Market participation and outlet choices among smallholder cabbage farmers in Mahobong, Lesotho

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Abstract

Smallholder cabbage production is a very important activity in Mahobong, Lesotho contributing significantly towards household food security and income. However, vegetable farmers are constrained from participating in remunerative markets by several factors. The main aim of this study was to analyse factors that influence market channel choice and market participation of smallholder cabbage farmers in Mahobong. The survey used cross-sectional data which was obtained in 2022 from 100 smallholder cabbage farmers. A two-stage sampling procedure which includes purposive and simple random sampling was employed to construct the sample. Descriptive statistics, multinomial logistic regression model and multiple regression model were used to analyse these factors. The results revealed that farmers used farm gates, local and urban market outlets to sell their cabbage produce. Multinomial regression results revealed that lack of access to extension services, lack of market information and poor roads infrastructure influence farmers' use of farm gate outlet. Poor roads infrastructure influence cabbage farmers to use local market outlets while gender and access to market information influence farmers use of urban market outlets. Multiple regression results revealed that age, household size, distance to markets and market infrastructure influence market participation among cabbage farmers in Mahobong. Government needs to explore measures to enhance youth agriculture. Extension services need to be strengthened since it is critical to improve farmer market decisions. The private sector and government must invest in infrastructure which includes cold storage, market centres and a market information system. Information asymmetry has a negative effect on optimal performance of markets.

Keywords: Smallholder Farmers; Market Outlet; Market Participation; Cabbage, Mahobong

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1. Introduction

Lesotho is an agrarian economy with about 70% of its population deriving livelihood from agriculture (Rocchi and Sette, 2016). Agriculture continues to be a strategic sector in the development of most low-income nations. (Poole, 2017) stated that smallholder agriculture is one of the principal economic occupations in the world and is the main source of income and employment for the 70 percent of the world's poor who live in rural areas. Lesotho United Nations Development Assistance Plan (2013-2017) indicated that agriculture's contribution to Gross Domestic Product (GDP) has declined overtime from around 20% in the 1980s to 7% in recent years. Smallholder farmers in Lesotho have limited access to factors of production, credit and information, and markets are constrained by inadequate property rights and high transaction costs (Reardon and Timmer, 2007). Agriculture is comprised of both livestock and crop production. Livestock production is mainly in the mountainous regions whereas the bulk of crop production is in the lowlands and foothill regions. The Northern districts of Lesotho are the leading districts in crop production due to good soils and favourable climatic conditions. Agricultural activities such as crop and livestock production, and agricultural marketing play a vital role in employment creation, economic development of a country and in poverty alleviation. In rural areas, participating in agriculture has the potential to alleviate poverty and reduce unemployment. By raising agricultural productivity and rural incomes, poverty alleviation and employment in rural areas can be achieved (Machethe, 2004). Machethe (2004) further stated that households engaging in agricultural production tend to be less poor than those who do not. This therefore enhanced the governments' belief in the development of smallholder farmers for economic development and establishment of viable rural livelihoods.

Market participation amongst smallholder farmers is important because households derive benefits such as income (Machethe, 2004). However, access to profitable output markets is important for smallholder farmers to earn reasonable income from the sale of their produce. Senyolo et al., (2009) stated that the limited ability by smallholder farmers in accessing viable local and international markets for their produce is a major challenge for sustainable agricultural development in Lesotho and other developing countries. Improving market access and commercialization of smallholder farmers helps to induce greater investment, productivity and income (Mathenge et al., 2012). Senyolo et al., (2009), citing Heinmann (2002) showed that rural people in Africa claim that they are unable to improve their living standards because of the difficulties in accessing markets. Therefore, having access to formal markets allows smallholder farmers to escape the poverty cycle. There is a greater number of smallholder farmers who are producing for the market and are determined to shift into commercial farming but due to the limited volumes produced by these suppliers, none is registered with the distribution centre, and local purchasing tends to happen on an ad hoc basis (Rocchi and Sette, 2016).

