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Factors influencing smallholder farmers' participation in collective marketing: micro-level evidence from Ehlanzeni, South Africa

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Engaging in markets is a critical step for smallholder farmers seeking to alleviate poverty, sustain their livelihoods, and contribute to local economic development. Collective market efforts is one of the promising pathways for transitioning smallholder farmers from no-profit market participants to successful market participants. Hence, this study was conducted to determine the market participation profile of smallholder farmers, examine their perception towards collective marketing, investigate the socio-economic factors influencing participation, and determine the constraints hindering engagements in collective market efforts among smallholder farmers in Ehlanzeni, South Africa. The researcher used a two-stage sampling procedure to sample a total of 300 smallholder farmers from Ehlanzeni district. Descriptive statistics, binary logistic and probit regression models were used to analyze the elicited data. The results showed that farming experience, farmer group membership, land ownership, frequency of extension officer visits, and selling diverse farm produce significantly influenced farmers' participation in collective marketing. The results further indicate that constraints such as lack of proper storage facilities, lack of marketing information, and inability to cope with other farmers significantly influence participation in collective market initiatives. The study recommends improved and clear information sharing from advisory services on collective marketing and frequent functionality checks for smallholder farmers in collective action through proceedings of farmers' day meetings and farmers' market days, coupled with financial and postharvest storage facilities support, to scale up their participation for better income and livelihoods.

KEYWORDS

collective action, smallholder farmers, market participation, logit model, South Africa

1 Introduction

Globally, the reduction of poverty and improvement of household food security among rural dwellers, the majority of whom are dependent on agriculture, are critical objectives within the framework of the Sustainable Development Goals (SDGs) (Olorunfemi et al., 2020). Agriculture is one of the most significant sectors worldwide, providing livelihoods for more than one-third of the global population (Food and Agriculture Organization of the United Nations, 2020). There are about 570 million farms worldwide, of which the majority are smallholder farms located in less economically privileged areas (Fanzo, 2017). Food and Agriculture Organization of the United Nations (2020) indicated that most farmers own at least 10 ha or less of land, and the land is often communal, which is advantageous in infrastructure costs. According to Jin et al. (2021) and Louhichi et al. (2020), the majority of

these farmers are located in remote rural areas and are primarily engaged in producing and marketing crop products, with only a small number involved in livestock (Jin et al., 2021). This highlights the important contribution this group of farmers makes to the local, national, and global economy.

However, due to a lack of support and exposure, smallholder farmers' face many challenges, most of which are related to increased marketing costs, inadequate market access, and participation (Kamara et al., 2019). According to Nwafor (2021), this is a situation that almost all smallholder farmers are exposed to in the rural areas of developing countries such as South Africa. Smallholder farmers lack knowledge and support with regard to marketing and marketing strategies (Ndlovu and Masuku, 2021). According to Magakwe and Olorunfemi (2024), about 40% of smallholder farmers are able to market and commercialise their farm produce, and the remaining 60% still struggle to make a good living out of their production. As such, many smallholder farmers have been discouraged and are losing interest in trying to break-through in the high market industry and growing their market niche (Hlatshwayo et al., 2021).

Several researchers, such as Gyau et al. (2016), Fischer and Qaim (2014), and Sinyolo and Mudhara (2018), have pointed out the importance of collective marketing in ameliorating smallholder farmers' marketing challenges in South Africa. This initiative has been touted to increase market participation among smallholder farmers in South Africa (Sinyolo and Mudhara, 2018). Khadse and Rosset (2019) stated that in India, most of the smallholder farmers who made it into the high-value market are using the collective marketing strategy. Furthermore, Methamontri et al. (2022) pointed out that collective marketing is a good strategy for smallholder farmers to leverage because it encourages support among farmers. Working together as a group is an advantage because it allows more ideas and strategies for tackling situations that seem impossible, such as approaching and securing more profitable markets. However, the Theory of Collective Action by Olson (1965), cited by Sandler (2015), stated that even if individuals can have the same interest in a specific niche, they may not successfully act on it as a collective due to others benefiting from the group without contributing the required effort. As such, little success has been recorded in cooperatives; hence, the study investigated the factors influencing smallholder farmers' participation in collective marketing.

Mpumalanga is one of the highest agricultural producing provinces in South Africa; however, as stated by Maponya et al. (2015), smallholder farmers in the Ehlanzeni district municipality are still struggling to break through in marketing their produce (Maponya et al., 2015). In addition, as opined by Hlatshwayo et al. (2021), this province is also one of the highest food-insecure provinces in the country; thus, demonstrating that many rural households, particularly smallholder farmers, are not benefitting much economically from their farming activities. Furthermore, as highlighted by Sinyolo and Mudhara (2018), despite the potential of collective marketing, the participation of smallholder farmers in it and its ultimate success depend on several factors, most of which are influenced by location-specific conditions. Thus, it is important that empirical research be carried out in different locations.

Ultimately, upon a critical review of literature, while some published research studies have focused on smallholder farmers' market participation and collective action in South Africa (Maponya, 2022; Mashaya, 2021; Sinyolo and Mudhara, 2018; Sehar, 2018), these studies have not focused specifically on the theme of factors

determining collective marketing participation among smallholder farmers. For instance, Mashaya (2021) investigated the factors influencing smallholder farmers' market participation in parts of Kwa Zulu-Natal, South Africa, focusing on smallholder participation generally as individuals in crop and livestock marketing. Sehar (2018) also examined factors influencing market access and livestock marketing inefficiency in Mpumalanga, South Africa. At the same time, Sinyolo and Mudhara (2018) focused on the impact of collective action on rural poverty reduction in KwaZulu-Natal, South Africa. Furthermore, Maponya (2022) studied factors affecting marketing participation among smallholder farmers in the Ehlanzeni district, South Africa. However, the study focused on individual marketing strategy and not on their participation in or use of collective marketing. A closely related study found in the literature was conducted by Kiprop et al. (2020) on the factors influencing smallholder farmers' participation in collective marketing. The study specifically focused on the marketing of indigenous chickens and was carried out in Kenya. Hence, to the knowledge of the researcher, there was limited study on factors that affect smallholder farmers' participation, specifically in collective marketing strategy in South Africa generally and specifically in the Mpumalanga province. Hence, the study was carried out in the Ehlanzeni region to investigate the factors influencing smallholder farmers' participation with a specific focus on their participation in collective marketing strategy.

The study specifically looked into: (i) the market participation profiles of smallholder farmers, (ii) smallholder farmers' perception towards collective market participation, (iii) the determinants of collective market participation among smallholder farmers, and (iv) the constraints to collective market participation among smallholder farmers. The study aims to help improve the income and alleviate the poverty of smallholder farmers. The study also focused on providing new and improved information in the study field and supremely enlightening the farmers on the collective action concept. Through the study's findings, extension officers and policymakers can find solutions on how they can help smallholder farmers successfully work together as a group.

2 Literature review

South Africa is an African country regarded as underdeveloped, among other countries, and it is experiencing high percentages (above 30%) of unemployment and poverty (Pasara and Garidzirai, 2020). As postulated by Hlatshwayo et al. (2021), agriculture is one of the economic activities that most South Africans are partaking in, especially in the rural areas where there is a lack of resources and service delivery. This notion is further reinforced by Louhichi et al. (2020) and Thamaga-Chitja and Morojele (2014), who in their studies opined that smallholder farming is a major role player in rural areas for poverty reduction, food security, and job creation, as 70% of households are dependent on it. However, the lack of resources, improved technologies, and adequate knowledge has resulted in poor production input, output, and market participation. Also, Mkhuhlane et al. (2020) indicated that most smallholder farmers own about 5 ha or less of land, and only a few have up to 10 ha of farmland. Most farmers who rear livestock still use their yards to keep the livestock, which indicates that they do not have a large amount of livestock.

