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A moderated-mediation analysis of resources and business performance of smallholder deciduous fruit farming enterprises in South Africa: toward the development of a sustainable business model

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Abstract: The performance of smallholder businesses in high value chains is important for their sustainability, especially given that their livelihoods depend on it. For businesses to thrive and maintain their competitive positions in global value chains, they need resources. This article analyses the variables that moderate and mediate the relationship between unique resources and the business performance of smallholder deciduous fruit farming enterprises using Andrew Hayes process macro model 7.The results showed that unique resources did not have a direct significant effect on smallholder business performance (β = -0.034, t(2) = -0.565, p = 0.565), while dynamic capabilities had a direct and positive significant effect on smallholder business performance (β = 0.1666, t(2) = 2.235, p = 0.027). In contrast, livelihood performance had a negative effect on small-scale business performance (β = -0.143, t (2) = -2.975, p = 0.004). There was a positive moderated effect of market performance on livelihood performance (β = 0.046, F (1,122) = 7.003, p = 0.000). Market performance also significantly moderated the relationship between unique resources and dynamic capabilities (β = 0.705, t (2) = 2.787, p = 0.006). The study recommends that small-scale deciduous fruit producers continue learning and experimenting during deciduous fruit production, as the dynamic capabilities acquired through learning are necessary for business performance. These findings have implications for smallholder deciduous fruit farmers and policy makers in South Africa managers.

Keywords: balanced scorecard theory; dynamic capabilities; learning; livelihood performance; market performance; resource-based view; sustainable livelihoods framework

Introduction

Traditionally, smallholder farming was never recognized as a business (Wiggins et al., 2010; (Fan and Rue, 2020; Gc and Hall, 2020) for different reasons including subsistence production for which most smallholder farmers engaged in farming activities (Qange and Mdoda, 2020; Achmad et al., 2022; Giller et al., 2021). During those days, farmers would, in a good production season, exchange products that were in abundance for those that were in shortfall with their neighbours, a practice that was referred to as bartering (Hendrickson *et al*., 2020; Burke, 2022). As economies developed, smallholder farmers started using cash to buy products that were in short supply, including non-agricultural commodities to satisfy household needs (Davis, 2004; Devereux, 1993). This exchange led to the recognition of market access as a livelihood strategy, which is also supported by the sustainable livelihoods' framework (Norfolk, 2004). The income obtained from farming was (partly) (re)invested in the farms and in the education of children by paying their school fees (Albertus *et al*., 2020; Davis *et al*., 2021). Through these investments, smallholder farming began to be recognized as a business (Fan and Rue, 2020; Gc and Hall, 2020). The only concern remains whether small-scale farming enterprises can perform and thrive as businesses, especially in turbulent environments.

Earlier research by development economists has looked at the business performance of smallholder farming enterprises in markets from a transaction costs economics perspective. According to this point of view, the scale of

operation of smallholder farmers (i.e., small land size), poor road infrastructure and other resource constraints increase their transaction costs of doing business (Kolade et al., 2020; Magesa and Mkasanga, 2021; Dhillon and Moncur, 2023; Ma et al., 2024; Mgomezulu et al., 2024). The small land size further limits smallholder farmers from producing large quantities and benefiting from economies of scale (Giller *et al*., 2021; Mizik, 2023; Mgomezulu *et al*., 2024). Therefore, these factors affect market performance and business performance of small farmers integrated into markets (Abdul-Rahaman and Abdulai, 2020; Dagbelou et al., 2021; Aliyi et al., 2021). Later studies on the business performance of smallholder farming enterprises in markets followed a resource-based view. The studies identified sets of (strategic) resources that smallholder farmers require to thrive in a competitive business environment (Grwambi *et al*., 2016; Olthaar *et al.*, 2019).

Although the latter studies acknowledged the importance of resources when competing in global markets, they did not pay attention to the variables that moderate and mediate the relationship between resources and the business performance of small farmers in rapidly changing market environments. This study addresses this shortcoming by analysing the variables that moderate and mediate the relationship between unique resources and business performance of smallholder deciduous fruit producers in South Africa. The overall objective is to develop a sustainable model for the integration of small-scale deciduous fruit farming enterprises into markets.

The structure of the article is as follows. Section 2 presents the theoretical framework. The next section (Section 3) presents a conceptual framework and develops research hypotheses. Section 4 outlines the research methodology followed to conduct the study. Section 5 presents the results, and Section 6 concludes and makes some recommendations. The implications for managers of small-holder deciduous fruit farming enterprises and policy makers in South Africa are presented in Section 7 of this article.

