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Marketing Practices and Challenges of Pineapple Smallholders in Sarawak: A Systematic Literature Review

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Abstract

This study presents a systematic literature review on the marketing practices of pineapple smallholders in Sarawak, discussing the factors that affect their market access, pricing dynamics, competition and government policies. Through a PRISMA-guided analysis of 44 selected studies, five key themes and nine sub-themes were identified, including elements such as geographic access, pricing, competition, transportation and government policies. The findings highlight the need for solutions to overcome infrastructure constraints, improve access to information and technology and promote sustainable agricultural production models to enhance competitiveness in the market. This study provides insights into potential strategies to address these challenges, supporting the growth and sustainability of pineapple smallholders in Sarawak.

Keywords: Systematic Literature Review, Pineapple Smallholders, Market Access, Marketing Challenges, Sarawak

Introduction

Marketing plays a crucial role in the agricultural sector, particularly in ensuring the sustainability and economic viability of smallholder farmers. It involves the exchange of goods, services, and values between producers and consumers within a dynamic marketplace that is influenced by socio-economic, environmental, and policy-driven factors. In the case of pineapple smallholders in Sarawak, effective marketing strategies are vital for improving livelihoods, increasing market participation, and ensuring long-term sustainability. Despite the growing significance of the pineapple industry, smallholder farmers in Sarawak continue to face challenges in market access, pricing structures, competition, transportation, and government regulations (Anthony et al., 2021). Addressing these challenges through a structured marketing approach is essential for fostering economic resilience and improving farmers' competitiveness in the global agricultural sector.

Marketing refers to the exchange of goods, services and values between people and organizations at a strategic level through social exchanges over time in free markets designed to meet an assortment of needs or wants by each party (Gebrehiwot et al., 2018). Smallholders often encounter various problems during their marketing activities, and this can have huge impacts on the profitability as well as the sustainability of pineapples in Sarawak. As described briefly by Barrett (2008), although producing food through smallholder farming at its maximum limit may lower the cost of nutrition, create employment for many poor people and enhance life qualities in rural households by social mobilisation and market enhancement approach to enhancing community resilience which would be beneficial not only local or nearby areas but towards comprehensive economic growth. In addition, smallholder agriculture can build social and human capital via collective action structures and leadership roles for agriculturalists, as well as grow environmental stewardship and diverse livelihoods in rural areas.

Most of these farmers could be classified as resource-poor, small-scale or peasant farmers that cultivate very low hectarages, generally less than 2 hectares and lack the needed resources to carry out crop production (Salami et al., 2010). According to Anthony et al. (2021), smallholders practice agriculture and low-input subsistence smallholder farming with limited output; they cultivate food crops as well as high-value products intermittently, besides using family labour for their survival, and most of these farmers own 10 hectares or below. As mentioned by de Janvry and Sadoulet (2021), they emphasised that improving the productivity, income and sustainability of agriculture is central to reducing rural poverty by enabling disadvantaged farming families whose livelihoods depend on equivalent development from this sector. This allows the farmers to experience efficient agricultural practices that will trim down cost and waste and foster a high yield of produce with a commensurate economic return.

Farmers who gain financial profit have the ability to uplift their standard of living and invest in vital sectors such as education and healthcare, thus breaking away from poverty. From quality and quantity of the produced pineapple, market accessibility and pricing to raising transportation/network challenges are important ones depending on how much demand forms in each district. These elements and their effect on marketing practices must be understood to create the appropriate strategies that make smallholders overcome these constraints, so they can succeed in today's competitive market of pineapple. This paper attempts to examine the factors that influence the marketing practices of pineapple smallholder growers in Sarawak and how these issues can be resolved or addressed to enable future market development among farmers.

Significance of the Study

The significance of this study is underscored by the role that smallholder farmers play in food security, rural employment, and economic growth. Smallholder agriculture is often characterized by low-resource availability, limited market access, and high vulnerability to price fluctuations (de Janvry & Sadoulet, 2021). Pineapple smallholders in Sarawak are no exception, as they operate within a highly competitive and rapidly changing agribusiness environment. By identifying key factors that influence marketing experiences and strategies, this study contributes to a deeper understanding of the systemic barriers and enablers within the pineapple supply chain. The study’s findings offer practical recommendations for

policymakers, industry stakeholders, and farmers to create more efficient marketing structures and policies that benefit smallholder farmers.

Furthermore, this research holds broader economic implications, particularly for the agricultural sector in Malaysia. As Sarawak is Malaysia's second-largest pineapple-producing state, improving the efficiency and effectiveness of smallholder marketing strategies can contribute to higher profitability, reduced post-harvest losses, and increased export potential (Matius et al., 2022). Given the increasing global demand for high-quality pineapples, understanding the marketing experiences of smallholders is crucial for ensuring the sustainability of the sector. Moreover, the integration of digital technologies, cooperative marketing approaches, and policy interventions can help mitigate challenges related to market fluctuations and infrastructure limitations (Campita et al., 2022).

This study is particularly relevant in the current era of digital transformation and sustainable agriculture, where smallholders must adapt to modern marketing methods to remain competitive. By incorporating insights from systematic literature reviews, industry reports, and qualitative field data, this research provides an in-depth analysis of the challenges, opportunities, and policy recommendations for smallholder pineapple farmers. The findings will serve as a reference for government agencies, agricultural organizations, and market analysts seeking to enhance smallholder market competitiveness and create sustainable economic models for pineapple farming in Sarawak.

Research Gap

This study identifies specific problems facing pineapple smallholders in Sarawak, who market their produce. Despite the importance of market access, production efficiency, pricing and competition, interpreting how these factors affect smallholders' market capabilities on the ground is not clear. Having no knowledge or experience in pineapple marketing means that today, most smallholders will be unable to take advantage of the market even though their conditions are ripe (Geoffrey et al., 2013). In addition to facing the basic issues of Sarawak smallholders, that is, insufficient market information; both expensive and time-wasting transportation taking their product so far; and being thrown off track by price instability, these farmers are unable to effectively market their produce.

Despite the importance of market access, production efficiency, pricing structures, and competition, there remains a lack of empirical research that examines how these factors influence smallholders' market participation on the ground. Previous studies have highlighted structural challenges, including limited market information, high transportation costs, and unstable pricing mechanisms (Nahar et al., 2020). However, there is little research on how these elements interact to shape smallholders' marketing experiences in Sarawak. Many farmers continue to rely on traditional marketing channels, which limits their profit margins and market reach. Additionally, the role of sustainable agricultural practices, organic certification, and branding strategies in improving smallholder profitability and competitiveness remains underexplored (Ghazi et al., 2023). Research into such practices could provide useful insights for smallholders looking to improve profitability as well as environmental sustenance (Daud et al., 2021).

