



## THE PERCEPTION OF SUPPLY CHAIN ACTORS ON FACTORS THAT DETERMINE FRESH TOMATO SUPPLY IN BAUCHI STATE, NIGERIA

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### ABSTRACT

The study was carried out to examine the determinants of fresh tomato supply in Bauchi State, Nigeria. A multistage sampling technique was used to select 301 producers, 105 wholesalers, 252 retailers and 150 consumer making a total of 808 Supply Chain Actors (SCA) for the study. Data were collected using structured questionnaire and analysed using descriptive statistics. The result reveals that 76.7%, 78.2%, 76.5% and 78.6% of the producers, wholesalers, retailers and consumers to be between the age category of 21-50 years old. Further, the result shows a mean age of 40 years old for the SCA in all the zones. The result reveals that consumers in all the zones agree that all the stated factors were determinants of fresh tomato supply (mean = 3.07 to 4.95). However, they disagree on packaging, and organic products as a determinants of fresh tomato supply. Price of tomato, seasonality and sorted tomato mean = 2.58, 1.23 and 2.93 respectively, were not considered as determinants by the wholesalers. All factors stated were regarded as determinants of supply by the retailers. While consumers disagree with packaging ( mean = 1.67) and organic (mean = 1.67) as determinants of supply. It is concluded that all the SCA in Bauchi State agree and disagree on some factors as the determinants of fresh tomato supply. Therefore, the study recommends that Supply chain actors particularly producers and marketers of fresh tomato should look into the factors considered by the consumers as obstacles to the supply of tomato and improve on them so as to increase its consumption and in return increase their profit. Also, using the appropriate technologies, producers should be able to produce tomato with desired qualities that will attract consumers.

**Keywords:** Actors, Chain, Determinants, Tomato, Supply, Perception

### INTRODUCTION

Agriculture in Nigeria is the main source of food and raw material for the nation's economy and it also provides job opportunities to many of its citizens both directly and indirectly. The sector also has exports earning potentials that could assist in the expansion of foreign exchange earnings of the country.

Tomato originated from South America (Aja, 2012). It is introduced into West Africa by Portuguese traders and freed slaves from West Indies (Tindal, 1988). Tomato is a short duration crop and it gives high yield, especially when high yielding varieties under improved production technology is adopted (MINFAL, 2013). According to FAO (2011), tomato production has increased throughout the world. About 125.5 MTs were produced in 2012. China, the largest producer, accounted for one quarter of the global output followed by United States and India. Nigeria ranked second largest in Africa and thirteenth largest in the world producing 1.8 million tonnes of fresh fruits of tomato annually, with national demand of about 2.3 million MTs annually and a demand gap of about 500,000 Metric tonnes. An annual total area of one million hectares is reportedly used for tomato cultivation with an annual average of 25-30 tonnes per hectares (Charity, 2015).

Tomato is a major food component used mostly by Nigerians and also the most widely used vegetable in the World (Usman and Bakari, 2013 and Sanauallah *et al.*, 2015). Also, tomato has been ranked as the highest vegetable product in terms of consumption (Shettima *et al.*, 2016). It contains high moisture content in their fresh forms, they are rich in vitamins A, B, C, D, E and K it is also rich in Potassium, a mineral most of us do not get enough of (John *et al.*, 2010; and Debjit *et al.*, 2012). It



helps in the fight against cancerous cell formation as well as other health complications. It reduces the risk of cancers of the mouth, stomach oesophagus, prostate, pancreatic, breast cancer, cervical, colon and rectal (Osemwegie, *et al.*, 2010).

As a result of the growing population, the per capita consumption of tomato on world average has increased from 7.5kg to 20.5kg/annum/capita. The availability of tomato and prices differ from season to season. The production and marketing of tomato serve as source of employment and food to producing and marketing families as well as to its consumers. Hence, its importance includes its nutritional and economical value (Oladapo *et al.*, 2011). Tomato Vegetables are therefore of great value to human development (Kalidas *et al.*, 2014). Fruits and vegetables constitute about 25% of the major food crops cultivated in the country (Shuaibu and Mohammed, 2015).

