Original Research Article

Potato Market Structure, Conduct and Performance in Mozambique: A Case of Tete Province Potato Marketers

ABSTRACT

Since over 85 percent (%) of potato production in Mozambique comes from Tete province, no any study has analyzed the structure, conduct and performance of potato marketing in this province so as to critically report the actual trend of potato marketing in this region. Hence, the study examined the structure, conduct and performance of potato marketing in four districts of Tete province, namely Angonia, Tsangano, Moatize and Tete town. The study used primary data. The primary data were obtained in February 2021 through the administration of structured questionnaires to 152 potato traders in 10 markets of these districts. Gini coefficient indices were used to analize the structure of potato markets, frequency and percentage were used to analyze the conduct of potato markets and marketing margins were the tools applied to analize the performance of potato markets. The result indicated that in overall sampled potato markets, the Gini Coefficient Index was 0.25 out of 1.0 indicating that potato markets were competitive. Additionally, 78.9% of traders reported that potato price per kilogram was unstable which depended on the forces of demand and supply. Among the selected potato markets, Lizulu and 1^{o} de Maio respectively were found to be most efficient with indices of 669.2% and 1,718.8%. A 100% of potato traders were unanimous on pointing a lack of cold storage facilities as a major constraint to potato marketing which make price per kilogram to be unstable, since potatoes should be sold in a short period of time. Despite this, potato marketing was found profitable in the study area, since all gross marketing margins registered positive values.

Keywords: *Potato marketing, Gini coefficient index, Marketing margin, Mozambique*

1. INTRODUCTION

1.1. Background

One of the policy drives [Strategic Plan for Agricultural Sector Development, Mozambique, unpublished] of the Government of Mozambique is to improve agricultural productivity, create market access infrastructure, ensure sustainable management of natural resources and strengthen agricultural institutions in order to increase production of certain crops so as to meet domestic consumption and foreign market demand. In the scheme potato was one of the priority crops [National Investment Plan for Agricultural Sector, Mozambique, unpublished]. In terms of worldwide production potato is ranked fourth after wheat, maize and rice. In Mozambique, potato is among the most important tuber crops grown and marketed [Demo *et al*., Mozambique, unpublished] and

[Schelling, Mozambique, unpublished]. However, 88% of the national area under potatoes is concentrated in Angonia and Tsangano districts of Tete province, in the country. Additionally, the actual levels of potato production (359,240.0 tons) are not enough to meet the needs of the country (676,581.6 tons). This is the reason why there are still significant levels of potato imports. However, imported potatoes have an average of over 25% higher prices than nationally produced potatoes. With more than 25% higher margin than nationally produced potatoes, the imported potatoes have a higher leverage on income earnings. Despite making relatively low-profit margins, the national potato seems to demonstrate some degree of competitive edge. The lack of sufficient quantities and industrial capacity, seem to hamper the higher competitiveness of the national potato industry aggravated by tax exemption policies that favor the imported potatoes that swamp the national potato needs deficit [Schelling, Mozambique, unpublished], [Fourth Census of Population and Housing, Mozambique, unpublished] and [1].

In an attempt to improve potatoes productivity and hence increase produced quantities and reduce importations, the Mozambican government had often formulated and used various policy instruments and interventionists approaches to boost local production. Some of these measures are the intensification of seed production in Serra Chôa and Tsetsere in Manica province and Tsangano in Tete province and later on distribute to potato farmers with subsidized prices of fertilizers [National Investment Plan for Agricultural Sector, Mozambique, unpublished]. However, most of the aforementioned initiatives seem to concentrate on boosting production with little emphasis on its marketing system which guarantees access. In addition, the structure, conduct and performance of the local potato market in Mozambique are largely unreported in the literature. In the absence of adequate information on this matter derived from empirical studies, discussions of potato marketing policy in Mozambique are taking place in an information vacuum. It is against this backdrop, that the study examined the structure, conduct and performance of the Mozambican potatoes markets in the districts of Angonia, Tsangano, Moatize and Tete town, in Tete province since this province concentrate 88% of planted land of potatoes and has a potential to supply potatoes to all the country. The study helps to ascertain challenges and evolving strategies to improve the efficiency of potato marketing. By doing so, can stimulate the increase of productivity and marketing of potatoes, and fill the observed gap between demand and supply.

