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The Determinants of Farmers' Choice of Markets for Staple Food Commodities in Dodoma and Morogoro, Tanzania

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Abstract: Institutional and policy-induced factors affect farmers' decisions on the choice of the market to sell their staple foods. This results in low motivation to participate in the production and agricultural commodities' commercialization. This study determines specific institutional and policy-induced factors affecting the farmers' decisions regarding the staple food market choice in Tanzania. The study uses household survey data collected from 820 farmers raising staple food crops (maize, rice, sorghum, and millet) randomly selected from the Dodoma and Morogoro regions, Tanzania. The index method, descriptive statistics, and choice model (multinomial logit model) are used for data analysis. Qualitative policy analysis is used for analyzing policy-induced factors. Findings show a low level of integration of farmers into staple food markets, with female-headed households facing more hurdles in accessing markets than male-headed households. Age, formal training, the value of agricultural production, membership in organizations, access to credit, contractual arrangements, and distance to markets are significant factors driving farmers to choose a particular market to sell their produces. Restriction of selling and use of staple food commodities, instability of food policy administration, and procedural operation obstacles are found to be key policy-induced factors affecting the marketing of staple food commodities in Tanzania. The scale of production, as depicted by the value of production, and supply contract arrangement with buyers are important factors to ensure that farming households excel in lucrative markets through increased economies of scale and the ability to reach critical volumes for supplying to various markets. Supporting market linkage and infrastructure, as well as enforcing transparent and non-restrictive food marketing policies, would help many farmers enter into contractual arrangements that increase market access and improve market choices.

Keywords: market choice; staple food; policy; institutional; index method

1. Introduction

Interventions that improve the agriculture commodities markets are critical, especially as agricultural transformations are changing Africa. The transformation of the agriculture sector will require farmers to produce efficiently based on market demand according to market signals [1].

Changing farm sizes across Africa and Tanzania, in particular, is an indicator of agricultural transformation signaling opportunities to be harnessed from increased economies of scale [2]. Realizing the opportunities for agricultural transformation go hand in hand with the increasing economies of scale, which require the farmer to have access to reliable markets [3].

Market access is an important aspect for farmers in Tanzania to raise their incomes, reduce poverty, and improve general welfare [4]. Farmers' access to markets improves production and productivity since markets create a pull for the production systems. Market participation leads to rural road development, electrification, and industrialization, since market participation extends some marketing activities, like sorting, processing, grading, and transportation, all increasing the length of the commodity value chain [5,6].

The decision by farmers to participate in a market is heavily determined by the volume of their produce, signifying the availability of surplus for sale [7]. Market participation also depends on both the socio-economic factors of the market participants as well as market features [8]. The transaction costs related to the markets are also key in influencing the market participation of farmers [5]. Studies [9–11] indicate that the market participation of farmers is positively affected by production technology, contract farming, and the collective actions of farmers, including agricultural market cooperative societies.

The participation of farmers in markets depends on the available markets that farmers can select. Market selection involves the process of farmers choosing and selling their produce in different marketing outlets [12]. The decision of farmers to select a particular market/market channel is complex, influenced by many factors conditioned on the farmer, including the volume of the produce, their location, information, the type of the product, and market prices. Other factors include physical access and distance to the markets, farm size, farm assets, age, income, long term investment, level of commercialization, transport, and infrastructure [6,9,12,13].

In the two regions under study, the Dodoma and Morogoro regions, farmers participate in the markets by selling their agricultural produce using various channels. Agricultural commodities sold depend on the agro-ecological zone where farmers conduct their farming activities. Agricultural commodities sold include both crops and livestock commodities. Crops sold include staple food crops and high value or commercial crops [14]. Sunflower, sesame, and grapes are the commercial crops grown and marketed in the Dodoma region. The region is also involved in staple food crops which include maize, rice, sorghum, millet, sweet potatoes, and cassava. The Morogoro region produces and markets sunflower, coconut, sugarcane, and sisal as commercial crops. Rice, maize, sorghum, cassava, and millet are the staple food crops produced and marketed in the region. Many farming households grow and sell a mix of crops, both staple food crops and high value or commercial crops.

