



## Profitability Analysis of watermelon (*Citrullus lanatus*) Marketing in Gombe and Bauchi States, Nigeria

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### Abstracts

The study assessed the profitability of wholesale and retail watermelon marketers in Gombe and Bauchi States, Nigeria. The specific objectives were to: to assess costs and returns of wholesale and retail watermelon marketers and describe the constraints associated to watermelon marketing in the study area. Multi-stage sampling technique was employed in the study and a total of 300 watermelon marketers were randomly selected from 18 markets; 165 marketers were selected from Gombe State and 135 from Bauchi State. Data were collected using structured questionnaires and then subjected to descriptive statistics and farm budgeting model for analysis. The results revealed that watermelon marketing was a profitable venture in both wholesale and retail categories in all seasons with wholesalers receiving the higher net income and return per capital invested of ₦ 1417.17 and 0.14 in surplus period respectively with the higher total revenue of ₦ 17745.10 in lean period. Poor marketing arrangement and inadequate information, pilfering and theft as well as Lack of uniform weight of measure were important constraints to watermelon marketing in the study area. The study therefore, recommends that Government and other stakeholders to provide adequate security, storage or processing facilities and as well as organised public research on marketing to enhance the use of new innovation in fruits marketing in the study area.

**Keywords:** Wholesale, Retails, Scarcity, Costs, Returns

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### Introduction

Watermelon (*Citrullus lanatus*) is one of the most important fruits cultivated in the tropics and consumed throughout the world by human and livestock needs as it contains most of the basic daily nutritional requirements of their body and other essential nutrients that prevents human health problems like cancer, stroke, high blood pressure, heart attack and other cardiovascular disease. It 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 (Adamu, 2015). Watermelon could be eaten raw when it is fresh after being washed and sliced into bits. It 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). Agricultural marketing involves the performance of all the business activities involved in the flow of agricultural products and services from the initial points of agricultural production until they reach the hands of the ultimate consumers. It is interested in everything that happens to crops as it leaves the farm gate; making decision, taking actions and bearing the responsibility of the action (Haruna *et al.*, 2012). Agricultural marketing also articulates all processes that take place from when the farmer plans to meet specified demands and market prospects to when the producers finally gets it to the consumers. It also recognises the mutual independence between farmers and marketing middlemen which is the whole essence of marketing in management decision making (Haruna *et al.*, 2012). The marketing cost describe as the actual expenses incurred in the performance of the marketing functions as a commodity moves from the farmer (producer) to the final consumer. It also includes the wages, costs of transportation, overhead costs and fees paid for services, handling of marketing charges, costs of assembling, processing, and distribution, and other running costs. Costs in processing and marketing of agricultural products are grouped basically into two; the fixed costs and the variable costs (Olukosi and Isitor, 2004). Marketing encourages production, which serves as motivating force in promoting specialisation and capital formation as well as instrument for income generation to individuals and foreign exchange earnings to the nation. Therefore, this implies that a detailed marketing knowledge and research on where, when, what and for how much investment could be made in production by individuals, groups, as well as Local, State and Federal Governments. Also the marketers would be able to appreciate their returns as revealed by (Mohammed, 2010). A proper functioning market is generally

perceived as the best organisational structure to achieve more efficient production and consumption decisions (Atman, 2008). There are few studies on Water melon marketing in the study area, this justify the need to conduct the research. The results of the study will be useful to Water melon marketers by helping them to improve their marketing activities, thus achieve maximum profit at lesser cost and will also add knowledge to the existing literatures which provide useful information to policy makers, planners of both government and non-governmental organisations for policy formulations. Results of the study will also be useful as a source of relevant information to other researchers and students for further studies and also serve as a guide to enhance the marketing and distribution of Water melon in Nigeria. There exists a wide gap between production and consumption of agricultural produce, thus marketing serves as a bridge between the two. There are few studies that exist on sweet and water melons marketing. This creates a gap that needs to be filled and necessitate the need for empirical investigation to assess the profitability and the marketing efficiency of the two fruits. Therefore, the study examined the economic analysis of Sweet melon and Water melon marketing in Gombe and Bauchi States, North-Eastern Nigeria. The study therefore, tries to find answers to the following questions.