However, the amount of a commodity purchase or offered for sale in a given market and in a given time is determined by some factors (Panda, 2013). Tianyi (2013) reported these factors as follows:- price of the good, price of factors of production, number of sellers technology, future expectations as factors affecting supply while on the other hand listed factors affecting demand as price of the good, price of substitute, population among others. Reem (2016) said supply and demand is perhaps one of the most fundamental concepts of economics. These two concepts operate on individual laws. Demand refers to the quantity of a good that is desired by buyers and supply is defined as the total quantity of a product or service that the market place can offer. These concepts, demand and supply are governed by just one condition and that is holding all other factors (such as those listed above) constant, and allow price to be the only determinant of the quantity demanded and or supplied and vice versa (Reem, 2016). Fresh tomato in Nigeria is very scarce and expensive particularly during its off season (May to September). Today, it has become a cash crop even in the production areas like the northern part of the country. Hence, consumers resort to other forms of tomato like the processed types such as canned, sachet, and dry tomato. Pumpkin are also use in place of fresh tomato in some parts of Northern of Nigeria.

## **METHODOLOGY**

### **Study Area**

Bauchi state as the study area, is one of the thirty six states of Nigeria and was created in 1976. The state is boarded by Taraba and Plateau state to the south, Gombe and Yobe to the East, Kano and Jigawa to the North and Kaduna in the west (BSG, 2011) Bauchi State is divided into three agricultural zones namely: Northern, Central and Western zones. The state is made up of twenty local government areas which are Bauchi, Kirfi, Alkaleri, Toro, Dass, Tafawa-Balewa, and Bogoro in the Western Zone; Zaki, Itas-Gadau, Gamawa, Jama'are, Katagum, Dambam, Giade, Shira and Misau in the Northern zone, and Darazo, Warji, Ningi and Ganjuwa are in the central zone. Bauchi state is located in the Northern Guinea Savannah Ecological zone of Nigeria. It lies between latitude  $9^{\circ} 3'$  and  $12^{\circ} 3'$  North of the equator and longitudes  $8^{\circ} 50'$  and  $11^{\circ}$  East of the Greenwich Meridian. Bauchi state occupies a total land area of 49,119km<sup>2</sup> representing about 15% of the Nigerian's total land mass (BSADP, 2015). The state has an estimated population of 4,889,811.2 (NBS, 2016). Majority of the inhabitants are Geremawa, Hausa Fulani, Sayawa, Jarawa and others. Most (80%) of the farmers of Bauchi State are predominantly subsistence farmers. The farmers in the state practice both dry and rainy seasons farming. They produce vegetables such as tomato, pepper, okra, lettuce, cabbage, amaranth among others. Other major crops produced include rice, maize, millet, cowpea, acha, groundnut, sesame and guinea corn. They also keep livestock such as goats, sheep, cattle, and poultry too.

The temperature range is  $9.11^{\circ}\text{C}$  minimum and  $40.55^{\circ}\text{C}$  maximum (BSADP, 2015). Bauchi State is characterized by a dust atmosphere referred to as harmattan with visibility being low as 100m. Secondly, is the southwest Maritime air mass. This wind system is responsible for the rainy season experienced in the state. The mean annual rain fall ranges from 700mm in extreme north (Zaki) and 1300mm in the southern part (Toro) of the state. The state is characterized by two distinct seasons (the



rainy and dry seasons). The rainy season begins from May and ends October and the dry season starts November and ends in April.

### Sampling Techniques and Sample Size

The target population for the study was the fresh tomato small scale producers, marketers and consumers. Both purposive and simple random sampling techniques were used. First, a purposive sampling technique was used to select three local government areas from each zone and two villages from each of the selected LGAs. This gave the total number of nine LGAs and eighteen villages. The purposive selection of both the LGAs and villages was based on the intensity of tomato production in the areas. These LGAs and their villages in bracket were as follows: Northern zone; Jama'are (Dogon-Jeji and Gongo); Zaki (Sakwa and Ariri); Misau (Zindi and Misau); Central zone: Warji (Badeyaso and Wando); Ningi (Kafin Zaki and Tsangaya), Ganjuwa (Filin-Shagari and Marbini); and in the Western zone; Toro (Tilde and Ganye); Kirfi (Badara and Baba) and Dass (Dabandak and Wand).i).