Most farmers sell the agricultural produce immediately after harvesting while few farmers store the agricultural produce to gain temporal utility by selling at a later time when prices are reasonably high. The harvesting months for the staple food crops in the Morogoro and Dodoma regions are June to August, depending on the crop. However, some farming households in these two regions are predominantly smallholders mostly operating as small-scale family farms. Under these situations of small-scale family farms, commercialization or market-oriented production is minimal, leading to an immediate sell after harvest [15]. Farmers usually sell their agricultural produce to village aggregators as agents or even sell in the local open markets where agents collect for the local traders who are always based at district and region levels. The channels of selling are location specific from sub-village/hamlet, village, district, region, and export markets. Some farmers sell at the household level through sub-village/hamlet or village aggregators without sending to open markets.

Factors affecting farmers' decision regarding their market choice is studied by many scholars in Africa. Many studies concentrate on socio-economic factors and market characteristics. Studies of institutional and policy-induced factors affecting farmers' market choices are rare. This study contributes to filling this knowledge gap by incorporating the institutional and policy-induced factors into the study of factors affecting farmers' decisions on market choice. This study intends to answer the key question regarding the market choice of rural households in Tanzania when it comes to what

drives farmers to choose a particular market. The study starts by outlining the key features of markets, farmers, the markets chosen, and their level of integration in the staple markets (maize, rice, sorghum, and millet). Finally, the study ascertains what drives the choice of the market by farming households.

2. Methodology

2.1. Data, Sampling Procedures, and Sample Size

The study uses a household survey dataset collected in 2017 through the project "innovative pro-poor strategies that safeguard food security using technology and a knowledge transfer". In addition to supporting access to markets, the project looked at other strategies (innovative pro-poor strategies) that farmers can use to sustain and increase staple food crop production. These strategies act as coping mechanisms and stabilizers of the economic status of farming households. These strategies include rainwater harvesting and fertilizer micro-dosing; pyrolysis for energy and biochar production in rural areas; use of improved maize sheller and millet thresher machines for reducing human labor in rural areas; use of improved wood supply on-farm, education, and tree planting; wood supply and environmental sustainability in rural communities; using improved firewood cooking stoves; sunflower processing for high quality cooking oil; optimized storage for earning better prices and for improved grain quality; poultry-crop integration for enhanced rural income and food security; mobile integrated market access system; and household-centered nutrition training and kitchen gardens of green leafy vegetables for improved dietary diversity and family health.

The dataset contains data collected from the Dodoma and Morogoro regions in Tanzania. The data were collected from two districts, the Chamwino district in the Dodoma region and the Kilosa district in the Morogoro region. The districts were purposively selected based on their similarity in staple food crops farming systems. The farming systems of both districts are characterized by maize, rice, sorghum and millet among other staple food crops. The dataset contains 820 households that were randomly selected from village household lists provided by local government authorities and research institutions. Three villages were randomly selected from each district; Ilakala, Changarawe, and Nyali in the Kilosa district, Morogoro region, and Ilolo, Idifu, and Ndebwe in the Chamwino district, Dodoma region. The sampling lists provided were sorted alphabetically, thereafter 137 households were randomly selected from each village, resulting in a total of 822 households overall. Two households were removed from the dataset because of missing, unreliable, and inconsistent answers. Thus, the final sample size is 820, from which 559 households are involved in the marketing of staple food commodities (maize, rice, sorghum, and millet).

