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Determinants of Commercialization among Home Garden Vegetable Producers in Kombo North District West Coast Region, The Gambia

[a*] Mortala Boye, [a]Lamin KM Fatty
[a] *Agricultural Economics and Extension Unit, School of Agriculture and Environmental Sciences University of The Gambia, P.O. Box 3530*
**Corresponding Author Email: moboye@utg.edu.gm*

ABSTRACT

The aim of this study was to examine the determinants and extent of vegetable commercialization among home garden vegetable growers in Kombo North District, West Coast Region, The Gambia. Primary data was collected using semi-structured questionnaire involving 140 home garden vegetable growers. Household Commercialization Index (HCI) was employed to evaluate the extent of commercialization of vegetable products. Factors influencing commercialization were analyzed using the Tobit regression model. The analysis reveals that 41 % of the respondents were semi-commercialized, 35% indicated subsistence, and 24% were moderately commercialized. The Tobit regression model indicates that gender, access to transport, access to credit, market information, and membership in a farmer association significantly and positively influenced growers' decision to commercialize vegetable produce. The study recommends that improving access to essential farming supplies could enhance the commercialization of home gardens. Additionally, developing gender-specific intervention programs is vital for ensuring that both men and women can participate equally in vegetable production and marketing. Furthermore, providing smallholder farmers with regular market information and supporting farmers' cooperatives may facilitate their entry into markets and increase their market participation, ultimately leading fair returns.

Keywords: Home garden; commercialization; home garden growers; West Coast Region; Tobit model

INTRODUCTION

Home gardens have long been recognized for their contributions to household food security, nutritional well-being, and ecological sustainability, particularly in poor rural areas of low-income countries (Abdoellah et al., 2020; Issahaku et al., 2023). Home gardens refer to small plots of land in the vicinity of households that are fully or partially devoted to vegetable production and are mainly cultivated using family labor (Ferdous et al., 2016). Home gardens encompass a range of practices, including urban agriculture, homestead farming, and kitchen gardening (Issahaku et al., 2023). For generations, smallholder farmers have practiced home gardening by using marginal land near their homes to grow vegetables, herbs, and rear small animals, contributing to household food security (Issahaku et al., 2023). Many studies reported that home gardening significantly contributes to improving smallholder livelihoods and enhancing food security (Abdoellah et al., 2020; Issahaku et al., 2023). Beyond supplying a steady variety of fresh vegetables and promoting self-reliance, home gardens play an important role in strengthening household food sovereignty and reducing vulnerability to food price fluctuations particularly during the COVID-19 pandemic and subsequent lockdowns (Issahaku et al., 2023; Kingsley et al., 2022; Mukiibi, 2020). Moreover, Corley et al.(2021) asserted that home gardening can enhance both the physical and psychological well-being of elderly individuals. Home gardens also contribute to the achievement of Sustainable Development Goals 1 and 2 "No Poverty" and "Zero Hunger," respectively (Abdoellah et al., 2020; Sharma et al., 2022).

The Gambia is an agrarian country, with about 70% of rural households relying on agriculture as their main source of livelihood (Carr et al., 2024). Agriculture

contributes approximately 21% to the gross domestic product (Sanyang and Saine, 2022). Horticulture employs over 65% of the agricultural workforce and contributes about 4% to GDP (Sanyang and Saine, 2022). In response to increasing demand and expanding market opportunities for vegetables at national, regional, and global levels, the Ministry of Agriculture developed the Agriculture and Natural Resources Policy (ANRP, 2017–2026), which advocates the creation of a market-led, commercially oriented, vibrant, and competitive agricultural sector. Similarly, the National Development Plan (NDP, 2018–2021) and the Recovery-Focused National Development Plan (RF-NDP, 2023–2027) both prioritize shifting agricultural production from subsistence-oriented systems toward commercial agriculture.

Furthermore, the National Horticulture Sector Master Plan (NHSMP, 2015–2035) emphasizes reducing heavy dependence on traditional grain crops in favor of high-value crops, particularly vegetables. The plan seeks to promote fruits and vegetables with strong potential for import substitution while expanding export and marketing opportunities. This strategy is expected to stimulate agro-industrial growth and increase value addition in agriculture. In recent years, donor support from development partners has largely targeted the horticultural sector, especially vegetable production, where women account for 88% of vegetable farmers and represent 65% of the agricultural workforce (Sanyang and Saine, 2022).