Two markets were selected from each zone. These markets were Jama'are and Misau in the northern zone; Cheledi and Toro in the Western zone while Ningi and Soro were from Central zone. In addition, Muda-Lawal market was also chosen being a collection centre for fresh tomato in Bauchi State. A list of both small scale tomato farmers (1,524) and Retailers (1,278) were obtained and used as the sample frame. This was achieved with the help of some key informants such as government officials from various B.S.A.D.P Headquarters in Bauchi State and from leaders of tomato farmers and marketers association.

A simple random sampling technique was used to ensure that each member of the target population is given equal chance of being selected. Thus, 20% of both farmers and retailers from the selected areas were chosen. This gave the total number of 301 farmers and 252 retailers from the sampling frame of 1,524 and 1,278, respectively. All 105 the identified wholesalers in the three zones were observed for the study. This was because their population was considered not very large. Five retailers from each selected markets were identified based on volume of trade. From each retailer four consumers were selected and interviewed at the point of purchase of fresh tomatoes. The numbers of yes and no made up the sample frame. Muda-Lawal market served as the collection centre for fresh tomato commodity and also has large number of different categories of fresh tomato consumers; hence, six consumers were selected from the five retailers and interviewed at the point of purchase of fresh tomato using accidental sampling procedure. This gave the total number of 150 consumers. In all, 808 respondents were randomly selected and interviewed for the study. This is shown in Table 1 and 2.

**Table 1:** Sample Size Selection Plan for Producers

Zone	LGA	Village	Sampling frame	Sample size (20%)
Northern Zone	Jama'are	Dogon-jeji	220	44
		Gongo	77	15
	Misau	Zindi	81	16
		Misau	60	12
	Zaki	Sakwa	125	25
		Ariri	65	13
Central Zone	Ningi	Kafin zaki	112	22
		Tsangaya	63	12
	Ganjuwa	Filing shagari	31	6
		Marbini	35	7
	Warji	Badayaso	53	10
		Bakin Kogin-Duburna	49	9
	Dass	Dabandak	100	20
		Wandi	115	23
WesternZone	Kirfi	Badara	81	16
		Baba	72	14
	Toro	Tilde	80	16
		Ganye	105	21
Total			1,524	301

**Table 2:** Sample Size Selection Plan for Marketers and Consumers

Zone	Market	Sampling Frame			Sample Size (20%)		
		W/saler	Retailer	Consumer	W/saler	Retailer	Consumer
<b>Northern Zone</b>	Jama'are	47	174	95	47	34	20
	Misau		191	103		38	20
<b>Western Zone</b>	Cheledi		153	75		30	20
	Toro	32	214	115	32	42	20
	Muda-Lawal		293	185		58	30
<b>Central Zone</b>	Ningi		132	80		26	20
	Soro	26	121	64	26	24	20
		<b>105</b>	<b>1,278</b>	<b>717</b>	<b>105</b>	<b>252</b>	<b>150</b>

**W/Saler = Wholesaler**

### Methods of Data Collection

Primary data from a field survey were collected using a well structured questionnaire. The Information obtained included socio-economic characteristics and factors that affect fresh tomato supply.

### Methods of Data Analysis

Descriptive statistics such as mean, average and graph were used. likert-type scale was used to obtain responses from respondents. This measures the degree of agreement and or severity of response by the respondents. The respondents were asked to give their opinions as to the level of agreement to a number of listed factors using a 5-point likert-scale of strongly agree (SA), Agree (A), undecided (UD), disagree (DA), and Strongly disagree (SD) coded as: 5,4,3,2 and 1 respectively. The mean of the various factors were computed by multiplying the frequency of each response with its appropriate nominal value and dividing the sum by the number of respondents to the items. Thus:

$$\bar{X}_s = \sum FX / S_s$$

Where:

$\bar{X}_s$  = Mean score

$\sum$  = Sign of summation (Almu and Olukosi, 2010)

F = Frequency of response

X = Normal code of rating scale (5,4,3,2 or 1 or 3,2, and 1)

$S_s$  = Sample size

The means was compared with the bench mark calculated as:

$$Bm = \sum X / n$$

Where:

Bm = Bench mark

$\sum$  = Summation

X = Normal Code

n = Number of codes

Thus,

$$\frac{5+4+3+2+1}{5} = 3.00 \quad \text{and} \quad \frac{3+2+1}{3} = 2.00$$

Based on Bagheri (2010) perception analysis, the means for all indicators were then categorised as follows:

