

Journal of Agriculture and Sustainability

ISSN 2201-4357

Volume 11, Number 1, 2018, 35-53

INFINITY PRESS

www.infinitypress.info

**Implications for Access and Non-Access of Agricultural Market Information in
Tharaka Nithi County**

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ABSTRACT

Agriculture is the mainstay of Kenyan economy. It accounts for 26% GDP and provides 18% and 42% formal and informal employment respectively. Tharaka Nithi has a population of about 400,000 persons, over 90% of whom rely on agriculture as a source of livelihood. Although surplus food production is common in the county, often farmers sell their produce at losses or lose it via post-harvest losses. Good output markets exist within the country but farmers lack sufficient knowledge to make use of them. This study aimed at establishing the importance of such information in addition to determining the challenges and opportunities for accessing the information in the County. The study sample included farmers and extension workers. Data was collected by use of semi-structured interview schedules and analyzed using qualitative and quantitative methods. The results show that farmers make losses due to lack of information. Unscrupulous middlemen confuse farmers with distorted market information causing them to make losses. Challenges facing access to information include poor physical/technological infrastructure among others. Opportunities for improving information access exist such as use of mobile telephony to communicate information to farmers. Despite these challenges, there are opportunities for increasing use of agricultural marketing information to improve farmers' livelihood.

Key words: Agricultural marketing, Information access, challenges, opportunities, Tharaka Nithi.

INTRODUCTION

Agricultural markets are crucial for distribution of food from the point of production to food deficit agricultural and urban areas. Often when markets are dysfunctional certain regions will tend to have excess food and high post-harvest losses concurrent with hunger in other regions even within the same country. Availability of markets and access to information about markets by the farmers is crucial for sustained high crop and animal production, distribution of food and enhanced livelihoods of small scale farmers (Robert and Kernick, 2006). Across Africa key market players strive to get such information to engage in profitable agricultural activities. However, regions, households and market players operate at varying levels of access to quality information. Being at the lowest level of the production value chain, farmers are the greatest casualty of lack of adequate quality information. Farmers who access the right information at the right time stand chances of pulling out of the poverty trap while those who lack access are disadvantaged.

It is expected that the average crop yield per unit area among the smallholder farmers will continue growing due to enhanced county, central government and donor investment in fertilizer subsidy program, improved seeds and irrigation and farmer education. The government's push through support on input financing, irrigation and mechanization to boost agricultural yields as a way of creating alternative employment and growing wealth is also taking root in Kenya which will lead to even better yields. This projected crop yield growth is not matched with growth in markets where farmers can sell their outputs. Often such markets exist in the cities, town centers and food industries but farmers are unable to access them directly. This either opens opportunities for middlemen to buy products from them at low prices or the products get spoilt on farm due to poor storage facilities. The Kenya vision 2030 recognizes that the Kenyan agricultural productivity is constrained by a number of factors including limited and inefficient extension services, high input costs and lack of remunerative markets among

others. Similarly Skjöldevald (2012) observes existence of a range of obstacles to agricultural marketing ranging from lack of good infrastructure, high transportation costs, no or limited access to financial credit and market information, no demand for farm produce or that the market is flooded with certain commodities lowering farm produce prices. Mukhebi, (2007) further notes that, the traditional approach to providing agricultural information in Kenya is through public extension services. This service does not work effectively owing to inadequate infrastructure to support their service delivery and the low extension worker-farmer ratio.

Despite the high agricultural productivity that often results in surplus production and the high economic importance of agriculture, over 40% of the county population live below the poverty line (less than a dollar a day) (Tharaka Nithi, 2012). These high poverty levels have been attributed to limited remunerative markets to absorb the surplus crop produce. Farmers therefore invest in fertilizers and good seeds to produce crops but there is limited linkage to remunerative markets to enable sale of surplus at a level that enable them to re-coup the returns on investment. Although market challenges are common for all marketed crops, perishable products like mangoes, tomatoes, avocados, paw paws, passion fruits and dairy products are the most affected (NEMA, 2007). As a result of disparities in information access and use in the County, some farmers deliver farm products to markets while others wait for middlemen to buy from their farms (Gacheri, 2008). Low farm-gate prices, high market fees and associated losses are closely linked to poor access and utilization of market information in the region (Gacheri, 2008). Against this background this study, sought to systematically establish the actual impact of limited access, the hindrances to access and the opportunities for improving access to market information among the farmers in Tharaka Nithi.