2.2. Analytical Framework

Descriptive statistics and the multinomial logit model (MNL) are used in the analysis. Policy issues are identified qualitatively in the study areas. Qualitative policy analysis follows the three steps suggested in Bardach [16]: content analysis, identification of factors for comparison, and setting evaluation questions. The content analysis involves reviewing existing policy documents. The policy documents reviewed are the 2003 trade policy, the 2013 agricultural policy, and the 2008 agricultural marketing policy. These are the key documents guiding the agricultural trade and marketing policy environment in Tanzania. Within the context of this study, policies were extended to include unwritten statements based on decisions made by government officials whose decisions authoritatively affect the agricultural marketing chain [17]. The evaluation questions are: (1) What are the best practices in food marketing policy administration? and (2) What policy issues prevent farmers from taking part in staple food markets?

Before the estimation of the choice model, the descriptive statistics are supported by the construction of the farmers' market integration index. The farmers' market integration index is constructed to depict the extent to which farming households are integrated into markets. The index is constructed on the basis of how farmers participate and sell products in various markets. The farmer's

market integration index (FMII) is calculated using the formula shown in the following equation (Equation (1)).

$$FMII_i = (\gamma_1 \text{x } m_1) + (\gamma_2 \text{x } m_2) + ...(\gamma_i \text{x } m_k) \quad (1)$$

Where: γ represents the proportion/percentage estimate of the products sold on that particular market, and m represents the index assigned to the market where the farmer sold the produce. These indices are 0 if a household did not sell the produce; 1 if sold to a sub-village/hamlet; 2 if sold to the village; 3 if sold outside the village but within the district; 4 if sold outside the village but within the region; 5 if sold outside the region but within Tanzania; and 6 if the household sold outside Tanzania (exported). The sub-village is the lowest administrative structure of the village, sometimes called hamlet. The collection of hamlets/sub-villages forms a village. As an example, if the household sold 40% of its products at the village level and 60% outside the village, then the farmer's market integration index is calculated as (0.4 × 2) + (0.6 × 3) = 2.6. The value 2.6 is less than 3, showing that the particular farming household participates or is integrated into sub-village/hamlet and village level markets. The higher the value, the higher the extent of integration into markets. The assumption under the index is that if the farmer participates in high-end markets, such as export markets, then the probability of being integrated into markets is high.

The farmers' market choices are modeled using the random utility framework (RUF). The RUF is key in guiding the farmers in making choices among alternatives that maximize their utility [18,19]. The RUF uses different choice models such as logit (binary, ordered, and multinomial) and probit models among others. Given the fact that farmers are confronted with multiple choices, the multinomial logit model (MNL) presented in Equation (2) is used to determine the factors that drive farmers to choose a particular market.

The MNL in Equation (2) estimates the probability of a farmer "*h*" having a set of socio-economic characteristics; institutional factors; and market characteristics, choosing a market "*i*" such that,

i =1; sub-village/hamlet market

i =2; village market (village level market)

i = 3; outside the village but within the district (district level market)

i = 4; outside the village but within the region (region level market)

i =5; outside the region but within the country

$$P(Y_h = i) = \frac{\exp(\beta'_i X_j)}{\sum_{i=1}^{5} \exp(\beta'_i X_j)}, \text{where } i = 1,\ 2, 3, 4, 5 \text{ and } X_j = X_1, X_2 \ldots\ldots X_8. \quad (2)$$

A set of socio-economic characteristics, institutional factors, and market characteristics conditioned on a farmer are presented in Table 1. The expected signs of the explanatory variables used in the multinomial logit model imply that they increase or decrease the relative or average likelihood that the farming household will sell the staple food commodities in the particular market of choice. The positive sign implies that the explanatory variable under consideration increases the relative or average probability of choosing among the set of market alternatives and vice versa.

