

SWOC Analysis of Tomato Cultivation

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ABSTRACT

The present study was conducted in ten villages of Madanapalle division in Chittoor district of Andhra Pradesh to unearth the strengths, weaknesses, opportunities and challenges in tomato cultivation. Sixty tomato growers were interviewed using a pre-tested interview schedule. The results revealed that a vast majority of the tomato growers perceived the strengths of tomato cultivation as, huge demand for tomatoes during the off-season (96.66%), tomato crop gives significantly higher yield (96.66%), tomato crop requires less irrigation (81.64%) and easy accessibility to market (78.34%). High cost of agro-chemicals (fertilizers and plant protection chemicals) (100.00%), price instability (100.00%), retailers and wholesalers have all the role in price fixation (100.00%) and less bargaining power of the farmers (100.00%) were the weaknesses of tomato cultivation as perceived by all the tomato growers. The opportunities of tomato cultivation as recognized by the tomato growers were: setting up of processing industries (100.00%), contact farming initiatives need to be encouraged more through supportive policies (93.33%), provision of storage facilities (86.67%) and creation of facilities for strengthening of public and private partnership in tomato cultivation (83.33%) and developing organized tomato marketing systems at village clusters (20 villages/cluster) (76.67%). High cost of agro-chemicals (fertilizers and plant protection chemicals) (100.00%), malpractices of merchants in the mandies (deduction of unauthorized market charges, the unfair weight of the produce, etc.) (100.00%) and frequent price slashes due to changes in export policies or unregulated domestic markets (100.00%) are the challenges of tomato cultivation as perceived by all the tomato growers.

Keywords : Strengths, Weakness, Opportunity, Challenges, Tomato cultivation

TOMATO (*Lycopersicon esculentum* L.) is a well-known and hugely popular vegetable, which is successfully grown throughout the year. The tomato plant is extremely adaptable, and the crop can be divided into two categories; (1) processing tomatoes (which are mechanically harvested and exclusively grown outdoors for the canning industry) and (2) fresh market tomatoes. The major advantages of growing tomatoes over other crops are: (1) tomato is an important solanaceous vegetable crop that could be cultivated in both indoors and outdoors globally (2) a short duration vegetable crop, (3) excellent for use with various cropping systems for grains, pulses, cereals and oilseeds, (4) produces higher yields, which

increases economic value, (5) because of their high pro-vitamins A and C content, tomatoes are one among the best contributors of nutrients to the human diet, and (6) large-scale preparations of a wide range of processed foods are made for ingestion, additionally for exporting purposes.

Tomato is the third-most significant crop in India followed by potato and onion. Andhra Pradesh, Madhya Pradesh, Karnataka, Himachal Pradesh, Uttar Pradesh, Gujarat, Chhattisgarh, Odisha, West Bengal, Bihar, Telangana, Tamil Nadu, Maharashtra and Haryana are the primary tomato-producing states in the country. These states provide about 90 per cent of

the nation's total production. Andhra Pradesh stood first in the country in respect of the highest production of tomato (9,92,200 MT) for the year 2020-21 (Anonymous, 2021a) and Chittoor district ranked first in Andhra Pradesh with respect to area (34,030 ha) and production (12,25,080 MT) during 2020-21. Madanapalle division (22,098 ha) stood at first place in respect of the area under tomato compared to Chittoor (4,951 ha) and Tirupathi (5044 ha) divisions of Chittoor district for the year 2020-21 (Anonymous, 2021b). Madanapalle is popularly known for its agricultural products, including tomatoes, mangoes, groundnut, tamarind, and others. It is also known as 'Asia's largest tomato market' and the tomato from the Madanapalle market is sent to Delhi, Mumbai, Pune, Chennai, Kerala, Karnataka, etc.

In view of the magnitude of the area under tomato cultivation, a large number of farmers are cultivating tomato impending problems in marketing the produce, hence it is most appropriate to undertake a SWOC analysis for sustainability of tomato cultivation by analyzing the strengths, weaknesses, opportunities and challenges of tomato cultivation. This analysis is expected to highlight the points for an in-depth understanding of the situation in its totality, which in turn helps the administrators, policy makers, scientists and extension personnel to take strategic decision for overcoming the weaknesses and challenges of tomato cultivation. In this backdrop, the present study is undertaken with the following specific objectives:

1. To analyse the profile characteristics of tomato growers; and
2. To know the Strength, Weaknesses, Opportunities, and Challenges of tomato cultivation