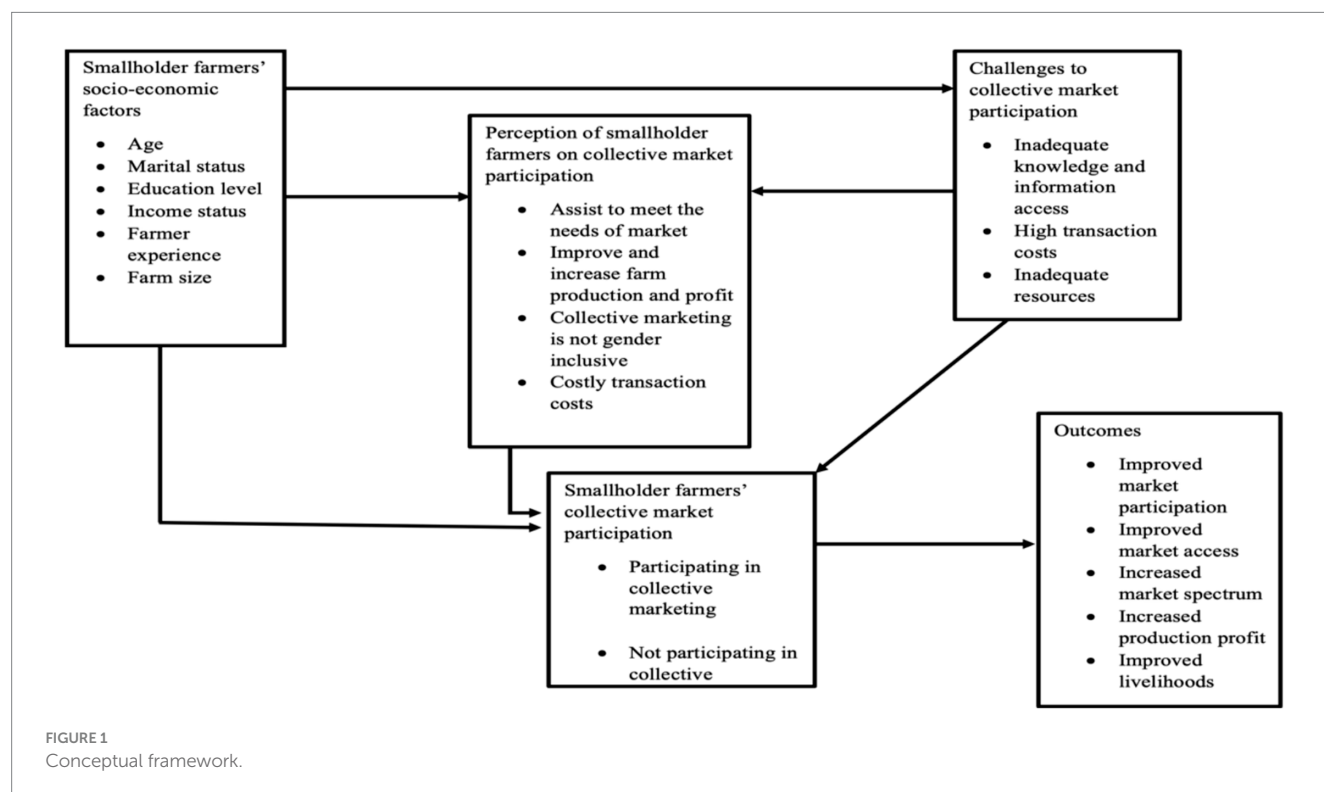
Smallholder farmers in South Africa receive little attention from official institutions such as agricultural extension, which results in

farmers lacking adequate knowledge on how to improve their production and participate in the market (Baiyegunhi et al., 2019). As reported by Mpandeli and Maponya (2014), smallholder farmers in South Africa are facing challenges that have been ongoing, and those include high transaction costs, which affect the production input quantity, access and participation in the market, and shortage of resources. The situation faced by the farmers forces them to engage in other income-generating activities which will boost their livelihood, however with the growing population and high unemployment rate in the country the situation does not get any better (Akrong et al., 2021). In addition, the majority of smallholder farmers are still farming independently and working on winning the competition among each other; hence, they are unable to assist or uplift each other, derailing development (Ogundeji, 2022). The lack of information transfer causes them to have little knowledge about strategies such as collective action and the inability to actively take part in the market, hence the lack of a plan on how they are going to sell the produce, leading to the rush to sell immediately after harvest (Mango et al., 2014). The lack of support from each other and official institutions forces the farmers to engage in labour-intensive practices, relying mostly on their families to perform the field activities, and they are still dependent on the traditional ways of farming, backed by a lack of proper resources and modern farming practices (Pienaar and Traub, 2015).

The rapid growth in population influences high demand for food in the market, and for that, it is seen as an advantageous move for smallholder farmers to work together to produce and deliver food to the market (Abdul-Rahaman and Abdulai, 2020). Some smallholder farmers view that participating in the market as a collective will bring a turnaround in production as they may be able to generate more income and more profit thereafter. For instance, Fischer and Qaim (2014) reported that smallholder farmers have indicated that selling produce

through a group generated more sales than selling individually, and it also gave them exposure to the market as they bring a large quantity of what the market needs. Similarly, Ismail (2021) observed that smallholder farmers think that collective action and marketing will help them secure high-value market customers, thus giving them a chance to compete with commercial farmers and be recognized. However, Amare et al. (2019) reported that some smallholder farmers opined that group marketing is for the farmers already doing well in their productions and not good for those still picking up because they are a step behind in the business. As such, the production classes of the farmers hinder them from becoming a solid collective. Nwafor and van der Westhuizen (2020) and Jebesa (2019) further indicated that most of the smallholder farmers lack knowledge about the market operations, which affects their exposure; hence, they encounter several challenges with market access.

A conceptual framework, as illustrated in Figure 1, was developed by synthesizing the reviewed literature and theories in alignment with the measured variables of the study. This framework includes both dependent and independent variables. The independent variables encompass the socio-economic characteristics of smallholder farmers, such as age, gender, marital status, education level, and income status, as well as farmers' perceptions and challenges related to collective marketing. The dependent variable is farmers' participation, or lack thereof, in collective marketing initiatives. The socio-economic factors of smallholder farmers are key determinants of their participation in collective marketing, as these factors significantly influence decision-making. However, certain constraints can obstruct the transition from initial decision-making to actual participation in collective marketing. Additionally, smallholder farmers' perceptions of collective marketing also affect their participation decisions. These perceptions are shaped by socio-economic factors and the challenges encountered in collective market participation. The socio-economic background of



the smallholder farmers influences their views on collective marketing initiatives, ultimately guiding their decision to engage or not in such efforts.

3 Materials and methods

3.1 Study area

The study was conducted in Ehlanzeni District Municipality (EDM) in Mpumalanga, South Africa. Ehlanzeni District Municipality is located between the borders of eastern Mozambique and southern Swaziland (Sidell and Mahlalela, n.d.). There are four local municipalities in Ehlanzeni, namely Mbombela, Nkomazi, Umjindi, and Thaba Chweu. According to Ehlanzeni District Municipality (2023), agriculture is the most common economic practice in the area; however, the poverty rate is also at its peak. Ehlanzeni is located in the Lowveld of Mpumalanga province and thus experiences high summer temperatures of 25 to 35°C and moderate winter temperatures, with 8°C being the lowest. The annual precipitation of the area is about 750 mm to 860 mm (O'Connor, 2015). Ehlanzeni is known for its vibrant and diverse farming operation, including but not limited to vegetable production, agronomic crops, fruits and citrus production, and livestock farming (Lubisi et al., 2021; Molefi et al., 2017). There are several rivers from which most smallholder farmers and livestock are able to get irrigation and drinking water.