The plot manager refers to the person at the household level who makes most decisions regarding the farm enterprise and is highly involved in the production activities. It refers to the head of households in some of the households. The sex of the plot manager being male is expected to reduce the probability of selling at lower-level markets. This is because women in many African countries face hurdles in transporting agricultural produce to distant markets. An increase in the age of the plot manager reduces the ability to look for other markets, hence increasing the probability of selling at lower-level markets. Formal training and education, as measured by the number of years spent (0 years means they did not attend any formal training; less than 7 years means they attended primary school but did not complete it; 7 years implies a primary education; 8 years means that training was received after primary school; 9–14 years indicates secondary school attendance; and 15–16 years indicates training

after the secondary schooling received, either through technical colleges or universities), is expected to create awareness for the farmer, improving their ability to network and obtain market information easily, thus improving the decision making on market choices.

Table 1. Market characteristics, socio-economic, and institutional factors for the multinomial logit model.

Factor	Variable	Definition	Expected Sign
Socio-economic characteristics	Sex	x_1 = Sex of the plot manager coded as 1 if the plot manager is male and 0 otherwise	–
	Age	x_2=Age of the plot manager in years	–
	Education	x_3 = Education level of the plot manager expressed in years spent in formal training	+
	Quantity and value of agricultural production	x_4 = value of agricultural production calculated as quantity produced at kg x price per kg in Tanzanian Shillings (Tsh)	+
Institutional factors	Membership in organizations	x_5 = membership in organizations coded as 1 if a member in various organization and 0 if not a member	+
	Access to credit	x_6= access to credit coded as 1 if the household had accessed credit within the reference period and 0 if did not access	+
	Contractual arrangement	x_7 = contractual agreement coded as 1 if the household had the contractual agreement with the buyer and 0 if no contract.	+
Market characteristics	Distance to markets	x_8 = Distance from homestead to the market in kilometers	-

The large value of agricultural production is affected by a large volume or scale of production, type of product, and prices. It signifies the ability of the household to reach critical volumes of production that can be transported and sold in distant and lucrative markets, thus reducing the relative probability of choosing low-level markets. This is spurred by the ability of the household to access credit that finances their farming and marketing activities. Collective action, as proxied by the participation of the household in collective action activities through having membership in various organizations, is expected to increase networking and, hence, the ability to make informed decisions on market choices. Possession of the supply agreement/contractual agreement implies already secured markets and structured commitment to production and supply, thus increasing the relative probability of choosing better markets. Distance to markets is also important, as an increasing distance to the market increases the probability that the household sells in the proximity. This is joined up with the existing means of transportation, infrastructure, and costs of logistics.

Before the estimation of the model, specification tests were done. Farm size (total household cropland in hectares and total household annual farm income are dropped due to multicollinearity issues, both are correlated with the value of agricultural production calculated as quantity produced in kilograms multiplied by the price per kilogram in Tanzanian shillings. When collinearity diagnostics are conducted, the remaining variables shown in Table 1 give the allowable variance inflation factor of 1.06, which is tolerable, indicating no further multicollinearity problem.

3. Results and Discussion

3.1. Socio-Economic Characteristics of Farming Households Involved in the Study

Sex, age, and education of plot managers vary across the markets accessed by farming households. The sex of the plot managers is highly skewed, with a large proportion being men (80%). None of the female-headed households accessed markets outside villages in the region or outside the region within Tanzania (Table 2). This is because women face hurdles in transporting their produce to distant markets. These hurdles are due to the poor means of transport available, poor rural roads, and the high costs of logistics in rural areas.

Table 2. Characteristics of plot managers involved in the study.

Socio-Economic Variable		Market					
		Sub Village/Hamlet (N = 403)	Village (N = 122)	Outside Village but within the District (N = 14)	Outside Village but within the Region (N = 12)	Outside the Region but within Tanzania (N = 8)	Total (N = 559)
Sex (%)	male	79.90	77.87	78.57	100.00	100.00	80.14
	female	20.10	22.13	21.43	0.00	0.00	19.86
Age (%)	Youth (≤35 years)	19.11	21.81	57.14	25	50	21.11
	Adult (36 to 59 years)	53.85	55.74	35.71	75	25	53.85
	Old (≥60 years)	27.05	22.95	7.14	0	25	25.04
Education level (%)	Not completed formal education	15.88	14.75	14.29	25	25	15.92
	Primary education	48.39	62.30	57.14	66.67	62.5	52.24
	Secondary to tertiary education	35.73	22.95	28.57	8.33	12.5	31.84