1.00 - 1.49 = Strongly Disagree (SD)

1.50 - 2.49 = Disagree (D)

2.50 - 3.49 = Undecided (UD)

3.50 - 4.49 = Agree (A)

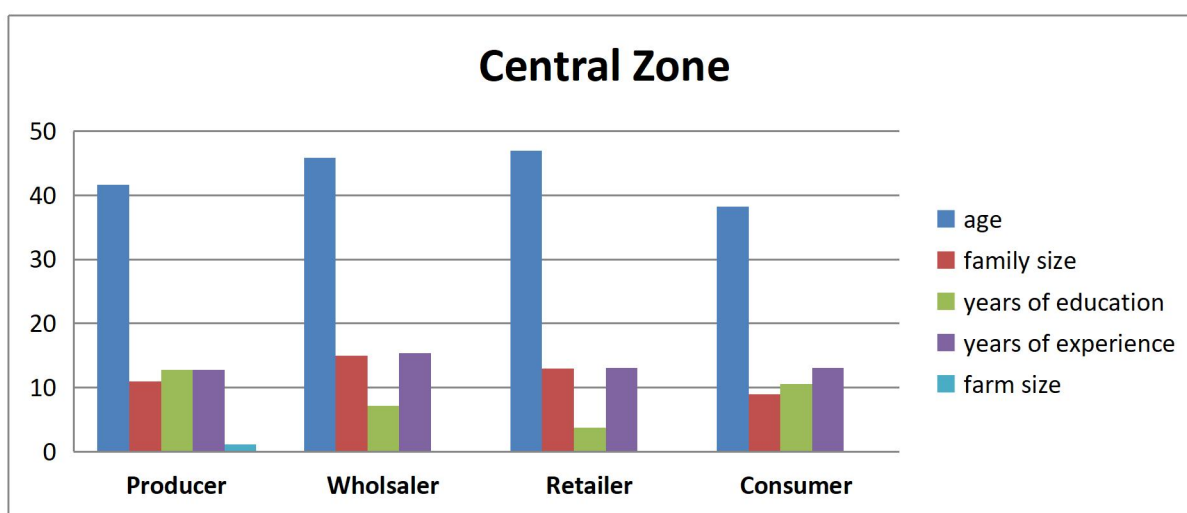
4.50 - 5.00 = Strongly Agree (SA)

Thus, any perception mean of  $\geq 3.00$  is a true factor (cause and constraints), otherwise it is not.

