

MARKETING CHANNEL PREFERENCE AMONG SMALLHOLDER COCOYAM FARMERS IN SOUTH AFRICA

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Abstract. Marketing channel choice makes important contributions to smallholder farmers' incomes and other livelihood attributes in developing countries. Often considered from several perspectives, the dominant view articulated suggests an advantageous integration into formal market channels. This position is questioned as it has implications for smallholder farmers' food security and rural incomes. Using a mixed-method approach, the study collected primary data from 174 smallholder farmers and applied both a descriptive and multinomial logit regression model to analyze factors contributing to cocoyam production and market channel choices of respondents in the study area. Findings indicate that financial returns and available markets were key factors in cocoyam production. At the same time, the amount received was a driver of market channel choice of 89% of respondents who sold directly at the farm gate. Farmers' age ($p = 0.044$), household size ($p = 0.043$), distance to market ($p = 0.021$), additional income ($p = 0.017$), and amount received ($p = 0.014$) were significant variables ($p < 0.05$) in the determinants of market channel choice. The study recommends improving market information provision and strengthening farmer associations, enabling smallholder farmers in rural communities to make informed choices regarding production price, access other markets, and consolidate their collective market bargaining position.

Keywords: cocoyam, developing countries, farm-gate, market channel, regression, smallholder farmers

INTRODUCTION

Cocoyam is a food crop grown mainly in rural communities across Africa by subsistent farmers. It is highly valued for its contribution to household food security. In addition, its superior storage capacity of other tuber and root crops has been recognized (Boakye-Achampong et al., 2017). Cocoyam is a staple food for many people in developing countries of Africa, Asia, and the Pacific. It is a member of the *Araceae* family, namely *Colocasia esculenta* and *Xanthosoma sagittifolium*. It is considered to have originated in the Indo-Malaysian region, Asia, or Central and South America, with its provenance remaining a point of debate. The FAO (2012) considers it one of the world's most important root and tuber crops domesticated in rural communities across Africa and other continents (Ramanatha et al., 2010). *Colocasia esculenta* is a tropical plant grown primarily for its edible corms, commonly known as taro, amadumbe, or cocoyam. It is widely cultivated in high rainfall areas under flood conditions, usually by smallholder farmers.

The versatile cocoyam crop plays a vital role in the livelihoods of many rural farmers and dwellers as it contributes to their dietary calories and household incomes, especially during lean or hunger periods (Azeez and Madukwe, 2010; Onyeka, 2014). Widely found in East, West, and Southern Africa, smallholder farmers grow this crop to increase food security and supplement

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their incomes. It is consumed by people of all ages but is particularly given to weaned children and usually sold at the farm gate (Talwana et al., 2009).

In South Africa, amadumbe, as it is known among locals in the isiXhosa and isiZulu language, has been cultivated by villagers in the Eastern Cape and KwaZulu-Natal provinces for so long that it is erroneously regarded as an indigenous food crop. Amadumbe is an important staple crop in the sub-tropical coastal areas of the Eastern Cape and the rest of coastal KwaZulu-Natal Province. According to Modi and Mabhaudi (2016), it is also cultivated, though to a lesser extent, in the subtropical and tropical regions of Mpumalanga and Limpopo provinces. Though the crop remains unpopular and relatively unknown outside KwaZulu-Natal and Eastern Cape provinces, where it is cultivated mainly for subsistence (Lewu et al., 2010), the recent marketing of this traditional vegetable and staple food by well-known retail food chains has suddenly improved its status among South African consumers.

Despite the importance of cocoyam to food security, scientific and economic research on it is scanty in South Africa and many other parts of the continent (Mare, 2009; Quaye et al., 2010). Furthermore, the production system is regarded as informal, managed outside conventional markets and economic channels. Yet, cocoyam contributes substantially to the food and income security of many rural households in the region (Talwana et al., 2009). The same situation was reported in West Africa, where Quaye et al. (2010) outlined the socio-economic importance of this crop in Ghana. However, its production is also beset with challenges such as lack of improved varieties for commercial production, post-harvest losses, and marketing via informal channels.

Research related to the dominant channels used in marketing the cocoyam crop has not been comprehensively explored and remains a gray area in the literature. Though widely consumed by the population, its production is confined to smallholder and subsistent farmers; the crop is mainly sold at the farm gate and found within local, street, or village markets. This study hence explores the marketing channel preferences of smallholder cocoyam farmers within a rural area.

STUDY QUESTIONS

To achieve the aim of this study, the following research questions were formulated.

1. What are the demographic characteristics of the smallholder cocoyam farmers?
2. How do these smallholder farmers rank the factors influencing their decision to produce cocoyam?
3. Which market channel(s) do smallholder farmers use to sell cocoyam in the area?
4. What factors contribute to the identified market channel preferences of these smallholder farmers?
5. What demographic and farm-specific features impact their market channel preferences?

LITERATURE REVIEW

The market outlet choice is a vital farm household-specific decision by farmers to sell their products through different channels to generate higher returns (Shewaye, 2016). Marketing channel choice is often considered one of the most complex and challenging decisions facing smallholder farmers (Ntimbaa and Akyoob, 2017). They have to choose relevant market outlets based on proven utility maximization of existing alternatives, clear comparative advantages in bargaining, and easy accessibility of the market channels for their farm products. The smallholder farmers' decision to select appropriate market outlets can be affected by various factors such as demographic, institutional, socioeconomic, and access to specific marketing outlets. Access to output markets is also directly linked with agricultural incomes, which play a pivotal role in smallholder farmers' livelihoods (Liu, 2018).

The farmers' decision to utilize a given market channel is often studied within a number of general frameworks, including a livelihood approach, value-chain development, transaction costs, and utility or profit maximization. Within these frameworks, smallholder farmers are often regarded as economic agents whose market channel choices can be measured by perceiving utility or net benefits from any chosen option. While the utility is not observed directly from the actions of economic agents, it can nonetheless be examined through choices made. Markets are also considered very important within the subsistence strategy of rural households (Otegunrin et al., 2019). Due to this, market channel choices of farmers have been studied based on the specific agricultural product, crop, or livestock. Thus, the marketing channel preferred by a particular group of farmers may differ based on crop or livestock type, while the determinant factors for channel choice may also be different.

