. 2021; Bocken 2015; Gidron et al. 2021; Maiolini et al. 2016). Unlike other startups formed primarily for commercial reasons, social startups aim to create positive social and environmental impacts; thus, they also benefit from a social or environmental cause (Gidron et al. 2021). They also promote sustainable development and new business models (OECD, 2016).

In 2015, the United Nations Interagency Task Team (UN IATT) on Science, Technology, and Innovation for Sustainable Development Goals (SDGs) recognized this new hybrid form of organization as an emerging form with the potential to catalyze the business sector's contribution to achieving the SDGs (United Nations, 2015; Vinuesa et al. 2020). Like social enterprises, social startups pursue social and environmental goals within a framework that engages in commercial activities (Battilana 2018; Doherty, Haugh, and Lyon 2014; Smith, Gonin, and Besharov 2013). At the same time, their innovative solution focus, growth orientation, dynamic business model, financing structure, and global markets place them close to startups (Blank, 2020; Gidron et al. 2021; Graham, 2012; Skala, 2019).

Social startups often have vague ideas about how their business delivers impact. Whereas they should still be able to demonstrate the connection between their business and the targeted impact; thus, social startups need to measure and evaluate their impact performance. Impact measurement encourages social startups to assess and consider whether or not their business precisely and successfully delivers the intended impact to the beneficiaries in a viable way (ANGIN-Angel Investment Network Indonesia and UNDP-United Nations Development Programme, 2016). There has been an increasing demand for measuring social impact since the growing trend of impact investment has increased. Impact investments are described as investments made to create a positive social and environmental impact that can be measured alongside a compelling financial advantage (Calderini et al. 2018; Maduro et al. 2018; Mudaliar et al. 2017). Impact investments in Indonesia have grown sufficiently since 2013 (ANGIN, 2020). More stakeholders, such as mainstream investors, banks, government, and foundations, have been moving quickly into the sector, with over USD 307 million in funding for social startup projects in 2019-2020 (ANGIN, 2020).

Many social startups in Indonesia are found in the agricultural sector and represent the most significant portion (55%) of the opportunity for impact (SDG relative) (ANGIN-Angel Investment Network Indonesia and UNDP-United Nations Development Programme 2016). The concentration of social startups in the agricultural sector is unsurprising. The agricultural sector contributes 14% of Indonesia's gross domestic product (GDP) (BPS, 2020). Agriculture is the largest source of employment, with around 30% of the Indonesian labor force (38,78 million people) employed in the agricultural sector (BPS, 2021). Although Indonesian agriculture provides a living for millions of Indonesians, it is at a crossroads at this time. Approximately 93% of Indonesia's total number of farmers are smallholders (FAO, 2018). Due to increased global and domestic demand, most smallholder farmers in Indonesia physically and financially fail to take advantage of the financial prospects. Farmers typically experience an extensive and dispersed agricultural supply chain; are geographically separated; and need access to a stable market, financial resources, and essential equipment. Several social startups see the disruption in the sector as business potential, such as a program for increasing yield, farm-to-fork business models, food manufacturing, and technological advancements in agriculture. Therefore, this paper explores the relationship between social startups and their impact, focusing on the agriculture sector in Indonesia.

Despite the absence of a universal impact measurement tool, practitioners have access to several global frameworks. Unfortunately, prioritizing and synthesizing indicators into an integrated social impact measurement practice needs to receive more attention. IRIS, GIIRS, B-Analytics, and SROI, are the four most commonly applied global impact measurements (ANGIN-Angel Investment Network Indonesia and UNDP-United Nations Development Programme, 2016). Global Impact Investment System (GIIRS) and

B-Analytics measurement practices refer to Impact Reporting and Investment Standards (IRIS) metrics. Whereas IRIS is the universal language for describing social and environmental performance metrics, GIIRS uses IRIS metrics to evaluate a fund's performance. GIIRS, introduced by the Clinton Global Initiative and the B Lab, is now a part of the IRIS-aligned B-Analytics platform (Kroeger and Weber, 2016; Wang, 2016). In addition to identifying impact investments, the IRIS system provides tools for comparing the impact performance of firms and funds. B-Analytics is an IRIS-aligned impact investing portfolio management platform managed by Global Impact Investing Network (GIIN) (Kato, 2021; Wang, 2016). The B-Analytics platform is optimized to permit investors to monitor and collect performance data utilizing IRIS indicators and the B Impact Assessment tool (Marquis and Lee, 2015). The platform is adaptable for planning, framework development, data storage and analysis, and report generation (Wang, 2016).

Moreover, Social Return on Investment (SROI) is usually employed to help investors analyze investments before and after investment. An Australian study conducted by Social Ventures Australia (SVA) Consulting on the impact of SROI and SROI reporting revealed that SROI analysis provided firms with a more in-depth and analytical understanding of their value creation (SVA-Social Ventures Australia Consulting, 2012). While SROI methods offer a process for determining which impact indicators to measure, the output will only be credible if there is a clear and consistent understanding of how each of those indicators will be measured, a challenge that can be overcome by relying on the IRIS standards described above (Gutterman, 2020).

IRIS has significant advantages over other measurements as a user-friendly metrics tool (Gelfand, 2012). IRIS is a catalogue of free-to-use, standardized impact performance metrics created by GIIN. It combines the measurement and reporting of social and environmental impact metrics along with financial performance metrics. For each metric, IRIS offers its name, definition, usage guidance, reporting format, and instructions for calculating the indicator. It is very flexible, as social startups may select metrics corresponding to the social value provided by the evaluated intervention from a list of 600 metrics (Kroeger and Weber, 2016; GIIN, 2021b). The IRIS is, therefore, easy and quick to learn and employ. Due

to its simplicity and flexibility, IRIS has become one of the most widely used systems for measuring impact (ANGIN-Angel Investment Network Indonesia and UNDP-United Nations Development Programme, 2016; Saltuk et al. 2014). It is used by 82% of nearly 300 leading impact investors, who manage a total of USD 404 billion in impact investment assets (Hand et al. 2020). It has a high level of credibility in the field and, thus, a high level of legitimacy (Busenhart, 2012).