1.2. Market Structure, Conduct and Performance Hypothesis

The causal linkage between market structure, conduct and performance was modified by [2] and termed as the SCP hypothesis. This theory suggests that the performance of the market is influenced by the structure of the market and by the conduct of the market actors. Hence, analyzing the market performance of a given market requires an analysis of the market structure and conduct of the major actors. Market structure is studied by looking at the market concentration ratio which is an indicator for competition among traders. Concentration is related to the number and size of the distribution of sellers and buyers in the market-place. However, a greater degree of concentration is an indication of the possibility of having low competition in the market given that for an efficient market, there should be a sufficient number of customers and traders. It is measured using concentration ratios. Market conduct as defined by [3], is the pattern of behaviours that firms follow in adapting or adjusting to the markets in which they sell or buy. In analyzing market conduct the important elements include methods used by the firms in setting the price of an output and sales promotion policy as well as the presence or absence of coercive tactics directed against either established rivals or potential entrants.

Market performance is the economic results that flow from the industry and how well it performs in terms of efficiency and innovation, given its technical environment. The impact of the structure and the conduct define market performance and it is measured

using variables such as prices, costs and volume of outputs. Market performance is constrained by the progressiveness of technology, agricultural firms growth, efficient allocation of scarce resources, product improvement and access to market services at low costs [3]. Market performance is a result of the impact of structure and conduct on product price, output costs, output volumes and quality of the produce. Market performance is measured using marketing margins [3]. Hence, when marketing margins across markets exceed operation costs, arbitrage opportunities emerge, [L Nyongo, Malawi, unpublished]. The difference between seller price and buyer price or the difference between the price of a homogenous commodity in two different locations is called price spread which is the measurement procedure to marketing margins. Therefore high price spread implies an inefficent market and high transaction cost [B K Nkenda and B Van Campenhout, Tanzania, unpublished].

2. MATERIALS AND METHODOS

2.1. Study Area

In Mozambique, among ten provinces, Tete province is located in the Central Region which lies between latitude $14^{o}00$ and $17^{o}42$ South and longitude $30^{o}13$ and $35^{o}20$ East. Tete province occupies an estimated land area of 100,742 km^2 with 2.2 million of population. From 200 to more than 1000 meters above sea level is the elevation that Tete province is included in the country with a tropical dry and humid climate. The average yearly temperature is from $22^{o}C$ to $32^{o}C$ with a mean yearly rainfall that lies between 180 to 360 millimeters [Tete province Government, Mozambique, unpublished]. Tete province has 15 districts and within the province the study covered four districts, Angonia, Tsangano, Moatize and Tete town.

2.2. Data Collection Methods

The study was conducted on the significant potato markets located in Angónia, Tsangano, Moatize and Tete town districts of Tete province in Mozambique. The province is well suited for the production of several food and cash crops due to its favourable climatic condition. The study used primary data collected through structured questionnaires. The first stage involved selecting significant potato markets in each district through a reconnaissance survey on May 2019, using purposive sampling method. The information obtained from a reconnaissance survey guided the author to have the estimated total number of traders operating in Tete province. To arrive at the sample size, the author used equation (1) adopted from [4]. However, 2 markets in Angónia, 2 markets in Tsangano, 2 markets in Moatize and 4 markets in Tete town were purposively selected for this study and 152 questionnaires were applied to potato traders in February 2021. Then, during primary data collection, in each market, traders were selected using a simple random sample method through a list of traders given by the market leaders.

$$n = \frac{N}{1 + N * e^2} = \frac{240}{1 + 240 * (0.05)^2} \Rightarrow n = 150 \quad (1)$$

Adding 10 percent for non-respondents, the final sample size was:

$$n = 150 + 150 * 0.10 \Rightarrow \boldsymbol{n = 165} \quad (2)$$

The total sample size collected from the respondents was 152.