Youth (less than or equal to 35 years of age)-managed households are few (21%), with results indicating that many (79%) heads of households are older than 35. In situations where youth-headed households are involved in selling their agricultural produce, results indicate that they are more eager to access markets outside their villages than an adult or old-age-headed households. This implies that increased export potentials can be tapped from the agricultural sector based on the high participation of youth in farming and agricultural marketing. Additionally, formal education improves access to markets outside the rural villages. The outside village-level markets are more frequently accessed by households whose plot managers had attended formal training than those who did not complete formal training education.

Access to credit, membership in organizations, and farm sizes varied across the markets accessed by farmers ($p < 0.05$). Participation in collective actions for social capital and other relative advantages are found to be moderate. These collective action activities in rural areas include participation in the Agricultural Marketing Cooperative Societies (AMCOS), Savings and Credit Cooperative Societies (SACCOS); Rotating Saving and Credit Associations (ROSCAs), and irrigation cooperatives or associations. Participation in collective actions is important, as it uses opportunities of economies of scale, improved participation in markets, and generated social capital through networking.

Results indicate that 55% of farming households are members of various organizations. Farmers who are members of various organizations are more likely to access markets outside Tanzania than farmers who are not members of any organization (not involved in collective actions). Results further show that 95% of the farmers involved in the survey are smallholders with farms not exceeding 5 hectares (ha). Few farmers (5%) have medium-sized farms (exceeding 5 ha but less than 100 ha) and none fall into the category of large-scale farmers (>100 ha farm size). This concurs with the earlier findings of Jayne et al. [2], who indicate that in many African countries, including Tanzania, land sizes are changing, implying the persistent graduation of smallholder farmers to medium-scale farmers. Additionally, few (27%) farming households have accessed credit (Table 3).

3.2. The Extent of Farmers' Market Integration

The market integration of farmers is found to be low, implying that few farmers participate in distant markets, such as regional and international markets. Results indicate that about 94% of the farming households have a market integration index that does not exceed 5, confirming that only a few farming households' access beyond district level markets (Table 4). A low market integration index suggests low participation of smallholder farmers in markets, due to the low quantities sold. The low quantities sold are linked to the nature of the production system that has a low level of commercialization. The available surplus for sale was low, thus farmers are not benefiting from economies of scale and the ability to reach critical volumes. The inability of farmers to reach critical volumes that warrant participation in markets may be due to various constraints that are not explored in this study. The study [4] reports resource and technological constraints, including low productivity,

inefficient use, and allocation of agricultural production inputs that affect the ability of farmers to obtain marketable surplus.

Table 3. Socio-economic characteristics of farmers and market used.

Socio-Economic Variable (%)		Market					
		sub Village/Hamlet (N = 403)	Village (N = 122)	Outside Village but within the District (N = 14)	Outside Village but within the Region (N = 12)	Outside the Region within Tanzania (N = 8)	Total (N = 559)
Main occupation (0.125) ‡	Agriculture	98.75	95.87	100	100	100	98.19
	Off-farm activity	0.5	1.65	0	0	0	0.72
	Others	0.75	2.48	0	0	0	1.08
Farm size (0.025) **	Smallholders (0–5 ha)	95.58	95.90	92.86	75	100	95.17
	Medium scale (>5 ha but ≥100 ha)	4.47	4.10	7.14	25	0	4.83
Access to credit (0.046) **	Accessed	25.1	36.89	35.71	16.27	0	27.55
	Did not access	74.69	63.11	64.29	83.33	100	72.45
Membership in organizations (0.012) **	Member	52.85	39.34	28.57	50	87.5	49.73
	Not a member	47.15	60.66	71.43	50	12.5	50.27

** Significant at the 5% probability level based on chi-square statistics. ‡ Values in brackets are *p*-values to show the level of significance.