Theoretical framework

The Balanced Scorecard Theory and Measurement of Business Performance

There has been an increasing understanding that businesses need to look beyond profit maximization when measuring performance, as focusing only on financial indicators is not adequate from a business sustainability point of view (Signori et al., 2021; Battilana et al., 2022). On this basis, in 1992, Kaplan and Norton introduced the balanced scorecard theory (Kaplan and Norton, 1992; Jaiswal and Thaker, 2024). The balanced scorecard is a set of indicators that allow for an all-inclusive, integrated view of business performance (Stewart and Carpenter-Hubin, 2001). The scorecard was specifically developed to complement "traditional financial indicators with performance measures from the point of view of customers, internal business processes, and learning and growth (Kaplan and Norton, 1996, p.75; Stewart and Carpenter-Hubin, 2001; Kaplan, 2009).

The theory of balanced scorecards argues that financial performance is the usual result of balancing other important organizational goals rather than the main goal of the organization (Norreklit, 2000; Kaplan, 2009; Rahayu et al., 2023). These other organizational goals are interrelated to support outstanding overall organizational performance (Kaplan, 2009). If one goal is not in balance with other goals, the performance of the entire organization is compromised (Benková *et al*., 2020; Abedian et al., 2021; Quesado *et al*., 2022). The balanced scorecard system also emphasizes the articulation of strategic goals in support of goals (Rafiq et al., 2020; Quesado et al., 2022; Tawse and Tabesh, 2023). The adoption rate of the balanced scorecard system increased rapidly over the years such that by 1996, businesses had implemented it as a strategic management instrument connecting long-term strategy to short-term targets (Kaplan and Norton, 1996). By viewing the business from the point of view of customers, internal business processes, and learning and growth in addition to financial performance, the balanced scorecard theory presents a more complete understanding of current business performance (Norreklit, 2000; Kaplan, 2009).

The Sustainable Livelihoods Framework and Smallholder Farm Businesses in developing countries

The sustainable livelihood framework is widely adopted to understand and analyze livelihood strategies of marginalized people, including smallholder farmers in developing countries (Adato and Meinzen-Dick, 2002; Ahmadzai et al., 2021; Natarajan et al., 20202).2). For example, in the DFID sustainable livelihoods framework, market access is seen as one of the livelihood strategies that build on policies, institutions, processes and livelihood assets such as social, human, natural, physical, and financial resources (Scoones, 1998; Solesbury, 2003; Hamilton-Peach and Townsley, 2004). Scoones (1998) defines a livelihood as consisting of the capabilities, assets, and activities required for a means of living (Rakodi, 2014; Mphande and Mphande, 2016; Khan et al., 2020). A livelihood is declared sustainable when it can manage with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future while being considerate of the natural environment (Chambers and Conway, 1992; Pound *et al*., 2003; Rakodi, 2014).

To achieve a sustainable livelihood, smallholder farmers improve their market access by engaging in institutions such as contractual agreements, strategic partnerships, and/or mentorship arrangements in which they pool resources to meet market requirements (Poole and de Frece., 2010; Prain et al., 2020). With improved market access, smallholder farmers can sell their produce and earn income to satisfy household needs (Purnawan and Brunori, 2023; Marion et al., 2024; Badar et al., 2024). Apart from earning income, improved market access entitles farmers to ownership and circulation of market information, management of social and business relationships, affirmation of personal significance, and group identity (Long, 1997), which are all important for livelihoods (Wallman, 1984) and business performance of smallholder farming enterprises.

The Resource-Based View and the Role of Dynamic Capabilities in Turbulent Environments

The resource-based view of the firm provides a useful perspective for explaining firm growth and sustainable competitive advantage. Its primary focus is to leverage current capabilities to gain and sustain competitive advantage, which is not helpful in turbulent environments (Eisenhardt and Martin, 2000). To support firms experiencing substantial change in transitioning from a regulated to a deregulated market environment, the dynamic capabilities perspective complements the resource-based view (Mosakowski, 1993; Augier and Teece, 2006; Amaral et al., 2023). 3). Teece (1990), Teece et al. (1997) and Teece (2011) define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external resources/competencies to address rapidly changing business environments.