3.2 Sampling procedure and sample size

Quantitative research approach utilizing descriptive survey research design was employed in the study. A two-staged sampling procedure was adopted in the sampling of smallholder farmers in the district. The first stage of sampling involved a purposive selection of two municipalities in the district with the highest number of registered smallholder farmers based on the information received from the Department of Agriculture, as indicated in Table 1. The selected municipalities were Mbombela and Nkomazi municipalities. According to the data obtained from the provincial Department of Agriculture, the total number of registered crop and livestock farmers was 1749 in Mbombela and 2,563 in Nkomazi. A second random sampling was done to sample participants from the selected municipalities. Using Slovin's formula, 661 smallholder farmers were expected participants. The formula helped to determine the appropriate sample to select at a 95% confidence level and 5% margin of error. However, having 661 participants was not feasible due

to time constraints and the unwillingness of some farmers to participate in the study. Thus, a random selection of 147 and 151 participants from Mbombela and Nkomazi municipalities, respectively, were eventually selected to participate in the study. Therefore, a sample size of 300 smallholder farmers, both in crop (vegetable and grain) and livestock, was selected to participate in this study- with details of the sampling process summarized in Table 1. Pre-testing of the questionnaire was administered to smallholder farmers of Umjindi municipality twice with 2 weeks interval.

3.3 Data collection and analysis

To collect data, a structured questionnaire was developed containing closed-ended questions. The questionnaire was designed in sections that aligned with the study objectives for accurate results. Two enumerators were trained to assist with the farmer interactions to gather data. Descriptive and inferential statistics were used to analyze the data, using the SPSS and STATA 14 software. Descriptively, the analysis utilized means, percentages, ranks, and frequencies. To ascertain the marketing profile of the smallholder farmers, SPSS version 28 software was used to descriptively analyze the data presented as frequency, percentages, and means. Furthermore, to examine the perception of smallholder farmers on collective market participation, a 5-point Likert type scale of strongly agree (5), agree (4), neutral (3), disagree (2), strongly disagree (1) was employed and the data analysed descriptively using percentages, mean scores and ranks. The mean score generated from the above-mentioned scale was used as a benchmark for the calculated mean score of the variables.

Moreover, the inferential statistics, utilizing binary logistics and probit regression model, were used to analyze factors that influence the participation of smallholder farmers in collective marketing. This model was proposed as suitable for binary measurement of the collective marketing participation variable, which was the dependent variable in the model. The binary regression model was used as it best suits the form of dichotomous variable measurement since the study focused on measuring smallholder farmers' participation against the socio-economic variables presented by either participating or not participating, as available responses. This variable was measured dichotomously by assigning 1 to respondents who are currently and willing to participate in collective marketing and 0 to those who state otherwise (Hsiao, 1996). Table 2 shows the socio-economic independent factors.

The binary logistic regression model in the form of the ratio of the natural logarithm of the probability of collective marketing participation

TABLE 1 Number of registered smallholder farmers in Ehlanzeni district.

Municipalities	Number of smallholder farmers	Appropriate sample size to select (based on Slovin formula)	Final sample size for the study (45.5% of appropriate due to time and resource constraints)
Nkomazi	2563*	335	152
Mbombela	1749*	326	148
Umjindi	1,618		
Thaba Chweu	844		
Total			300

* Selected municipalities. Source: DALRRD, 2022.

TABLE 2 Independent variables fitted into the logit regression model.

Dependent variables	Independent variables	Expected sign	Description
Smallholder farmers' participation or non-participation in collective marketing	Age	+	Measured in years (continuous)
	Gender	+/-	Variable coded as 1 = males and 2 = females
	Household size	+	Measured in persons (continuous)
	Formal education	+	Variable coded as 0 = NFE, 1 = ABET, 2 = primary, 3 = secondary, and 4 = tertiary
	Farm size	-	Measured in hectares
	Secondary occupation	-	Variable coded as 1 = Yes and 0 = No
	Member of a farmer group	+	Variable coded as 1 = Yes and 0 = No
	Farming experience	+	Measured in years (continuous)
	Marital status	-	Variable coded as 1 = single, 2 = married, 3 = widowed, and 4 = divorced
	Annual on-farm income	+	Measured in rands (continuous)
	Annual off-farm income	+	Measured in rands (continuous)
	Land ownership	-	Variable coded as 1 = Yes and 0 = No
	Frequency of extension visits	+	Variable coded as 0 = Not at all, 1 = occasionally, and 2 = regularly
	Frequency of selling farm produce in the market	+	Variable coded as 0 = Not at all, 1 = occasionally and 2 = regularly
	Marketing diverse farm produce in the market	-	Variable coded 1 = Yes and 0 = No

NFE, no formal education; ABET, adult basic education and training; regular extension visit, having fixed visitation dates on a regular bases; occasional extension visit, visiting without schedule on irregular bases.

to the probability of non-participation in collective marketing (i.e., log odd ratio), can therefore be stated as Gyau et al. (2016):

$$\ln\left(\frac{\alpha}{\alpha-1}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \mu \quad (1)$$

Where α is the condition probability of collective marketing participation, X_1, \dots, X_k is a vector of hypothesis explanatory variables such as respondents' age, gender, educational level, farm size, farming experience, and so on, β_0, \dots, β_k is a vector of unknown parameters to be estimated, and μ is a random error term.

Furthermore, inferential statistics using the probit regression model was employed to determine the influence of the constraint factors on the participation of collective marketing for smallholder farmers. The participation or not-participation of smallholder farmers in collective marketing was regressed against the encountered constraint factors (refer to Table 3). The model was utilized as it is also a standard established approach for estimating dichotomous natured dependent variable with an array of independent or explanatory variables. The probit model was employed in this study to explore an alternative approach to the logit model for analysing binary outcomes. This model uses a different link function to examine the relationship between the predictors and the probability of the outcome variable. By doing so, the study aims to present findings on the determinants of collective marketing participation among respondents that are not solely reliant on the assumptions of a single model, thereby enhancing the robustness of the findings. Equation 2 depicts the probit model as:

$$P(Y=1|X_1, X_2, \dots, X_k) = \Phi(\beta_0 + \beta_1 X_1 + \dots + \beta_k X_k) \quad (2)$$

Where: β is a vector of estimated coefficient, X is a vector of predictor variables, Φ is the cumulative distribution function (CDF) of the standard normal distribution, and $P(Y=1|X)$ is the probability of the binary outcome with Y ; representing the independent variable, being equal to 1 given that the predictor variable is X (Muthén, 1979).

3.4 Ethical consideration

This study adhered to the various ethical principles and considerations associated with the collection of data from human participants, such as voluntary participation, confidentiality of data, anonymity of respondents, ensuring informed consent before data collection, and not causing any harm to the research participants during the study. Ethical clearance and approval was obtained from the appropriate ethics committee at the University of Mpumalanga before data collection.

4 Results and discussion

4.1 Socio-economic characteristics of smallholder farmers

Table 4 presents the socio-economic characteristics of the smallholder farmers who participated in the study. Table 4 shows that

the study areas have more (52%) female smallholder farmers than males (41%). The results show the prominent contribution of female farmers to agricultural production in the area, as they are more available and active in smallholder farming than their male counterparts. This finding aligns with the results of Ogotu et al. (2020), who identified female farmers as a dominant force in the smallholder farming sector, while also highlighting their limited participation in key agricultural activities such as produce marketing. According to Black et al. (2019), women have the potential to work together, and therefore, there may not be issues if they form farmers' cooperatives. In addition, the results in Table 4 indicate that the majority (48%) of the farmers are in their senior years, aged from 61 years upwards, followed by 45% of farmers who were between 31 to 60 years of age, and only a minority (7%) who were between 30 years of age and above. The total mean age of 57.45 years obtained in the area indicates that the majority of the farmers are still within the range of being productive in the field. According to Kangile et al. (2020), individuals between the ages of 31 and 60 have the potential to work together using their experiences and goals as a drive. Osmani and Hossain (2015) reported that smallholder farmers between this age group (31–60) can be active market participants, and be able to study their market using different platforms so they can strategize their way into the market and deliver what the customer needs. Additionally, the results show that the farmers have been practicing farming for an average of 11.52 years, which is an indication that they are well-experienced and have accumulated sufficient knowledge and experience to successfully manage their farming operations. As stated by Andaregie et al. (2021), the knowledge and farming experience that farmers accumulate over time play a pivotal role in motivating them to pursue profit-increasing initiatives such as collective marketing. These initiatives not only improve their overall profitability but also help to generate much-needed revenue to grow and sustain their farming operations. As such, smallholders are likely to be part of cooperatives, which will expose them to potential markets and improve their marketing skills.