This study aims to fill this research gap by providing a comprehensive analysis of marketing experiences and identifying strategic interventions that can improve smallholders' access to profitable markets. By addressing these knowledge gaps, this research advances theoretical and practical contributions to the field of agricultural marketing and offers valuable insights into how smallholder farmers can optimize their marketing strategies to achieve greater economic success and resilience in Sarawak's pineapple industry.

Systematic Literature Review (SLR)

A systematic literature review (SLR) is a comprehensive and structured approach to analysing a specific research question or area. It consists of systematically identifying relevant studies, statistics and criticisms, followed by synthesizing these findings together to offer the clearest summary possible for what already exists of the topic of interest. The process of doing an SLR aims to minimize bias by making use of a transparent and reproducible methodology that generally includes clearly defined criteria for included studies as well as a comprehensive search strategy across multiple databases. It also seeks critique about those papers that were ultimately included from an evaluation for their quality (Higgins et al., 2011).

According to Higgins et al. (2011), an SLR may or may not incorporate statistical techniques, such as meta-analysis, to quantitatively combine the results of the included studies. This systematic method of reviewing the literature enhances the reliability and rigour of its findings, giving it additional power as a tool for being able to identify research gaps and guiding future research directions (Higgins et al., 2011; Kitchenham & Charters, 2007). In the context of this article, an SLR is of particular value because it provides not just an overview but also a diligent and thorough summary of existing research. Using this process, we make sure that all the reports which are critical to understanding an issue from various angles are included, not omitted or left out inadvertently. This not only helps to create a solid background but also brings out clearly where gaps of knowledge remain that need further exploration.

By systematically reviewing the literature, this paper can produce stronger, more evidence-based conclusions; a contribution which in the end will help the development of this field (Tranfield et al., 2003). Therefore, since comprehensive, highly systematic and in line with the purpose of this paper is to produce a solid analysis that is well supported by evidence, the use of an SLR is entirely justified.

Methodology

The research methodology is based on identifying the articles on factors determining marketing strategies among pineapple smallholders. The PRISMA framework was selected because of a list of its benefits, such as a systematic and organized analysis of sources. The methodology brings detailed information about the databases used, namely Scopus and Web of Science, as well as inclusion and exclusion criteria used for gathering the appropriate studies. The review includes four main stages: identification, which implies the gathering of the articles on the topic; screening, where all irrelevant sources were excluded; eligibility, which involves the consideration of the properly classified articles; and data extraction and analysis, which includes the assembling and evaluation of sources. Each of those parts was carefully elaborated to ensure the accuracy and relevancy of the identified articles and arrived

at the final paper where the chosen studies highlight all the factors determining marketing strategies for pineapple smallholders.

PRISMA

The study underwent a rigorous review method outlined by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), ensuring transparency in the environmental management analysis. As Moher et al. (2009) indicate, PRISMA is particularly useful for organizing systematic reviews and ensuring transparency. Sierra-Correa and Cantera Kintz (2015) identify three key advantages of PRISMA which closely relate to the objectives of this study. First, PRISMA ensures that clear research questions are framed and developed bit by bit. This is of particular importance in methodically exploring topics like the competitive environment, promotional strategy, or challenges faced by small-scale pineapple growers. Secondly, PRISMA enables specific inductive criteria for inclusion and exclusion, which are extremely important to living and expanding the research topic range. Thus, the study does not leave out very crucial aspects such as innovation, partnership and productivity. Finally, PRISMA is a highly effective method to traverse huge databases of scientific literature within set time-frames, which makes it well suited for this review's comprehensive analysis of marketing strategies among Asian pineapple smallholders (Page et al., 2021).

By strictly following PRISMA, this study gives a detailed and systematic look at the main factors affecting smallholder progress, including branding strategies, cooperation and governmental relief measures. The consistent procedural plan means that research can offer useful insights into the commercial aspects faced by smallholder pineapple growers, ultimately providing accurate guidance for future research in environmental management.

Formulation of Research Question

The study is based on the Population, Interest, and Context (PICo) framework to formulate a research question. The purpose of PICo is to provide writers with the means to form robust research questions for their reviews. The major research question is aimed at this parameter: "What are the factors that affect the marketing practises of pineapple smallholders in Sarawak?". The present review is aimed at three major topics: pineapple smallholders' population, their marketing practises, and the context – Sarawak.

Research Question

This systematic review is based on a primary research question, which is: What factors influence the marketing practices of pineapple smallholders in Sarawak? The study emphasizes the impacts of various items in those farmers' experiences on their transactions with the market. The pineapple industry brings smallholders in the country success, with Jaji et al. (2018) noting that it is a critical group in sociological and economical terms. Moreover, the difficulties smallholders face, such as inadequate market information, inefficient transport and volatile prices, are criteria for marketing strategies (Nahar et al., 2020). By understanding these aspects, it can be seen where market dynamics might potentially assist the marketing experience of these farmers and then improve their lives and futures. In addition, market channel choices and the importance of sustainable practices in marketing decisions have been identified as significant determinants of smallholder success in similar contexts (Campita et al., 2022; Ruslan & Saili, 2021). This study aims to help smallholders in

Sarawak realize more effective and profitable marketing strategies, offering them valuable insight into these concerns.

Systematic Searching Strategies

Identification, screening, and eligibility checks are the three principal stages involved in the process of utilizing systematic search methods systematically.

Resources

Scopus and Web of Science offered essential scholarly resources for this investigation. As described by Azril et al. (2018), the Web of Science functions as an expansive digital library housing over 33,000 publications spanning a diversity of academic disciplines and pertinent societal themes. Clarivate Analytics, which oversees Web of Science, leverages nearly a century's worth of citation and publication records to rank academic journals, basing these positions on metrics like sum citations, number of articles published, and citations per paper as highlighted by (Falagas et al., 2008). This diligent approach makes certain that the Web of Science remains a pivotal resource for evaluating and exploring scholarly results.

Additionally, Scopus too proved valuable for this analysis. Scopus ranks amongst the largest abstract and citation indexes, aggregating more than 22,800 periodicals distributed across more than 5,000 academic and commercial publishers worldwide, traversing a broad array of fields from natural sciences to social sciences and agriculture (Baas et al., 2020). Both Scopus and Web of Science exhibit noteworthy utility for systematic evaluations owing to their comprehensive archives, nuanced search capabilities, and rigorous quality assurance protocols (Gusenbauer & Haddaway, 2020; Zhu & Liu, 2020). Through searching these two databases, 823 articles were identified, offering a thorough foundation for this review.

Identification

The identification process requires exploring synonyms, similar expressions, and different manners to mention the key keywords of the analysis, which are pineapple smallholders, marketing practices, and Sarawak. Its objective is to offer other possibilities for using the chosen database to search for additional articles that apply to the assessment. As suggested by Okoli (2015), web thesauruses, keywords employed in prior studies, keyword recommendations from Scopus, and expert keyword suggestions were employed to develop keywords for the research question. The researcher utilized Boolean operators, phrase searching, truncation, wildcard symbols, and field code functions to enhance keywords and create whole search strings on Scopus and Web of Science databases, as can be seen in Table 1. Both of these resources have quite a few helpful features that could help them place high in a systematic literature review. For example, they have smart search tools, a broad range of content (they index the works of over 5,000 publishers), quality control measures, and can be employed for studies in fields like environmental administration (Gusenbauer, 2019). As a result, when searches were done in these two databases, 823 articles were discovered.