For smallholder farmers, the marketing of agricultural commodities remains a challenge (Umberger et al., 2015), whereas reliable and ready markets serve as an incentive for producers to increase their farm outputs. However, high transaction costs associated with formal markets were reported, considering the need for farmers to comply with stringent quality standards and volume requirements (Nxumalo et al., 2019). By developing the capacity to sell to an institutional buyer, smallholder farmers may acquire the knowledge, skills, and confidence needed to enter formal markets. Empowering these farmers through commercial opportunities requires an understanding of the drivers of farmers' marketing channel choices, the available marketing options, the characteristics of each channel, and the tradeoffs inherent in the selection of a marketing strategy (Amani, 2014). Past studies reveal that informal markets are more accessible than formal markets, and the product price was a major determinant of market channel choice. Where smallholder farmers receive better prices from informal markets, Zivenge and Karavina (2012) aver that these markets offer greater prospects for the development of communal farmers, contributing positively to rural welfare, household incomes, and livelihoods. Smallholder farmers may also engage in transactions at lower prices, resulting from inadequate storage facilities to avoid transaction costs associated with searching for higher prices (Adeoti et al., 2014; Osmani et al., 2015).

The majority of trade that links small-scale producers and low-income consumers in developing and emerging economies is informal. In addition, any market links, whether to street markets or at the farm gate, have long-term importance for the development of smallholder farmers and strategies aimed at reducing poverty and hunger. An identification of the market channels which are beneficial to local smallholder farmers is therefore considered very important for development practitioners (Seville et al., 2011). While there are competing narratives about the market context for smallholder farmers, their role in local food security has been widely recognized.

Smallholder farmers use several strategies to secure their livelihoods to ensure that their food requirements are met, with enough income generated for their immediate consumption needs, other social purposes, and farm investments. Hence, interaction with agricultural markets is an essential part of these strategies. Markets are where, as producers, smallholders buy their farming

inputs and sell their products; they are where, as consumers, smallholders use income from the sale of crops or their non-agricultural activities to purchase food and other consumer goods. Therefore, improved market access is not only crucial for better-off producers or the production of cash crops rather than food crops; it is also essential for smallholder farmers (IFAD, 2003).

In the development literature, resource-constrained people adopt informality as a choice to secure their livelihood and food security, despite the evolution of markets toward formality. The participation of smallholder farmers in the mainstream economy and rising global food prices have been discussed among scholars and policymakers, and now these issues are topical and urgent for two reasons. Firstly, in development policy, there are presently much higher expectations of the formal private sector to act as an engine of development. With renewed concerns about food security due to rising food prices, resource constraints, climate change, urbanization, and growing population, much policy has focused on linking smallholder farmers with modern value chains and other formal markets. Secondly, there is a policy and intellectual bias against informality that has taken shape in recent times. Informality is now often viewed as a deadweight that perpetuates poverty and impedes the development of the private sector (OECD, 2009). The dominant globally accepted models for the development of small-scale producers focus on market-inclusion approaches within the value chain development.

Vorley (2013) asserts that for some farmers, especially smallholders in rural areas, when formality is neither affordable nor viable, embracing the informal sector may not be a choice at all; furthermore, not participating in high-value formal chains is not always a question of exclusion. Some producers make a conscious choice not to become involved because, compared to informal channels, the entry costs and barriers are too high, and the rewards are considered too low. Baiphethi and Jacobs (2009) note that subsistence or smallholder production can increase food supplies and thus cushion households from food price shocks, thereby improving their household food security. The dominant narrative regarding formal market inclusion for smallholders was also questioned (Nxumalo et al., 2019). Smallholder farmers may exhibit subjective attitudes where their personal preferences drive reluctance to engage with certain market sources. When price received is not the only factor

explaining smallholder farmers' choice of market channels and the personal relationships involved, including issues of perception and trust, are prominent; then, their marketing channel preferences matter whether they participate or not in the formal supply chains.

Typically, there are three most common marketing destinations for the produce of smallholder farmers, namely fresh produce markets, informal markets, and supermarket chains. From the literature, we extracted core reasons why informal markets may present the most viable and attractive option for smallholder or subsistence farmers, especially in rural communities. Firstly, supermarkets supposedly make foods available at lower prices than informal vendors in local markets because of their economies-of-scale advantages in procurement. Secondly, competitors for the local demand, especially wholesale traders who operate fresh produce markets, have often been forced out of business because they cannot compete against the pricing of large supermarket retailers. While the implications for consumers may appear to be positive, the consequences for smallholder farmers are, on the whole, more negative than positive. And finally, farmers with secured market outlets have been noted to be less likely to produce for self-consumption (Yemeogo et al., 2018), which is a potent risk to their household food security.

A market channel describes the movement of agricultural produce from the farm to consumers (Mbage, 2012), and there is no universally accepted set of marketing channels. Various studies related to the market channel choice of smallholder farmers classify the available market channels under different categories. Some consider it a choice between informal and formal market channels (Kawala et al., 2018; Mafukata, 2015), a direct or indirect sale to various intermediaries and users (Donkor et al., 2018). Others studied these channels by exploring the different value-chain actors and structures (Benmehaia, 2019) or compared the institutional and technical factors involved (Panda and Sreekumar, 2012). Irrespective of the classification used, the choice of a market channel depends on a multitude of composite and inter-dependent factors, ranging from the economic, personal and social, to the technical, political, and institutional.

Understanding the market channel choices of smallholder farmers is important due to the prevailing economic and social policy direction, where many interventions seek to encourage the participation of smallholder

farmers in formal markets or supply to modern value chains (Olofsson, 2020). While there is an implicit assumption of enthusiasm among smallholder farmers in this regard, empirical evidence from related studies, such as this, could provide useful insights into the market channel preferences of specific groups of smallholder farmers.

METHODOLOGY

Study area

The Winnie Madikizela-Mandela Local Municipality (formerly known as Mbizana Local Municipality), shown in Fig. 1, is located in the Eastern Cape Province of South Africa with Bizana as its administrative town. The area was initially called Mbizana and is the traditional homeland of the isiXhosa speaking AmaPondo ethnic group.

