

## Determinants of Market Outlet Choice for Smallholder Broiler Farmers in Leribe District of Lesotho

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**Abstract:** Smallholder broiler farmers struggle to access lucrative formal markets because of low economies of scale, high transaction costs, a lack of awareness of market demand, poor production practices that are not oriented towards meeting the quality and quantity required in the market, poor infrastructure that raises transaction costs, and post-harvest losses. Therefore, this study examined the socio-economic, market and institutional factors that influence broiler farmers' choice of market outlets in Leribe. The study adopted a random utility maximization theory and transaction cost theory to explain the farmers' decision process regarding the choice of marketing outlet available in the study area. A total of 114 respondents for this study were selected from five villages using a two-stage sampling technique. The survey data was collected through a structured questionnaire. The MVP model results revealed that gender, vehicle ownership, stock size, contract agreement and access to extension services significantly influenced the choice of market outlets. Therefore, this study recommends the government and development partners consider interventions that will increase broiler production such as enhancing credit access, promoting contract farming, group membership and providing institutional support. The study also recommends policies that will facilitate the adoption of Good Agricultural Practices (GAP) to improve farmers' access to the lucrative formal market outlets available in the study area. The Government of Lesotho should adopt policies that aim at linking smallholder farmers to formal markets, encouraging contract farming and facilitating the adoption of a Market Information System (MIS) to harmonize the flow of market information among exchange partners in broiler marketing.

**Keywords:** *Broiler farmers, market outlet choice, Multivariate Probit model, Leribe, Lesotho.*

### 1. Introduction

Poultry production is widely practiced in rural families in Lesotho and contributes significantly to the growth of the rural economy in the majority of developing countries. The poultry sector is still a significant sub-sector of agriculture, and it continues to be the primary source of income for rural residents and other small-scale farmers. Besides keeping poultry as a source of protein products such as eggs and meat for their households, most rural communities engage in poultry marketing to raise income from the surplus and create employment opportunities (Praburaj, 2018; WFP, 2020). In addition to improving farmers' livelihoods, market participation of farmers can also be seen as a strategic tool for transforming subsistence agriculture into commercial and market-oriented farming (Ingabire et al., 2017). Nxumalo et al. (2019) added that market participation is among important development issues since access to various market channels is an enabler for the poor to deal with poverty and equity issues. Thus, access to markets is not only an economic issue but is also included in social, economic and political institutions. This means that market access can be referred to as a transmission mechanism that links poor farmers to mainstream economic activities that guarantee them better returns from their farming.

Though market participation is considered an important aspect of economic development and in improving livelihoods in many rural communities, most smallholder farmers are still constrained by numerous challenges in accessing formal markets for their produce and these challenges force farmers to operate in less profitable markets. The majority of smallholder farmers in developing countries such as Lesotho are located in remote areas characterised by poor road and market infrastructure and for this reason, their marketing activities are still performed traditionally (Rafoneke et al., 2020). This isolation of farmers from improved markets increases their transaction costs and this creates a challenge for rural smallholder farmers when selecting market outlets for their agricultural output (Rafoneke et al., 2020). The most accessible markets for smallholder farmers in many developing countries are informal and they are referred to as being informal because they are set out of the tax systems and do not operate under any legal framework (Ferris et al., 2014). These markets include farm gates, roadside sales, village markets and urban markets. Poor market infrastructure, high transaction costs, lack of market information, lack of market options and the inability of farmers to meet market requirements such as grades.

Standards constrain smallholder farmers in Lesotho to participate in the formal markets and that forces farmers to sell their produce at the farm gate (Ferris et al., 2014; Mphahama, 2017; Rafoneke et al., 2020). The other reason for smallholder farmers to sell directly to consumers at the farm gate is that farmers lack the knowledge, skills and confidence to supply formal markets (Mphahama, 2017). According to Rantlo, Tsoako and Muroyiwa (2020), the participation of farmers in the informal market is significantly influenced by the dependence path and delayed payment from the formal markets. Many farmers in developing countries such as Lesotho are located in remote areas and this makes it difficult for them to access high-value market outlets, thus forcing them to participate in informal market outlets such as farm gates, local markets and urban markets (Rafoneke et al., 2020). Nxumalo et al. (2019) added that the informal markets gained more popularity in developing countries because farmers find it easy to transact with their customers because they are living in the same location and there is no need for intermediaries. According to Ripley (2017), smallholder farmers are excluded from improved markets because of low economies of scale, a lack of awareness of market demand, poor production practices that are not oriented toward meeting the quality and quantity required in the market, poor infrastructure that raises transaction costs, and post-harvest losses.

Thus, the failure of smallholder poultry farmers to participate in improved and profitable market outlets poses a major challenge in transforming subsistence agriculture into commercial agriculture and this limitation also has a negative impact on farmers' livelihoods and the potential of agriculture to improve the economy of Lesotho as a whole. Smallholder farmers in developing countries encounter similar challenges, this study may contribute to appreciating better marketing outlets determinants. Therefore, the study intends to identify and assess the socio-economic, institutional and marketing factors that affect broiler farmers' decisions regarding the market outlets available in Leribe, Lesotho. Identifying the factors that affect smallholder broiler farmers' decisions regarding the markets where they sell their produce will be essential for filling the gaps in the literature on smallholder farmers' market outlet preferences in Lesotho. The findings of this study might assist in the development and improvement of linkages between smallholder farmers and markets, reduce market transaction costs, and align production decisions with business and market opportunities. Moreover, the findings of this research may inform policymakers and development partners in Lesotho in the formulation of policies that may improve marketing structure and influence positively smallholder farmer livelihoods and alleviate poverty by enhancing their access to lucrative marketing outlets in the poultry market. This study contributes to the body of scholarly literature for researchers and academics who will conduct related or similar research.