2.3. Methods of Data Analysis

The objective of this paper was to assess the structure, conduct and performance of potato marketing in Tete province of Mozambique. The primary data collected, for this aim, were analyzed using Gini coefficient index, frequency, percentage and marketing margin.

2.3.1. Market Structure

Market structure analysis was done by applying the Gini Coefficient Index, GCI. The GCI as proposed by [5] is calculated as the percentage of an industry output that a specific number of the *m* largest firms have. The GCI of firms that are potato traders was calculated by adding up the market shares of the *m* firms. This can be represented as indicated in formula (3) and (4).

$$S_i = \frac{V_i}{\sum V_i} \qquad (3)$$

where:

$\boldsymbol{S_i}$ the market share of the firm i
$\boldsymbol{V_i}$ the amount of product handled by firm i
$\sum \boldsymbol{V_i}$ the total amount of the product handled by all firms

$$C = \sum_{i=1}^{m} S_i \qquad i = 1, 2, \dots, m \qquad (4)$$

where:

$\boldsymbol{C}$ the concentration ratio (GCI)
$\boldsymbol{S_i}$ the percentage share of the i^{th} firm
$\boldsymbol{m}$ the number of largest firms

To generate market structure, the study collected from each trader the quantities of potatoes, in kilogram (kg), that are sold per week. Based on [5] the eight major quantities of potatoes sold per week were selected among all the sampled traders. By sorting the sales of traders in ascending order was possible to get the eight largest firms holding major market shares. The GCI was calculated using cumulative percentages of these quantities and this procedure gives an understanding of the extent of inequalities in market shares of potato traders. The summation of these figures subtracted by 10,000 and then divided by 10,000 generate automatically the Gini Coefficient Index (GCI). A GCI of 50 percent or more indicates a strong oligopolistic behavior in an industry, 33-50 percent indicates a weak oligopolistic behavior and less than that, indicates perfect competition. For an efficient market, the number of firms should be larger enough.

2.3.2. Market Conduct

To assess market conduct the study collected data related to the mechanisms used by potato traders on setting selling price to the consumers. In this case potato traders were asked to choose amongst these mechanisms: supply and demand, collusion, cost plus pricing, predatory pricing. Multiple responses were also registered. Based on the responses, frequencies and percentages were generated to analyze these data.

2.3.3. Market Performance

To evaluate market performance, the marketing margin theory was used which is the most used tool for assessing the performance of markets. The marketing margin is the difference between two prices at different points in a marketing channel. Based on [6] to compute the total gross marketing margin, TGMM, the price paid by the final consumer and the price paid to the immediate actor along the channel are needed as shown in equation (5).

$$\mathrm{TGMM} = \left(\frac{\mathrm{sp} - \mathrm{bp}}{\mathrm{sp}}\right) * 100 \qquad (5)$$

where:

TGMM is the total gross marketing margin
sp is the selling price of potato by a trader in MZM/kg
bp is the buying price of potato by trader in MZM/kg

To analyze the efficiency of the potato marketing system, the marketing efficiency (ME) criterion was used which was computed across markets by using the formula adopted from [7] and presented in equation (6).

$$\mathrm{ME} = \left(\frac{\mathrm{NMM}}{\mathrm{MC}}\right) * 100 \qquad (6)$$

where:

ME Is the marketing efficiency;

Marketing Efficiency (ME) gives the marketing feasibility information on executing any additional service [7].

To analyze market performance, following variables were collected from potato traders:

i. Buying price per 50kg from farmers;
ii. Selling price per 1kg to consumers;
iii. Marketing costs:
    - Cost of packing (traders buy potatoes far from seeling markets and pack potatoes into bags for transportation),
    - Cost of transportation (from buying localities to selling markets),
    - Cost of handling (load and unload bags),
    - Cost of storage (in the markets there are private warehouses that traders store potato and pay per bag until finishing its sale),
    - Cost of market fee (per day traders pay a market fee).