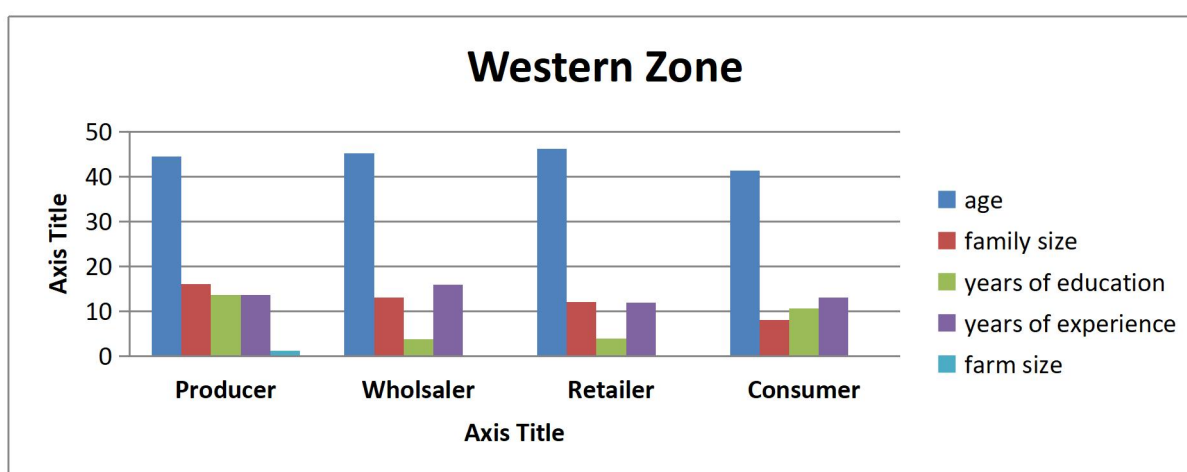
## RESULTS AND DISCUSSION

### Socio-economic Variables of Fresh Tomato Supply Chain Actors by Zones in Bauchi State

Figure 1, 2 and 3 presents the result on means of socio-economic characteristics of the supply chain actors by zones. The results show the average age for all the supply chain actors to range from 38.22 to 46.96, across zones indicating, that all actors between and among zones are within their active farming and marketing age. The average family size ranges between 8.00 to 16.00 across the three zones among producers, wholesalers, retailers consumers. This indicates a high household size, which provides cheap labour. The result contradict that of Abdurrahman *et al.* (2016), who reported that large family sizes does not necessarily manifest into higher use of family labour as some of the young able bodied members of the family may prefer other Jobs than farming. The mean years of formal education falls between 3.82 and 14.45, indicating that supply actors attained formal education in the study area. The mean years of experience ranges between 15.42 to 11.73 years, implying that supply chain actors are experienced. The mean income falls between ₦134968.87 to 1,074,000.85. the result also reveals mean size of between 1.15 to 1.25 hectares. There is no significant difference among and between zones for all the actors in the individual zones.

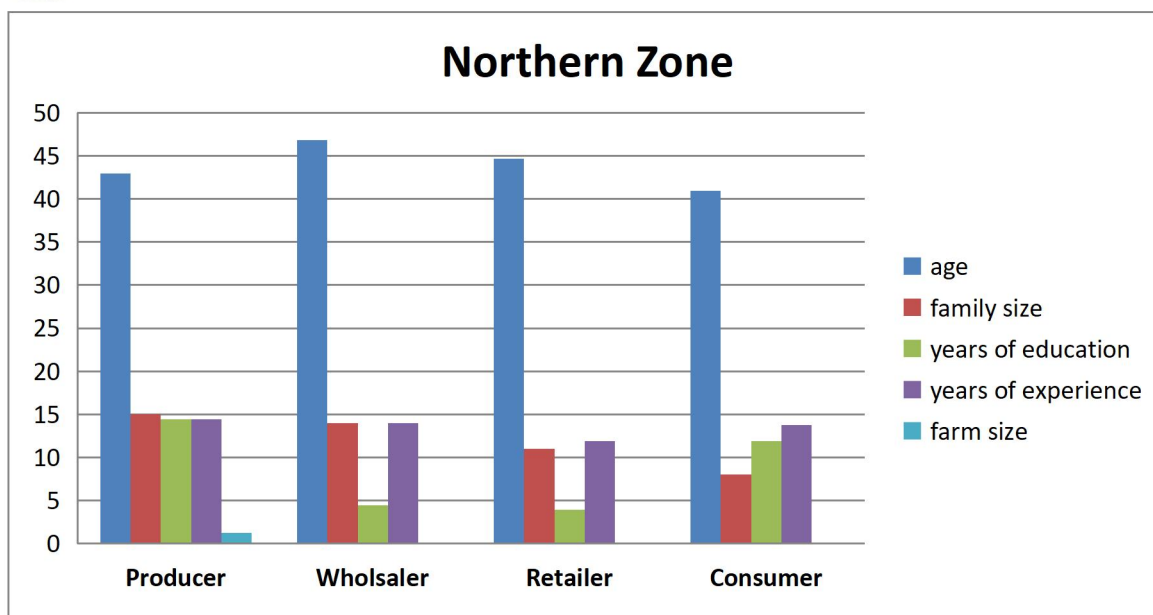


**Figure 1:** Average Distribution of Fresh Tomato Supply Chain Actors in Central Zone



**Figure 2:** Average Distribution of Fresh Tomato Supply Chain Actors in Western Zone





**Figure 3:** Average Distribution of Fresh Tomato Supply Chain Actors in Northern Zone

### Perception of the Supply Chain Actors on Determinants of Fresh Tomato Supply by Zones

Table 3 presents the mean perception of supply chain actors on factors that affect the supply of fresh tomato between zones in Bauchi state. The perception of producers on whether the listed factors affect the supply of fresh tomato or not between Central, Western and Northern zone were agreed on almost every factor except for the factor festivity which is believed by Northern producers as determinant of fresh tomato supply. Northern zone producers regards festivity (mean = 4.01) as determinant of fresh tomato supply as compared to Central zone and Western zone producers who do not believe that festivity is a determinant of supply. This means that festivity does not affect tomato supply in both Central and Western zones.

