

Smallholder Orange Farmers' Access to Market Information in Muheza District, Tanzania

Adolf Julius Mbedule
Library, Ardhi University

Email: mbeduleadolf@gmail.com

&

Hosea N. Mungwabi

Information Studies Programme, University of Dar es Salaam.

Email: mungwabih@gmail.com

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Abstract

This study has investigated market information access by smallholder orange farmers in Muheza District, Tanga Region. Specifically, the study sought to examine the extent to which farmers access market information, their sources of information, and whether their age, gender, and level of education influence them. The study used a descriptive research design and a mixed-methods research approach. It involved 103 randomly selected respondents, four key informants and 26 focus group discussion participants divided into two groups, each consisting of 13 participants. To analyze quantitative data, SPSS version 21 was used, and chi-square and logistic regression were run to determine the relationship between variables. Qualitative data were analyzed using content analysis. The findings suggest that the majority of the respondents, access limited market information mainly through relatives and friends, meetings, traders, and radio. Also, at a 5 percent confidence level, there is a statistically significant association between preferred information sources, gender, and level of education. Furthermore, the findings suggest that respondents with primary education and below are 91.8 percent less likely to have access to market information. Based on these findings, the study recommends that smallholder orange farmers be encouraged to form or join farmers' associations to enhance their access to market information.

Key terms: *market information, orange farmers, Muheza District, data origins, information access*

Introduction

Agriculture is the mainstay for the majority of citizens of Tanzania. It is a source of employment and export earnings, and most importantly, it contributes significantly to the national gross domestic product (GDP). Oranges are one of the top citrus fruits grown in most countries in the world, after grapes and apples (Abobatta, 2015). Tanzania is the biggest producer of oranges in East Africa. FAO estimated that Tanzania's orange production has been increasing with an annual growth rate of 14 percent (Lunogelo et al., 2020). In East Africa, Kilifi and Kwale Districts on Kenya's coast near Mombasa and Soroti and Mubende Districts in eastern and mid-western Uganda are key orange production locations (USAID, 2013). Mwatawala and Kidoloi (2018) suggest that most of oranges in Tanzania are grown in Muheza District, Tanga Region, and particularly by smallholder farmers.

Smallholder orange farmers in Muheza District, Tanzania, need a variety of information, including market information, to be able to benefit from their produce. However, accessing this information has posed challenges for smallholder farmers on the continent generally. For instance, smallholder farmers in South Africa are generally illiterate, aged, and lack market information (Pienaar & Traub, 2015). Therefore, it is clear that poor access to market information is among the factors that limit the success of smallholder farmers of citrus crops such as oranges in most African countries. When access to market information is not a problem, as is the case in developed countries, farmers can effectively plan their activities from production to disposal, compared to when this information is lacking (Kongai et al., 2017). Thus, the key to harnessing smallholder orange farmers' potential lies in improving their access to information, particularly market information (Kongai et al., 2020). Agricultural market information is generated in different formats and disseminated via different channels in Tanzania. However, only a fraction of this is accessible in rural areas, where the majority of smallholder farmers are based (Matovello, 2008; Lwoga et al., 2011). As a result, there is a negative relationship between production costs and profitability in orange farming (Mwatawala & Kidoloi, 2018). This state is partly attributed to a lack of awareness about the importance of accessing this information, limited communication channels, inadequate income, and a lack of knowledge about the role of information and communication in enhancing livelihoods (Mwalukasa, 2013).

The current market information systems in Tanzania are characterized by isolated efforts from sector-specific organs such as sisal and cotton boards and their respective ministries, departments, or agencies (Ngogo, 2013). These systems are not comprehensive because they only cover small areas of the vast territory of Tanzania, and the dissemination of market information is disorganized and not coordinated (URT, 2008). For instance, Mwakaje (2010) observes that a large proportion of farmers receive market information from fellow farmers, relatives, and traders. The few that use ICTs like mobile phones to access this information are generally bigger farmers or producers of crops that are in great demand. Such farmers sell a lot more, receive relatively better prices and, understandably, have better livelihoods. However, their choice of information sources is influenced by some of their demographic characteristics (Manda & Mukangara, 2007). Good access to market information and, eventually, to markets is likely to enable smallholder orange farmers to benefit more from their efforts (Magesa et al., 2020). To shed more light on this, reliable market information is valuable to smallholder farmers because it enables them to: reduce marketing risks; decide where to sell produce; check the appropriateness of prices; and make informed decisions regarding storing their produce, choosing the right crops to grow, and diversifying their product offerings (FAO, 2017). As such, it is unfortunate that in many developing countries, agricultural production faces weak market links, limiting its contribution to farming communities' livelihoods (Magesa et al., 2014).

Smallholder farmers in Muheza District play a significant role in Tanzania's annual orange production. However, their prevailing state of poverty raises concerns about whether they have the necessary information to maximize their efforts. To address this issue, a study was conducted to investigate their access to market information. Successful smallholder farmers require a diverse range of information to thrive in their agricultural activities. Market information plays a vital role as it allows them to make informed decisions about crop selection, input procurement, and selling their produce in various markets (Ronald et al., 2014). Conversely, the absence of information

severely limits the profitability of their agricultural pursuits. According to Magesa et al. (2014), the lack of market information deprives smallholder farmers of bargaining power, making it difficult for them to negotiate fair prices for their produce. Access to market information empowers farmers by enabling them to make well-informed choices regarding production, pricing, and marketing strategies. This study emphasizes the importance of empowering smallholder farmers in Muheza District by improving their access to market information, thereby enhancing their agency and decision-making capabilities. While several studies have explored markets and market information in Tanzania, such as Mwalukasa (2013), Magesa et al. (2014), and Mwatawala & Kidoloi (2018), they have generally focused on access to agricultural information across the country. The most recent study by Magesa et al. (2020) measured the information capabilities of smallholder farmers using Scoones' approach (1998). However, the extent to which smallholder orange farmers' access market information, their information sources, and their relationship with demographic characteristics like age, gender, and educational levels remained unclear. This study aims to bridge these gaps by examining how information flows from sources to smallholder orange farmers in Muheza District, utilizing Berlo's model of communication. Additionally, since these previous studies were conducted some time ago (the most recent being about three years ago), it was crucial to revisit the topic due to the ever-changing context driven by technology and its implications.