All of these costs were calculated per 1kg, per week and per trader. Thereafter, the all process of market performance analysis was done and presented into the results section.

3. RESULTS AND DISCUSSIONS

3.1. Analysis of Potato Market Structure

From the survey data, in Tete province markets, the scale of business found was composed of wholesale traders and retail traders. Wholesale traders were those traders buying quantities ranging from 960 to 25,200 kilograms per week from farmers and they sold directly to retail traders. Retail traders were those found buying from 200 to 7,800 kilograms of potatoes per week. Almost 48.4% of retail traders bought potatoes with wholesale traders and 51.6% of retail traders buy potatoes with farmers. To see the structure of the market, all traders together were sorted using the quantities they sold per week. The major eight quantities were taken and analyzed. The GCI was used for this analysis and Table 1 presents the results. The result indicated that, the overall potato traders in Tete province markets, the GCI was 0.25 (25%) out of 1.0.

Table 1 reports that overall in Tete province, the potato market was competitive. This means that with GCI score of 0.25, the overall potato market in the study area was characterized by a significant number of traders without much variation in the quantities sold per week on the market place and no trader is assumed to control all potato market. In this case, potato traders in Tete province markets shared a competitive behavior implying that, the size and the distribution of potato sales between traders were similar. [5] found a milk GCI of 0.87 (87%) in Sululta Woreda in Ethiopia which shows a strong oligopoly behavior in this Ethiopian milk market that was contrary to what was found in this study regarding the competitiveness of potato markets. [A W Gichangi, Egerton University, Kenya, unpublished] in his study in Nairobi and Kisumu in Kenya found 0.71 and 0.55 GCI, respectively, revealing that the sweet potato market was highly concentrated in Kenya which was different from potato market in Tete province of Mozambique. This analysis assists in understanding the level of income distribution among traders in the market-place.

Table 1. Gini Coefficient Index of Potatoes Sold per Week in Kg, all Selected Markets

Firm	Percent. of firms (%)	Cumulative % of firms	Quantities (kg)	Market shares (Si)	Market shares (Si) (%)	Cumulative market shares (%)	Pared sums	(1)*(6)
	1	2		3	4	5	6	7
1	12.5	12.5	7,800.0	0.1	6.5	6.5	6.5	80.7
2	12.5	25.0	8,400.0	0.1	7.0	13.4	19.9	248.3
3	12.5	37.5	9,600.0	0.1	7.9	21.4	34.8	434.6
4	12.5	50.0	9,800.0	0.1	8.1	29.5	50.8	635.3
5	12.5	62.5	14,400.0	0.1	11.9	41.4	70.9	885.8
6	12.5	75.0	21,600.0	0.2	17.9	59.3	100.7	1,258.3
7	12.5	87.5	24,000.0	0.2	19.9	79.1	138.4	1,730.1
8	12.5	100.0	25,200.0	0.2	20.9	100.0	179.1	2,239.2
Total			**120,800.0**					**7,512.4**
							GCI	**0.25**

The other part of the study was to separate traders into those operating on urban markets and those operating on rural markets so as to verify the structure of their markets. During the survey, traders reported that in the urban markets the quantity of potatoes sold ranged from 240 to 25,200 kilograms per week and from 200 to 14,400 kilograms per week in the rural markets. Those quantities sold were sorted and eight

major firms were selected, Table 2 and Table 3. The urban markets demand more potatoes than rural markets since in urban areas the population is much more concentrated than in rural areas, despite that [Fourth Census of Population and Housing, Mozambique, unpublished] noted that in Mozambique rural areas accommodate 67.7% of the population.