Moreover, the majority (88%) of farmers occupy 1 to 5 hectares of land, followed by 11% who occupy about 5.1 to 10 hectares of land, and only a few (1%) have land of more than 10 hectares. The mean for land occupied is 2.96 ha with a 2.02 standard deviation. With this space occupied by the farmers, Arinloye et al. (2015) opined that the only marketing route that successfully works is the farm-gate market. However, for smallholder farmers to access more diverse and profitable markets beyond the farm gate, collective marketing might be an initiative to explore in order to increase their income and livelihoods. About two-thirds (66%) of the smallholder farmers were not affiliated with any farmer group, while only a minority (34%) were part of a farmers' group. The results in Table 4 further reveal that the majority (46%) of the smallholder farmers generate about R31000 – R60000 annual on-farm income, followed by 33% of farmers who generate R30000 or less, and only a few (21%) farmers generate R60000 or more. The average annual on-farm income of R48526.76 in the surveyed area implies that farmers receive about R4000 a month from their sales, out of which they must pay expenses and have a monthly profit for household needs. Asfaw et al. (2017) opined that since most of the smallholder farmers in rural areas who solely depend on farming earn below average, they are unable to have a stable and well-balanced livelihood compared to those who have back-up plans. Such a situation becomes a disadvantage as it results in them not

TABLE 3 Independent variables fitted into the probit model and their description.

Dependent variable	Constraints Independent variables	Expected sign	Description
Smallholder farmers' participation or non-participation in collective marketing	Admin and management	+	Measured as a dummy variable 1 for severe, 0 if otherwise
	Inability to cope with group members	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Inability to work with other farmers	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Absence of structured groups	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Inadequate training	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Inadequate information	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Unavailable stakeholders	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Inadequate link	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Unfavourable policies	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Lack farmer loyalty	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Frequent conflicts among farmers	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Weak marketing arrangement	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Inadequate relevant information	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Inadequate grants	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Inadequate legal support	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Inadequate storage facilities	–	Measured as a dummy variable 1 for severe, 0 if otherwise
	Lack of marketing channels	–	Measured as a dummy variable 1 for severe, 0 if otherwise

TABLE 4 Socio-economic characteristics of smallholder farmers.

Characteristics	Frequency (%)	Mean (SD)
Gender		
Male	144 (48)	
Female	156 (52)	
Age (years)		
≤30	20 (7)	57.45 (15.19)
31–60	134 (45)	
>60	146 (48)	
Years of farming		
≤10	194 (65)	11.52 (10.742)
11–30	91 (30)	
>30	15 (5)	
Farm size (Ha)		
1–5	264 (88)	2.957 (2.0222)
5.1–10	35 (11)	
>10	1 (1)	
Average annual farm income (R)		
≤30,000	98 (33)	48526.76 (23509.82)
31,000–60,000	137 (46)	
≥60,000	65 (21)	
Member of farmer group		
Yes	101 (34)	1.34 (0.473)
No	199 (66)	

getting basic resources and not being knowledgeable due to social isolation. Lastly, the results reveal that many respondents were beneficiaries of the old-age social grant. The study results concur with the results by Adem and Tesafa (2020), who reported that farming alone does not sustain the livelihoods of rural farmers due to various challenges related to smallholder farming. Therefore, smallholders need to leverage market participation and diversify their means of income so that they can sustain their livelihoods in the presence of shocks and stressors.

4.2 Smallholder farmers' collective market participation profile

Figure 2 shows the collective market participation profile of smallholder farmers. From the presented results, more than two-thirds (64%) of the farmers indicated that they do not engage in any form of collective marketing, while 36% reported otherwise. These results align with the study by Nyasulu (2021), which reported that many smallholder farmers in the rural areas refrain from group activities due to a lack of adequate knowledge on how these activities should be conducted and difficulties in adhering to group rules, often stemming from the absence of a focused group goal. Limited market access and uncertainty about marketing channels further constrain smallholder farmers, causing them to concentrate primarily on farm gate sales as individual salespersons. Consequently, it becomes

impractical for them to engage in collective marketing when their customers are the ones approaching them (Fischer and Qaim, 2014). This is further reinforced by Gyau et al. (2014) who reported that the majority of smallholder farmers who manage to engage collectively in the market, most do so informally and indirectly. Some refer to recommending customers to other farmers when they have run out of a product as a collective practice. The results further indicate that a significant proportion (92%) of the farmers are willing to participate in collective marketing, while a minority (8%) have no desire to participate in collective marketing. These results are in agreement with the findings of Murugani and Thamaga-Chitja (2018), who in their empirical study observed that smallholder farmers aim to enhance their livelihoods through any means possible and are ready to acquire knowledge to accomplish this goal. However, a lack of extension intervention to provide relevant strategies and knowledge hinders their efforts, as 72% of the farmers have indicated that they have not received any advisory services from the extension officers. Also, a significant proportion (94%) of the smallholder farmers expressed confidence in their ability to collaborate with others to achieve marketing goals, while only a few (6%) disagreed. Gyau et al. (2014) opined that while smallholder farmers can work together to enhance their marketing efforts, it is vital to note that this category of farmers requires training in field management, financial management, and negotiation skills, among other areas. Conversely, Corsi et al. (2017) challenge these findings, noting that issues such as coordination and commitment among group members may impede group activities.

The results also indicate that a majority (66%) of respondents engage with the market, while 34% do not. These findings align with the results of Ngwako et al. (2021), who opined that most smallholder farmers are located in rural areas, where the homesteads are in close proximity to farms and a close contact with potential customers. Farmers can market their produce through word-of-mouth in their neighbourhoods, allowing customers to buy directly from the farm through farm gate sales. This is particularly easier for livestock farmers, as their livestock are often seen walking through the streets, making them easily marketable. However, Jebesa (2019) noted that smallholder farmers tend to engage only with the markets nearest to them and struggle to reach a wider market due to limited access and a lack of tools such as cell-phones and social media platforms. Consequently, the only market accessible to smallholder farmers is the local one, and as such, it becomes impractical for them to engage in collective marketing when their customers are the ones approaching them (Fischer and Qaim, 2014). More than two-thirds (65%) of the farmers indicated that they are able to produce enough yield to be part of a collective, while 35% said otherwise. The discussion by Ricciardi et al. (2018) concurs with these results, indicating that 70–80% of the world's food is produced by smallholder farmers. However, a study by Agholor et al. (2023) found that due to the limited space smallholder farmers occupied, they are unable to produce enough food, hence they are still unable to actively participate in the market and are experiencing high poverty levels in their livelihoods.