## 2. Literature Review

**Marketing Channels in Developing Countries:** A marketing channel can be defined in various ways and according to Amanor-Boadu, Nti and Ross (2016) it can be defined based on farm location, farm size and as well as different actors in the supply chain of poultry products. Bannor, Ibrahim and Amrago (2021) describe a marketing outlet in agriculture as a set of independent and interrelated entities that are concerned with the flow of agricultural commodities from producers until they reach the final consumers while Wahyono and Utami (2018) explained marketing channels as an array of companies or people that are directly involved in the distribution of agricultural goods and services from producers to final consumers. Numerous pieces of the literature show that there are various marketing systems and channels available to smallholder farmers in developing countries and this variance is brought by their difference in terms of agriculture commercialisation. According to Wahyono and Utami (2018), marketing outlets can be divided into two categories that include direct marketing and indirect marketing outlets.

In a direct market channel, agricultural commodities move directly from producers to immediate consumers (Pattern I) whereas in indirect channels products can be distributed from producers directly to retailers and then to consumers (Pattern II) or be distributed from producers to wholesalers to retailers to consumers (Pattern III). The study conducted by Bannor, Ibrahim and Amrago (2021) in Ghana identified seven broiler market channels and these market outlets include direct-to-consumer; wholesalers; retailers; hawkers; chop bars; hotels, restaurants and institutions. The most profitable market outlet for poultry is wholesalers because they reduce transportation and feeding costs since they buy large quantities at once (Bannor, Ibrahim and Amrago, 2021). Farmers with small farms in most cases sell their products directly to consumers at the farm

gate and the reason for major sales at the farm gate is to reduce transaction costs of selling either in the village market or in the urban market (Adams, Caesar and Asafu-Adjaye, 2021).

**Marketing Outlets Available Accessible to Smallholder Farmers in Lesotho:** The majority of smallholder farmers in developing countries such as Lesotho are located in remote areas characterized by poor road and market infrastructure and for this reason, their marketing activities are still performed traditionally (Rafoneke et al., 2020). This isolation of farmers from modern markets increases their transaction costs and this creates a challenge for rural smallholder farmers when selecting market channels for their agricultural output (Rafoneke et al., 2020). The most accessible markets for smallholder farmers in many developing countries are informal and they are referred to as being informal because they are set out of the tax systems and do not operate under any legal framework (Ferris et al., 2014). These markets include farm gates, roadside sales, village markets and urban markets. These markets are particularly important in agricultural commercialization because they absorb a high volume of agricultural output such as crops, vegetables and meat products from smallholder farmers (Ferris et al., 2014).

Rafoneke et al. (2020) states that the issue of high transaction costs and lack of market options restrict participation of smallholder farmers in Lesotho in the high-value markets and this forces farmers to sell their produce at the farm gate and in their backyards. The other reason for smallholder farmers to sell at the farm gate is that farmers lack the knowledge, skills and confidence to supply formal markets and farmers that are using farm gate as their market outlet sell their products directly to individual consumers (Mphahama, 2017). Mphahama (2017) further argues that the majority of smallholder farmers in Lesotho operate in village (local) markets for their poultry products whereby they sell to individual households, friends and neighbors in the community, school feeding programs and churches while few of these farmers are taking advantage of market opportunities in urban markets. Mphahama (2017) observed that farmers operating in urban markets are selling their live or slaughtered birds along the roadside in town, to retailers and food restaurants or directly to consumers. Very few of these farmers negotiate a formal agreement to supply food for restaurants, hotels, guesthouses and private schools when their chickens are ready for the market. Poor market infrastructure, high transaction costs, lack of market information, and the inability of farmers to meet market requirements such as grades and standards constrain farmers to participate in the formal markets (Ferris et al., 2014; Mphahama, 2017).

**Factors Influencing Farmers' Choice of Marketing Outlets:** The decision of smallholder farmers on which market channel they can sell their agricultural products is one of the most important aspects of marketing. The market outlet choice has a direct impact on the profitability of their farming and it is critically important for farmers to understand the various characteristics of different market outlets available as this helps them to make informed decisions during marketing outlet selection (Soe, Moritaka and Fukuda, 2015). Adugna et al. (2019), asserts that farmers' decisions to select a particular market outlet are affected by various factors which include institutional, socio-economic and technical factors among others. Thus, understanding the factors that influence market outlet choice by smallholder farmers allows agricultural policymakers to formulate strategies that will improve agricultural production, investment and profitability (Abate, Mekie and Dessie, 2019). An appreciation of the relationship between factors that influence the choice of market outlets and the market itself makes it easier for policy intervention and this understanding also helps smallholder farmers to ensure a maximum return from their agricultural businesses by making appropriate decisions about market outlets where they can sell their agricultural output (Abate, Mekie and Dessie, 2019). In addition, Adugna et al. (2019) argue that farmers' decisions about market outlet choices are guided by the transaction costs that they are likely to incur as a result of participating in that channel.

Abate, Mekie and Dessie (2019) further highlighted that many challenges, which cannot be limited to inadequate and inappropriate market information, price fluctuations, limited traders, weak bargaining power of smallholder farmers, transportation costs, credit access, and physical infrastructures such as roads, storage facilities and markets influence market outlet decisions. An empirical study conducted by Olufadewa, Obi-egbedi and Okunmadewa (2018) to examine the determinants of market outlet choice by smallholder poultry farmers in Nigeria identified factors such as household size, road condition, contractual arrangement and flock size in the farm to have impact on the choice of the local market outlet whereas the level of education, price information, poultry farming experience and access to extension services were found to influence urban market

choice. In this study, household size was found to have a negative impact on farmers choosing a local market and the probable reason for this is that an increase in family size increases family consumption and this reduces the marketable output hence they opt for a farm-gate outlet to incur zero transportation costs. In contrast, Magogo (2015) argued that household size had a positive impact on farmers' decisions to choose local and urban markets since a large family size means more labor to take agricultural commodities to the markets. Factors like contractual agreement, flock size and road conditions increase the likelihood of farmers participating in local markets and urban markets.