Mbizana is a rural area located in the northeastern part of the Eastern Cape Province, within the Pondoland in the former Transkei homeland. A recent municipal boundary adjustment finds the Winnie Madikizela Mandela Local Municipality within the Alfred Nzo District. Bizana lies on latitude 31.567 and longitude 29.400 with an estimated area of 2,806 km², along the coastal belt of the Eastern Pondoland. It has a temperate climate, fertile soils, frost-free conditions, and an annual rainfall of 700 mm per annum. It is considered one of the highly populated local municipal areas within the district. It is wedged between rivers umTentu to the south and umTamvuna to the north, forming the northern boundaries of the Eastern



Fig. 1. Map of Winnie Madikizela-Mandela local municipality
Source: <http://www.municipalities.co.za>

Cape Province with the Kwazulu Natal Province (Nwafor and Westhuizen, 2020). Dominated by grasslands, settlements are loosely scattered throughout the area and surrounded by arable grazing land.

Data collection, sampling, and delimitation

A questionnaire was used for the study's target population, and sections of the questionnaire captured demographic characteristics, production, and product marketing information. The questionnaires were pre-tested, and adjustments were made to produce a study instrument deemed appropriate for the objective of this study.

Farmer interviews and data collection were carried out using a purposive sampling technique based on a list of farmers provided by the Department of Agriculture in the Bizana District Office. Using a snowball approach, a total of 174 farmers were interviewed; this number was based on the calculated sample size required. The choice of respondents or study population was delimited, as the sample consists of smallholder farmers selected purposively using convenience sampling. The geographical area of the study was also limited to the Mbizana Local Municipality of the Eastern Cape Province.

Data analysis

Descriptive statistics and quantitative methods were applied to analyze the collected data. The descriptive analysis consisted of frequency distribution values of the parameters of interest, with the results presented in tables. Though simple descriptive methods provide vital information regarding observed trends in behavior, it does not provide much-needed insights into complex relationships which influenced the observed trend. This study, therefore, also used quantitative econometric analysis to explore the smallholder farmers' choice of marketing channels.

For the quantitative analysis, the study used multinomial regression to test variables significant for the market channel preferences of the study population. A number of studies related to market channel choice of farmers consider it as a choice between two sources, either formal or informal markets, and hence model it as the function of either outcome. These studies, such as that by Sikawa and Mugisha (2010) and Kwakwa et al. (2013), used binomial logit or probit models, combining several market outlets to make the dependent variable binary. For problems involving the choice among three or more categories, the multinomial logit technique is

employed most often. Studies that utilized this technique include Ayuya et al. (2012), Murage (2010), as well as Jari and Fraser (2009). The study also collected data of market selection decisions using methods based on the revealed preferences of respondents.

Empirical model

The multinomial logit is an econometric model applicable when there are more than two choices of the dependent. This approach analyzes the selection of the market on the premise of individual decision-makers rather than the choice itself. It establishes the determinants of choice. The multinomial logit model is considered the best approach for choices based on the attributes of the decision-maker; it is employed in studies exploring the market channel choices of smallholder farmers.

The study assumes that individuals have preferences defined over a set of alternatives, and the choice of a given marketing outlet is discrete since it involves different options (Greene, 2012). The choice variable (dependent) has more than two unordered options, while the independent variables have both features of the alternatives and the characteristics of the individual farmer. In the model (which assumes a decision to sell), the utility of a household i choosing market channel j is given by U_{ij} and is a linear stochastic function of exogenous household characteristics and endogenous household choices.

$$U_{ij} = \beta_i X_{ij} + \varepsilon I_j \quad (1)$$

Noting the limitations in the multinomial logit model, we utilized the probability function to show that the farmers' choice of a particular market channel U_{ij} is the largest utility among other j utilities, and the probability of most farmers choosing the specific market channel is given by:

$$\text{Prob}(U_{ij} > U_{ik}) \text{ for all other } k \neq j \quad (2)$$

P_{ij} represents the probability of choosing a given market outlet by the farmer, as shown in the equation.

$$P_{ij} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon \quad (3)$$

where:

- i – could take a value from 1, 2, and 3 (representing the market channel of choice, i.e., farm-gate sales, informal retailers, and formal dealers),
- $X_1 \dots X_n$ – are the independent variables affecting the choice of a given market channel,
- β_0 – is the constant term or intercept,

$\beta_1 \dots \beta_n$ – are estimated factors,
 ε – represents the random error.

Assuming i alternatives, the probability of choosing any market outlet by the farmer j , having computed the log odds ratios and marginal effects determined by differential probabilities, is given by the following equation:

$$P_{ij} = \beta_o + \beta_{1age} + \beta_{2gender} + \beta_{3education} + \beta_{4exp} + \beta_{5farmsize} + \beta_{6hhsz} + \beta_{7distance} + \beta_{8labour} + \beta_{9addincome} + \beta_{10coopmember} + \beta_{11price} + \varepsilon \quad (4)$$

The identified variables expected to influence market channel choice of the rural farmers included in the model are age, gender, education, farming experience, farm size, number of persons in farmer’s household, distance to market, use of casual labor, additional income source, membership of a cooperative, and the amount received. These variables and their measurement, including the expected sign, are shown in Table 1.

The choice of a market channel is independent of other market alternatives, as the farmer may sell produce using more than one channel in the same period. Simultaneous estimation typically resolves this problem. Using a multinomial regression model, different combinations of the independent variables were used to determine the factors associated with the market channel choice of respondents. Since the correlation of predictors in the regression was likely, the variance inflation factor was checked (greater than 1 but less than 4) to ensure the absence of minimal multicollinearity.