Although resources comprise the assets of a firm, which tend to be stationary until put to productive use, learning is conceptualized as a dynamic capability that continuously generates economic value through the development of new ideas and the renewal of current capabilities (Kogut and Zander, 1992). Learning influences the interactions among numerous resources in a firm (eg, human and material resources), resulting in improved productivity capacity for individual resources (Zollo and Winter, 2002). New resource amalgamations produce a new set of productive services that were previously unavailable to the firm (Penrose, 1959). This systematic occurrence of learning at a resource-based level contributes to learning at the organizational level (Spender, 1992). Through this learning, the firm's capabilities change to adapt to dynamic market conditions. Firms also use learning to reconfigure current resources into co-specialized assets, which can be applied to main and related markets (Teece, 1986).

Development of concepts and research hypotheses

Figure 1 presents the conceptual framework of mediation and moderation of smallholder business performance of the deciduous fruit subsector in South Africa.

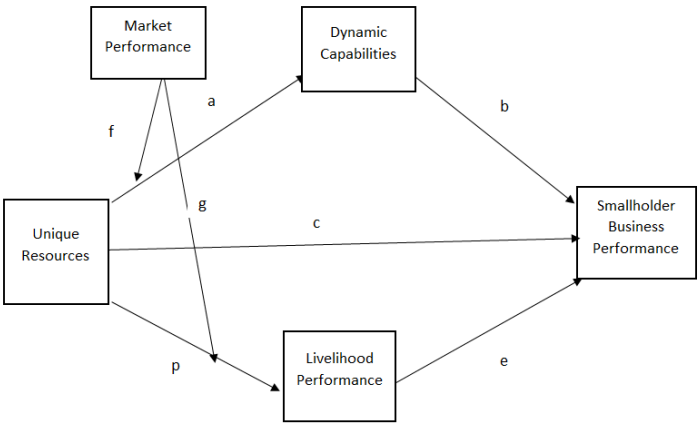

Figure 1: Conceptual framework for mediation and moderation of small-holder business performance of the deciduous fruit sector in South Africa

The different concepts depicted in Figure 1 above are briefly discussed below. Smallholder Business Performance is an indicator of how smallholder farmers' businesses perform. Although often treated as a homogeneous group, smallholder farmers are endowed with different bundles of resources, which have the potential to improve business performance, if deployed appropriately (Olthaar et al., 2019). It is also important to note that for resources to be

effective, they need to be enhanced, and this may be done, for example, through investing labor resources to enhance soil quality or by investing financial resources in a wagon to take produce to the market (Chambers and Conway, 1991).

A livelihood is considered a means of gaining a living and includes sufficient food and income to meet basic needs. It consists of the competencies, resources, and activities essential for making a living (Chambers and Conway, 1991). Livelihood Performance thus indicates how farmers perform in terms of their standards of living, taking into consideration the Unique Resources at their disposal.

Dynamic Capabilities, on the other hand, are considered as providing a process for incorporating, re-allocating, obtaining, and abandoning resources to address changes in market conditions (Eisenhardt and Martin, 2000). Due to the characteristics of unique resources, dynamic capacities can effectively extract competitive combinations from them (unique resources) to improve smallholder business performance (Lin and Wu, 2014).

Export-orientated farmers, such as smallholder deciduous fruit farmers integrated in high value chains through strategic partnerships, operate in a competitive business environment where all farmers, regardless of farm size or resource endowment, compete for shelf space in global markets. They also have to deal with uncertainties regarding climatic conditions, which may affect yields, quality, and prices fetched. These factors, including the dynamic market environment, affect farmers' performance in the market, which is referred to herein as 'Market Performance.'

Based on the conceptual framework in Figure 1 above, the study formulated the following specific hypotheses:

H_1: Unique Resources has a significant influence on the Smallholder Business Performance

H2: Unique Resources has a significant influence on living standard performance

H3: Living wage performance has a significant influence on small business performance

H4: Unique resources have a significant influence on dynamic capacities

H_5: Dynamic Capabilities has a significant influence on Smallholder Business Performance

H6: Market performance has a significant moderation effect on unique resources and dynamic capabilities

H7: Market performance has a significant moderation effect on unique resources and income performance.

Research Methodology

Study Area

This study was carried out in the Western Cape, Eastern Cape, and Northern Cape provinces of South Africa. These provinces were chosen because they are the three main deciduous fruit producing regions in South Africa, with the Western Cape representing 74% of the total area planted with deciduous fruits. This is followed by the eastern Cape and Northern Cape provinces at 15% and 8%, respectively. The map of the study area is presented in Figure 2 below.

