Determinants of Market Participation among Vegetable Growers in West Coast Region, The Gambia

ABSTRACT

Aims: This study aimed to identify factors that influencing vegetable growers' decision to participate in output market in the West Coast Region of The Gambia.
Study design:A cross-sectional data involving a sample of 138 vegetable producers were selected using multi-stage sampling technique.
Methodology: Data was collected through in-person interview using semi-structured questionnaire and analyzed using descriptive and Probit model.
Results: Results indicated that market participation among smallholder vegetable producers were significantly influenced by gender, access to transportation, availability of financing, belonging to farmer organization, and access to market information.
Conclusion: The findings suggests that government and other stakeholders dedicated to supporting the well-being of vegetable growers should invest in road construction, particularly in feeder roads, to ease growers' access output market. Furthermore, policymakers need to empower and strengthen farm associations as this will help facilitate access to credit and market information, as well as enhance their bargaining power to secure better prices for their produce.

Comment [TU1]: Add Key Note not more than 5-7 alphabetically

1. INTRODUCTION

Transition from subsistence-oriented agriculture practice into a market-oriented approach has been in the policy spotlight of many developing countries, including the Gambia [1.2]. Market participation is a means to assist farmers' transition from subsistence farming to a market-oriented option, whereby they buy more inputs and sell their products to merchants. Participation in the market is the ability of a person to interact in an effective and lucrative way. The present research follows [2] in considering market involvement as a means to help farmers transition from subsistence farming to a market-oriented option, whereby they buy more inputs and sell their products to merchants.

Smallholder market participation is important for agricultural growth and economic development [1, 3]. In addition, market participation serve as means to increase rural income, reduce poverty, and food insecurity which translate in achieving the Sustainable Development Goals (SDGs), especially, Goal 1 and 2 which calls for an end to all forms of poverty and achieving zero hunger, improve nutrition and promote sustainable agriculture [4,5]. A study by [4] claim that when vegetable growers enter the market, their income and consumption levels rise beyond what a subsistence-oriented strategy can accomplish. Therefore, enhancing access to vegetable markets for small-scale farmers can improve their productivity, income, and food security, while also reducing poverty.

In the Gambia, agricultural sector is one the key driver of the Gambia's economy. The sector remains a source of livelihood for over 75% of the rural population [6]. Additionally, the sector contribute 17% of the gross domestic product (GDP) and generates 30-40% of the overall foreign exchange earnings from exports [6]. Given the significantly role agriculture play in the country's economy, the government of the Gambia has formulated range of strategies, initiatives, and programs to revitalize the agricultural sector and ensure food security. For example, the second National Development Plan for the period 2023–2027 emphasize the need to shift focus from subsistence agricultural traditions to more contemporary market-oriented alternatives. Furthermore, the Agriculture and natural resource (ANR) Policy 2017-2026 prioritizes the efficient and sustainable use of resources and the development of the agricultural sector, with a focus on value chain-oriented growth.

The horticultural sub-sector on the on other hand, contribute greatly to the economy of the Gambia. According to [7], the sub-sector typically contribute around 4% to the GDP, and there are numerous community-based initiatives aimed at boosting vegetable production and sales. The authors emphasized that by adopting the modern horticulture production system, which is characterized by intensification and diversity, vegetable growers can enhance both their yields and profits. Vegetables with shorter duration and higher productivity provides a higher economic return and act as source of income for farmers [8-10]. Like in many developing countries, the Gambia in recent years witnessed an upsurge in vegetable production. This is because vegetable production is associated as one best option in providing gainful employment as compared to the cereal crops [11,12].

The Gambia's vegetable sector has vast unrealized potential for expansion in the local market as well as in regional and worldwide marketplaces. In 2013, the Gambia Bureau of Statistics reported that the country's vegetable exports reached 220,213 tons, resulting in revenue of 438 million USD. However, vegetables are not the primary source of income for farmers; rather, they are utilized by numerous intermediaries, including wholesalers, retailers, and farm agents, who are involved in the value chain approach, which involves the movement of food commodities from downstream to upstream [13]. In addition to raising family consumption and therefore reducing poverty and hunger, diversifying and growing horticulture output may open up new avenues of income and employment in processing and selling [14].