RESULTS AND DISCUSSION

Demographic characteristics of respondents

The study focused on specific characteristics of respondents, including their gender, age, level of education, farming experience, household size, farm size, and distance to market. The focus was chosen due to its prominence in the reviewed literature on market channel

Table 1. Variables in the determinants of smallholders market channel choice

Variable (type)	Code	Description	Measurement	Expected sign
Market channel (dependent)	MrkChan	Choice of marketing channel used by farmer	1 = own sales 2 = informal retailer 3 = formal dealers	None
Age (independent)	Age	Age of farmer	years	+/-
Gender	Gndr	Gender of farmer	0 = male 1 = female	+
Education	Edu	Level of education attended	years	+
Experience	Exp	Farming experience	years	+
Farm size	Frmsz	Size of farm	hectares	+
Household size	Hhsz	Number of persons in household	units	-
Distance	Dist	Distance to local market	km	-
Additional income	Addinc	Other income source	0 = no 1 = yes	-
Labour	Labr	Use paid casual labour	0 = no 1 = yes	+
Cooperative member	Coopmem	Membership of a farmer cooperative	0 = no 1 = yes	+
Price	Amt	Amount received from sales	Rands	+

Source: own elaboration.

Table 2. Respondents’ demographic characteristics

	Variable	Frequency (<i>n</i> = 174)	Percent (%)
Gender	male	54	39
	female	120	61
Age	35 or less	15	9
	36–45	42	24
	46–55	78	45
	56 or more	39	22
	Education	0	12
	5 or less	24	14
	6–12	126	72
	more than 12	12	7
Farming experience	5 or less	39	23
	6–10	51	29
	11–20	63	36
	more than 20	21	12
Farm size	less than 1	69	53
	1–2	84	35
	more than 2	21	12
Household size	1–4	39	23
	5–8	84	48
	9 and above	51	29
Distance to market	less than 10 km	54	31
	10 km and more	120	69

Source: questionnaire survey.

choice of smallholder farmers. The individual features of respondents are given in Table 2.

From the survey, 61% of respondents were female, and 39% male, their age bracket varied with 9% of respondents between 35 years or less, 24% were aged 36–45 years, about 45% were between 46–55 years, and 22% were 56 years and more. In addition, only 7% of respondents had completed high school, 7% did not attend any school, while 72% had between 6–12 years of schooling. On average, the respondents had about 14 years of farming experience, with 23% farming for about five years and another 23% farming for more than

twenty years. The minimum and maximum farming experience were three and 40 years, respectively. More than half (53%) of respondents had farms smaller than 1 hectare, while 35% had between 1 and 2 hectares, and 12% had more than 2 hectares of farmland. Furthermore, 23% of respondents had four persons or less, 48% had between five and eight persons, and 29% had more than nine persons in their household, respectively. The distance to local markets was less than ten kilometers for 31% of respondents and more than ten kilometers for 69% of the survey respondents.

Factors influencing cocoyam farmers’ production decision and ranking of factors

The respondents were asked to identify and rank various factors that influence their decision to produce cocoyam within the area. Then, the responses concerning each factor were summed to create a ranking, as shown in Table 3.

Table 3 shows that 40% of respondents identified the financial return made from the sale of cocoyam as a critical factor influencing their production decision. Also, 32% of respondents believed that an available market for the sale of the product was a crucial factor that influenced their decision. In addition, approximately 20% of respondents placed greater emphasis on home consumption of the produce, 5% considered the low cost of inputs, and 3% noted cultivation ease as a key influence for their cocoyam production decision. The five identified factors, i.e., returns from the sale, the availability of a market for the produce, home consumption, low cost

Table 3. Ranking of factors influencing respondents to produce cocoyam

Factors	Respondents (%)	Ranking
Returns from sale of the produce	40	1
Available local market for the produce	32	3
Home consumption of the produce	20	2
Low cost of inputs (no seeds or fertilizer)	5	4
Easy to cultivate (no mechanization involved)	3	5

Source: respondents survey.

of required inputs, and cultivation ease of the crop, were ranked in the order shown.

Farmers in the study area placed greater importance on the financial returns from their crop production activities. This is confirmed by ranking the returns from sales and the market availability for the products as more influential than product home consumption. The cost of the required inputs and cultivation ease ranked fourth and fifth, respectively.

Market channel preference and ranking

Smallholder farmers generally market their products through different channels, and the survey asked respondents if they sold them using any of the channels identified in Table 4. These channels were then ranked based on the number of respondents involved.

Table 4. Ranking of market channel used by farmers

Respondents preferred marketing channel (<i>n</i> = 174)	Yes (%)	No (%)	Ranking
Farm-gate (own sales to consumers)	89	11	1
Informal retailers	28	72	2
Fresh produce wholesalers	12	88	3
Supermarket chain	8	92	4
Others (aggregators, processors)	3	97	5

Source: respondents survey.

As shown in Table 4, about 89% of respondents sold directly to consumers, while 11% did not use this channel. Also, 28% of respondents sold to informal retailers, while 72% did not use this channel, 12% sold to local grocers, and 88% did not. Only 8% preferred selling to chain stores as 92% did not select this channel, and 3% sold to processors or aggregators, with 97% not making sales through this channel. Direct sales by farmers were ranked number one preference, sales through informal retailers were ranked second, local grocer shops ranked third, with supermarket chain ranking fourth followed by aggregators/processors in fifth place.

Perception of factors in market channel preferences of respondents

Factors that affect the market channel preference of smallholder farmers were listed, and respondents had

Table 5. Perception of respondents about factors related to market channel preference

Factors considered by farmers (<i>n</i> = 174)	Agree		Disagree		Undecided	
	n	%	n	%	n	%
Price received for produce	156	90	18	10	0	0
Farmers experience of market	111	65	42	25	18	10
Competition among marketers	78	45	90	50	9	5
Cost of transporting produce	132	75	24	15	18	10
Distance to available market	138	80	36	20	0	0
Immediate payment for produce	165	95	9	5	0	0
Volume produced by farmer	87	50	60	35	27	15
Personal relationships with buyers	69	40	87	50	18	10

Source: respondents survey.

to indicate if they agreed, disagreed, or were undecided about each factor. Finally, the total number of respondents and their percentage for each factor heading were tabulated and presented (Table 5).