MATERIALS AND METHODS

Study area description

The target area is Tharaka Nithi County whose total population is about 400,000 (Tharaka Nithi County, 2014). Tharaka Nithi County has three sub-counties Maara, Tharaka and Meru South. In terms of agricultural production Tharaka Nithi can be divided into the high potential region with adequate rainfall covering Maara and Meru south and low potential arid region covering Tharaka (Jaetzold, Schmidt, Hornetz & Shisanya, 2006). Due to precipitation related climatic challenges the range of crops and crop yields in the arid part of Tharaka Nithi is minimal while the types of crops and the associated yields are high in the upper region of Tharaka Nithi (Jaetzold, Schmidt, Hornetz & Shisanya, 2006). Surplus crop yields are therefore more common in the upper high potential region. For that reason, this study, concentrated on the higher potential region of Tharaka Nithi, i.e. Meru south often referred to as Chuka and Maara sub counties.

Study design, data collection

Representative locations were purposively identified in Maara and Meru south on the basis of food crop productivity. (Jaetzold, Schmidt, Hornetz & Shisanya, 2006). Four most productive wards in Meru south and two most productive wards in Maara were identified and sampled. Quota sampling and purposive sampling were employed to draw a sample from Maara and Meru south sub-counties. Application of quota sampling ensures that sample group represents certain characteristics of the population (Mugenda & Mugenda, 2003). For this study the target was food crop farmers and extension workers in Meru South and Maara sub-counties of Tharaka Nithi. For purposes of capturing market dynamics farmers were further grouped into independent marketing farmers and

group marketing farmers. In the context of this study independent farmers are those who marketed their produce within their farms while group farmers were those that marketed their produce within a group structure that allowed aggregation of outputs, group bargaining and group input acquisition. The farmer group structure was made up of the chairperson, secretary, treasurer and ordinary group members. Both categories of farmers were growing either or all of the following food crops (bananas, maize and beans). In total, the sample size consisted of 154 farmers and 9 extension workers.

Independent and group marketing

A baseline survey carried out prior to initiation of the main study revealed that farmers either sold their produce independently or through groups. Historically all farmers had sold their produce independently within their farms prior to the year 2000. However, after 2000 a number of NGOs including the International Fertilizer Development Center (IFDC), Agricultural Market Development Trust (AGMARK), AGRA, Cereal growers association (CGA) and the ministry of agriculture trained farmers on product aggregation and group negotiation for output prices. The group also presented other opportunities related to economies of scale such as buying inputs more cheaply in large quantities. At the start of this study about 52% of the sampled farmers were still selling their farm produce independently within their farms. Some had never sold their produce through groups while others had dropped from marketing groups for various reasons. This study integrated the group and non-group (independent) marketing into analysis to reveal the advantages and disadvantages related to the two marketing models and provided recommendations. Throughout the study, farmer datasets were therefore classified into the two categories i.e. independent farmers and farmer group members.

Data management and analysis

Prior to analysis, data was organized by coding and classifying and checked for errors of omission and commission. Data coding was done by assigning symbols to answers so as to put responses into limited related categories and to relate them with the study objectives. The processes of arranging data, reflecting on it, learning from the data and making sense of the data was carried out concurrently with the data collection process to optimize recall of flow of events and ideas. The coded data was then analyzed for percentage responses and economic trends. Some of the findings were represented as a detailed discussion of themes with specific quotations.

Results and Discussions

Socio demographic characteristics of sample

The proportions of the sampled farmers whether for group or independent marketing farmers increased with age from 21-30 years to 41-50 years age bracket and then started decreasing (Table 1). A more drastic decline in proportion of farmers (over 40%) was observed beyond 50 years for group members compared to independent farmers. This suggests that group membership was more popular among the younger farmers. While all the group members had formal education, about 5% of the independent farmers lacked any formal education. The highest level of education among most of the independent farmers (32%) was primary school education in contrast to farmer group members' whose majority (57%) had completed secondary school level of education. This implies that group marketing is more popular among educated farmers. Land ownership patterns for both group members and independent farmers were similar with majority in both cases owning between 0.5 and 1 acre (Table 1). Over 70% of the farmers owned between 0.5 and 1 acre of land. This low acreage per household in a region where an average household is made up of about 5 persons, imply a need for improved

intensifications and returns on agricultural investment to meet household needs like education, health, food, clothing and shelter.

