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RESEARCH PAPER

Pathways to prosperity: Sustainable livelihoods in organic-product micro, small, and medium enterprises

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Abstract Research on the sustainability of organic-product micro, small, and medium enterprises (MSMEs) in secondary cities remains limited, especially after pandemic-driven shifts in demand and distribution. In 2022, we conducted a census of all active organic-product MSMEs in Malang Raya (four firms) and collected data through remote semi-structured interviews and a RAPFISH sustainability assessment with a 1-5 scoring scheme. Data were gathered via WhatsApp text messages and scheduled voice calls, involving one key informant from each firm and three additional members (total $n = 7$). Multi-Dimensional Scaling was used to profile performance across the five Sustainable Livelihoods Approach asset dimensions, while Leverage analysis identified the attributes with the strongest influence. Public assets ranked lowest, with transport and mobility for certification and market access emerging as binding constraints, while the remaining dimensions met sufficient sustainability criteria. Interviews documented clear demand shifts: sales of organic goats at a boarding-school enterprise rose by approximately 40%; selected herbal and staple products increased by 25% to 47%; and one certified firm experienced a 60% increase in turnover in the first year, followed by a 40% decline in the second. Overall, operations continued, sustainability was constrained by deficits in public assets. The findings highlight the need to prioritize improvement in transport and logistics, streamlining certification processes, and complement these interventions with working-capital support and targeted digital-capability enhancements.

Keywords: COVID-19 Pandemic; Malang Raya; MSME; organic product; Pentagon assets; RAPFISH; Sustainable Livelihood Approach.

1. Introduction

COVID-19 generated economy-wide disruptions in Indonesia, including a contraction in labor supply and restrictions on the movement of goods and services that depressed economic growth (Chaplyuk et al., 2021; McKibbin & Fernando, 2020). Micro, small, and medium enterprises (MSMEs) were especially exposed, with limited buffers that magnified shocks to cash flow and operations. The sector has been identified as highly susceptible to pandemic repercussions (Vhikry & Mulyani, 2023). These vulnerabilities emerged through tightening access to finance, disrupted supply chains, and reduced consumer demand during periods of mobility restriction.

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Yet MSMEs remain central to the Indonesian economy as engines of growth, job creation, and the broad distribution of development benefits (Joseph et al., 2020). Understanding how these firms weathered and adapted to pandemic conditions is, therefore, an economic and policy priority. This study takes that proposition as its point of departure and focuses on organic-product MSMEs in Malang Raya.

Organic-product producers operate at the intersection of health-oriented demand and stringent quality and certification requirements. During COVID-19, agri-food systems shifted toward at-home consumption, online channels, and heightened safety expectations, reshaping market conditions for small producers (Grashuis et al., 2020; Hobbs, 2020). International evidence also reports stronger consumer preferences for organic and health-related products, with consequential implications for certification processes and logistics in emerging markets (Timpanaro & Cascone, 2022). These pressures are amplified in secondary cities where last-mile infrastructure and institutional access are often uneven. Malang Raya combines a growing network of organic producers with distribution linked to major Indonesian cities, yet faces persistent constraints in certification pathways, working capital, and digital capability. This context provides a compelling case for a focused sustainability assessment at the enterprise level.

Despite extensive scholarship on sustainable livelihoods, enterprise-level applications of the Sustainable Livelihoods Approach (SLA) that identify binding constraints remain limited. Recent conceptual refinements emphasize asset interactions and changing governance, but empirical work often reverts to static inventories of capitals rather than diagnosis under stress (Natarajan et al., 2022). Rapid, leverage-oriented diagnostics capable of translating mixed indicators into priority actions remain underused for MSMEs in agri-food niches. Multi-dimensional scaling (MSD) methods such as Rapid Appraisal for Fisheries (RAPFISH) have been adapted in recent studies, yet applications rarely target small agro-enterprises or secondary-city ecosystems (Hidayah et al., 2024; Widyawati et al., 2024). Indonesian evidence on organic-product MSMEs remains largely descriptive and does not clarify which assets most constrain performance during shocks. Addressing these gaps can inform practical interventions for competitiveness and resilience.

Prior research addresses these themes along several strands, but they rarely converge at the enterprise level. Household- and community-oriented SLA studies show that resilience arises from complementarities among assets under stress, yet these insights are rarely translated into firm-level diagnostics or investment priorities (Chowdhury, 2021; Mora-Contreras et al., 2023; Nasrnia & Ashktorab, 2021). MSME studies during COVID-19 document rapid digital uptake and mixed performance outcomes, but typically examine correlates of adoption rather than embed digital capability within an asset-based sustainability framework (Bai et al., 2021; Erdiaw-Kwasie et al., 2023; Trinugroho et al., 2022). Agri-food research highlights persistent shifts toward health-salient products and online channels, raising quality and compliance thresholds for small producers, but these studies seldom link market changes to enterprise-level sustainability diagnostics (Grashuis et al., 2020; Hobbs, 2020). Methodologically, recent adaptations of RAPFISH generate rapid sustainability profiles, yet applications rarely target organic-product MSMEs in secondary cities or deploy leverage analysis to prioritize constraints (Hidayah et al., 2024; Widyawati et al., 2024). Consequently, opportunity remains for integrated analyses that combine an updated SLA with leverage-oriented MDS to identify which public, physical, financial, human, and social assets most restrict enterprise sustainability in these settings (Natarajan et al., 2022).

This study evaluates the sustainability of organic-product MSMEs in Malang Raya and determines which asset domains most constrain performance. It operationalizes the SLA across five asset domains: human, social, public, physical, and financial. The first research question concerns the sustainability status of these enterprises across the five dimensions. The second question examines which specific attributes exert the greatest influence on overall status using Leverage analysis. The third explores implications for post-pandemic recovery and resilience in

secondary-city settings. Together, these questions align the study with current policy debates on green and inclusive growth in Indonesia.

Interview evidence collected in 2022 shows heterogeneous demand dynamics among organic-product MSMES in Malang Raya. A boarding-school-based MSME (Raudhatul Madinah) reported about a 40% increase in sales of organic goats for sacrifice (primary interview data, 2022), consistent with international evidence reports stronger preferences for organic and health-oriented foods, increased at-home consumption, and growing interest in immunity-related products during COVID-19 (Kanberger et al., 2025; Rachul et al., 2020; Rosero et al., 2023; Timpanaro & Cascone, 2022). By contrast, Vigur O, an MSME with national organic certification, experienced a turnover increase of about 60% in the first pandemic year, followed by a decline of about 40% in the second year (primary interview data, 2022). A rise-then-normalization pattern aligns with studies linking SME performance swings to supply-chain frictions and shifting demand conditions (Canwat, 2024; Erdiaw-Kwasie et al., 2023). The broader literature further indicates that COVID-19 catalyzed sustained digital adoption, with technology uptake persisting beyond the crisis (Bai et al., 2021; Holl et al., 2025), including among Indonesian SMEs, where e-commerce and digital tools became central adaptation mechanisms (Faiz et al., 2025). These external findings contextualize our local interview data and motivate the study's focus on diagnosing which asset domains constrain MSME resilience and competitiveness in the current recovery period.

Over the past few decades, organic agriculture in Indonesia has shown a positive trajectory. According to the Indonesian Organic Alliance (2019), demand for organic outlets in Jakarta increased by up to 300 percent, signaling strong livelihood prospects for organic-product MSMEs nationwide. Previous research by Muljaningsih et al. (2022) examined organic product MSMEs in Malang Raya using descriptive analysis methods, finding varied responses to pandemic-era market shifts. Vigur O experienced a 60% increase in turnover during the first pandemic year, followed by a 40% decline due to a decrease in regular customers and community members. La-Tanza, part of the Lily Organic Group, was negatively affected by the closure of partner souvenir shops, reducing sales of products such as chips. However, health-related items such as mocaf flour, dried spices, and herbal drinks increased by 25%. Ewid Brain Energy, also within the Lily Organic Group, recorded a 47% increase in demand for products like moringa tea and apple cider vinegar, along with a 30% increase in acupressure services.