- i. What are the socio- economic characteristics of the Sweet melon and Water melon marketers in the study area?
- ii. What are the costs, returns and profit in watermelon marketing in the study area?
- iii. What are the constraints to Sweet melon and Water melon marketing in the study area?

The possible answers to these questions among others serves as a basis for taking proper decision regarding the marketing of Water melon which can immensely contribute in reducing the problems of unemployment and make necessary

adjustment on products efficient marketing system in the study area.

However, the broad objective of the study was to determine the profitability of watermelon marketing in Gombe and Bauchi States. The specific objectives were to; (i) assess costs and returns of wholesale and retail watermelon marketers in the study area, (ii) determine costs, returns and profitability of watermelon marketing in the study area; and (iii) identify and describe the constraints associated to watermelon marketing in the study area.

## Materials and Methods

### The Study Area

Gombe State lies between Latitudes 10° 16' and 11° 00'N and Longitudes 11°00'E and 11°11'E. It has a land area of 20,265 km<sup>2</sup> with human population of 2,875,042 people as of from 2006 population census; with annual population growth rate of 3.2% (NPC, 2006). 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 22.7°C and 33.5°C respectively, Gombe State Economic Empowerment and Development Strategy (GOSEEDS, 2010). The State is a multi-ethnic area predominantly occupied by the Fulani, Hausa Tera, and host of others all juxtaposed together. The major income activities of the people include agriculture (farming and livestock rearing), trading and civil work etc. Major crops grown include maize, millet, cowpea, groundnut, fruits and vegetables like okra, tomatoes, pepper, water melon and sweet melon etc. (GOSEEDS, 2010).

Bauchi State lies between Latitudes 10° 17' and 11° 00'N and Longitudes 9° 45' E and 11°12'E. It has a land area of 49,119 km<sup>2</sup> with human population of 6,164,964 people as of 2006 population census; with 2.6% annual population growth rate (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. The temperature ranges from 18.5°C to 32°C as minimum and maximum respectively, with April as the hottest and January as the coldest month, Bauchi State Agricultural development Project [BSADP] (BSADP, 2009). The State is a multi-ethnic area predominantly occupied by Hausa, Fulani, Jarawa, Sayawa and host of other Nigerian tribes living together. The main occupation of the people is farming and the major crops grown in the area include maize, sorghum, millet, rice, cowpea, sweet potato, fruits and vegetables (like tomato, water melon, sweet melon, pepper, cabbage etc.) mainly on small scale level (BSADP, 2004).

### Sampling Technique and Sample size

Multi-stage sampling technique was used. Stage one involved the purposive selection of three (3) Local Government Areas each from Bauchi and Gombe States for their popularity in watermelon production. The second stage involved purposive selection of three (3) markets from each Local Government Area, (to arrive at the targeted scope) making 18 markets as they were notable in watermelon marketing in the study areas. However, the last stage involved simple random selection of respondents proportionate to the number of participants in each market. A sample is a representation of the population of study (Otokiti, 2005). However, in determining the sample size appropriate for this study, the Barlett *et al.* (2001), model as modified by Alamu and Olukosi (2010) was used, where 20% was suggested when the population is up to 1,000; 10% when the population is up to 5,000 and 5% when the population is up to 10,000. A proportional allocation technique was then used in order to determine the number of sample from each market location. The number of respondents to be sampled will be proportionate to the number of traders in the markets under investigation (Alamu and Olukosi, 2010)

and (Wanjru, 2012). In all, three hundred (300) Water melon marketers were randomly selected from a sample frame of 1056 collected from eighteen (18) markets of the study area. The sampling was done based on proportionality factor as adopted from Adebayo, (2008) and was used in this regard as:

$$S = \frac{p}{P} * \frac{Q}{1} \quad \dots (1)$$

where:

S = Sample size

p = Population of water melon marketers at each location

P = Total population of watermelon marketers in the study area

Q = Total questionnaires that were administered.

