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AN EMPIRICAL RESEARCH ANALYSIS OF AREA UNDER TOMATO, PRODUCTION, PRICE BEHAVIOUR, MARKETING, EXPORT POTENTIALITY OF TOMATO CROP IN THE GLOBE AND INDIA WITH SPECIAL REFERENCE TO SELECTED TWO DISTRICTS OF KARNATAKA

DR.PADMINI S.V. PROFESSOR OF ECONOMICS,
DEPARTMENT OF STUDIES AND RESEARCH IN ECONOMICS,
UNIVERSITY COLLEGE OF ARTS,
TUMKUR UNIVERSITY, TUMKUR 572 103, KARNATAKA.

Abstract

Tomato crop is the native of Soth America, having the botanical name Solonm lycopersicum Mill has been produced in the globe as a major vegetable crop and supplementary crop with oniOn and green chillies which have been used together in cooking to perform cooking of various food stuffs , as a result, the tomato crop is having economic importance as it is having essential high nutritional content and as it gives its own taste in various food stuffs). Tomato can be eaten in raw for, in the form of juice, in the form of sauces, soup,ketchup,powders, canned food stuffs. As the crop is having higher concentration of lycopene an antioxidant and vitamin C and A which will serve the purpose of cold, calf, and for good vision. By swallowing tomato regularly people can get reduced the risk of prostate cancer. Indian economy is the 2nd largest producer of tomatoes, growing more than 20.4 million metric tons (as per 2022 data), Top ten tomato growing states in India are Madhya Pradesh, Andhra Pradesh, Karnataka, Gujarat, Odisha, West Bengal, Maharashtra, Tamil Nadu, Bihar, Chattisgarh. the ten states that contribute to almost 80 to 85% of the total tomato production of India. Tomato price in Mandis minimum Rs.1,000/-, Model price 2,100/- and Maximum price Rs.3,500/- as on 18th June 2026 at 9 AM. (Farmer.in, India's #1 Farmer's Platform).

Overall objective of the study is to examine the trends in area under tomato, production, processing, price behaviour and marketing of Tomato crop in the Globe, India and Karnataka. Specific objectives of the study are to examine the area under tomato, production, processing, price behaviour and marketing of Tomato crop in the selected districts of Karnataka.

Tomato production and marketing face severe challenges . From production side, climate change, pests and diseases, high input costs,,labour shortages. From marketing side price volatility, post-harvest lossess, middlemen

dominance,inadequate infrastructure. These production as well as marketing challenges cause massive post-harvest losses and leave small-scale farmers vulnerable to heavy financial distress (Research Gate).

Key words cum Index terms: Polyhouse, Multistage sampling technique, Cochran's formula , Tomato Supplier Countries, Tomato exporting countries.

1.INTRODUCTION

Tomato crop is the native of Soth America, having the botanical name Solonm lycopersicum Mill has been produced in the globe as a major vegetable crop and supplementary crop with oniOn and green chillies which have been used together in cooking to perform cooking of various food stuffs , as a result, the tomato crop is having economic importance as it is having essential high nutritional content and as it gives its own taste in various food stuffs). Tomato can be eaten in raw for, in the form of juice, in the form of sauces, soup,ketchup,powders, canned food stuffs. As the crop is having higher concentration of lycopene an antioxidant and vitamin C and A which will serve the purpose of cold, calf, and for good vision. By swallowing tomato regularly people can get reduced the risk of prostate cancer.

Indian economy is the 2nd largest producer of tomatoes, growing more than 20.4 million metric tons (as per 2022 data), Top ten tomato growing states in India are Madhya Pradesh, Andhra Pradesh, Karnataka, Gujarat, Odisha, West Bengal, Maharashtra, Tamil Nadu, Bihar, Chattisgarh. the ten states that contribute to almost 80 to 85% of the total tomato production of India

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2. REVIEW OF LITERATURE, RESEARCH GAPS AND NEED OF THE STUDY:

1. J. S. Vijayakumar and B. R. Jamakhandi I (Vol 37 No 02 (2024): Journal of Farm Sciences): Dynamics of area, production and productivity of tomato in Kolar and Belagavi districts of Karnataka state.

The study focused that the time series data for 20 years (2001-02 to 2020-21) was divided into two periods: Period-I (2001-02 to 2010-11) and Period-II (2011-12 to 2020-21).The Compound Annual Growth Rate (CAGR) technique was employed to evaluate trends in area, production and productivity. The results obtained from analysis indicated that, Compound Annual Growth Rate for production of Tomato in the state registered significant and positive growth rate during study Period-I (6.59%), whereas in Period-II, the area under the Tomato showed the highest growth rate (1.79%) and overall, production registered the highest growth rate (4.74%) with instability indices of 8.13,9.73 and 10.26 percent, respectively. Belagavi district, registered a significant and positive growth rate in the area during the overall study period (4.34%) with instability index of 20.28 percent which indicates area-led growth rate. In the case of Kolar, the growth rate registered a significant and positive in production during the overall study period (6.48%) with an instability index of 30.38 per cent indicating production lead growth. The study concluded with positive trend in all cases. Hence, there is a potential scope for growth in vegetable like tomato production in state and selected districts.