The selection of Malang Raya as the study rests on the area's strong potential for organic-product MSMEs, supported by growing public awareness of healthy and sustainable consumption. Natural resource endowments, land availability, and community support, such as Lily Organic Group, position the region as a potential hub for organic production. Products such as spices, herbal tea, and mocaf have experienced rising demand, especially post-pandemic, with distribution reaching major Indonesian cities. However, challenges still persist, such as limited access to organic certification, constrained capital, and uneven digital capability. Therefore, the study assesses the livelihood sustainability of organic-product MSMEs in Malang Raya by profiling strengths and weaknesses across the five SLA asset dimensions (human, social, public, physical, and financial) and identifying binding constraints using RAPFISH-based MDS and Leverage analysis. The findings aim to inform policies that position organic MSMEs as drivers of the local and national green economy.

A pandemic-period analysis remains relevant because the episode functions as a system-wide stress test whose lessons continue to carry strong policy significance. COVID-19 triggered lasting shifts in demand, distribution, and compliance, meaning that understanding how MSMEs adapted then provides insights for today's recovery and for preparedness against future disruptions such as those related to climate, supply-chain, and public health. The SLA and RAPFISH framework diagnoses which asset domains require strengthening across contexts, not only during a pandemic. This makes the insights transferable to ongoing economic recovery efforts and beyond while illuminating resilience mechanisms and operational bottlenecks that are

less visible in stable periods. Framing the analysis in this way emphasizes the contribution to building a durable, green MSMEs ecosystem rather than focusing exclusively on COVID-19.

2. Literature review

Sustainable livelihoods (SL) explain how people meet basic needs while safeguarding natural resources. The classical approach identifies five types of capital: human, social, physical, financial, and natural, as the foundation for sustainable outcomes (Chambers & Conway, 1991). More recent contributions emphasize that outcomes depend not merely on the presence of each capital but on how these capitals complement one another within institutional and market contexts that govern access and use. In other words, configuration and interaction matter: a shortfall in one form of capital can offset gains in others, whereas supportive rules, norms, and market institutions can amplify complementarities and strengthen adaptive capacity (Natarajan et al., 2022).

Within this lens, findings from enterprise and community studies consistently show that the contribution of each capital is conditional. Human capital raises productivity and adaptability when education and training opportunities connect to finance and infrastructure that allow skills to translate into market outcomes (Hendratmi et al., 2022). Social capital broadens access to information and support, yet its benefits can be uneven without inclusive, bridging networks (Chowdhury, 2021). Physical capital underpins production and market reach, but its effectiveness depends on reliable logistics and access to basic facilities such as water, transport, and energy, which influence efficiency and distribution (Pu et al., 2022). Financial capital facilities investment and risk management, although credit alone often underperforms without complementary skills and market access (Guo et al., 2022). Natural capital forms the ecological foundation; poor and inflexible resource management can quickly erode gains from other assets, underscoring the need for prudent, adaptive governance (Nasrnia & Ashktorab, 2021; Xiao et al., 2021).

A related body of work examines how shocks reorganize livelihood systems and why coordinated, multi-capital recovery tends to be more effective than single-factor interventions. Post-disaster research highlights the importance of rebuilding capital in an integrated manner and targeting binding constraints rather than dispersing resources thinly across many activities (Mora-Contreras et al., 2023). Comparative evidence illustrates similar mechanisms across settings: women entrepreneurs in Indonesia mobilize skills, networks, and finance to improve well-being when complementary supports are present (Hendratmi et al., 2022). Indigenous communities in Bangladesh convert livelihood capital into longer-term prosperity when institutions are enabling (Chowdhury, 2021); rural households in China manage poverty risks while leveraging tourism opportunities when market access is credible (Liu et al., 2022); and drought-affected communities in Iran adapt more effectively when strategies are guided through an SL perspective that aligns multiple capitals (Nasrnia & Ashktorab, 2021). In Indonesia, tsunami rehabilitation research advances SL-based vulnerability analysis and coordinated institutional responses, while livelihood-restoration evaluations show that programs are most effective when financing is aligned with skills and market access for project-affected communities, not when compensation alone is provided (Alexander et al., 2006; Erick et al., 2017).

Pandemic-era studies add a complementary demand- and channel-side mechanism that is particularly relevant for agri-food and organic products. Food supply chains and consumer behavior shifted toward health-salient attributes and alternative channels, with greater reliance on online and direct-to-consumer distribution and with heightened quality and compliance thresholds for small producers (Grashuis et al., 2020; Hobbs, 2020). At the firm level, micro and small enterprises increased their digital uptake during the crisis, with many retaining these tools in the recovery period; however, the returns to digitalization depend on absorptive capacity and complementarities with logistics and finance. This implies that digital tools act more as multipliers for other capitals rather than as substitutes for them (Trinugroho et al., 2022). This literature reinforces the SL insight that the most policy-relevant question is not whether a given capital

exists, but which combination of capitals constrains or enables upgrading under changed, shifting market conditions.

Taken together, the literature suggests that sustainable livelihoods are best understood by identifying which capitals are binding in a given context and by explaining how interactions among human, social, physical, financial, and natural assets shape resilience and competitiveness. What remains underexplored is an enterprise-level diagnosis that applies this logic to organic-product micro, small, and medium enterprises in secondary-city ecosystems, where certification, logistics, and market reach are decisive constraints. This study addresses this gap by using an SL-based framework to examine how asset combinations condition the sustainability of organic-product enterprises in Malang Raya, and by interpreting the pandemic period as a revealing shock that clarifies where targeted interventions can deliver the largest marginal gains.

3. Materials and methods

3.1. Logical framework

Based on this study background, a logical framework related to the SLA of organic products MSMEs in Malang Raya was developed, as shown in Figure 1. A fishbone diagram is used to identify and visualize the main problem: how to maintain the livelihoods of organic product MSMEs in Malang Raya during the COVID-19 pandemic. Malang Raya was designated as a red-zone area, requiring heightened vigilance and adaptive response. The SLA is used as an analytical foundation, encompasses natural, economic, human, social, and physical resource dimensions. A sustainability radar diagram was then constructed, followed by the application of MDS as the operational method. The analysis uses the MDS algorithm equipped with a continuous kite diagram (Fauzi, 2019), as illustrated in Figure 2.