Olufadewa, Obi-egbedi and Okunmadewa (2018) identified level of education and poultry farming experience as some of the factors that affect the choice of urban market outlets while access to extension services and price information motivate the use of urban poultry markets in place of the farm gate. Empirical findings of Bannor, Ibrahim and Amrago (2021) indicated factors such as farming experience and farmer organization membership influenced the choice to use retail market outlets by broiler farmers. Farmers with more marketing experience have acquired more expertise on grades and standards and this increases their competency in the retail market. Group membership encourages farmers' participation in the retailers' market outlet. Group membership enables farmers to access inputs, credit and other capital resources to improve their involvement in retail markets. Experience in production and marketing enables farmers to adapt their marketing strategies, attempting to find other market outlets that offer better returns (Wosene, Ketema and Ademe, 2018). Hawlet, Birhane and Alemayehu (2019) used a multivariate Probit model to analyze market choice decisions among tomato producers in South Gonder Zone, Ethiopia and factors such as age, distance to market, access to credit, transport ownership, land size and household size had a significant impact on farmers' decision of market outlet choice. The study revealed that the old age of farmers and an increase in market distance lead to increased farmers' participation in the farm gate as opposed to the local and urban market and this was because older farmers are no longer active in traveling long distances to find a market for their products and the market distance is directly proportional to transportation costs hence farmers are likely to sell to buyers at the farm gate. Olufadewa, Obi-egbedi and Okunmadewa (2018) concur asserting that the long distances poultry farmers travel to the market and lack of working capital are major constraints in poultry marketing.

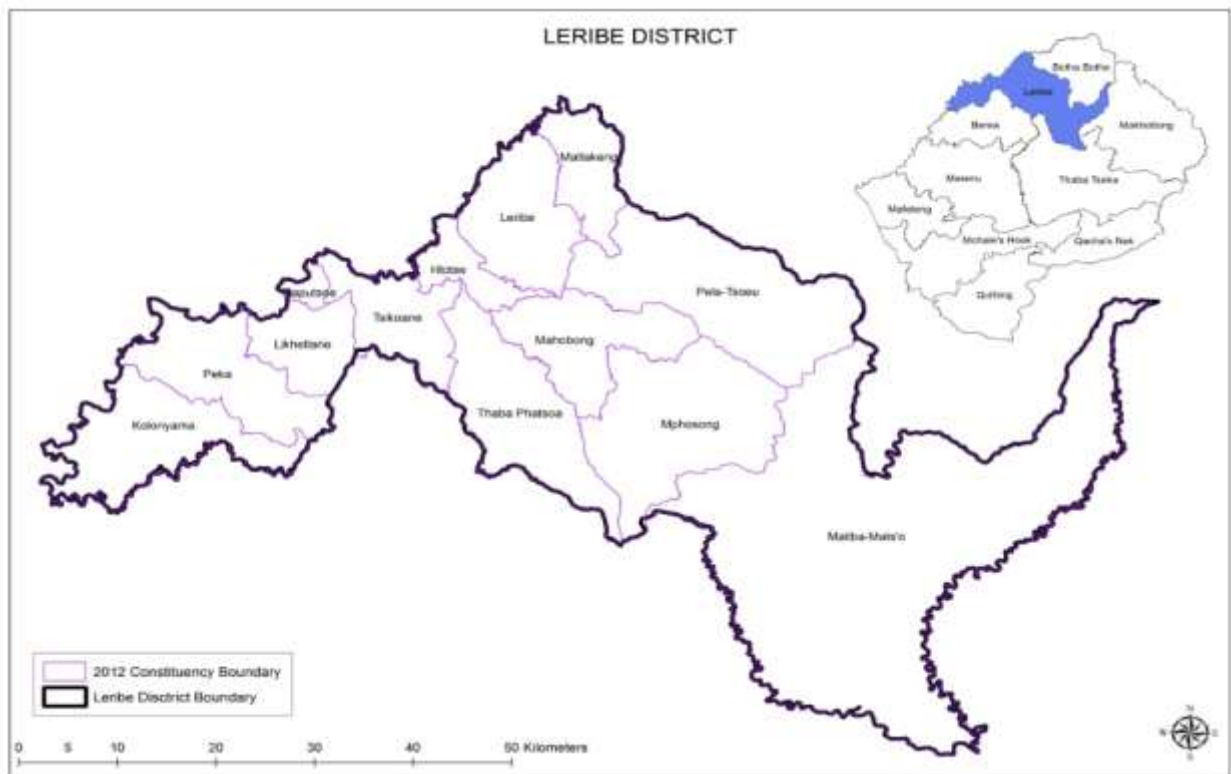
Hawlet, Birhane and Alemayehu (2019) argued that credit access and transportation facilities improve farmers' choice of both local market and urban market outlets. In their study, farmers with transport and credit access are likely to sell their produce to wholesalers, retailers and other immediate consumers such as hotels and restaurants in the urban markets. Different studies on farmers' market outlet choice revealed that gender had a positive influence on farmers' decisions to sell their produce at farm-gate, local and urban markets (Sigei, 2014; Rafoneke et al., 2020). There is a gender disparity in terms of market outlet choice where male farmers participate more than females in the aforementioned channels and this is attributed to the fact that female farmers are resource-constrained and spend much of their time on house chores therefore do not have time to go and sell their products in distant markets (Rafoneke et al., 2020). The difference in gender participation in agricultural production and marketing is because women have inequitable access to inputs, income diversification opportunities, credit access, productive technology and decision-making power (Musafili, Ingasia and Birachi, 2021). Market information is another important factor that guides smallholder farmers in developing countries when they make decisions on market outlets. Access to information from different markets regarding products needed, quantities and quality needed, prices offered as well as the time they are needed is very key when smallholder farmers make decisions about market channels they can use to dispose of their agricultural produce (Mukarumbwa et al., 2018). Lack of access to market information among smallholder farmers makes it difficult to prioritize new and high-value markets and this forces farmers to use informal markets that offer low prices (Nugroho, 2021).