Table 1
Search string for Scopus and Web of Science

Database	Search string
Scopus	TITLE-ABS-KEY ((“marketing method” OR “marketing purchasing” OR “marketing retailing” OR “selling” OR “commerce” OR “marketing practice*” OR “marketing principle*”) AND (“marketing factor*” OR “aspect” OR “marketing influence*” OR “marketing consideration”) AND (“farmer*” OR “smallholder*” OR “grower*” OR “producer*” OR “harvester*” OR “planter*”))
Web of Science	TS= ((“marketing method” OR “marketing purchasing” OR “marketing retailing” OR “selling” OR “commerce” OR “marketing practice*” OR “marketing principle*”) AND (“marketing factor*” OR “aspect” OR “marketing influence* OR “marketing influence*” OR “marketing consideration*”) AND (“farmer*” OR “smallholder*” OR “grower*” OR “producer*” OR “harvester*” OR “planter*”))

Screening
The initial exclusion was performed as a primary component of the study, which involved an opening review that included 823 studies from these search results. It was implemented by using the database sorting functions. However, given that researchers cannot read all published papers in a particular scientific field, Okoli (2015) suggests time framing the period covered with regard to maintaining focus and manageability. However, Higgins et al. (2017) note that the time limit should only be used when there has been research published in a period of most concern. To ensure that our review captures the current literature, we selected 2018–2024, as investigating more recent years in these past six years is crucial when searching for up-to-date findings and reflecting on the advancements of this period (Clark et al., 2021). This methodological decision is similar to other systematic reviews that focus on more recent years to ensure relevance and quality (García-Holgado et al., 2020). Additionally, to ensure the reliability of review findings, only articles from scientific journals were taken into account and publications like book series, short notes or chapters outside a peer-reviewed journal. Moreover, to reduce language confounding effects, only English language articles were included (description of this in Table 2). After the screening, 604 articles were excluded because they did not fulfil the inclusion criteria, which resulted in a total of 219 full-texts for final eligibility treatment.

Eligibility
The third step, eligibility, necessitates the evaluation of all retrieved articles by human review to determine if they meet the criteria. The reading’s key criterion was the titles and abstracts of papers. Altogether, 175 articles that did not address the topic had an excessive amount of marketing jargon, were not dedicated to agricultural smallholders, contained a lack of information in methodology, or were published as a book chapter were thus excluded from the selection process. As a result, only 44 articles were taken into account.

Quality Appraisal
Following Petticrew & Roberts (2008), two independent reviewers conducted a detailed quality appraisal to facilitate the inclusion of only studies that were reliable and credible. The design, methodology and results of each study were considered as high, moderate or poor quality. A total of 11 articles were assessed as high-quality and 33 as moderate-quality

studies. All high- and moderate-quality studies were retained for inclusion in this article because these manuscripts are likely to yield reliable results. Any disagreement that emerged during the assessment was addressed by discussion among the experts until an agreement was reached on its rating status. This stringent evaluation process replicates the benchmark from Shao et al. (2023). They affirm that stringent quality checks are necessary to maintain the integrity and validity of systematic reviews.

The cutoffs for high and moderate-quality articles were aligned with those used in widely accepted frameworks, that is, the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) framework. High-quality articles are typically well-cited and published in esteemed peer-reviewed journals, showcasing robust research methods like randomized control trials or systematic reviews. In contrast, moderate-quality articles, while not as rigorous as high-quality studies, are still profoundly useful. These articles may have smaller sample sizes or methodological flaws but provide valuable insights. As Balshem et al. (2011) noted, high-quality articles are unlikely to change with future research, while moderate-quality articles may require updates as new studies emerge. For this study, both high- and moderate-quality articles were included to ensure a comprehensive and balanced assessment, leveraging insights from a wide range of valuable research.

Data Abstraction

This research was based on an integrative review of a flexible nature with the possibility to include studies with different methodological approaches, such as quantitative, qualitative and mixed methods. In this way, qualitative or mixed-method approaches allow repeated comparisons of the primary data sources, which makes it a suitable method for integrative synthesis and analysis (Whittemore & Knafl, 2005). For this review, a qualitative approach was chosen. A detailed review of all 44 studies was performed, focusing on the abstracts, results and discussions. All information needed to respond to the research questions was collected and tabulated following a protocol informed by the data abstraction process.

The specific approach used was thematic analysis described by (Braun & Clarke, 2006), whereby the data abstracts were examined for suggested patterns to label themes and sub-themes from each theme. Flemming et al. (2019) suggest this approach to be particularly appropriate for summarizing the results of an integrative research design. Thematic analysis is also more of a descriptive approach that would organise the data but in a flexible manner, and it could easily be paired with other strategies for describing qualitative information, thus adding richness to an analysis (Vaismoradi et al., 2013).

The thematic analysis began with the creation of themes that underpin data readings. In the following processes, similarities were sought in data, which was aggregated into elements of reviewed literature to develop seven main themes that had commonality or relation. Analysed 9 subthemes were identified after exploring these main themes. After developing the themes, each of them was revisited in relation to those subcategories where data within it were assigned, and some data might have escaped attention. As a result, two social and expenditure-related issues fell out of the conversation because they did not meet the inclusion criteria. The refinement led to the eventual identification of five themes and 9 subthemes, as presented in Table 3.

Next, the researcher moved to the subsequent stage, assigning a theme name to each subcategory as per its linkage with major themes. Two experts were used to ensure the validity and relevancy of these themes/subthemes. They shared their perspectives and confirmed that the developed themes and subthemes through this study process were suitable and useful for the research. The thematic analysis enables the identification of patterns and the regrouping of such for presentation as themes/subthemes (Braun & Clarke, 2006). This strategy is especially useful in integrating results summarized under an integrative research design by Flemming et al. (2019) and may also be flexibly combined with other approaches to qualitative data analysis methods (Kiger & Varpio, 2020).