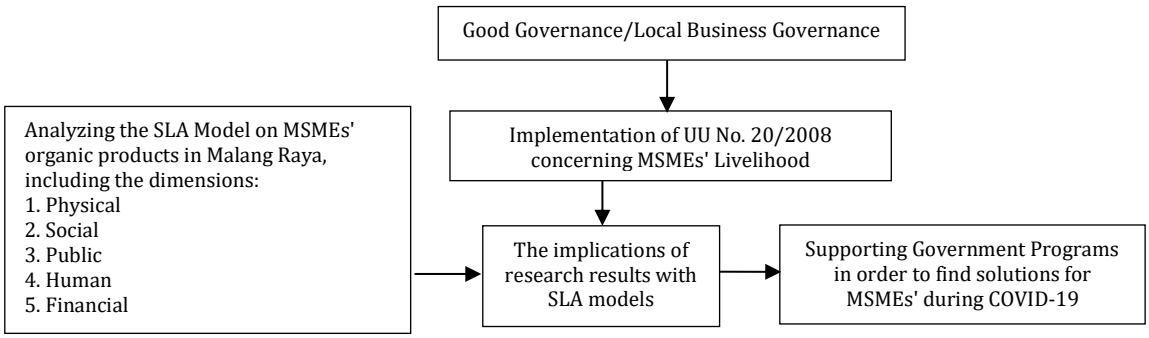

Figure 1. Logical framework

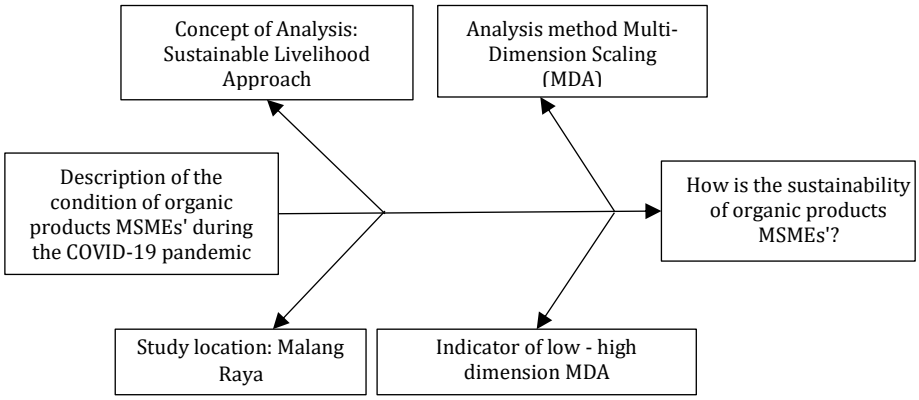

Figure 2. Fishbone diagram research

3.2. Unit of analysis

The unit of analysis in this research is organic-product MSMEs in Malang Raya that remain actively producing, whether or not they are members of the organic alliance. Three organic-product MSMEs in Malang Raya that are both active and registered as members of the organic alliance: La Tanza in Malang Regency, Ewid Brain Energy in Malang City, and the Raudatul Medina Entrepreneurial Islamic Boarding School in Batu City. Meanwhile, one organic-product MSME, Vigur Organik in Malang City, remains active but is not part of the organic alliance. However, even though it is non-membership, Vigur Organic already holds organic certification.

In the study of the northern waters of Aceh, RAPFISH was used as an analytical tool to evaluate the sustainability of pelagic fisheries. The purpose of the study was to identify the sustainability status of pelagic fisheries and the main elements that affect it. Data were gathered by questionnaire-based surveys and interviews, and subsequently analyzed using the five-dimensional RAPFISH framework. The findings indicate that while the social, technological, and institutional dimensions fall into different sustainability categories, the ecological and economic dimensions are classified as quite sustainable, while the social and economic dimensions fall into the less sustainable category (Chaliluddin et al., 2023).

Following a similar approach, this study conducted a sustainability assessment using RAPFISH across five dimensions: (1) physical, (2) social, (3) public, (4) human, and (5) financial, in response to the challenges posed by the COVID-19 pandemic in Malang Raya. A subsequent leverage analysis was then employed to identify the attribute with the greatest influence on overall sustainability.

RAPFISH is a rapid, multi-criteria appraisal that uses MDS to ordinate cases based on attribute scores and identify leverage attributes with disproportionate influence. In this study, we adapted RAPFISH from environmental applications to the MSME livelihood context by aligning its dimensions with SLA asset categories, converting enterprise attributes (e.g., certification access, logistics, marketing capability) into ordinal 1–5 scoring rules, and applying Leverage analysis to prioritize constraints. The procedure comprised seven steps: selecting attributes and scoring rubrics; assigning 1–5 scores based on interviews and documentation; normalizing scores to a 0–100 scale; calculating dimension-specific and overall indices; conducting MDS ordination; performing Leverage analysis; and recording stress and goodness-of-fit. This adaptation is consistent with recent rapid sustainability assessments that employ MDS or RAPFISH for small, diagnostic appraisal evaluations (Chrispin et al., 2022).

RAPFISH is an analytical technique that utilizes ordination, arranging cases based on measured attributes, to evaluate the sustainability in a comprehensive manner, with MDS as its core tool. MDS is a statistical method that integrates and analyzes multi-dimensional data by projecting it into lower dimensions for cleaner interpretation (Fauzi, 2019). RAPFISH is a participatory assessment method that uses MDS with a 1-5 scoring range to assess the sustainability status of fisheries. Stakeholders participate in identifying and prioritizing the factors that influence sustainability, after which MDS is used to visualize the relationships among attributes and generate a sustainability profile. Scores from 1 to 5 indicate the sustainability level of each factor, where 1 represents poor sustainability and 5 represents excellent sustainability. The overall sustainability score is calculated by averaging the attribute scores within each dimension. Each dimension comprises specific sustainability-related attributes. In this study, the assessed dimensions include physical, social, public, and human dimensions, with the scoring criteria presented in Table 1 to 5.

The scores were assigned based on interview outcomes and subsequently processed using the RAPFISH analysis. The results were subsequently categorized into four groups representing sustainability levels: 0-25 (poor), 26-50 (subpar), 51-75 (satisfactory), and 76-100 (good). Let $r_{ijd} \in \{1,2,3,4,5\}$ denote the raw score for enterprise i, attribute j, in dimension d. These were rescaled to a 0–100 range using Equation (1). Classification thresholds follow the same categories

described above. Binary or categorical indicators were converted into the 1–5 rubric as specified in Table 1–5.

$$s_{ijd} = 100 \times \frac{r_{ijd} - 1}{4} \quad (1)$$

Table 1. Criteria for assessing physical-dimension attributes

Attribute	Good	Bad	Assessment criteria
Owned technology	5	1	None (1); Non-machine equipment (2); Machine tools (3); Electronic equipment (4); The combination of machine tools, electronic, and non-machine (5)
Type of vehicle used	5	1	Walking (1); Public transportation (2); Bicycle (3); Motorcycle (4); Car (5)
Road condition	5	1	Very Bad (1); Bad (2); Enough (3); Good (4); Very good (5)
Distance from home to the place of business	4	1	More than 15 km (1); 10-15 km (2); 5-10 km (3); 0-5 km (4)
Distance from the house to the village market	4	1	More than 15 km (1); 10-15 km (2); 5-10 km (3); 0-5 km (4)
The distance from the house to the sub-district market	4	1	More than 15 km (1); 10-15 km (2); 5-10 km (3); 0-5 km (4)
Home Status	3	1	Rent (1); Parents' house (2); Private (3)

Table 2. Criteria for attribute assessment on social dimensions

Attribute	Good	Bad	Assessment criteria
Organization type	5	1	Does not joining any organization (1); Joins one organization (2); Join two organizations (3); Join three organizations (4); Join more than three organizations (5)
Community organization	5	1	Does not participate in any social organization (1); Participate as a member (2); Joins two organizations as a member (3); Serves as an administrator in one organization (4); Serves as an administrator in two or more organizations (5)
Other people's support	2	1	None (1); There are (2)
Training participation	2	1	None (1); There are (2)

Table 3. Criteria for attribute assessment in the public dimension

Attribute	Good	Bad	Assessment criteria
Local facilities used	4	1	Not using any facility (1); Using public places of worship (2); Using communal parking (3); Using terrace facilities (4)
Types of public transportation	3	1	Do not use (1); Use with hindrance (2); Use smoothly without obstacles (3)
Ease of access	5	1	Very poor (1); Poor (2); Fair (3); Good (4); Very good (5)