METHODOLOGY

The study was carried out in ten villages of Madanapalle division of Chittoor district in Andhra Pradesh state during 2021-2022. Among the 26 districts of Andhra Pradesh, the Chittoor district stood first in terms of maximum area under tomato cultivation (32,093 ha) during the year 2020-2021, hence Chittoor district was purposively selected for

the study. Out of the three divisions in Chittoor district, Madanapalle division (22,098 ha) was again purposively selected for the study, since tomato was cultivated in more area as compared to Chittoor (4,951 ha) and Tirupathi (5044 ha) divisions of Chittoor district (Anonymous, 2022). Madanapalle (741 ha) and Nimmanapalle (435 ha) mandals were specifically chosen for the research, since these two mandals stood first and second, respectively in terms of area under tomato cultivation among the 33 mandals of the Madanapalle division of Chittoor district. Five villages each from Madanapalle and Nimmanapalle mandals were randomly selected for the research study. In each village, six tomato growers were again randomly selected for the study. Thus, the total sample constituted 60 tomato growers from ten villages in two mandals of Madanapalle division. The research design adopted for this study was ex-post-facto technique.

Ten profile characteristics namely, age, education, land holding, annual income, achievement motivation, innovativeness, management orientation, mass media participation, extension agency contact and extension participation of tomato growers were analyzed using a structured schedule with suitable scale/procedure. SWOC analysis is an acronym stands for Strength, Weakness, Opportunity and Challenge of the organization, project, technology or any programme. These four attributes are known as SWOC parameters. Nine statements on Strengths, nine statements on Weaknesses, eight statements on Opportunities and another eight statements on Challenges of tomato cultivation were presented to the tomato growers. They were asked to respond as 'Yes' or 'No' and the results are presented in terms of frequency and percentages.

RESULTS AND DISCUSSION

1. Profile Characteristics of Tomato Growers

The findings in Table 1 reveals that more number of tomato growers were of old age (38.33%), while 36.67 and 25.00 per cent of the respondents were of middle and young age, respectively. One-third (33.34%) and

TABLE 1
Profile characteristics of tomato growers (n=60)

Characteristics	Category	Tomato growers	
		Number	Per cent
Age	Young (<35 years)	15	25.00
	Middle (36 - 50 years)	22	36.67
	Old (>50 years)	23	38.33
Education	Low (< 4.37 score)	16	26.66
	Medium (4.37 to 5.39 score)	24	40.00
	High (> 5.39 score)	20	33.34
Land holding	Marginal farmers (<2.5 acres)	19	31.67
	Small farmers (2.5 to 5.0 acres)	18	30.00
	Big farmers (> 5.0 acres)	23	38.33
Annual income (Rs)	Low (< 2.5 lakh)	20	33.34
	Medium (2.5 to 5 lakh)	22	36.66
	High (> 5 lakh)	18	30.00
Achievement motivation	Low (<7.00 score)	19	31.66
	Medium (7.00 to 7.90 score)	24	40.00
	High (>7.90 score)	17	28.34
Innovativeness	Low (<9.18 score)	18	30.00
	Medium (9.18 to 11.00 score)	21	35.00
	High (>11.00 score)	21	35.00
Management orientation	Low (<20.25 score)	19	31.66
	Medium (20.25 to 24.07 score)	21	35.00
	High (>24.07 score)	20	33.34
Mass media participation	Low (<4.96 score)	18	30.00
	Medium (4.96 to 6.28 score)	25	41.67
	High (>6.28 score)	17	28.33
Extension agency contact	Low (<10.73 score)	17	28.33
	Medium (10.73 to 12.63 score)	26	43.34
	High (>12.63 score)	17	28.33
Extension participation	Low (<13.15 score)	16	26.67
	Medium (13.15 to 16.05 score)	25	41.67
	High (>16.05 score)	19	31.66

26.66 per cent of tomato growers, had high and low levels of education, while 40 per cent of tomato farmers had a medium level of education.

A little over one-third of the sampled tomato growers were big farmers (38.33%), while 31.67 per cent of

the sampled tomato growers were marginal farmers and the rest of the sampled tomato growers were small farmers (30.00%). The data in Table 1 also reveals that a greater proportion of tomato growers were belonging to medium level of annual income (36.66%), while one-third (33.34%) and 30.00 per cent

of the tomato growers were belonging to low and high level of annual income, respectively.

Forty per cent of tomato growers had medium level of achievement motivation, whereas 31.66 and 28.34 per cent of tomato growers are having low and high level of achievement motivation, respectively. An equal percentage of tomato growers (35.00% each) were having medium and high level of innovativeness, while the remaining 30.00 per cent of tomato growers were having low level of innovativeness.