Nevertheless, the production of vegetable commodities in the country is significantly less established compared to that of cereal grains. According to [13], most smallholders in The Gambia view vegetable farming as an additional source of income, and their crop production is dispersed and primarily overseen by domestic workers. Despite the importance of vegetable cultivation for rural economic development and poverty alleviation, the sector has received minimal attention. Furthermore, the vegetable output markets in The Gambia face obstacles such as an inadequate transportation network, a restricted market information system, and underdeveloped industrial sectors [15]. Smallholder vegetable producers lack access to critical information on market demand, pricing, and the most effective selling periods for their products. The capacity of farmers to diversify their livelihoods beyond vegetable production is significantly limited by the weak link between production and the market. Small-scale producers often struggle to access markets due to a lack of understanding of market requirements or their inability to meet them. Moreover, the poverty rate among small-scale producers is exacerbated by their inability to enter new markets or maximize the benefits they possess, which is further hindered by a lack of information flow and other barriers. Consequently, their ability to fully profit from the marketable portion of their production and efficiently trade their products is reduced [15]. Understanding the factors that influence decisions regarding market involvement and the extent to which these factors can be mitigated is crucial for enhancing the livelihoods and marketing of smallholders [16].

Therefore, policymakers committed to fostering rural economic development and alleviating poverty should prioritize the issue of smallholder involvement and their level of participation in the vegetable market.

Numerous empirical studies have been conducted in developing countries on factors influencing the smallholder farmers' participation in the marketing of agricultural produce [3,17,18]. The results from these empirical studies are inconclusive and mixed. For instance, [17,19) reported that age and education have a positive and significant impact on market participation decision of horticultural growers, whereas [20] found that both variables have a negative effect on farmers' decisions to participate in the output market. In addition, [21,22] indicated that farm experience had a significant positive impact on farmers' decisions to participate in the agriculture value chain, while [23] concluded that experience had a significant negative impact on farmers' engagement in the fruit value chain.

Although these studies provide valuable insights into the determinants of market participation, they exhibit several limitations. Primarily, researchers conducted most of the research in North Africa [2, 3, 17and 18], and Southern African nations [3], potentially limiting their contextual applicability to West Africa, particularly The Gambia. Secondly, most of the studies found in the Gambia focus on transaction cost, in marketing of livestock [24], commercialization of livestock through value chain approach[25], and the effect of technology transfers to women vegetable production and marketing. This suggests that there is a huge gap on factors influencing vegetable growers' decision to participate in output marketing in the west coast region of the Gambia. Therefore, this research aimed to examine factors influencing market participation of vegetable growers in the West Coast Region of the Gambia. Consequently, this study sets out to address the following central research question:

What are the determining the factors that influence vegetable market participation in The Gambia?

This study has the potential to contribute significantly to the existing body of knowledge on the topic, fill in the existing gaps in the literature, and provide evidence to policymakers and NGOs working to alleviate poverty and boost rural economies.

THEORETICAL BACKGROUND

Random utility theory serves as the foundation for this research, which is based on the idea that customers will choose the option that maximizes their utility from a limited number of choices [26]. The hypothesis aims to measure the preferences of smallholder vegetable growers based on the income they receive from participating in marketplaces. Using the random utility framework [27]), households and farms make decisions about whether or not to engage in markets. Farmers cultivate land in order to meet their physiological food needs and/or increase their income through the sale of agricultural products. The study measures farmers' desire for money and their willingness to take risks in pursuit of greater prosperity through utility functions.

The aim of smallholder farmers is to maximize their financial reward by making strategic decisions about which vegetables to grow, how much to grow, and when and where to sell their produce. According to the random utility framework, smallholder vegetable farmers will participate in the market as net sellers, net buyers, or autarkics if they perceive the greatest utility or net benefit from that option. Farm family decision-making suggests that the market involvement of smallholder farmers is mainly determined by transaction costs. In order for farmers to participate in the market, their earnings from selling their products must exceed their expenses related to the transactions; otherwise, it is the opposite.