For smallholder farmers to supply supermarkets or wholesalers, they need a certain volume of production, high quality products and consistency in supply and quality (Baloyi, 2010). Due to technical and institutional constraints, smallholder farmers find it challenging to meet the required quantities and quality standards set by the large retailers and wholesale buyers. In contrast, failing to participate in formal markets enforces a negative effect on the growth and development of smallholder farmers. Therefore, improvements in market participation are necessary to link smallholder farmers to markets (Omiti et al., 2007). In Lesotho, there is high demand for cabbage and small-scale farmers have ventured into cabbage production as a result. The government of Lesotho together with development partners has implemented projects such Smallholder Agriculture Development Project (SADP) and Agricultural Productivity Programme (APPSA) to boost cabbage and other commodities production and market linkages. However, despite these initiatives and high demand

in cabbage, Lesotho cabbage producers continue to lack access to markets and continue to live in abject poverty. Formal and informal markets are dominated by cabbage imports from the neighbouring Republic of South Africa. Supermarkets rely on their distribution centres in South Africa and purchases from wholesale fresh produce markets as the key sources of supply (Reva, 2019). This situation has led to the study seeking to investigate factors that influence cabbage producers' participation in output markets in the country.

A number of international studies have been conducted to assess the benefits of participation in cabbage production among smallholder farmers and factors that influenced decision to participate in cabbage marketing (Iruo et al. 2018; Ankrah Twumasi et al., 2021). In Lesotho, several studies have assessed the importance of participation in cabbage farming from business and policy perspectives. Market-oriented production has potential for income diversification and can increase agricultural production, hence encouraging profitability, food security and poverty reduction. Mohale (2019) focused on the effects of agricultural extension service on the profits of cabbage production in Lesotho and emphasised the importance of access to extension services for farmer technical support services. There is a dearth of studies in Lesotho that investigate the smallholder cabbage farmers' decision to participate in cabbage production and their market outlet choice. To date there has not been a study conducted to assess the factors influencing the participation of Lesotho cabbage producers in cabbage farming in Lesotho. Since there is a dearth of local studies in this area, this study seeks to investigate factors that influence market participation among small-scale cabbage farmers in Mahobong, Lesotho.

2. Materials and methods

The study was carried out in Mahobong, Leribe district of Lesotho. The study area is located between latitudes 28 and 31and the longitude 27 and 30. It is situated in the northern part of Lesotho with the total population of 224710 (Bureau of Statistics, 2016). According to Ministry of Agriculture and Food Security (2018), life in Leribe depends on agriculture as most of the villagers are engaged in crop and livestock production. The area was chosen because it produces an average of 1 690, 500 tonnes of cabbage annually (Bureau of Statistics, 2021) which is the biggest in terms of area planted in the country in comparison to other districts, and this quantity is around half of total cabbage production in the Kingdom of Lesotho. All cabbage producers in the region of Mahobong constituted the population for the study. A two-stage sampling technique involving purposive and simple random sampling was used to draw a sample of 100 farmers. Five sub-areas Seetsa, Ramapepe, Pitseng, Likhakeng and Matlameng were selected purposively because of the large number of small-scale involved in cabbage production. Twenty farmers in each sub-area were selected randomly to give a total sample of 100 farmers who were ultimately interviewed.

Kilangi (2012) asserts that in the quantitative research design, it is crucial to ensure and secure all ethical requirements which include informed consent from all the relevant stakeholders, maintaining confidentiality of information received, and disclosing potential study consequences to study participants during the survey. In this study, confidentiality was addressed by assuring participants in the consent form that their information will remain confidential between the University and the researcher. Ethical approval for this research was obtained from the National University of Lesotho (NUL) through the Department of Agricultural Economics and Extension in the Faculty of Agriculture. Subsequently, the researcher was granted permission from the Ministry of Agriculture and Food Security (MAFS) in Leribe district to conduct surveys and interviews with

study participants. During the survey data collection, researchers collaborated with the study participants under the guidance of Area Extension Officers from respective Agricultural Resource Centres, along with local community leaders like Area Chiefs and government Councillors. Every survey respondent was given the choice to participate, and those who declined were substituted.