**Method of Data Collection**

The data for this research were collected from wholesale and retail Sweet melon marketers using structured questionnaires. The data were collected at different periods i.e (at different marketing seasons) where surplus period ranged from the months of September to December, balance period from May to August as well as scarcity period that ranged from January to April of the year calendar.

**Method of Data Analysis**

**Enterprise budgeting model:** The budgeting model technique was employed so as to estimate costs and returns as well as net profit in the marketing of water melon as applied by (Mohammed *et al.*, 2015).

**Descriptive statistics:** The frequency counts, percentages, means, standard deviation and ranking were used to analyse the constraints associated with sweet melon marketing in the study area as applied by (Mohammed *et al.*, 2012).

**Results and Discussion**

**Costs and Returns of Wholesale Watermelon Marketers**

Table 2 presented the cost and returns of wholesale watermelon marketers. As shown in the table, variable cost dominated the marketing cost in surplus, balance and scarcity periods with ₦9,874.96 (95.16%),

**Specification of the Model:**

$$TC = TFC + TVC \quad \dots (2)$$

$$NI = TR - TC \quad \dots (3)$$

$$RCI = PROFIT / TC \quad \dots (4)$$

where:

TC = Total cost

RCI = Return on capital invested

NI = Net income

TVC = Total variable cost

TFC = Total fixed cost

TR = Total revenue

**Depreciation of Fixed Items:** The Total Fixed Costs involved the depreciation on fixed assets and for the purpose of this study straight line method (SLM) was used to determine depreciation value of each of fixed items, such as wheelbarrow, drum/bucket, knife, shade, etc. which when used over a period of time loses value. The straight line method (SLM) was used as advocated by (Adamu *et al.*, 2011). Depreciation can be evaluated using different methods namely: straight line method, sum of the year digits method, declining balance method and annual revaluation method. However, for the purpose of this study, the straight line method (SLM) was viewed appropriate, therefore was adopted and expressed as:

$$SLM = \frac{Pp - S}{L} \quad \dots (5)$$

where:

Pp = Purchase price

S = Salvage value

L = Useful life span

₦12,637.59 (94.38%) and ₦15,866.38 (94.18%) respectively. The fixed cost incurred was found to be ₦505.07 (4.86%), ₦755.33 (5.65%) and ₦982.42 (5.86%) in respect of surplus, balance and scarcity periods respectively. This is in line with the work of Adamu *et al.* (2011) on Profitability of Watermelon Production and Marketing in Kirfi Local Government Area of Bauchi State, Nigeria and Haruna *et al.* (2012) on Economics Analysis of Fresh Tomato Marketers in Bauchi Metropolis of Bauchi state, Nigeria, that variable costs dominated the entire marketing cost of their respondents which contributed ₦4,731.87

(97.20%) and ₦68,600.00 (99.99%) respectively as compared to the fixed cost. The result further depicts that marketers realised the highest total revenue of ₦17,745.10 during the scarcity period followed by ₦14,697.51 and ₦11,797.20 in respect of balance and surplus periods respectively. This might be as a result of availability of the products during the balance and its insufficient in the surplus period. The marketers obtained more profit and higher returns per capital invested of ₦1,417.17 and 0.14, ₦1,304.59 and 0.10 in surplus. and balance periods respectively. Compared to ₦896.30 and 0.05 amounts realised in the scarcity period. The returns per capital invested of 0.14, 0.10 and 0.05

means that marketers realised the profit of 14kobo, 10kobo and 0.5kobo in every naira they invested in watermelon marketing in respect of surplus, balance and scarcity periods respectively. This is lower than 0.58, 0.36 and 0.16 returns realised by Adamu *et al.* (2011), Adesina (2013) on Marketing Analysis of Pineapple in Surulere and Ogo-Oluwa Local Governments Area of Oyo-State, Nigeria and Sajo (2015) on Economic Analysis of Onion Marketing in Gombe Local Government Area, Gombe State, Nigeria respectively; in their study areas and 0.14 is higher than 0.13 as recorded by Mohammed *et al.* (2012) on Marketing of Fresh and Dried Tomato in Kano Metropolis, Nigeria.

