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Study on market analysis of tomato in Kaimur district of Bihar

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Abstract
Tomato is the edible berry of the plant *Solanum lycopersicum*, commonly known as the tomato plant. The species originated in western South America and Central America. The Mexican Nahuatl word tomatl gave rise to the Spanish word tomate, from which the English word tomato derived Its domestication and use as a cultivated food may have originated with the indigenous peoples of Mexico.

Tomatoes are a significant source of umami flavor. It is consumed in diverse ways: raw or cooked, and in many dishes, sauces, salads, and drinks. While tomatoes are fruits-botanically classified as berries-they are commonly used culinarily as a vegetable ingredient or side dish.

The present research was designed to study the marketing analysis of tomato in Kaimur district of Bihar. Farmer's knowledge about the safe handling and application of seed and their practices on pesticide usage. In-depth field surveys were undertaken with 100 farmers and complemented with focus Group Discussions, Interview, Questionnaires, and Field Observation. The results showed that there were 30% marginal farmer, 34% small farmer, 16% semi medium and 12% medium farmer and 8% large farmers. There were 70% male farmers and 30% female farmers.

70% were male and out of that maximum no. 28.57% are small size farmers and 25.71% are marginal size farmers and semi Medium size farmers 14.28% rest are large size farmers i.e 8.57%. 30% were females out of which 40% are marginal size female farmers and 46.66% are small farmers which is maximum and 20% are semi-medium and 13.33% are medium farm group, and there was only 2 i.e 6.66% female in large size farmers.

Age group below 15yrs are only 8 out of which maximum i.e 75%. And maximum age group falls between 15 to 60 yrs of age group amongst that maximum i.e 37.5% are small size farmers followed by marginal farmers i.e 27.5%. Only few farmers lie in old age group above 60 yrs and maximum i.e 33.33% are semi medium size farmers.

Study reveals the educational status of different size of farms groups. Literacy percentage was highest in Small size farms 27.27% followed by marginal size farms 29.09% and semi medium size farms 16.36% respectively. Among small, medium and large size farms group literates were 58.17% of farms had education. Illiteracy percentage was highest in small size farms i.e 42.22% followed by marginal size farms 31.11% and was lowest in large size farms 2.22% respectively.

Keywords: *Solanum lycopersicum*, tomato, umami flavor

Introduction
Tomato is the edible berry of the plant *Solanum lycopersicum*, commonly known as the tomato plant. The species originated in western South America and Central America. The Mexican Nahuatl word *tomatl* gave rise to the Spanish word *tomate*, from which the English word *tomato* derived Its domestication and use as a cultivated food may have originated with the indigenous peoples of Mexico.

Tomatoes are a significant source of umami flavor. It is consumed in diverse ways: raw or cooked, and in many dishes, sauces, salads, and drinks. While tomatoes are fruits—botanically classified as berries—they are commonly used culinarily as a vegetable ingredient or side dish.

Numerous varieties of the tomato plant are widely grown in temperate climates across the world, with greenhouses allowing for the production of tomatoes throughout all seasons of the year. Tomato plants typically grow to 1–3 meters (3–10 ft) in height. They are vines that have a weak stem that sprawls and typically needs support [2]. Indeterminate tomato plants are perennials in their native habitat, but are cultivated as annuals. (Determinate, or bush, plants are annuals that stop growing at a certain height and produce a crop all at once.) The size of the tomato varies according to the cultivar, with a range of 1–10 cm ($\frac{1}{2}$–4 in) in width.

Tomato plants are vines, initially decumbent, typically growing 180 cm (6 ft) or more above the ground if supported, although erect bush varieties have been bred, generally 100 cm (3 ft 3 in) tall or shorter. Indeterminate types are "tender" perennials, dying annually in temperate climates (they are originally native to tropical highlands), although they can live up to three years in a greenhouse in some cases. Determinate types are annual in all climates.

Tomato plants are dicots, and grow as a series of branching stems, with a terminal bud at the tip that does the actual growing. When the tip eventually stops growing, whether because of pruning or flowering, lateral buds take over and grow into other, fully functional, vines.

Tomato vines are typically pubescent, meaning covered with fine short hairs. The hairs facilitate the vining process, turning into roots wherever the plant is in contact with the ground and moisture, especially if the vine's connection to its original root has been damaged or severed.

