Original Research Article

An Analysis of the Knowledge of Improved Cultivation Practices of Tomato (*Lycopersicon esculentum*) of Khasi tribes in East Khasi Hills of Meghalaya, India

ABSTRACT

The main purpose of the study was to determine the extent of knowledge of Khasi tribe on improved cultivation practices of tomato. The study was conducted purposively in Mawryngkneng Block in East Khasi Hills District, Meghalaya in the year 2022. A descriptive research design was applied for the study. The primary data was collected from 120 respondents by personal interview method using pre - structure interview schedule Knowledge of the farmers was measured by asking 13 questions in respect to tomato cultivation practices. Pearson's Product Moment Coefficient of Correlation (r) was employed to determine the relationship between independent variables and knowledge of the respondents. Finding showed that (78.33%) of the respondents had medium level of knowledge, (10%) of the respondents had high level of knowledge and only (3.33%) of the respondents had low level of knowledge about improved cultivation practices of tomato. Co-efficient of correlation (r) analysis indicated that land holding, farming experience, extension contact and sources of information are significantly associated with knowledge of farmers whereas variables like: age, education, annual income, family type, size of family, and occupation was found to be non-significant with the knowledge of farmers towards improved cultivation practices of tomato.Extension Workers should frequently contact with the farmers for disseminating of proper information which in turn lead to better implementation of improved practices.

Key Words: *Tomato cultivation, Knowledge, correlation co – efficient, Mawryngkneng.*

INTRODUCTION

Tomato (*Lycopersicon esculentum*) is botanically a fruit, which is commonly used as a vegetable because of its nutritional content. It is an edible, red berry belonging to the family Solanaceae. Tomato plants are dicotyledon with a number of branching stems and a terminal bud at the tip. Tomato is composed of compound leaves, particularly known as 'regular leaves' but some consist of simple leaves known as 'regular leave'. It originated from Western South America and Central America and spread to other countries as it can tolerate different climatic conditions. Tomatoes are widely grown in temperate climate across the world throughout the year. It is usually perennial; but is cultivated as annuals.

The total cultivated area of tomato in the world was 4.84 and 4.76 million hectares with production 180.94 and 182.25 million tonnes and productivity 37.33 and 38.26 ton/ ha during 2017-18. Major producing countries of tomato in the world include: China, India, USA, Turkey, Egypt, Iran, Italy, Spain, Brazil, Uzbekistan in which China is the largest producer of tomato in the world (FAO Statistical Database 2020).

India is the second largest producer of tomato in the world with a total cultivated area of 760,000 ha with production 18,399,000 tonnes and productivity 24,209.2 kg/ha (Atlasbig.com 2018-2020). There has been an increasing rate in production of tomato from 18,732,000 tonnes during 2016 to 20,708,000 tonnes in 2017 ; but decrease to 19,377,000 tonnes during 2018 (FAO Statistical Database; 2020). Andhra Pradesh is the leading producer of tomato in India with production volume of 3.90% of tomatoes in the country. Tomato ranks third in priority in India after potato and onion. The major leading states of tomato production in India include; Andhra Pradesh, followed by Madhya Pradesh, Karnataka, Gujarat, Odisha, West Bengal, Telangana, Chattisgarh, Maharashtra, and Bihar (Agri Exchange.APEDA.gov.in 2015). There has been a decreasing rate in the area and production of tomato during 2016-17 to 2017-18 from 797 ha to 789 ha and from 20,708 MT to 19,759 MT in terms of production; but there was an increase in 2018 to 814 ha in cultivated areas and 20,515 MT in production (agricoop.nic.in 2020).

Meghalaya is an agrarian state and is known for its large scale cultivation of vegetables both tropical and temperate. There has been an increasing rate in the cultivated area, production and productivity of vegetable crops. In addition, he growth rate of vegetable crops has shown an increasing rate in area cultivated and production with respect to tomato. The Department of Agriculture has taken steps in order to increase production of vegetables in the state by motivating the farmers to cultivate vegetables in polyhouses by providing subsidy on the cost of construction of polyhouses which plays a significant role in the agricultural sector as vegetable production from polyhouse increases its productivity by twice. Important tomato varieties grown in Meghalya include: Marglobe, Shillong Selection -1, Vaishali, Rocky,Mangala, Karnataka F1.(Department of Agriculture Government *of* Meghalaya, Shillong ,2019).

Meghalaya is also one of the states in India in which tomato can be grown. According to the Horticultural Statistic, 2017, the average cultivated area and production under tomato during 2014-15 was 2.20ha and 52 million tonnes, 2015-16 was 2.15ha and 34.02 million tonnes and 2016-17 was2.12 ha and 33.95 million tonnes (Horticultural Statistics, 2017).Horticultural sector in Meghalaya is now moving forward as the horticultural crops have more advantages than the indigenous crops in terms of generating employment, increasing the income and also the potential to compete at National and International level. (Lyngdoh, 2014).

STATEMENT OF THE PROBLEM:

Tomato is one of the most important crops in India almost grown in every state and Meghalaya is also one of the state in which tomato is grown commercially which has a tremendous impact in the income of the farmers. In Meghalaya, it is widely cultivated in Umsning block-Nongpoh which can be grown both during kharif and rabi seasons but recently high altitude regions of East Khasi Hills district also practice tomato cultivation in large scale and it has spread to different parts due to high return during off-season. The farmers in East Khasi Hills District have the potential to be economically strengthened through tomato cultivation. Despite the fact that tomato is cultivated on a large scale not much study has been done in the field so far.