Table 5 indicates that 90% of respondents agreed that the price received for produce was a factor in market channel choice, while 10% disagreed. The first and most apparent potential economic incentive for participating in a particular marketing channel was the expected or actual output price offered to the farmer. Some, however, suggest that price differences may not be the main factor explaining farmers' marketing choices. Also, 65% of respondents agreed that prior market experience contributes to market channel choice of farmers, 42% of respondents did not agree, while 18% were undecided.

Competition among marketers was not considered as contributing to market channel choice by 50% of respondents, though 45% agreed and 5% were undecided. The cost of transporting produce was agreed by 75% of respondents to contribute to their market channel choice, while 24% disagreed and 18% were undecided. Similarly, 80% of respondents agreed, and 20% disagreed that distance to available markets contributes to

market channel choice. The cost of transporting produce to market is invariably linked to the distance involved, and it is generally perceived as a constraint that increases transaction costs for farmers.

Most farmers expect to receive immediate payment for their produce at the market, and 95% of respondents agreed with this view, while only 5% disagreed. The issue of immediate payments was noted as the reason why many smallholder farmers do not enter into supply agreements or other market contracts where they have to defer receipt of payments for produce. The volume of crops produced was also listed as a factor contributing to the market channel choice of farmers, and 50% of respondents agreed with this statement, while 35% disagreed, and 15% were undecided. Based on the survey, 55% of respondents agreed that personal relationships with buyers contribute to market channel choice, though 35% disagreed, and 10% were undecided.

The survey findings indicate that smallholder farmers prefer market channels where they get a better price and do not have to incur high transport costs or travel long distances to market their produce. It also suggests that farmers prefer to receive immediate payments for the crop, and the choice of the market channel could be linked to the volume produced. At the same time, many respondents consider personal relationships with buyers as an important factor.

Farmer and farm specific factors influencing market channel choice

The result of the multinomial logit regression provides the estimated coefficients and the marginal effects of the independent variables in the model, as shown in Table 6. The values measure the expected change from a unit change in each independent variable, and the coefficient sign indicates the direction of variable influence

Table 6. Empirical results of the determinants of market channel choice

Market channel choice	Own sales (farm-gate)		Informal retailers		Formal wholesalers	
	Coef.	P-value	Coeff	P-value	Coef.	P-value
Age	0.140	0.044*	1.268	0.084	0.209	0.161
Gender	0.016	0.985	0.036	0.145	0.006	0.130
Education	-0.388	0.073	-1.323	0.091	-0.218	0.032*
Farm experience	0.134	0.367	1.182	0.059	0.195	0.022*
Farm size	-2.847	0.294	-1.075	0.046*	-0.177	0.007*
Household size	0.034	0.043*	-0.891	0.082	-0.147	0.068
Distance to market	-2.236	0.021*	0.287	0.618	0.047	0.620
Additional income	-1.756	0.017*	0.320	0.441	0.053	0.438
Use casual labour	0.176	0.677	0.732	0.086	0.121	0.043*
Cooperative membership	1.203	0.092	3.983	0.023*	0.656	0.018*
Price received	0.045	0.014*	0.087	0.006*	0.014	0.756
Constant	-4.191	1.837	0.023			
Prob > chi ²			0.000			
Pseudo R ²	0.5716					
LR chi ² (33)	101.25					
Log likelihood	-73.93					

* Significance at 5% ($p < 0.05$).

on the market channel choice. The *p*-values were tested at the 5% significance level; thus, *p*-values less than, or equal to, 0.05 indicate sufficient evidence supporting the claims presented by the coefficient.

Age, household size, distance to market, additional income, and price received were significant variables among respondents who sold directly at the farm gate. In the farmers who used the informal retailer channel, the farm size, cooperative membership, and price received significantly influenced this choice. Among the respondents who utilized formal wholesale channels, education, farm experience, farm size, use of casual labor, and cooperative membership significantly influenced their market channel choice.

Age was significant for farmers making sales at the farm gate and may involve older farmers reluctant to engage with outside markets. On the other hand, younger farmers proved enthusiastic and eager to seek market opportunities wherever they were. The adventurous nature of younger farmers was noted, whereby younger farmers sought urban markets far away from their rural farm locations, in contrast to older farmers' preference for closer rural markets within the proximity of their farms. These market explorations also required effective coordination and risk-taking, which are considered negative traits among older farmers (Kyomugisha et al., 2019).

Across the market channels used by respondents in the study, gender was not shown to be a significant influence on the chosen channel. Many studies that analyzed how gender affects agriculture and market participation found unequal access to socioeconomic opportunities for male and female farmers (Palacios-Lopez and Lopez, 2015; Farnworth and Colverson, 2015; Me-Nsope and Larkins, 2016). The findings reported in these studies suggest that gender constraints may affect the market channel choice among women, who preferably utilize informal markets due to lower transaction costs (Olumeh et al., 2018). Gender represents differences in market orientation between male and female farmers. Reyes et al. (2012) posited that male farmers were better resourced, more likely to sell produce, owned productive assets, and had better access to extension services.

Education was shown to be significant among farmers who used the formal wholesale market channel. Education improves the sourcing and interpretation of market information, hence influencing market participation (Jari and Fraser, 2009). It is assumed to enhance

the farmer's ability to access and process information, thereby facilitating an understanding of contractual requirements and supply agreements inherent to formal market channels. The wording of contracts sometimes requires literacy and may discourage non-literate smallholder participation. Kassaw et al. (2019) aver that education increases the farmer's level of productivity, which in turn improves and strengthens linkages with formal wholesalers. When farmers are educated, they become aware of the value of their products, and hence their likelihood to participate in informal markets is reduced.

Farm experience was determined by the number of years spent in farming and considered a direct indicator of production knowledge, including expertise in producing the crop. The variable for farm experience was significant for the formal market channel. The experienced farmers could have built up contacts in different market channels and could meet the often stringent requirements of the formal market channel. This may also imply that inexperienced farmers did not create market networks with other buyers in the formal channel. However, some studies (Muthini et al., 2017) report that the farming experience does not affect market channel choice significantly.

Farm size is closely related to the quantity produced, implying that farmers with larger farms had more crop output and required market channels to absorb their output. The farm size was significant for the informal retailer and formal wholesaler channels. This could imply that farmers with greater crop output were unable to sell all their products directly to consumers at the farm gate, necessitating other market channels.