The GCI in urban markets (Table 2) was 0.32 and in rural markets (Table 3) was 0.19 out of 1.0 indicating that in urban markets the potato market structure was less competitive which has been demonstrated by the moderate concentration while in rural markets the potato market structure was more competitive since the concentration of the firms was very low. In urban markets the structure was slightly concentrated given that in towns small number of traders go to the rural markets or to the farms to buy potatoes. Due to this additional effort, a small number of traders control the potato market. In the urban markets, 66.7% of the traders sourced their potatoes from wholesale traders and 33.3% of traders sourced their potatoes from farmers. Therefore, a small percentage of wholesale traders in urban markets traveled to the potato farms to supply the urban market. This additional effort made the wholesalers control the market. That is why in the urban markets the structure of the market was concentrated among wholesale traders. Given that retail traders do not have enough funds to travel to the farms which can lead to high transaction costs, they prefer to source potatoes from wholesale traders and these retailers in the urban markets are basically price takers.

In rural markets, 11.7% of the traders sourced potato from wholesale traders, and 88.3% of the traders sourced potatoes directly from farmers. In the rural markets the majority had access to farmers to supply the markets and thus there are no limited traders controlling the rural market. There was enough competition among traders on supplying the rural market, leading to a perfectly competitive market. This similarity in sales per week has shown that revenues gained among traders were not much different.

Table 2. Gini Coefficient Index of Potatoes Sold per Week in Kg in Urban Markets

Firm	Percent. of firms (%)	Cumulative % of firms	Quantities (kg)	Market shares (Si)	Market shares (Si) (%)	Cumulative market shares (%)	Pared sums	(1)*(6)
	1	2		3	4	5	6	7
1	12.5	12.5	6,000.0	0.1	5.6	5.6	5.6	70.2
2	12.5	25.0	6,000.0	0.1	5.6	11.2	16.9	210.7
3	12.5	37.5	7,200.0	0.1	6.7	18.0	29.2	365.2
4	12.5	50.0	7,200.0	0.1	6.7	24.7	42.7	533.7
5	12.5	62.5	9,600.0	0.1	9.0	33.7	58.4	730.3
6	12.5	75.0	21,600.0	0.2	20.2	53.9	87.6	1,095.5
7	12.5	87.5	24,000.0	0.2	22.5	76.4	130.3	1,629.2
8	12.5	100.0	25,200.0	0.2	23.6	100.0	176.4	2,205.1
Total			**106,800.0**					**6,839.9**
							GCI	**0.32**

Table 3. Gini Coefficient Index of Potatoes Sold per Week in Kg in Rural Markets

	Percent.	Cumulative	Quantities	Market	Market	Cumulative	Pared

Firm	of firms (%)	% of firms	(kg)	shares (Si)	shares (Si) (%)	market shares (%)	sums	(1)*(6)
	1	2		3	4	5	6	7
1	12.5	12.5	4,800.0	0.1	7.5	7.5	7.5	94.0
2	12.5	25.0	5,200.0	0.1	8.2	15.7	23.2	290.0
3	12.5	37.5	6,400.0	0.1	10.0	25.7	41.4	517.2
4	12.5	50.0	7,000.0	0.1	11.0	36.7	62.4	779.8
5	12.5	62.5	7,800.0	0.1	12.2	48.9	85.6	1,069.7
6	12.5	75.0	8,400.0	0.1	13.2	62.1	111.0	1,387.1
7	12.5	87.5	9,800.0	0.2	15.4	77.4	139.5	1,743.7
8	12.5	100.0	14,400.0	0.2	22.6	100.0	177.4	2,217.9
Total			**63,800.0**					**8,099.5**
							GCI	**0.19**

Disaggregating the potato market by the scale of business (wholesale and retail), the study intended to verify the competitiveness of the potato market among wholesale and retail markets, respectively. The results reveal that GCI among the wholesalers was 0.25 (Table 4) and 0.16 among retailers (Table 5). These Tables showed that the market was competitive for both wholesalers and retailers, implying that among wholesalers the size of the market share and the distribution of income was almost the same. A similar situation is observed among retailers.