Table 4. Criteria for attribute assessment in the human dimension

Attribute	Good	Bad	Assessment criteria
Level of education	5	1	Junior High School (1); Senior High School/Vocational School (2); Bachelor's degree (3); Professional program (4); Master degree (5)
Type of skill	5	1	No skills (1); Have skills but not aligned with the business field (2); Has skills aligned with the business field (3); Has two skills with the business field (4); Has more than two skills and aligned with the business field (5)
Marketing method	5	1	Has not yet found a suitable marketing technique (1); Uses one marketing technique (2); Uses two marketing techniques (3); Uses three marketing techniques (4); Uses more than three marketing techniques (5)
Processing Method	5	1	Does not managing (1); Manages (2); Manages and describe the technique (3); Manages, describe the technique, and explains the process (4); Manages, describes the technique, and explains more than one method/technique (5)
Supporting Skills	5	1	None (1); One skill (2); Two skills (3); Three skills (4); More than three skills (5)
Health condition	2	1	Unhealthy (1); Healthy (2)
Illness History	2	1	Has illness (1); Has no illness (2)
The length of time the business has been established	5	1	Newly started (1); < 3 years (2); 4 – 8 years (3); 9 – 11 years (4); < 12 years (5)
Duration of Business Activities	5	1	Still in preparation (1); 1 day per week (2); 2-3 days per week (3); 4-6 days per week (4); Operates whenever there is an order (5)

Table 5. Criteria for attribute assessment in the financial dimension

Attribute	Good	Bad	Assessment criteria
Average income	5	1	< 1 million (1); 1.1-3 million (2); 3.1-5 million (3); 5.1-7 million (4); > 7 million (5)
Family needs	2	1	Not yet fulfilled (1); Already fulfilled (2)
The number of dependents	5	1	More than 3 dependents (1); 3 dependents (2); 2 dependents (3); 1 dependent (4); No dependents (5)
Whether or not there is a loan	2	1	No loan (1); Has a loan (2)
Capital	5	1	< 1 million (1); 1.1-3 million (2); 3.1-5 million (3); 5.1-7 million (4); > 7 million (5)
Profit or loss	2	1	Loss (1); Profit (2)
Savings ownership	2	1	No saving (1); Has saving (2)
Use of savings	5	1	Personal needs (1); Financial transactions (2); School needs/charity (Shodaqoh) (3); Emergency fund (4); Purely for savings (5)
Supporting investment	5	1	None (1); Vehicles (2); Kiosk/building (3); Savings in precious metals (4); Savings/land certificates at other locations (5)

Leverage was assessed using attribute-drop and small-perturbation tests, with changes in ordination positions and goodness-of-fit reported to identify high-influence attributes. MDS stress

scores are included as a diagnostic of configuration quality. When appropriate, simple Monte Carlo resampling of scores was used to assess stability. This robustness strategy follows recent MDS-RAPFISH implementations in R that emphasize transparency and decision relevance (Widyawati et al., 2024).

RAPFISH and MDS are well-suited to small-N, multi-criteria, practitioner-oriented diagnostics because they operate on ordinal expert or interview scores, generate interpretable profiles, and allow sensitivity checks even with limited cases. Using a census eliminates sampling error within the 2022 Malang Raya organic-MSME population, although external generalizability remains constrained. To mitigate small-N risks, we used clear, pre-specified rubrics, triangulated informants, reported dimension-level indices alongside leverage rankings, and focused on identifying policy-relevant constraints rather than relying on parametric inference. Contemporary applications support this use case for rapid sustainability appraisal and priority setting (Chrispin et al., 2022; Hidayah et al., 2024; Widyawati et al., 2024).

4. Result and discussion

4.1. Physical asset

The RAPFISH appraisal places the physical-asset dimension in the moderate range, with an average index of 58.2, a minimum of 45.11 (less sustainable), and a maximum of 65.84 (quite sustainable). In sustainable livelihoods terms, this pattern suggests that basic infrastructure exists but does not consistently translate into reliable market access or production efficiency. During the pandemic, transport and logistics disruptions limited small agri-food producers more sharply than on-farm capacity, which helps explain these mid-range scores (Hobbs, 2020). Shifts toward at-home consumption and alternative distribution channels increased the importance of last-mile mobility for small firms (Grashuis et al., 2020). Thus, physical capital appears necessary but not sufficient; its payoff depends on the rules, services, and other complementary assets that shape access and use (Natarajan et al., 2022). Overall, the physical-asset profile is adequate but fragile under stress (Figure 3).

Leverage analysis identifies road condition (standard error 3.65) and type of vehicle used (2.98) as the highest-influence attributes (Figure 4), meaning marginal improvements in these areas shift the overall sustainability configuration most strongly. This result aligns with quasi-

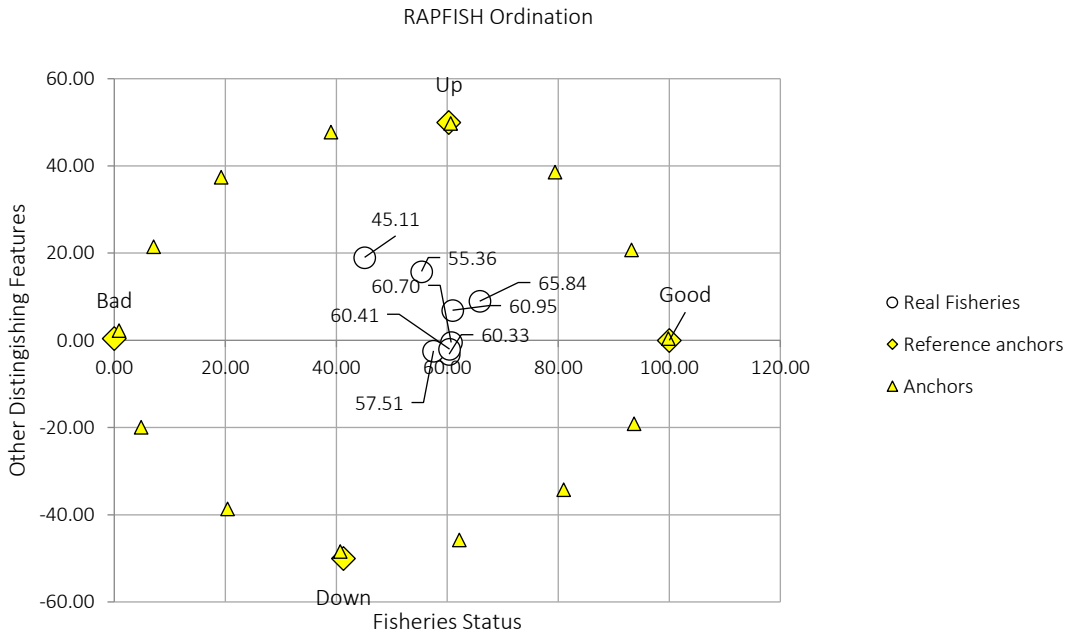

Figure 3. Position of sustainability status of physical assets for organic product MSMEs' sustainability effort