Wholesalers too were compared between the three zones and the result indicated that all other factors were agreed to be factors that affect the supply of fresh tomato except for location (3.30). Location was disagreed upon by Central and Western wholesalers but was agreed upon by northern zone wholesalers as a factor that determines fresh tomato supply. This could be because Northern tomato sellers sell at farm gate because they are far from Muda-Lawal market which is the major vegetable market located in the State capital of the State.

Also, consumers were compared between zones and were found to agree on the same factors except for the factor sorted tomato (3.70) which Northern zones consumers believed that it affect the supply of fresh tomato. The implication is that consumers of fresh tomato in Northern zone agree that grading of tomato affect their decision on the prices they pay for fresh tomato.



**Table 3:** Perception of Supply Chain Actors on Determinants of Fresh Tomato Supply by Zones in Bauchi State

Factors	Producers			Wholesalers			Retailers			Consumers		
	CZ Mean	WZ Mean	NZ Mean	CZ Mean	WZ Mean	NZ Mean	CZ Mean	WZ Mean	NZ Mean	CZ Mean	WZ Mean	NZ Mean
Price of tomato	2.73	2.79	2.59	3.92	3.88	3.91	3.00	4.19	4.33	4.65	4.64	4.95
Tomato Variety	4.76	4.79	4.93	4.00	4.06	3.47	3.50	3.34	3.13	3.75	3.56	3.82
Festivity	2.92	2.41	4.01	3.77	4.00	3.60	4.04	4.04	3.74	4.28	4.37	4.28
Consumers income	3.68	3.63	3.18	3.38	3.06	3.09	4.50	4.15	4.42	4.58	4.67	4.85
Tomato quality	4.67	4.57	4.00	3.81	4.00	3.89	4.50	4.18	4.40	4.78	4.64	4.90
Packaged tomato	3.64	3.57	4.00	1.96	2.09	2.53	4.50	4.15	4.42	2.55	1.37	1.53
Organic product	3.27	3.16	4.01	2.77	2.34	2.64	2.42	1.77	2.11	1.63	1.64	1.95
Seller's attitude	3.71	3.53	5.00	2.00	2.16	2.30	4.04	4.05	3.74	4.08	4.16	3.93
Clean tomato	4.21	4.33	4.95	3.73	3.66	3.94	4.24	4.25	4.36	4.5	4.37	4.48
Distance	3.56	3.44	4.00	3.12	3.28	3.11	3.62	3.55	3.06	3.98	3.07	3.25
Clean selling area	3.80	3.65	4.97	4.00	3.97	3.70	3.94	3.92	3.99	4.20	4.19	4.03
Product shelf-life	4.58	4.85	3.98	3.65	3.69	3.36	4.00	3.90	3.36	3.75	3.72	4.7
Seasonality	1.06	1.00	1.00	3.81	3.91	3.81	4.04	3.66	3.06	3.80	4.24	4.33
Sorted tomato	1.89	2.06	2.36	4.04	3.81	3.72	3.82	3.88	3.47	2.48	2.76	3.70
Location	4.03	4.25	4.00	2.77	2.91	3.30	3.90	3.58	3.40	3.65	4.17	4.15

CZ = Central zone WZ = Western zone NZ = Northern zone

Source: Field Survey, 2017



### **Perception of Producers and Wholesalers on Determinants of Fresh Tomato Supply retailers**

Table 4 presents the mean perception of producers and wholesalers on factors that affect the supply of fresh tomato supply in Bauchi state as perceived by the marketing chain actors. Producers of tomato gave their opinions as to their level of agreement to a number of listed factors. Prices of tomato (mean=2.62), seasonality (mean=1.01) and sorted tomato (mean=2.15) were not factors that affect tomato supply. This implies that it is generally agreed among producers of tomato in Bauchi State that the listed factors do not affect the supply of tomato. However, this is not in conformity with the supply theory which states that prices of goods determine the level of supply. On whether the remaining factors listed were determinants of tomato supply or not producers agreed that these factors (Table 4) affect the supply of tomato in the state, as any factor with the mean of 3.00 is considered as a factor that affects the supply of fresh tomato in Bauchi State as at when the study was conducted.