Despite the strategic importance of vegetable production for food security and income generation, productivity in household gardens continues to underperform due to persistent structural constraints, including limited access to capital and modern inputs, outdated infrastructure, inadequate market access, land and environmental degradation, and insufficient research and extension services (Sanyang and Saine, 2022).

The transition from traditional farming systems to commercially oriented agriculture has been central to agribusiness development discourse (Lala et al., 2023; Nguyen et al., 2023). Home garden commercialization is driven by economic growth, urbanization, and the need to accelerate the agricultural sector's development. Governments in developing countries have promoted the commercialization of home garden produce as a strategy to improve access to adequate food supplies (Abdoellah et al., 2020; Issahaku et al., 2023). This approach relies on modern technologies to maximize productivity and profitability in response to growing demand for nutritious, safe, and affordable vegetables. According to (Issahaku et al., 2023) pointed out that home garden commercialization has the potential to increase smallholder farmers' income and overall well-being. Similarly, Abdoellah et al. (2020) observed that home garden practices have increasingly become integrated into global markets, evolving into more formalized and industrialized agricultural systems.

Numerous studies in developing countries have examined the factors influencing vegetable commercialization, (Abdoellah et al., 2020; Issahaku et al., 2023; Nkomoki et al., 2025). For example, Nambafu et al. (2024) analyzed the determinant of vegetable commercialization in Kenya and found that gender, farm size, payment methods, distance to markets, yield levels, production costs, time required to reach markets, and value addition had significant positive effects on commercialization. Similarly, Sekyi et al. (2020) in a study on the effect of credit access on vegetable commercialization, reported that sex, age, marital status, household size, land size, ownership of nonfarm business equipment, means of transport, membership in farmer associations, asset index, multiple crop production, and location significantly influenced commercialization. Access to transport has also been widely identified as a key factor promoting vegetable commercialization (Sekyi et al., 2020; Tafesse et al., 2020). For instance, Akinlade et al. (2016) reported that membership in farmer associations positively affect vegetable commercialization (. In addition, Gebre & Deshmukh (2024) found that access to market information significantly increases farmers' likelihood of commercializing vegetable production.

While existing literature acknowledges a range of factors influencing home garden commercialization, a nuanced understanding of these factors in the context of The Gambia remains limited. This study aims to fill this gap by examining the determinants of home garden commercialization among smallholder vegetable growers in the West Coast region. By identifying and analyzing these factors, the research contributes to the literature on marketing and clarifies the key drivers of vegetable commercialization. This detailed analysis provides practical insights for policymakers and practitioners seeking to promote vegetable commercialization among smallholder farmers,

particularly for home-garden agricultural commodities.

MATERIALS AND METHODS

Study Area

Kombo North District is in the West Coast Region of The Gambia, stretching along the Atlantic Ocean in the western part of the country. It lies approximately between latitudes Latitude: 13° 22′ 0.012″ North and Longitude: 16° 40′ 0.012″ West (Figure 1). This geographic location places the district within a tropical climate zone characterized by a distinct dry and rainy season, making it favorable for both agricultural and coastal activities. The district is part of the rapidly urbanizing Greater Banjul Area and includes communities such as Bakau, Brufut, Tanji, and Sukuta. The economic activities in Kombo North are diverse, reflecting both rural and peri-urban livelihoods. Agriculture remains a major source of income, with many residents engaged in the cultivation of vegetables such as tomatoes, onions, okra, and peppers. Small-scale horticulture is particularly common among women, who manage communal garden plots. In addition to crop production, livestock production, including poultry and small ruminants, also plays a vital role in household economies. The fertile soils and proximity to urban markets encourage commercial farming practices. Fishing and trade are also key economic drivers in the district. Coastal communities like Tanji and Bakau are known for artisanal fishing, which provides employment and food for local and national markets, Fish processing and sales, often led by women, are common along the coast. Furthermore, Kombo North benefits from its strategic location near major towns and cities, enabling vibrant commercial activity. Local markets serve as hubs for the sale of agricultural produce, seafood, and imported goods. Additionally, tourism, real estate development, and construction are growing sectors, driven by the district's scenic coastline, and increasing urban expansion.