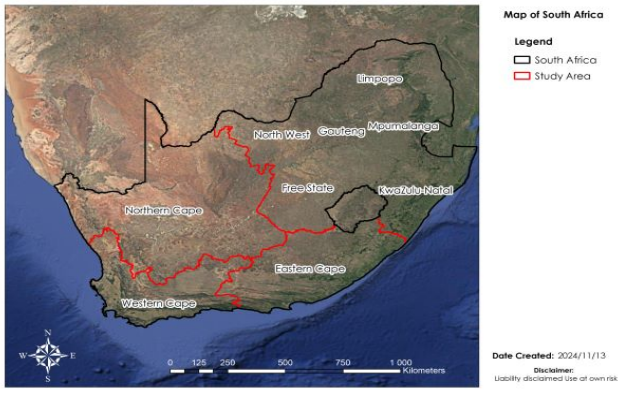

Figure 2: Map of the study area in South Africa

Research design

This study followed quantitative research design. This research design allowed the researchers to study relationships between variables in terms of how they influence each other, the nature of their influence, i.e. whether direct, indirect, or conditional, and whether variables play a mediating or moderating role in influencing certain variables.

Sampling and sampling technique

A sample of 125 smallholder deciduous fruit farming enterprises was taken using purposive sampling. This sampling technique included all small-scale deciduous fruit producers in the study area who were available during the data collection period and were willing to participate in the study.

Data collection

Primary data was collected from small-holder deciduous fruit producers using a structured questionnaire. The questionnaire predominantly used Likert scales to measure the variables of interest, as indicated in Table 1.

Data Analysis

This study used Andrew Hayes process macro model 7 to examine how an independent variable (X) affects a dependent variable (Y) through an intermediary variable, known as the mediator (M). The Andrew Hayes process macro supports a variety of models, allowing researchers to explore direct, indirect, and conditional effects within their data. Table 1 below presents the variables that were used to model the influence and effects of mediation on small business performance.

Table 1: Variable list, description, and measurements

Items	Variables	Abbreviations	Description	Measurements
Dependent variable (DV)				
1	Y	SmaBP	Smallholder Business Performance	Composite
Independent Variables (IDVs)				
2	X1	UnR	Unique Resources	Scale
3	X2	DyC	Dynamic Capabilities	Scale
4	X3	LiveP	Livelihood Performance	Scale
5	X4	MarkP	Market Performance	Scale

Notes: Five-point Likert scale:1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree

Model specification

$$YSmaBP1 = \beta 01i + \beta 1iUnR + ei \quad (1)$$

$$Y_{SmaBP2} = \beta_{02i} + \beta_{21}UnR + \beta_{23}DyC + e_{2i} \quad (2)$$

$$Y_{SmaBP3} = \beta_{03i} + \beta_{31}UnR + \beta_{32}LiveP + e_{3i} \quad (3)$$

Where:

$Y_{SmaBP} =$ Dependent variable

$\beta_{0i....} \beta_k =$ Constant

$\beta_{1i.....} \beta_k =$ Co-efficient of the regression

$e_{1i.....} e_k =$ Error term

$_{UnR, DyC, LiveP}$ = Independent variables

Before running the mediation analysis, the authors checked if the data met the assumptions of linearity, normality, no multi-collinearity and no heteroskedasticity as required in a mediation analysis. After confirming the suitability of data for mediation analysis, the authors ran the analysis in SPSS. Further to the mediation analysis, a moderation analysis was performed using the Johnson-Neyman's test. The Johnson-Neyman test established whether the association between the Independent Variable (IV) and the Dependent Variable (DV) varied at different levels of the moderator (W). This test identified areas in the range of the moderator variable where the effect of the focal predictor

on the outcome is statistically significant and not significant. The result generated from the analysis is presented in Section 5 below.

Results

Effect of Unique Resources (UnR), Dynamic Capabilities (DyC), and Livelihood Performance (LiveP) on Smallholder Business Performance (SmaBP)

The results in Table 2 below show that UnR has no direct, significant effect on smallholder business performance (β = -0.034, t (2) = -0.565, p = 0.565). Hypothesis 1 is supported. On the other hand, DyC has a direct and positive significant effect on smallholder business performance (β = 0.166, t (2) = 2.235, p = 0.027). This result is in support of Hypothesis 5. In contrast, LiveP has a negative and significant effect on smallholder business performance (β = -0.143, t (2) = -2.976, p = 0.004). Therefore, Hypothesis 3 is not supported in this regard. These results imply that a unit increase in dynamic capabilities will eventually lead to an increase in small-holder business performance, while a unit increase in livelihood performance could lead to a decrease in the small-holder business performance, when other variables are held constant.