Table 2
The inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Timeline	2018-2024	< 2018
Document type	Article reviews, article journals and conference papers	Chapters in books, books series and short notes
Language	English	Non-English
Access to articles	Open access	Non open access

Table 3
Themes and sub-themes

Author	Market Access		Pricing		Competition		Transportation		Government Policies
	GA	IA	PT	PS	CL	ID	TI	TC	SP
Anteneh and Asrat (2020)	/								
Nahar et al. (2020)			/				/		
Gobie et al. (2019)			/			/	/		
Gebrehiwot et al. (2018)	/		/	/			/	/	
Habanyati et al. (2022)	/								
Ouma et al. (2020)	/							/	
Amuko et al. (2023)		/							
Alavion & Taghdisi, (2021)	/								
Anthony et al. (2021)	/								/
Ravichandran et al. (2020)	/								
Park et al. (2018)		/	/		/				
Hlatshwayo et al. (2021)		/			/				/

Dadzie et al. (2022)		/							
Nwafor et al. (2020)		/					/	/	/
Diaz et al. (2021)		/				/			/
Olumba & Onunka, (2020)							/		
Melovic et al. (2020)				/					
Jurconi et al. (2022)				/					
Zámková et al. (2021)				/		/			
Cayaban & Alvarez (2022)				/					
Tray et al. (2021)				/	/				
Dimitri et al. (2019)				/					
Solanki & Inumula (2021)				/					
Kemboi et al. (2020)					/	/			/
Matius et al. (2022)									/
Abiddin et al. (2023)		/	/						
Thamthanakoon et al. (2021)							/		
Donner et al. (2021)									/
Seo & Kang, (2020)								/	
Luckyardi et al. (2022)									/
Kyotos et al. (2022)								/	
Gebre et al. (2020)									/
Kirimi et al. (2022)									/
Mwangi & Crewett (2019)	/								
Rashidi et al. (2021)	/								
Goswami et al. (2021)	/								

Wudad et al. (2021)	/								
Ahmed (2021)		/							
Anthony & Mwangi (2020)				/					
Baseca et al. (2019)						/			
Gumbi et al. (2023)						/			
Wang (2023)						/			
Fatty et al. (2021)							/		
Jingjing et al. (2024)									/

Market Access	**Pricing**	**Competition**	**Transportation**	**Government Policies**
GA = Geographic Access IA = Information Access	PT = Pricing Transmission PS = Pricing Setting	CL = Competitive Landscape ID = Innovation and Differentiation	TI = Transportation Infrastructure TC = Transportation Cost	SP = Support Programs

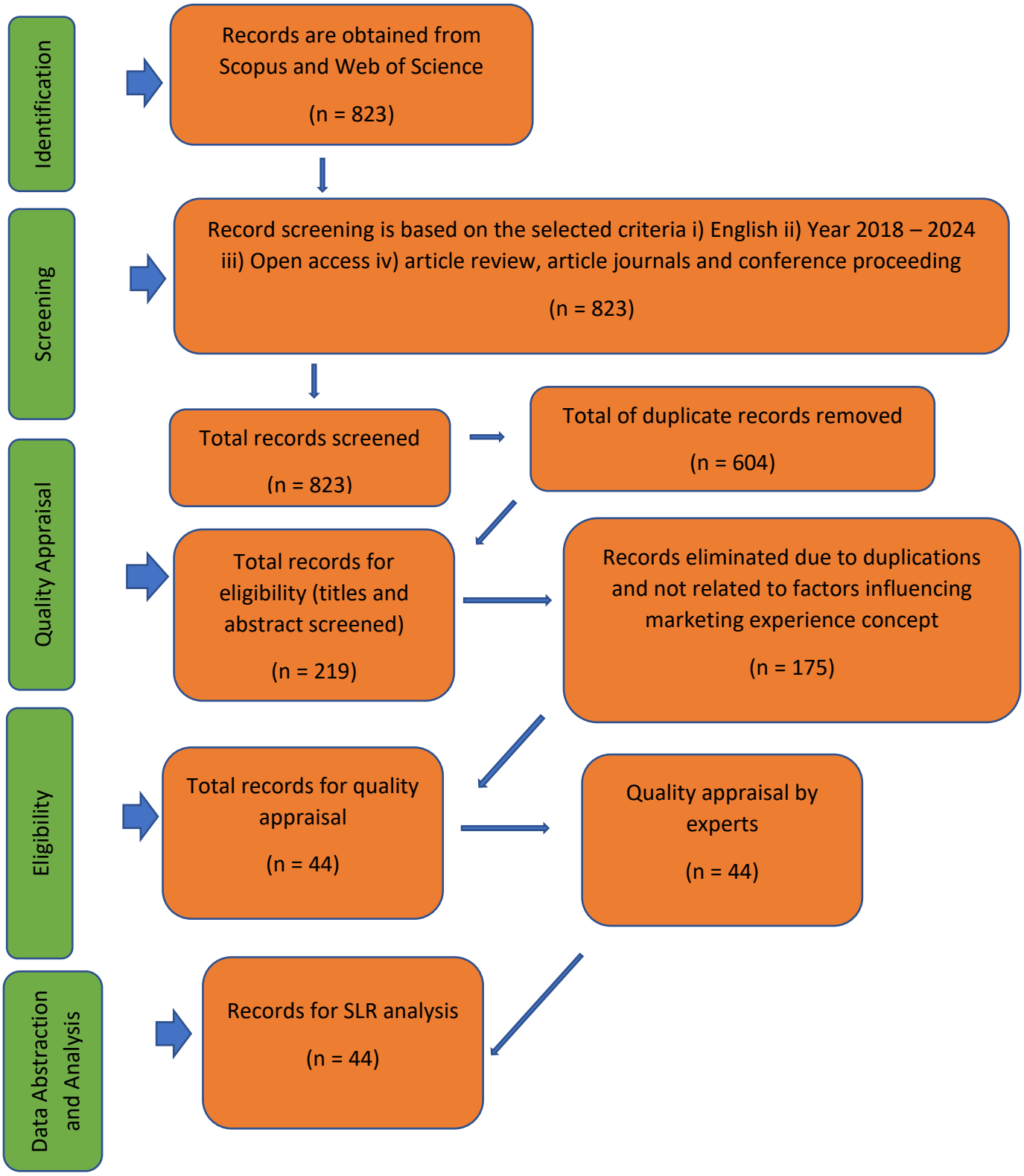

Figure 1: The flow diagram for the systematic literature review (SLR) process (adapted from Page et al. 2021)

Results

Background of Selected Articles

Fifty-two articles were identified and selected with great success using the review process. Thematic analysis was employed to analyse these articles, which highlighted seven search themes. The key points that came out of these analyses were in the form of themes such as market access, competition, government policies, pricing, product quality, transportation and productivity. Five final main themes were then further developed into 9 sub-themes that offer a detailed description of the factors influencing our area of interest. Following this systematic approach allowed the themes and sub-themes to be well defined and associated with fieldwork data, therefore, easier presentation of findings.

Themes and Sub-Themes

Theme 1: Market Access

Geographic Access

When it comes to the supply chain, infrastructure is one of those basic needs that underlies every aspect called upon in both marketing and manufacturing. For instance, pineapple smallholders often have to overcome high transportation costs and infrastructural constraints that deter them from reaching distant markets (Rashidi et al., 2021). Consequently, all these may play a role in determining the priorities of smallholder decisions when selling, which still makes local markets more viable options. Moreover, their marketing strategies are also affected by the long journey from farm to customer as a result of poor infrastructure, which limits market access to the right product quality and prices (Mwangi & Crewett, 2019). This information underscores the challenges faced by smallholders in choosing their sales strategy and suggests that they may benefit from working with intermediaries or investing to increase an economy of scale.