2. Saha Poulomi ET AL (2026, Amazon.in): Production and Marketing of Tomato in West Bengal Province of India.

The study has focused that seasonal fluctuations in monthly wholesale prices prevail. reveals that wide and random seasonal fluctuations in monthly wholesale prices prevail Transport has considered as highest among various cost items.

3. Oscar Noah Nathan (2026, Amazon.in): The Art of Tomato Farming: A Practical Guide to Growing and Selling Tomatoes for Profit.

With an emphasis on practicality, the book offers step-by-step guidance on preparing the soil, implementing optimal cultivation practices, and ensuring proper plant nutrition. It covers essential topics such as soil testing, fertilization, irrigation systems, and pest management techniques, equipping farmers with the knowledge necessary to create a healthy and productive growing environment for their tomato crops.

4. C. Indu Rani (2026, Amazon.in): Tomato (A complete guide on crop improvement, crop protection and crop management)

Tomato, Onion, and Potato (TOP) are the crops of major concern due to their versatileand indispensable nature. Among these, tomatoes consistently steal the spotlight due to the myriad challenges encountered from production to marketing. It often faces a wide fluctuation in prices and demand intervention by the government officials and policy makers. Despite being the second-largest producer of tomatoes globally, India grapples with substantial price inflation in this crop. As a short-duration and highly perishable crop, tomatoes can bring both joy and distress to growers, consumers, and retailers alike.

2.1 RESEARCH GAPS AND NEED OF THE STUDY:

There are various studies have been conducted on tomato production and marketing. But none of the study focused on innovative practices can be adopted related to the preservation techniques adopted for tomato. In the present research study these innovative practices examined along with the cost of production and marketing of tomato in two districts of Karnataka.

2.2 THEORITICAL FRAMEWORK :

The current research study combines agricultural economics theories such as Structure-conduct-performance (SCP), Rational Choice/Profit maximization,Supply chain management (SCM), and comparative Advantage to systematically evaluate farm-level economics,market inefficiencies,and global trade viability.

2.3 STATISTICAL TOOLS AND ECONOMETRIC MODELS:

Chi-square test of goodness of fit and Analysis of Variance (ANOVA) applied to verify and test the objectives and hypotheses of the research study.

Descriptive statistics, functional analysis models like the Cobb-Douglas production function and marketing efficiency formulas have been employed as these tools help to measure resource use efficiency,profit margins and price spreads.

Related to descriptive and financial tools Mean, Percentage and Ratio and Cost concepts such as A1,A2,B1,B2,C1,C2,C3 have been employed.

Apart from this, Benefit-Cost Ratio (BCR) and Net Return and Margin applied.

Related to Econometric models as mentioned earlier Cobb-Douglas production function, Translog production function, Marginal value product (MVP) employed.

Related to marketing and price analysis models Marketing efficiency index, Price spread analysis as mentioned earlier employed. In addition, Garett's ranking technique, Multiple linear regression also have been employed.

3. THE RESEARCH METHODOLOGY:

3.1 OBJECTIVES OF THE STUDY:

Overall objective of the study is to examine the trends in area under tomato, production, processing, price behaviour and marketing of Tomato crop in the Globe, India and Karnataka.

Specific objectives of the study are to examine the area under tomato, production, processing, price behaviour and marketing of Tomato crop in the selected districts of Karnataka.

1.To examine the socio-economic conditions of the tomato producers in study area.

2. To examine the different types of Tomato produced in study area.

3. To examine the agronomic practices of Tomato growers in the study area.

4. To analyse cost of cultivation and returns of Tomato growers in the study area.

5. To analyse the marketing structure of Tomato growers in the study area.

6. To analyse the price behaviour of Tomato crop in the study area.

7. To identify the constraints involved in the pre and post harvesting of Tomato crop in the study area.

8.To give policy suggestions for the improvement of Tomato crop production.

3.2 HYPOTHESES OF THE STUDY:

H0: Socio-economic conditions of Tomato producers in the study area are not good.

H1: Socio-economic conditions of Tomato producers in the study area are good.

H0: Agronomic practices adopted in the study area are nor scientific.

H1: Agronomic practices adopted in the study area are scientific

H0: There is no differentiation in tomato farming in open house and Polyhouse.

H1: There is differentiation in tomato farming in open house and Polyhouse.

H0: Tomato production and marketing for all the farmers category are not economically viable, feasible.