Table 4. The extent of farmers' market integration.

Market Integration Index	Frequency	Percentage
1–5	523	93.56
6–10	31	5.55
Greater than 10	5	0.89
Total	**559**	**100**

3.3. Features of Markets Accessed by Farming Households

Distance to markets, means of transport used to access the markets, and the structure of the market linkages are explored to depict the structure of the markets accessed by the farming households. It is found that many farmers (60%) sell their produce on the farm, indicating that the distance to their markets is 0 kilometers (km). About 34% of farmers sell their agricultural produce in markets that are 50 km or more away from their homes and the remaining 6% sell their produce in markets that are less than 50 km away, as indicated in Figure 1. This indicates that farmers access markets that are not far from their farming households. This is further validated by the means of transport used in transporting their produce to markets. It is found that only 5% of the farming households use vehicles to transport their agricultural produce to markets. This implies that farmers are not involved in long-distance markets. The involvement of farming households in distant markets is found to be impeded by their low scale of production and limited access to new emerging market opportunities.

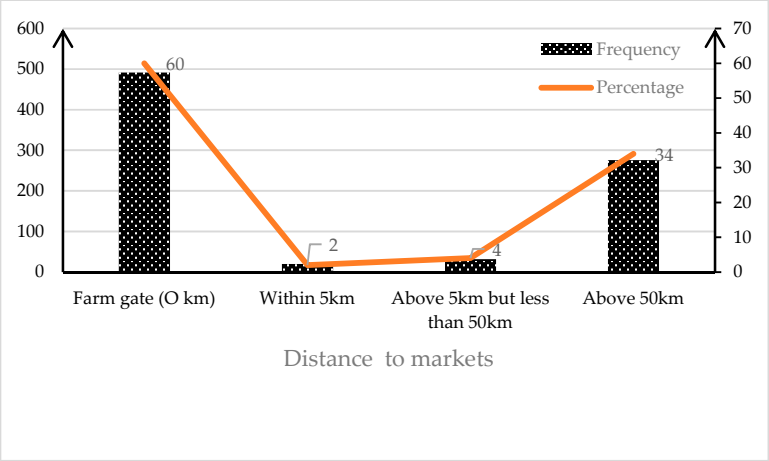

Figure 1. Distance to markets accessed by farming households.

The structure of market linkages shows that many farming households (98%) sell their agricultural produce to buyers with whom they do not have contractual agreements. Of the few (2%) with contractual agreements, the contract was typically oral. Results indicate that only 0.2% of the farmers have written contractual agreements with the buyers of their agricultural produce.

3.4. Factors Affecting the Market Choice

3.4.1. Socio-economic, Market Characteristics, and Institutional Factors

Age, level of education, and value of agricultural production are socio-economic factors that significantly influence farming households for the selection of marketing channels to use ($p < 0.05$). Results (Table 5) show that an increase in the age of the farmer increases the likelihood that their household will sell their produce at the sub-village and village level markets. This is because it is found that a one-year increase in the age of the plot manager reduces the average probability of selling at district level markets by 0.001. An increase in the age of the person responsible for marketing decisions in the household reduces the chance of a correct selection of the marketing channel, thus affecting market participation. This depends on the type of crop and seems more relevant for the staple food crops. An increase in age is similarly found to influence market choices, affecting market participation in the study by Arinloye et al. [12] of banana farmers. This finding was different in the study involving staple food crops by Abafita et al. [20] in Ethiopia.

Surprisingly, the education level of the plot manager is found to increase the probability that the household sells at the lower level markets that are sub-village, village level, and district level markets. Results confirm a decrease by 0.442 of the relative probability of choosing to sell in region level markets from an increase in the level of education of the plot manager by each additional year spent in formal training. This can be linked to the ability of the household to attract buyers to come and buy at the household as the level of education of the plot manager increases. These findings are similar to those of Maponya et al., and Arinloye et al. [8,12] that describe knowledge as an important factor in the market selection, especially when selling staple food commodities.