Measuring impact performance is vital as it supports social startups trace whether their business and the intended impact are in line. This research utilizes the IRIS framework to identify impact performance indicators. In assessing their impact, social startups should keep things straightforward. Because their impact measurements should benefit them and investors, they must select only the most relevant key performance indicators aligned with their business (ANGIN-Angel Investment Network Indonesia and UNDP-United Nations Development Programme, 2016). Bouri (2011) describes the early history of impact investing and the establishment of IRIS as a standard for terms and definitions in many industries. A case study on the Kleissner Felicitas Foundation's adoption of IRIS standards is included in the research. The Kleissners established their family foundation to make early-stage investments in ethical entrepreneurs with scalability potential. IRIS is popular due to its comprehensive set of measures and potential for standardization, enabling comparisons of various investments' performance. Unitus Seed Fund, one of the impact investors, uses the IRIS catalogue of impact measurements in the social, environmental, and financial domains to evaluate the performance of its investments (Sekar, 2015). The social impact category of metrics has sector-specific metrics to measure the impact their investee companies have on the sector. For example, social enterprises within the agriculture portfolio of Unitus are measured against four key areas in which they enable farmers: access to inputs, information, market linkages, and financial services (Sekar, 2015). A case study from Aidis et al. (2022) provides the preliminary measures NESsT, a small-impact investment firm, took to pilot gender-inclusive policies and practices throughout its portfolio companies and internal operations. To construct its indicators based on their applicability to its portfolio companies, NESsT utilized a set of GIIN indicators based on the impact measurement standards of the IRIS tool.

Existing global social impact metrics focused on classifying impact performance indicators and primarily addressed the question of what to measure in agricultural social startups. The current global social impact metrics need to adequately address the selection, prioritization, and integration of impact performance indicators into the impact performance measurement system. IRIS only offers a database of indicators with standardized definitions applicable to numerous sectors. There is no relative importance rating on each indicator in IRIS metrics. The companies must select and assess the importance rating based on their business context. Since IRIS is merely a catalogue, many early-stage social startups need help understanding and converting the metrics into data and converting them into an informative impact report. This limitation makes it harder for the organization to make good decisions about performance reviews. Further research is required to provide social impact metrics to consolidate KPIs into overall performance measurement. To address the abovementioned issues, we propose a set of KPIs for the impact performance evaluation of agricultural social startups. Various techniques for selecting and ranking KPIs have been described in the literature, such as simple rating methods and borda (Arliana and Soebroto, 2018; Tangkesalu and Suseno, 2018; Attia et al. 2020; Aziz et al. 2020). Analytical hierarchy process (AHP) has been chosen because of its advantages in delineating a hierarchical framework in decision-making that breakdown general criteria into detailed indicators. AHP also applied pairwise comparison to elicit relative importance scores among criteria and indicators, making this method more robust than simple rating methods (Anjomshoae et al. 2019; Nam et al. 2019; Podgórski, 2015).

This section provides a general background for the impact performance measurement in agricultural social startups. The following section presents the KPIs ranking methodology; discusses the result and the case study. The final section concludes this paper with a summary, recommendations, and an outlook on future work.

METHODS

A study has been conducted on Indonesian agricultural social startups to determine the success criteria for agricultural social startups. A multi-case study based on a structured interview with experts has been conducted on Indonesian agricultural social startups to determine the success criteria for agricultural social startups. Four Indonesian agricultural social startups were chosen due to their fit in identifying and overcoming the barriers encountered by the farmers in conducting a proper agricultural business that contributes to the economic development of farmers. Moreover, all social startups in this study meet other criteria as follows. Organizations seek to pursue social and environmental objectives within a framework that engages in commercial activities (Battilana, 2018; Doherty et al. 2014; Smith et al. 2013). They also adopt innovative solutions to various social and environmental problems; have a growth orientation and a dynamic business model (Blank, 2020; Gidron et al. 2021; Graham, 2012; Skala, 2019). The participating social startups (SSs) are referred to as SS-A, SS-B, SS-C, and SS-D due to a non-disclosure agreement. They run a sustainable farming system that is environmentally friendly, economically viable for farmers, and socially acceptable. Each social startup's targeted problems, proposed solutions, and intended impact are depicted in Figure 1.

This study conducted in-depth interviews between January and March 2022 with eight practitioner experts from four major Indonesian agricultural social startups, and their responses were evaluated. They consist of four co-founders, one human resources manager, and three managing partners. They have at least three years of experience creating and sustaining social impact in the agricultural sector, which could make the judgments more credible and reliable. The interviews were conducted in person and through the completion of the AHP questionnaires. The questionnaire was created using the standard AHP format first proposed by Saaty (1988). The questionnaire consists of two parts: pairwise comparison of the relative importance of impact themes and the relative importance of strategic goals of the items. Respondents were instructed to rate the importance of each item using pairwise comparison when completing the questionnaire. The pairwise comparison was conducted using the relative scale values from 1 to 9. The value 1 indicates that the two items being compared are of equal importance, while the value 9 indicates that only one item is of high importance.