H1: Tomato production and marketing for all the farmers category are economically viable, feasible.

H0: There is no differentiation in price behaviour of Tomato crop in the study area.

H1: There is differentiation in price behaviour of Tomato crop in the study area.

3.3 NATURE AND SOURCE OF DATA:

The research study has been conducted with the help of primary as well as secondary data base. Secondary data source obtained through University of Agricultural Science, GKVK, Bangalore, University of Horticultural Science, Yelahanka, Bangalore, Office of Horticulture, Office of Joint Director of Agriculture, Office of Assistant Director of Agriculture, Bangalore, Bureu of Economics and Statistics, Bangalore.

With the help of secondary data source area under tomato, production, price behaviour, marketing of Tomato crop in ten top tomato growing districts in Karnataka examined. Primary data obtained through Personal interview method with the help of pre tested well structured personal interview schedule. . Kolara and Shivamogga districts in Karnataka were took for field study.

3.4 SAMPLING TECHNIQUE ADOPTED:

For evaluating the specific objectives of the research study a multistage sampling technique has adopted for the selection of the Taluks, Villages and the farmers of the study.

Sampling Design and Size:

The sample holdings were of the following for four size groups.

1. Marginal Farmers: Below 1 hectare
2. Small Farmers: 1 hectare and above but less than 2 hectares.
3. Semi -Medium Farmers: 2 hectares and above but less than to 4 hectares.
4. Medium Farmers: 4 hectares and above but less than 10 hectares.

5. Large Farmers: 10 hectares and above.

For the selection of Sample from the population Cochran's formula ie., infinite population for large unknown population rounded up sample size is 381 farmers will pick up for the purpose of the study, when the samples grouped on it. On the basis of area of cultivation 81 samples will be collected from Marginal farmer's group, 100 samples will be collected from small farmers group, 100 samples will be collected from Medium farmers, group, and remaining 100 samples will be collected from large farmer's group.

4.RESULTS AND DISCUSSION

4.1 Production of Tomato in various countries in the globe:

Tomato has been grown in various countries in the world in different countries.

Table 1.1

Tomato production in different countries in the world during 2023

Country	Tomato production
China	70,11`9,694
India	20,425,000
Turkey	13,300,000
United States	12,370,057
Egypt	6,211,016
Italy	6,016,050
Mexico	4,394,807
Brazil	4,166,017
Spain	3,968,460
Nigeria	3,803,598
Iran	3,367,599
Russia	2,721,428

It is clear from the above table that during 2023, China is the highest producer of Tomato followed by India, Turkey, United States, Egypt, Italy, Mexico, Brazil, Spain, Nigeria, Iran and Russia.

4.2 Major Tomato growing states in India during 2026

Thus, Madhya Pradesh, (3,269 to 3,498 thousand tonnes in 2025 alone) , Andhra Pradesh (3,147 thousand tonnes), ,Karnataka (2,776 thousand tonnes of tomatoes by 2025), and Gujarat (1,810 thousand tonnes of tomatoes) are the leading tomato-growing states in India, collectively accounting for the majority of the country's national production. Together with Tamil Nadu, Maharashtra and Odisha,these regions drive over 90 per cent of India's tomato output due to ideal agro-climatic conditions and high-yield farming (Krishibazar).

1.Madhya Pradesh:

Leading the national production with roughly 16 per cent of the total share. Key cultivating districts include Shivpuri,Dewas and Khargone (TractorKarvan).

2.Andhra Pradesh:

Contributing around 20 per cent of the country's output. The major production centtters are Madanapalli which is one of Asia's largest tomato markets (ABC Fruits).

3.Gujarat:

A major contributor particularly in regions like Anand,Kheda,and Vadodara,driving about 8-9 per cent of the national volume (Tractor Karvan).

4.3 Cost of cultivation, Yield, Market price of Tomato crop:

Table 1.2

Per Acre cost of cultivation , Yield, Market Price and Revenue and Net Profit of Tomato crop:

Particluars	Yield/Productivity	Market Price	Revenue	Cost	Net Profit
Low(Bad season)	6 tonnes	Rs 8/kg	Rs.48,000/-	Rs.35,000/-	Rs.13,000/-
Average	10 tonnes	Rs.15/kg	Rs.1,50,000/-	Rs.35,000/-	Rs.1,15,000/-
Good(Hybrid +Peak price)	12 tonnes	Rs.20/kg	Rs.2,40,000/-	Rs.45,000/-	Rs.1,95,000/-

It is evident from the above table that Net profit from Tomato crop is relatively high the crop can be considered as remunerative crop for farmers çategories.