Data was collected from all 100 farmers found in the study area through a pre-tested semi- structured questionnaire. The tool was piloted on 20 cabbage farmers that were only used in the pre-test exercise but not as part of the main study. The questionnaire was tested before the execution of the main survey to ensure content validity and internal consistency, hence reliability. The feedback from the pilot of the data collection instrument was used to improve the clarity and quality of the questions in the tool. Cronbach's Alpha formula was used to assess the reliability of the tool and a coefficient of 0.8 was recorded, which indicates reliability of the data collection tool. Statistical indicators that included frequencies and percentages were used to describe market outlets utilised by cabbage farmers in Mahobong. The Multinomial Logistic Regression model was applied to estimate factors influencing their choice of marketing channel. A multinomial logistic regression model can be used when the dependent variable is comprised of more than two categories (Park, 2013). The model was deemed suitable for the study as cabbage farmers in Mahobong have more than two market outlet alternatives. Since there is no ordering in the decision process of choice of marketing outlet, unordered choice models such as the multinomial logistic regression is suitable for a study such as this one. The model is widely used in studies involving multiple choices that define the dependent variable (Gujarati and Porter, 2009). The choice of a given marketing outlet is discreet because it is chosen from among other alternative outlets. Let Pij represent the probability of choice of any given market outlet by cabbage farmers, then equation representing this is:

$$P_{ij} = \beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k + \varepsilon_i$$

Where *i* takes values (1, 2,3), each representing the choice of marketing outlet (farm gate=1, local market=2, urban market=3). X1 are factors affecting choice of market outlet, β are parameters to be estimated and ε is an error term. With j alternative choices, the probability of choosing outlet j is given by;

$$Prob(Y_i = j) = \frac{e_{z_j}}{\sum_{k=0}^{j} e_{z_k}}$$

Where Z_j is a choice and Z_k is alternative choice that could be chosen (Greene, 2000). The model estimates are used to determine the probability of choice of a market outlet given j factors that affect the choice X_i. Log odds ratio is therefore computed as;

$$\ln\left(\frac{P_{ij}}{P_{ik}}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k + \varepsilon_i$$

Where P_{ij} and P_{ik} are probabilities that a farmer will choose a given outlet and alternative outlet respectively. $\ln\left(\frac{P_{ij}}{P_{ik}}\right)$ is a natural log of probability of choice j relative to probability choice k, α is a constant, β is a matrix of parameters that reflect the impact of changes in X on probability of choosing a given outlet, ε is the error term that is independent and normally distributed with mean zero. The parameter estimates of the multinomial Logit model provide only the direction of the effect of the independent variable on the dependent variable but do not represent neither the actual magnitude of change nor probabilities.

The multinomial Logit model is given below,

$$P_{ij} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k + \varepsilon_i$$

$Choice\ of\ market\ outlet(P_{ij}) = \beta_0 + \beta_1 Age + \beta_2 FrmSiz + \beta_3 Grp\ mrk + \beta_4 Trns + \beta_5 Mrkt\ infor + \beta_6 Frmn\ Exp + \beta_7 Mrkt\ Dstnc + \beta_8 Infrstr + \beta_9 Mrkt\ accss + \varepsilon_i$

The results of the estimated equations of the multinomial logistic regression model were discussed in terms of the significance and signs on the parameters. From the above theoretical framework and other studies (Mathenge et al., 2012; Amaya and Alwayng, 2011; Woldie and Nuppenau, 2009), the empirical MNL for factors affecting the choice of marketing channel by the smallholder maize and pigeon pea farmers in the four areas was specified as:

$$P_{ij} = \beta_0 + \beta_1 Age + \beta_2 FrmSiz + \beta_3 Grp\ mrk + \beta_4 Trns + \beta_5 Mrkt\ infor + \beta_6 Frmn\ Exp + \beta_7 Mrkt\ Dstnc + \beta_8 Infrstr + \beta_9 Mrkt\ accss$$

Where $\beta_0 \dots . \beta_9$ = the MNL coefficients to be estimated,

P_{ij} is the probability of marketing channel j being chosen by smallholder farmer i; and

j=1: for sales at farm gate

j=2: for sales at local market

j=3: for sales at urban market

The explanatory variables are described in Table 1 below. A positive sign for estimated coefficients in categories j = 1 and j = 2 indicates a higher likelihood of choosing alternative channel 1 or 2, respectively, over the base category (j = 3) as the level of that explanatory variable increases, *ceteris paribus*.