**Theoretical Framework:** The study adopted a random utility maximization theory and transaction cost theory to explain farmers' decision process regarding the choice of marketing outlet available in the study area. The random utility maximization theory stipulates that when farmers are faced with numerous decisions to choose from among alternative market outlets, the decision-making process will be informed by the utility a farmer is likely to enjoy as a result of taking a certain decision among other alternatives, the farmer chooses the option that yields the highest level of utility (Sigei, 2014; Otekunrin, Momoh and Ayinde, 2019). On the other hand, transaction cost theory proposes that broiler farmers are likely to choose marketing outlets that will minimize their transaction costs while marketing their products (Donkor et al., 2021).

### 3. Research Methodology

**Description of the Study Area, Sampling Procedure and Data Collection:** The study area was the Leribe district which is in the northern region of Lesotho. Leribe covers an area of 2,882km<sup>2</sup> between the longitude of 28°53'0" South and longitude of 28°3'0" East (Moeletsi and Walker, 2013) and it is made up of three agro-ecological zones; Lowlands (42%), Highlands (30%) and foothills (28%) (Bureau of Statistics, 2020). The Ministry of Agriculture and Food Security has resource centers that cut across all villages in the country for efficient and effective extension services and administration of farming activities. Each district has a District Agricultural Office. The study area is divided into the following seven agricultural resource centers: Hlotse, Maputsoe, Peka, Mahobong, Khabo, Tale and Pelaneng. Every resource center, under the supervision of the Area Technical Officer, is charged to provide extension and other agricultural services to all farmers residing in the villages found within that specific resource center. Though most small-scale farmers are engaged in poultry production in this district, they are still faced with the challenge of access to markets, and this eventually denies them an opportunity to exploit and enjoy the potential benefits of participating in the commercial markets. Therefore, it is important to investigate the underlying causes of this market participation failure and the determinants of market outlet choice for farmers in this district.

**Figure 1: Study Area Map**



The study employed a probability-sampling technique to draw study participants from the sampling frame obtained from the Ministry of Agriculture and Food Security, Department of Livestock Services in Leribe. Sampled villages were used as a sampling frame for this study to identify broiler farmers. The study targeted villages with a high level of broiler production and those with farmers producing in a commercially oriented manner. Information about such villages in the Leribe district was obtained from the Department of Livestock Services in the Ministry of Agriculture and Food Security. A two-staged sampling technique was employed to select a sample of respondents for this study. In the first stage, five villages in Leribe where poultry farming and marketing are a common practice were selected using the purposive sampling method and this method was informed by the information received from the Department of Livestock Services in the Ministry of Agriculture and Food Security. Based on this information the sampled villages included Hlotse, Maputsoe, Mahobong, Peka and Tale. In the second stage, a simple random sampling technique was used to draw

respondents from the list of broiler farmers for each sampled village in this study. Microsoft Office Excel was used while running a randomization exercise to select respondents from the available lists of broiler farmers. Based on the information received from the Department of Livestock Services about villages with a high level of broiler production, the total population of broiler farmers from sampled villages was 158 as shown in Table 1. The study used Yamane's formula to determine the sample size for this study, following Abate and Addis (2021), the study sample is 114 as shown in Table 1.

**Table 1: Leribe Broiler Farmers Sample Frame**

No	Name of the Village	Total Population	Population Proportion	Sample Size (n)
1	Hlotse	50	0.32	36
2	Mahobong	15	0.09	11
3	Maputsoe	60	0.38	43
4	Peka	20	0.13	14
5	Tale	13	0.08	9
<b>Total</b>		<b>158</b>		<b>114</b>

**Source:** Ministry of Agriculture and Food Security (2021); Author's Computation (2021).

The study collected primary data using a structured questionnaire that consisted of both open and close-ended questions with the aid of well-trained research assistants. The study administered the questionnaire (interview schedule) through interviews with respondents which allowed the researcher to explain and interpret questions that respondents found difficult to understand, research assistants were able to ask study participants follow-up questions where necessary (Nxumalo et al., 2019).

**Data Analysis:** The survey data collected in this study was analyzed using both descriptive and econometric analysis. Descriptive statistics were used to describe the socio-economic characteristics of broiler farmers in the Leribe district. The multivariate Probit model was adopted in the econometric analysis.

**Multivariate Probit (MVP) Model:** Farmers are more likely to choose one or more than two types of marketing outlets at the same time and the selection of various marketing outlets as well as their simultaneity use usually depends on farmers' willingness to maximize the level of utility and minimization of transaction costs (Hawlet, Birhane and Alemayehu, 2019). The selection of market outlets is also affected by the socio-economic characteristics of farmers, and institutional and marketing factors in the study area (Hawlet, Birhane and Alemayehu, 2019). To analyze the factors influencing the marketing outlet choice by broiler farmers, the researcher was interested in establishing the likelihood that farmers will choose certain market outlets and as well as their simultaneous use. This means that the study intended to estimate the probability that a certain market channel can be adopted by farmers given a set of influencing factors and in this research, farmers were faced with a choice between three marketing outlets- Collectors, Retailers and Direct to Consumers. Based on the random utility maximization theory and transaction cost theory, broiler farmers in the study area chose market outlets with the highest expected level of utility and minimum associated transaction costs respectively (Donkor et al., 2021).