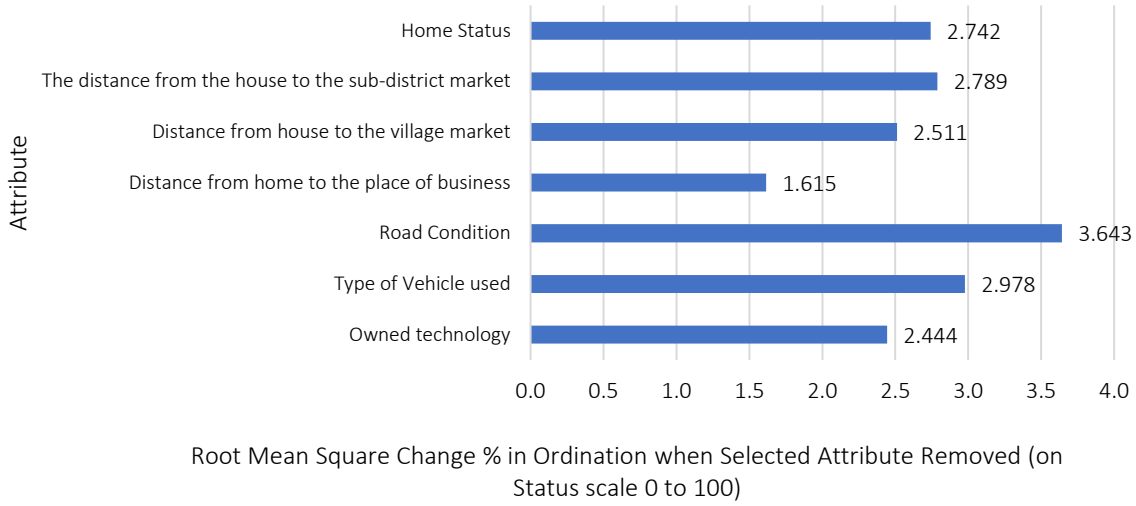

Figure 4. Results of Leverage analysis on physical assets

experimental evidence showing that better roads reduce transport costs, expand market access, and increase local economic activity, especially where baseline frictions are high (Asher & Novosad, 2020). In shock settings, livelihood recovery studies similarly show that restoring and upgrading transport links is foundational for re-establishing income streams (Pu et al., 2022). Under pandemic-era delivery and direct-to-consumer models, vehicle capability becomes a practical bottleneck for order fulfillment and certification visits (Grashuis et al., 2020). Together, these findings explain why the leverage concentrates in mobility-enabling attributes rather than in static equipment. The implication is that small, targeted upgrades in road quality and vehicle access can yield outsized gains in the physical-asset index.

In managing business operations, the critical physical assets include the condition of transportation routes that enable the movement of organic products produced by MSMEs in Malang Raya. Similarly, the condition of the vehicles utilized plays an essential role. In parallel, within the broader environmental policy context, key physical assets are closely tied to land use, as highlighted by scholars such as Fan and Xiao (2021). Farmers increasingly perceive climate change as a significant influence on their livelihoods, while research on disaster communities, for example, residents impacted by the 2013 Lushan earthquake in China, shows that disruptions to physical assets can profoundly affect livelihood outcomes (Chen et al., 2019; Pu et al., 2021).

4.2. Social asset

Derived from the results of the RAPFISH analysis conducted to assess the sustainability of organic products MSMEs affected by the COVID-19 pandemic in Malang Raya, the social-asset dimension falls within the fairly sustainable range, with an average index of 63.63, a minimum of 20.40 (poor), and a maximum of 100.00 (good) (Figure 5). This wide distribution indicates substantial heterogeneity in network strength and civic engagement across firms: some enterprises are strongly embedded in associations and support groups, while others operate with limited ties. In sustainable livelihoods terms, social capital enables information flow, mutual support, and collective action, but its effectiveness depends on the interplay of bonding, bridging, and linking relationships and the institutional arrangements that enable or constrain access (Chowdhury, 2021; Natarajan et al., 2022). During the pandemic, such networks played an important role in coordinating input procurement, sharing market information, and overcoming logistics barriers. Thus, the mid-to-high average score combined with very low outliers suggests that social assets function as an uneven buffer: they strongly support well-connected firms but provide limited protection for those with weak networks.

The findings of the Leverage analysis on social assets (Figure 5) show that the attributes with the greatest influence are the type of organization (standard error 13.6) and participation in community organizations (standard error 10.23) (Figure 6). This indicates that policy measures aimed at improving the sustainability status of social assets should prioritize and closely address these two attributes.

These results align with Pour et al. (2018), who argue that community organization participation significantly contributes to the success of development programs. Non-governmental social organizations can also improve the program outcomes. However, several challenges persist, such as low public awareness, reluctance to participate in training activities, and community anxiety or hesitancy when engaging in such programs.

The involvement of organizations and the community in policy formulation fosters a sense of responsibility and trust. As a result, communities are more likely to participate actively and to take greater ownership in implementing policy programs that they helped develop. Therefore, collaboration among government, non-government organizations, and community groups is essential om the policy-making process.

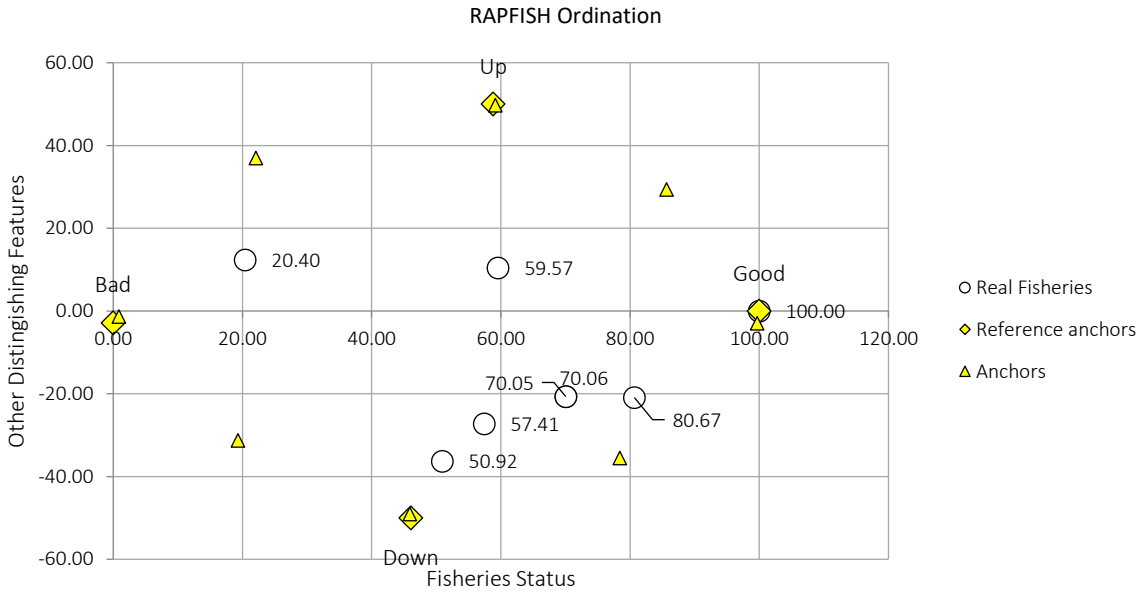

Figure 5. The position of the sustainability status of social assets for organic product MSMEs' sustainability efforts

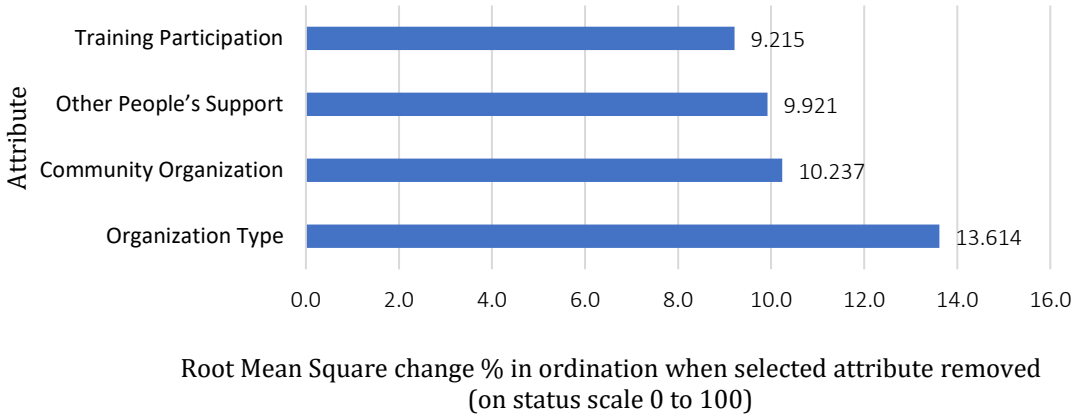

Figure 6. Leverage analysis results on social assets.