Table 1. Explanatory variables, description and the expected outcome

Variable	Description and Measurement Type	Variable Type	Expected Outcome (+/−)
Age	Age of farmer (years)	Continuous	+
Gender	Gender of farmer (1 = female 0 = male)	Categorical	+
Education	Number of years of formal education	Continuous	+
Market information	Use of market price information before making a decision to sell (1= yes, 0= otherwise)	Categorical	+
Experience in farming	Experience in farming in years	Continuous	+
Road Infrastructure	Quality of road to the main market (1= good, 0= otherwise)	Categorical	+
Extension	Frequency of extension visits per month (1 = does not visit, 2= once, 3= twice, 4= more than twice)	Categorical	+

Table 1. *Cont.*

Variable	Description and Measurement Type	Variable Type	Expected Outcome (+/−)
Group membership	Membership of farmers' association/group (1=yes, 0= otherwise)	Categorical	+
Household size	Number of individuals/people per household	Continuous	-
Distance to output markets	Distance to the market (kilometers)	Continuous	-

Source: By authors; (+/−) indicates a positive or negative relationship with the dependent variable

To determine factors that influence participation in cabbage marketing, the study used a multiple regression model. These factors include socioeconomic and institutional factors. The regression allows for estimation by Ordinary Least Square (OLS) procedure where cabbage marketing (Y) is a linear function of X. The OLS model is given by:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \varepsilon_i$ Where Y denotes the cabbage sales, β_0 is a constant, $\beta_1 \dots \beta_n$ are parameters to be estimated and X_i are explanatory variables.

3. Results and discussions

3.1. Socioeconomic characteristics of cabbage farmer in Mahobong Lesotho

Table 2 summarized the descriptive statistics of the farmers' socio-economic characteristics in the study area. The results indicated that the majority of farmers attained tertiary education. This could be attributed to the country's high literacy rate which is estimated at 76.6% (Mohlakoana, 2019). There is the highest proportion of farmers who attained tertiary education (40%) followed by secondary education (36%), primary education (16%) and lastly households with no formal education (8%). According to Musasa et al. (2015), literacy level of smallholder farmers and middlemen is very important as it allows for better flow of product information and knowledge within the value chain. Therefore, more efforts still need to be made to increase the number of households who attained tertiary education to cabbage farmers.

The results presented in Table 2 show that 55% of the respondents are females. This indicates that female-headed households are more actively involved in cabbage production than males. This is consistent with Mdlalose (2016) who found that in uThungulu District Municipality, majority of the fresh produce farmers were females rather than men. A possible reason for this may be that women are the ones who are expected to cook for families and ensure that there is food to eat on the table. Being officially unemployed, women often become actively involved in growing cabbage and other vegetables while male counterparts seek jobs or keep livestock.

The respondents were asked about their employment status, and the analysis results show that 42% of the farmers are full-time workers and 12% are fully employed. This implies that 54% (42%+12%) of the farmers only have farming as their source of income. As Table 2 shows, 39% of the respondents are part-time workers, 1% are students who are probably in their last year at tertiary institutions and 6% are pensioners, meaning that besides farming, they still have another source of income such as incomes from government grants, pension or other businesses. The findings are similar to those of Jari and Fraser (2009) who found that household incomes of the respondents were received from among other main sources, farming, pensions, social grants and other small household business activities.