Table 4. Gini Coefficient Index of Potatoes Sold per Week in Kg, Wholesalers

Firm	Percent. of firms (%)	Cumulative % of firms	Quantities (kg)	Market shares (Si)	Market shares (Si) (%)	Cumulative market shares (%)	Pared sums	(1)*(6)
	1	2		3	4	5	6	7
1	12.5	12.5	7,200.0	0.1	6.0	6.0	6.0	74.9
2	12.5	25.0	8,400.0	0.1	7.0	13.0	19.0	237.1
3	12.5	37.5	9,600.0	0.1	8.0	21.0	33.9	424.3
4	12.5	50.0	9,800.0	0.1	8.2	29.1	50.1	626.0
5	12.5	62.5	14,400.0	0.1	12.0	41.1	70.2	877.7
6	12.5	75.0	21,600.0	0.2	18.0	59.1	100.2	1,252.1
7	12.5	87.5	24,000.0	0.2	20.0	79.0	138.1	1,726.3
8	12.5	100.0	25,200.0	0.2	21.0	100.0	179.0	2,237.9
Total			**120,200.0**					**7,456.3**
							GCI	**0.25**

Table 5. Gini Coefficient Index of Potatoes Sold per Week in Kg, Retailers

Firm	Percent. of firms (%)	Cumulative % of firms	Quantities (kg)	Market shares (Si)	Market shares (Si) (%)	Cumulative market shares (%)	Pared sums	(1)*(6)
	1	2		3	4	5	6	7
1	12.5	12.5	2,600.0	0.1	7.1	7.1	7.1	88.9
2	12.5	25.0	3,600.0	0.1	9.9	17.0	24.1	301.0
3	12.5	37.5	3,840.0	0.1	10.5	27.5	44.4	555.6
4	12.5	50.0	3,900.0	0.1	10.7	38.1	65.6	820.3
5	12.5	62.5	4,800.0	0.1	13.1	51.3	89.4	1,118.0
6	12.5	75.0	4,800.0	0.1	13.1	64.4	115.7	1,446.4
7	12.5	87.5	5,200.0	0.1	14.2	78.7	143.1	1,788.5
8	12.5	100.0	7,800.0	0.2	21.3	100.0	178.7	2,233.2
Total			**36,540.0**					**8,351.8**
							GCI	**0.16**

However, referring to Table 1 and Table 4 the GCI is similar. In Table 1, all traders were put together and because wholesalers handle high quantities for the overall market, they were positioned on the first eight. Meaning, the wholesalers encountered in Table 4 were the same as those in Table 1 but in a different context of analysis. Thus, the analysis using different contexts resulted in the conclusion that the potato markets were competitive. Using the scale of business, the potato markets were competitive for both. In addition, wholesalers were found to realize more revenues per week than retailers since they had a trend of implementing economies of scale, which reduced transaction costs and generated more income. Moreover, for a retailer to become a wholesale business agent, large operating capital is needed since wholesalers handle significantly larger quantities of potatoes per week. The operating capital was found as the main barrier entering into the market or growing into this business given that 52.6% of traders reported so.

3.2. Analysis of Potato Market Conduct

The result of market conduct analysis is presented in Table 6. However, the mechanisms that were most preferred for setting selling prices to the final consumers included supply and demand (78.9%), collusion (0.0%), cost plus pricing (6.0%), predatory pricing (0.6%) and more than one option (14.5%). Meaning that 78.9% of protato traders adopted the supply and demand mechanism to set selling price in the stuy area. This is done so because price varies depending on the variations of the quantities that are supplied from the productive areas. Since potatoes are already in the market-place, they must be sold for whatever the market supports. In this situation, price is an indicator to regulate demand. That is, the price is adjusted to clear the market and all the quantity supplied must be sold during a short period of time given that potatoes are perishable goods. This situation is common in the study area. [9] added that this is the case where the price is an indicator for producers to regulate their production in the future. A similar study by [5] reported that 22.5% of sellers set milk price based on the negotiation with buyers. The majority of sellers (35%) do not negotiate milk price with buyers. Other similar study by [8] in Ethiopia, found 62.5% of potato traders set their prices in the market based on the existing forces of demand and supply.