Also, the result in Table 4 shows the extent to which Wholesalers of fresh tomatoes in Bauchi state agreed or disagreed to the listed factors that affect fresh tomato supply in the State, except for packaged tomato (mean=2.26), organic products (mean=2.58), sellers attitude (mean=1.23) and location (mean=2.93) which were considered as not determinants of tomato supply, all other factors were agreed upon by the Wholesalers as factors that affect tomato supply in the state. This connotes that the factors agreed upon are determinants of tomato supply at wholesale level in Bauchi state. This findings is in agreement with Fabien and Timothy (2006), that price, variety, and quality are important determinants of trade between buyers and sellers of organic produce in the U.S.





**Table 4:** Producers and Wholesalers Perception on Determinants of Fresh Tomato Supply in Bauchi State

Factor	Producers							Wholesaler						
	SA	A	UD	DA	SD	Total%	Mean	SA	A	UD	DA	SD	Total%	Mean
Price of Tomato	0.0	0.0	76.86	23.02	0.12	100	2.62	2.44	94.63	1.46	0.98	0.48	100	3.90
Tomato Variety	88.46	11.33	0.0	0.14	0.7	100	4.81	2.52	81.61	15.11	0.50	0.25	100	3.78
Festivity	8.34	59.65	15.95	13.14	2.92	100	3.19	2.53	91.14	1.52	4.05	0.76	100	3.76
Consumers income	0.48	55.44	42.44	1.54	0.10	100	3.45	0.0	56.79	25.38	17.52	0.30	100	3.15
Tomato Quality	45.77	53.39	0.23	0.46	0.15	100	4.36	2.44	94.63	1.46	0.98	0.49	100	3.90
Packaged Tomato	4.41	83.32	8.21	3.88	0.18	100	3.76	2.11	8.44	21.52	66.67	1.26	100	2.26
Organic Product	0.94	81.50	6.48	11.08	0.0	100	3.54	7.38	5.90	46.49	39.85	0.37	100	2.58
Sellers attitude	55.25	28.62	14.31	1.75	0.07	100	4.18	3.88	6.20	34.88	52.71	2.33	100	1.23
Clean tomato	65.18	34.08	0.44	0.15	0.15	100	4.56	5.01	79.20	15.04	0.50	0.25	100	3.80
Distance	1.88	83.54	7.61	6.77	0.19	100	3.53	1.52	55.76	25.45	16.97	0.30	100	3.13
Clean selling Area	54.55	33.38	10.59	1.41	0.16	100	4.23	4.96	82.38	11.91	0.49	0.25	100	3.84
Product Shelf-life	50.30	49.55	0.0	0.15	0.0	100	4.43	1.35	80.86	6.47	11.32	0.0	100	3.53
Seasonality	10.0	1.31	0.0	0.66	98.03	100	1.01	2.42	95.88	0.73	0.48	0.48	100	3.93
Sorted Tomato	3.08	1.85	43.75	40.99	10.32	100	2.15	1.24	87.56	10.45	0.49	0.25	100	3.86
Location	19.04	78.12	2.43	0.32	0.08	100	4.10	1.62	32.47	51.62	13.64	0.65	100	2.93

**Bench mark = 3.00**

**SA= Strongly Agreed, A = Agreed, UD= Undecided,**

**DA = Disagreed, SD= Strongly Disagreed,**

**Source: Field survey, 2017**



### **Perception of Retailers and Consumers on Determinants of Fresh Tomato Supply**

Table 5 presents the mean perception of retailers and consumers on the factors that affect the supply of fresh tomato among retailers and consumers in Bauchi State. Retailers of fresh tomato also gave their opinion as to the level of agreement to a number of factors that determine the supply of fresh tomato in Bauchi state. Only the factor, organic product (mean=2.33) was disagreed upon, suggesting that organic product is not a factor that affects fresh tomato supply among retailers in Bauchi state; indicating that retailers of fresh tomato in Bauchi State do not differentiate their product into organic and non –organic products . This explains too, why consumers did not regard this factor as a determinant of fresh tomato supply. However, all other listed factors were considered as determinants of fresh tomato supply by the retailers.