Social Startup A (SS-A)	Social Startup B (SS-B)
Problems addressed: The lack of affordable organic healthy food in urban Indonesia. Due to limited market access and a lack of training in organic farming and the production of high-value goods, the standard of living of Indonesian farmers is deficient. The farmers' low income is a consequence of their low-quality produce.	Problems addressed: Market access is challenging for smallholder farmers. Most of them cannot process their milk output because they need the required technology to produce premium products. Meanwhile, their market price depends on the quality of the milk. Poor quality has led to poor-income farmers.
Solutions: SS-A gives extensive training and support on organic farming. It then purchases organic products from farmers at a price premium. It also provides farm-to-table online groceries that link farmers to markets.	Solutions: SS-B partners with dairy farmers to ensure a market and guaranteed income. SS-B attracts consumers to dairy-based products sourced from local dairy milk farmers at a premium price.
Impact/SDGs targeted: Increase farmers' income; quality agricultural input; environmentally friendly, increase food security; aline with SDG 1 (No poverty), SDG 2 (Zero Hunger), SDG 3 (Good health and well being), and SDG 12 (Responsible consumption and production).	Impact/SDGs targeted: Increase in farmers' income, increase awareness of the health benefits of dairy products; aline with SDG 1 (No poverty), SDG 3 (Good health and well-being), and SDG 12 (Responsible consumption and production).
Social Startup C (SS-C)	**Social Startup D (SS-D)**
Problems addressed: Despite being the largest maritime country in the world, pharmaceutical raw material and food ingredient raw materials industries in Indonesia still import salt from other countries. There are also issues of low productivity, lack of added value, and lack of education in salt purity.	Problems addressed: Indonesia's demand for beef keeps growing, increasing the gap between its low production and high consumption (excess demand). To fulfill this excess demand, Indonesia depends on meat imports. Some challenges in the livestock sector include a long supply chain, old technology, financial problem, low education, market access barrier, and unfair trade,
Solutions: Provides salt farmers with the financing, expertise, and income security they need to achieve significantly better-living standards.	Solutions: Partners with smallholder farmers in livestock fattening and breeding by implementing a sustainable and integrated farming system. SS-D acts as a market regulator, support system, and coaching. SS-D creates added-value products to reach the global market by introducing processed-ready-to-eat meat products.
Impact/SDGs targeted: Increase farmers' income, increase social equity and justice; aline with SDG 1 (No poverty), and SDG 8 (Decent work and economic growth).	Impact/SDGs targeted: Increase in farmers' income, increase food security; aline with SDG 1 (No poverty), SDG 2 (Zero Hunger), SDG 8 (Decent work and economic growth), and SDG 12 (Responsible consumption and production).

Figure 1. Indonesian agricultural social startups' profile

Selected Impact Performance Indicators and Structure of The Decision Hierarchy

As mentioned in the introduction, IRIS metrics give agreed-upon definitions of Impact Categories, Impact Themes, and Strategic Goals to develop a standard language for sharing and comparing affect performance. It identifies common goals and core metrics organized by theme, establishing a common vocabulary for describing, assessing, sharing, and comparing impact performance. IRIS is managed in accordance with the social and environmental Impact Themes that impact investors and startups use to define their strategic objectives, portfolios, and business models. IRIS metrics are also aligned with SDGs and targets, respectively. IRIS metrics for the Agriculture Impact Category are built from Impact Themes and Strategic Goals. Impact Categories within the IRIS metrics are aligned with the industry classes standardized by the International Standard Industrial Classification of All Economic Activities (ISIC). The agriculture Impact

Category classifies the types of Impact Themes as (1) Smallholder Agriculture, (2) Sustainable Agriculture, and (3) Food Security (GIIN, 2021a). Each category of impact themes on the agricultural sector has a defined and standardized strategic aim and a set of key impact performance indicators and is aligned with the Sustainable Development Goals (SDGs), including SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being), SDG 10 (Reduced Inequality), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action) (McCarthy et al. 2019)

Impact Themes assist in describing a purpose-driven strategy for contributing to social or environmental impact. Investors can use each theme to identify and evaluate investment opportunities, while enterprises can use it to organize and communicate their work. Impact Themes classify the type of Strategic Goals or approach investors or enterprises may employ to achieve the main social or environmental effects they intend to

deliver. Strategic Goals are strategies commonly used by impact investors or businesses to achieve established social or environmental impact goals. Each strategic goal in the agriculture impact theme is embedded with impact performance indicators. Thus, the determination of key impact performance indicators for measuring the success of agricultural social startups has a hierarchical structure with two levels (impact themes and strategic goals) based on their thematic categories, as seen in Figure 2.