4.3 Smallholder farmers' perception of collective marketing

The results in Table 5 indicate that most of the smallholder farmers have a positive perception of collective marketing, as most

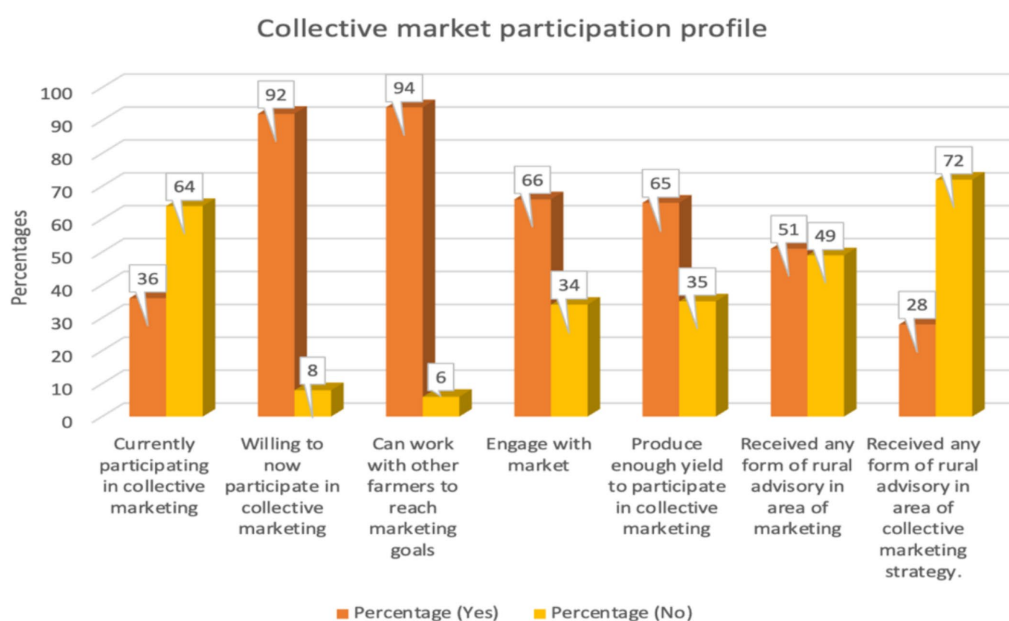


FIGURE 2
Distribution of the collective market participation profile of smallholder farmers.

TABLE 5 Smallholder farmers' perception towards collective marketing.

Perception of smallholder farmers on collective marketing	Mean	Rank
Improves farm income	4.52	2nd
Breaks market inequality	4.44	6th
Closes product demand gap	4.47	4th
Leverage on formal marketing participation	4.63	1st
Higher utility from farming activities	4.51	3rd
Engagement in contract farming	4.52	2nd
Reduction of transaction costs	4.36	8th
Increase smallholder farmers bargain power	4.46	5th
Facilitate access to information and capital	4.42	7th
No success due to lack of management and leadership	2.76	9th

aspects score above the mean benchmark. They perceive collective marketing as a strategy that would advocate for their participation in the formal market ($MS = 4.63$), as this variable is ranked first. The finding is supported by Hill et al. (2021) who reported that formal market often requires a large quantity of products that are supplied by registered businesses, which becomes a possibility for smallholder farmers' cooperatives to engage in. Ma et al. (2024) further reported that in practicing quality production through shared skills and knowledge, smallholder farmers stand to produce good-quality products that are going to attract formal markets. The results again indicate that the majority of the farmers believe collective marketing could assist in improving their farm income ($MS = 4.52$), ranking it the 2nd. These results align with the findings of Mango et al. (2017), who discovered that smallholder farmers' cooperatives are generating good profits in the market because they can supply larger markets and save on transactional costs. This is further reinforced by Zhu et al. (2022) who observed that the livelihoods of the farmers in China

engaged in collective marketing are improving more than those of farmers who still operate individually. In addition to enhancing production profits, smallholder farmers strongly believe that collective marketing can help reduce the transaction costs ($MS = 4.36$) and grant them a greater bargaining power ($MS = 4.46$) as collectives in the market. The findings by Magakwe and Olorunfemi (2024) support these results, showing that smallholder farmers may prefer collective marketing because it allows them to gain more than they would spend by leveraging the shared costs of the services. This is further reinforced by Meier zu Selhausen (2016), who postulated that collective marketing enables smallholder farmers to access local, national, and international markets, giving them the opportunity to negotiate their prices rather than accepting market-set prices, and thus increasing their bargaining power. Table 6 further reveals that smallholder farmers believe that collective marketing can assist them in securing contract farming ($MS = 4.42$). Government organizations and large event organizers often require significant supplies from suppliers and

TABLE 6 Marketing strategies utilized by smallholder farmers.

Marketing strategies	Frequency (%) [used]	Frequency (%) [not used]
Farm gate	284 (95)	16 (5)
Roadside	217 (72)	83 (28)
Vendor and hawkers	264 (88)	36 (12)
Door to door	179 (60)	121 (40)
Local supermarket	136 (45)	164 (55)
Large supermarket	28 (9)	272 (91)
Export market	1 (1)	299 (99)
Service providers	26 (9)	274 (91)
Processors and exporters	18 (4)	287 (96)
Arranged procurement	66 (22)	234 (78)

are looking to support local producers, who may struggle to supply individually (Tray et al., 2021). The results align with the discussion by Ochieng et al. (2018), who reported that registered farmer organizations are more easily recognized and approached by larger organizations for food supplies, especially as they provide fresh and organic produce. Thus, being part of a particular farmer group and meeting demand collectively may be essential for becoming contractors for these organizations (Ochieng et al., 2018).

Furthermore, the farmers agreed that marketing collectively can help level the accessibility field between the commercial and the smallholder farmers in the market ($MS = 4.44$) and close the product demand gap ($MS = 4.47$). Smallholder farmers' groups will not only advocate for their involvement in formal markets, but they will also help break the inequality in the supply of farmers, where commercial farmers are being given first preference. Smallholder farmers can potentially supply products of the same quality and quantity products (Büchner et al., 2020). Bisht et al. (2020) reported that smallholder farmers in the rural areas of India supply food to local schools through cooperatives, successfully catering to a large number of learners. This indicates that farmer groups can provide smallholder farmers with access to formal markets. Lastly, smallholder farmers believe that working collectively will facilitate access to information and capital ($MS = 4.42$). This agrees with a study by Nyawo and Olorunfemi (2023), who observed that cooperatives enable smallholder farmers to gather necessary resources by sharing information on where to obtain them or how to improve existing resources. Through cooperatives, smallholder farmers are also recognized by potential production funders, such as the government, which may offer incentives to help them execute their plans (Johnson and Shaw, 2014).

4.4 Marketing strategies used by smallholder farmers

Market access is very limited for smallholder farmers in many rural areas due to a lack of market planning, market information, and proper resources and infrastructure. Consequently, farmers are forced to choose market strategies that are convenient for them (Arinloye et al., 2015). Table 6 shows that the predominant marketing strategy is farm gate marketing, employed by 95% of the farmers,

while only a few (5%) farmers do not use it. These results align with the findings of Rafoneke et al. (2020), who reported that smallholder farmers prefer the farm gate strategy because it eliminates transportation costs and the struggle to find transport to deliver the goods to the market. However, Anthony et al. (2021) reported that smallholder farmers compromise their chances of maximizing profit with this method, as only a few customers can access the farms due to the distance between them and market-oriented areas. Competition is minimal with this strategy because customers tend to visit farms that are more easily accessible (Munzhelele et al., 2021). Albani (2023) noted that to some farmers, particularly livestock farmers, work together informally using this strategy, for example, if a farmer runs out of a needed product, they can direct the customers to other farmers who have it. However, Jjagwe et al. (2022) argue that the use of this strategy does not guarantee improved profits, as farmer-customer interaction is very limited. The results also show that a majority (60%) of the farmers use door-to-door marketing, a strategy where the farmers go around the area to market their products. Farmers preferred this strategy due to the proximity of their farms to households and their familiarity with the local community.

Supplying large supermarkets, service providers, and organizations with produce comes with a few requirements, including a registered farm business, high-quality and quantity products, and compliance with market terms. The results show that a significant proportion (91%) of the farmers do not market their produce to large supermarkets and service providers, and 74% do not market to arranged individuals or government-ordered procurements. The lack of participation in these strategies could be ascribed to insufficient information, knowledge and the farmers' remote location (Amer et al., 2018). Most smallholder farmers lack exposure to potential customers and lack access to information relevant to their service needs. According to Jjagwe et al. (2022), a lack of pricing knowledge results in underpayment for some farmers who can supply the large market. This suggests that individuals cannot overcome some of the challenges; instead, farmers must collaborate to exchange essential information and minimize transaction expenses. Due to a lack of resources, individual farmers may struggle to meet customers' quality and quantity requirements, but collective production and marketing can address this issue (Amer et al., 2018). Experience and negotiation skills are also crucial for securing customers in the formal market. Therefore, it is crucial for less experienced farmers to actively seek opportunities to collaborate with more experienced farmers. By doing so, farmers will gain essential information that can support them during price negotiations, enabling them to reach mutually beneficial agreement with buyers (Sigei et al., 2014).