Genetic evidence has now shown that Linnaeus was correct to put the tomato in the genus *Solanum*, making *Solanum lycopersicum* the correct name. Both names, however, will probably be found in the literature for some time. Two of the major reasons for considering the genera separate are the leaf structure (tomato leaves are markedly different from any other *Solanum*), and the biochemistry (many of the alkaloids common to other *Solanum* species are conspicuously absent in the tomato). On the other hand, hybrids of tomato and diploid potato can be created in the lab by somatic fusion, and are partially fertile, providing evidence of the close relationship between these species.

Materials and Methods
Selection of district
There are 38 districts in state of Bihar. Out of these Kaimur district of Bihar was selected purposively as it was required for the study. Kaimur district occupies an area of 3362 square kilometre. Till 1764 the region (Kaimur district) was a part of Ghazipur District and was a part of Kamsaar Raj and later it was a part of Chainpur Estate till 1837.
- Total population: 16,26,384
- Density: 488/1000

Selection of block
There are 11 blocks in district. Out of which Kudra is selected purposively for the study limitations, Kaimur block was selected as Tomato and other vegetables were grown here in considerable area.

Selection of village
In Kudra block there are 159 villages. After selection of block, out of which only 10 villages were selected randomly from block. From each village Tomato growing area was selected randomly. The selected villages are:

Table 1: Selection of village

S. No.	Name of village	No. of respondents
1	Auraiya	8
2	Karman	12
3	Shahpur	11
4	Bahera	4
5	Gora	14
6	Hardaspur	17
7	Itahi	13
8	Jagatpura	10
9	Meura	6

Selection of respondents
Total 100 respondent was selected randomly from the selected villages. Auraiya, Karman, Shahpur, Bahera, Gora, Hardaspur, Itahi, Jagatpur, Meura, Nimia.

Table 2: Selection of respondents

SI. No.	Respondents	Land Holdings
1.	Marginal Farmers	0-1 Hectares
2.	Small Farmers	1-2 Hectares
3.	Semi Medium Farmers	2-4 Hectares
4.	Medium farmers	4-10 Hectares
5.	Large farmers	Above 10 Hectares

Analytical tools
Results were expressed as mean and average. Find out the percentage of respondent using a percentage formula are following:

[Percentage (%) = (Value/Total Value)*100]

The market share of different brands was calculated by the index of market efficiency
1. Marketing Margin: The term marketing margin refers to the different in places for a commodity at different stages of the marketing system. In the widest sense marketing margin is the difference in price received by the producer and the price paid by ultimate consumer. Marketing margin include all costs of assembling processing storage transportation, handling, wholesaling and retailing in the process of marketing moving of produce from the farmer to the ultimate consumer.

Marketing Margin = Retail or Selling price - Actual cost

2. Price Spread: The price spread is workout by computing the difference between the market price and the net price received by the producers. This difference represents the gross marketing margin.

$$GMM = Pc – Pfb$$

Where
GMM = Gross Marketing Margin
Pc = Price Paid by consumer
Pfb = Price received by producer

3. The total cost incurred on marketing by various intermediaries involved in the sale and purchase of the commodity till it reaches the ultimate consumer was computed as follow.

$$C = Cf + Cml + Cm2 + Cm3 + … + Cmn$$

Where
C= Total cost of marketing
Cf= Cost borne by the producer farmer from the produce leaves the farm till the sale of the produce, and
Cmn= Cost incurred by the middlemen in the process of buying and selling

4. Marketing Efficiency
Marketing efficiency is the degree of market performance. It is the ratio of market output to market input

Conventional Method

Index of marketing efficiency (E) = O / I * 100

Where

O= value added by the marketing system

I= cost of market intermediaries

Results and Discussion

1. To study the socio-economic profile of the respondents in study area

Table 3: Detail description of sample size of households/ families in different Size of Farms Group Number of Respondents = 100 Marginal, Small, Semi medium, Medium and large = 30+34+16+12+8= 100

SI. No.	Particulars	Size of farm groups					Sample Average
		Marginal	Small	Semi. Medium	Medium	Large	
1.	Size of farm group (in number)	30	34	16	12	8	100
2.	Average size of cultivated holding in hectares	0.74	1.68	3.44	7.16	12.52	5.10