Table 2. Socio-economic characteristics of survey respondents

Variables	Measure	Frequency	Percentage (%)
Gender	Male	45	55
	Female	55	55
Age	20-30	35	35
	31-40	23	23
	41-50	25	25
	Above 50	17	17
Educational level	No formal education	8	8
	Primary level	16	16
	Secondary level	36	36
	Tertiary level	40	40
Employment status	Full-time worker	42	42
	Part-time worker	39	39
	Full employed	12	12
	Pensioner	6	6
	Other	1	1
Household size	1-5	61	61
	6-10	39	39
Farming Experience	1-10	80	80
	11-20	14	14
	21-30	5	5
	Above 30	1	1

The educational level of the interviewed farmers shows that the greater percentage (40%) of them attained tertiary education. This could be attributed to the country's high literacy rate which is estimated at 76.6% (Mohlakoana, 2019). As indicated in Table 2, 36% of the respondents attained secondary education, primary education (16%) and lastly households with no formal education (8%). According to Musasa et al. (2015), literacy level of smallholder farmers and middlemen is very important as it allows for better flow of product information and knowledge within the value chain. The descriptive statistics in Table 2 indicate that 35% of

the respondents' range between the ages of 20 and 30 and they occupy the greater percentage than other age ranges. This implies that, due to the lack of employment among the youth, after completing their studies at the highest institutions, even though their specialties were not agriculture, they engage in it for their living and for them to earn some income. This is consistent with Mukarumbwa et. al. (2018) who found that Mutoko district in Mashonaland had mostly young farmers. A possible reason for this was that the young vegetable farmer might be attributed to irrigation schemes which tend to be lucrative and profitable, hence attracting the young farmers. The results in Table 2 show that 23% of farmers are in the range of 31-40, 25% are those between the ages 41-50 and 17% represents the respondents who are above 50 years.

3.2. Market outlets used by cabbage farmers in Mahobong, Lesotho

In Mahobong, most (55%) of farmers used farm gate outlet to market their cabbage produce, 25% used local market outlets while the remaining 20% used urban market outlets. There is gender equity in terms of farmers who market their cabbage through farm gate and local market outlets while there is gender inequity in terms of those who used urban market outlets to sell their cabbage. The explanation for this scenario could be that in other areas women are forced to supervise farming activities as men go to business centres to look for formal jobs.

Around 35% of cabbage farmers are aged between 20 and 30 years, 23% are aged between 31 and 40 years, 25% are aged between 41 and 50 years while only 17% are above the age of 50 years. This indicates that majority (58%) of cabbage farmers are youth and the explanation for this situation could be that there is high youth unemployment rate (43%) in the country that has made young people to turn to farming for livelihood. Most (80%) of the respondents have been in cabbage farming for less than 10 years, 14% have been farming for less than 20 years, 5% have been in cabbage farming for less than 30 years while only 1% have been in this business for more than 30 years. The dominance of new entrants could be due to the high job losses the country has been experiencing over the past decade, hence, the switch to farming by many households.

Most (80%) cabbage farmers indicated that poor condition of the road's infrastructure has been one of the challenges that have been affecting the marketing of their produce while the remaining 20% have not been faced with this challenge. In terms of access to market infrastructure, about 10% of cabbage farmers claimed to have access and half of those indicated that the condition of their market infrastructure and stalls is not satisfactory. Most (55%) cabbage farmers cited lack of access to market information as one of the factors that have been negatively affecting their marketing activities while 20% claimed to have good access to market information. More than half (55%) of cabbage farmers did not have access to extension services while 45% did have access to this critical business development service. The explanation for this poor access could be that Lesotho has a high farmer to extension agent ratio of about 1:800 and this has increased from 1:500 over that last 10 years.

3.3. Factors influencing the choice of market outlet by smallholder cabbage producers

This section presents the results from the study on factors that influence the choice of market outlet by farmers in the study area. The farmers use three market outlets which farm gate, local market and urban market. The results of the study show that gender, group membership, road infrastructure, extension services and access to market information influence the choice of market outlet. Gender, group membership and access to market

information were significant in the farmer's choice to use the urban markets. Road infrastructure influences farmers' use of the local market according to the study results. Road infrastructure, extension services and access to market information influence the farmers' choice to use the farm gate to market their produce. The results also show that age, market distance, farming experience, market infrastructure, market stall condition does not influence the farmers' choice of market outlet for smallholder cabbage producers in Mahobong.