Furthermore, the results show that 72 and 88% of the farmers market their produce at roadside stand and to vendors and hawkers, respectively. These findings align with those of Gyau et al. (2014), who indicated that smallholder farmers sell their produce to local traders at farm gate prices due to a lack of knowledge about pricing, leading to significant losses as local traders often reprice the products. The export market serves as a significant sales channel, presenting numerous requirements and demands that smallholder farmers may find overwhelming. Individual smallholder farmers, given the quantity they produce on their farms, often cannot meet the global market's demand for large supplies at once (Ochieng

et al., 2018). The results further indicate that a significant proportion (99%) of the farmers do not engage in export marketing, with only 1% doing so. The locations of smallholder farmers, characterized by inadequate infrastructure, lack of proper storage facilities, insufficient information on pricing, and limited transport options, restrict them from participating in markets such as exporting (Osmani and Hossain, 2015). The government can address some of these resource gaps, but to receive potential funding and resource support, smallholder farmers must form groups (Afanaseva et al., 2021).

4.5 Smallholder farmers' constraints to collective market participation

The results in Table 7 show that inadequate access to legal support from stakeholders (MS = 2.75) is the most challenging factor ranked at number 1 for smallholder farmers. The results align with the findings of Eidt et al. (2018), who indicated that this is a predominant issue in most rural areas, with evidence showing that extension officers, researchers, and policymakers are not properly executing their duties. Smallholder farmers become compromised in the market due to a lack of information on the proper procedures to secure legitimate markets, and they risk significant losses due to insufficient knowledge of market operations (Phiri et al., 2018). Having access to a storage facility allows farmers to participate in the market for a longer period with high-quality produce. However, the results reveal that smallholder farmers in the surveyed area are severely lacking access to storage facilities (MS = 2.73). This finding aligns with the study by Rabbi et al. (2019), which indicated that the lack of proper storage and infrastructure hinders smallholder farmers from being active participants in the market, as various environmental exposure

affects the quality of their produce. Consequently, smallholders are potentially limited from participating in collective marketing due to their products having a shorter shelf life (Rabbi et al., 2019). Access to a storage facility plays a significant role in enabling farmers to market their products while still in good condition, as they can be kept in a secure environment (Manandhar et al., 2018). This also allows them to explore value-added options to provide market varieties (Manandhar et al., 2018).

The results further indicate that the lack of knowledge and information regarding the benefits of collective marketing (MS = 2.63) has been identified as a very severe issue for the smallholder farmers. These findings corroborate the study by Okoli and Ezenwafor (2018), who reported that farmers' cooperatives struggle to develop because individuals lack knowledge about how to run groups in accordance with established principles and execute activities collectively. This is further emphasized by Gashaw and Kibret (2018) by highlighting that smallholder farmers are often situated in areas where valuable information does not reach. The author further highlights that many farmers are illiterate and unable to comprehend their situations or goals, remaining dependent on outdated practices that are incompatible with recent developments. Additionally, ranking at number 7, respondents reported experiencing a lack of marketing channels (MS = 2.56). The discussion by Arinloye et al. (2015) supports these results, indicating that smallholder farmers are primarily limited to word of mouth as their marketing channel. This reliance on informal channels often results in less bargaining power, as the customers tend to negotiate for lower prices. Khapayi and Celliers (2016) further stated that most of the smallholder farmers depend on their neighbours and those who purchase at the farm gate as their marketing agents. They are also unable to explore other channels due to the associated transaction costs and a lack of resources to facilitate marketing.

TABLE 7 Smallholder farmers' constraints to collective marketing.

Constraints	Mean	Rank
Collective action group admin and management problems	2.04	16th
Inability to cope with group membership and guidance	2.17	15th
Inability to work with and trust other farmers	2.26	13th
No properly structured farmer groups	2.25	14th
Inadequate training of farmers by rural advisors	2.58	6th
Inadequate knowledge and information on collective marketing benefits	2.62	5th
Unavailability of stakeholders to monitor farmers groups	2.49	8th
Inadequate linkage of existing collective action groups	2.44	10th
Unfavourable government policies and support	2.38	11th
Lack of proper loyalty, respect and support	2.28	12th
Frequent conflicts and lack of cooperation	2.26	13th
Weak marketing arrangements	2.48	9th
Inadequate access to relevant marketing information	2.63	4th
Inadequate access to grants and financial support	2.66	3rd
Inadequate access to legal support from regular stakeholders	2.75	1st
Inadequate access to post harvest storage facilities	2.73	2nd
Lack of marketing channels	2.56	7th

Mean score benchmark of 2 derived from severity scale of very severe = 3, moderate severe = 2 and not severe = 1.

TABLE 8 Marginal effect for binary logistics regression of smallholder farmers' socio-economic characteristics.

Variables	Co-efficient (dy/dx)	Std. Err.	Z	P > z
Location	−0.4542943 (−0.0816639)	0.0552117	−1.48	0.139
Gender	0.2858939 (0.0513923)	0.0522131	0.98	0.325
Age	−0.0167468 (−0.0030104)	0.0022026	−1.37	0.172
Marital status	0.0042256 (0.0007596)	0.0285679	0.03	0.979
Household size	−0.0821831 (−0.0147732)	0.0117107	−1.26	0.207
Formal education	−0.004587 (−0.0008246)	0.022674	−0.04	0.971
Secondary occupation	−0.0758172 (−0.013629)	0.0945615	−0.14	0.885
Farming experience	0.0370595 (0.0066618)	0.0027426	2.43	0.015**
Farm size	0.1182522 (0.021257)	0.0143825	1.48	0.139
Land ownership	−0.6174965 (−0.1110011)	0.0547216	−2.03	0.043**
Member of organization	0.9287955 (0.1669602)	0.0568792	2.94	0.005*
Average annual farm income	−3.22e−06 (−5.79e−07)	1.41e−06	−0.41	0.681
Average off-farm income	0.0000139 (2.50e−06)	1.81e−06	1.38	0.167
Extension visits	1.263562 (0.2271378)	0.0355266	6.39	0.000*
Frequency of product sales	0.2813685 (0.0505788)	0.0613912	0.82	0.410
Selling diverse farm produce	−1.325493 (−0.2382706)	0.0579328	−4.11	0.000*
Constant	0.0873369	1.319689	0.07	0.947
Observation number	300			
LR chi2 (16)	70.96			
Prob > chi2	0.0000			
Pseudo R2	0.1810			
Log likelihood	−160.54496			

* for $p \leq 0.01$, ** for $p \leq 0.05$ and *** for $p \leq 0.10$; dy/dx = marginal effects.

Furthermore, the results show that farmers are experiencing inadequate access to grants and financial support ($MS = 2.26$). This finding aligns with the study by [Sanka and Nkilijiwa \(2021\)](#), which reported that agricultural policies are structured to favour registered smallholder farmers' cooperatives. Due to the high number of smallholder farmers who are either informally part of organizations or not part of any at all, they are unable to apply for and receive grants or financial support from professional bodies. As stated by [Mersha and Ayenew \(2018\)](#), having access to financial support could help farmers establish a strong foundation for their businesses, empowering them to diversify beyond a single commodity. The inability to work with and trust other smallholder farmers in a group ($MS = 2.26$) was ranked 13th, indicating that it may hinder the performance of collective activities. This development can foster disrespect within the group and induce conflicts, which supports the results indicating that smallholder farmers consider conflict and lack of cooperation ($MS = 2.26$) to be severe issues in farmer groups. The results align with the discussion by [Sebhatu et al. \(2010\)](#), who argue that as groups grow and attract additional members, they tend to perform less effectively and lose social capital, leading to disinterest and distrust among committed members. This development can foster disrespect within the group and induce conflicts, which supports the results indicating that smallholder farmers consider conflict and lack of cooperation ($MS = 2.26$) to be severe issues in farmer groups. This is further reinforced by [Tadesse and Kassie \(2017\)](#) who noted that

smallholder farmers can also be socially influenced to mistrust their fellow farmers which may affect the success of their cooperative. Lastly, the results indicate that group administration and management are less challenging for smallholder farmers' participation in collective marketing ($MS = 2.04$), as they are ranked last. This finding aligns with the study by [Dejene and Getachew \(2015\)](#), which stated that management and administration are not considered problematic, as farmers are typically eager for growth and will learn to manage themselves towards the success of the group. However, [Onwuegbuchunam et al. \(2015\)](#) opined that governance and management remain challenges in farmers' cooperatives, often becoming a root cause of the group's decline and leading to increased competition. Mismanagement issues are likely to arise if members do not join the group willingly and with an adequate understanding of the group's goals. Such a lack of insight may result in the group members being less committed and failing to comply with the group's terms ([Kalogiannidis, 2020](#)).