In addition, Gebrehiwot et al. (2018) pointed out that farmers' profitability can depend on their geographic location, and this determines the availability of marketing channels as well as their ability to appeal to customers. Similarly, Habanyati et al. (2022) noted that limited access to inputs and markets are significant barriers exacerbated by insufficient infrastructure such as roads and telecommunications. Therefore, the scarcity of crucial market information exchange among input suppliers, producers, distributors and consumers due to the absence of infrastructure also makes the establishment of strong infrastructure essential for making both production and marketing activities successful (Goswami et al., 2021).

Smallholder farmers will need demand-led systems as more commercialisation evolves the agricultural industry in developing countries. These are some of the key ingredients, including access to markets, market information, market intelligence and effective farmer organization (Ouma et al., 2020). There is widespread recognition that better road access can deliver a range of benefits to rural development. For example, Alavion and Taghdisi (2021) found a positive relationship between better road access in rural communities and productivity, as well as how it affected new technologies used by farmers. Anteneh and Asrat (2020) similarly discovered that the establishment of asphalt roads and infrastructure in urban areas were the main determinants for wheat marketing thus, easily accessed markets lessen the distance to reach the local consumer. When smallholder farmers have limited access to the market, it can result in reduced revenues.

Problems with access to good agricultural markets and short supplies of farm inputs greatly hinder smallholder farming households (Anthony et al., 2021). For instance, Ravichandran et al. (2020) mentioned how dairy producers are unable to participate in the market because of bad roads, which is a cause for depleting income, leaving them financially unsteady. Insufficient access to markets could also result in perishable products not being sold on time, leading to waste. As noted by Wudad et al. (2021), the poor road networks in Ethiopia not only affect the timely delivery of agricultural products but also lead to substantial post-harvest losses. Therefore, it is necessary to create strong infrastructures for both the production and marketing activities in these regions.

Information Access

Marketing performance depends on a continuous intake of information. This calls for insight along with broad knowledge of the field, which no one could acquire all at once. It also means the most subtle of strategic realignments that will enable the smallholders to get ahead before anyone else does. Hence, market information is regarded as the producer's critical tool to effectively identify and service customer demand (Amuko et al., 2023). In a market-driven smallholder farming world, the more quickly and accurately one can respond to market needs, the more competitive others will be to oneself. As Abiddin et al. (2023) pointed out, if smallholders desire to remain relevant and competitive in today’s dynamic plantation environment, they can never stop learning. In this way, some must constantly upgrade their skills and take on new technologies.

Smallholders' market access has been enhanced considerably through the clever use of Information and Communication Technologies (ICT) by using tools such as mobile applications or digital platforms. These instruments can provide smallholders with live market data and weather forecasts and directly communicate with purchasers, thus bypassing intermediaries and going straight to the final consumer. According to Diaz et al. (2021), a result of all this has shown that men make a risky profit. For example, Ahmed (2021) argues that mobile technology offers marginal farmers vital access to prices and forecasts. Thereby enabling them in marketing and production planning to maximize efficiency. In an age where agriculture is more globalized than ever before, the ability to acquire real-time market information via ICT tools is vital for competitiveness.

Inefficient decisions may, therefore, be made regarding which direct marketing channels to use. However, this incapacity can cause producers to be unable to maintain transparent and sustainable relationships with retailers or consumer outlets, and hence, effects on the marketplace are short-term at best (Park et al., 2018). Furthermore, Hlatshwayo et al. (2021) found that some farmers lack enough consciousness of marketing information, which results in non-standardized chemical applications and crop failures. This suggests the necessity of giving farmers enough information and technology to control quality so that they are able to apply for formal certification and standards.

In fact, education is a powerful tool to build the resilience factor through our farmers. According to Dadzie et al. (2022), keeping farmers informed on current trends in the market, along with educating them about newly adopted technologies, is essential so that they can adopt and manage risks. Furthermore, Nwafor et al. (2020) indicated that age is an influencing factor on farmers, such as how they search for information. Young farmers often have more

technology, and at the same time, they also attract new knowledge sources in a different way than older generations of that class represent. This generational divide highlights the importance of specific educational programs that provide younger and older farm workers with these same tools to be successful.

Theme 2: Pricing

Pricing Transmission

This is why brokers such as dealers, wholesalers and retailers are so often significant in indirect channels with the bulk of the value chain controlled. This price transmission can prevent pineapple smallholders from receiving a commensurate portion of the final consumer price (Gobie, 2019). As middlemen exploit smallholders' knowledge gaps, they frequently offer producers extremely limited returns by under-pricing during peak supply season times (Nahar et al., 2020). Furthermore, the absence of fresh markets makes smallholders have no choice but to depend entirely on middlemen to market their products (Abiddin et al., 2023). According to Gebrehiwot et al. (2018), several attributes are necessitated by the intermediaries, such as poor market connection, low prices and an overabundance of intermediaries; it collectively obstructs small-scale farmers from doing business on scale in a polite channel. This underscores the direct-to-consumer sales strategy as a method of improving financial outcomes for producers, stimulating demand downstream in retail consumption, and more readily shifting earnings into these channels (Park et al., 2018).

Price Setting

How prices are set constitutes a notable variable in smallholder farmers' efforts at marketing pineapples. For instance, another notable means is that the market for pineapples on a smallholder producer level is determined by which methods there are for setting prices. As Melovic et al. (2020) suggest, price is a big problem purchasers encounter when they are trying to make decisions on whether or not to buy organic food. There is evidence to show this is true where Jurconi et al. (2022) found that the shelf pricing and discounts offered by retailers contribute significantly to customers' decisions in whether or not they will buy sustainably packaged goods. In addition, research by Zámková et al. (2021) has shown that premium pricing of organic items reduces the availability of these products. Taken together, these findings demonstrate that price considerations are central in an organic food consumer's choice, affecting both what is bought and how widely sustainable food is found.
However, because consumers started to value quality over cost and see the health benefits of organic vegetables, they cared less about price. Pesticide residues are but one of many pollutants in our food supply (Zámková et al., 2021). This question is highly debatable from the consumer point of view. As demonstrated by Cayaban and Alvarez (2022), one of the important factors that affect what people prefer and how they spend is economic status. Value and practicability are essential for most middle- and upper-middle-class consumers, while luxury, unique features or fine craftsmanship is more likely to appeal to a wealthier segment.