Table1: Social-demographic characteristics of sample population (n=154)

	Independent farmers (n=80)	Farmer group members (74)	Cumulative % (N =154)
Age	%		
21-30	11	11	10
31-40	24	30	27
41-50	38	57	47
51-60	27	11	19
Education Level			
No formal training	5	0	3
Primary level	32	11	22
Secondary level	32	57	43
Tertiary level	30	38	33
Land size dedicated for food crop farming (acres)			
0.25	17	22	19
0.5	39	41	40
1	33	35	34
1.5	3	0	1.6

Farmer use and preference of various information channels

Table 2 shows channels used by farmers in Tharaka Nithi County to access agricultural marketing information. In contrast with the group marketing farmers, where all the farmers used information from various channels, about 20% of the farmers did not use any channel as a source of market information. This implies that some of the independent farmers marketed their products either with very limited or no market information at all. The most popular channels of accessing information were mobile phones and media which were used by more than 70% of both independent marketing farmers and group marketing farmers. The other popular channel was farmers' interaction which was used by 7% and 30% of independent and group marketing farmers respectively. There was limited use (0-5%) of agricultural journals, magazines, websites, research centers and administrative barazas by both independent and group marketing farmers. The low use of website is attributed to limited access to internet coupled with low internet use proficiency. Similarly majority of the farmers couldn't access information from research centers because the nearest research center; the Kenya Agricultural and Livestock Research Organization is about 40 kilometers away. The few farmers who accessed information from this center tended to be wealthier, commercial crop farmers.

At 80% use, mobile phones and media were also most popular channels for sourcing and disseminating agricultural marketing information among the extension workers. High use of mobile phones and media to access and disseminate agricultural market information in other Kenyan regions was also observed by Spurk, Schanne, 'Ochieng & Ugangu (2013).

Table 2: Channels used by farmers to access agricultural marketing information in the county

Channel	Independent farmers (n=80)	Group member farmers (n=74)	Total Independent + Farmer group (n =154)
%.....		
Do not use any channels	20	0	10
Mobile phones	73	85	78
Media (TV, radio and newspapers)	85	89	87
Farmers interaction	7	30	23
Agricultural journals and magazines	3	2	4
Websites/computers	5	4	6
Research centers	5	0	0
Administrative Barazas	0	1	0

The ranking presented in Table 3 shows how farmers ranked various communication channels in respect to access of marketing information. The patterns in order of importance and preference associated with communication channels by the two groups were similar. Mobile phones were ranked the most important and effective communication channels by between 67 and 79% of the respondents. This was also indicated by extension workers. An extension worker noted that, mobile phones were owned by farmers because they were affordable and accessible. He also noted that, it was easy to share information via mobile phones because, if one did not have a phone, they could get information from neighbors. Radios were found to be effective by farmers and extension workers. An extension worker noted that radios were popular because they used local languages which are easily understood by farmers. The least popular of the identified communication channels among farmers was the written material. The written materials were deemed inefficient because they require literacy skills yet in the rural areas literacy levels are low hence few farmers were able to read and interpret information on

their own as noted by both independent and farmer group members. They also indicated that printed materials such as newspapers were expensive to purchase and poor farmers could not afford them. Tharaka Nithi county farmers mainly used the most effective communication channel which was mobile phone to access and use agricultural marketing information as it enabled them to interact with the other stakeholders like extension workers and agro dealers who provided them with various packages of information. A similar study by Zhang et al. (2016) shows that, information dissemination is done through text messages from mobile phones which is a service normally jointly operated by agricultural sector and telecom service providers, for example Hunan Agri-Telecom Platform.