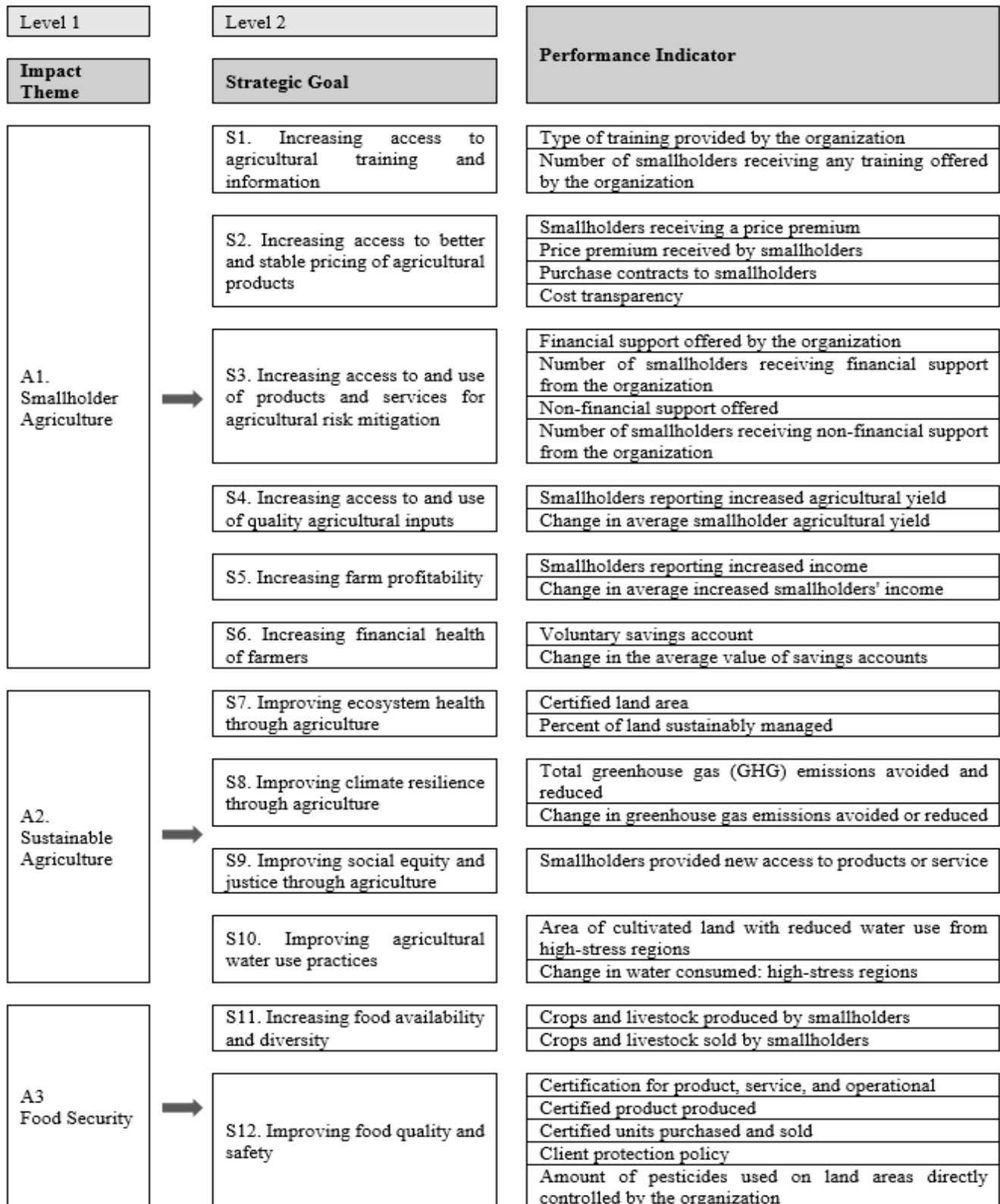| Level 1	Level 2	Performance Indicator
Impact Theme	**Strategic Goal**	
A1. Smallholder Agriculture	S1. Increasing access to agricultural training and information	Type of training provided by the organization
		Number of smallholders receiving any training offered by the organization
	S2. Increasing access to better and stable pricing of agricultural products	Smallholders receiving a price premium
		Price premium received by smallholders
		Purchase contracts to smallholders
		Cost transparency
	S3. Increasing access to and use of products and services for agricultural risk mitigation	Financial support offered by the organization
		Number of smallholders receiving financial support from the organization
		Non-financial support offered
		Number of smallholders receiving non-financial support from the organization
	S4. Increasing access to and use of quality agricultural inputs	Smallholders reporting increased agricultural yield
		Change in average smallholder agricultural yield
	S5. Increasing farm profitability	Smallholders reporting increased income
		Change in average increased smallholders' income
	S6. Increasing financial health of farmers	Voluntary savings account
		Change in the average value of savings accounts
A2. Sustainable Agriculture	S7. Improving ecosystem health through agriculture	Certified land area
		Percent of land sustainably managed
	S8. Improving climate resilience through agriculture	Total greenhouse gas (GHG) emissions avoided and reduced
		Change in greenhouse gas emissions avoided or reduced
	S9. Improving social equity and justice through agriculture	Smallholders provided new access to products or service
	S10. Improving agricultural water use practices	Area of cultivated land with reduced water use from high-stress regions
		Change in water consumed: high-stress regions
A3 Food Security	S11. Increasing food availability and diversity	Crops and livestock produced by smallholders
		Crops and livestock sold by smallholders
	S12. Improving food quality and safety	Certification for product, service, and operational
		Certified product produced
		Certified units purchased and sold
		Client protection policy
		Amount of pesticides used on land areas directly controlled by the organization

Figure 2. Composition for selection of success criteria for agricultural social startups

The impact theme (level 1) is the first layer of the hierarchical structure and consists of the three impact themes: smallholder agriculture, sustainable agriculture, and food security. The composition of level 1 is defined below (A1 to A3).

- Smallholder agriculture (A1): marginal and sub-marginal agricultural households with constrained resources and size. Smallholder farmers were cultivating less than two hectares; had low access to technology; limited capital, skills, and risk management; reliance on family labor for the majority of activities; and limited storage, marketing, and processing capacity (Terlau, Hirsch, and Blanke 2019; Vignola et al. 2015).

- Sustainable agriculture (A2): an integrated system of agricultural production practices that seeks to produce adequate amounts of high-quality food while being profitable and environmentally safe (Akamani, 2021; Mpanga et al. 2021). Sustainable agriculture practices include farming activities with environmental, societal, and economic dimensions (Zeweld et al. 2017).

- Food security (A3): all individuals always have physical and economic access to sufficient, safe, and nutritious food that satisfies their dietary needs and food preferences for an active and healthy life (FAO, 2003; the Republic of Indonesia, 2012).

Since a significant body of empirical research suggests that smallholder farmers are the most important unit to focus on in agriculture (Adenle et al. 2019; Lowder et al. 2016; Purnawan et al. 2020; Sergio et al. 2020; Zeweld et al. 2017), the majority of farmers in Indonesia are smallholders (FAO, 2018; Purnawan et al. 2020). We hypothesized that smallholder agriculture is the most critical impact that agricultural social startups must prioritize. Smallholders in Indonesia are important but economically vulnerable because they cannot work commercially due to limited farm sizes (Hidayat et al. 2015). The programs and strategies for Indonesian smallholder agriculture continue to focus on the income level of farmers. Therefore they remain devoid of environmental (sustainable agriculture) and food security awareness (Hidayat et al. 2015; Rozaki, 2020; Syuaib, 2016).

The strategic goal (level 2) is the second layer of the hierarchical structure, distinguished by the upper level's impact themes. In this study, 12 indicators are separately contained in level 1, and each impact theme in level 1 includes two to six specific and common strategic goals.