The results in [Table 8](#), using average marginal effects, show that the farming experience (0.0066618) of smallholder farmers has a positive influence at $p \leq 0.05$ significance on the decision of smallholder farmers to participate in collective marketing in the study area. This implies that a unit increase in the farming experience of the smallholder farmers will likely lead to a 0.0066618 increase in their participation in collective marketing. Thus, as the farming experience of the farmers increases, so does the probability of their decision to participate in collective marketing. The results concur with the

findings of Ochieng et al. (2018), who indicated that smallholder farmers with successful farmer organizations are those who have been farming for years and have an adequate understanding of the state and the operation of the market in which they operate. These farmers recognize the strength of working together, and they ensure that they hold farmers' meetings at least monthly to provide updates and share new ideas (Shumeta and D'Haese, 2016). As these farmers have faced individual challenges for quite some time, they are able to listen to and empower each other to find strategies for addressing their difficulties.

It is indicated again from the results (Table 8) that land ownership has a negative influence (-0.1110011) on smallholder farmers' willingness to participate in collective marketing, at $p \leq 0.05$ significance. This implies that farmers who own or have title deeds for their farmland are 0.1110011 times less likely to participate in collective marketing when compared to their counterparts who do not own farmland. This is most likely because farmers who own their lands are not so much under pressure to cover rent-related costs and thus may be less motivated to explore more farm income-generating initiatives like collective marketing, as they have less cost to cater for as opposed to their counterparts who are renting or leasing their farmlands. Thus, smallholder farmers who have title deeds of their farming land are likely to be less interested in collective marketing as a strategy to improve their farm business compared to those who are renting. This finding aligns with the discussion by Bijman (2016), who found that land-renting farmers are the ones interested in exploring income-generating strategies to allow maximization of profit. Partaking in such innovations, they are able to cover rent and transaction costs while maintaining good profits. Unlike land owners, renting farmers are always proactive and provide full potential to strategic development activities such as collective marketing, increasing their chances of being recognized by production sponsors who would sponsor them with production inputs for improved yield and customers who would be interested in buying fresh and quality produce (Gramzow et al., 2018; Muraoka et al., 2018).

Membership in a farmer organization (0.1669602) has a positive influence on smallholder farmers' participation in collective marketing, at $p \leq 0.01$ significance. This implies that smallholder farmers who are members of farmer organizations are 0.1669602 more likely to participate in collective marketing than those who are not members. This is an indication that joining a farmers' group increases the likelihood of smallholder farmers' participation in collective marketing initiatives either within the group they currently are in or even in other groups that are solely established for collective marketing purposes. The results are supported by Kyaw et al. (2018), who indicated that one of the key mandates of organizations is collective action in all organizational activities. Being part of a farmer group motivates individuals to explore the market with the intention of finding strategies that best suit the growth of their businesses (Ombogoh et al., 2018). As stated by Kilelu et al. (2017), signing up for membership helps to build trust among individual members and allows them to act as a union, abiding by the terms of the organization. Ortega et al. (2019) further indicated that cooperatives have a higher chance of accessing inputs and resources, enabling them to participate in the market with fewer limitations. Smallholder farmer organizations also receive support from government and private bodies, which allows them to grow by building relationships and stakeholder

linkages that expose them to a much wider market spectrum (Blekking et al., 2021).

The results in Table 9 further reveal that the frequency of extension officers' visits (0.2271378) has a positive influence and a significant ($p \leq 0.01$) influence on smallholder farmers' participation in collective marketing. This implies that farmers who are frequently visited by extension officers are 0.2271378 more likely to participate in collective marketing than farmers with occasional or no extension visits. This is because extension visits focus on knowledge and information transfer, particularly since smallholder farmers in remote areas often struggle to access such resources due to limited availability and distance from the markets (Regasa-Megerssa et al., 2020). Therefore, through extension officers, farmers will be informed of collective marketing, its functioning, and associated benefits, thereby empowering them to engage in such initiatives. Kilelu et al. (2017) opined that extension visits provide smallholder farmers the opportunity to learn and connect with other stakeholders who can help them build and maintain their cooperatives. The knowledge and support farmers receive from extension officers enable them to be relevant and maintain product standards that meet market needs.

Furthermore, Table 8 shows that selling diverse farm produce (-0.2382706) significantly ($p \leq 0.01$) and negatively influences smallholder farmers' participation in collective marketing. This is most likely because collective marketing-related initiatives are usually more specific to a particular commodity or product to enhance the scale of the product available for marketing. Thus, smallholder farmers who are marketing uniform farm produce, such as vegetables or beef, are likely to participate in the market as collectives. These results align with the study by Regasa-Megerssa et al. (2020), which indicated that most of the smallholder farmers who are participating in the market are known for a specific commodity. Like any business, specializing in one farm commodity allows smallholder farmers to create their market profile and develop a consumer base that recognizes them for the commodity they offer. This specialization enables them to maintain consistent sales and generate profits (Haile et al., 2022). Additionally, smallholder farmers are more likely to engage in contract farming when they are recognized for specializing in a certain commodity, as this guarantees service delivery (Bellemare, 2015). This notion is further reinforced by Otegunrin et al. (2019), who opined that focusing on a single commodity allows smallholder farmers to learn about and understand their market, improving their offerings based on consumer needs. However, Xu et al. (2022) argued that having multiple products for the market to choose from increases the chances of the suppliers staying relevant and active in the market, as customers will engage more.

Moreover, the results in Table 9 show that smallholder farmers' inability to cope with other farmers in a group (-0.2093868) has a significant ($p \leq 0.10$) and negative influence on smallholder farmers' decision to participate in collective marketing. This implies that smallholder farmers who are struggling to cope when working with other farmers are 0.2093868 times less likely to participate in collective marketing when compared to those who can cope when working in groups. The results indicate that smallholder farmers are less likely to participate in collective marketing if they struggle to cope with their fellow group members. This finding aligns with the report by Ratner et al. (2017), which noted that collaborating with a diverse group can be complex due to a multitude of ideas and opinions, some of which may lead to disagreements and conflicts. Also, having inadequate training

TABLE 9 Marginal effect of the probit regression results of smallholder farmers' constraints to collective marketing.