Table 3: Rank of the communication channels on basis of effectiveness

	Farmer Group Members		Independent Farmers	
	Rank	Awarded Marks	Rank	Awarded Marks
Mobile phone	1	5	1	5
Radio	2	4	2	4
Television	3	3	3	3
Computers	4	2	4	2
Written material	5	1	5	1

Returns from with and without market information scenarios

To find out how access or inability to access information affected their returns, farmers with access to information and those without access were asked about their sale price per unit of the crop within the same season for the June to December 2013 period. Data was compiled on two scenario basis of with and without information and presented as shown in Table 4. All the group members (100%) were informed about the market prices while only 35% of independent marketing farmers were aware of the market prices. The

informed farmers indicated that they were able to benefit from selling their crops at a higher price since they knew what the market price was and were not susceptible to exploitation by middlemen. On average, in November 2013 farmers with market information sold their maize at Ksh 3,700 per 90 kilogram bag instead of Ksh 3,240, beans at Ksh 4,910 per 90 kilogram bag instead of Ksh 4,040 and bananas at Ksh 15 per kilogram instead of Ksh 11 as sold by the un-informed farmers. On a per hectare basis using the average crop harvest yield of 30 bags (90 kg bag) per hectare maize, 15 bags (90 kg bag) per hectare beans and 10 tons per hectare banana this translates to information access income advantage of, Ksh 13,800/ ha for maize, Ksh 13,050/ha for beans and Ksh 40,000/ha for bananas. The un-informed farmers therefore incurred a loss of about US\$ 138 per ha for maize, a loss of about US\$ 130/ha for beans and a loss of about US\$ 400/ha of bananas as a result of non-use of agricultural market information. As more group members were informed, this analysis implies that the group marketing farmers made higher profits than the independent marketing farmers.

Table 4: Economic returns for various crop outputs with information

Crop	Average Yield per ha	Returns with information per ha	Returns without information per ha	Financial advantage of information per ha	US Dollar advantage @ 1 dollar = Ksh 100
Maize	30 bags	111,000	97,200	13,800	138
Beans	15 bags	73,650	60,600	13,050	130
Bananas	10 tonnes	150,000	110,000	40,000	400

Unit price per 90 kg bag of maize with information = Ksh 3700; unit price per 90 kg bag of maize without information =Ksh 3240, Unit price per 90 kg of beans with information =Ksh 4910, unit price per 90 kg bag of beans without information =Ksh 4040, Unit price per kg of most common marketed banana (Kampala) with information =Ksh 15; Unit price per kg of banana without information = Ksh

Factors hindering farmers access to market information

Findings show that a myriad of factors hinder effective access to agricultural market information. Slight differences existed between group marketing farmers and independent marketing farmers in terms of proportions that identified with various challenges but generally the challenges identified by the two types of farmers were similar. Farmers identified infrastructural challenges, low information literacy, lack of adequate information, inadequate support by the government agencies and the high cost of information as the key challenges limiting access and use of agricultural marketing information. Poor infrastructure hindering easy access to markets stood out as the major challenge. The second most important challenges were low information literacy and lack of adequate information.

Table 5: Challenges experienced by farmers in access of agricultural market information (AMI)

Challenges	Independent farmers (n =80)	Farm group members (n =74)	Cumulative % (N =154)
Poor infrastructural linkages hindering access and use of AMI	50	62	56
Low information literacy	43	35	39
Lack of adequate information	33	45	39
Inadequate support by the government agencies	30	43	36
Costly to get information	5	27	15

On the other hand the extension workers identified various challenges that hindered appropriate dissemination of information to farmers. The hindrances were:

Low literacy levels and poor ICT skills

Low literacy levels among farmers who were not able to read the disseminated information. An extension worker noted that *“low literacy levels hinder dissemination of information to farmers who did not know how to read for they cannot access and use written information”*. ICT proficiency was a challenge with over 40% of the farmers lacking skills required for accessing current agricultural marketing information e.g. via text messages and emails. An extension worker confirmed this by stating that, *“there were technological challenges, such as access to ICT, inability to use mobile phones and internet among farmers. Some of the buyers also paid farmers using Mpesa which was a challenge especially to illiterate farmers”*

Inadequate extension workers

There was general inadequacy of extension services in the county. It was noted by an extension worker that *“staff levels were low and were not able to visit farmers regularly resulting to farmers visiting the agricultural offices instead. This presented challenges because majority of farmers were either constrained by long distances, health complications or money and they were not able to come to agricultural offices for information. Furthermore, with more than 100,000 farmers against less than 100 county agricultural employees (equivalent to 1 extension worker for 1000 farmers against the recommended 1:400) it is difficult for the county employees to meet the information demand for each farmer even when they visited the county agricultural offices”*.