4.4 Differentiation of Tomato farming in Open field and Polyhouse:

Table 1.3

Tomato farming in Open field and Polyhouse:

Parameter	Open field	Polyhouse
Setup cost	Rs.30,000-Rs.50,000/acre	Rs.10-Rs25 lakh/acre
Yield	8-12 tonnes/acre	25-50 tonnes/acre
Risk from weather	High	Very low
Best for	Beginners,small farmers	Progressive farmers,entrepreneurs
Government subsidy	Limited	NHB subsidy available (up to 50 per cent)

The data of the above table indicate that Tomato farming is relatively more profitable in openhouse compared to open field.

4.5 Price of Tomato in different time periods:

Table 1.4

Tomato price in different countries

Region	Price	Updated month and year
China	USD 1,057.10/MT	May 2026

	USD 1,046.63/MT	April 2026
India	USD 216.39/MT	May 2026
	USD 182.15/MT	April 2026
USA	USD 1,852.40/MT	May 2026
	USD 4,431.30/MT	April 2026
Brazil	USD 1,356.45/MT	May 2026
	USD 1,388.38/MT	April 2026
Italy	USD 1,977.63/MT	May 2026
	USD 3,756.52/MT	April 2026

Pl Note: Incoterm basis: FOB

The last updated price of tomato in the month of April 2026 and May 2026 showed relatively high in Italy followed by USA, Brazil, China and India.

4.6 Tomato exports from India

India as a Major exporter of Tomato to Bangladesh:

As of 27th November 2026 India has exported worth of Rs.1713768 to Bangladesh.

Source: Volza Export Trade Data.

4.7 Top Tomato supplier countries.

Table 1.5

Top 10 Tomato Supplier Countries

Rank	Supplier Countries	Count
1	Turkey	4,729
2	Turkmenistan	2,692
3	Tran	1,370
4	Uzbekistan	1,350
5	Mali	1,216
6	South Africa	1,042
7	China	1,042
8	Burkina Faso	925
9	Italy	719
10	United States	612

Source: Export Trade Data.

4.8 Imports of Tomato

Table 1.6

Major Tomato importing countries

Rank	Importing Countries	Count
1	Bangladesh	4,807

2	United States	319
3	Kenya	7
4	Tanzania	5
5	Malaysia	3
6	Ghana	2
7	Pakistan	2
8	Sri Lanka	1

Source: Volza import trade data

The above table indicate that major tomato importing countries are Bangladesh, United States, Kenya, Tanzania, Malaysia, Ghana, Pakistan and Sri Lanka.

4.9 Major Tomato growing districts in Karnataka during 2026:

Karnataka's major tomato growing districts are concentrated in the southern and central regions of the state. Kolar is the undisputed leader, accounting for the highest volume and area. Other major districts include Chikkaballapur,Belagavi,Mandya,Tumakuru,Haveri and Mysore.

1.Kolar:

The leading producer in Karnataka ,contributing heavily to both state and national markets.

2.Chikkaballapur:

Located just north of Bangalore,this district is a major producer and key supplier to neighboring state markets.

3.Belagavi:

The primary tomato hub in North Karnataka,contributing large commercial yields.

4.Mandya and Mysore:

Major production zones in the southern transition zone of the state.

5.Tumkur and Haveri:

Known for cultivating large expanses of land dedicated to tomato crops (International Journal of Advanced Biochemistry Research, Journal of Farmsciences, Hortidaily,Krishimitra.in).

Thus, major Tomato growing districts in Karnataka are Kolar, Chikkaballapur,Bangalore Rural and Ramanagara,Belagaum, Davanagere, Hassan,Tumkur, Dharwad and Ballari districts.

Major Tomato growing taluks in Kolar district in Karnataka:

In Kolar district, major Tomato growing taluks are Shrinivasapura, Malur and Mulabagilu. In Shrinivasapura major tomato growing villages are Yeldur, Ronur,Tayalur,Gownipalli and Doddaankahalli.

4.10 Important agronomical details of the Kolar district:

Soil and Climatic conditions:

The dry climate and gravelly soil of the region are highly conducive to producing premum-quality,high-yield crops. Resource reliance. Cultivation is heavily dependent on borewell irrigation.

Srinivasapura is located at 13.33 N 78.22 E It has an average elevation of F 819 metres (2,687FT). The geographical area of the taluk is 860 square kilometers.

Market Access: Tomato produce is primarily traded locally at the Shrinivasapura APMC as well as at the massive C.M.R Tomato market in Kalavanchi which is known for its high volume auctioning.

Price of Tomato at Srinivaspura APMC as of 13th July 2026.

Price of Tomato per quintal at Srinivaspura APMC has recorded Rs.1,333/-, minimum price has been recorded Rs.866/- per quintal, and maximum price has been recorded Rs.2,000/-.

4.11 Performance of Tomato marketing in Kolar Mandi of Karnataka.

In Karnataka Kolar district has been accounted for 16 per cent and 28 per cent to production.