3.3.1. Gender

The variable gender is not significant for the farm gate and local market which implies that gender has no influence in the participation of cabbage farmers in farm gate and local markets. However, the coefficient for gender (2.481) is significant for the urban market (0.031) at 5 percent level of significance. Therefore, the variable gender has a positive influence on farmers' use of urban market channels in the study area. The findings imply that there is enough evidence to support that being male leads to an increase in the use of urban market outlets in the region of Mahobong, Lesotho. The results are consistent with Sikwela (2013) that male farmers relatively use the usually lucrative urban market outlets more than their female counterparts. The possible explanation is that in Africa, male farmers tend to have better access to productive resources such as ownership of transport which enable them to produce and transport large volumes of output as well as to meet standard quality and quantity requirements which are normally prerequisites in formal urban markets.

3.3.2. Market information

The variable access to market information had a coefficient of 13.462 for farm gate which is significant at 5 percent. The coefficient for access to market information (4.128) is also significant at 5 percent for the urban market channel. Based on these results the study concludes that there is a positive relationship between access to market information and the use of farm gate and urban market channel in selling cabbage in Mahobong, Lesotho. The results imply that a unit increase in access to market information leads to a 13.462 increase in farmers' use of farm gate channel to sell their cabbage. At the same time a unit increase in access to market information will increase farmer participation in urban markets by 4.128 units. The results concur with Bindu and Chigusiwa (2013) that access to market information leads to the utilisation of the farm gate channel to participate in output markets. The probable explanation for this situation is that due to lack of market information farmers are unable to align their production as well as their marketing systems in tandem with the demands of other markets. Jari and Fraser (2009) argue that farmers with better access to market information use the normally lucrative urban market channels more than they're not so endowed counterparts. The explanation for this scenario is that market information enables smallholder farmers to align their production as well as their marketing systems in tandem with the demands of various urban market channels.

3.3.3. Road infrastructure

The variable poor condition of road infrastructure has a positive influence on the use of farm gate and local market channels with coefficient of 3.146 and 4.829 for farm gate and local market channels respectively. These findings imply that a unit increase in the condition of road infrastructure led to a 3.146 and 4.829 increase in farmers' use of farm gate and local market channels respectively in the region of Mahobong, Lesotho. Road infrastructure is critical to the performance of markets since produce has to be transported from producers to consumers, In most cases in rural areas the road infrastructure is poor which delays movement

of produce and hence farmers end up accepting low prices for their produce. These results confirm earlier findings by Panda and Sreekumar (2012) that goad road infrastructure enhances smallholder vegetable farmers' participation in markets. The probable explanation for this is that when roads are in good condition farmers find it easier to transport their produce to various and potentially lucrative markets.

3.3.4. Extension services

The variable access to extension services has a positive influence on cabbage producers' use of farm gate channel. The coefficient of extension services (12.983) is positive and significant at 10 percent significance level (0.073). The result implies that a unit increase in access to extension services leads to a 12.983 unit increase in farmers' utilisation of farm gate channel to sell their cabbage produce in the region. Access to extension services influences farmers' marketing decisions which include the choice market outlet. Farmers tend to depend on extension services for advice on market outlets and other forms of market information. Adams et. al. (2022) study found that access to extension services was significant in influencing farmers' decisions to sell by the roadside. Access to extension services significantly influences the decision of farmers to use other market outlets (for example, regional/ district markets) (Adams et al., 2022). Therefore, one can conclude that access to extension services influences the choice of market outlet. These findings have policy implications for strengthening extension service delivery. Limited access to extension services potentially results in smallholder farmers lacking skills and knowledge on proper production management and market information which makes them unable to utilise and benefit from formal markets.