Empowering communities to strengthen their livelihood activities is critical for transforming effort into reliable income. This is most effectively achieved by providing context-relevant skills, for example, as group-based training and peer mentoring, that improve daily practices and create opportunities for collaboration that can increase earnings. Within the SLA, meaningful empowerment must build on local wisdom and values rather than override external models that may weaken existing social structures (Steiner & Farmer, 2017).

Institutions also play a key role: by lowering transaction costs and coordinating expectations, institutional arrangements make collaboration and market participation less costly and more predictable (Wallis & North, 1986). Recent evidence supports this perspective, showing that active participation in community and producer organizations improves access to training, reduces information gaps, and strengthens collective bargaining among small enterprises (Hendratmi et al., 2022; Pour et al., 2018). From the standpoint of contemporary SLA scholarship, these elements, locally grounded capability building, organizational embeddedness, and Supportive institutions, work together to convert social capital into greater resilience and improved market outcomes (Chowdhury, 2021; Natarajan et al., 2022).

4.3. Public assets

Derived from the RAPFISH analysis, the sustainability status of public assets for the organic products MSMEs in Malang Raya during the COVID-19 pandemic shows an average score of 46.85, placing it in the less sustainable category. The lowest public asset score among the MSMEs is 34.68, also in the less sustainable range, while the highest score reaches 61.64, which falls into the sustainable category (Figure 7). This spread indicates substantial variability in MSMEs' access to public services and institutional support.

Within the SLA, public capital serves as an enabling platform that helps convert other assets, such as skills, financial capital, and physical infrastructure, into concrete market opportunities. Therefore, mid-to-low public asset scores imply that even capable MSMEs may be unable to fully leverage their human or financial resources when permits, certification services, inspections, and transport links are difficult to access or unreliable. This interpretation aligns with pandemic-era evidence showing that institutional access and logistics, not production capacity alone, were major constraints for small agri-food enterprises (Grashuis et al., 2020; Hobbs, 2020). In a secondary city like Malang Raya, last-mile infrastructure and proximity to public services further amplify these constraints. Put simply, weak public assets reduce the returns to all other livelihood capitals (Natarajan et al., 2022).

Based on the Leverage analysis (Figure 7), two main attributes have the greatest influence on the sustainability of public assets: ease of access (standard error 19.97) and type of public transportation (standard error 14.09) (Figure 8). These findings suggest that policy efforts to improve the sustainability of public assets should prioritize improvements in these two areas.

Ease of access is important. The lack of access and inflexibility within the policy structures can limit the achievement of intended goals. Prior research highlights this point: Wongnaa and Babu (2020) emphasize the significance of local governments in facilitating the transition of rural communities toward sustainable and climate-resilient practices. They also argue that greater attention should be given to the knowledge and policy-support needs of individuals working at the lowest tiers of government, as these actors play a central role in balancing and mediating sustainable livelihood narratives. In addition, community presence is essential. Community assets can function as public goods that expand household access to economic resources and opportunities.

Public transportation is very important. Transport enhances mobility and enables people to sustain their livelihoods. The government is therefore expected to strengthen public transport provision because affordable transportation can significantly benefit MSME actors. This aligns with the findings of Padhee and Pingali (2020), who note that transportation disruptions during the pandemic intensified challenges in urban areas.

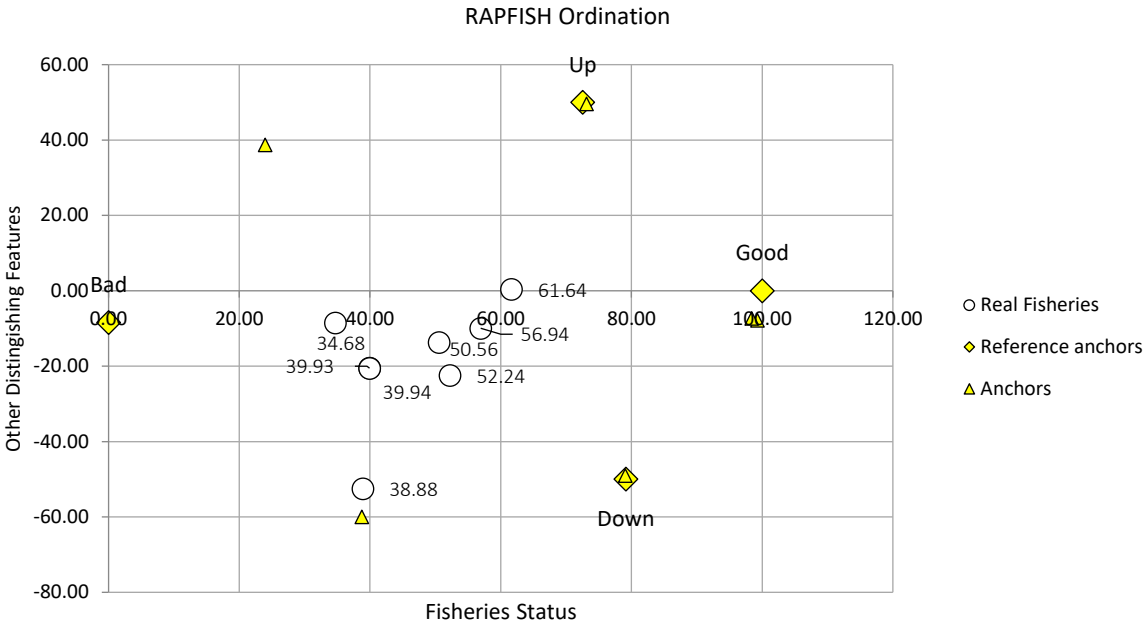

Figure 7. The position of the sustainability status of public assets for organic products MSMEs' sustainability effort

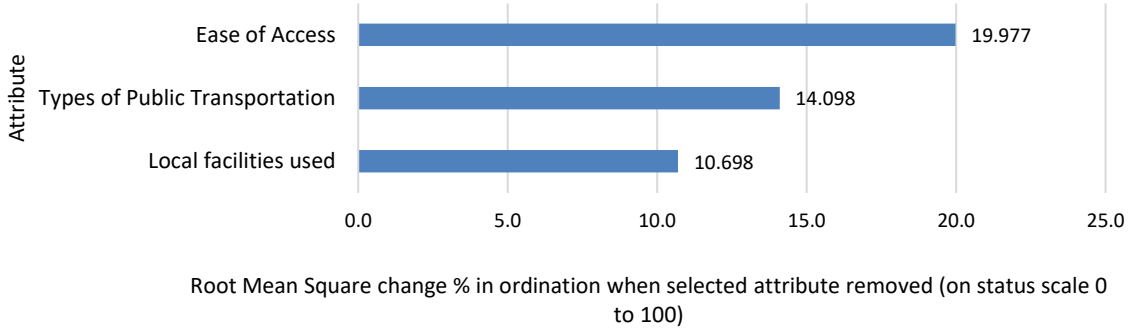

Figure 8. Leverage analysis results on public assets.

These findings also straightforwardly contribute to SLA theory. Public assets operate as enablers for the other four types of assets. When access to certification services and transportation is weak, the benefits of skills, finance, and equipment cannot be fully realized in the market. This supports more recent SLA research that underscores the interactions among assets and the importance of rules and institutions, rather than considering each asset in isolation (Chowdhury, 2021; Natarajan et al., 2022). The results also show that constraints are context-specific and dynamic: in a secondary city like Malang Raya, mobility and service access are the primary bottlenecks, especially during and after shocks. Focusing on two high-leverage attributes, ease of access to public services and availability of public transport, should produce the greatest short-term improvements and strengthen resilience to future shocks.

4.4. Human assets

Derived from the outcomes of the RAPFISH analysis, the sustainability status of human assets for the organic products MSMEs in Malang Raya during the COVID-19 pandemic has an average score of 63.01, placing it in the fairly sustainable category. The lowest sustainable score for human

assets among these MSMEs falls in the less sustainable category (43.61), while the highest score reaches the sustainable category (83.84) (Figure 9).

