



MARKET CONCENTRATION AND EFFICIENCY OF SWEET MELON AND WATER MELON IN GOMBE AND BAUCHI STATES, NIGERIA

¹Mohammed, S. Y., ²Murtala, N., ²Jibrin, S.A., ²Mohammed, I. and ¹Adamu, Y.

¹Department of Agricultural Economics and Extension, Federal University of Kashere, Gombe State, Nigeria

²Department of Agricultural Economics and Extension, Abubakar Tafawa Balewa University Bauchi, Bauchi State, Nigeria

Corresponding Author's E-mail: suleiyidi@gmail.com **Tel.:** +23408036079433

ABSTRACT

The study examined the market concentration and efficiency of sweet melon and water melon in Gombe and Bauchi States, Nigeria. Multi-stage sampling technique was used to select 300 sweet melon and water melon marketers from 18 markets, among which 165 marketers were selected from Gombe and 135 from Bauchi States. Data were collected using structured questionnaires. Descriptive and inferential statistics were used for the analysis. The gini-ratio analysis indicates that sweet melon and water melon retail marketers handled larger quantity of the commodities which amounted to 26,562 and 34,871 respectively. The same category of marketers also recorded the higher gini-ratio of 0.14 and 0.17, respectively. The marketing efficiency results revealed that retail sweet melon marketers recorded the highest efficiency of 53.08%. Conclusively, both sweet melon and water melon markets were highly efficient and concentrated, implying that there is perfect inequality in the distribution recorded which might be as a result of limited information access on prices and products availability. The study recommends the establishment of collaboration between private and public research and development programs to improve management practice, particularly the use of new available technology for time disposal and efficient marketing of sweet melon and water melon in the study area.

Keywords: Concentration, Efficiency, Market, Marketers, Melon.

INTRODUCTION

Fruits like Sweet melon (*Cucumis melo* L.) and Water melon (*Citrullus lanatus*) are mostly cultivated in tropical countries and are important for both human and livestock consumption as they contain all the body nutritional requirements for a living. They provide essential nutrients that prevent human health problems like cancer, stroke, high blood pressure, heart attack and other cardiovascular diseases. Both could be eaten raw, fresh, sliced into bits for their sweet and juicy pulp and this juicy pulp could be mixed with sugar, water or milk. Nutritionally they supply body with low calories, lycopene which prevent cancer and other diseases, vitamin A, vitamin C, proteins carbohydrates, fibre, Ka, Ca, Fe, fats and water which all are necessary for good health and development for both human and livestock needs (Onyemauwa, 2010).

Sweet melon (*Cucumis melo* L.) is a warm, long season crop adaptable to all climatic zones. Mature fruits of sweet melon cultivars are usually consumed fresh for the sweet and juicy pulp. The pulp is also mixed with water and sugar, or with milk, and sometimes served as refreshing drink or made into ice cream. Immature fruits of non-sweet types, including snake, are used as a fresh, cooked, or pickled vegetable and are also stuffed with meat, rice and spices or fried in oil. Sweet melon seeds are eaten after roasting as they contain edible oil. The young leaves are occasionally consumed as a potherb and in soup. The leafy stems of



melon also a fruit provide good forage for all livestock. It's usually grown in drier regions and in highlands. Statistics on its production and marketing are not available for most African countries except in Cameroon and Sudan cultivating up to 3500 ha and 1200 ha, respectively. Also Senegal and surrounding countries export melon to Europe during winter periods (FAO, 2000)

Water melon (*Citrullus lanatus*) is one of the most important fruits cultivated in the tropics. It is consumed throughout the world and is mainly cultivated in the tropical countries. Watermelon is good for all human consumption and livestock needs as it contains most of the basic daily nutritional requirements of the body and other essential nutrients that prevents human health problems like cancer, stroke, high blood pressure, heart attack and other cardiovascular disease (USDA, 2002).