Table 3. Multinomial Logistic Regression Results

Variable	Farm Gate			Local Market			Urban Market		
	Coefficient	Std. Error	Sig.	Coefficient	Std. Error	Sig.	Coefficient	Std. Error	Sig.
Intercept	-1.992	2540.899	0.999	-11.504	5.836	0.492	2.595	7.632	0.140
Gender	0.265	0.887	0.765	0.681	0.968	0.794	2.481	0.706	0.031**
Age	0.249	0.457	0.586	0.463	0.492	0.3470	0.351	0.658	0.456
Market distance	-0.237	0.674	0.250	-0.752	0.800	0.670	2.042	0.881	0.812
Group membership	0.487	0.947	0.765	0.851	0.985	0.388	1.813	0.592	0.002**
Farming Experience	-0.475	0.741	0.522	-0.323	0.813	0.691	0.234	0.748	0.425
Road infrastructure	3.146	3.146	0.001**	4.829	1.037	0.002**	1.859	0.553	0.949
Market infrastructure	12.183	2626.993	0.645	14.007	0.000	0.975	2.846	1.132	0.524
Market stall condition	-0.670	1.009	0.507	-0.575	1.063	0.589	-0.490	0.570	0.791
Access to market information	13.462	667.054	0.000**	0.362	1.731	0.912	4.128	0.545	0.000***
Extension Services	12.983	0.610	0.073*	1.063	0.626	0.889	-0.328	1.433	0.267

Significance at 5% (**), 10% (*) Pseudo R-Square = 59.4% No. of observations = 100 Overall classification = 72 (98.6%)

3.3.5. Group membership

The results of the study indicate that the coefficient for group membership (1.813) is positive and significant (0.002) at 1 percent significance level. The interpretation of these results is group membership has a positive influence on farmers' use of the urban market channels in the study area. Cabbage producers are more likely to use the urban market compared to farm gate and local market, if they are members of the of a group. The results imply that a unit increase in farmer group membership results in a 1.813 unit increase in the use of urban market outlets among cabbage farmers. These findings are consistent with Abdul-Hanan et al. (2014) and Markelova et al. (2009) that collective action among smallholder farmers enhances participation in lucrative urban markets. The possible explanation is that group participation enhances collective action thus, economies of scale that enables smallholder farmers to gain access to lucrative markets which they might find difficult to penetrate individually.

3.4. Determinants of cabbage farmers' participation in output markets

The results of the determinants of market participation in output markets are displayed in Table 4. The dependent variable was cabbage sold by the farmers, which is the proxy for market participation explained by independent variables presented in the methodology section. The results show that the coefficients for age, household size, distance to market and market infrastructure influence participation in output markets. The coefficients of the variables gender, education level, mode of transport and farm size were insignificant influencing participation in output markets according to the results of the study. The results for each of the variables are discussed in detail below.

3.4.1. Age

The coefficient of the variable age (2.361) is positive and significant at 5 percent level of significance (0.003), therefore age influences farmers' market participation in the region of Mahobong. The study findings imply that a one unit increase in age increases cabbage sold by 2.361 units. The study results show that there is a positive relationship between age and increase in market participation represented by cabbage sold. Since 58% of the farmers are below 40 years of age, this age category has many financial responsibilities, as this is usually time to build life and family. This age category is normally aggressive in the market as they seek to grow their business and increase the profitability of their agribusinesses. Therefore, increase in age is likely to increase market participation in formal markets which are more lucrative which has a positive effect on income. The findings of this study are consistent with Randela et al. (2008) who found a positive relationship between farmers' market participation and age of the respondents. Their possible explanation for this scenario is centred on the findings by Rantlo (2022) who found that young people tend to participate more in agricultural output markets due to limited formal employment opportunities in Lesotho.

3.4.2. Household size

The coefficient of household size was negative (-0.027) and significant at 5 percent significance level. Therefore, the study concludes that household size influences market participation among the cabbage farmers. This result implies that a one unit increase in household size cabbage sold by 0.027 units, which represents a

decrease in market participation. Therefore, smallholder cabbage farmers who have large household size are more likely to have limited participation in cabbage markets. This result concurs with the findings of Onoja et al. (2012) that household size significantly influenced participation in agricultural commodity marketing in Niger delta region. The probable explanation is that as the number of family members increases, the household food requirements increase and hence the increased responsibility of providing food for the household members which makes it necessary to withhold more farm produce for household consumption.