Shows that maximum no. of farmers were small size land holders.
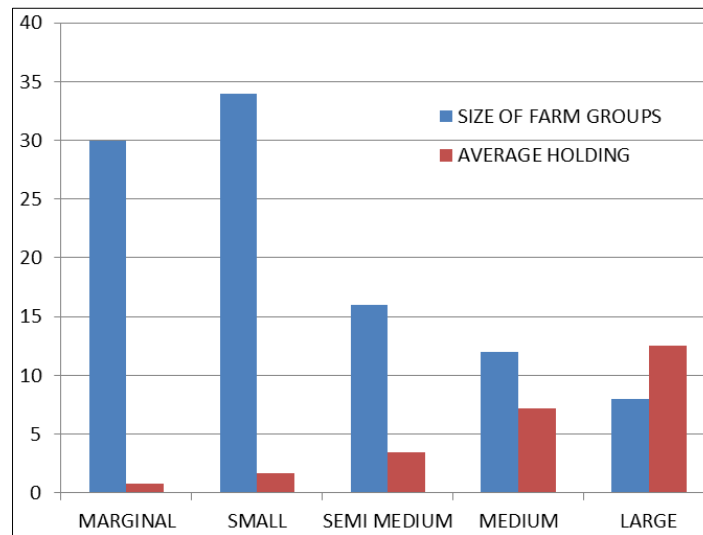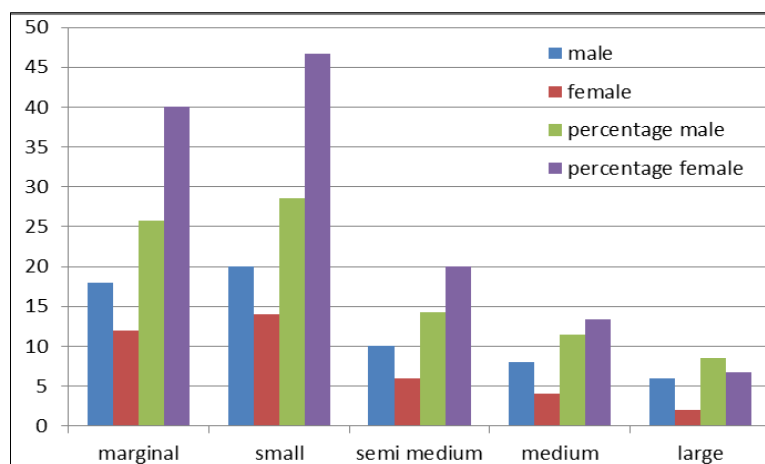

Fig 1: Detail description of sample size of households/ families in different Size of Farms Group Number of Respondents = 100 Marginal, Small, Semi medium, Medium and large = 30+34+16+12+8= 100

Table 4: Distribution of the respondents on the basis of Gender

Sr.no	Gender	Respondent Number	Size Group									
			Marginal Farmers		Small Farmers		Semi-Medium Farmers		Medium Farmers		Large Farmers	
			Number	%	Number	%	Number	%	Number	%	Number	%
1.	Male	70	18	25.71	20	28.57	10	14.28	8	11.42	6	8.57
2.	Female	30	12	40	14	46.66	6	20	4	13.33	2	6.66
	Total	100	30	-	34	-	16	-	12	-	8	-

Table 3 shows that out of 100 respondents 70% were male and out of that maximum no. 28.57% are small size farmers and 25.71% are marginal size farmers and semi Medium size farmers 14.28% rest are large size farmers i.e 8.57%. 30% were females out of which 40% are marginal size female farmers and 46.66% are small farmers which is maximum and 20% are semi-medium and 13.33% are medium farm group, and there was only 2 i.e 6.66% female in large size farmers.
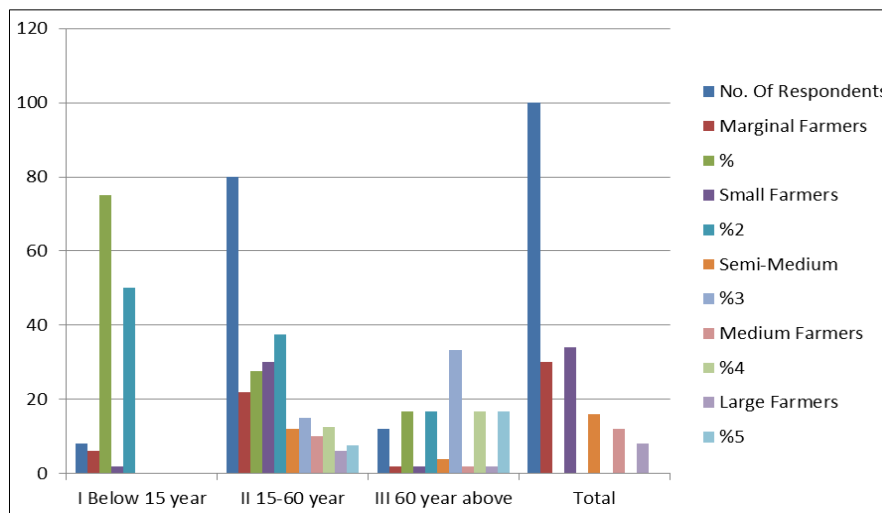