We assessed the significance of these impact performance indicators based on practitioners' responses. The AHP analysis consisted of two stages: in the first, the relative weights of the three impact themes were determined. The second stage involved determining the relative weights of the selected strategic goals for established key impact performance indicators for agricultural social startups. A set of KPIs is obtained from the highest-ranked strategic goals and then incorporated into managerial implications (Figure 3).
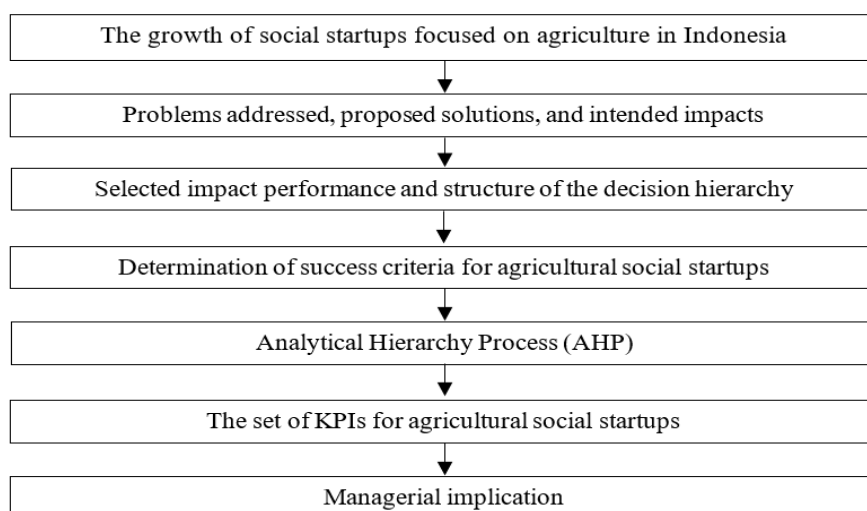

Figure 3. Research framework

RESULTS

Analysis of the AHP results

We used Microsoft Excel to calculate the weights. The consistency ratio (CR) value of the AHP analysis for all the matrices was calculated as less than 0.1 (10%), which was within the acceptable range for the validity results (Saaty, 1988). Table 1 categorizes the AHP results into three groups: (1) The relative weights of the impact themes, (2) The relative weights of the strategic goals for each impact theme, and (3) The final weights of the strategic goals for the primary goal. Table 1 shows that smallholder agriculture was the most critical impact on agricultural social startups (0.585). It was followed by the sustainable agriculture impact (0.282), and the food security impact had the

lowest weight (0.132). It indicated that experts in the field deemed that smallholder farmers are still the critical unit to focus on making progress in agriculture to achieve food sustainability and security. Lowder et al. (2016) confirm that smallholder farmers represent the backbone of the farming sector, especially in low-income countries. A large body of empirical research argues that smallholder farmers are critical to global food security (Adenle et al. 2019; Lowder et al. 2016; Sergio et al. 2020). In Indonesia, smallholder farmers are the significant economic agent in the farming sector. They occupy around 89% of the land and comprise a large portion of the overall economy (Purnawan et al. 2020). Adopting sustainable agriculture practices is considered a win-win strategy for smallholder farmers because it can simultaneously improve food security (Zeweld et al. 2017).

Table 1. Relative weights of strategic goals for each impact theme

Impact themes and strategic goals	Relative weight of impact themes	Relative weight of strategic goals to each impact theme	Final weight of strategic goals to goal (overall prioritization)	Priority
Smallholder Agriculture (A1)	0.585			
Increasing access to agricultural training and information (S1)		0.117	0.068	8
Increasing access to better and stable pricing of agricultural products (S2)		0.231	0.135	2
Increasing access to and use of products and services for agricultural risk mitigation (S3)		0.130	0.076	6
Increasing access to and use of quality agricultural inputs (S4)		0.101	0.059	9
Increasing farm profitability (S5)		0.167	0.098	4
Increasing financial health of farmers (S6)		0.254	0.149	1
Sustainable Agriculture (A2)	0.282			
Improving ecosystem health through agriculture (S7)		0.237	0.067	7
Improving climate resilience through agriculture (S8)		0.195	0.055	10
Improving social equity and justice through agriculture (S9)		0.453	0.128	3
Improving agricultural water use practices (S10)		0.115	0.032	12
Food Security (A3)	0.132			
Increasing food availability and diversity (S11)		0.600	0.079	5
Improving food quality and safety (S12)		0.400	0.053	11
Total Weight			1	

The overall ranking of strategic goals showed that increasing farmers' financial health and access to better and more stable agricultural product pricing, with a weight of 0.149 and 0.135, respectively, were the first and second most important strategic goals (included in the smallholder agriculture impact theme). The third highest-ranked strategic goal was improving social equity and justice through agriculture, with a weight of 0.128 (included in the sustainable agriculture impact theme), followed by increasing farm profitability, with a weight of 0.098 (included in the smallholder agriculture impact theme). The fifth-ranked strategic goal was increasing food availability and diversity, with a weight of 0.079 (included in the food security impact theme).

Smallholder farmers are a key to ending Hunger and undernutrition worldwide, but they are increasingly facing barriers to profitability (Sergio et al. 2020). Smallholder farmers have faced challenges in their livelihood strategies, such as a lack of human capital and limited access to infrastructure, markets, and technologies (Gaffney et al. 2019). Today smallholder farmers are also becoming more vulnerable to new risks and challenges related to climate change, health, prices, and finances (Burnham and Ma, 2016). In this study, the increasing financial health of farmers (0.254), increasing access to better and stable pricing of the agricultural products (0.231), and increasing farm profitability (0.167), were ranked highest among the strategic goals in smallholder agriculture impact theme. Social startups' commitment to treating smallholder farmers as viable businesses is key to unlocking the sector's potential to contribute to a broader development agenda. Enhancing the viability of smallholder farmers could increase agricultural productivity and income, reduce rural poverty, improve food security, and contribute to achieving multiple SDGs. Compared to conventional agriculture, sustainable agriculture can increase smallholders' productivity and poverty reduction (Marasteanu and Jaenicke, 2018). In this study, improving social equity and justice, with a weight of 0.453, scored the highest ranking among the strategic goals in the sustainable agriculture impact theme. Sustainable agriculture prioritizes social equity and justice because it can improve economic outcomes for smallholder farmers. Therefore, social startups in the agriculture sector

have to provide a sustainable agricultural practice system to ensure smallholders' income is enough to satisfy their family needs for health, education, and social welfare, thus improving smallholders' social equity and justice (Sassi, 2018; Sergio et al. 2020) multiple burdens of malnutrition persist worldwide: 795 million people are hungry more than 2 billion people suffer from micronutrient deficiencies and over 2 billion are overweight or obese. At the same time, various challenges continue to threaten global food security and nutrition. Smallholder farmers are a key to ending hunger and undernutrition worldwide, but they are increasingly facing barriers to profitability. Yet smallholders should not all receive the same kind of support; they are not a homogenous group. While some smallholders should be supported to move up to commercially oriented and profitable farming systems, some should be supported to move out to seek non-farm employment opportunities. Strategies to promote smallholder agriculture as a business can help to overcome these obstacles and move smallholders with profit potential towards greater prosperity, while also contributing to the achievement of multiple Sustainable Development Goals (SDGs).