Table 2: Results of the effect of Unique Resources (UnR), Dynamic Capabilities (DyC), and Livelihood Performance (LiveP) on Smallholder Business Performance (SmaBP).

Model	Coeff	SE	T	P-value
UnR	-0.034	0.059	-0.565	0.565
DyC	0.166	0.074	2.235	0.027
LiveP	-0.143	0.049	-2.976	0.004
Constant	3.369	0.247	13.603	0.000

Notes: R^2 = 0.087, MSE = 02778, ** p < 0.01 and *** p < 0.05

Source: Survey, 2020

The results in Figure 2 below show that unique resources have a positive and significant influence on both mediators (dynamic capabilities and livelihood performance). Based on these results, hypotheses 2 and 4 are accepted. However, it is the dynamic capabilities that then positively and significantly influence the small-holder business performance.

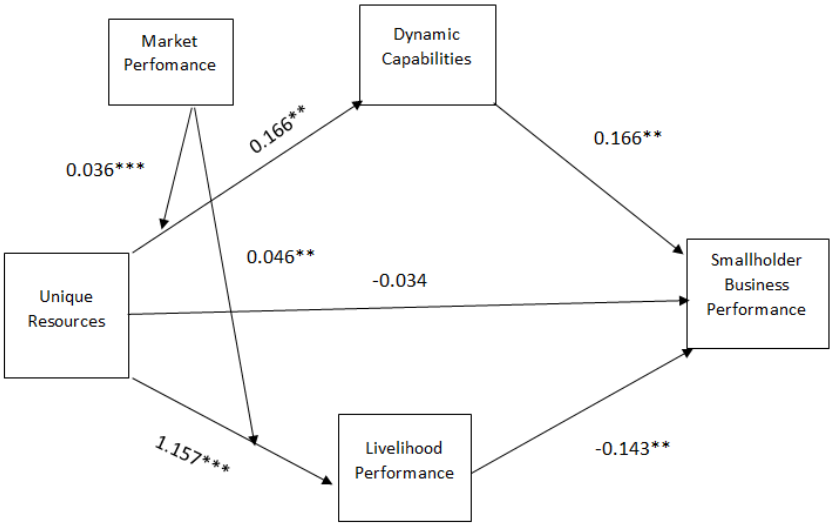

Figure 2: Estimated framework for the mediation and moderation of smallholder business performance of the deciduous fruit subsector in South Africa

Mediation effect of dynamic capabilities (DyC) on smallholder business performance (SmaBP)

Table 3 below shows that the mediation role those dynamic capabilities play on smallholder business performance (SmaBP) is significant, at all levels.

Table 3: Conditional effects of UnR on DyC at values of the moderator(s)

MarkP	Effect	se	t	p	LLCI	ULCI
2,107	,578	,0915	6,319	,000	,397	,759
2,984	,430	,0615	7,008	,000	,309	,552
3,860	,283	,0766	3,699	,000	,132	,435

Source: Survey, 2020

Mediation effect of Livelihood Performance (LiveP) on Smallholder Business Performance (SmaBP)

Table 4 below shows that the mediation role that Livelihood Performance (LiveP) plays on the Smallholder Business Performance (SmaBP) is significant, only on the lower and average levels. At the level above the average, the mediation is not significant. Hypothesis 7 is therefore accepted (partially).

Table 4: Conditional effects of UnR on LiveP at values of moderator(s)

MarkP	Effect	se	t	p	LLCI	ULCI
2,108	,600	,138	4,338	,000	,326	,874
2,984	,369	,093	3,968	,000	,185	,553
3,860	,138	,116	1,187	,237	-,0918	,367

Source: Survey, 2020

Moderation effect of Market Performance (MarP) on Dynamic Capabilities

The results show that Market Performance significantly moderates the relationship between Unique Resources and Dynamic Capabilities in the smallholder deciduous fruit sector ($\beta = 0.705$, $t(2) = 2.787$, $p = 0.006$). Furthermore, the results show that there is a higher conditional effect between the variables ($\beta = 0.036$, $F(1.22) = 6.499$, $p = 0.000$). The effect of the Market Performance is felt in all the ranges (i.e., at levels below the average, average, and above average). The Johnson-Neyman test highlights the fact that the moderation effects of market performance stop at the value of 3.800, p = 0,174 (see Table 5 below). Thus, Hypothesis 6 is accepted.