Pricing dynamics, even among producers, can markedly differ. Most small-scale farmers are confronted with barriers to entry into and operation with formal markets, which include high transaction costs, high risks at all junctures, and narrow market outlets, in addition to other problems of collective activity (Anthony & Mwangi, 2020). The result of these limitations is that smallholder farmers suffer from an unfair distribution of consumer prices and confusion

in their production and marketing processes, with possible gains being channelled to middlemen (Gebrehiwot et al., 2018). In this kind of situation, the economic well-being of the producers is bound to suffer.

Tray et al. (2021) indicate that smallholder farmers in developing countries are one of the most vulnerable groups suffering from an underperforming market that limits access to input and product markets with high transaction costs. In addition, small farm owners might not be able to grow as much food as the market needs consistently. Dimitri et al. (2019) note that high costs of entry into intermediated markets, such as required Good Agricultural Practices (GAP) certification or insurance coverage, are prohibitive. Hence, to tackle this problem, producers should plan their marketing into buying strategies of clients at different channels so that it can have maximum benefit in yield. When farmers sell their crops independently using direct marketing strategies at local farmers' markets, it encourages them to compete in a sustainable manner and create more diversity, thus creating better quality agri-foods (Solanki & Inumula, 2021).

Theme 3: Competition

Competitive Landscape

The pineapple smallholders must compete with each other as well as competing crops that can be more profitable and less difficult to plant. Such competition may be driven by a range of factors, such as markets saturated with other crops that require less labour or are more resistant to environmental changes. To avoid risks emanating from the nature of competition, smallholders could diversify their crop portfolios. In this way, diversification helps to cushion market variations and reduce reliance on a single crop. Investigating intercropping options for pineapples with another complementary crop might not only present cost savings but also agronomic benefits. According to Kemboi et al. (2020), crop diversification is relatively key replacement of less-valuable crops with high-value ones like fruits and vegetables targeting export niche markets. This should help to make food production more economically viable by moving away from commodity crops and onto higher-paying cultivated land.

In many areas, pineapple smallholders face immense competition from other pineapple producers. Indeed, prices fluctuate a lot, and they have to sell more with small margins to remain competitive in business in retrospect to the financial gains of many other sectors. To counter this, some smallholders have opted for direct marketing strategies that lead to less wholesale pricing and help create more competition in the downstream market (Park et al., 2018). In Zimbabwe, farmers often maintain a balance between their economic interests; instead of selling vegetables at low rates locally, they sell their produce in metropolitan cities where farmers are getting good returns upon their efforts (Tray et al., 2021). Channelling marketing on a decentralized setup could also enable farmers to collect higher margins for their produce.

Additionally, collaborative ventures like cooperative farming and shared knowledge among smallholders can also be used to improve their bargaining position while ensuring that they remain competitive. The collaboration will achieve an economy of scale, better access to inputs and shared knowledge for best practices in pineapple farming. Hlatshwayo et al. (2021) pointed out that small-scale farmers often face numerous obstacles to completing their production efforts and enjoying the benefits of participation in agricultural markets, including

a lack of key skills, limited access to information needed for successful marketing and efficiency, insufficient knowledge necessary upon both market sophistication as well as agricultural technicalities. This is the reason why most smallholder farmers find it hard to get involved efficiently in the international agricultural market.

Innovation and Differentiation

In order to stay in pace with the changing pineapple industry, smallholders ought to consider innovation and diversification. In this regard, new pineapple varieties have been incorporated, as well as unconventional packaging and marketing strategies (Diaz et al., 2021). For smallholders, ICT tools, such as mobile applications, serve as important tools to address both productivity challenges and market access issues. Through these technologies, smallholders get promoted with highly informative agro-information for the enhancement of their productivity and market linkages (Baseca et al., 2019). The ICT integration enables smallholders to use technology as a decision-making tool in both farming and marketing, improving the competitiveness of their products within local or global markets (Diaz et al., 2021).

Another solid approach to differentiating agricultural products is through value-added offerings such as pineapples that are organic or pesticide-free. Smallholders increasingly can comply with this as consumers demand healthier and more sustainably produced products in the market by providing certified organic produce (Zámková et al., 2021). Innovation in processing and packaging can add value to farm produce, increase the economic power of smallholders as well and open windows for them into niche markets that would enable both bigger margins against competitors (Gobie, 2019). Consumer preferences are trending towards eco-friendly products, and smallholders who adopt sustainable practices stand to gain benefits in the market (Kemboi et al., 2020).

Smallholders will become better marketers given the onward trend in the adoption of digital marketing and social media platforms for them to link with consumers or promote their products. Mobile marketing provides a new method for the benefits of organic products to consumers, which is particularly effective in markets where health-conscious purchasing decisions are growing (Wang, 2023). Digital tools for agriculture are becoming increasingly diverse, and early adopters have experienced increased market access, better customer engagement and profitability (Gumbi et al., 2023). These changing conditions often favour large-scale producers who benefit from financial support and access to advanced technology. However, smallholders can remain competitive by integrating digital strategies, such as smart farming innovations, allowing them to adapt and thrive in the evolving agro-technical landscape (Diaz et al., 2021).

Theme 4: Government Policies

Support Programs

Government support also plays an important role in dealing with the smallholder farmers' challenges where, through these programs, smallholders receive subsidies, including training and technology necessary to enhance their agricultural productivity as well as access the market. Luckyardi et al. (2022) argue that the government also plays a crucial role in encouraging policies on local labour utilization and human resources development involved in high value-added commodities, which is generated via national income. According to

Hlatshwayo et al. (2021), government stakeholders are unwavering in support of the informal agricultural sector by providing extension advice on seed cultivation, storage practices, as well as processing and market channelling from certified sources. These endeavours have the potential to increase the awareness and technical capabilities of farmers.

On the other hand, complicated and difficult procedures encountered by young people whenever they wanted to obtain assets in agriculture were one factor that demotivated them in doing farming (Matius et al., 2022). Training farmers in new techniques, through government-funded programs can increase productivity by a mile and also incentivize them to learn better agriculture practices. Subsidies provide another form of support by providing financial assistance to smallholders for seeds, fertilizers and pesticides. Jingjing et al. (2024) discovered that government subsidies affect productivity and market engagement from the standpoint of smallholder farmers who are involved in pineapple cropping. These subsidies ensure small-scale farmers have the cash to overcome budget issues, which can, in some cases, extend their farming or push them out altogether. Anthony et al. (2021) mentioned that subsidies lower the price of key inputs like seeds and fertilizers, which then allows smallholders to get more productive with higher yields.

Furthermore, governmental extension services significantly improve farmers' knowledge and skills in crop production (Kemboi et al., 2020). Farmers benefit from these services that help them better their agricultural methods and locate market opportunities, make aggressive deals with purchasers, as well as abide by trade regulations (Diaz et al., 2021). This assistance enables farmers to access new markets and enhances their competitiveness.