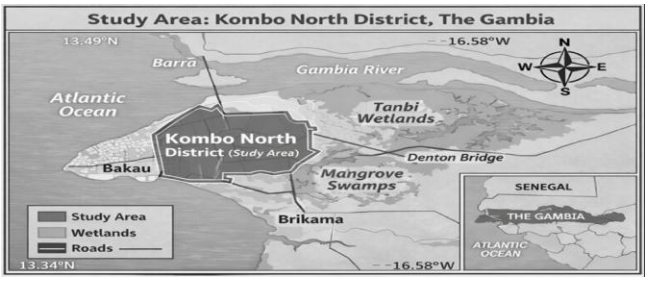


Figure1: Map of the study Area

oSample Size and Sampling Technique

The target population for this research consisted of vegetable growers in the Kombo North District of The Gambia. Data collection employed a multi-stage sampling technique. In the first stage Kombo North District was purposively selected due to its dominance in horticultural production, favorable agro-ecological conditions. In the second stage, four vegetable producing communities Yundum, Busumbala, Lamin, and Banjulinding were purposively selected because of their high concentration of small-scale vegetable growers and proximity to urban markets, which enhances opportunities for commercialization. In the final stage, stratified sampling was used to select participants in commercialization of vegetables. With this, 50 respondents were consulted in each village summing up to a total of 200 respondents were selected, 50 households from each of the four villages. To minimize potential biases, such as non-response and selection bias, we used random sampling to ensure broad representation of vegetable growers in the district. Additionally, follow-up methods and small incentives were implemented to improve response rates. The sample size was determined using Cochran's formula (Cochran, 1997). The formula is illustrated below.

$$n = \frac{z^2 pq}{e^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where, n = Sample size.
Z= confidence level (α = 0.07).
p = proportion of the population containing the major interest,
q = 1- p and e = acceptable error (0.07). Hence, Z = 1.96.

$$n = \frac{1.96^2 (0.5)(0.5)}{0.07^2} = 196 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Data collection

A semi-structured questionnaire survey was used to collect the primary data. The questionnaire was structure as follows: The first section looks at the socio-economic characteristics, such as age, gender, education, and farm experience. The second section focused on the key determinants influencing commercialization such as access to transport, market information, credit, extension agent, membership of farmer associations. Data was collected through in-person interviews by the

principal researcher supported by four enumerators who were well-trained and had previous experience with the household survey. Before collecting data, participants provided their consent through a written statement outlining the study's purpose. Anonymity and confidentiality were assured throughout the research process.

Data Analysis

Household Commercialization Index (HCI) was used to assess the degree of commercialization of garden products in the study area. According to Strasberg et al. (1999), HCI measures the extent to which a household commercializes their agricultural produce. The authors explained that an HCI value of zero shows purely subsistence farming practices, while a value closer to one implies a stronger commercially oriented approach. Moreover, (Strasberg et al., 1999) categorized farmers into three groups based on their HCI level: (HCI ≤ 0.5), semi-commercial farmers (HCI between 0.51 and 0.75), and highly commercial (HCI > 0.75). This categorization was facilitated using Von-Braun's (1994) formula:

HCI=(Total value of vegetable sold)/(Total value of vegetable produce)*100 ……3

Next, the current study used the Tobit regression model with STATA version 12 to identify the determinants of commercialization of home garden products. The Tobit regression model was preferred over the binary Logit model because it assumes that the same factors affect both the choice to commercialize and the extent of commercialization. The ordinary least squares (OLS) model could have been used for this research, but the study used the Tobit regression model since OLS regressions can provide biased estimates of the parameters. The model can be specified as:

γ^*=max (γ^*,O) ……..4

Where γ^* are latent variables derived from the linear regression model in equation 3.

ϒ^*=β_o+Xβ_ι+μ ……..5

Where; ϒ^* = latent variable of the dependent variable and that γ=γ^* when ϒ^* ≥0 and γ=0 when ϒ^*=0 β-estimate parameter, μ = error term X = explanatory variable.