Several studies used different econometric models such as Multinomial Logit/Probit (MNL or MNP) and Multivariate Logit/Probit (MVL or MVP) models to predict the influence of the selected set of explanatory variables on the discrete categorical dependent variables. A study by the following scholars (Sigei, 2014; Magogo, 2015; Mukarumbwa et al., 2018; Nxumalo et al., 2019; Kiprop et al., 2020) used the MNL model to identify factors affecting the choice of marketing outlets by producers while marketing their agricultural produce. MVP was employed in several studies to determine factors influencing producers' market outlet choice (Arinloye et al., 2015; Abate, Mekie and Dessie, 2019; Dlamini-Mazibuko, Ferrer and Ortmann, 2019; Hawlet, Birhane and Alemayehu, 2019; Ermias, 2021). Multinomial models have been used in cases where farmers are obliged to choose only one outcome from a set of mutually exclusive and collectively exhaustive alternative lists of market outlets (Ermias, 2021). However, it is important to take note that in this study, broiler farmers' market outlet selections are not mutually exclusive and collectively exhaustive. Therefore, there is a possibility of simultaneous use of market outlets and the potential correlation among these marketing outlet selection decisions.

Multinomial models will not consider the possibility of interdependence and simultaneous use of market outlets because they have an assumption of independence among the outcome variables (Dessie, Abate and Mekie, 2018). Since the market outlet decisions by broiler farmers are interdependent there is also a problem of simultaneous use of market outlets (Ermias, 2021), the appropriate model for this study will be the Multivariate Probit model. The use of a univariate model will be misleading since it ignores the possibility of interdependence among choice decisions and the potential correlations between the set of outcome variables thus leading to biased and incorrect estimates of parameters and standard errors (Dlamini-Mazibuko, Ferrer and Ortmann, 2019). Taking into account this problem, the MVP model simultaneously models the impact of a set of independent variables on each of the different market outlet choices while allowing for the potential correlation between unobserved disturbances, as well as the relationship that exists between the different marketing outlets (Abate, Mekie and Dessie, 2019; Dlamini-Mazibuko, Ferrer and Ortmann, 2019).

Following Abate, Mekie and Dessie (2019), the selection of appropriate market outlet  $i$  by farmer  $j$  is  $Y_{ij}^A$  defined as the choice of the farmer  $j$  to transact market channel  $i$  ( $Y_{ij}^A = 1$ ) or not ( $Y_{ij}^A = 0$ ) is expressed as follows:

$$Y_{ij}^A = \begin{cases} 1 & \text{if } Y_{ij}^A = X_{ij}^A \alpha_{ij}^A + \varepsilon^A \geq 0 \Leftrightarrow X_{ij}^A \geq -\varepsilon^A \\ 0 & \text{if } Y_{ij}^A = X_{ij}^A \alpha_{ij}^A + \varepsilon^A < 0 \Leftrightarrow X_{ij}^A < -\varepsilon^A \end{cases} \quad (1)$$

Where  $\alpha_{ij}^A$  is a vector of estimators,  $\varepsilon^A$  a vector of error terms under the assumption of normal distribution,  $Y_{ij}^A$  the dependent variable for market outlet choices simultaneously and  $X_{ij}^A$  the combined effect of the explanatory variables. Since the market outlet choice decisions by smallholder broiler farmers in the study are affected by a similar set of independent variables, the econometric specification of the multivariate Probit model is stated as follows:

$$\begin{cases} Collectors_j = \chi_1 \beta_1 + \varepsilon^A \\ Retailers_j = \chi_2 \beta_2 + \varepsilon^B \\ Consumers_j = \chi_3 \beta_3 + \varepsilon^C \end{cases} \quad (2)$$

Where  $Collectors_j$ ,  $Retailers_j$  and  $Direct to Consumers_j$  are binary variables taking values 1 when farmer  $j$  selects Collectors, Retailers and Direct to Consumers (D2Cs) respectively, and 0 otherwise;  $X_1$  to  $X_5$  are the vector of variables;  $\beta_1$  to  $\beta_5$  are the vector of parameters to be estimated and  $\varepsilon$  disturbance term. In a multivariate model, the choice of several market outlets is possible, the error terms jointly follow a multivariate normal distribution (MVN) with zero conditional mean and variance normalized to unity, and the symmetric covariance matrix  $\Omega$  is given by:

$$\Omega = \begin{bmatrix} 1 & p_{12} & p_{13} \\ p_{21} & 1 & p_{23} \\ p_{31} & p_{32} & 1 \end{bmatrix} \quad (3)$$

Where  $p_{ij}$  represents the correlation between different types of market outlets available in the study area. The variables that were used in the MVP model while modelling the probability of farmers' market outlet choice in the study are presented in Table 3 below.

**Table 2: Variables used in the Multivariate Probit (MVP) Model**

<b>Dependent Variables</b>			<b>Expected Sign</b>		
Market outlets			Collectors	Retailers	D2Cs
<b>Independent Variables</b>					
	<b>Variable Type</b>	<b>Measurement</b>			
Gender	Categorical	Male[1] Female[2]	+ve	+ve	+ve
Farmer Income	Dummy	Yes[1] No[0]	+ve	+ve	-ve
Vehicle Ownership	Dummy	Yes[1] No[0]	+ve	+ve	-ve
Flock Size	Continuous	Number of Birds	+ve	+ve	-ve
Storage Access	Dummy	Yes[1] No[0]	+ve	+ve	+ve
Contract Agreement	Dummy	Yes[1] No[0]	+ve	+ve	+ve

Distance to market	Continuous	In kilometres	-ve	-ve	+ve
Extension Access	Dummy	Yes[1] No[0]	+ve	+ve	+ve
Credit access	Dummy	Yes[1] No[0]	+ve	+ve	+ve
Information Access	Dummy	Yes[1] No[0]	+ve	+ve	+ve