In sustainable livelihoods terms, human capital generates higher returns when complemented by other assets such as finance, logistics, and institutional access, rather than operating in isolation (Natarajan et al., 2022). In Indonesia, the returns to skills increase when MSMEs also develop basic digital capabilities that connect production to customers and certification systems (Trinugroho et al., 2022). Studies on women entrepreneurs likewise show that capability upgrading, together with supportive networks, improves livelihood strategies and performance (Hendratmi et al., 2022). Overall, the mid-to-high average score combined with notable variation suggests that MSMEs possess usable skills, but their ability to translate those skills into sales depends on uneven connections to enabling systems (Chowdhury, 2021).

Based on the results of the Leverage analysis of human assets, the two highest-influence attributes are supporting skills (standard error 6.40) and processing methods (5.37) (Figure 10). This means that policies intended to strengthen the sustainability of human assets must prioritize these two attributes.

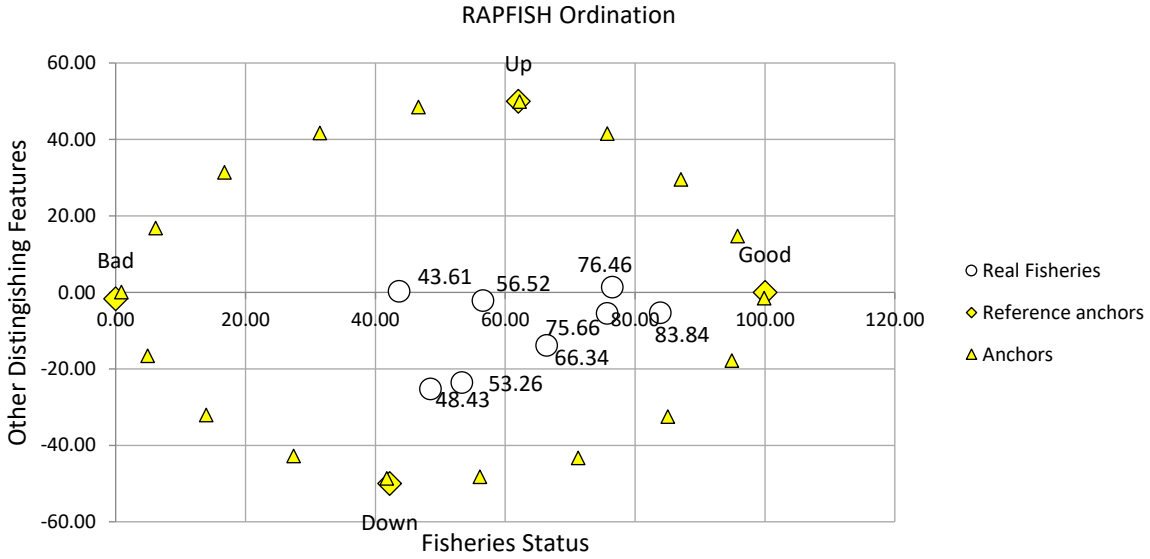

Figure 9. The position of the sustainability status of human assets for organic products MSMEs sustainability effort

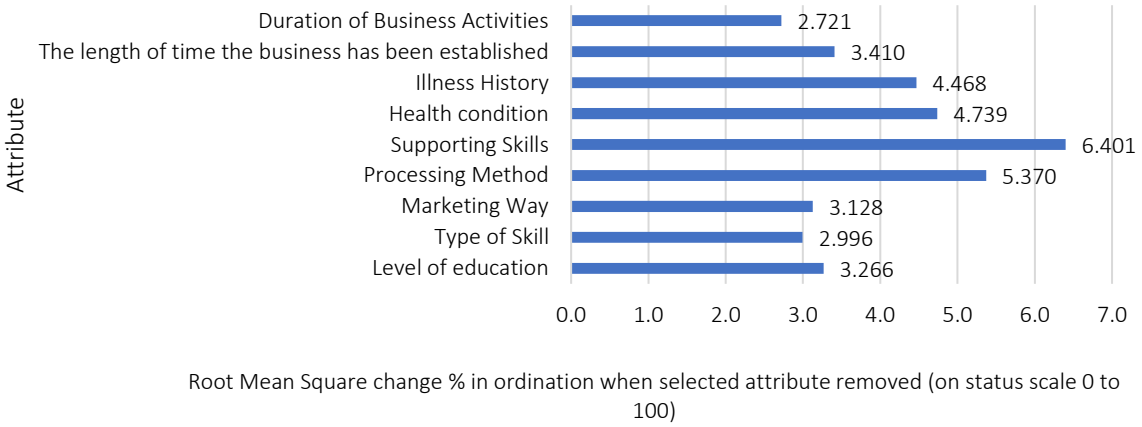

Figure 10. Results of Leverage analysis on human assets

The importance of supporting skills is consistent with Pour et al. (2018), who highlight that livelihood-sustaining skills are especially needed for women. For example, fishers and farmers require environmental knowledge and skills to cope with adverse climate conditions. However, age can act as both an advantage and a constraint: younger individuals tend to have higher productivity and absorb information more easily, but often lack experience, whereas older individuals generally possess richer skills derived from long-term experience. Within the SLA framework, these results indicate that human capital in Malang Raya exists, but its effectiveness depends on complementary assets and institutions rather than skills alone (Natarajan et al., 2022; Chowdhury, 2021). The high leverage of supporting skills and processing methods aligns with evidence that transversal capabilities and codified SOPs enhance quality, compliance, and adaptation among small agri-food enterprises (Hendratmi et al., 2022; Grashuis et al., 2020). In secondary-city contexts, limited access to certification, logistics, and working capital constraints the benefits of training; conversely, when these enabling factors are present, the same skills lead to higher sales and greater resilience (Trinugroho et al., 2022; Nasrnia & Ashktorab, 2021). Research on recovery from shocks similarly shows that coordinated, multi-asset interventions outperform single-factor approaches (Mora-Contreras et al., 2023). Therefore, policy should bundle hands-on training in hygiene, SOPs, and basic digital record-keeping with scheduled group audits and microfinance for simple equipment or testing kits, ensuring that human assets interact effectively with public, physical, and financial assets to generate durable improvements.

4.5. Financial assets

Based on the results of the RAPFISH analysis, the sustainability status of financial assets for organic product MSMEs in Malang Raya during the COVID-19 pandemic has an average score of 51.95, placing it in the fairly sustainable category. The lowest financial assets score falls in the less sustainable category (38.81), whereas the highest reaches the sustainable category (66.75) (Figure 11). The Leverage analysis indicates that the two attributes with the strongest influence on financial asset sustainability are the adequacy of family needs (standard error 17.44) and the presence or absence of loans (12.98) (Figure 12). This suggests that policy efforts to strengthen financial assets sustainability must prioritize these two factors.