Due to the relevance of smallholder farmers, enhancing their production capacities, economics, and social resilience within sustainable agriculture could positively impact food security (Sergio et al. 2020). Food security is a multi-dimensional concept comprising availability, supply stability, access, and utilization (Magcale-Macandog et al. 2010). In this study, the increasing food availability and diversity have received the highest rank with the weight of 0,600 among the strategic goals in the food security impact theme. Most of the attention has been on agricultural intensification to produce more food, but food insecurity in many places is mainly caused by problems with income and distribution (Waha et al. 2018). Also, there needs to be more research focusing on the contribution of farming diversity toward achieving food security. Evidence shows that more diverse agroecosystems are likely to perform better today and under changing environmental conditions because a broader range of functions and responses to change will stabilize the system (Lin, 2011; Michler and Josephson, 2016).

Extraction of KPIs for Agricultural Social Startups

Based on interviews with four agricultural social startups, we found that no existing social indicators are systematically targeted as formal KPIs in their annual report. All KPIs in those startups are only derived from financial performances. The impact performance indicators for describing success criteria for agricultural social startups include 30 indicators categorized into specific strategic goals according to three main impact themes. The impact performance indicators help assess, evaluate, and compare agricultural social startups' performance in a specific area. Each indicator has a unique function and level of importance. Some indicators will become the most critical data source for enhancing performance and driving agricultural social startups toward success. This study proposes key performance indicators (KPIs) comprised of the most significant impact indicators selected from the highest-ranked strategic goals determined by the AHP to identify the success criteria for agricultural social startups.

KPIs for describing success criteria for agricultural social startups were selected from IRIS metrics by GIIN for the agriculture impact category established in the previous section (analysis of the AHP results). Only a handful of carefully chosen indicators can effectively convey impact performance information. The KPIs are determined based on the following criteria (Nam et al. 2019): (1) The AHP result: the selected indicators must correspond to the important impact indicators determined by experts; (2) The KPIs used to evaluate agricultural social startups must incorporate all relevant factors; (3) KPIs should comply to SMART criteria and other criteria that are directly relevant to objectives, be as few as possible, apply to the options being considered, be comprehensive, meaningful, and relevant to all stakeholders, and be applicable over time.

The selection criteria ensure that the indicators provide impact investors/startups with valuable and effective information. Based on the AHP results, the KPIs were developed under five strategic goals ranked from 1 to 5 (Table 1), accounting for 59% of the total weight. The KPIs set (Figure 4) comprises 11 chosen from the 30 indicators, reflecting three significant impact themes in the agriculture industry. Table 2 displays the unit and measurement concepts for 11 KPIs.
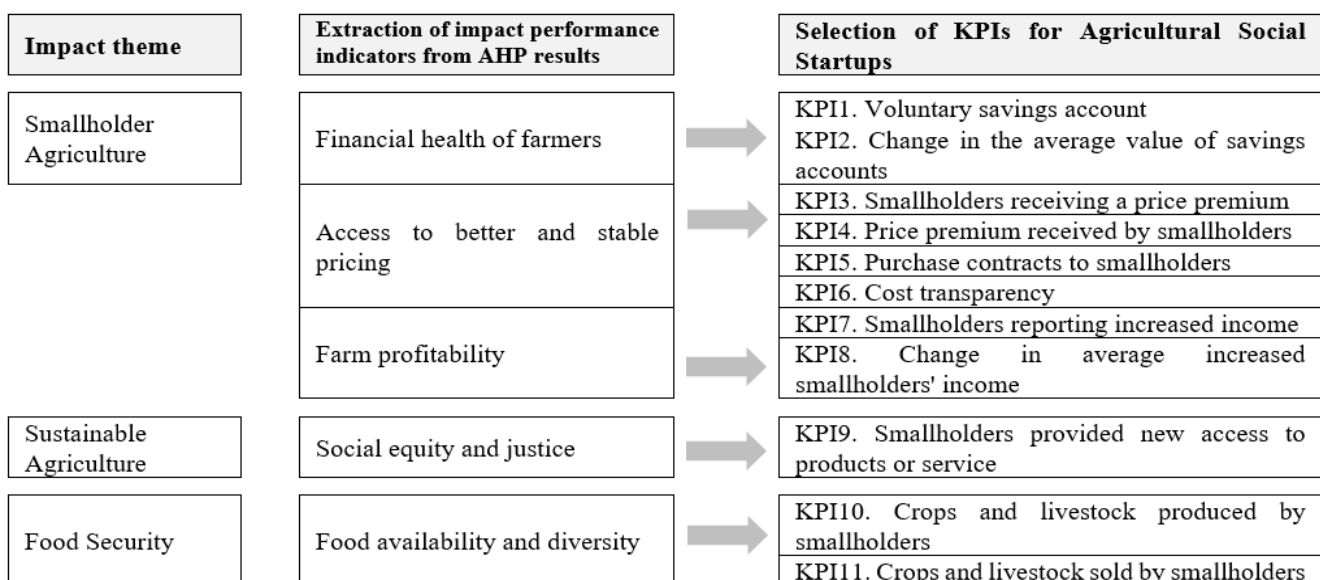

Figure 4. Extraction of the impact indicators and selection of KPIs for agricultural social startups