Fig 2: Distribution of the respondents on the basis of Gender

Table 5: Detail description of Literacy in different Size of Farms Group Marginal, Small, Semi medium, Medium and large = 30+34+16+12+8= 100

Categories	No. of respondents	Marginal Farmers	%	Small Farmers	%2	Semi-Medium	%3	Medium Farmers	%4	Large Farmers	%5
I Below 15 year	8	6	75	2	50	0	-	0	-	0	_
II 15-60 year	80	22	27.5	30	37.5	12	15	10	12.5	6	7.5
III 60 year above	12	2	16.66	2	16.66	4	33.33	2	16.66	2	16.66
Total	100	30		34		16		12		8	

Table 5 shows that age group below 15yrs are only 8 out of which maximum i.e 75% are and maximum age group falls between 15 to 60 yrs of age group amongst that maximum i.e 37.5% are small size farmers followed by marginal farmers i.e 27.5%. Only few farmers lie in old age group above 60 yrs and maximum i.e 33.33% are semi medium size farmers.

Fig 3: Detail description of Literacy in different Size of Farms Group Marginal, Small, Semi medium, Medium and large = 30+34+16+12+8= 100

Table 6: Distribution of the respondents on the basis of qualification. Marginal, Small, Semi medium, Medium and large = 30+34+16+12+8= 100

SI. No.	Categories	Respondents Number	Farm size group									
			Marginal		Small		Semi medium		Medium		Large	
			No.	%	No.	%	No.	%	No.	%	No.	%
A.	Illiterate	45	14	31.11	19	42.22	7	15.55	4	8.88	1	2.22
B.	Literate	55	16	29.09	15	27.27	9	16.36	8	14.54	7	12.72
	Total	100	30		34		16		12		8	

Table 6 reveals the educational status of different size of farms groups. Literacy percentage was highest in Small size farms 27.27% followed by marginal size farms 29.09% and semi medium size farms 16.36% respectively. Among small, medium and large size farms group literates were 58.17% of farms had education.

From the table it could be seen that illiteracy percentage was highest in small size farms i.e 42.22% followed by marginal size farms 31.11% and was lowest in large size farms 2.22% respectively.
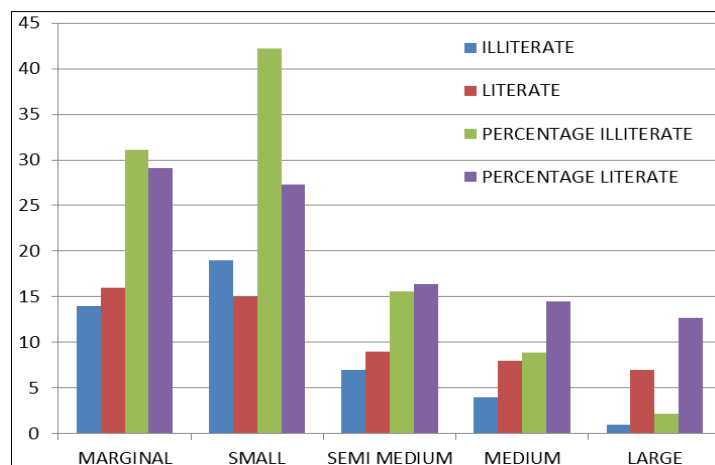
Fig 4: Literacy In different farm groups

Conclusion

From the survey conducted it is observed that Tomato Industry has good distribution channel in the market. From the study it is observed that factors which make its distribution channel effective are on time delivery, quality products, no damage to products, fast and effective supply chain. It is also observed during the study that the majority of the customers are satisfied with the products because of its good quality reputation. Some customers are not satisfied with the products because not easily available product in the market, less supply chain management scheme. Efficient and dynamic management with strong leadership innovative strategies and proactive decision making can help Tomato Industry to improve its performance in the market.

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