Table 6. Price Setting Mechanism of Potatoes by Scale of Business

Characteristics	Scale of Business		Total
	Wholesaler (n=30)	Retailer (n=122)	(n=152)
Price s. mechanism (%)			
Supply and demand	70.0	81.2	78.9
Collusion	0.0	0.0	0.0
Cost plus pricing	13.3	4.1	6.0
Predatory pricing	0.0	0.8	0.6
More than one option	16.7	13.9	14.5
Total	100.0	100.0	100.0

3.3. Analysis of Potato Market Performance

The prevailing average selling price of potatoes per kilogram at different points of the marketing chain is presented in Table 7.

Table 7. Average Selling Prices per 1Kg of Potatoes

Selling Level	Selling Price (MZM/kg)
Farmers	12.8
Wholesalers	18.0
Retailers	25.4

Mozambique Metical (MZM), Where 70MZM= 1U$D.

Table 8 shows marketing margins calculated from the prices that are implemented by farmers, wholesalers and retailers at different point in the overall potato market. The producer participation was also calculated to determine the portion of the final price paid by consumer that belonged to the farmer. As described in Table 8, farmers' participation in the consumer price was low (42.1%) comparing to the total gross marketing margin that was achieved by both wholesaler and retail traders. [8] on their study on SCP potato market in Ethiopia found a slightly different result where wholesalers were getting more profit (195.65) than retailers (74.0) and this was a result of the business environment in the study area. Another study conducted by [6] found a minimum of 73.76% as a producer's share of the final price paid by the consumer in groundnut marketing in Malawi. In the study area effort should be done so that potato farmer gets more consumer's price share, given that actually traders are getting more.

Table 8. Gross Marketing Margins per 1Kg of Potatoes, by Scale of Business

Gross Marketing Margin	Value in Percentages
Total Gross Marketing Margin	57.9
GMM- Wholesaler	28.8
GMM- Retailer	29.1
Producer Participation	42.1
Total	100.0

Table 9 reports marketing efficiency across ten selected potato markets and additional important variables were calculated so as to find the marketing efficiencies across potato markets in the study area. As presented, the average marketing efficiency across the markets was 290.9% and 707.9% for rural and urban markets respectively. With respect to rural markets, Lizulu market had the highest marketing efficiency of 669.2%, followed by Chiandame market (246.7%). The least marketing efficiency (129.0%) was recorded by Mussakama market. This implies that Lizulu market was more efficient in terms of pricing for potatoes.

With respect to Urban markets, 1° de Maio market was found to be more efficient (1,718.8%) followed by Canongola market (706.7%) and the least marketing efficiency was recorded in Kwachena market (173.9%). On the other hand, [7] when studying the structure, conduct and performance of rice markets in Nigeria found 392.9% and 408.1% as the mean for marketing efficiency of imported and local rice, across the sampled markets. In this context Akpan Andem market registered the highest marketing efficiency of 412.7% for imported rice, meaning that in terms of pricing for imported rice this market was more efficient than others. The Ibaka market, among local rice markets, had registered the highest marketing efficiency of 515.9% revealing that this market was more efficient in terms of pricing among local rice markets. Additionally, based on findings of [11] the increase of marketing channels among traders cause inefficiency in marketing process of any product and reduce the share of the price paid by the consumer.