**Table 1: Selection Procedure of Watermelon Marketers in Gombe and Bauchi States**

States/LGA's	Markets	Sample Frame			Total No. of marketers selected
		<b>Wholesalers</b>			
<b>A. Gombe State</b>		<b>Retailers</b>			
1.Balanga	1.Daban Magariya	96	12	15	27
	2.Gelengu	121	10	24	34
	3.Talasse	54	6	10	16
2.Yamaltu –Deba	1.Dadin Kowa	73	6	15	21
	2.Kuri	31	0	9	9
	3.Kwadon	36	0	10	10
3.Gombe	1.Gombe Central	106	6	24	30
	2. Gombe Old	32	0	9	9
	3.Pantami	30	0	9	9
<b>Total</b>		<b>579</b>	<b>40</b>	<b>125</b>	<b>165</b>
<b>B. Bauchi State</b>					
1.Bauchi	1.Muda Lawal	57	5	11	16
	2.Kangere	31	0	9	9
	3.Yelwa	29	1	7	8
2.Kirfi	1.Bara	111	5	27	32
	2.Badara	62	2	14	16
	3.Cheledi	57	0	16	16
3.Misau	1.Dabigi	34	0	10	10
	2.Misau	51	1	14	15
	3.Zindi	45	1	12	13
<b>Sub-Total</b>		<b>477</b>	<b>15</b>	<b>120</b>	<b>135</b>
<b>Grand Total</b>		<b>1056</b>	<b>55</b>	<b>245</b>	<b>300</b>

Source: Pilot survey, 2015-2016

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**Table 2: Cost and returns of wholesale watermelon marketers (n=300)**

Variables	Surplus period		Balance period		Scarcity period	
	Value ₦/pyramid	(%)	Value ₦/pyramid	(%)	Value ₦/pyramid	(%)
a. Acquisition cost	9101.78	87.69	11564.98	86.35	14311.76	84.94
b. Transportation	237.28	2.29	355.74	2.66	561.47	3.33
c. Gift/ Consumption	164.52	1.59	255.69	1.91	403.68	2.40
d. Taxes/Levies	61.15	0.59	61.15	0.46	61.15	0.36
e. Commission	19.67	0.19	19.67	0.15	19.67	0.12
f. Rent	119.04	1.15	119.04	0.89	119.04	0.71
g. Loading/Offloading	40.15	0.39	60.11	0.45	94.29	0.56
h. Water	13.17	0.13	30.38	0.23	32.49	0.19
i. Detergent	13.94	0.13	21.10	0.16	36.67	0.22
j. Grasses	50.42	0.49	67.11	0.50	94.42	0.56
k. Washing labour	28.41	0.27	44.24	0.33	73.41	0.44
l. Hand globes	25.43	0.25	38.38	0.29	58.33	0.35
<b>Total variables cost</b>	<b>9874.96</b>	<b>95.16</b>	<b>12637.59</b>	<b>94.38</b>	<b>15866.38</b>	<b>94.18</b>
<b>Fixed Cost</b>						
a. Shade/Store	207.10	2.00	247.20	1.85	301.60	1.79
b. Table/bench	67.43	0.65	107.40	0.80	177.67	1.06
c. Bucket	25.29	0.24	39.39	0.29	63.11	0.38
d. Wheel barrow	115.50	1.11	231.10	1.73	231.10	1.37
e. Knife	11.38	0.11	16.46	0.12	28.79	0.17
f. Lantern lamp	22.51	0.22	35.63	0.27	63.72	0.39
g. Trampoline	48.15	0.46	66.48	0.50	98.60	0.59
h. Broom	7.71	0.07	11.67	0.09	17.83	0.11
<b>Total fixed cost</b>	<b>505.07</b>	<b>4.86</b>	<b>755.33</b>	<b>5.65</b>	<b>982.42</b>	<b>5.86</b>
<b>Total cost</b>	<b>10380.03</b>	<b>100.00</b>	<b>13392.92</b>	<b>100.00</b>	<b>16848.80</b>	<b>100.00</b>
<b>Total revenue</b>	<b>11797.20</b>		<b>14697.51</b>		<b>17745.10</b>	
<b>Net Income</b>	<b>1417.17</b>		<b>1304.59</b>		<b>896.30</b>	
<b>Return/₦ invested</b>	<b>0.14</b>		<b>0.10</b>		<b>0.05</b>	