Moderation effect of market performance (MarP) on livelihood performance

The results showed that there is a positive, moderated effect of Market Performance ($\beta = 0.046$, $F(1, 122) = 7.003$, $p = 0.000$). This implies that Market Performance facilitates the increase of the Livelihood Performance of the smallholder deciduous fruit sector (see Figure 2 above). The study therefore accepts Hypothesis 7.

Table 5: Conditional effect of focal predictor at values of the moderator

MarkP	Effect	se	t	p	LLCI	ULCI
1,000	,893	,233	3,830	,000	,431	1,354
1,200	,840	,215	3,910	,000	,415	1,265
1,400	,787	,197	3,996	,000	,397	1,177
1,600	,734	,180	4,090	,000	,379	1,090
1,800	,681	,163	4,189	,000	,359	1,003
2,000	,629	,147	4,288	,000	,338	,919
2,200	,576	,132	4,376	,000	,315	,836
2,400	,523	,118	4,430	,000	,289	,757
2,600	,470	,107	4,412	,000	,259	,681

2,800	,417	,098	4,265	,000	,223	,611
3,000	,365	,093	3,934	,000	,181	,548
3,200	,312	,092	3,403	,001	,130	,493
3,400	,259	,095	2,730	,007	,071	,447
3,600	,206	,102	2,022	,045	,004	,408
3,612	,203	,103	1,980	,050	,000	,406
3,800	,154	,112	1,367	,174	-,069	,376
4,000	,100	,125	,806	,422	-,147	,348
4,200	,048	,139	,344	,732	-,228	,324
4,400	-,005	,155	-,032	,975	-,311	,302
4,600	-,058	,171	-,337	,737	-,397	,281
4,800	-,111	,189	-,586	,559	-,484	,263
5,000	-,163	,206	-,792	,430	-,571	,245

Source: Survey, 2020

Based on the findings, this study accepts the hypothesis that dynamic capabilities mediate the positive effect of unique resources to improve smallholder business performance. These findings are in line with the findings of Lin and Wu (2014) and Rehman et al. (2023) on the mediating role of dynamic capabilities on business performance. Based on the non-significance of the mediation effect at a level above the average, this study partially accepts the hypothesis that livelihood performance mediates the positive effect of unique resources on smallholder business performance.

Conclusions and recommendations

As hypothesized, unique resources and dynamic capabilities moderated by market performance improved the business performance of small-holder deciduous fruit farming enterprises. Although these resources contribute to the performance of smallholder business, it is important to note that the dynamic capabilities of smallholder deciduous fruit producers are dynamic learning capabilities and were applied only to the production function, rather than the marketing function, as the marketing function is the sole responsibility of strategic partners.

This study recommends that if smallholder producers wish to grow as entrepreneurs, so they can sustain their deciduous fruit farming enterprises, they should consider marketing arrangements outside of strategic partnerships, as these do not contribute to the development of resources that are necessary to sustain income growth in high value chains.

Implications of the Findings

Implications for Managers of Smallholder Deciduous Fruit Farming Enterprises

Managers of small-scale deciduous fruit farming enterprises should build relationships with their customers (markets) so that they can learn from them. These relationships will enable the parties to exchange information on market trends, new fruit varieties, technologies, sustainable production practices, and new market requirements. They should also build relationships with their suppliers (production inputs) along the deciduous fruit value chain to take advantage of opportunities to experiment with new varieties, production inputs, testing of new technologies, etc. This will help smallholder deciduous fruit enterprises to continue producing products that meet customer demand in markets.

Implications for Policy Makers in South Africa

Support should be provided to ensure that small-holder producers comply with the food safety and quality requirements of alternative markets. For smallholder deciduous fruit producers to continue learning and to benefit from it, their learning should not be limited to the internal environment as is currently the case but should be extended to the external environment. Capacitation of farmers with alternative marketing channels and their needs is important in this regard. This capacity building should also include the exposure of small farmers in terms of how these markets operate, as this will also contribute to their learning.

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