Blockage of vital information by brokers

Often, brokers and middlemen block flow of appropriate market information to the farmers. An extension worker noted that, *“Brokers block vital information provided by*

extension workers from reaching farmers. They also distort information given to farmers e.g. when Meru Green company buys bananas at Ksh 16 per kilogramme, brokers cheat farmers that they may not be paid on time and this discourages farmers from joining farmer groups which sell the crops in an organized manner to such companies for better profits." The resulting information limitations expose farmers to exploitation by middlemen especially when they dispose off their farm produce at the peak harvest. Peak harvest periods are characterized by huge amount of commodity in the market against limited demand. The shift in the supply against demand during that phase of production shifts the farm gate prices downwards forcing farmers to sell at losses.

In another scenario, an extension worker cited cases where brokers distort market information forcing farmers to sell a cob of green maize to middlemen at Ksh 5 while the actual market value for such a cob is between Ksh 10 and Ksh 15 per cob. On average this represents a negative price distortion of more than 100%. An analysis of relationship between the broker price and the actual market price show that the farmer ends up selling the maize cob at between 50% and 75% of the actual market value.

Farm gate prices averaged ksh 25 per kilogram while through direct sale to agro food shop, farmers realized a net income of between Ksh 40 and ksh 50 per kilogram. Table 6 shows the cumulative market losses on a per hectare basis for 3 clusters of farmers, mainly those that harvest an average of 1 ton per hectare (11 bags each weighing about 90 kg), those that harvest 2.0 tons per hectare, (22 bags each weighing about 90 kgs), those that harvest an average of 3.0 tons per hectare (33 bags each weighing about 90 kilograms) and those that harvest 4 tons per hectare (44 bags each weighing about 90 kilograms).

Typically, studies have shown that the average maize yield for most farms in Tharaka Nithi ranges between 1 and 2 tons but with appropriate use of inputs, high quality seed

and good agronomic information the farm level yield can be increased to between 3 and 5 tons (Mugwe et al., 2008). Average household yields would therefore range between 1 ton and 4 tons per hectare depending on the level of use of inputs and agronomic knowledge. Table 6 shows that these clusters of farmers usually incur losses of between ksh 10,000 and Ksh 40,000 per every hectare of dry maize production when the middlemen distorts the market price information conservatively by 25%. As shown previously such distortions could be as high as 75% leading to even higher losses, depending on the crop, time of the year and the farmer in question.

Table 6: Effect of market information distortion on farmer incomes in Tharaka Nithi

Typical Farm Harvest/hactare	Weight in kg	Market price @ Ksh 40 per kilogram	Impact of 25% market distortion	Losses for 25% market information distortion
1.0 tons	1000	40000	30000	10000
2.0 tons	2000	80000	60000	20000
3.0 tons	3000	120000	90000	30000
4.0 tons	4000	160000	120000	40000

Methods for addressing low access to market information

The challenges in access and use of agricultural marketing information could be addressed in various ways. The farmers and extension workers suggested multiple methods for enabling farmers to access agricultural market information. For the farmers, the appropriate approaches can be clustered into 3 on the basis of the number of farmers who identified them as best intervention.

- **Cluster 1:** Includes the use of radio, mobile phones, other farmers-This method is preferred by about 47% of the farmers
- **Cluster 2:** Use of extension services, billboards and seminars-This method is preferred by between 24 and 35% of the farmers
- **Cluster 3:** Use of churches and group leaders-These methods are preferred by between 9 and 12% of the farmers

Whilst cluster 1 provides methods preferred by over 47% of the farmers, there are more than 40% of the farmers who did not find methods in that cluster effective. This implies that a multiple methods approach combining the methods identified in cluster 1, cluster 2 and 3 is the best way of reaching majority of Tharaka Nithi farmers with agricultural marketing information.

Conclusion and policy implications

In conclusion, prices are an important incentive in determining the supply of agricultural commodities in markets. Producer rationality to raise supply to the market is mainly driven by the projected level of earnings. Conversely, low producer prices result to low market supply. Though findings have identified challenges which hinder access to information, it has also presented opportunities for increasing use of agricultural marketing information to boost production, marketing and return on investments.

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