Household size was significant in own sales (direct farm gate) market channel in this study. The size of households significantly influenced the farmer's choice of market channel, as it affects their production and consumption patterns. While some suggest that large households positively assist the farmer in selling produce either at the farm gate or the local market, others argue that large families encourage consumption with a less marketable surplus or facilitate the search for more profitable market options rather than selling at the farm gate (Mango et al., 2018; Sunga, 2011).

Distance to market was significant but negatively influenced own sales at the farm gate and was not significant for the other market channels. Past studies show that the farther away the farmers were based, the fewer

products they brought to the market and made more sales at the farm gate (Tura and Hamo, 2018). Also, the greater the distance to the market, the higher transportation costs and lower net benefits accrued to the household (Adugna et al., 2019), which reduces the price farmers receive for their outputs or produce (Buckmaster, 2012). Transaction costs are associated with distance to market and are important covariates in the marketing decision; therefore, a direct relationship exists between the distance to market and selling at the farm gate.

Additional income source was found significant among farmers using the sale at the farm gate market channel. However, related studies have shown that farmers with an additional source of income are less likely to sell at the farm gate. This is because these farmers are not cash-constrained and can delay sales and seek better prices. Contrarily, cash-constrained farmers sold at the farm gate even at the risk of lower prices to meet their urgent financial needs.

The use of casual labor was significant for the formal wholesale market channel in the study, though it was not significant for others. This might be connected to the volume of produce and farm size of the farmers involved. The casual labor used may also be necessary to meet the requirements of formal markets, either during the harvest, cleaning, packing, or transportation of produce to the market.

Cooperative membership was also shown to be significant for the informal retailer and formal wholesale market channels in this study. Cooperatives are considered a marketing channel used by members (Liu et al., 2018). This study agrees with Hao et al. (2018), who report a positive influence of cooperative membership on farmers' decision to participate in the wholesale market channels. Membership of a cooperative is universally understood to provide market access, improve bargaining power, and reduce transaction costs for members (Alho, 2015), essential to obtaining benefits from formal wholesale market channels.

Price received for produce was significant for own sales (farm gate) and informal retailer market channels in this study. Price received for produce has been noted to be a driving factor among smallholder farmers, as rational producers seeking to maximize their net returns choose marketing channels with relatively higher prices. Though price received was not a significant variable in the formal wholesaler market channel, it could be assumed that crop volumes and stable supply agreements in the formal

channels compensate for any price differentials across marketing channels. Price received translates to income for the farmer and may be determined by choice of marketing channel (Khapayi and Celliers, 2016).

CONCLUSIONS

This study shows that there are more female smallholder farmers in the area than males, and most of the smallholder farmers were advanced in age, mostly over 46 years, with few having attained more than high school education. Many cultivated less than one hectare of land, had an average of fourteen years of farming experience, and were based less than ten kilometers from the local market center. The expected financial returns from the crop, the availability of a market for the product, and contribution to home consumption were the main factors influencing the farmer's decision to grow cocoyam. Other factors considered were the low cost of inputs and also the ease of cultivating the crop.

Most smallholder farmers sold their produce directly to local consumers at their farm gate, while few sold to local retailers, fresh market wholesalers, chain stores, and other aggregators or processors. Therefore, the amount received was the major factor contributing to their market channel preference and immediate payment for the produce. Other factors considered for choosing this market channel were the distance to other markets, cost of transportation, and experience in using the market channel.

The study shows that smallholder cocoyam farmers in the study area mainly used their own sales (farm gate) market channel, followed by informal retailers market channel, and compares with a number of other findings regarding smallholder farmers in South Africa. Farmers choose their preferred market channel from several possible options based on envisaged financial returns, comparative advantage in bargaining, and closeness of market channels. Different socioeconomic characteristics of the farmers determined their choice of various market channels. For the majority who sold directly at their farm gate, the variables influencing their choice included age, household size, distance to market, additional income, and price received. Gender did not significantly affect the market channel choice of the smallholder cocoyam farmers within the study area.

Based on the study findings, it is recommended that adequate market information be provided to the

smallholder farmers through existing sources such as extension officers, community boards, and farmer associations. In addition, the market information should include the current price offered by other market channels or agents, as the amount received was found to influence the smallholder's market channel choice significantly. The study also recommends strengthening farmer cooperatives in the area, which will improve the collective bargaining power of the farmers, as well as their access to formal value chains.