Consumers' opinion as to how the listed factors affect the supply of tomato was also revealed in Table 5. Consumers in Bauchi state collectively disagreed that packaged tomato (mean=1.67) and organic product (mean=1.69) are not factors to tomato supply in Bauchi state. However, they agreed on all other listed factors to be factors affecting the supply of fresh tomato in Bauchi state. Price of tomato which was not considered as a factor that affect tomato supply by producers, was collectively agreed upon by both traders and consumers as a factor that affects tomato supply in Bauchi state. This clearly shows that wholesalers, retailers and consumers of fresh tomato in Bauchi state believe that price of tomato affect its supply. This contradicts producer's result but is in conformity with the supply theory that price of a good is a determinants of its supply. Panda (2013) and Tianyi (2013) reported price of the product, seller's innovation and quality as determinants of supply. This is not surprising because, to some extent farmers are not actually directly involved in the trading of their produce, but traders and Consumers are directly involved in the buying and selling of tomato. Quality of a product is not a bonus for the customer, it is expected. High cost, low productivity, and loss of market share are directly related to poor quality of product (Henry *et al.*, 2012). Quality of tomato and other factors were agreed upon by all (producers, wholesalers, retailers and consumers) supply actors as determinants of fresh tomato supply in Bauchi state. Quality of product is an important factor for the acceptance of any product (Henry *et al.*, 2012). In support of this, Fabien and Timothy (2006) reports that quality plays equal if not greater role than price in determining product supply.



**Table 5:** Retailers and Consumers' Perception on Determinants of Fresh Tomato Supply in Bauchi State

Factor	Retailers							Consumer						
	SA	A	UD	DA	SD	Total%	Mean	SA	A	UD	DA	SD	Total%	Mean
Price of Tomato	26.02	73.42	0.28	0.19	0.09	100	4.19	76.87	23.13	0.0	0.0	0.0	100	4.73
Tomato Variety	1.19	71.82	10.70	16.17	0.12	100	3.34	14.49	73.19	3.80	7.61	0.91	100	3.68
Festivity	10.54	84.34	3.61	1.20	0.30	100	3.95	63.27	30.25	1.85	4.63	0.0	100	4.32
Consumers income	54.47	42.11	1.39	1.29	0.74	100	4.30	73.86	26.14	0.0	0.0	0.0	100	4.69
Tomato Quality	40.94	58.14	0.27	0.55	0.09	100	4.31	80.92	19.08	0.0	0.0	0.0	100	4.61
Packaged Tomato	54.48	42.11	1.38	1.29	0.74	100	4.30	0.0	19.20	0.0	51.20	29.60	100	1.67
Organic Product	4.26	9.54	30.15	52.81	3.24	100	2.33	0.0	0.0	0.0	81.85	18.15	100	1.69
Sellers attitude	11.03	83.85	3.60	1.20	0.30	100	4.00	31.30	66.13	0.0	2.57	0.0	100	4.15
Clean tomato	37.11	61.97	0.56	0.18	0.18	100	4.28	48.87	51.13	0.0	0.0	0.0	100	4.15
Distance	2.91	63.25	26.16	7.21	0.47	100	3.41	8.96	51.79	29.88	8.36	1.00	100	4.46
Clean selling Area	5.04	91.44	2.42	0.80	0.30	100	3.94	17.68	82.32	0.0	0.0	0.0	100	3.35
Product Shelf-life	2.64	85.23	8.54	3.37	0.21	100	3.76	73.46	13.36	0.0	12.35	0.83	100	4.15
Seasonality	10.92	70.74	10.48	7.42	0.44	100	3.63	62.70	28.30	0.0	9.00	0.0	100	4.00
Sorted Tomato	2.65	87.61	5.08	4.23	0.42	100	3.75	0.0	80.00	0.0	11.82	8.18	100	4.15
Location	0.55	76.91	16.90	5.52	0.11	100	3.39	23.18	72.85	-	3.97	-	100	

**Bench mark = 3.00**

**SA= Strongly Agreed, A = Agreed, UD= Undecided,**

**DA = Disagreed, SD= Strongly Disagreed,**

**Source: Field survey, 2017**



## CONCLUSION AND RECOMMENDATION

All the supply chain actors in Bauchi State agree and disagree on some factors as determinants of fresh tomato supply.

Based on the findings of the study the following recommendation was made:

Supply chain actors particularly producers and marketers of fresh tomato should look into the factors considered by the consumers as obstacles to the supply of tomato and improve on them so as to increase its consumption and in return increase their profit.

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