**Source:** (Sigei, 2014; Negerssa et al., 2020).

#### 4. Results and Discussion

**Descriptive Statistics on Market Outlet Choice Decisions of Broiler Farmers:** This section covers the descriptive statistics such as frequencies and percentages of the marketing outlets available to broiler farmers as well as the socio-economic, marketing and institutional factors influencing farmers' market outlet decisions in the study areas. As shown in Table 2, out of five possible broiler market outlets in the study area, only three market outlets were used by broiler farmers in the study area. The majority of broiler farmers (97.4%) used consumer market outlets while retailers and collectors market outlets were used by 15.8% and 3.5% of the farmers respectively. The results in Table 2 show that cooperatives and wholesalers' market outlets are absent on the menu of market outlets for farmers in the study area and it is evident from this result that broiler farmers in the study area are still struggling to access formal markets. According to Mphahama (2017), poultry farmers in Lesotho are less likely to participate in the formal markets because they are unable to meet different market quality and standards requirements in the formal market sector. Challenges such as lack of access to financial resources, inadequate extension contact, lack of relevant and timely market information and high transportation costs are among to challenges that farmers face in the poultry sector (Olufadewa, Obi-egbedi and Okunmadewa, 2018).

**Table 3: Broiler Market Outlets Utilised by Farmers in the Study Area**

Market Outlets	Frequency (n)	Percentage (N %)
Cooperatives	-	-
Wholesalers	-	-
Collectors	4	3.5
Retailers	18	15.8
Direct to Consumers(D2Cs)	111	97.4

**Source:** Author's Survey (2022).

Even though the majority of farmers in the study area sell their produce in informal markets, broiler farmers still had no access to other informal market outlets including street vendors, and other informal and semi-formal food eateries. Farmers are unable to meet some of the strict product specifications and requirements of these kinds of informal markets. Some of these informal market outlets which should be within the reach of the farmers normally require farmers to supply them with specific parts of the chicken since they produce the meals with specific parts such as quarter legs and wings, however, farmers in the research area prefer to sell full chickens and this mismatch of products on the supply and the demand side among exchange partners makes it difficult for farmers to participate in these markets. Furthermore, farmers in the study area admitted to being price takers in these types of market outlets, and that the predetermined price is so low that only a few farmers do business with these market outlets. Producers that frequently receive updated and accurate selling price information from a variety of sources choose the proper market outlet where they may anticipate making a profit (Sori and Adugna, 2022).

**Determinants of Marketing Outlet Choice by Broiler Farmers:** Econometric analysis was used to investigate factors influencing the farmers' choice of broiler market outlets at their disposal. There are three market outlet choices that farmers used to sell their broilers and the Multivariate Probit model was estimated jointly for three binary outcome variables namely, Collectors, Retailers and Direct to Consumers outlets. The model was fitted with eleven independent variables of which six of them were observed to be statistically significant in influencing farmers' decision of choice of marketing outlet as depicted in Table 4. The result of the Wald test (Wald  $\chi^2$  (33) =2395.40, p=0.000) is statistically significant at a 1% significance level. This shows that the coefficients estimated in the model are jointly significant and the explanatory power of variables



included in the model is acceptable. Thus, a conclusion is made that the model fit is reasonably good (Mwembe et al., 2021). The result of the likelihood ratio test of the null hypothesis in the model is statistically significant at a 1% probability level.

This means that the null hypothesis of independence among market outlet decisions is rejected and the farmers' decisions to choose market outlets for their produce are interdependent (Abate, Mekie and Dessie, 2019). The rho values ( $\rho_{21}=\rho_{31}=\rho_{32}=0$ ) in the likelihood test ratio are all equal to zero and this indicates that all error terms in the model follow a normal distribution with a zero conditional mean. Therefore, this further proves that there is a good model fit and interdependence of market outlet choice in the study area (Honja, Geta and Mitiku, 2017; Mwembe et al., 2021). As shown in Table 3 below, estimated coefficients in the Pearson Correlation matrix between the choice of collectors and direct to consumers' (D2Cs) market outlets and the correlation between the choice of retailers and consumers' market outlets are negative and statistically significant at 1% and 5% respectively. These results suggest that broiler farmers using D2C market outlets are less likely to sell their products in either the collector's or the retailers' market outlets.

**Table 4: Overall Model Fitness, and Correlation Matrix of Market Outlet Choices from the MVP model**

<b>No. of observations</b>	<b>=114</b>		
<b>Log likelihood</b>	<b>= -55.681371</b>		
<b>Wald chi2(33)</b>	<b>=2395.40</b>		
<b>Prob &gt; chi2</b>	<b>=0.0000***</b>		
Likelihood ratio test of $\rho_{21} = \rho_{31} = \rho_{32} = 0$			
chi2(3)	=22.946		
Prob > chi2	= 0.0000***		
	Collectors	Retailers	Direct to Consumers
Collectors	1		
Retailers	-0.083	1	
D2Cs	-0.266**	-0.229*	1

**Source:** Author's Survey (2022). \*\*\*, \*\* and \* indicate statistical significance level at 1%, 5% and 10%, respectively.

Table 4 presents the estimated Multivariate Probit model results of the broiler farmers' choice of available market outlets where they sell their broilers. The results of the MVP indicate that out of eleven predictor variables included in the MVP model, six variables influence the farmers' choice of broiler market outlet at 1%, 5% and 10% significance levels. The probability of choosing a collectors' market outlet in the study area is influenced by four variables (contract agreement, vehicle ownership, gender and flock size), and the retailers' market outlet is influenced by three variables (Extension access, Vehicle ownership and farmer income) while only one variable (flock size) influenced D2Cs market outlet choice. The figures in parentheses represent standard errors while figures outside the parentheses represent the coefficients of independent variables (Table 4).