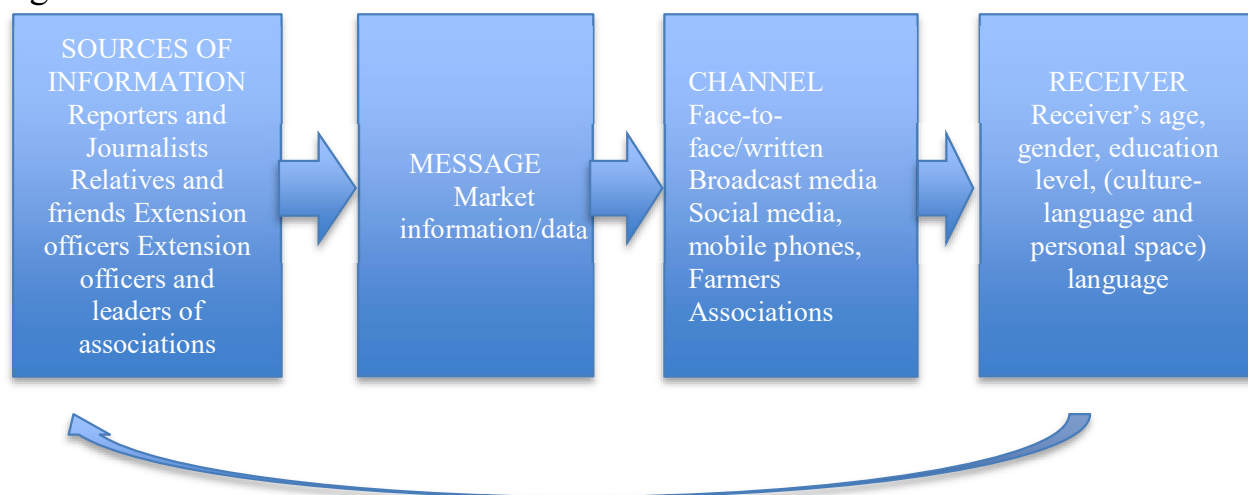
Conceptual and Theoretical Frameworks

Berlo's communication model was applied for this study. Description of the model has been entwined with the conceptual model to ease its understanding. Berlo's model has four main components that describe information communication process. The first component is the sender. The sender (in this case government, individual reporters or journalists, agricultural extension officers and leaders of associations who may inform others about prices set for oranges), is the one from whom the thought originates. The sender transfers the information to the receiver using different communication channels, face-to-face or after carefully putting the thoughts into words in either print or electronic format. The second component is message (information that is transferred to seller of oranges including smallholder farmers). A message comprises of attributes such as contents, elements, treatment, code, and structure. The message created is influenced by the attitudes of both the sender and the recipient. A person's attitude towards

themselves, the receiver, and the environment may change the meaning and effect of a message. The third component is the channel (Mass media such as radio, social media, newspapers and television), channels comprise hearing, seeing, touching, smelling, and tasting (Businessstopia, 2018). According to Berlo's communication model, receiver (in this case a small holder orange farmer), constitutes the last component. Receiver reception of information may be influenced by his/her age, gender, educational level and culture (language and personal pace: a cultural norm in which a person may have a preference for close physical proximity during communication while others do not). These aspects may apply to the sender as well. Berlo's communication model was chosen because of two reasons. First, Berlo's communication model emphasizes the sender-receiver relationship and the factors influencing effective communication between them. In a study that focuses on smallholder orange farmers' access to market information, understanding how information flows from senders (e.g., agricultural extension officers, market intermediaries) to receivers (the farmers) is crucial. Second, the model was chosen due to its simplicity and clarity, making it accessible and understandable to researchers. The study aimed to provide insights for improving smallholder farmers' access to market information. Therefore, using a straightforward model like Berlo's could help facilitate the communication of the findings.

Conceptual Framework

In this study, components of Berlo's communication model were adopted to figure out the structural design of the conceptual framework as illustrated in Figure 1:



Message

Figure 1: Berlo's 1960 Modified Communication Model

Figure 1 shows the relationship among the variables in this study. The premise was that smallholder orange farmers have access to market information and know which channels to use to get specific information based on their age, education level, gender and culture (language and personal space). Similarly, the extent to which smallholder orange farmers access market information is associated with their demographic characteristics and culture. Receivers receive information through channels such as broadcast media (radio, television, newspapers, social media, relatives and friends, and agricultural extension officers).

Methodology

This study employed a descriptive design and a mixed-methods research approach and gathered both secondary and primary data. Secondary data are those that have already been collected by someone else and statistically processed (Kothari, 2014). These data were collected by reviewing literature from books, dissertations, journal articles, research papers, theses, project reports, online databases, websites, and newspapers. Primary data were obtained through interviews and questionnaires. Non-probability and random methods of sampling were employed to select respondents. Purposive sampling techniques were used to select villages and key informants, such as village leaders and agricultural extension officers. This technique was applied because it is quick, less expensive, and offers potentially useful information with regard to a population (Sekaran & Bougie, 2010). Therefore, the selection of the respondents was based on their potential or usefulness in terms of the information to be collected. A convenient sampling technique was applied in the selection of participants in the focus group discussion. Random sampling was used to select smallholder farmers available in Ngarani and Kwakifua Villages with the support of village leaders who helped in the distribution of questionnaires. Interviews were held with two village leaders and two agricultural extension officers and centered on market information needs, sources, challenges, and strategies for improving access to and use of market information by smallholder farmers. A questionnaire with both closed and open-ended questions was served to 103 smallholder farmer respondents. Data were processed and analyzed in line with the study's

research objectives. Qualitative data arising from interviews, observation, focus group discussions, and open-ended question responses were subjected to content analysis and have been presented in narrative form. Quantitative data, on the other hand, were organized, described, coded, and analyzed in tabular form using Statistical Product and Service Solutions (SPSS) version 21 to generate simple descriptive and inferential statistics. Chi-square was run to establish the relationship between preferred sources of information and demographic characteristics of respondents, namely age, gender and educational levels. Logistic regression was also run to determine the relationship between access to information and age, gender and education levels of the respondents. Microsoft Excel was used to draw tables and graphs.