In fact, a key role market access programs supported by the government play in helping small-scale farmers get their products into larger markets. Smallholder farmers need market information flow in rural areas, which is critical, and government agencies should ensure that farmers can access marketing-related information (Nwafor et al., 2020). As noted by Gebre et al. (2020), the rehabilitation of agricultural extension programs can affect production. Sadly, agriculture primarily has to rely on small and medium-sized enterprises that already can seldom keep up with the requirements due to limited subsidies and lack of expert staff (Donner et al., 2021). The provision of direct government purchases from farmers does increase the income of producers, and it better enables rural farmers to directly engage in markets (Kirimi et al., 2022). Additionally, the promotion of technology transfer and solving farmers' difficulties ensures that agricultural productivity will be economically efficient (Kemboi et al., 2020).

Theme 5: Transportation

Transportation Infrastructure

Pineapples are globally produced and traded fruits that have a significant impact on the agricultural economy in many developing countries through smallholder cultivation. The transportation infrastructure for these farmers is, however, riddled with a host of problems. Time-sensitive transportation networks are needed to deliver perishable products to the markets as soon as possible. Smallholder farmers face challenges of not having proper infrastructure, location distance from the market, a shortage of personal transportation and less knowledge about the market where to sell the produced commodities (Nahar et al., 2020). There is also a massive chunk of smallholder farmers in developing countries who stay

in physically remote areas where there is almost no infrastructure. Therefore, these farmers have difficulties in participating markets and high transaction costs (Gebrehiwot et al., 2018). Olumba & Onunka (2020) also identified some key issues by banana and plantain growers in Nigeria. The absence of roads due to which cars would fail to travel and expensive transport fares. Poor road infrastructure leads to high transaction costs and backlogs for smallholder farmers trying to get their goods to market. As a result, this harms the competitiveness of these farmers.

If the products travel long distances through poor roads, they lose their quality and value at the markets. This has the most detrimental effect on smallholder farmers, who are not able to quickly sell their crops because poor transportation leads to significant post-harvest losses from damage and delays. Perishable goods, such as vegetables, suffer a continuous decrease in their quality from the moment of harvest to consumption and even more when transported unsuitably (Gebrehiwot et al., 2018). Marketing channel is another important factor that farmers located in remote areas should consider as it varies its cost and profit for different channels (Nahar et al., 2020).

In cases where farmers are unable to transport their harvest or borrow adequate funding, they are constrained to selling off their produce right at the farm gate, leading to lower-cost recoveries in general. Thamthanakoon et al. (2021) have noted that although certain farmers are conveniently engaged in post-farm gate marketing initiatives, many farmers still sell most of their produce to middlemen at the farm gate with minimal attention given to the financial implication of such practice on farming operations. This has led to the problem being compounded by poor road networks, inaccessible bridges and limited port facilities that hinder farmers' ability to reach the market, adding transportation costs for those selling their products, which in turn make them less competitive at bigger markets. As Fatty et al. (2021) pointed out, the lack of proper facilities means smallholder farmers cannot move their goods as fast as they would like, meaning less money and increased operational costs.

Transportation Cost

Pineapple is one of the prominent crops in smallholder agriculture in the world. But from a financial point of view, these farmers have to struggle as well for the simple reason that transportation costs are very high. Agricultural produce such as pineapples being transported to the markets requires reliable transportation on time. According to Kyotos et al. (2022), smallholders, especially women, face major challenges to wider distances between farms and markets, which would then raise the costs of access to fundamental inputs such as vaccines and medications. This calls for effective marketing systems which can reduce the cost of transportation from production sites to market centres (Gebrehiwot et al., 2018). For smallholders, in particular, high transportation costs are an important reason to cut into profits and increase overall production costs.

The direct link between producers and consumers through local food supply chains has been proven to minimize both transportation as well as packaging costs (Seo & Kang, 2020). In addition, easier access to transportation services and lower transaction costs, together with shorter market distances, could also lead to additional participation in markets (Ouma et al., 2020). Given the perishability of pineapples, this transportation cost adds up for smallholders far away from major markets. Improving the bottom line of smallholder pineapple farming,

as well as enabling greater economic efficiency and sustainability, hinges on dealing with transportation costs.

Discussion

The systematic literature review (SLR) reveals five main themes, including market access, pricing, competition, transportation and government policies, that influence the marketing experience of pineapple smallholders in Sarawak. Each theme, with the support of 9 sub-themes, provides insightful comments about smallholders' involvement in the pineapple market. A total of 44 articles are included in the review, helping us to better understand these themes. Analysing these key areas provides a close-up portrait of all that hinders a smallholder from making the activities on which he depends for his living prosper. Additionally, with 9 sub-themes providing details about each heading, this section will then outline the implications for sustainable development and suggest potential strategies.

Market Access

Market access is very critical for the success of smallholder farmers who are involved in pineapple farming. Poor infrastructure and poor information distribution about markets are two of the main challenges for smallholders. For example, Gebrehiwot et al. (2018) and Ouma et al. (2020) mentioned that poor road access, poor telecommunication networks and geographic isolation all combine to limit the potential for smallholders to be able to market their produce more efficiently. For example, in rural areas, smallholders are typically located further from markets, and the absence of appropriate transport systems can cause delays to perishable produce such as pineapples, which result in it spoiling over time, leading to reduced market value (Anthony et al., 2021; Nahar et al., 2020). Since they are often out of touch with real-time market information as a result of geographical isolation, farmers cannot respond properly to changes in prices or client preferences (Gebrehiwot et al., 2018; Ouma et al., 2020).

It cannot be emphasized enough that the physical infrastructure and digital connectivity must go hand in glove. Improved roads and transportation networks would not only enable smallholders to access wider markets but also link them with market information systems, making the farmers able to decide on what, when, where, and at which price their commodities should be sold (Gobie, 2019; Anteneh & Asrat, 2020). Effective decision-making must be enabled by up-to-date market data, the absence of which can hamper smallholder profitability and continued operation (Nahar et al., 2020; Diaz et al., 2021). These, among others, would reduce the high cost of transportation spoilage of produce and facilitate smallholders to compete in higher markets, which is critical for enhancing a resilient and profitable agricultural sector (Anthony et al., 2021; Gobie, 2019).

Pricing Mechanism

Hence, the results show that the pricing mechanism plays a significant role in determining both profits and financial sustainability of smallholder pineapple farmers. Smallholders are particularly dependent on fair competition conditions when it comes to pricing discrimination and transmission, which shape their experience due to frequently limited market power. Studies show that many intermediaries, such as brokers and middlemen, take advantage of smallholders' weak bargaining power to fix prices with a disadvantageous condition for the producers (Anthony et al., 2021; Diaz et al., 2021). These intermediaries keep a big part of the

profits, so smallholders do not receive much on their sweat and crops (Nahar et al., 2020; Park et al., 2018).