Source : Field survey, 2016-2017

Note: Net weight per one watermelon in (kg); Large = 7.75kg; Medium = 4.56kg; Small = 2.52kg

**Cost and Returns of Retail Watermelon Marketer**

Table 3 shows the cost and returns of retail watermelon marketers in the study area. The result shows that total variable cost was also found to dominate the entire marketing cost of this category of marketers with ₦11,730.51 (91.14%), ₦13,769.01 (90.96%) and ₦18,056.16 (91.780%) in respect of surplus, balance and scarcity periods respectively, whereas the total fixed cost accounted for ₦1,143.95 (8.89%), ₦1,368.96 (9.09%) and ₦1,614.85 (8.22%) respectively. This is in line with the studies of Adamu *et al.*, (2015), Mohammed *et al.* (2012), Haruna *et al.* (2012) and Adamu *et*

*al.* (2011) that variable costs dominated the entire marketing costs of the respondents in their study areas. The result further revealed that the total revenue of ₦20, 807.99 was found to be higher in scarcity period followed by ₦16, 246.45 and ₦13, 353.03 in respect of balance and surplus periods respectively. Marketers were found to obtained more profit of ₦1, 136.98 in scarcity period with less profit recorded during the surplus time. The return per naira invested of 0.07 realised was higher in balance period, followed by 0.06 in scarcity period but low (0.04) in surplus marketing season. This indicated that in every naira invested, marketers gained

**Table 3: Cost and returns of retail watermelon marketers (n=300)**

Variables	Surplus period		Balance period		Scarcity period	
	Value ₹/pyramid	(%)	Value ₹/pyramid	(%)	Value ₹/pyramid	(%)
a. Acquisition cost	10472.45	81.34	12283.50	81.14	16234.95	82.53
b. Transportation	366.89	2.85	444.34	2.94	555.58	2.82
c. Gift/Consumption	304.43	2.37	363.87	2.40	459.58	2.33
d. Taxes/Levies	34.14	0.27	34.14	0.23	34.14	0.17
e. Commission	17.96	0.14	17.96	0.12	17.96	0.09
f. Rent	110.52	0.86	110.52	0.73	110.52	0.56
g. Loading/offloading	101.05	0.79	120.21	0.79	151.00	0.77
h. Water	28.64	0.22	34.42	0.23	42.26	0.22
i. Detergent	28.06	0.22	33.98	0.23	41.87	0.21
j. Washing labour	54.81	0.43	68.32	0.45	90.72	0.46
k. Polythene	161.56	1.26	191.08	1.26	230.66	1.17
l. Hand globes	50.00	0.39	66.67	0.44	87.50	0.45
<b>Total variables cost</b>	<b>11730.51</b>	<b>91.14</b>	<b>13769.01</b>	<b>90.96</b>	<b>18056.16</b>	<b>91.78</b>
<b>Fixed Cost</b>						
a. Shade/Store	378.47	2.94	427.04	2.82	427.04	2.17
b. Table/Bench	329.29	2.56	379.85	2.51	453.39	2.31
c. Bucket	87.07	0.68	100.00	0.70	114.87	0.58
d. Knife	52.08	0.41	60.82	0.40	71.53	0.36
e. Lantern	76.36	0.59	96.60	0.64	124.30	0.63
f. Umbrella	194.40	1.51	268.90	1.78	371.43	1.90
g. Broom	26.28	0.20	35.75	0.24	52.29	0.27
<b>Total fixed cost</b>	<b>1143.95</b>	<b>8.89</b>	<b>1368.96</b>	<b>9.09</b>	<b>1614.85</b>	<b>8.22</b>
<b>Total cost</b>	<b>12874.46</b>	<b>100.00</b>	<b>15137.97</b>	<b>100.00</b>	<b>19671.01</b>	<b>100.00</b>
<b>Total revenue</b>	<b>13353.03</b>		<b>16246.45</b>		<b>20807.99</b>	
<b>Net income</b>	<b>478.57</b>		<b>1108.48</b>		<b>1136.98</b>	
<b>Return/₹ invested</b>	<b>0.04</b>		<b>0.07</b>		<b>0.06</b>	