Multiple studies have applied the theory to assess farmers' decisions to participate in the output market for agricultural produce. For example, in Ghana, [28] conducted a study using random utility theory to assess the market participation and choices made by groundnut and maize farmers. The study assumes that small-scale vegetable producers decide whether to participate in the vegetable market as net purchasers, self-sufficient (autarkic), or net sellers. In a recent investigation, [3] also employed random utility theory to examine the impact of economic, social, and institutional factors on the involvement of irrigated small-scale vegetable farming in the Eastern Cape, South Africa. The study revealed that market involvement was influenced by various economic, technological, institutional, social, and cultural factors. In another study by [29], random utility theory was applied to assess the factors determining the market outlet choice of mango growers in Ethiopia. The study found that mango producers' market outlet choice behavior was influenced by several factors, including gender, age, level of schooling, dimensions of the land allocated for mango production, use of market knowledge, access to credit, livestock holdings, distance to the nearest market, and quantity of mangoes produced.

2. MATERIAL AND METHODS

2.1. Source of data

The study was conducted research in the West Coast Region (WCR) of The Gambia, with a specific focus on vegetable growers. The Republic of The Gambia is situated on the Atlantic Coast of Africa, spanning from latitudes 13°N to 14°N and longitudes 14°W to 17°W. It has a total area of 11,420 square kilometers. The Gambia consists of two elongated land strips, ranging in width from 6 to 26 kilometers, extending 320 kilometers eastward along the banks of the River Gambia. Senegal is the only neighboring country to The Gambia, with a territory that is 20 times larger than that of The Gambia. Senegal borders The Gambia on its northern, eastern, and southern sides. The West Coast Region is located in the western section of The Gambia, next to the Atlantic Ocean, bordered by the Kanifing Municipal Council to the north, the Lower River Region to the east, and the River Gambia and Cassamance in Senegal.

Quantitative and qualitative data were collected from primary and secondary sources to address the research objectives and objectives of the study. The primary data were gathered from vegetable growers, related to the commercialization of vegetables. Primary data were obtained from the respondents through the use an interview schedule, which were administered by the principal researcher assisted by two trained enumerators. In addition. The agriculture directorate region two, ministry of trade and employment, Trade, and Gambia bureau of statistics were consulted to gather secondary data on past studies and reports,

Data analysis

The data were encoded using SPSS version 23 and then transferred to STATA version 12 software for analysis. Households of vegetable growers was the unit of research in this work. Descriptive statistics, inferential statistics, and econometric models were used in order to examine the collected data. Using mean and percentage descriptive statistics as well as inferential statistics.

Statistical Tools

The dependent variable in this research was dichotomous—that of growers' choice to engage in output market or not. In this kind of investigation, with either a binary logistic or probit model is ideal [30]. As [26] noted, both logistic and probit models provide similar results. Probit analysis has been utilized extensively in research looking at the factors influencing market engagement [17, 31, 32, and 34]. This led the present work to investigate the variables influencing smallholder farmers' participation in vegetable sales using a probit

model. The degree of participation of the respondents in the marketing decision-making process constituted the dependent variable; if the farmer participated, the value was 1; otherwise, it was 0.

This model evaluated the possibility that Y = 1—that is, the household's involvement in output market. Since the study choose to investigate the determinants of smallholders' decision to participate in the vegetable market using the probit regression model, the dependent variable is dichotomous. Thus, the endogenous variable has only two potential values: 0 for those that do not participate in the vegetable market and 1 for those who do. Given a vector of regressors X, which are supposed to impact the endogenous variable (Y), we may accept that Y can be denoted by market participation and that the regression model is expressing market participation (Y, the dependent variable). Specifically, we assume that the model takes form;

$P_r(= 1/X) = (X'\beta)$ (1)

Pr shows the probability of a household choosing to engage in the vegetable market; Φ displays the cumulative distribution function of the normal distribution. Usually, the greatest likelihood approach is used to project the parameter β. A latent variable model might also help to justify the probit model. Should a second random variable prove to be accessible?