Table 2. The set of KPIs for agricultural social startups

Key Performance Indicator		Unit	Concept
KPI1	Voluntary savings account	(%)	Voluntary savings accounts = [(Number of smallholders with increased value in savings account during the reporting period) / (Total number of smallholder clients)] x 100
KPI2	Change in the average value of savings accounts	(%)	Change in value of savings accounts = {[(Value of voluntary savings accounts in the reporting period) - (Value of voluntary savings accounts in the prior period)] / (value of voluntary savings accounts in the prior period)} x 100
KPI3	Smallholders receiving a price premium	(%)	Smallholders receiving a price premium = [(Number of smallholders receiving price premium) / (Total number of smallholder suppliers)] x 100
KPI4	Price premium received by smallholders	(%)	Price premium received by smallholders = {[(Price obtained by the producer/supplier from the organization for a good or service) - (Benchmark price of the good or service)] / (Benchmark price of the good or service)} x 100
KPI5	Purchase contracts to smallholders	(%)	Percent of purchase contracts = [(Number of purchase contracts to smallholder suppliers) / (Total purchase contracts)] x 100
KPI6	Cost transparency	(Yes/ No)	Cost transparency = Indicate whether the organization fully discloses to its clients all pricing and cost information for its products and services
KPI7	Smallholders reporting increased income	(%)	Smallholders reporting increased income = [(Number of smallholders reporting increased income) / (Total number of smallholders)] x 100
KPI8	Change in average increased smallholders' income	(%)	Change in increased smallholders income = {[(Smallholders income in the prior period) - (Smallholders income in the reporting period)] / (Smallholders income in the prior period)} x 100
KPI9	Smallholders provided new access to products or service	(%)	Percent of smallholders provided new access to products/services* they were unable to access prior to the reporting period *water/energy/ education/ finance/healthcare
KPI10	Crops and livestock produced by smallholders		Type of crops and livestock = describe the types of crops and livestock produced by the organization (smallholders) during the reporting period
		(Tons or head)	Average smallholders agriculture yield = (sum of smallholder agricultural yield for all smallholders) / (number of smallholders)
KP11	Crops and livestock sold by smallholders	(Tons or head)	Number of crops and livestock = Units or volume purchased from smallholders who sold to the organization during the reporting period by crop and livestock type
		(%)	Units or volume purchased from smallholders (by crop and livestock type) = [(Units or volume produced) / (Total units or volume purchased)] x 100

Due to their complexity, cost, and time investment, social startups in this study need to measure their impact correctly. It is in line with ANGIN and UNDP's (2016) report that Indonesian social startups barely use global impact metrics due to low demand in the market and the high cost associated. More importantly, they perceived little could be learned from their social impact data. Moreover, 3 out of 4 social startups in this study did not involve investors in scaling their social impacts; thus, they do not feel the importance of assessing the social impact they have created. However, monitoring effect performance is still critical for social startups. They should be able to demonstrate how their business is linked to the targeted impact through social impact measurement. The current global social impact measurements are undeniably challenging, especially for early-stage social startups. Selecting impact indicators aligned with their business takes significant time, money, and skill. Rather than devoting more time and resources to this than to their core company, social startups can use these KPIs to analyze and evaluate their impact success.

The financial health of farmers

The most critical strategic goal for agricultural social startups is to ensure that startup activities will impact the increasing financial health of farmers. The outcome impact of this strategic goal was increased farmer assets, measured by voluntary savings accounts (KPI1), and a change in the average value of voluntary savings accounts (KPI2). A voluntary savings account (KPI1) is essential to understand the number of smallholder farmers experiencing increased assets compared to all smallholder farmers served. At the same time, the percent change in the average value of voluntary savings accounts (KPI2) is essential to understand the aggregate degree of change experienced by smallholder farmers.

Access to better and stable pricing

Smallholders' price for their agricultural products has tremendous implications for poverty alleviation. Unfortunately, in developing countries, smallholder farmers frequently lack access to viable markets. Due to a lack of information (about price, supply and demand, and quality standards) and lower market participation, smallholder farmers face higher prices from opportunistic intermediaries and traders (Omiti et al. 2009). As a result, smallholder farmers were subjected to market fluctuation and received only low prices for their products. As a result, social startups must enhance farmers' access to better and more stable agricultural product pricing. All social startups in this study pay premium prices for products meeting the organization's quality standards. The price premium is the percentage by which the selling price of a product exceeds a benchmark price. The benchmark price is the local average price for a comparable product or service. To understand how many smallholder farmers received a price premium from organizations, social startups need to measure the percentage of smallholder farmers receiving a price premium (KPI3). In this case study, all smallholder farmers who were suppliers to the organization received a smallholders' price premium (KPI4). The smallholders' price premium is the percentage that the smallholder producers (suppliers) sell to the organization obtain from the organization for its goods or services during the reporting period. KPI4 is essential for social startups to understand the aggregate price premium smallholder farmers receive for their crops or livestock by selling to the organization. It can help show if the organization's

producers or suppliers receive a fair price for their produce. Moreover, these indicators can help describe a startup's contribution to the degree of change (depth) in the outcome experienced by smallholders compared to what the market or social system would have given. Smallholders' price premium was different from one organization to the other organizations.

Social startups often used purchase contracts with smallholder farmer suppliers to ensure stable pricing. Purchase contracts provide smallholders with a direct sales agreement for a specific product and a target market. The deal is usually based on price, quality standards, and sales volumes. Purchase contracts to smallholders (KPI5) are essential to understand the number of smallholders with whom the organization has written agreements, contracts, or ongoing business relationships, demonstrating progress toward more stable pricing. Purchase contracts with smallholder farmers made it easier to sell their products. With the support of social startups, smallholder farmers can solve issues related to the sale of their produces. The benefits perceived by smallholder farmers were market access, post-harvest market certainty, and stable price. According to Ruml et al. (2021), social startups provided two types of contracts in this study: marketing and resource-providing contracts. SS-A and SS-B used a verbal agreement with smallholder farmers, stating the amount and schedule of goods to be delivered and a fixed price per year, namely a marketing contract. SS-C and SS-D offered a resource-providing contract. Regular delivery and a fixed yearly price are set on the output side. On the input side, SS-C and SS-D offer in-kind credits for plantation creation, such as technical assistance, equipment, and inputs (e.g., seedling, calf, kid, lamb). Farmers with a resource-providing contract can get production inputs on credit during the contract's duration.