Parameters of the Tobit model does not react immediately to shifting the dependent variable caused by alterations in the explanatory variable. Therefore, we may use the equation 3.6 to determine the marginal effect of changing the explanatory factors on the intensity of agricultural commercialization.

(δε[γ_ι/χ_ι]/(δχ_ι))βφ(βX_ιj)……3.6

With HCI as the dependent variable, the independent variable is specified in the regression equation below:

Y = f (gender, age, education, farm experience, proximity to market, access to transport, access to credit, access to training, belonging to farm association, contact with extension, and access to market information availability).

Table 1. Composition of Sampled Respondents.

Type of Entrepreneurs	No. of Respondents
Farm Entrepreneurs	150
Non farm Entrepreneurs	150
Total	300

RESULTS

Comparison of socio-economic variables between two categories

Table 2 presents the differences in various socio-economic variables of commercial and subsistence vegetable growers in the study area. The findings show that commercialization of vegetable production is significantly associated with access to credit, membership in farmer associations, and access to market information, while gender, education, and contact with extension agents are not statistically significant. Specifically, access to credit has a positive and significant relationship with vegetable commercialization at the 10% level (χ^2 = 4.382), indicating that farmers with access to credit are more likely to commercialize their vegetable in markets than those without. Membership in farmer associations is significant at the 5% level (χ^2 = 7.256), suggesting that collective action and social networks facilitate engagement in vegetable markets. Access to market information also exhibits a strong and significant association at the 5% level (χ^2 = 10.130), implying that informed farmers are substantially more likely to commercialize in market activities. In contrast, the differences in participation by gender (χ^2 = 3.225), education status (χ^2 = 1.714), and contact with extension agents (χ^2 = 0.774) are not statistically significant, indicating that these factors do not independently explain variations in commercialization in the study area.

Level of Commercialization by small scale vegetable gardeners

Table 4 presents the results regarding the extent of commercialization of vegetables by home gardeners. Out of the 140 respondents, the largest proportion (41%, 57

respondents) operate at the semi-commercial level, followed by those at the subsistence level (35%, 49 respondents). Only (24%, 34 respondents) fall within the moderate commercial level. With majority of respondents are subsistence and semi-commercial oriented, the results suggest the sector is still not fully commercialized. The significant proportion of semi-commercial producers indicates considerable potential for commercialization, contingent upon addressing critical issues such limited market access, poor infrastructure, insufficient financing, and inadequate extension services. The results are consistent with Endalew et al. (2020), who reported found low levels of market orientation among smallholder wheat producers.

Determinants of vegetable Commercialization among home gardeners

The determinants of commercialization of vegetables are presented in Table 5. The Tobit regression show several important characteristics that shape commercialization of home garden products. At the 1% level of significance, the model indicates an adequate fit to the data with a likelihood of 275.867 and a chi-square of 38.512.The Pseudo R-squared is 0.13 indicating that 13% of the variations in the dependent variable were incorporated in the model. The determinants of commercialization of vegetables are presented in Table 5. The Tobit regression show several important characteristics that shape commercialization of home garden products. At the 1% level of significance, the model indicates an adequate fit to the data with a likelihood of 275.867 and a chi-square of 38.512.The Pseudo R-squared is 0.13 indicating that 13% of the variations in the dependent variable were incorporated in the model. Table 5 shows six variables that have significant influence on commercialization vegetables.

The regression results show that sex has a significant negative effect (β = -712, t = -2.34, P= 0.021) indicating that female respondents are less likely to be commercialized compared to males. The results indicated women are less like to engage in commercial activities. Market experience also shows significant negative relationship (β = –141, t= -1.97, p < 0.51), with commercialization. This suggests that longer experience in marketing may not necessarily translate to higher levels of commercialization of vegetables.

However, access to transport, the analysis shows that a significant positive relationship (β = 0.536, t=2.57 p = .011) with commercialization of vegetables. The empirical results illustrate that access to transport increase the probability of growers to engage in the commercialization of vegetable by 53.6%. With regards to access to credit have significant positive effects on commercialization (β = 0.774, t=2.82 p = 0.05), highlighting the importance of financial support in enhancing market participation. The means that any one unit increase in access to credits will eventually increase the possibility of participating in vegetable commercialization by 77.4%.