$Y^* = X'\beta + \varepsilon,$ (2)

Where $\varepsilon \sim N(0,1)$. Then Y can be considered as an indicator assuming that the latent variable is positive:

$Y = 1\{Y^* > 0\} = \{i, e - \varepsilon < X'\beta 0\ otherwise$(3)

Therefore, Pr-is the likelihood at which vegetable growers involve in marketing of vegetable β are the coefficient to be assessed

X1 Age
X2 gender
X3 education
X4 experience
X5 Distant to market
X6 Access to transport
X7 Access to credit
X8 training
X9 member of farmer association
X10 Contact with extension
X11 Access to market information

From equation (1)

$P(Y_i = 1_{xi}) = P(Y_i > 0/x_i) = (\beta x_i + u_i > 0/x_i);\ u_i \sim N(0, \sigma^2 = P(u_i > -\beta x_i/x_i) = P(u_i \leq \beta x_i/x_i)$(4)

$px_i \emptyset(\beta x_i)dx_i = dy/dx$ (5)

Means the marginal effect. In which $\emptyset$ is the cumulative normal distribution function.

Therefore, finally $p(Y_i = 1/x_i = \emptyset(\beta x_i = \frac{1}{\sqrt{2\sigma^2}} e - (x_i - \beta)^2/2\sigma^2$(6)

Table 1: Explanation of the variables for probit model

Explanatory variables	Description	Dimensions	Predictable effect	Empirical studies
Market participation	market participation decision	Dummy 1=yes,0=otherwise	+	
Gender	Gender of respondents	Dummy 1 = Male; 0=otherwise	+	[34] Rehima and Dawit (2012)

Age	Age of respondents	Number of years	+	
Education	Literacy level of growers	Dummy 1=yes,0=otherwise	+	
experience	duration of farming experience	Continuous	+	[35] Tafesse et al. 2023
Distance to market	The nearnesss to the market	Continuous In Kilometer	+	[35] Tafesse et al. 2023
Access to transport services	Access to an all-weather road	Dummy 1=yes,0=otherwise	+	[35] Tafesse et al. 2023
Access to credit	Use of credit	Dummy 1=yes,0=otherwise	+	[36, 37] Alene et al. (2008); Martey et al. (2012);
training	Attend training	Dummy 1=yes,0=otherwise	+	[35] Tafesse et al. 2023
Membership of farm association	Membership of cooperative	Dummy 1=yes,0=otherwise	+	[35] Tafesse et al. 2023
Contact with extension		Dummy 1=yes,0=otherwise	+	[35] Tafesse et al. 2023
Availability market information	Availability of Market information	Dummy 1=yes,0=otherwise	+	[38] Changalima and Ismail (2022).

Source: Own study (2024)

3. **RESULTS** AND DISCUSSION

3.1. Descriptive statistics

The descriptive statistics for the key factors among the 138 participants are shown in table 2 below. The gender distribution shows that 59% of the respondents are male, with a standard deviation of 0.493. The age of participants ranges from 23 to 50 years, with a mean age of 35.71 years and a standard deviation of 7.188. The literacy rate indicates that 55% of the participants are literate, with a standard deviation of 0.499. The participants have an average of 3.54 years of experience, on a scale from 1 to 6, with a standard deviation of 1.404. The average distance to the output market is 3.07 kilometers, with a standard deviation of 1.357. Only 25% of the participants own transportation, with a standard deviation of 0.437. Access to credit is available to 36% of the participants, with a standard deviation of 0.480. Training is received by 31% of the participants, with a standard deviation of 0.465. Membership in relevant farmer associations is held by 39% of participants, with a standard deviation of 0.490. Finally, 62% of the participants have access to market information, with a standard deviation of 0.486. These statistics highlight areas for potential improvement, particularly in terms of transportation ownership, access to credit, training, and extension services.

Table 2: Descriptive statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Gender	138	0	1	.59	.493
Age	138	23	50	35.71	7.188
Education	138	0	1	.55	.499
experience	138	1	6	3.54	1.404
distance to output market variable	138	1	9	3.07	1.357
transport ownership variable	138	0	1	.25	.437
access to credit	138	0	1	.36	.480
training	138	0	1	.31	.465
Membership of farmer association	138	0	1	.39	.490
Access to market information	138	0	1	.62	.486

Source: Own study (2024)

Comment [TU2]: Reduce number of columns i.e delete Number of observation, minimum and maximum value. Variables, mean and standard is enough

The data from Table 3 shows that, out of the 138 households surveyed, 75 (54%) participate in vegetable production, while 63 households (46%) do not engage in this activity. This indicates that more than half of the households are involved in growing vegetables, demonstrating a significant level of participation in vegetable production among the surveyed group.