Table 4. Multiple regression (OLS) results

Variable	Coefficient	Std. Error	t	Sig.
(Constant)	1.203	1.685	0.714	0.478
Gender	0.323	0.204	1.587	0.118
Age	2.361	0.104	-0.006	0.003**
Educational level	-0.141	0.138	-1.025	0.310
Distance to the market	-4.326	0.190	0.514	0.039**
Mode of transport	0.021	0.068	0.304	0.762
Household size	-0.027	0.229	-0.120	0.052**
Farm size	-0.175	0.231	-0.758	0.451
Market infrastructure	4.457	0.368	0.496	0.036**

*** 5% level of significance*

3.4.3. Distance to output markets

The coefficient of the variable distance to market (-4.326) is significant at 5 percent significance level and negative therefore, the study concludes that distance to output markets has negative influence on farmers' participation in cabbage markets in the study area. The findings imply that the further the farmers' location from the output markets the lesser and more constrained their participation in cabbage output markets. The study findings indicate that a unit increase in distance travelled to the output market would likely decrease the cabbage sold in output markets by 4.326 units. The decrease in cabbage sold represents a decrease in market participation. This is consistent with Olwandle and Mathenge (2012) who reported that long distance to output markets had a negative effect on market participation. This is possibly because most farmers located far from output markets are not able to participate in distant output markets as they lack necessary marketing infrastructure (such as cold storage to keep produce fresh) and transport to deliver their produce to such markets (Baloyi, 2010).

3.4.4. Market infrastructure

The study results show that the coefficient for the variable market infrastructure (4.457) is positive and significant (0.036) at 5 percent significance level. The implication of this finding is that market infrastructure

influences market participation among cabbage farmers in Mahobong. These findings indicate a unit increase in market infrastructure results in an increase of 4.457 in cabbage sold. The increase in cabbage sold represents an increase in market participation. Therefore, good market infrastructure such as market centres with cold storage and proper storage facilities have a positive influence on farmer's market participation. In instances where the farmers have no access to good market infrastructure, it is most likely that market participation will be poor. Similar results can be inferred from previous studies that availability of good market infrastructure positively influences smallholder farmers' participation in output markets (Jari and Fraser, 2009; Panda and Sreekumar, 2012). The existence of proper market infrastructure leads to most requisite conditions under which farmers effectively and efficiently conduct their transactions.

4. Conclusion and recommendations

Cabbage farmers in the region of Mahobong, Lesotho used farm gate, local and urban market outlets to sell their produce with farm gate the predominant market outlet among smallholder farmers. Gender enhanced male farmers' endowment with resources, particularly productive enables them to use the relatively lucrative urban market outlets. The utilisation of these urban market outlets is further enhanced by the collective action among some cabbage farmers. On the other hand, lack of access to market information, poor roads infrastructure and lack of access to extension services render the environment conducive for use of farm gate and local market outlets in the region of Mahobong, Lesotho. Local markets are less lucrative compared to urban markets since urban markets have a constituency of people that has higher incomes. Most people in urban areas do not practice agriculture, they buy most of what they consume, therefore farmers should be encouraged to sell more of their produce in urban markets. Access to market information, extension services and improvement of road infrastructure can possibly increase use of urban marketing outlets.

Collective action through membership in farmer organisations enhances smallholder farmers' participation in the cabbage output markets in the study area. The environment is further made conducive for farmers' market participation by the existence of proper and appropriate market infrastructure for certain farmers. In addition, the distance between cabbage farmers' dwellings and output markets and age has a significant bearing on marketing decisions among cabbage farmers. In order to address factors that limit most cabbage farmers participation in less lucrative market outlets, a business development support system should be developed to ensure that cabbage farmers have access to the necessary technical support and market information. The government should consider incentives for collectors and aggregators who will work with the farmers to offload their produce as soon as it is ready since distance to output markets hampers market participation. Furthermore, the generally poor roads infrastructure should be repaired in order to enhance farmers' access to different markets. Moreover, the challenge of distant located output markets for most producers should be overcome through establishment of small collection centres in close vicinity of farming units. Extension services need to be strengthened since it is critical to improve farmer market decisions. Private sector and government must invest in infrastructure which include cold storage, market centres and a market information system. Information asymmetry has a negative effect on optimal performance of markets. All these policy interventions require collective effort from both private and public sector stakeholders to bear positive results.

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