**Gender:** The coefficient for gender (7.633) has a positive influence on farmers' choosing the collectors market outlet at a 1% level of significance. This positive coefficient implies that being a female farmer increases the likelihood of selling broilers to the collectors' market outlets at a 1% level of significance. The probable reason for this is that many female farmers in the study area are keeping poultry as their main source of income and they try by all means to access markets that will buy in bulk to minimize loss due to overspending on feeds and spoilage during storage and also to reduce transportation costs. This result is not in line with the findings of Endris, Haji and Tegegne (2020) where the male gender had a positive and significant impact on farmers' likelihood to use collectors as their vegetable market outlet.

**Table 5: MVP Estimated Results for Determinants of Market Channel Choice Variables**

Variables	Coefficient (Standard error)		
	Collectors (1)	Retailers (2)	Direct to Consumers (3)
Gender	<b>7.633(2.005) ***</b>	-0.253(0.554)	0.000 (1.046)
Household Size	0.421(0.270)	-0.103(0.116)	0.330(0.227)
Farmer Income	-0.807(0.715)	<b>-0.466(0.217) **</b>	-0.037(0.320)
Vehicle Ownership	<b>6.726(3.895) *</b>	<b>0.965(0.398) **</b>	0.000(0.588)
Stock Size	<b>-0.0001(0.0004) *</b>	0.0003(0.0003)	<b>-0.0007(0.0002) *</b>
Storage Access	0.000(1.542)	0.0006(0.586)	0.000(0.926)
Contract Agreement	<b>20.011(4.641) ***</b>	-2.196(7.881)	0.000(1.769)
Distance To Market	-0.031(0.070)	0.014(0.012)	0.044(0.032)
Extension Access	-0.484(0.915)	<b>0.901(0.445) **</b>	0.000(0.620)
Credit Access	0.799(1.692)	0.390(0.361)	0.000(0.553)
Information Access	-2.015(1.888)	-0.134(0.547)	0.000 (0.997)
Constant	-20.914 (3.123)	-0.898(1.195)	0.875(2.155)

**Source:** Author (2022). \*\*\*, \*\* and \* indicate statistical significance level at 1%, 5% and 10%, respectively.

**Farmer Income:** The coefficient for the variable farmers' income (-0.466) has a negative influence on farmers' choosing the retailers' market outlet. This result indicates a negative association between the farmers' income and the probability of farmers selling their broilers to retailers at a 5% significance level. This result implies that the probability of farmers participating in the retailers' market outlet decreases with the increase in the level of farmer's income, *ceteris paribus*. The possible reason for this outcome could be that farmers with high-income levels are not investing surplus income into improved broiler production practices and this makes it hard for them to meet formal market requirements such as quality and standards. Farmers may also be discouraged by lower prices offered by the formal markets. Nxumalo et al., (2019) opined that farmers must agree to lower prices in exchange for longer-term purchasing arrangements, access to services and social investments in the informal market. This result is in contrast with the findings of Mugenzi, Owour and Bett (2021) where the high-income level of potato farmers positively influenced the choice of collectors and D2Cs market outlets.

**Vehicle Ownership:** The coefficients for vehicle ownership among broiler farmers selling their chickens to collectors (6.726) and retailers (0.965) in the study area show that vehicle ownership has a positive influence on farmers' choosing the collector's and retailers' market outlets. These results imply a positive influence of vehicle ownership on farmers' decision to sell their produce to collectors and retailers at 10% and 5% significance levels respectively. Farmers with access to transport can take their products to different markets in the industry and this is a good option for poultry producers since it allows them to sell their produce quickly thereby reducing the extra feeding and cold storage costs. Additionally, having a vehicle makes it easier for farmers to deliver their farm produce to markets on time and lowers transportation costs. This result is consistent with the study of Dlamini-Mazibuko, Ferrer and Ortmann (2019) where transport ownership positively influenced the probability of farmers' decision to choose retailers' market outlets for their output. The availability of transportation for produce enables farmers to select appropriate marketing channels and supply produce to preferable markets regardless of their location (Sori and Adugna, 2022).

**Stock Size:** The coefficients of the variable stock size for farmers selling to collectors (-0.0001) and consumers (-0.0007) market are both negative and significant at a 10% level of significance. The negative coefficients imply an inverse relationship between stock size and the farmers' decision to choose both collectors' and direct consumers' market outlets to sell their output. The results suggest that farmers who keep a high average number of broilers each year are less likely to sell directly to consumers and collectors market outlets. The possible explanation for the negative correlations could be that individual consumers buy in small quantities, and this makes it difficult for producers to sell their broilers within a reasonable time which can lead to

increased cost of production and loss through spoilage. Additionally, consumers when buying informally from broiler producers at the village and door-door marketing prefer buying chickens on credit, and some of them fail to make their payments on time or fail to pay at all and this has a detrimental effect on farmers' business operations. Farmers with a large quantity of production prefer to dispose of their output to market channels that buy in bulk such as collectors and wholesalers (Honja, Geta and Mitiku, 2017; Wosene, Ketema and Ademe, 2018). However, the coefficient of variable stock size (-0.0001) for farmers selling to collectors is negative and significant. This result implies a negative influence of stock size on farmers selling to collectors' market outlets at a 10% level of significance. One possible explanation for this result is that collectors are taking farmers' produce at dictated prices and this is believed to reduce farmers' profit margins. This result contradicts the finding of Addis, Tegegn and Ketema (2019) where the quantity of wheat produced positively influenced the likelihood of farmers' decisions to supply collectors' market outlets.

**Contractual Agreement:** The coefficient for the variable contract agreement (20.011) of farmers participating in the collectors' market outlet is positive and significant. This positive association between contractual agreements and collectors market outlets means that broiler farmers who have access to contract marketing are more likely to prefer collectors market outlets than any other channel available in the study area at a 1% level of significance. The contractual agreement with collectors involves bulk purchases and it also creates a guaranteed market for broiler farmers thus reducing transaction costs as well as other marketing costs for farmers. Contract farming is very important in addressing the issue of market failures and reduces the marketing risks facing smallholder farmers (Meemken and Bellemare, 2020). Farming under a contractual agreement enables farmers to make informed economic decisions about what to produce, quantities and quality because of the less costly and smooth flow of information regarding market requirements between buyers and sellers (Rantlo, Tsoako and Muroyiwa, 2020).