Comment [TU3]: So what, discuss in detail(Its implication very well)

Table 3: vegetable production status of the household

Comment [TU4]: Revise this title

Vegetable producers	Frequency	Percent
Participants	75	54
Non-participants	63	46
Total	138	100

Comment [TU5]: Deletete it and replace with Decision of market participation

Source: Own study (2024)

Table 4 indicates that the mean value for gender is higher among participants (0.6098) compared to non-participants (0.4464). At the 5% probability level, the t-test results suggest that there was a statistically significant mean difference between the genders of market participants and non-participants. This suggests that males were more actively in vegetable marketing. The literacy rate among non-participants (0.5743) is slightly higher than that of participants (0.4677), but this difference is not statistically significant. Similarly, the availability of transport is higher among participants (0.6000) compared to non-participants (0.5243), but this difference is not statistically significant. However, access to credit is significantly higher among participants (0.6735) compared to non-participants (0.4719). There was a statistically significant variation between the non-participants and participants with access to credit, as shown by the t-test result, at the 5% probability level. Furthermore, a larger proportion of participants (0.7037) are members of farmer associations compared to non-participants (0.4405). The t-statistics shows means difference between market participants that belongs to farmer association and non-members was significant at a 5% level of significance.

Table 4: Assessment of key household-level characteristics by vegetable traders

Comment [TU6]: Make it too specific (yours looklike research topic)

Variables name	Participant (n 75)		Non Participant(n 63)		Overall	
	Mean	SD	Mean	SD	Mean (n 138)	T-test value
Gender	.6097561	.4908068	.4464286	.5016207	.5434783	-1.9025**
Literacy	.4677419	.5052279	.5742574	.4969212	.5434783	1.1968^{ns}
transport	.6000000	.4970501	.5242718	.5018526	.5434783	-0.7731^{ns}

credit	.6734694	.4738035	.4719101	.5020387	.5434783	-2.3018**
membership	.7037037	.4609109	.4404762	.4994259	.5434783	-3.1130**

Source: Own study (2024)

Comment [TU7]: Do your analysis again. Because of t-test only used to compare mean comparison between two groups (continous variables)
. So use Chi square test.

Comment [TU8]: Also modify this subtitle

Type of Vegetable grown by producers

The distribution of different types of vegetables grown by the respondents are presented in Figure 1. Among the 138 respondents, onions are the most commonly grown vegetable, with 44 respondents (31.9%) reporting it as their crop. This is followed by cabbage, which is grown by 28 respondents (20.3%), and tomatoes, grown by 27 respondents (19.6%). The results support the claim made by [39] that tomatoes, onions, and cabbage hold significant economic importance worldwide due to their extensive use. Moreover, Pepper is also a popular choice, with 24 respondents (17.4%) growing it, while lettuce is the least common among the listed vegetables, with 15 respondents (10.9%) cultivating it. This distribution highlights onions as the predominant vegetable, while lettuce is the least prevalent among the surveyed farmers.

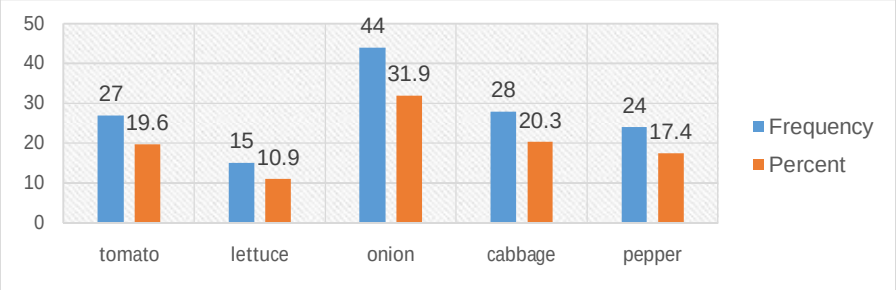

Figure 1: type of vegetables produced by respondents
Source: Own study (2024)