Water melon has preferably nutritional values to its consumers and supplied the body with low calories, lycopene which is an antioxidant that prevents cancer and other diseases, vitamin A, vitamin C, protein, carbohydrate, fibre, potassium, calcium, iron, fats and up to 92 mills of water. These are all necessary for good health and development of human and livestock needs. Hence, it is referred to as to "the chief of the world's luxuries and king over all fruit of the earth" (Adamu *et al.*, 2015). Watermelon (*Citrullus lanatus*) is one of the most widely cultivated crops in the world at large and the global production in 2002, according to Huh *et al.* (2008), reached 89.9 million mega grams. Preferred exotic vegetables produced in large quantities and most consumed cucurbit because of its nutritional and health values (Adeoye *et al.*, 2011).

The objective of the study was to examine the market concentration and efficiency of water melon marketing in Bauchi and Gombe States. The specific Objectives were to: determine the market concentration of Wholesale and Retail Sweet Melon markets; determine the market concentration of Wholesale and Retail Water Melon markets; and determine the market efficiency of Sweet Melon and Water melon in the study area.

MATERIALS AND METHODS

The Study Area

Gombe State lies between Latitudes $10^{\circ} 16'$ and $11^{\circ} 00'N$ and Longitudes $11^{\circ} 00'E$ and $11^{\circ} 11'E$. It has a land area of 20,265 km² and a projected population of 3,159,693 people (NPC, 2006) census with a 2.8% annual growth rate of the population. The climatic condition of the state is characterised by two distinct seasons dry and wet. The wet season begins from April and ends in October, and the dry season starts in November and last up to March. The mean annual rainfall ranges from 600mm to 1200mm, with the minimum and maximum temperatures of 22.7⁰C and 33.5⁰C respectively (GOSEEDS, 2010). Bauchi State lies between Latitudes $10^{\circ} 17'$ and $11^{\circ} 00'N$ and Longitudes $9^{\circ} 45' E$ and $11^{\circ} 12'E$. It has a land area of 49,119 km² and a projected population of 6, 16496 inhabitants (NPC, 2006) census with a 2.8% annual growth rate of the population (NPC, 2006). The climatic condition of the state is characterized by two distinct seasons dry and wet. The wet season begins from May and ends in September, and the dry season starts in October and lasts up to April with the mean annual rainfall that ranges from 600mm to 1300mm, while the temperature ranges from 18.5⁰C to 32⁰C as minimum and maximum, with April as the hottest and January as the coldest month respectively (BSADP, 2009).

Sample Selection and Data Collection

Multi-stage sampling technique was used which involved States selection, i.e., Gombe and Bauchi States. The second stage involved purposive selection of three (3) main local government areas from each State. The third stage involved purposive selection of three



(3) markets from each village making 18 markets and the last stage involved simple random selection of respondents from these markets. In all, 300 fruits vegetable marketers were randomly selected from a sample frame of 1056 collected from 18 markets of the study area.

Data Analytical Techniques

The market concentration of sweet melon and water melon was determined by using the gini-coefficient, which is a price measure of inequality between many groups especially marketers. It is used to illustrate the market concentration as procedure to analyses of the market structure. (Atman, 2008) denoted that a gini coefficient of 0 means perfect equality in the distribution of marketers, but when G is one (1) means there is perfect inequality or monopoly in the market. Therefore, the closer the value is to one, the greater is the degree of inequality, and the higher the level of concentration and vice versa. Gini- ratio was computed using the following formula:

GR = 10,000 – Trapezoidal area ... (1)

where;

GR = Gini ratio

Trapezoidal area = % total x paired sum of % total of quantity handled.

Marketing efficiency was used to measure the market performance and can be expressed by the formula:

$M_E = \frac{V_m \times 100}{C_m - 1}$... (2)

where;

M_E = Marketing Efficiency

V_m = value added by marketing service

C_m = costs of marketing services (Olukosi and Isitor, 2007).

RESULTS AND DISCUSSION

Analysis of Sweet Melon Wholesalers Market Concentration

The market concentration for the sweet melon wholesalers was presented in Table 1. The result indicated that majority (75.00%) of the respondents handled 1-1000 pieces per week, which amounted to 50,974 fruits of Sweet melons, followed by 8.93% of the respondents who handled 1000-1500 pieces which amounted to 11,428 fruits in a week. The result further indicated that only 1.79% of the marketers were found to handle 3501-4000 pieces which amounted to 28,000 pieces per week. The total quantity handled per week by the wholesale sweet melons marketers was found to be 121,118, with the gini-ratio 0.42. The result is lower than the findings of Sajo (2015) who reported the gini- ratio of 0.60 in Onion marketing in Gombe metropolis of Gombe State and higher than 0.21 as obtained by Mohammed *et al.* (2014) in the marketing of orange in Gombe State.