Moreover, membership in a farmer association emerges as the most influential factor, showing a strong positive association with commercialization (β = 1.233, t = 4.21p = 0.01). The empirical findings show that belonging to farm association increase the chance of involvement in the marketing of vegetables by 123.3%. Furthermore, Access to market information was also found to have positively and significantly associated with commercialization (β = 0.525, t = 3.16, p= 0.02). This implies that access to market information increase the probably of engagement in commercialization of vegetables by 52.5%.

DISCUSSION

This research assessed the factors influencing commercialization of vegetables and the study also examine the extent of the commercialization. The findings of this investigation elucidate the primary determinants influencing the commercialization behavior of vegetable home gardeners. The HCI revealed that majority of respondents remain at subsistence or semi-commercial stages, however, a small segment has successfully transitioned toward higher levels of market engagement.

Results from the Tobit regression analysis shows that gender had a negative coefficient and was statistically significant at a 5% level. This implies that women are less likely than men to participate in vegetable commercialization at higher levels. This is because that women are disproportionately affected by societal barriers, such as restricted access to land, inputs, credit, extension services, and decision-making authority. The findings are consistent with Ayele et al., (2021), Nambafu et al., (2024) and Nkomoki et al. (2025), who found that gender had significant negative effect on the commercialization of vegetables.

Access to credit was found to have significant positive effects on commercialization at 1% level of significance.

The implication is that vegetable growers with access to credits are more likely to participate in commercialization of vegetable. With adequate capital, farmers can expand their scale of production, adopt modern technology, and improve the quality and quantity of their produce. These results support empirical findings of Ayele et al. (2021) and Sekyi et al. (2020), who reported that access to credit had a positive relationship with commercialization of vegetables.

With regards to access to transport, the analysis shows that a significant positive relationship with commercialization of vegetables at 1% level of significance. This implies that if vegetable growers have access to transport, they are more likely to have timely delivery of their vegetables in the market. When vegetable growers have reliable means of transport, they can deliver their produce to the market more quickly and in fresh condition, which is highly preferred by buyers. The results is in conformity with the findings of Tafesse et al. (2020) which concluded that access to transport had significant positive relationship with commercialization of vegetables in Ethiopia.

The coefficient of membership of farmer association was positive and significant at the 1% significance level. This implies that vegetable growers that belong to farmer association are more likely to participate in commercialization. The association may enable members to have timely and relevant market information, and other essential services such as inputs, technical advice, and financial facilities. Through collective actions, members are more likely to benefit from range of serves including sharing price updates and market trend. Moreover, belonging to farmer association, increase their bargaining power when securing quality farm inputs. The findings are consistent with the previous studies by (Akinlade et al., 2016; Sekyi et al., 2020) who found that being a member of farm association stimulate farmers' interest commercialization of agricultural products.

Access to market information was also found to have positively and significantly associated with commercialization at 1% significant level. This implies that access to market information increase the probably of engagement in commercialization of vegetables by 52.5%. Similar findings were reported by (Endalew et al., 2020) who found that access to market information had a significant positive relationship with commercialization decision of vegetable growers. The implication is that vegetable growers who have access to timely and relevance market information are more likely to sale their produce. Farmers with accurate make information can make informed decisions about where to sell, when to sell and how to sell. This will reduce their uncertainty and increase likelihood of engaging in commercial activities. However, the study found that other variables such as age, education, distance to market, and contact with extension agents do not have any effect on commercialization of vegetables.

Table 1. Explanation of the variables for Tobit model.