1)Srinivaspura taluk:

1)Yeldur is a major village in the Srinivaspur Taluk of the Kolar district known for its agrarian economy. Because. The challenging issue is the exact number of tomato growers and acerages for the village Yeldur fluctuate by season and are primarily managed by local co-operative records..

Location of Yeldur village:

Yeldur village is 12 km from the Srinivaspura town center,which is the major hub for agricultural economic activity. As of the recent last census Yeldur is roughly 4,110 residents across 993 households and covers a total geographic area of approximately 1,255.6 hectares.

2) Ronur is a medium-sized village in Srinivaspura taluk, Kolar district ,with a population of 1,224 across 274 households. Very surprising issue is Tomato cultivation is a major source of livelihood in the area.

Ronur village is located roughly 7 km northeast of Srinivaspura town.

Climate and Geography: The village located in the drought-prone yet highly fertile Kolar district,the area relies heavily on borewells and modern farmimng techniques to sustain high-yield horticulture.

3)Tayalur is a prominent panchayat village located in the Kolar district of Karnataka. While Tayalur and its surrounding villages like Kuppandahalli are administratively situated in the neighbouring Mulbagal taluk one of the region's agricultural and horticultural hubs.

Tayalur region is a recognized gram panchayat with a population of just over 3,800 people. Its local economy relies on borewell -irrigated agriculture,with horticultural crops serving as the primary source of income.

4) Gownipalli is a large prominent village located in the Srinivaspur taluk of the Kolar district,Karnataka. With a population of over 6,400 people. the village has considered as a major tomato production.

Location of Gownipalli village:

The Gownipalli village located 20 km from Kothakota and connected to the Gownipalli -Rayalpadu Road . It includes the Gownpalli Gram Panchayath, post office and local traders catering to the agricultural and residential needs of its 1,480 households.

Thus, Srinivaspura and the broader and the broader Kolar district are widely recognized as the 'Tomato capital' of Karnataka,with thousands of farmer's heavily engaged in horticulture.

Cultivation and Production:

Kolar district cultivates tens of thousands of hectares of tomatoes, producing roughly 5.5 lakh metric tons annually . Srinivaspur taluk alone constitutes a significant portion of this output,aided by hybrid seed varieties and advanced localized farming techniques.

2) Malur Taluk:

Malur taluk is a vital horticulture hub in Kolar district,major tomato growing villages are concentrated in Lakkur,Masthi and Kasaba hoblis . Key cultivation centers include Lakkur, Hosahalli,Solur,Chikkathirupathi,Anchemuskur and Masti.

The above mentioned villages supply local and regional markets ,taking advantage of of the high agricultural viability of the region. Farmers in these areas widely utilixe shade nets and protected cultivation to maximixe yields,and their produce is routinely traded through nea0.rby agricultural markets like the Kolar APMC an0.d the Malur Vegetable market.

1)Lakkur village has a total population of 3,961 and 918 households. Out of its 1,781 main workers ,there are 240 primary cultivators. Majority of the farmers dedicate significant portions of their land to high-yielding,irrigated hybrid tomato varieties.

2)Masthi village: Masthi is a prominent is a prominent historic village in Malur taluk,Kolar district,Karnataka. Located about 18 km from Malur town ,around 775 hectares and supports an agrarian based economy heavily driven by commercial tomato cultivation and extensive agricultural labour.

Masthi village located in Malur taluk, Kolar district , 38 km from Kolar city, total population 7,345 residents across about 1,619 households. Out of roughly 2,800 main workers,over 360 are registered cultivators,and more than 580 function as agricultural labourers.

3) Hosahalli is a revenue village in Malur taluk,Kolar district in Karnataka,known for high-yield hybrid tomato farming.

In this village narly 20,000 hectares under Tomato cultivation and an annual yield of over the three seasons in the district.

31 to 37 per cent of the total cost of cultivation comprised of labour cost. Total labour cost was highest in Malur taluk accounted to Rs.60,592/- (The Times of India, KRISHI Publication and Data inventory Repository).

4)Solur is prominent agricultural village in Malur taluk in Klar district known for its commercial cultivation of high-yielding hybrid tomatoes.

3) Mulbagal Taluk:

Mulbagal taluk is a major tomato cultivation area in Kolar district,known for its high yields and intensive farming. The major tomato growing vilages in the taluk include:

N.Vaddahalli, Byrakur,Minijenahalli, Hiranya Goudanahalli, Honnasettihalli,Kasuvuganahalli.

1) N.Vaddahalli(A prominent hub for wholesale tomato markets and trader exports. It is a small village in Mulbagilu taluk of Kolar district covering 119.64 hectares governed by the Kappalamadaugu Gram Panchayat,it is located about 9 km from the nearest town. Mulbagilu as per the 2011 census it is home to roughly 700 residents across 147 households.