Study Area

This study was conducted in Muheza District, which has a total area of 1,974 square kilometers and 204,461 people as per the 2022 national census. The District experiences two rainfall seasons, one of which takes around two to four months depending on a specific year and local weather patterns, and an average annual rainfall of 1,100 to 1,400 mm. Rainfall is an important factor in the success of agricultural crops generally, and it is the cornerstone of the livelihood of farmers. Muheza District was chosen for its key role in orange production, which is one of the district's good sources of livelihood. The study was conducted in two villages, namely Ngarani and Kwakifua. These were chosen because they are among the areas that produce big volumes of oranges.

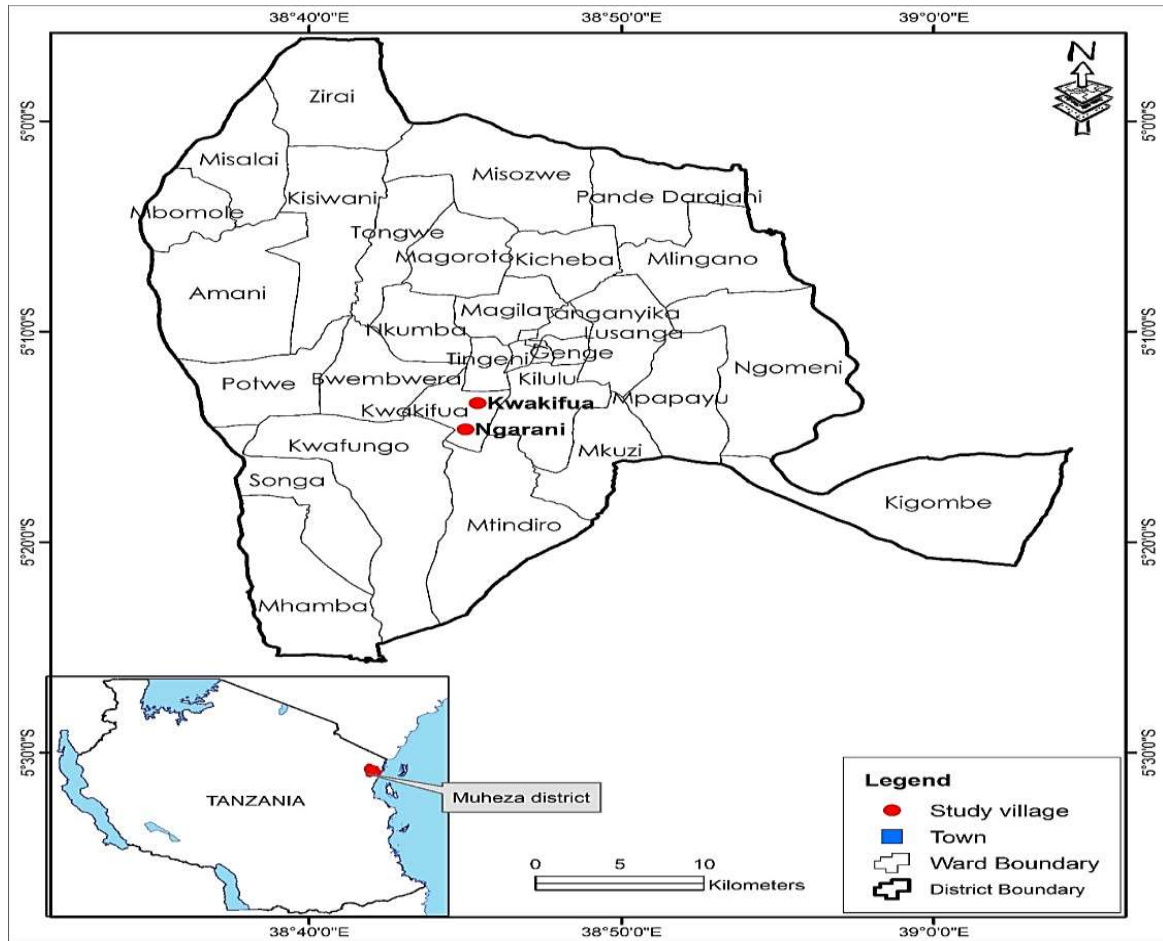


Figure 2: Location of Ngarani and Kwakifua Villages in Muheza District, Tanzania.

Source: IRA, University of Dar es Salaam.

Sampling and Data Collection Methods

In this study, the sample size for smallholder orange farmers provided with questionnaires was decided using a formula. According to Yamane (1967), sample sizes should be computed using the following formula:

$$n = \frac{N}{1 + N(e)^2}$$

Whereby; n stands for the sample size; N stands for the population size; e for the margin of error and the target population under the study is 200, hence:

$$n = 200 / (1 + 200 * (0.05)^2) = 133$$

Therefore, the sample size of this study was 133 respondents. Among them, two village leaders and two agricultural officers were interviewed. Twenty-six other respondents were divided into two groups, consisting of 13 participants who engaged in focus group discussions.

Results and Discussion

Characteristics of Respondents

The one hundred and three respondents who were served with a questionnaire were drawn from two villages, as follows: 40 (39%) males and 63 (61%) females were selected from Ngarani and Kwakifua Villages, respectively. Table 1 provides a summary of these details:

Table 1: Gender distribution of respondents by village (n=103)

Gender	Villages		Total
	Ngarani	Kwakifua	Frequency/percentage
Male	22	18	40(39%)
Female	40	23	63(61%)
Total	62	41	103(100%)

Source: Field Data, 2022.