Variables	Co-efficient (dy/dx)	Std. Err.	Z	P > z
Admin and management	−0.0928849 (−0.0317881)	0.1098282	−0.29	0.772
Inability to cope with group members	−0.6118294 (−0.2093868)	0.1155832	1.81	0.070***
Inability to work with other farmers	0.0586593 (0.020075)	0.1079545	0.19	0.852
Absence of structured groups	−0.1050152 (−0.0359394)	0.0555714	−0.65	0.518
Inadequate training	−0.3356954 (−0.1148853)	0.0581453	1.98	0.048**
Inadequate information	−0.26778 (−0.0916426)	0.0540381	−1.70	0.090***
Unavailable stakeholders	−0.01849 (−0.0063278)	0.0552131	−0.11	0.909
Inadequate link	0.4159236 (0.1423418)	0.1799965	0.79	0.429
Unfavourable policies	0.1659863 (0.0568056)	0.1611189	0.35	0.724
Lack farmer loyalty	−0.2088006 (−0.071458)	0.1394098	−0.51	0.608
Frequent conflicts among farmers	−0.0231821 (−0.0079336)	0.1473489	−0.05	0.957
Weak marketing arrangement	−0.2080152 (−0.0711892)	0.2702559	−0.26	0.792
Inadequate relevant information	0.0634425 (0.021712)	0.0551269	0.39	0.694
Inadequate grants	−0.2238534 (−0.0766095)	0.1890244	−0.41	0.685
Inadequate legal support	0.4919439 (0.1683583)	0.2570705	0.65	0.513
Inadequate storage facilities	−0.2746913 (−0.0940078)	0.0549181	1.71	0.013*
Lack of marketing channels	−0.3920947 (−0.1341869)	0.053764	−2.50	0.013*
Constant	−1.237992	0.4625239	−2.68	0.007
Observation number	300			
LR chi2 (17)	31.81			
Prob >chi 2	0.0159			
Pseudo R2	0.0811			
Log likelihood	−180.11919			

* for $p \leq 0.01$, ** for $p \leq 0.05$, *** for $p \leq 0.10$; dy/dx = marginal effects.

(0.1148853) has a negative and significant ($p \leq 0.05$) influence on smallholder farmers' collective market participation. This implies that the reception of inadequate training by smallholder farmers will likely lead to a 0.1148853 decrease in their participation in collective marketing. The results indicate that the less training smallholder farmers receive, the less likely they are to participate in collective marketing. This result corroborates the work of [Ochieng et al. \(2018\)](#), who noted that a lack of knowledge and training hinders smallholder farmers from reaching their full business potential and affects their decision-making capabilities. Although [Maina \(2014\)](#) reported that smallholder farmers can succeed through passion and commitment, [Kazeem et al. \(2017\)](#) and [Olorunfemi et al. \(2020\)](#) emphasize that they need support and training to make informed decisions, especially regarding new strategies and technologies.

The results in [Table 9](#) further indicate that inadequate storage facilities (−0.0940078) has a negative and significance influence ($p \leq 0.10$) on smallholder farmers' participation in collective marketing. This implies that having inadequate storage facilities will likely lead to a 0.0940078 decrease in their participation in collective marketing. This indicates that smallholder farmers' participation in collective marketing suffers due to a lack of storage facilities. Having storage facilities increases the chances of supplying fresh produce for a longer period, even after harvesting, which is not a reality for the majority of smallholder farmers ([Rafoneke et al., 2020](#)). [Ratner et al. \(2017\)](#) indicate that smallholder farmers lack consistency in market participation because their

products do not have a long shelf life, as they are exposed to uncontrolled temperatures. Moreover, the marginal effect of inadequate information (−0.0916426) has a significant ($p \leq 0.10$) and negative influence on smallholder farmers' participation in collective marketing. This indicates that smallholder farmers with inadequate information about collective action initiatives and the benefits that it offers are 0.0916426 less likely to participate in collective marketing when compared to those with adequate information about the initiative. The results agree with the work of [Phiri et al. \(2018\)](#), who reported that, due to a lack of information on production practices and marketing strategies, smallholder farmers struggle to generate income from their yields. As stated by [Adeoti et al. \(2014\)](#), insufficient information about collective marketing and its benefits hinders farmers' growth and their ability to connect with potential customers ([Adeoti et al., 2014](#)). Therefore, extension officers need to ensure that smallholder farmers are well informed about collective marketing, enabling them to utilize it effectively to enhance the promotion and marketing of their products.

5 Conclusion and recommendations

An active participation from 300 smallholder farmers producing either crop and/or livestock commodities was achieved

in Mbombela and Nkomazi Local Municipalities. The study concluded that although the smallholder farmers have a positive perception about the potential of collective marketing initiatives in improving their market access, income, and livelihood, their participation in collective marketing is still very low, with only 34% of the farmers indicating their current participation in collective marketing. Most of the smallholder farmers still market their farm produce at the farm gate and local markets, which gives them less value and income for their produce. Significant socio-economic determinants of smallholder collective marketing participation were farming experience, land ownership, membership of a farmer organization, frequency of extension visits, and sales of diverse farm produce. Socio-economic characteristics such as age, household size, and education level, to name a few, do not have a significant influence on the decision to participate in collective marketing. Furthermore, significant constraint factors influencing farmers' participation in collective marketing were inability to cope with group members, inadequate training from extension officers, inadequate storage facilities, inadequate information on the benefits of collective marketing strategies, and lack of marketing channel access. Lack of exposure to relevant stakeholders and information appears to be impeding farmers' ability to fully utilize their collective marketing potential, which explains the low participation rate. However, smallholder farmers have shown interest in collective marketing participation and willingness to learn more about it before engaging in it.

As indicated by smallholder farmers, the government, in partnership with rural development organizations, should enhance the visibility and accessibility of rural advisory services (RAS), particularly educational programmes aimed at promoting collective market participation. Strengthening the visibility and accessibility of RAS will help ensure that farmers are well informed about the key benefits of collective marketing as well as the critical factors that contribute to the success of collective marketing. In addition, the government and rural development stakeholders should place greater emphasis on improving farmers' knowledge, attitudes, and perceptions of collective marketing initiatives, as these factors have been seen to significantly influence farmers' willingness to participate in such initiatives. Specialized training on forming farmer groups, effective group dynamics, and management should be provided for smallholder farmers in the surveyed area to enhance their participation in successful collective marketing initiatives and strategies. This can be achieved through regular workshops, held weekly or monthly, bringing together change agents, group leaders, and farmers to share feedback, progress reports, and collaboratively strategize on improving the efficiency of collective marketing. These workshops will further offer farmers a platform to voice out concerns and dissatisfaction relating to collective marketing and extension services, thus fostering a more responsive and inclusive support system. Smallholder farmers should be encouraged and supported by the government and other relevant stakeholders to engage in specialized commodities for which prior market surveys have been conducted. This approach will enhance their collective marketing participation potential and further improve their market access and effectiveness, leading to better income.

6 Study limitations

While this study yields promising results, it is essential to recognize its limitations, similar to other research endeavours. The sample size was smaller than initially anticipated. Despite efforts to recruit more participants, logistical challenges related to time and the limited availability of willing participants hindered this goal. To address potential bias, the study made efforts to ensure diverse demographic representation within the available sample. Additionally, it employed various techniques to enhance the accuracy of responses, such as rephrasing questions to capture essential information and mitigate response errors. These strategies enhance the study's insights for stakeholders in agri-food systems and contribute to the broader understanding of factors influencing collective marketing and action among smallholder farmers in the Global South. Furthermore, a notable limitation of the logistic and probit models used in this study is the relatively low pseudo- R^2 values, which indicate that the models explain only a modest proportion of the variation in collective marketing participation. While this does not negate the significance of the identified predictors, it suggests that other influential factors, possibly unmeasured in this study, may also contribute to farmers' decisions, resulting in the potential influence of unobserved heterogeneity. Low pseudo- R^2 values are common in cross-sectional, behavioural, and socio-economic studies, where human decision-making is complex and influenced by many latent or contextual variables not captured in structured survey data. These omitted variables can lead to biased or inconsistent estimates, particularly if they correlate with the included predictors. Therefore, future research could benefit from more nuanced mixed-method approaches or panel data to better account for these latent differences among farmers. Also, future research could build on this study's findings by examining the impact of collective marketing and action on the livelihoods of smallholder farmers, providing valuable insight into the empirical effects of these strategies on their well-being.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by University of Mpumalanga Research Ethics Committee for Human and Social Sciences. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

NM: Conceptualization, Data curation, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing. OO: Conceptualization, Formal analysis, Methodology,

Resources, Software, Supervision, Writing – review & editing. AS: Writing – review & editing.

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