Source : Field survey, 2016-2017

Note: Net weight per one watermelon in (kg); Large = 7.75kg; Medium = 4.56kg; Small = 2.52kg

**Table 4: Constraints to watermelon marketing (n=300)**

Constraints	*Constraint Levels				Mean Score	SD	Rank
	VS	S	NS	Total			
Inadequate credit facilities	120 (40)	155 (52)	25 (8)	505	1.68	0.62	5 <sup>th</sup>
Poor market arrangement and information	48 (16)	144 (48)	108 (36)	660	2.20	0.69	1 <sup>st</sup>
Pilfering and theft	61 (20)	147 (49)	92 (31)	631	2.10	0.71	2 <sup>nd</sup>
Lack of uniform weight and measures	80 (27)	143 (48)	77 (26)	597	1.99	0.72	3 <sup>rd</sup>
Inadequate research and extension services	128 (43)	122 (41)	50 (17)	522	1.74	0.73	4 <sup>th</sup>

Source : Field survey 2016-2017

**Note :** \*Multiple réponses were recorded ; and figures in parentheses are percentages of the frequencies **SD :** Standard Deviation, **VS=** Serious, **S=** Serious and **NS=** Not Serious

0.4kobo, 0.7kobo and 0.6kobo profits in respect of surplus, balance and scarcity periods respectively. This is lower than 0.30 as reported by Adamu *et al.* (2015); 0.23 by Mohammed *et al.* (2012); and 0.16 by Sajo (2015); in surplus, balance and scarcity periods respectively. Therefore, the result showed that the marketing of watermelon in both wholesale and retail categories was profitable, but wholesalers realised more than their retail counterparts.

### **Constraints Associated with Watermelon Marketing**

The problems associated with the marketing of Water melon in the study area were presented in Table 4. These problems include;

**1. Inadequate credit facilities:** The provision of credit facilities to watermelon marketers assist them directly or indirectly to improve their marketing activities. As shown in Table 4, inadequate credit facilities are one of the constraints affecting the marketers with the mean score of 1.68 and ranked 10<sup>th</sup> in the series of problems associated with watermelon marketing in the study area. This could be attributed to problem of access to credit institutions, high interest rate, untimely or delay in credit disbursement, lack of collateral and insufficient information on how to secure the credit. Thus, these factors may affect the expansion and development of watermelon marketing as a result of low capital for investment in the business. This is similar to findings of Mohammed *et al.* (2012) and Atman, *et al* (2007) in Profitability of Tomato Production and Marketing in Yamaltu-Deba LGA, Gombe State Nigeria, who reported that lack of credit facilities affected the orange and onion marketers in their study areas and were found to ranked 1<sup>st</sup> and 2<sup>nd</sup> respectively.