Across the two villages, female respondents had a higher representation in this study than their male counterparts. This result suggests that the number of females engaged in agricultural activities is greater than that of males. Njelekela and Sanga (2015) note that in Tanzania, women perform more farm production activities than men, who engage more in market activities (the sale of agricultural crops). As such, the conclusion that there is an unequal gender distribution of farm responsibilities between men and women in the study area is justified. This next subsection presents data on the composition of respondents based on age. Table 2 summarises this composition.

Table 2: Age Group of respondents (n=103)

Age Group	Frequency	Percentage
21-30	22	21
31-40	29	28
41-50	24	23
51-60	16	16
61+	12	12
Total	103	100

Source: Field data, 2022

Table 2 shows that there was no respondent below the age of 20 and that the majority 75(72%) of them were below the age of 50, while 28 (27%) were over the age of 51. This shows that despite using random sampling, this study managed to generate a sample in which various age groups were represented, which gave it a chance of creating a better understanding of the subject under study. In fact, people under 50 years of age are also considered energetic and able to involve themselves in different socio-economic activities. Such age composition aided the study in determining whether farmers' choices of information sources and use of information are related to their ages. The other attribute of interest in this study was the educational level of the respondents. Education is a major determinant of their access to and use of various sources of information. As presented in the conceptual framework, this study has demonstrated that a receiver of information, should have the knowledge and the right attitude that would help him or her to understand the message and use it in marketing activities in different circumstances to meaningfully benefit from it. In general, those with limited education are at a disadvantage in terms of access to and use of market information. Details on the respondents' education are summarized in Figure 3.

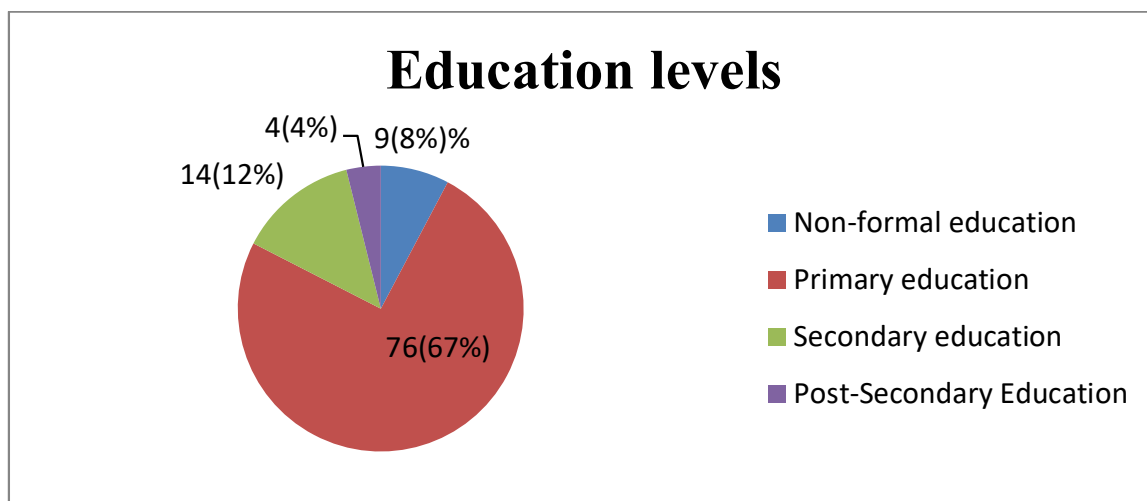


Figure 3: *Education level of respondents (n=103)*

Source: Field Data, 2022

Figure 3 shows that the majority (91%) of respondents underwent formal education (from primary to post-secondary). In other words, the majority of smallholder orange farmers in the study area have formal education. In slight contrast, Magesa (2014) found that the majority of small-scale farmers had gone as far as Form 4. The few Form VI leavers and college graduates who took part in the current study were employees working in the respective villages.

Respondents' Preferred Sources of Market Information

When respondents were asked to mention the sources of information that they use to access market information, they provided responses that have been summarized in Figure 4.

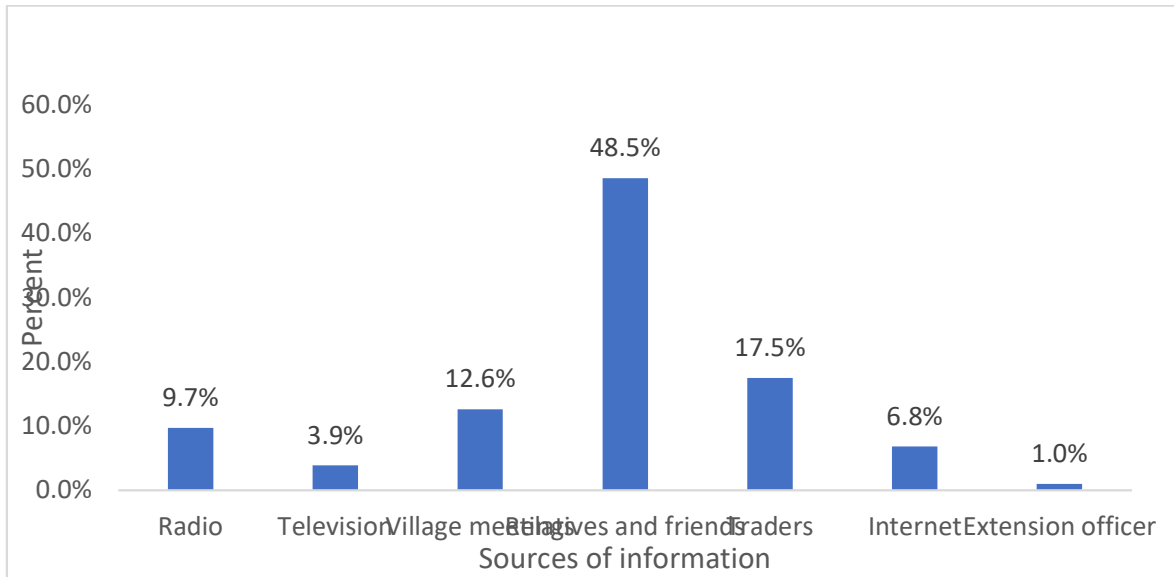


Figure 4: Preferred Sources of Market Information (n=103)

Source: Field data, 2022

According to Figure 4, respondents indicated that their most preferred sources of market information were relatives and friends, traders, village meetings, and radio. This finding implies that friends and relatives are the major sources of market information for smallholder orange farmers. The finding corresponds with a study by Saryam (2020), who noted that family members, friends, relatives, and progressive farmers were regularly contacted as sources of information. Similarly, Adio et al. (2016) found that neighbors, friends, family, and village meetings were among the major information sources for farmers. Furthermore, Ameru et al., (2018) noted that market information was obtained through interactions with family members, other farmers, and friends. Perhaps this is so because of the low cost and reliance on information sharing.