Table 1: Distribution of Sweet Melon Wholesalers according to Market Concentration

Table with 8 columns: Range of quantity handled in pieces, Number of wholesale marketers, Cumulative % total of wholesalers, Quantity handled per week, Percentage (%) total of quantity handled, Cumulative % total of quantity handled, Paired sum of quantity handled, Trapezoidal Area. Rows include ranges from <= 500 to 4501-5000 and a Total row.

Gini ratio = 0.42; Figures in parenthesis shows percentage of the total frequency.

Source: Field Survey, 2016-2017.

Analysis of Sweet Melon Retailers Market Concentration

Table 2 shows that majority (67.98%) of sweet melon retailers handled between 51-100 pieces and the total quantity handled was found to be 26,562 pieces totalling to 15,480 pieces per week. This was followed by 14.91% of the marketers who handled between 101-150 balls; this amounted to 4168 pieces of Sweet melons per week. The result further indicated that only 1.76% of the respondents were found to handle between 251-350 pieces per week, with the gini-ratio 0.14, implying that there is perfect inequality. This might also be as a result of limited information access on prices and product availability. The result is also lower than the findings of Sajo (2015), Mohammed et al. (2014) and Atman (2008) who had the gini ratios of 0.60, 0.21 and 0.34, respectively, in fruits and vegetables marketing in their separate study areas.

Table 2: Distribution of Sweet Melon Retailers according to Market Concentration

Table with 9 columns: Range of quantity handled in pieces, Number of retailers, % total of retailers, Cumulative % total of retailers, Quantity handled per week, % total of quantity handled, Cumulative % total of quantity handled, Paired sum of quantity handled, Trapezoidal Area. Rows include ranges from 1-50 to 301-350 and a Total row.

Gini ratio = 0.14

Source: Field Survey, 2016-2017.



Market Concentration of Water Melon Wholesalers

Table 3 indicates that 50.98% of the wholesale water melon marketers handled less than or equal to 500 pieces (≤ 500) which amounted to 20,020 balls per week; this was followed by 39.22% who handled 501 to 1000 which amounted to 24,608 pieces. The result further revealed that only 1.96% of the marketers are handling 1,800 pieces per week. The total quantity of water melon handled by this category of marketers was found to be 75,728 with the gini-ratio of 0.38, signifying that there was perfect equality in the distribution; hence higher level of concentration was recorded. This might also be as a result of limited information access on prices and product availability. The result was also lower than 0.60 as recorded by Sajo (2015) and greater than 0.21 and 0.34 as indicated by Mohammed *et al.* (2014) and Atman (2008), respectively.

Table 3: Distribution of Water Melon Wholesalers according to Market Concentration

Range of quantity handled in pieces	Number of wholesale marketers	% total of wholesalers	Cumulative % total of Wholesaler	Quantity handled per week	% total of quantity handled	Cumulative % total of quantity handled	Paired sum of quantity handled	Trapezoidal Area
1	2	3	4	5	6	7	8	9
≤ 500	26	50.98	50.98	20020	26.44	26.44	26.44	1347.91
501-1000	20	39.22	90.20	24608	32.50	58.94	85.38	3348.60
1001-1500	2	3.92	94.12	9333	12.32	71.26	130.20	510.38
1501-2000	2	1.96	96.08	1800	2.38	73.64	144.90	284.00
2001-2500	2	3.92	100.00	19967	26.37	100.00	173.64	680.67
Total	52	100		75,728	100			6,171.56

Gini ratio = 0.38

Source: Field Survey, 2016-2017.

Market Concentration of Water Melon Retailers

As shown in Table 4, the market concentration of water melon retailers revealed that majority (44.91%) handled 51-100 pieces with the total quantity handled per week of 34,871 the result further revealed the gini-ratio of 0.17, implying that there is high inequality in the distribution; hence higher level of concentration was recorded. The result is also lower than the findings of Atman (2008) who reported the gini ratio of 0.34 by tomato marketers.