The scale of production is an important driver for the decision of the household to choose a specific market. The increase in the value of agricultural produce obtained by the household is found to reduce the chance of the household to sell in sub-village and village-level markets. It is found that a one Tanzanian shilling increase in the value of agricultural production is associated with a 0.001 increase in the relative probability of choosing to sell at district level markets versus selling at sub-village/hamlet markets. The scale of production represents economies of scale for the household involved and it is important in the market choice decision. Some studies, including Abafita et al., and Oparinde and Daramola [20,21], link the scale of production to farm size and the quantity harvested from the farm, both positively affecting the probability that farmers participate in the markets. Producers with significant volumes of products have a marketable surplus and hence are likely to select some lucrative markets.

Membership in organizations and access to credit significantly enhance access to markets beyond village-level markets. The situation of a farmer being a member of a particular organization decreases the average probability of selling at the village level by 0.132. In other words, using exponentiated coefficients, the relative probability of selling at the village level is 41% less for farmers that are members of organizations. Nevertheless, when the farming household has accessed credit, the chance of selling at the village level market increases. Findings show that access to credit of the farming household increases the average probability of selling at the village level markets by 0.170. This could be facilitated by the credit repayment mechanisms or the need to have immediate cash to service the credit. Many of the credit organizations are linked to buyers, who hence arrange collections at the village level to allow smooth repayment of the credit by the farming households. Membership in various organizations creates networking among farmers, increasing the integration of farmers in the markets. Memberships in organizations such as Agricultural Marketing Cooperative Societies, Savings

and Credit Cooperative Societies, Rotating Saving and Credit Associations, and irrigation cooperatives or associations facilitate access to markets, market information, and credit.

Table 5. Determinants of farmers' choice of markets.

Within the Sub-Village/Hamlet (Base Outcome)				
Y_h	**Variable**	**Coeff.**	$p > \|Z\|$	**mfx**
Within the village	Sex	0.555	0.111	0.205
	Age	0.000	0.983	0.001
	Education	−0.033	0.611	−0.001
	Agric value	0.000	0.637	0.002
	Membership	−0.900 ***	0.001	−0.132
	Credit	0.985 ***	0.000	0.170
	Contract	0.508	0.699	0.280
	Distance	0.214 ***	0.000	0.030
	Constant	−1.641	0.033	
Outside the village but within the district	Sex	0.472	0.701	0.064
	Age	−0.073 **	0.046	−0.001
	Education	−0.287	0.109	−0.004
	Agric value	0.001 **	0.013	0.000
	Membership	−1.380 *	0.072	−0.019
	Credit	0.205	0.816	0.000
	Contract	−26.772	1.000	−0.555
	Distance	0.257 ***	0.000	0.003
	Constant	−0.002	0.999	
Outside the village but within the region	Sex	−15.066	0.993	−0.274
	Age	−0.046	0.164	−0.001
	Education	−0.442 **	0.028	−0.007
	Agric value	0.001 ***	0.002	0.000
	Membership	−1.090	0.180	−0.012
	Credit	0.176	0.853	0.002
	Contract	4.274 ***	0.006	0.181
	Distance	0.259 ***	0.000	0.002
	Constant	14.614	0.994	
Outside the region but within the country	Sex	−16.018	0.993	−0.035
	Age	−0.015	0.887	0.000
	Education	−0.186	0.785	−0.000
	Agric value	−0.002	0.396	−0.000
	Membership	3.793	0.295	0.012
	Credit	−10.964	0.993	−0.030
	Contract	−21.756	1.000	−0.051
	Distance	0.322 ***	0.000	0.000
	Constant	8.343	0.996	

Number of observations = 559; likelihood ratio $chi^2(32) = 198.84$; prob > $chi^2 = 0.0000$; McFadden's pseudo R-squared = 0.479; and mfx implies average marginal effects. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Contractual arrangements significantly influence farming households to access lucrative markets. Results indicate that having contractual arrangements with the buyer increases the average probability of selling at the regional level markets by 0.181. Contractual arrangements influence the market choice decision and when farmers have supply contracts, their eagerness to invest in productivity-enhancing technologies, such as fertilizer and improved seed varieties, increases alongside the use of good agricultural practices.