Table 3: Cross-tabulation of Preferred Information Sources and Age, Gender and Educational Levels of the Respondents

Demographic characteristics	Information Sources						Chi-square	df	Sig.
	Radio	Television	Village meetings	Relatives and friends	others	Total			
Gender									
Male	40.0%	50.0%	46.2%	50.0%	11.5%	38.8%			
female	60.0%	50.0%	53.8%	50.0%	88.5%	61.2%	11.288 ^a	4	0.024
age group									
21-30	30.0%	25.0%	30.8%	22.0%	11.5%	21.4%			
31-40	40.0%	25.0%	15.4%	22.0%	42.3%	28.2%	7.143 ^a	8	0.521
41+	30.0%	50.0%	53.8%	56.0%	46.2%	50.5%			
Education									
Primary and below	60.0%	50.0%	53.8%	92.0%	92.3%	82.5%			
Secondary and above	40.0%	50.0%	46.2%	8.0%	7.7%	17.5%	18.704 ^a	4	0.001
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			

Source: Field data, 2022

The findings indicate that there is a statistically significant association between preferred sources of information and gender and level of education at a 5 percent level of significance. Perhaps this is due to the fact that education provides the knowledge necessary to determine the most effective information format and information sources based on one's information needs. The smallholder farmers who have limited education also have friends and relatives who can provide market information. However, if relatives and friends have primary education or below, they may be constrained by cultural factors such as language and a lack of information literacy skills, resulting in a lack of awareness and limited access to formal information sources, such as social media, newspapers, the Internet and television, which can provide them with market information. Furthermore, smallholders who have limited education may have more limited social networks than those who have higher levels of education. This is because people who have higher levels of education may have more opportunities to meet new people and establish broader social networks through their education and professional activities. Thus, rely more on informal sources of information, such as friends and relatives, as a substitute for formal sources of information. Similarly, gender

may also influence one's choice of information source. For instance, females, who are the majority in this study and ordinarily engage themselves in farm activities, due to cultural norms, social roles, and discrimination may have less access to mobile phones or internet services, which can limit their ability to access market information. As a result, may opt to use relatives and friends, who are more easily reachable than traders who stay in faraway marketplaces or towns. Therefore, gender can be an important variable to consider in understanding the farmers' access to market information. Manda and Mukangara (2007) investigated the relationship between gender and the choice of information sources by students at the University of Dar es Salaam. Their findings also revealed that there was an association between gender and the choice of information sources.

Respondents' Market Information Needs

Respondents were asked to point out the types of information they need to be able to sell their oranges. They had to tick more than once from the checklist provided. Their responses are summarised in Table 4:

Table 4: *Market Information Needs of Smallholder Orange Farmers (n=103)*

Market information need	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Price negotiation techniques	83(79%)	17(17%)	0(0%)	2(2%)	1(1%)
Product quality	75(73%)	22(21%)	1(1%)	3(3%)	2(2%)
Market outlets (new market opportunity)	69(67%)	23(22%)	1(1%)	4(4%)	6(6%)
Current Market prices	66(64%)	12(12%)	0(0%)	12(12%)	13(12%)
Current product supply and demand	57(55%)	19(18%)	0(0%)	15(15%)	12(12%)
Supply on the markets	46(45%)	17(16%)	1(1%)	28(27%)	11(11%)
Sale timing and win/loss analysis	41(40%)	22(21%)	0(0%)	16(16%)	24(23%)
Transport cost	37(36%)	12(12%)	1(1%)	33(32%)	20(19%)
Market risk	32(31%)	9(9%)	1(1%)	22(21%)	39(38%)
Tax duties	28(27%)	7(7%)	1(1%)	48(47%)	19(18%)

Source: Field Data (2022)

As from Table 5, the majority of smallholder orange farmers require market information on price negotiation techniques (100%), product quality (97%), market outlets or new market opportunities (89%); current market prices (78%); current product supply and demand on the markets (73%), supply on the markets, sale timing, and win-loss analysis (61%). Interview data confirm some of the information required: *“Knowing market prices and possessing negotiation skills will help farmers negotiate reasonable prices for their oranges. Currently, smallholder farmers are being exploited by middlemen due ignorance of prices elsewhere and a lack of bargaining skills”* (Interview with the leader, Kwakifua Village, 2022).

According to the above quotation and the data generated from the questionnaire, the information that would equip smallholder farmers with the ability to earn more from their product is highly needed. This finding corroborates those of Silayo (2016), which revealed that in many rural areas, poor communication systems prevent farmers from knowing product prices before taking their produce to markets. As a result, many smallholder farmers often sell their oranges to middlemen at pre-arranged low prices. During a focus group discussion with smallholder orange farmers, it was noted that inadequate information on markets and prices hinders farmers from profiting from their farm efforts. The availability of market information could enable farmers to check their product prices against those offered by middlemen. Smallholder farmers require this information in order to meet market quality standards. Also, during the discussions, it was noted that the dissemination of this information is very essential in helping farmers produce oranges that could fetch good prices. This finding also echoes findings in a study by Magesa (2014) that found the majority of farmers living in isolated rural areas lack access to agricultural market information. According to the farmers, the information is crucial as it would enable them to know orange prices, demand, and supply. Moreover, timely access to this information may enable smallholder orange farmers to plan for their various activities. Through this information, farmers are able to decide when it is the right time to take their products to market. Kongai et al. (2020) observe that farmers who have market information are able to plan the production and sale of any quantities of their products and negotiate higher prices.