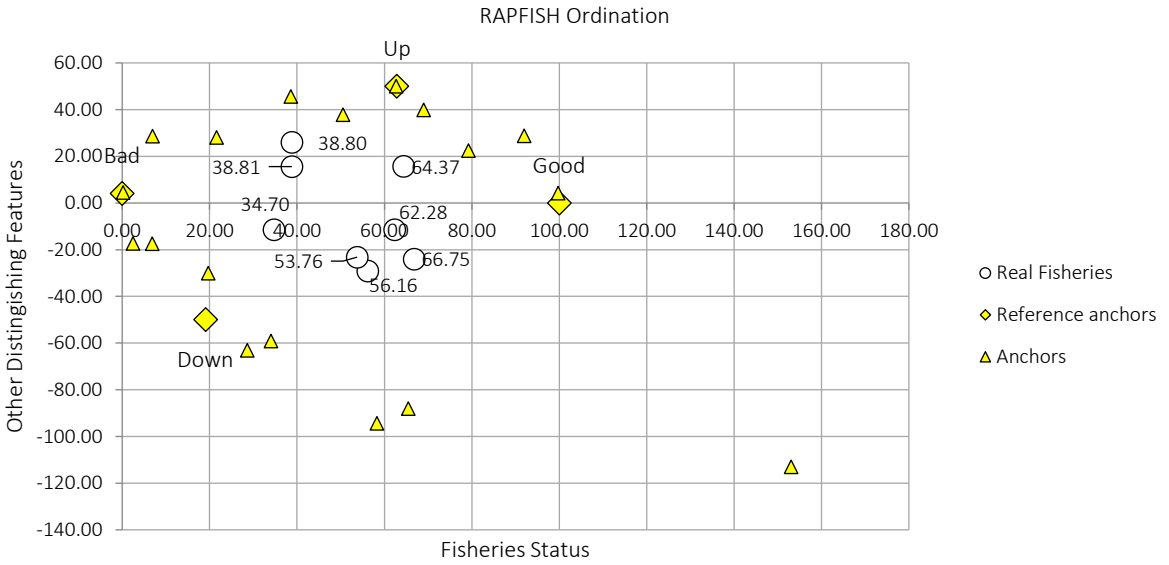

Figure 11. The position of the sustainability status of financial assets for organic products MSMEs sustainability effort

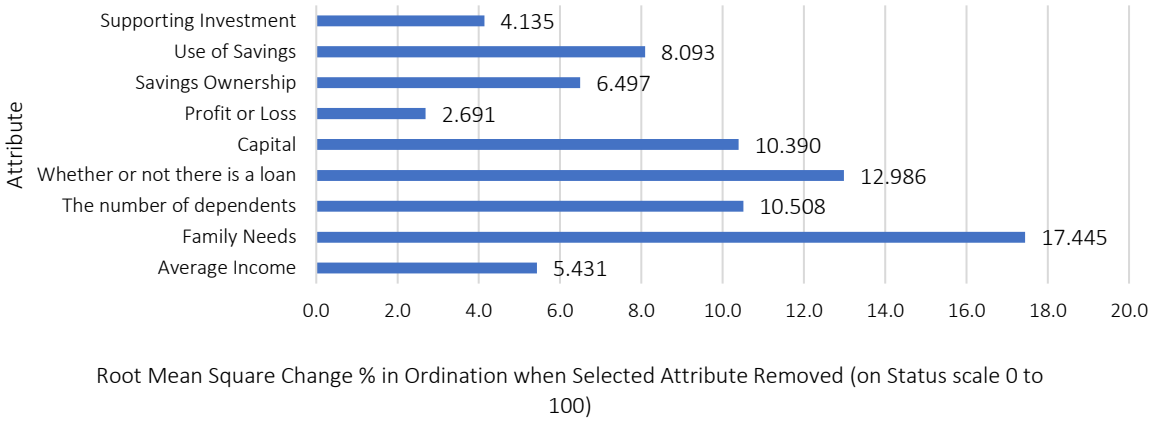

Figure 12. Leverage analysis results on financial assets.

Mabon et al. (2021) emphasize that financial resources, including household income, expenditure capacity, access to loans, and local government support, are imperative, particularly crucial for activities such as resettlement or transitioning to alternative livelihoods. However, communities often face constraints: many residents remain hesitant due to perceived ineffectiveness and inflexibility of available support. Limited land ownership and lack of capital expose households to financial risk, especially in disaster-prone areas. Extreme events, illness, and price volatility further heighten financial vulnerability, making government support essential. At the same time, some communities collaborate with government initiatives aimed at improving living standards. Access to loans or government incentives can prevent poverty, provide capital for livelihood diversification, facilitate entry into industrial jobs, and increase household income.

Drawing upon the study by Pu et al. (2021), which elucidates the repercussions of the 2013 Lushan earthquake in China, it becomes evident that the most profoundly affected aspect was financial assets or income. Expanding on this perspective, it is essential to acknowledge the multifaceted nature of livelihood strategies and outcomes, an understanding reinforced by Serrat (2017), where access to capital assets alone does not singularly determine these outcomes. Instead, the broader structural and procedural environment plays a pivotal role in shaping and constraining livelihood strategies.

The sustainability status values obtained from the RAPFISH analysis for each dimension are represented using a kite diagram to facilitate a clearer understanding of the overall sustainability status of organic products MSMEs in Malang Raya across multiple dimensions (Physical, Social, Human, Financial, and Public). The results indicate that the sustainability status of organic product MSMEs in Malang Raya is generally categorized as quite sustainable. Specifically, the sustainability values are as follows: physical assets at 58.27 (moderate), social assets at 63.63 (moderate), public assets at 46.84 (Low), human assets at 63.01 (moderate), and financial assets at 51. 95 (moderate), as presented in Figure 13.

The sustainability of livelihoods within organic products MSMEs in Malang Raya appears to be notably affected by a lack of public assets. Public assets encompass a range of resources and infrastructure provided by the government or public institutions, such as transportation networks, educational facilities, healthcare services, and public spaces. These assets are crucial for supporting an enabling environment for businesses and communities.

Insufficient public assets can pose significant challenges for MSMEs in the organic products sector. For instance, inadequate transportation infrastructure can hamper the efficient movement of goods and access to markets, thereby limiting the reach and growth potential of these enterprises. Additionally, a lack of access to educational and skills development institutions can hinder the development of a skilled workforce within the MSMEs, impacting productivity and innovation.

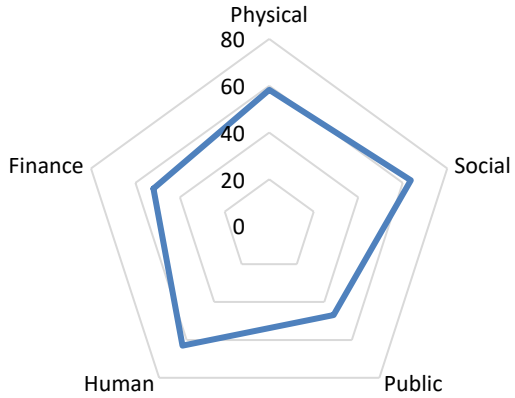

Figure 13. Pentagon kite diagram of organic product MSMEs' assets

Furthermore, inadequate healthcare facilities and limited access to quality healthcare services can lead to health-related issues among employees, thereby reducing productivity and overall well-being. Insufficient public investment in environmental sustainability initiatives can also pose challenges for MSMEs involved in organic products, as these enterprises rely heavily on sustainable and eco-friendly practices, necessitating appropriate public infrastructure and supportive policies.

To address these challenges, policymakers and relevant stakeholders should prioritize investments in public assets aligned with the specific needs of organic products MSMEs. Targeted improvements in transportation, education, healthcare, and environmental sustainability infrastructure can significantly enhance the sustainability and resilience of livelihoods in the organic products sector in Malang Raya. Proper allocation and efficient utilization of public resources are essential to ensure the long-term sustainability of these businesses and the communities they support.

5. Conclusion

This study aims to describe the conditions of organic product MSMEs in Malang Raya during the COVID-19 pandemic. The analysis of the five asset dimensions shows that the weakest attribute that public assets. Public asset indicators relate to various public facilities to support the sustainability of MSMEs, especially in terms of ease of access. This includes transportation means and mobility access. Thus, during the COVID-19 pandemic, organic product MSMEs in Malang Raya continued operating, although mobility restrictions affected their ease of movement. Recommendations for further research include analyzing the impact of the COVID-19 pandemic on inter-sector linkages and dependencies within the MSMEs context. Such research can help measure the extent to which the COVID-19 pandemic has affected these linkages and what efforts can be undertaken to strengthen them.

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