The increase in the distance to the markets increases the average probability that the household will sell at the proximity market. Results reveal that a one-kilometer increase in the distance to the market is associated with an increase in the relative probabilities of selling at village level markets, district level markets, region level markets and outside the region level markets by 24%, 29%, 30%,

and 38% respectively. This implies that the distance to the market is a critical determinant in accessing various market choices. These findings are similar to those of [9,13,22], which all found that proximity to the market is a key factor driving the market choice of farming households.

3.4.2. Policy Induced Factors

We found additional policies that affect the choices of export markets and other distant domestic markets. Five specific factors that influence market choices were identified in the qualitative policy analysis. The policy documents support the use of administrative barriers to marketing. The use of administrative barriers to marketing, based on the grounds of food security reasons, is found to result in two main marketing restrictions: (1) restrictions from selling staple food commodities in the form wanted by buyers; and (2) restrictions regarding the use of staple food commodities implemented by regional and district authorities in the study areas. These restrictions include a prohibition of the sale of green maize, restrictions on selling raw maize in the export market and being required to add value to sell value-added maize (mostly flour), as well as restricting the use of maize and sorghum for brewing beer in the rural areas.

An unstable staple food policy is found to be another factor that affects marketing. We found ad hoc export bans that affect future contracting and investments in the production of staple food commodities. The export ban has been lifted, but producers are not confident, fearing that it might be abruptly reintroduced, thus affecting their marketing decisions. Diao and Kennedy; and Porteous [23,24] have similar findings, showing that the export ban not only affects the marketing decisions of farming households but also production supply responses and the entire agricultural growth of Tanzania.

Additionally, procedural operation obstacles, such as long processes in accessing permits for selling the commodities in the export markets and poor enforcement of standard weights and measures are other key factors affecting the marketing choice decisions of staple food crop commodities. We find that the level of knowledge regarding the use of weights and measures to be low, thus farmers are afraid to access markets that use standardized weights and measures. On the other hand, the use of unstandardized weights and measures means that some farming households do not sell at low-level markets because these markets lack good and standard measures. Low-level markets, especially sub-village/hamlet and village level markets, are reported to use tins and bags that are not standardized to standard units such as kilograms. In rural areas, when standard weights and measures are used, some farming households claim that the beam/spring balances used are always manipulated and adjusted to favor the buyers.

4. Conclusions

Farming households are not well integrated into markets. Many farming households participate in village-level markets. The contractual arrangement is a key influential factor for staple food market choices. The other factors are age, formal training, the scale of production, membership in organizations, access to credit, and the distance from the homestead to the market. Policy-induced factors must also be considered, as they exert some market restrictions that affect the marketing of staple food commodities. The scale of production, as depicted by the value of production and supply contract arrangement with buyers, is important for ensuring that farming households excel in lucrative markets through increased economies of scale and the ability to reach critical volumes for supplying various markets.

In fostering farming households' market integration through reliable market choice options in rural Tanzania, we recommend supporting market linkages, infrastructure, and policy reforms. Market linkages should be through facilitating supply and purchase agreements between farmers and buyers of staple food commodities. Market infrastructure, including storage facilities, rural roads, and telecommunications will increase access to market opportunities, reduce transaction costs, and support long-distance marketing. Policy reform is required to ensure non-restriction and transparency in marketing policies, thus ensuring consistency between food and marketing policies.

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