As per 2011 ,total population 700, 344 males and 356 females. Sex ratio: 1035 females per 1000 males ,higher than the Karnataka State. Literacy rate ,the village has an average literacy rate of roughly 61 per cent to 69 per cent with male literacy at 68 per cent and female literacy at 54 per cent.

2)Byrakur is a prominent large village in Mulabagilu taluk ,Kolar district,serving as an administrative hub.Its agricultural economy is dominated by horticulture, with tomatoes as the main vegetable cum commercial crop.

Total geographical area 345.60 hectares,Net sown area 240.9 hectares,Irrigated area 104.46 hectares. Byrakur is widely recognized as a heavy tomato producing village in this region,farmers typically allocate 2 to 5 acres per household to water intensive cash crops like tomatoes.

Byrakur is located in a drought-prone district,cultivaton,cultivation relies heavily on borewells and micro-irrigaton.The village frequently shifts focus towards high-value vegetable and tomato farming for short-term profit,despite the risks of fluctuating market prices and viral crop diseases.

3)Hireshettyhalli is a settlement located in the Mulabagilu taluk of Karnataka's Kolar district,situated in the eastern part of the state,the village relies heavily on borewell-irrigated agriculture,sericulture and dairy farming.

4) Minijenahalli is a rural village located in Mulabagilu taluk of Kolar district.It operates under the Oorakuntemittur Gram Panchayath. According to standard census records,the village spans an area of 364.93 hectares and comprises about 125 households. It has a total recorded population of 628 consisting of 333 and 295 male and female population respectively.

4) Kolar taluk:

Major tomato growing villages include Huthur,Sugatur,Vemgal,Devarayasamudra and Madivala. These villages supply significant aounts of produce to key local trading hubs and processing centres. To buy sell or track daily tomato prices,local farmers and traders rely on these key facilities. These localized hubs consistently supply tomatoes to the Kolar Agricultural Produce Market Committee (APMC) ,which serves as one of the region. Thus, Kolar district is a central hub for horticulture in Karnataka,and Kolar taluk specifically features 28 prominnnnnent revenue villages that drive 60 per cent of the area's tomato cultivation. Key tomato growing villages in the taluk include Vakkaleri, Sugatur,Huthur,Mudavathi,Haralakunte and Gangapura.

1) Vakkaleri:

Vakkaleri is a large is a large village in Kolar taluk,located roughly 14 kilometers west of Kolar city. As per 2011 census the population of the village 3,571 residents across 824 families.

2) Jugatur often recorded as Sugatur is a large village in Kolar taluk, governed by its own Gram Panchayat. It is home to 3,421 residents across 655 households,featuring an above-average sex ratio of 981 females per 1,000 males and 72.54 per cent of literacy rate. As per 2011 census total population of the village has recorded 3421 (1727 males,1694 females,children 0-6 395 (179 boys,216 girls)

3) Maderahalli is a village located in the Kolar taluk ,situated 5 km from the town of Kolar governed by the Arabikothanur Grampanchayat,it covers an area roughly 424.82 hectares.

4) Kaparasiddanahalli is a small primarily agricultural village located in the Kolar taluk , it spans a geographical area of 75.82 hectares (0.75 sq km) and administratively falls under the Arabikothanur Gram Panchayath.

5) Kendatti is a village in Kolar taluk, administered under the Sulur Gram panchayath ,located, total population 825 residents, across 165 households ,434 males,391 females according to census of India

6) Muduvathi is a village panchayath in Kolar taluk, covering an area of 303.51 hectares,it has a Bangarapetbtotal population of 1,928 residents across 400 households.

5) Bangarapet taluk:

1)Bodenahalli is a villag0e in the Bangarapet taluk of Kolar district administered by Thoppanahali Gram Panchayat,located roughly 21 km from the nearest town of Robertsonpet, the village spans an area of 524.59 hectares . As per 2011 Census data 1664 of people across 355 households , Out of the total population 847 males , 817 females and literacy rate of 54.97 per cent.

2) Kalavanchi is a medium-sized village in Bangarapet taluk of Kolar district,located about 19 km from Robertson pet. It spans an area of 423.93 hectares and houses a population of 1,460 residents. Out of the total population,723 males and 737 females across 289 households.

and its literacy rate stands at 58.26 per cent.

3)Thoppanahalli is a village located in Bangarapet taluk,of Kolar district. It has a total population of 796 (Census report 2011) spans 219.59 hectares,and is the headquarters of its local gram panchayat. The road distance is 18km from its nearest statutory town,Robertsonpet. Total population of the village is 796. Out of the total population male population 423 and female population is 373, the total number of households 186,sex ratio 882 females per 1,000 males.