Extent to which Respondents Access Market Information

Investigating the extent to which farmers accessed information aimed at establishing the adequacy of market information. Generally, the majority of respondents indicated that they had access to market information. However, when asked to indicate the extent to which they had access, the participants responded as summarized in Table 5.

Table 5: *Cross-tabulation between Extent of Access and Villages (n=103)*

Villages		extent of access		Total
		Large Extent	Moderate	
Ngarani	Frequency	7	55	62
	% within extent of access	50.0%	61.8%	60.2%
Kwakifua	Frequency	7	34	41
	% within extent of access	50.0%	38.2%	39.8%
Total	Frequency	14	89	103
	% within extent of access	100.0%	100.0%	100.0%

Source: Field data, 2022

The findings in Table 5 suggest that the majority of 89 (86%) respondents from both the Ngarani and Kwakifua Villages expressed that they moderately access market information. This situation was confirmed by an interview with an agricultural officer, who commented:

"We do not provide much information to smallholder orange farmers. We encourage them to form groups or join together to form farmers' associations in order to facilitate the distribution of market information." (Interview the agricultural extension officer, Ngarani Village, 2022)

Extension officers encourage smallholder orange farmers to work with fellow farmers to enhance reliance on personal networks for information. Extension workers ought to be proactive in information dissemination via diverse platforms that can reach many farmers instantly and simultaneously (Ameru

et al., 2018). Aidoo and Freeman (2016) argue that agricultural extension officers should identify farmers who can serve as intermediaries among various actors to help disseminate information in rural areas. Perhaps farmers have been accessing limited information due to the fact that findings show they have been using informal sources of information rather than formal sources, as indicated in Figure 4 above. The relationship between the demographic characteristics of the respondents and access to market information was determined using logistic regression analysis. The results are as indicated in Table 6:

Table 6: *Logistic Regression Analysis between Access to Market Information and Age, Gender and Educational Levels of the respondents*

Access	Odds Ratio	Std. Err.	z	P>z	[95% Conf. Interval]	
Education [Secondary and above]						
Primary and below	0.082	0.073	-2.82	0.005	0.014	0.466
Age [21-30]						
31-40	1.463	1.578	0.35	0.724	0.177	12.116
41+	1.685	1.661	0.53	0.596	0.244	11.631
Gender [Female]						
Male	3.115	3.234	1.09	0.274	0.407	23.837
Cons	0.270	0.377	-0.94	0.348	0.018	4.151

Source: Field data, 2022

Table 6 presents the multiple binary logistic regression findings on the relationship between access to the market and the demographic characteristics of the respondents. The findings show that individuals with a primary or below primary level of education are 91.8 percent less likely to have access to market information, and the results are statistically significant at the 5 percent level of significance. Perhaps this is due to the fact that knowledge enables one to solve problems that constrain one's life, including the need to search for information in order to meet her or his information needs. In Tanzania, the higher the education level, the greater the ability to speak English, and hence, the ability to access information in both Swahili and English as well as diverse media and formats. This finding concurs with those in a study by Shimaponda-Mataa et al. (2016), which establishes that newspapers and television as sources of malaria information were significantly related to education levels. It should be noted that information

and sources of information ordinarily concern all sectors, including the health and agriculture sectors.

Challenges Facing Smallholder Orange Farmers in Access to Market Information

Respondents in the study areas were finally asked to state the challenges they face when accessing market information. Table 7 is a summary of their responses.

Table 7: *Challenges Facing Smallholder Orange Farmers in Accessing Market Information*

(n=103)

Challenges	Strongly Agree	Agree	Neutral	Dis Agree	Strongly Disagree
Lack of information centers	91(88%)	6(6%)	1(1%)	3(3%)	2(2%)
Low level of ICT literacy	91(88%)	2(2%)	0(0%)	3(2%)	7(7%)
Low support of extension officer (agricultural officer) at village	89(86%)	3(2%)	1(1%)	4(4%)	6(6%)
Distance from the sources of information	88(85%)	5(5%)	0(0%)	3(3%)	7(7%)
Inadequate of ICT infrastructures	86(83%)	5(5%)	0(0%)	4(4%)	8(8%)
Price boards not present in the village and market place	84(82%)	8(8%)	1(1%)	4(4%)	6(6%)
Inadequate of content information	83(81%)	8(8%)	1(1%)	3(3%)	8(8%)
Low level of income (can't afford to buy radio, TV, newspaper, smartphone)	78(76%)	16(16%)	1(1%)	3(2%)	5(5%)
Format and language problem	30(29%)	28(27%)	2(2%)	3(3%)	40(39%)
Lack of Farmers' Associations	22(21%)	17(16%)	15(15%)	4(4%)	45(44%)

Source: Field Data, 2022

The findings suggest that though there are diverse challenges that respondents encounter, the critical ones include lack of information centers, limited ICT literacy, followed by limited support from extension officers, distance from the sources of information, inadequacy of ICT infrastructure, absence of price boards in the village and market place and inadequacy of information content. Also, low income constraint farmers to afford purchasing radio, TV, newspaper and smartphones as one FGD participant revealed:

"Smallholder orange farmers cannot access market information effectively because only few of them have computers and smartphones major constraints being to cost, and the few who own them do not know how to access relevant information" (FGD with participant, Kwakifua Village, 2022)

These findings echo those of Hoang (2020) who argues that farmers are unable to utilize ICTs due to cost, a lack of knowledge and skills. Farmers' associations which were stressed by extension officers do not appear that they are not seen as important by farmers. Hence, extension officers have a duty to train them so that they may realize the importance of formal farmers' associations in enhancing provision of agricultural information.