REFERENCES

- Adeoti, A.I., Oluwatayo, I.B., Raheem, O.S. (2014). Determinants of Market Participation among Maize Producers in Oyo State, Nigeria. *Brit. J. Econ. Manag. Trade*, 4(7), 1115–1127.
- Adugna, M. Ketema, M. Goshu, D., Debebe, S. (2019). Market Outlet Choice Decision and its Effect on Income and Productivity of Smallholder Vegetable Producers in Lake Tana Basin, Ethiopia. *Rev. Agric. Appl. Econ.*, 1, 83–90. DOI: 10.15414/raae.2019.22.01.83-90
- Alho, E. (2015). Farmers' self-reported value of cooperative membership: evidence from heterogeneous business and organization structures. *Agric. Food Econ.*, 3, 23. DOI 10.1186/s40100-015-0041-6
- Amani, S. (2014). Smallholder Farmers' Marketing Choices. P4P Global Learning Series. Prepared for the World Food Programme (WFP), by Management Systems International (MSI).
- Ayuya, O., Waluse, S., Gido, O. (2012). Multinomial logit analysis of small-scale farmers' choice of organic soil management practices in Bungoma County, Kenya. *Curr. Res. J. Soc. Sci.*, 4(4), 314–322.
- Azeez, A.A., Madukwe, O.M. (2010). Cocoyam production and economic status of farming households in Abia state, South-East, Nigeria. *J. Agric. Soc. Sci.*, 6(1), 83–96.
- Baiphethi, M., Jacobs, P. (2009). The Contribution of Subsistence Farming to Food Security in South Africa. *Agrekon*, 48(4), 459–482.
- Boakye-Achampong, S., Ohene-Yankyer, K., Aidoo, R., Sorensen, O.J. (2017). Is there any economics in smallholder cocoyam production? Evidence from the forest agroecological region of Ghana. *Agric. Food Sec.*, 6, 44. DOI 10.1186/s40066-017-0121-9
- Buckmaster, A.D. (2012). Going the distance: The impact of distance to market on smallholders' crop and technology choices. Doctoral dissertation, Virginia Tech. University. USA.
- Benmehaia, M.A. (2019). Farmers' Income Risks and Marketing Channel Choices: Case of Date Palm Processing in Biskra, Algeria. *New Medit*, 18(3), 47–58.
- Donkor, E., Onakuse, S., Bogue, J., Rios-Carmenado, I. (2018). Determinants of farmer participation in direct marketing channels: A case study for cassava in the Oyo State of Nigeria. *Span. J. Agric. Res.*, 16(2), 1–17.
- Farnworth, C., Colverson, K. (2015). Building a Gender-Transformative Extension and Advisory Facilitation System in Sub-Saharan Africa. *J. Gender Agric. Food Sec.*, 1(1), 20–39.
- FAO (Food and Agriculture Organization) (2012). FAO statistical yearbook. World food and agriculture. Rome, Italy: Food and Agriculture Organization of the United Nations.
- Greene, W. (2012). *Econometric Analysis*, 7th Edition. Prentice Hall, Upper Saddle River, New Jersey.
- Hao, J., Bijman, J. Gardebroek, C. Heerink, N. Heijman, W., Huo, X. (2018). Cooperative membership and farmers' choice of marketing channels – evidence from apple farmers in Shaanxi and Shandong Provinces, China. *Food Policy*, 74, 53–64.
- IFAD (International Fund for Agricultural Development) (2003). Promoting Market Access for the Rural Poor in Order to Achieve the Millennium Development Goals'. IFAD Discussion Paper. Rome, IFAD.
- Jari, B., Fraser, G. (2009). An analysis of institutional and technical factors influencing agricultural marketing amongst smallholder farmers in the Kat-River Valley, Eastern Cape Province, South Africa. *Afr. J. Agric. Res.*, 4(11), 1129–1137.
- Kassaw, H.M., Birhane, Z., Alemayehu, G. (2019). Determinants of market outlet choice decision of tomato producers in Fogera woreda, South Gonder zone, Ethiopia. *Cogent Food Agric.*, 5(1). Retrieved Dec 1st 2020 from: <https://doi.org/10.1080/23311932.2019.1709394>
- Kawala, M., Hyuha, T.S., William, E., Walekwa, P., Elepu, G., Kalumba, S.C. (2018). Determinants for Choice of Fish Market Channels: The Case of Busia (Uganda/Kenya) Border. *J. Agric. Sci.*, 10(8), 118–124.
- Khapayi, M., Celliers, P.R. (2016). Factors limiting and preventing emerging farmers to progress to commercial agricultural farming in the King William's Town area of the Eastern Cape Province, South Africa. *South Afr. J. Agric. Exten.*, 44(1), 25–41.
- Kwakwa, P., Wiafe, D., Hamdiyah, A. (2013). Households Energy Choice in Ghana. *J. Empiric. Econ.*, 3(1), 96–103.
- Kyomugisha, H., Nuppenau, E., Mugisha, J. (2019). Market channel options for smallholders in dual markets: A case of organic pineapple farmers in Uganda. *J. Dev. Agric. Econ.*, 11(8), 186–196.