4)Chananahalli is an inhabited rural village located in the Bangarapet taluk of Kolar district, situated close to Kolar Gold fields(KGF) and Bangarapet town,its local administration relies on nearby GramPanchayats

5)Arimanahalli village is located in Bangarapet taluk of Kolar district. It covers an area of roughly 1.02 square kilometers and is home to a population of 891 residents across 168 households.

Total population of the village has recorded 891 consisting of 462 males and 429 females as per the 2011 Census, Sex ratio 929 females per 1,000 males, Literacy 64.18 per cent overall,74.50 per cent for males, 53.37 per cent for females.

6)Bodagurki is a village in Bangarapet taluk of Kolar district with a population of 744 ie., 159 households as per 2011 census,spanning 589.8 hectares and located 10 km from the nearest statutory town of Robertsonpet, further, sex ratio 922 females per 1,000 males.

4.12 Tomato cultivation,production and marketing in Shimoga district:

Tomato cultivation in Shivamogga taluk occurs on a small scale in the semi-malnad transition zones,concentrated around areas like Kumsi village, Sominakoppa village and also rural pockets near the Tunga river basin.

Type of Region:

Semi-malnad parts of Shivamogga taluk where farmers intersperse vegetable farmimng with horticulture.

Farming practices adopted:

Modern methods such as staking and drip irrigation are promoted locally through the ICAR-Krishi Vigyan Kendra, Shivamogga.

The major Tomato growing taluks in Shivamogga district found in the semi-malnad and transition parts like Shikaripura,Shivamogga and Bhadravathi taluks.

Tomato crop grown mostly on a small scale or as a vegetable rotation crop in semi-malnad areas,distinct from heavy plantation egions like Thirthahalli or Sagar.

1) Shimoga taluk,commercial tomato cultivation is primarily concentrated in the peripheries and rural agrarian command patches near Kumshi,Holehonnur road surroundings and Nidige hobli Villages.

Factors of cultivation:

Water source: Primarily dependent on tube-well and lift irrigation near to the Tunga River basin channels. Cropping pattern; Main plantation crop is Arecanut and Coconut and major food and commercial crops are Paddy and Sugarcane and Vegetables such as Tomato has been grown.

2) Bhadravathi taluk ,tomato crop cultivation is primarily concentrated in rural agrarian villages such as Hallikere,Machenahalli and Kalahalli. In this semi-malnad region of Karnataka,vegetables such as tomatoes are generally grown on a small-to-moderate alongside major commercial crops such as paddy,sugarcane and chillies.

Biochemistry Research status of Tomato early blight in Shivamogga and Davanagere 6th August 2017 has recorded 35.80 per cent, Bannikere 40.10 per cent,Chikkagonahalli 37.25 per cent,Honnavile 35.25 per cent, Mallapura 34.50 per cent,Harnahalli 35.65 per cent, Siddlipura 37.35 per cent, Muduvala 37 per cent, Mean 37.26 Bhadra.

3)In Shikaripura taluk tomatoes are grown primarily as small-scale or intercrops rather than a major standalone district monoculture.Horticultural activity in Shikaripura taluk focuses predominantly on paddy,maize and arecanut.s

Agricultural profile of Shikaripura :

Major crops: Paddy and maize cover the vast majority of cultivated land,while commercial plantation crops like arecanut dominate.

Cultivation of vegetables:

Vegetable farming including tomatoes ,chillies and beans occurs on a minor scale across scattered rural pockets and smaller farm holdings rather than concentrated commercial hubs.

In Shikaripura taluk major as per State bodies major horticultural crops are ginger and banana along with local vegetable production occurs in scattered agrarian clusters.

1) Ambaragoppa is a census village in Shikaripura taluk of Shivamogga district. It has a total population of 3,012 people living across 644 households and spans a geographical area of 386.65 hectares.

2) Avarekoppa is a small rural locality situated in the Shikaripura taluk of Shivamogga district. Shikaripura taluk has 185,350 people in 40,834 households across 176 Census 2011 village records, Average population 1,053.

3) Harogoppa s a medium-sized village in Shikaripura taluk of Shivamogga district, with a total population of 1,774, an area of 673.13 hectares.

4) Anjanapura hobli: Total population 1,774 people, Out of the total population 905 males and 869 females and total number of households 387 families, Children 0-6 are 235 and 128 boys and 107 girls, Schedule caste population 1,030 and sex ratio 960 females per 1,000.

5) Kadadakatte is a growing residential and semi-urban locality cum village area situated in Bhadravathi taluk of Shivamogga district ,closely connected to the Bhadravathi Bypass Road and the urban hub of Jannapura.

6) Masarahalli is a medium sized village in Bhadravathi taluk of Shivamogga district featuring a total population of 756,an area of 220.25 hectares,and local administration under the Mavinakere Gram Panchayath.