**2. Poor marketing arrangement and information:** Poor marketing arrangement and inadequate information may lead to lower prices of watermelon, which sometimes makes marketer loss market for their produce. This loses may be as a result

of perishability and bulky nature of the commodity which discourage the traders from increasing quantity of goods they purchase for their market investments. The result in Table 4 indicated that, nearly all the respondents viewed poor marketing arrangement and inadequate information as the 2<sup>nd</sup> most important problem facing the sweet melon and watermelon marketing in the study area. The result further recorded the mean score of 2.20 with respect to the problem, implying that without proper marketing arrangement and adequate information on commodity prices, marketers are likely to be cheated as some middlemen will capitalize on these short comings to offer less attractive prices, hence may result to disincentive towards boosting the marketing of watermelon in the study area. The result is contrary to the findings of Taphee *et al.* (2015); Adamu *et al.* (2015); Saleh (2015); Sajo (2015); Mohammed *et al.* (2014); Adamu *et al.* (2011) and Yohanna (2006) as none of them reported this as part of the respondents' problems in their studies.

**3. Pilfering and theft of the product:** Pilfering and theft of watermelon was found to be among the major problems faced by the marketers in the study area. The result revealed that nearly all the marketers complained on the problem of theft and pilfering of products. The problem was ranked 4<sup>th</sup> with mean score of 2.10. This is also in line with study of Adamu *et al.* (2015), but contrary to the findings of Taphee *et al.* (2015), Sajo (2015); Mohammed *et al.* (2014); Adamu *et al.* (2011) and Yohanna (2006) as none of them reported this as part of the respondents' problems in their studies.

**4. Lack of uniform weight and measures:** Most markets use different type of measures for fruits and vegetables marketing, which ranges from bags, baskets, and tins. Other measures include estimation by size, number (quantity) and grades (quality) to determine the produce price. Weights are rarely used especially in marketing of fruits and vegetables except in few cities of Nigeria

and other developed countries (Mohammed *et al.*, 2012). Prices are usually determined by haggling and price paid depends upon the bargaining power of the buyer, or his/her social status. Thus, the result showed that watermelon marketers face the problem of uniform weights and a measure in quantifying and fixing price for their produce and were found to rank the 5<sup>th</sup> with a mean score of 1.99. This result agrees with the findings of Taphee *et al.* (2015), who reported that lack of standard unit of measurement which ranked as 3<sup>rd</sup> was among the major problems faced by Okra marketers in Jalingo metropolis of Taraba State, Nigeria. The result is contrary to the works of Adamu *et al.* (2015); Sajo (2015); Mohammed *et al.* (2014); Adamu *et al.* (2011) and Yohanna (2006) as none of them reported this as part of the respondents' problems in their studies.

**5. Inadequate research and extension services:** Until recently, there are few researches being conducted on fruits and vegetable marketing in the study area, as most of the researchers geared towards producing more than thinking about how to market it. Nowadays, a marketer needs to know much about new technologist of marketing agricultural produce due to their perishable and bulky nature. Thus there is need for consumers' demands and preferences, new storage and preservation technologies as well as how to handle and package the products to reduce loses in the marketing of fruits and vegetables for better returns. This can only be achieved through the use of well-trained extension workers which is lacking. The result revealed that watermelon marketers encountered the problems of inadequate research and extension services which ranked the 9<sup>th</sup> with the mean score of 1.74, hence lack of new innovations on marketing of the produce in the study area. This problem was found to affects the marketing of watermelon in the study area, hence lead to lower profit among the marketers in the business. Thus, this is contrary to the findings of Taphee *et al.* (2015); Adamu *et al.* (2015); Sajo (2015); Mohammed *et al.* (2014); Adamu *et al.*

(2011) and Yohanna (2006) as none of them reported this as part of the respondents' problems in their studies.

### Conclusion and Recommendations

In conclusion, the result indicated that water melon marketing was profitable in both wholesale and retail categories with wholesale marketers receiving the higher net income and the higher returns per capital invested in surplus period. Poor marketing arrangement and information, Pilfering and theft of products as well as Lack of uniform weight and measures were the major problems faced by water melon marketers in the study area. The study therefore, recommended that marketers' associations and stakeholders should employ the services of security personnel to ensure the provision of adequate security facilities such as market vigilante, secured ware houses, firefighting machineries etc. in the markets to reduce loses as a result of pilfering and theft as well as those caused by other security negligence. There also need to establish public research and development programs to improve management practice, particularly the use of new available technology for timely disposal, processing and efficient marketing.

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