Smallholder supply chains of developing countries face the challenge of insufficient price transparency, limiting smallholder farmers' welfare. Social startups have emerged to improve price transparency in smallholder supply chains to mediate such inefficiencies by providing smallholders with market information. All of the social startups in this study enforce cost transparency. Cost transparency (KPI6) indicates whether the organization fully discloses all pricing and cost information for its products and services to its smallholders. This indicator is important to see whether smallholder farmers are given information about how prices are set, which can

help them make better decisions. From this result, we can summarize that social startups in this study play a similar role to aggregator business distribution chains that make smallholder farmers who partner with social startups receive higher prices, experience increased farmers' income, farmers know the prices of selling at the consumer level, and farmers know preferences of consumer for the products (Jahroh and Meliala, 2021).

Farm profitability

Farm profitability is critical for survival, farmer welfare, and food security. Failure to sustain farm growth and profitability has driven some farmers out of the industry. Agricultural social startups are committed to making farms of smallholder farmers more profitable by increasing farmers' income. To understand the number of smallholder farmers who were clients of the organization experiencing increased revenue concerning all smallholder farmers served, social startups need to calculate the percentage of smallholder farmers reporting increased income (KPI7). Moreover, social startups also need to calculate the percent change in smallholder farmers reporting increased income (KPI8) to understand the extent of change experienced by smallholder farmers. KPI7 and KPI8 may serve as proxy indicators of whether the result desired by an investor/organization occurred. Smallholder farmers are vital in ensuring food security, so their welfare is very important. Therefore, SS-A, SS-B, SS-C, and SS-D place farmers' welfare highly consideration. With access to capital, fixed selling prices (smallholders' price premium), and market stability, all social startups in this study aim to increase smallholder farmers' income.

Social equity and justice

With increased profitability, smallholder farmers can meet more basic needs, such as education and health services. Most of the farmers who partnered with social startups in this study reported that they could provide more education for their family members and access more healthcare services.

Food availability and diversity

Social startups need to describe smallholder farmers' crops and livestock production to understand the variety and average amount of agricultural outputs smallholder farmers produce (KPI10). In KPI10 social startups have to describe the type of crop(s) and livestock produced by the smallholder farmers and measure the average smallholder farmers' agriculture yield. Furthermore, to understand how many of each crop and livestock variety are sold by smallholder farmers, social startups need to measure how many crops and livestock are sold by smallholders (KPI11). Combined with a measure of crops produced, this roughly indicates how much of each type of crop or livestock smallholder suppliers retain for their consumption. All else being equal, a higher percentage and diversity of retained agricultural yields can directionally indicate higher food security.

Managerial Implications

It is hard for agricultural social startups to recognize and implement the most relevant impact performance KPIs. Existing global social impact measures typically include a huge number of KPIs; consequently, it is essential to identify the most measuring systems' inability to prioritize impact performance indicators may result in information overload and decision-making difficulty. It could result in poor judgments and make the existing performance measurement systems somewhat ineffective. The proposed set of KPIs can serve as a guide for practitioners, social startups, investors, and policy-makers by giving information about measurement goals and how to quantify impact indicators. It helps determine which KPIs demand more attention to applying performance improvement initiatives with more significant impact. This study's research can guide practitioners/social startups, investors, and policy-makers in overcoming the difficulties of KPI selection and prioritization and significant and relevant ones. Existing impact performance designing appropriate impact performance measurement systems for characterizing the success of agricultural social startups. Moreover, this study helps agricultural social startups to generate comprehensive impact performance measurement reports to increase their credibility in the eyes of their stakeholders. For policy-makers, the set of KPIs provides a framework to enable policy and programs better to support smallholder farmers, as they become a priority impact that agricultural social startups must achieve. Public policy should promote the transition of smallholder farms to commercially oriented and successful agricultural systems to boost smallholder productivity and reduce poverty.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This paper presented an AHP-based ranking analysis of hierarchically arranged KPIs in agricultural social startups. It has briefly discussed the current social impact metrics in agricultural social startups' performance measurement system and highlighted the importance of prioritizing impact performance indicators in agricultural social startups. This research developed an impact performance measurement system based on selected KPIs clustered into three major impact themes of agriculture. Practitioner experts were responsible for the selection and weighting of KPIs. The AHP was applied to developing the basic impact performance measurement system for agricultural social startups. The proposed measurement system creates a systematic way for managers to decide which KPIs are more important to the goals of a social startup than others. Social startups can identify areas to invest resources to improve strategies and scale their social impacts. The advantages of this KPIs social impact measurement are as follows. KPIs enable social startups to assess their impact performances over time, benchmark and make direct comparisons among other agricultural social startups based on the impact performance results. So that stakeholders, such as beneficiaries, funders, impact investors, and policy-makers, can define the shortcomings in agricultural social startup operations. Non-specialists, such as beneficiaries, can easily understand the comprehensive numeric form applied for KPIs. Thus, it is easy to convey the present status of social impact performances. In conclusion, the authors recommend that stakeholders participating in agricultural social startup activities use the KPIs provided in this study to generate a comprehensive impact assessment report. It allows organizations and other stakeholders to learn from their work, promoting a culture of accountability and credibility. Moreover, an impact report also allows mature social startups to share lessons with similar social startups, especially at an early stage.

Recommendations

The set of KPIs provided in this study is a starting point for developing other sets of KPIs tailored to specific determinants of an agricultural social startup, such as size, organizational structure, activity type, and the social startup's maturity. Since each KPI in this study has different units and scales, further development of KPIs needs to determine all the KPIs into a standard reference score scale. This study has given exact values information of the KPIs' priorities. Future research should implement fuzzy decision-making for KPI priorities and practitioner scores. Research is a potential solution for evaluating agricultural social startups' impact performance using high-uncertainty data. It has been demonstrated that fuzzy decision-making is an accurate method for addressing the complexity associated with information uncertainty. Future research may extend this research at a larger scale by including experts from incubators/accelerators, investors, government, and academia to determine the generalisability of our results. Case studies and the application of methodologies such as structural equation modelling may be used to conduct follow-up validation.

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