One-third (33.34%) and 31.66 per cent of tomato growers, had high and low levels of management orientation, while 35.00 per cent of tomato growers had medium level of management orientation. A higher percentage of tomato growers (41.67%) had the mass media participation at medium level, compared to the tomato growers having at low level (30.00%) and high level (28.33%).

An equal number of tomato growers (28.33% each) reported low and high levels of extension agency contact, while as many as 43.34 per cent of tomato growers had medium level of contact (Table 1). The findings in Table 1 also showed that 31.66 and 26.67 per cent of tomato growers had high and low levels of extension participation, respectively. while 41.67 per cent of tomato growers had medium level of extension participation.

As per to the aforementioned findings, a greater proportion of tomato growers were of old age (38.33%) and were having medium level of education (40.00%), annual income (36.66%) achievement motivation (40.00%), management orientation (35.00%), mass media participation (41.67%), extension agency contact (43.34%), and extension participation (43.34%). Big farmers made up a larger portion of the sampled tomato growers (38.33%), whereas tomato growers with medium and high levels of innovativeness made up an equal number of the sampled tomato growers (35.00% each). The findings of the present study are in line with the findings reported by Shivani Dechamma *et al.* (2020) Rahul (2021) and Shinde Rohini Sharad *et al.* (2022).

2. Strengths, Weaknesses, Opportunities and Challenges of tomato cultivation

2.1. Strengths of Tomato Cultivation

The research findings in respect of the strengths in tomato cultivation are presented in Table 2. It is observed from the Table 2 that a vast majority of the tomato growers perceived the strengths in tomato cultivation as, huge demand for tomato during off season (96.66%), tomato crop gives significantly higher yield (96.66%), tomato crop requires less irrigation (81.64%), easy accessibility to market (78.34%), higher net income (76.66%), and the

TABLE 2
Strengths of tomato cultivation (n=60)

Statements	Tomato growers			
	Yes		No.	
	No.	%	No.	%
Huge demand for tomato during offseason	58	96.66	2	3.34
Tomato crop gives significantly higher yield	58	96.66	2	3.34
Tomato crop requires less irrigations	49	81.64	11	18.33
Easy accessibility to market	47	78.34	13	21.66
Higher net income	46	76.66	14	23.33
Availability of HYV and disease resistant varieties/hybrids	31	51.64	29	48.33
Better price in the market	30	50.00	30	50.00
Cost of cultivation is low	24	40.00	36	60.00
High demand for the value added tomato products in the market	23	38.33	37	61.37

availability of high yielding variety and disease resistant varieties/hybrids in tomato (51.64%). Half of the tomato growers (50.00%) felt that tomato crop fetches better price in the market as one of the strengths in the cultivation of tomato, while less number of tomato growers felt that the cost of cultivation of cultivating tomato is low (40.00%) and there is high demand for the value added tomato products in the market (38.33%). Because of the above reasons, the respondents have preferred to cultivate tomato in Madanapalle division of Chittoor district.

2.2. Weaknesses of Tomato Cultivation

The results in Table 3 presents the data on the weaknesses of tomato cultivation. High cost of agro-chemicals (fertilizers and plant protection chemicals) (100.00%), price instability (100.00%), wholesalers and retailers have major role in price fixation (100.00%) and less bargaining power of farmers (100.00%) were the weaknesses of tomato cultivation as perceived by all the tomato growers. Whereas, a majority of the tomato growers perceived the weaknesses of tomato cultivation as, lack of direct farmer access to retailers and supermarkets (90.00%), non-availability of labour (81.66%) and higher hiring charges of transport vehicles (66.66%). Less than half of the tomato growers felt the weaknesses in tomato cultivation as, micronutrient deficiency in tomato crop

(30.00%) and lack of market information sources (16.66%). The above weaknesses could be addressed by the Andhra Pradesh State Department of Horticulture, Farm Universities and Agriculture Produce Marketing Committees (APMCs) for providing agro-chemicals at subsidized rates for resource poor farmers, dissemination of technical information for getting increased tomato yield and bringing price stability in tomato. The above findings are in line with the findings of Madhuri *et al.* (2017)