Conclusion and recommendations

Following the findings, it is apparent that smallholder orange farmers need diverse market information. This includes price negotiation techniques, product quality, and sale timing. The findings also show that friends and relatives, agricultural and extension officers, village meetings, and traders are the main sources of market information for the farmers and that there is a relationship between information sources and the demographic characteristics of the respondents. Furthermore, the findings show that smallholder orange farmers' access limited market information, and there is a significant relationship between access to information and the gender and education level of the farmers. Various challenges constrain effective access to market information. These include a lack of information centers, a lack of ICT infrastructure, low literacy levels, inadequate agricultural extension officers, long distances from sources of information, and low income. Based on the findings of this study, the following are recommended: First, smallholder orange farmers should be encouraged to access market information from

formalized sources instead of using informal sources. Formal sources made available through village leaders, extension services, and ICTs can communicate accurate, relevant, and current information. Second, only information on market prices for a few designated crops from a few selected key markets is provided currently. The Government should develop a comprehensive information support system that will provide information for smallholder agricultural farmers. Third, the Government should empower smallholder orange farmers with soft loans so that they may buy ICT tools and train them on how to access relevant information. This should go in tandem with employing agricultural extension officers who are competent in ICT skills for the purpose of training farmers. Finally, the Tanganyika Library Board (TLB), which currently oversees the establishment and management of libraries in the regions, should extend its services to rural areas where the majority of citizens reside. This will enable farmers to be served with fliers, newspapers, and other publications that bear market information.

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References

- Abobatta, W.F. (2015). Influence of magnetic iron and K-humate on productivity of valencia orange trees (*Citrus sinensis.*) under salinity. *International Journal of Scientific Research in Agriculture Science*, 2, 108–119.
- Aidoo, D.C., & Freeman, C.K. (2016). Agricultural informational flow in informal communication networks of farmers in Ghana. *Journal of Development and Communication Studies*, 4(2), 443-453.
- Adetimehin, O.D., Okunlola, J.O., & Owolabi, K.E. (2018) Utilization of agricultural information and knowledge for improved production by rice farmers in Ondo State, Nigeria. *Journal of Rural Social Sciences*, 33(1), 76–100.

- Adio E.O, Abu, Y., Yusuf, S.K. (2016). Use of agricultural information sources and services by farmers for improve productivity in Kwara State. *Library Philosophy and Practice*, 1-18
- Agbola, P.O., Adenaike, T., & Babalola, D.A. (2010). Determinants of farmers' access to output markets and the effects on income; A case study of Ikenne local government area, Nigeria. *Journal of life and physical sciences*, 3(2), 33-39.
- Ajani, E.N., & Agwu A.E. (2012). Information and communication technology needs of small-scale farmers in Anambra State, Nigeria. *Journal of Agriculture and Food Information*, 13(2), 144–156.
- Ameru, J. N., Odero, D., & Kwake, A. (2018). Towards improving agricultural marketing information systems for smallholder farmers: A Tharaka Nithi case. *Journal of Agriculture and Sustainability*, 11(2), 99-128.
- Balarane, A., & Oladele, O.I. (2012). Awareness and use of agricultural market information among small scale farmers in Ngaka Modiri Molema District of North West Province. *Life Science Journal*, 9(3), 57-62.
- Businessstopia, (2018). Berlo's model of communication. Retrieved from <http://www.businessstopia.net/communication/berlo-model-communication>
- Christian, M., Otitoju, M. A., & Nohamba, S. (2019). Estimation of Post-Harvest Losses along Marketing Channels of Navel and Lemon in Kat River Valley, Eastern Cape, South Africa. *Proceedings Book*, 24: 108.
- FAO, (2021). *Production: Crops and livestock products*. Retrieved from <https://www.fao.org/faostat/en/#data/QCL>
- Ferris, S., Engoru, P., & Kaganzi, E. (2014). Making market information services work better for the poor in Uganda. *Cahiers Agricultures*, 23(4-5), 336-343.

- Fonseca D, Conde MA and Garcí'a-Pen*alvo FJ (2018) Improving the information society skills: Is knowledge accessible for all? *Universal Access in the Information Society*, 17, 229–245.
- Hoang, H. G. (2020). Determinants of the adoption of mobile phones for fruit marketing by Vietnamese farmers. *World Development Perspectives*, 17, 100178.
- Kaddu, S., Nanyonga, D., & Haumba, E. N. (2020). Role of small-scale farmers in making agricultural market information systems relevant and sustainable in Bugiri district, Uganda. *University of Dar es Salaam Library Journal*, 15(2), 69-83.
- Kongai, H., Mangisoni, J., Elepu, G., Chilembwe, E., & Makoka, D. (2020). Smallholder orange farmer access to markets in Uganda. *African Crop Science Journal*, 28(2), 267-278.
- Kothari, C.R. (2014) *Research methodology*. 3rd ed.-New Delhi, India: New Age International publisher.
- Lunogelo, H., Kihenzile, P.T., & Lasway, J. (2020). Citrus in Tanzania. Dar es Salaam, Tanzania: Economic and Social Research Foundation, Dar es Salaam.
- Lwoga, E. (2011). Application of Knowledge Management Approaches and Information and Communication Technologies to Manage Indigenous Knowledge in the Agricultural Sector in Selected Districts of Tanzania. (PhD Thesis). Retrieved from <https://www.researchgate.net/publication/260704627>
- Magesa, M.M., & Ko, J. (2014). Access to agricultural market information by rural farmers in Tanzania. *International Journal of Information and Communication Technology Research*. 4(7), 264-273.
- Magesa, M.M., Michael, K., & Ko, J. (2020). Access and use of agricultural market information by smallholder farmers: Measuring informational capabilities. *The Electronic Journal of Information Systems in Developing Countries*, 86(6), e12134.
- Manda, P. & Mukangara, F. (2007). Gender analysis of electronic information resources use: The case of the University of Dar es Salaam, Tanzania.

The University of Dar es Salaam Library Journal, 9(1),
doi:10.4314/udsLj. V911.26660.