**Extension Services:** The coefficient for access to extension services (0.901) of farmers participating in the retailers' market outlet is positive and significant. This result implies a positive influence of extension service on farmers' decision to choose the retailer market outlet at a 10% significance level. This positive correlation implies that increased access to extension services by broiler farmers increases their chances of choosing retailers as their market outlet for broilers. One possible explanation for this result could be that extension services give farmers timely and reliable market information, such as market demand, price, and quantities required, and by equipping them with this information, farmers are better prepared to engage the retailer market outlet. Frequent access to agricultural extension services for farmers improves their knowledge, skills and intellectual capacity which helps them to improve their production and select both appropriate and profitable market outlets (Ahmed et al., 2017). This result agrees with Taye, Degye and Assefa (2018) who found that extension access has a positive and significant influence on retailer market outlet choice by onion farmers in Ethiopia.

**Market Information:** The coefficient for access to market information for broiler farmers was expected to have a positive influence on the farmers' participation in formal market outlets such as collectors and retailers. According to Abate, Mekie and Dessie (2019), access to market information such as prices, quality and quantity and other market requirements help farmers to make informed decisions while marketing their agricultural output. Access to reliable market information helps to reduce transaction costs associated with searching for the market, contracting and enforcing the contract (Mgale and Yunxian, 2020). However, the MVP model results revealed that the coefficients for access to market information for farmers are insignificant for all available market outlets in the study area. This indicates that information received by farmers did not have a significant influence on farmers' choice of any market outlet utilized by farmers in the study area. Lesotho through the Ministry of Agriculture, Food Security and Nutrition is working on establishing a functional, efficient and reliable Market Information System (MIS).

Access to market information is a challenge for most farmers. Therefore, the insignificant influence of access to market information on the choice of market outlet could be a result of a lack of access to market information services by farmers. MIS gathers, analyses and disseminates market information such as prices, quantities and other valuable market information relevant to farmers, traders and other value chain actors (Mgale and Yunxian, 2020; Nugroho, 2021). Thus, lack of access to reliable market information sources handicaps farmers' decisions in market outlets choice. Furthermore, the other possible explanation for these results could be that

farmers in the study area are constrained by a lack of financial resources, skills and technical supervision to adhere to the standards and quality assurance practices required in the formal market. According to Rahmat, Cheong and Hamid (2016), developing countries are unable to access and adopt best agricultural practice technology due to inadequate resources as a result of inequalities perceived in their economies. Smallholder farmers in developing countries are resource-constrained and lack the resources to invest in the best agricultural practice technologies.

## 5. Conclusion and Recommendations

Most smallholder broiler farmers in the study area are selling their broilers in the informal markets even though they are still unable to take advantage of all available informal market outlets. In addition to that, the study concludes that farmers continue to experience barriers to accessing formal markets. This failure is attributed to farmers' inability to satisfy formal market requirements, lack of access to financial resources, market information, and impertinent extension advisory services. Therefore, steps must be taken to increase farmers' access to the lucrative formal markets that are accessible to improve the broiler sector in the study area. To determine factors influencing the choice of market outlets by broiler farmers in the study area, the MVP model was employed. The results of the study indicate that farmers were selling their chickens to the following three market outlets: collectors, retailers and direct consumers. The correlation between the choice of collectors and direct to consumers' market outlets and the correlation between the choice of retailers and direct to consumers' market outlets are negative and statistically significant. This implies an element of interdependence among market outlets utilized by farmers in the study area existed. Thus, farmers selling their produce to collectors and retailers are less likely to sell their produce to the direct to consumers' market outlet. The empirical results of the MVP model showed that the broiler farmers' choice of market outlets was influenced by gender, farmer income, stock size, vehicle ownership, contract agreement and access to extension services. Gender, vehicle ownership and contract agreement positively influenced the choice of collectors' market outlet while stock size had a negative influence. Concerning the choice of retailers' market outlet vehicle ownership and extension services access had a positive effect while on the other hand, stock size was negatively influencing the choice of direct-to-consumer market outlet.

Based on these findings and conclusions of the study the following recommendations are proposed: Farmers should take advantage of all informal market outlets including street sellers, informal restaurants, informal food caterers, and other informal food eateries in the study area. To aggregate their output and strengthen their negotiating position in the formal markets, smallholder broiler producers are also urged to organize themselves into farmers' groups. Farmers organizations help address the issue of the high extension-to-farmer ratio in the country, facilitating a smooth exchange of market information flow and extension services. Such groups will also give smallholder farmers the ability to negotiate better terms of trade and acquire contractual agreements in the formal markets. There is a need for NGOs and other development partners in Lesotho to establish financial investments in the poultry sector, especially in processing and packaging projects or firms to improve the market infrastructure of the poultry industry. Such interventions will also increase the market opportunities for broiler farmers. The study also recommends local financial institutions establish credit facilities for smallholder farmers with affordable interest rates and flexible repayment options to improve their access to productive inputs and appropriate technology thereby encouraging commercial farming in the agriculture sector. Adequate access to financial resources will also enable farmers to adopt Good Agricultural Practices (GAP) and this will promote their participation in the formal markets. The Government of Lesotho through the Ministry of Agriculture, Food Security and Nutrition; and Ministry of Small Business Development, Cooperatives and Marketing should adopt policies aimed at linking smallholder farmers to formal markets, encouraging contract farming and facilitating the adoption of a Market Information System (MIS) to harmonize the flow of market information among value chain actors in broiler marketing.

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