There are several strategies that can be used to combat this issue, including allowing smallholders to advertise and sell their produce directly from the farm itself, which would mean a greater share in market value for them (Anthony et al., 2021; Gebrehiwot et al., 2018). Through collective action, smallholders can exert power through cooperative marketing strategies and at least partially erode the intermediaries' bargaining leverage (Park et al., 2018; Gebrehiwot et al., 2018). Furthermore, the increasing utilization of online platforms provides an avenue for smallholders to communicate and transact directly with intermediaries rather than through auction sales where profits may accrue higher at a source, providing more leeway to set remunerative prices in contrast (Seo & Kang, 2020; Zámková et al., 2021). Such interventions will increase the bargaining power of smallholders and provide their fair share in profit distribution, which would be another source contributing to a stable stream of income (Nahar et al., 2020; Anthony et al., 2021).

Competition and Differentiation

Pineapple growers face a variety of threats in their competitive landscape, ranging from other pineapple producers to competing crops which could offer higher profitability or easier cultivation. The global agricultural market is changing more and more, leading smallholders to adapt their plays in product differentiation plus innovative strategies towards being competitive within markets (Kemboi et al., 2020; Tray et al., 2021). Diversification is one of the core solutions to meet this problem. Smallholders can also combine intercropping with high-value crops as a way of mitigating market risk, diversifying agricultural business risks, and potentially improving financial stability (Hlatshwayo et al., 2021; Diaz et al., 2021).

Beyond diversification, smallholders cooperating with each other can improve their performance in the market (Thamthanakoon et al., 2021; Hlatshwayo et al., 2021). Creating cooperatives or engaging in collective marketing collaborations enables smallholders to share resources, lower costs, and reach better market channels (Hlatshwayo et al., 2021; Donner et al., 2021). Such collaborative arrangements enhance smallholder market access and learning opportunities that can lead to more widespread adoption of best practices or economies-of-scale friendly outcomes. Long-term competitiveness appears to benefit from differentiation but can be augmented through innovative branding and sustainable farming practices that are especially important in niche markets where consumers see value by paying a premium for special products, environmentally friendly products (Kusá et al., 2021; Diaz et al., 2021).

Government Policies

Strengthening government policies targeting smallholder pineapple farmers is vital in improving their productivity and market participation. The success of smallholders, to a great extent, depends on the type of incentives, including subsidies and training programs that prove highly effective in improving the productivity and competitiveness among these production systems (Luckyardi et al., 2022; Anthony et al., 2021). Subsidies in the form of financial assistance in the provision of key agricultural inputs such as seeds and fertilizers are a critical component necessary to alleviate constraints associated with smallholder farmers accessing improved farming practices, which consequently enhance their productivity through increased yields (Anthony et al., 2021; Diaz et al., 2021).

Furthermore, government-led training programs can assist smallholders in gaining updated skills and new production technologies to enhance productivity as well as market access (Kemboi et al., 2020; Hlatshwayo et al., 2021). Market access programs supported by government policies create interaction between smallholders and larger markets, therefore benefiting better price realization for their produce coupled with reduction of transaction costs (Nwafor et al., 2020; Gebre et al., 2020). If properly applied, these policies can notably contribute to smallholder pineapple farming resilience and sustainability (Diaz et al., 2021).

Transportation and Logistics

Transportation infrastructure and logistics are critical for smallholders to be able to affordably move perishable goods, in this case pineapples, into markets quickly. Many times, the inability to afford road improvements for market access provides easy avenues of location-specific exclusions with major potentialities to compromise smallholders' competitiveness and, ultimately, their profitability (Olumba & Onunka, 2020; Gebrehiwot et al., 2018). A particular disadvantage of smallholders located in rural areas is that, due to poor transportation networks, their farm produce undergoes post-harvest losses and delays, thereby increasing operational costs (Anthony et al., 2021; Gobie, 2019).

Enhanced marketability of smallholder produce is encouraged by improved transportation (Nahar et al., 2020; Gobie, 2019). Improved infrastructure in the form of good roads, reliable vehicles and efficient logistics systems will also help in reducing post-harvest losses as well as decreasing transportation costs, which can enable smallholder farmers to access wider markets (Anthony et al., 2021; Ouma et al., 2020). On the other hand, facilitating smallholders with digital tools in managing logistics can help to harmonize delivery as well as optimize the supply chain and lead to the profitability of these crops, which is again related to sustainability (Kyotos et al., 2022; Gebrehiwot et al., 2018).

Conclusion

The findings implied that diverse factors affect the marketing experiences of pineapple smallholders in Sarawak, and each strategic way must be accomplished. These can be grouped into market access, pricing mechanism, competition on quality, transportation facility to the related value chain entity as processors will not buy pineapples when there is no reliable means of transporting it as well as government policies which collectively influence performance in the pineapple market for smallholders based on the systematic review. Such findings offer a complete picture of the complexities associated with these challenges for smallholders and identify pinpoint areas that require targeted interventions to enhance the market orientations of farmers along with their profitability.

Accessing markets remains one of the biggest constraints for smallholder farmers, often limited by infrastructure and poor information on market prices. Transportation costs need to be brought down, and mobility must be increased by increasing features like roads and bridges. Additionally, investing in telecommunication infrastructure is necessary for economic development. Smallholders require access to accurate and timely market data to join the marketplace effectively. Similarly, the pricing mechanism is also based on fair market value for smallholders, as they are always being treated with unfair prices by middlemen. It could be avoided if the smallholders may still speak right with their purchasers through direct

advertising and marketing channels like e-trade systems or farmers' markets, supposing that they nonetheless permit them to function.

Given the level of competition, smallholders should be bold through innovation and applying new agricultural techniques. Smallholder farmers utilizing smart farming technologies such as Information and Communication Technologies (ICT) will be able to improve the efficiency of their operations to take advantage of new market opportunities. Additionally, organic and sustainable farming practices result in higher quality, making products not only more marketable but also attractive to a growing desire for green goods. Also, transport logistics have to be enhanced as there is no way the products could get a market if you do not have efficient supply chains and which is vital in trying to reduce post-harvest losses.

Additionally, enabling government policies is important to maintain a viable and profitable pineapple sector. Financial support, subsidies and skill development programmes with a tilt towards modern agriculture techniques will help in upgrading the productivity levels of smallholders along with enabling them to reach the market. Similarly, collaboration among smallholder producers by way of cooperatives or associations may lead to economies of scale and provide them better access to resources as well as shared knowledge, which could improve their overall productivity and make the venture profitable.

In conclusion, a focus on these challenges with targeted interventions not only improves the economic viability of smallholders but can also contribute to larger sustainable agricultural development goals in Sarawak. Better infrastructure, transparent pricing and promotion of innovation with matching government policies will enable smallholders to have a better market standing. Collaboration, constant innovation and the uptake of modern agricultural technologies are some enablers to sustain the pineapple industry in Sarawak for long-term success. This will give rise to sustainable development at both local and regional levels as the efforts reach out to enterprising farmers.

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