Table 4: Distribution of Water Melon Retailers according to Market Concentration

Range of quantity handled in pieces	Number of retailers	% total of retailers	Cumulative % total of retailers	Quantity handled per week	% total of quantity handled	Cumulative % total of quantity handled	Paired sum of quantity handled	Trapezoidal Area
1	2	3	4	5	6	7	8	9
1-50	15	6.94	6.94	931	2.67	2.67	2.67	18.53
51-100	97	44.91	51.85	12551	35.99	38.66	41.33	1856.13
101-150	38	17.60	69.45	6207	17.80	56.46	95.12	1674.11
151-200	42	19.44	88.89	9233	26.48	82.94	139.40	2709.93
201-250	6	2.78	91.67	1354	3.89	86.83	169.77	471.96
251-300	17	7.87	99.54	4315	12.37	99.20	186.03	1464.06
301-350	0	0	99.54	0	0	99.20	186.03	0
351-400	1	0.46	100	280	0.80	100	199.20	91.63
Total	216	100		34,871	100			8,286.35

Gini ratio = 0.17

Source: Field Survey, 2016-2017

Marketing Efficiency of Sweet Melon Marketers in the Study Area

The marketing efficiency of wholesale and retail sweet melon marketers was presented in Table 5. The results indicated that retail marketers were found to incur more cost of ₦5,000.00 when compared with ₦3,898.00 cost incurred by the wholesalers and also sold to consumers at a bit higher price of ₦6,049.00 per pyramid than ₦4,905.00 as sold by wholesale Sweet melon marketers. The result further revealed the highest value added cost of ₦2,654.00 and marketing efficiency of 53.08% was also recorded in respect of the retail marketers. This indicates that 53.08% the marketing cost of sweet melon was incurred through the value added in the process of marketing of that commodity. This could be due to the fact that it has a shorter marketing chain than the wholesale, hence has less complexity markets. This agrees with the findings of Usman (2005) on tomato marketing in Jos metropolis, Plateau State, Nigeria.

Table 5: Marketing Efficiency of Sweet Melon Marketers

Marketing parameters	Wholesalers	Retailers
Buying/purchase price (₦)	3019	3395
Marketing cost (₦)	3898	5000
Selling price (₦)	4905	6049
Value added (₦)	1886	2654
Marketing efficiency (%)	48.38	53.08

Source: Field Survey, 2016-2017

Marketing Efficiency of Water Melon Marketers in the Study Area

The result in Table 6 revealed that wholesale water melon marketers incurred higher marketing cost of ₦12,947.00 and the highest value added cost of ₦4,289.00, and the marketing efficiency of 33.13%. This is contrary to the findings of Usman (2005) on tomato marketing in Jos metropolis, Plateau State, who reported that retail markets were relatively more efficient than the wholesale markets in the his study area.

Table 6: Marketing Efficiency of Water Melon Marketers



Marketing parameters	Wholesalers	Retailers
Buying/purchase price (₦)	10458	11660
Marketing cost (₦)	12947	12352
Selling price (₦)	14747	15099
Value added (₦)	4289	3439
Marketing efficiency (%)	33.13	27.85

Source: Field Survey, 2016-2017

CONCLUSION AND RECOMMENDATIONS

The gini- ratio for business concentration of marketers indicated that there was perfect equality in the distribution of both sweet melon and water melon in the study area; meaning that higher level of concentration in the distribution was recorded. The marketing efficiency of 53.08% for retail sweet marketers was found to be higher than 48.38% received by the wholesalers. The result further indicated the higher marketing efficiency of 33.13% received by wholesale water melon marketers' as compared to 27.8% of the retailers. Thus, sweet marketers received the higher marketing efficiency of 53.08% when compare to 33.13% of the water melon respondents. The study recommends the establishment of collaboration between private and public research and development programs to improve management practice, particularly the use of new available technology for time disposal and efficient marketing of sweet melon and water melon in the study area. This can be achieved through the use of good and well trained extension personnel's to assist the marketers.

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