Table 9. Distribution of Marketing Efficiency per 1Kg of Potatoes

Market	Buying Price (MZM/kg)	Selling Price (MZM/kg)	Marketing Cost (MZM/kg)	Gross Marketing Margin (%)	Net Marketing Margin (MZM/kg)	Marketing Efficiency (%)
Rural markets						
Tsangano	12.6	17.6	1.7	28.4	3.3	194.1
Chiandame	11.7	16.9	1.5	30.8	3.7	246.7
Lizulu	14.5	24.5	1.3	40.8	8.7	669.2
Ngwenha	12.8	16.9	1.3	24.3	2.8	215.4
Mussakama	10.7	17.8	3.1	39.9	4.0	129.0
Across Markets	12.5	18.7	1.8	32.8	4.5	290.9
Urban markets						
Bairro4	16.5	27.6	1.9	40.2	9.2	484.2
Cambinde	16.4	26.4	1.8	37.9	8.2	455.6
1° de Maio	18.8	47.9	1.6	60.8	27.5	1,718.8
Canongola	17.3	29.4	1.5	41.2	10.6	706.7
Kwachena	13.2	19.5	2.3	32.3	4.0	173.9
Across Markets	16.4	30.2	1.8	42.5	11.9	707.9

3.4. Constraints to Marketed Quantities of Potato

Table 10 shows the constraints to potato marketing which were ranked in descending order of magnitude based on the traders perception. The limitations and their percentage ranking computed under multiple responses are: price fluctuation (100%), lack of cold storage facilities on the market places (100%), lack of credict access (100%), lack of collective action on setting price (96.1%), poor quality of roads (25%). Potato traders revealed existence of limitations to benefit cold storage facilities and credit access including the lack of collective action on setting price to consumers in the market place. The implication of this, account for why traders face price fluctuation which is the main indicator for getting a good market share. If traders get the right market share, farmers will benefit by selling in time and at good prices their produce to a fixed buyers. [11] also noted in their study that 22.4% of potato smallholder farmers claimed lack of storage facilities to store potato and stabilize price to vendors and thereafter to consumers.

Table 10. Constraints to Marketed Quantities of Potato

Item	Frequency	Percentage
Selling price fluctuation (yes)	152	100.0
Cold storage facilities (no)	152	100.0
Credict access (no)	152	100.0
Collective action on setting price (no)	146	96.1
Road quality (no)	38	25.0

4. CONCLUSIONS

The study examined the structure, conduct and performance of potato marketers in Tete province, Mozambique, to understand the level of competitiveness among sellers as well the price efficiency. This was done by applying Gini Coefficient Index and Marketing Margin tools to the data collected from 152 traders in 10 potato markets of Angonia, Tsangano, Moatize and Tete town districts of Tete province.

The results revealed that in overall, potato marketers in the study area are facing a competitive market since the major eight traders that are supplying more potatoes per week had almost the similar quantities. Disaggregating markets into urban and rural, in both cases the potato markets were less concentrated and hence, with presence of competitive practices. In urban markets the potato market structure was less competitive which has been demonstrated by the moderate concentration while in rural markets the potato market structure was more competitive since the concentration of the firms was very low. Furthermore, separating the scale of business, wholesale and retail traders, it was found that among wholesalers the market was competitive and among retailers the market was also competitive. This means that the size of the market share and the distribution of income was almost the same between diferent categories of potato market.

In terms of the conduct adopted by potato traders, the mechanism of supply and demand was the most followed in the stuy area, given that price varies depending on the variations of the quantities that are supplied from the productive areas. Since potatoes are already in the market-place, the price should be negotiated with consumers so that the product must be sold for whatever the market supports.

Combining prices at farmers, traders and consumers level, marketing efficiencies were reported. In this case among ten selected potato markets, Lizulu market had the highest marketing efficiency over the rural markets while among urban markets, 1^{o} de Maio market was found to be more efficient. The study further showed that potato marketing was profitable in the study area, since all gross marketing margins registered positive values. This is a good signal since good level of efficiency ensures a right share of consumer price to farmers and traders. Additionally, the net marketing margin was greater in urban markets than that of rural markets, due to the marketing costs that are included in potato price per one kilogram given that urban traders travel more distance than rural traders to order potato and supply their markets.

A greater proportion of respondents assumed that the major limitation of the potato marketing activity in the study area is a lack of cold storage facilities and poor road qualities from productive farms to the selling markets. Traders reported that sometime sell potato at low prices, due to the fact that potato is a perishable commodity and must be sold in a short period of time.

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