7) Mavinakere village is locaed 4 km away from the nearest town of Bhadravathi. Total population has recoded 756.Out of the total population male population has recorded 370 and female population has recorded 386, 212 families residing, Child population 0-6 has recorded 67 children ,8.86 per cent of total population,Sex ratio has recorded 1,043 females per 1,000 males.

8) Kumsi is a large,prominent village in Shimoga taluk of Shivamogga district featuring a total population of 6,115 people,a village area of 3,039 hectares and local governance under its own Gram Panchayath, Total population 6,115 people. Out of the total population 3,071 males and 3,044 females. Total number of houselholds has ecorded 1,380 families, Children 0-6, 642 children, making up about 10.50 per cent of the total population, Sex ratio 991 females per 1,000 males,which is higher than the state average. Literacy rate has recorded 77.80 per cent, male literacy rate has recorded 83.18 per cent and female literacy rate 72.39 per cent,it is above state average.

9)Sominakoppa is a medium-sized village and locality in Shivamogga taluk of Shivamogga district with a population of1,247 people. It covers a total geographical area of 188.59 hectares and is located about 14 kiloeters away from the city of Shivamogga. Total population 1,247, total number of households are 303 families.

10) Nidige is a large village and industrial locality in Shivamogga taluk of Shivamogga district with a population of 3,329 people across 725 households. It is located about 8 km from the city of Shivamogga and functions under its own Gram Panchayath. Children 0-6 years has recorded 316 (9.49 per cent), Overall literacy rate 68.24 per cent,Geographical area 520.87 hectares.

4.13. CONCLUSION:

Tomato production and marketing face severe challenges . From production side, climate change, pests and diseases, high input costs,,labour shortages. From marketing side price volatility, post-harvest lossess, middlemen dominance,inadequate infrastructure. These production as well as marketing challenges cause massive post-harvest losses and leave small-scale farmers vulnerable to heavy financial distress (Research Gate).

4.14 SUGGESTION:

1. To maximize tomato yields and quality,focus on well-draining soil with a Ph of 5.8 -6.6 ,consistent drip irrigation to prevent fruit cracking,balanced NPK fertilization,and strict pest monitoring for whiteflies and fruit borers.
2. Related to testing of soil health, farmers should check Ph and nutrient levels before planting and also add organic compost.
3. Related to space, farmers should avoid crowding to improve airflow and cutdown on fungal risks.
4. Related to mulching operation, farmers should put down plastic or organic mulch to retain moisture and stop weeds.
5. Related to application of water and nutrients, farmers should keep soil uniformly moist. Sudden dry spells followed by heavy water cause fruit cracking.
6. Related to management of nitrogen, farmers should avoid high nitrogen levels after flowering starts, as it leads to excess leaves instead of fruit.
7. Related to support of heavy vines are concerned, farmers should use stakes, poles or cages to keep fruit off the ground.
8. Related to Pest and disease control , prune suckers, farmers should remove lower leaves and side shoots to boost air circulation.
9. Related to watch for vectors, farmers should use yellow sticky traps to manage whiteflies that spread leaf curl viruses.
10. Related to crop rotation, farmers should not plant tomatoes in the same plot consecutively to reduce soil-borne diseases.

4.15 RECOMMENDATIONS:

1. Related to crop management practices farmers can usedisease-resistant F1 hybrid seeds raised in professional pro-tray nurseries under insect nets to prevent early virus attacks.
2. Farmers can use build raised beds ,15-20 cm high and use drip irrigation with silver-black mulch film to maintain moisture and prevent fatal waterlogging.
3. Farmers can install staking and trellising early so fruit does not touch the soil and rot.

4. Farmers can apply calcium and boron sprays right at the first flowering stage to stop blossom-end rot and boost fruit set.

5. Related to pest and disease control, farmers can hang yellow sticy traps ,8-10 per acre,permanently to control whiteflies that spread the Tomato yellow leaf curl virus.

6. Farmers can set up pheromone traps,4-6 per acre early to trap fruit borer moths before they lay eggs.

7. Farmers can use safe biological controls like Trichoderma viride in the soil and Bacillus thuringiensis (Bt) during flowerning instead of relying only on heavy chemicals.

8. Related to marketing and financial strategy farmers can join Farmer producer organizations(FPOs) to share transport costs and bypass middlemen who cut into rofits.

9. Farmers can learn and practice scientific grading ,sizes A,B, and C, before taking produce to major markets like Kolar APMC to get better rates.

10. Farmers can check real-time pricing data via the Krishi Maratavahini portal of Karnataka before heading out to sell.

4.16 AREA OF FURTHER RESEARCH:

1. Study can be conducted on climate change, adaptation, smart farmimg technologies, post-harvest loss reduction and sustainable supply chain transparency to meet rising global food demands.

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