CONCLUSIONS

This study shed light on the key factors influencing home gardeners derive to engage in commercialization of vegetable and the extent to which they endeavor to commercialize. The analysis indicated that vegetable commercialization among home garden growers were significantly and positively influenced by factors such as access to credit, transport, market information and membership in farmer association. The analysis also revealed that majority of home garden growers were subsistence, semi-commercialized and small percent of them are fully commercializing their produce. Based on these findings, the following policy measures are recommended. First, policy makers and government should expand and enhance financial support mechanisms, such as microcredit schemes and agricultural loans, to make them more accessible to smallholder home gardeners, enabling investment in market-oriented production. Second, government and development partners should promote and support formation of farm associations to provide farmers with collective bargaining power, knowledge sharing, and improved access to inputs and markets. Third, prioritize the formation and capacity building of these groups. Providing timely and relevant market information can allow farmers to make informed decisions regarding marketing of agricultural products. Investments in ICT-based solutions, radio programs, and extension services focused on market updates could be highly beneficial. Fourth, improve road networks and affordable transport options to reduce transaction costs and facilitate easier access to markets, particularly for farmers in remote areas.

Table 2. Comparison of socio-economic variables between two categories.

Explanatory variables	Description	Dimensions	Predictable effect
Market participation	market participation decision	Dummy 1=yes,0=otherwise	+
Gender	Gender of respondents	Dummy 1 = Male; 0=otherwise	+
Age	Age of respondents	Number of years	+
Education	Literacy level of growers	Dummy 1=yes,0=otherwise	+
Experience	duration of farming experience	Continuous	+
Distance to market	The nearnesss to the market	Continuous In Kilometer	+
Access to transport services	Access to an all-weather road	Dummy 1=yes,0=otherwise	+
Access to credit	Use of credit	Dummy 1=yes,0=otherwise	+
Training	Attend training	Dummy 1=yes,0=otherwise	+
Membership of farm association	Membership of cooperative	Dummy 1=yes,0=otherwise	+
Contact with extension		Dummy 1=yes,0=otherwise	+
Availability market information	Availability of Market information	Dummy 1=yes,0=otherwise	+

Explanatory Variables	Response	Market participants (%)	Non-Participants (%)	Total	χ^2
Gender	Male	49(67.1)	35 (52)	84(60.0)	3.225
	Female	24(32.9)	32(47.8)	56(40.0)	
	Yes	33 (49.3)	34 (9.33)	85(56.67)	1.714
Education	No	44 (38)	29 (5.33)	65(43.33)	
	Yes	18 (26.9)	32 (43.8)	50 (35.7)	4.382*
Access to credit	No	49 (73.1)	41 (56.2)	90 (64.3)	
Membership of farmer	Yes	19 (28.4)	37(29.2)	84(60.0)	7.256**
association	No	48 (71.6)	36 (49.3)	56(40.0)	
	Yes	20(29.9)	17(23.3)	37 (26.4)	.774
Contact with extension agent	No	47(70.1)	(56(76.7)	103(73.6)	
	Yes	19(26.0)	54(74.0))	54(38.6)	
Access to market information	No	35(52.2)	32(47.8)	86(61.4)	10.130**

Table 3. Level of commercialization of home gardeners.

Commercial level	Range	Frequency	Percent
Subsistent level	0-25	49	35
Semi-commercial level	25-50	57	41
Moderate commercial level	50-75	34	24
	Total	140	100

Table 4. Determinants of vegetable Commercialization by home gardeners.

Variables	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Gneder	-.712	.304	-2.34	.021	-1.313	-.11	**
Age	-.001	.009	-0.07	.94	-.019	.018	
Education	.055	.2	0.28	.783	-.341	.451	
Market experience	-.141	.071	-1.97	.051	-.282	.001	*
Distance to market	-.024	.061	-0.40	.692	-.146	.097	
Access to transport	.536	.208	2.57	.011	.124	.948	**
Access to credit	.774	.274	2.82	.005	.232	1.316	***
Membership of farmer association	1.233	.293	4.21	0	.654	1.812	***
Contact extension agent	.278	.254	1.10	.275	-.224	.781	
Market information	.525	.166	3.16	.002	.196	.854	***
Constant	.553	.494	1.12	.265	-.424	1.53	

Mean dependent var	0.521	SD dependent var	0.501
Pseudo r-squared	0.133	Number of obs	140
Chi-square	38.512	Prob > chi^2	0.000
Akaike crit. (AIC)	275.867	Bayesian crit. (BIC)	311.166

**** p<.01, ** p<.05, * p<.1*

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