Preference of Marketing Channels

Table 5 displays the preferences of participants regarding vegetable marketing outlets. Among the 138 participants, a significant majority (34.1%) expressed a preference for selling to collectors. This preference is probably due to the bulk purchasing options and value-added services, such as packaging and logistics, provided by assemblers. Wholesale suppliers rank second with 28.3%, potentially because of their advantageous connections with retailers and greater purchasing flexibility. Direct sales to retailers make up 23.2% of the total. This approach has the potential to significantly improve profit margins by eliminating middlemen. Consumers are not the most favored channel, with only 14.5% preference. This could be due to inadequate infrastructure, including limited storage facilities and transportation options for accessing the market. The findings are consistent with a previous study conducted by [40] which revealed that groundnut producers prefer selling directly to collectors, followed by wholesalers and retailers. The distribution of responses suggests a clear inclination towards utilizing intermediaries such as collectors and wholesalers, rather than selling directly to end consumers.

Table 5. Choice of marketing channels of respondents

Marketing channels	Frequency	Percent
Whole Sellers	39	28.3
collectors	47	34.1

retailers	32	23.2
consumers	20	14.5
Total	**138**	**100.0**

Source: Own study (2024)

Comment [TU9]: Next to this add market channel analysis to give full explanation for your research

Factors influencing vegetable growers from participating in output market

Table 6 shows the outcomes of the predicted probit regression analysis. With a zero p-value, our model is statistically significant according to the likelihood ratio chi-square value of 34.819. This implies that our model performs somewhat better than one devoid of predictors. Out of the eleven independent variables assumed to affect smallholder vegetable commercialization; five variables (gender, access to transport, credit availability, belonging to farmer association and, market information) were found statistically significant in the study area (Table 2). Conversely, farmers' market involvement was not much influenced by age, literacy, experience, remote to market, training, or interaction with extension. In order to determine the marginal effects, an analysis of the data was conducted, and the results of the selection equation were assessed after the evaluation. Given the lack of apparent meaning in the coefficients of the selection equation, the interpretation relied on the application of marginal effects. These are just values that optimize the likelihood function. The definitive explanation of marginal effects may be found in Heckman's 1979 publication.

Table 6. Parameter estimates for the Probit model and its marginal effects

Variables	Probit		Marginal Effect	
	Coefficient	SE	Coefficient	SE
Gender	-1.5210	.56000***	-.4866703	.1653753***
Age	-.04200	.13700	-.0135715	.043799
Literacy	.29200	.35600	.0935875	.1130996
Experience	-.11200	.08800	-.0360013	.0275748
Distance to market	.00900	.02700	.0027442	.0086087
Transport	.63500	.32100**	.2032326	.0980484**
Credit	.99000	.43600**	.1319916	.1331102**
Training	-.41200	.42100	.5746476	.1334024
Membership of farmer association	1.7950	.47500***	-.0830324	.1282923***
Contact with extension officers	-.25900	.44600	-.0830324	.1423921
Market information	.61800	.25700**	.1978434	.0770046**
Constant	-.09800	.65900		

*** *p<.01, ** p<.05, * p<.1* Log likelihood = − 77.78; Wald chi^2 [10] = 34.72; Pseudo-R^2 = 0.18

Comment [TU10]: I suspect this finding. Only use marginal effect for probit and use of coefficient is not recommended. Coefficient is only for OLS.

4.4.1. Gender

Comment [TU11]: Also rotate digits to increase attractiveness of your article

Comment [TU12]: Why separate?

Farmers' possibility to engage in vegetable marketing was adversely impacted by gender; the probability level is 1%. Men are more inclined than women to participate in the marketing of vegetables. All other things being equal, a 1% rise in male engagement reduces the likelihood of female engaging in vegetable marketing by 49%. The results are consistent with the earlier findings of [2, 41, 42, 43] who reported that decision of smallholder to participate in the output market were influenced by gender. According to [41, and [42], male dominant in the output market due to cultural make up in developing countries. This suggests that males are more connected to technology and refresh their commercial ideas with marketing difficulties such that young people in the research region were more involved in vegetable

marketing than older people. This is consistent with the results of [44], which show young individuals are more eager than older ones to engage in the pineapple market.

4.4.2. Credit access

Comment [TU13]: Why separate?