2.3. Opportunities of Tomato Cultivation

The opportunities of tomato cultivation as perceived by the tomato growers are: setting up of processing industries (100.00%), contact farming initiatives needs to be encouraged more through supportive policies (93.33%), creation of facilities for strengthening of public and private partnership in tomato cultivation (83.33%), provision of storage facilities (88.33%), developing organized tomato marketing systems at village clusters (10 villages/cluster) (76.67%), provision of government support for market integration and agro-enterprise development (60.00%), empowering tomato growers on value addition (30.00%) and raise in export prices to achieve higher margins in current and future export markets by enhancing quality (15.00%) (Table 4). The listed opportunities needs to be looked into by the Andhra

TABLE 3
Weaknesses of tomato cultivation (n=60)

Statements	Tomato growers			
	Yes		No.	
	No.	%	No.	%
High cost of agro chemicals (fertilizers and plant protection chemicals)	60	100.00	00	0.00
Price instability	60	100.00	00	0.00
Wholesalers and retailers have major role in price fixation	60	100.00	00	0.00
Less bargaining power of farmers	60	100.00	00	0.00
Lack of direct farmer access to retailers and supermarkets	54	90.00	06	10.00
Non availability of labour	49	81.66	11	18.33
Higher hiring charges of transport vehicles	40	66.66	20	33.34
Micronutrient deficiency in tomato crop	18	30.00	42	70.00
Lack of market information resources	10	16.66	50	83.34

TABLE 4
Opportunities of tomato cultivation (n=60)

Statements	Tomato growers			
	Yes		No.	
	No.	%	No.	%
Setting up of processing industries	60	100.00	00	0.00
Contact farming initiatives needs to be encouraged more through supportive policies	56	93.33	04	06.67
Creation of facilities for strengthening of public and private partnership in tomato cultivation	53	88.33	07	11.67
Provision of storage facilities	52	86.67	08	13.33
Developing organized tomato marketing systems at village clusters (20 villages/clusters)	46	76.67	14	23.33
Provision of government support for market integration and agro-enterprise development	36	60.00	24	40.00
Empowering tomato growers on value addition	30	50.00	30	50.00
Raise in export prices to achieve higher margins in current and future export markets by enhancing quality	15	25.00	45	75.00

Pradesh State Department of Horticulture for the benefit of tomato growers for getting increased yield and sustained income. Similar findings are reported by Adugna (2009).

2.4. Challenges of Tomato Cultivation

The research results pertaining to the challenges in

tomato cultivation are presented in Table 5. Malpractices of merchants in the mandies (deduction of unauthorized market charges, unfair weighing of the produce etc.) (100.00%) and frequent price slashes due to changes in export policies or unregulated domestic markets (100.00%) are the challenges in tomato cultivation as perceived by all the tomato

TABLE 5
Challenges of tomato cultivation (n=60)

Statements	Tomato growers			
	Yes		No.	
	No.	%	No.	%
Malpractices of merchants in the mandies (deduction of unauthorized market charges, unfair weighing of the produce etc.)	60	100.00	00	0.00
Frequent price slashes due to changes in export policies or unregulated domestic markets	60	100.00	00	0.00
Labour migration to nearby cities/towns	49	81.66	11	18.33
Farmers not having their own transport to deliver tomato to the market	40	66.67	20	33.34
Cash payments for produce not received on time	18	30.00	42	70.00
Lack of extension and advisory services in tomato marketing	10	16.67	50	83.33
Non availability of seeds in time	10	16.67	50	83.33

growers, while a majority of the tomato growers perceived the challenges of tomato cultivation as, labour migration to nearby cities/ towns (81.66%) and farmers not having their own transport to deliver tomato to the market (66.67%). Less than half of the tomato growers perceived the challenges of tomato cultivation as, cash payments for produce not received on time (30.00%), lack of extension and advisory services in tomato marketing (16.67%) and non-availability of seeds in time (16.67%). It is quite obvious that the above challenges would help the tomato farmers to get optimum crop yield and fetch better price for tomato through-out the year. The above findings are similar to the findings reported by Saurav and Neeraj (2015) and Sabyasachi (2018).

Farm Universities, Indian Council of Agricultural Research Institutes and Andhra Pradesh Horticulture Department should provide training to empower the tomato growers on improved cultivation practices including the post-harvest techniques. The Andhra Pradesh Horticulture Department must also: (a) encourage the tomato growers to go for direct marketing or to market their produce through Agriculture Produce Marketing Committee to prevent the malpractices by the merchants and (b) promote contract farming among tomato growers for getting assured market for their produce. In addition, the Government needs to create and strengthen the public and private partnerships to set up required infrastructure facilities for creating adequate storage facilities and processing industry for tomato crop.

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