- Makorere, R. (2014). An exploration of factors affecting development of citrus industry in Tanzania: Empirical evidence from Muheza District, Tanga Region. *International Journal of Food and Agricultural Economics (IJFAEC)*, 2, 135-154.
- Matovello, D.S. (2008). Enhancing farmers' access to and use of Agricultural information for empowerment and improved livelihoods, a case of Morogoro Region, Tanzania. (PhD Thesis), University of Dar es Salaam.
- Mhando, D., & Ikone, I. (2018). Production and Marketing of Orange in Two Villages in Muheza District, Tanzania. *Supplementary Issues*, 55, 85-98.
- Mgonja, C.T., & Utou, F.E. (2017). Assessment of fruits and handling in Tanzania – Case of orange fruit. *International Journal of Innovative Research in Science Engineering and Technology*, 6, 10408–10416.
- Mtega, W. & Benard, R. (2013). The state of rural information and communication services in Tanzania: a meta-analysis. *International Journal of Information and Communication Technology Research*, 3(2), 64 – 73.
- Mwakaje, A. (2010). Information communication technology for rural farmers in Tanzania. *Journal of Information and Technology Impact*, 10 (2), 111-128.
- Mwalukasa, N. (2013). Accessibility of Agricultural Information in Supporting Climate Change Adaptation in Tanzania, *Library Review*, 62, (4/5), 266-292.
- Mwatawala, H., & Kidoloi, R. (2018). Determinants of Profitability in Orange Production under Smallholder Farming in Muheza District, Tanzania. *Institute of development planning*, 20(2), 52-60.
- Mwatawala, H., & Kidoloi, R. (2018). An evaluation of Challenges Facing Smallholder Orange Farmers in Muheza District, Tanzania. *Institute of development planning*, 20(2), 72-80.

- Mwombe S.O.L, Mugivane F.I., Adolwa, S.I. (2013). Evaluation of information and communication technology utilization by small holder banana farmers in Gatanga District, Kenya. *Journal of Agricultural Education and Extension*, 20(2), 247–261.
- Naveed, M.A., & Hassan, A. (2020). Sustaining agriculture with information: An assessment of rural citrus farmers' information behaviour. *Information Development*, 37(3), 496-510.
- Ngogo, J. (2013). The role of information in improving fruits marketing for small scale farmers in Lushuto district, Tanzania. (M.A. thesis), University of Dar es Salaam.
- Njelekela, C., & Sanga, C, (2015). Contribution of information and communication technology in improving access to market information among smallholder farmers. The case study of Kilosa district. *The International Journal of Management Science and Information technology*. Retrieved from <http://hdl.handle.net/10419/178806>.
- Pienaar, L., & Trauma, L.N. (2015). Understanding the smallholder farmer in South Africa: Towards a sustainable livelihoods classification. *International Conference of Agricultural Economists*, 1-37.
- Pokharkar, V.G., Dongre, C. S., &Kulkarni, A. R. (2016). Economic analysis of marketing and problems of sweet orange in Ahmednagar district of Maharashtra. *Trends in Biosciences*, 9(2), 82-87.
- Ronald, B, Dulle, F., & Honesta, N. (2014). Assessment of the information needs of rice farmers in Tanzania: A case study of Kirombero district, Morogoro. *Library Philosophy and Practice*, 1-24.
- Saryam, M., & Jirli, B. (2020). Socio economic status of orange farmers in Chindwara district of madhyapradesh. *International Journal of Agricultural Science and Research (IJASR)*, 10, 67-78.
- Salau, E.S., Saingbe, N.D., & Garba, M.N. (2013) Agricultural information needs of small holder farmers in central agriculture zone of Nasarawa state. *Journal of agricultural extension*, 17(2), 113-121.

- Sekabira, H., Bonabana, J., & Asingwire, N. (2012). Determinants for adoption of information and communications technology (ICT)-based market information services by smallholder farmers and traders in Mayuge District, Uganda. *Journal of Development and Agricultural Economics*, 4(14), 404-415.
- Shimaponda-Mataa, N.M., Tembo-Mwase, E., Gebreslasie, M. & Mukaratirwa, S. (2016). Knowledge, attitudes and practices in the control and prevention of malaria in four endemic provinces of Zambia. *South Africa Journal of Infectious Diseases*, 1(1), 1-11.
- Sharma, P.S., Kuwornu, J. K., Datta, A., Yaseen, M., & Anal, A. K. (2020). Analysis of marketing information sources among smallholder vegetable farmers. *International Journal of Vegetable Science*, 26(1), 96-105.
- Siyao P.O. (2012). Barriers in accessing agricultural information in Tanzania with a gender perspective: The case study of small-scale sugarcane growers in Kilombero District. *Electronic Journal of Information Systems in Developing Countries* 51 (1), 1–19.
- Silayo, E.S. (2016) *Access to and use of agricultural information in poverty alleviation: A case of agropastoralists in Kilosa and Monduli Districts in, Tanzania.* (PhD thesis), University of Dar es salaam.
- Sateesh, V., & Indumathi, V. M. (2018). A study on marketing of sweet orange in Nalgonda district of telangana state. *International Journal of Advances in Agricultural Science and Technology*, 5 (8), 74-82.
- Tekale, V.S., Bhalekar, D.N., Tayde, V.V., & Jamdhade, S.S. (2016). Knowledge and use of information communication technology (ICT) tools by orange growers. *International Journal of Commerce and Business Management*, 9(2), 267-271.
- USAID. (2013). *The fresh Fruit and Vegetable Markets of East Africa: An Assessment of Regional Value Chain Actors, Activities and Constraints in Kenya, Tanzania and Uganda.* East Africa: Trade Hub.
- URT. (2008). *Agricultural Marketing Policy.* Ministry of Industry, Trade and Marketing. Dar-es-Salaam, Tanzania: Tanzania Government Printer.

Wyche, S., & Steinfield, C. (2016). Why don't farmers use cell phones to access market prices? Technology affordances and barriers to market information services adoption in rural Kenya. *Information Technology for Development, 22 (2)*, 320-333.