Smallholder farmers' choice to join the vegetable market was positively and significantly influenced by loan accessibility ($P < 0.01$). All other things being equal, the marginal impact indicates that an increase lending to farmers would lead to 13% chance of farmers engaging in vegetable market. The results are consistent with early studies of [33, 43,45, 46], who reported that farmers' choice to engage in output market was influenced by credit access. This suggests that access to allow farmers to engage more actively in markets. Improved finance availability gives farmers the tools they need for investment and operational scaling-back. The study highlights the need to create an enabling environment for smallholder farmers to operate effectively. It is imperative that policymakers, development agencies and stakeholders prioritize financial support to producers.

4.4.3. Owning transport

Comment [TU14]: Why as a separate title?

The impact of transportation on a farmer's choice to engage in the vegetable output market was shown to be statistically significant at a 5% level. Ownership of transportation assets, such as donkeys and horse carts, has a positive impact on market participation by decreasing the expenses associated with moving resources from the market to the farm and products from the farm to the market. The result aligns with the study conducted by [47], which reported that owning transportation reduces the relative expenses associated with transactions, thereby increasing the likelihood of participating in the market.

4.4.4. Belonging to farmer association

Comment [TU15]: Why as a separate title?

Additionally, the results demonstrate that the choice of producers to involve in vegetable marketing was significantly influenced by their membership in an association. This suggests that growers who are belong to farmer association are more likely to engage in produce sales. This suggests that growers who belong to farmer association are more likely to engage in vegetable sales. The results are in accordance with the previous study conducted by [18, 46, 48] which determined that farmers' decision to engage in the output market was significantly influenced by their membership in a farmer association. Farmer associations are essential because they enable members to negotiate for better prices for their products and establish connections. This means that membership in cooperatives can provide members with better market information, inputs, advisory services, technical advice and credit facilities, which are essential for production and marketing decisions.

4.4.5. Availability for market information

Comment [TU16]: Why as separate tittle?

The availability of market information has proven to have a significant positive impact on smallholder farmers' decision to sell their harvested products at a significant level of 5%.Based on the marginal impact, growers are 19.7 percent more likely to take part in the output market' if they have a better chance of obtaining information on time, all else being equal. This suggests that producers must be able to market their products and receive fair pricing. In order to make an informed decision regarding the different kind of vegies to produce and offer at the market prior to the production season, farmers require information regarding output prices. This outcome is consistent with the findings of [48], who found that

households' likelihood of market participation was significantly increased by access to market information.

Comment [TU17]: Majority of your finding looklike review and better if you reewrite

CONCLUSION

The objective of this research was to examine factors influencing vegetable grower from participating the in output market. The descriptive statistics shows that vegetable growers sell their produce using diverse marketing channels like collectors, wholesalers, retailers, and consumers. This means with these channels collectors were the most preferred channel, followed by whole sellers and retailers. However, direct-to-consumer sales seem to be the least preferred channel for vegetable growers. In addition, the results of the Probit model analysis show that gender, accessibility, credit, membership of farmers' associations, and access to market information have a positive impact on the market participation of smallholder vegetable producers.The outcome of the this research suggests that it is advantageous to widen markets centers in urban areas and create an ideal atmosphere for elderly farmers, as they are able to sell their commodities at farm gate and village markets at a fair price, despite the influence of intermediaries. In addition, providing instruction on sales, where to sell, and when to sell their goods would help producers who lacked knowledge on these aspects. With regard to market information, local authorities with vested interest in farmer welfare should boost the marketing knowledge and capacity of smallholder vegetable growers via rural community radios and social media platforms. Moreover, improving farmer's market involvement requires increasing knowledge of constructing sufficient storage facilities and appropriate control of temperature, humidity, air movement, correct stacking pattern, frequent inspection, and quick product disposal. We examined the factors that affect vegetable marketing at the domestic level. Therefore, further research is necessary to critically evaluate other factors influencing vegetable growers' decision-making at the macro and community levels.

COMPETING OF INTEREST

The authors affirm that they have no conflicts of interest.

INFORMED CONSENT

Prior to data collection, we obtained informed consent from all participants. The data collection period spanned from April 2024 to June 2024. We approached each participant and provided detailed information about the study's objectives, assuring them that their privacy and personal information would remain confidential. Additionally, we emphasized that they had the freedom to opt out of the survey at any time if they chose not to participate.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript..

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Comment [TU18]: Put your references alphabetically

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