- Lewu, M.N., Adebola, P., Afolayan, J.A. (2010). Comparative assessment of nutritional value of commercially available cocoyam and potato tuber in South Africa. *J. Food Qual.*, 33(4), 461–476.
- Liu, Y. (2018). Determinants and impacts of marketing channel choice among cooperatives members: Evidence from agricultural cooperative in China. 30th International Conference of Agricultural Economists. July 28-August 2, Vancouver, Canada.
- Liu, Y., Ma, W., Renwick, A., Fu, X. (2018). The role of agricultural cooperatives in serving as a marketing channel: evidence from low-income regions of Sichuan province in China. *Int. Food Agribus. Manag. Rev.*, (in press) DOI: 10.22434/IFAMR2018.0058
- Mafukata, M. (2015). Factors Having The Most Significance on the Choice and Selection of Marketing Channels Amongst Communal Cattle Farmers in Vhembe District, Limpopo Province. *J. Human Ecol.*, 19(1), 77–87.
- Mare, R.M. (2009). TARO (*COLOCASIA ESCULENTA L. SCHOTT*) Yield and Quality Response to Planting Date and Organic Fertilisation. Unpublished PhD thesis. University of Kwa-zulu Natal, South Africa.
- Mango, N., Makate, C., Francesconi, N., Jager, M., Lundy, M. (2018). Determinants of market participation and marketing channels in smallholder groundnut farming: A case of Mudzi district, Zimbabwe. *Afr. J. Sci. Technol. Innov. Dev.*, 10(3), 311–321.
- Mbaga, M.D. (2012). Date Marketing. In: A. Manickavasagan, M. Mohamed Essa, E. Sukumar (Eds.), *Dates: Production, Processing, Food, and Medicinal Values*. Boca Raton (FL): CRC Press.
- Me-Nsope, N., Larkins, M. (2016). Beyond crop production: Gender relations along the pigeon pea value chain and implications for income and food security in Malawi. *J. Gen. Agric. Food Sec.*, 1(3), 1–22.
- Modi, A.T., Mabhaudhi, T. (2016). Developing a research agenda for promoting under-utilised, indigenous and traditional crops. Water Research Commission Report No. KV 362/16. Retrieved May 12th 2019 from: www.wrc.org.za/wp-content/uploads/mdocs/KV362_172.pdf
- Muthini, D.N., Nyikal, R.A., Otieno, D.J. (2017). Determinants of small-scale mango farmers' market channel choices in Kenya: An application of the two step Cragg's estimation procedure. *J. Dev. Agric. Econ.*, 9(5), 111–120.
- Ntimbaa, G.J., Akyoob, A.M. (2017). Factors Influencing Choice Decision for Marketing Channels by Coffee Farmers in Karagwe District, Tanzania. *Global J. Biol. Agric. Health Sci.*, 6(2), 1–10.
- Nwafor, C.U., van der Westhuizen, C. (2020). Prospects for Commercialization among Smallholder Farmers in South Africa: A Case Study. *J. Rural Soc. Sci.*, 35(1), Article 2. Retrieved Oct 1st 2020 from: <https://egrove.olemiss.edu/jrss/vol35/iss1/2>
- Nxumalo, K.K., Oduniyi, O.S., Antwi, M.A., Tekana, S.S. (2019). Determinants of market channel choice utilised by maize and sunflower farmers in the North West province, South Africa. *Cogent Soc. Sci.*, 5. DOI: 10.1080/23311886.2019.1678451
- OECD (Organization for Economic Cooperation and Development) (2009). *Promoting Pro-Poor Growth: Employment*. Retrieved Oct 12th 2019 from: <https://www.oecd.org/greengrowth/green-development/43514554.pdf>
- Olofsson, M. (2020). Socio-economic differentiation from a class-analytic perspective: The case of smallholder tree-crop farmers in Limpopo, South Africa. *J. Agrar. Change*, 20(1), 37–59.
- Olumeh, D.E., Adam, R., Otieno, D.J., Oluoch-Kosura, W. (2018). Characterizing Smallholder Maize Farmers' Marketing in Kenya: An Insight into the Intra-Household Gender, Wealth-Status, Educational and Credit Access Dimensions. *J. Market. Consum. Res.*, 48, 1–10.
- Onyeka, J. (2014). Status of Cocoyam (*Colocasia esculenta* and *Xanthosoma* spp) in West and Central Africa: Production, Household Importance and the Threat from Leaf Blight. Lima (Peru). CGIAR Research Program on Roots, Tubers and Bananas (RTB). Retrieved from: www.rtb.cgiar.org
- Osmani, A.G., Hossain, E. (2015). Market Participation Decision of Smallholder Farmers and Its Determinants in Bangladesh. *Econ. Agric.*, 62(1), 163–179.
- Otegunrin, O.A., Siaka, M., Ayande, I.A. (2019). Smallholder Farmers' Market Participation: Concepts and Methodological Approach from Sub-Saharan Africa. *Curr. Agric. Res.*, 7(2), 139–157.
- Panda, R.K., Sreekumar, S. (2012). Marketing Channel Choice and Marketing Efficiency Assessment in Agribusiness. *J. Int. Food Agribus. Market.*, 24, 213–230. DOI: 10.1080/08974438.2012.691812
- Palacios-Lopez, A., Lopez, R. (2015). Market imperfections exacerbate the gender gap: The case of Malawi. World Bank Policy Research Working Paper, Number 7300.
- Ramanatha, R.V., Matthews, P.J., Eyzaguirre, P.B., Hunter, D. (2010). *The global diversity of taro: Ethnobotany and Conservation*. Rome, Italy: Biodiversity International.
- Quaye, W., Adofo, K., Agyeman, K.O., Nimoh, F. (2010). Socio-economic survey of traditional commercial production of cocoyam and cocoyam leaf. *Afr. J. Food Agric. Nutr. Dev.*, 10(9), 4060–4078.
- Reyes, B., Donovan, C., Bernsten, R., Maredia, M. (2012). Market participation and sale of potatoes by smallholder farmers in the central highlands of Angola: A Double Hurdle approach. Paper presented at the International

- Association of Agricultural Economists (IAAE) Triennial Conference, 18-24 August, 2012. Foz do Iguaçu, Brazil.
- Shewaye, A. (2016). Econometric analysis of factors affecting haricot bean market outlet choices in Misrak Badawacho District, Ethiopia. *Int. J. Res. Stud. Agric. Sci.*, 2(9), 6–12.
- Seville, D., Buxton, A., Vorley, B. (2011). Under what conditions are value chains effective tools for pro-poor development? Report for the Ford Foundation. Sustainable Food Laboratory & IIED.
- Sikawa, G.Y., Mugisha, J. (2010). Factors influencing south-western Uganda dairy farmers' choice of the milk marketing channel: a case study of Kirihura district south western Uganda. Research report series, No. 0856-9681
- Sunga, C. (2011). Factors Influencing Bean Producers' Choice of Marketing Channels in Zambia. MSc thesis, University of Zambia.
- Talwana, H.L., Serem, A.K., Ndabikunze, B.K., Nandi, J.O., Tumuhimbise, R., Kaweesi, T., Chumo, E.C., Palapala, V. (2009). Production Status and Prospects of Cocoyam (*Colocasia esculenta* (L.) Schott.) in East Africa. *J. Root Crops*, 2009, 35(1), 98–107.
- Tura, E.G., Hamo, T.K. (2018). Determinants of Tomato Smallholder Farmers Market Outlet Choices in West Shewa, Ethiopia. *J. Agric. Econ. Rural Dev.*, 4(2), 454–460.
- Umberger, W.J., Reardon, T., Stringer, R., Loose, S.M. (2015). Market channel choices of Indonesian potato farmers: A best-worst scaling experiment. *B. Indones. Econ. Stud.*, 51(3), 461–477.
- Vorley, B. (2013). Meeting small-scale farmers in their markets: understanding and improving the institutions and governance of informal agrifood trade. IIED. London. Available at <https://pubs.iied.org/pdfs/16548IIED.pdf> Accessed on 12/11/2019.
- Yameogo, T.B., Bossa, A.Y., Torou, B.M., Fusillier, J.-L., Da, D.E.C., Yira, Y., Serpantié, G., Somé, F., Dama-Balima, M.M. (2018). Socio-Economic Factors Influencing Small-Scale Farmers' Market Participation: Case of Rice Producers in Dano. *Sustainability*, 10, 4354. doi: 10.3390/su10124354
- Zivenge, E., Karavina, C. (2012). Analysis of factors influencing market channel access by communal horticulture farmers in Chinamora District, Zimbabwe. *J. Dev. Agric. Econ.*, 4(6), 147–150.