O**bjective of the Study:** Analysis of the Knowledge of Improved Cultivation Practices of Tomato((*Lycopersicon esculentum*) of Khasi tribes in East Khasi Hills of Meghalaya, India.

RESEARCH METHODOLOGY

The study was conducted in the state of Meghalaya covering an area of about 22,430 sq Km which is situated between 25.57°N and 91.88°E. Descriptive research design was followed for this study as it describes the characteristics or phenomenon that is being studied. The study was conducted among the Khasi tribes of East Khasi Hills District in Meghalaya. Mawryngkneng Block was selected purposively and 6 villages were selected randomly from this block and a total number of 120 farmers were selected proportionately for this study.

A pre-tested structured interview schedule directed towards the objectives of the study was developed for data collection. For the present study, both primary and secondary data were utilized for data collection. The primary data was collected through personal interview by the researchers using personal interview method. The secondary data was collected from various publications, magazines, journal, relevant text books and other sources.

The entire data was transformed into normal score for tabulation. Keeping in view the objectives of the study and to draw logical conclusion the statistical tests i.e. frequency, percentage, mean, standard deviation and correlation coefficient were used for analyzing and interpretation of the data.The independent variables as well as dependent variable were categorized as low, medium and high or the term applicable so far on the basis of score obtained.

RESULT AND DICUSSION

The objective of the study is to find the knowledge of the respondents towards improved cultivation practices of tomato.

Socio-economic and Knowledge level of the respondents toward improved cultivation practices of tomato was studied and presented in Table 1, Table 2 and Table3 and figure 1.

Table 1. Socio-economic profile of the respondents (n = 120)

Sl.no	Characteristics	Category	Frequency	Percentage
1.	Age (in years)	Young (<30)	6	5
		Middle (30 – 50)	84	70
		Old (> 50)	30	25
2.	Education	Illiterate	24	20
		Primary	75	62.5
		Secondary	15	12.5
		High School	3	2.5
		Graduate and above	3	2.5
3.	Annual Income	Low (20,000 - 40,000)	23	19.17
		Medium (40,000-60,000)	78	65
		High (Above 60,000)	19	15.83
4.	Martial Status	Married	103	85.8
		Unmarried	17	14.2
5.	Family Type	Nuclear family	92	76.67
		Joint family	28	23.33
6.	Size of Family	Small family (Less than 5 members)	79	65.83
		Large family (More than 5 members)	41	34.17

7.	Occupation	Farming	94	78.3
		Farming + labour	26	21.7
8.	Land Holding	Marginal (<2.5acre)	77	73.33
		Small (2.5-5acre)	33	20.83
		Medium (5-10acre)	10	5.83
9.	Farming experience	5-10 years	10	8.33
		10-20 years	87	72.50
		More than 20 years	23	19.17
10.	Mass Media Exposure	Low	74	61.67
		Medium	38	31.67
		High	8	6.66
11.	Extension Contact	Low	23	19.17
		Medium	77	64.17
		High	20	16.66
12	Source of Information	Low	56	46.66
		Medium	53	44.17
		High	11	9.17

From the table 1, it can be concluded that that 70 per cent of the respondents belong to middle age group i.e. (30- 50) years. Followed by 5 per cent respondents belong to young aged group (i.e., below 30 years), and 25 per cent of the respondents belong to the old aged group (i.e., above 50 years). Majority of the respondents (62.5 per cent) were educated till primary school,

20 per cent illiterate, 12.5 per cent of the respondents were secondary, 2.5 per cent High school and 2.5 per cent were graduates. 65 per cent of the respondents have an annual income of 40,000-60,000, followed by 19.17 per cent of them earn around 20,000-40,000 a year, and 15.83per cent earns above 60,000 annually. Majority (85.8 per cent) of the respondents were married while 14.2 per cent of the respondents were unmarried. Majority (76.67%) of the respondents belonged to nuclear type of family and only 23.33 per cent belonged to joint type of family. 65.83 per cent of the families have less than 5 members and 34.17 per cent have more than 5 family members.

Majority of the respondents (78.3 per cent) earn their income only through farming, followed by 21.7 per cent who earn from both farming and labour. 73.33 per cent of the respondents have land holding less than 2.5 acre whereas 20.83 per cent of the respondents possess land holding between 2.5 – 5 acre and 5.83 percent of the respondents have of land more than 5 acre.72.5 per cent of the respondents were having a farm experience of 10-20 years, 19.17 per cent have experience of more than 20 years while 8.33 per cent of the respondents have a farming experience of 5-10 years. The level of mass media exposure is low (61.67 per cent) followed by medium31.67 per cent and high 6.66 per cent respectively. The level of extension contact is medium (64.17 per cent) followed by low (19.17 per cent) and high (16.66 per cent) respectively. 44.66 per cent of the respondents were having low level of source of information followed by medium (44.17 per cent) and (9.17per cent) high level of source of information respectively.

Table.2.Distribution of respondents based on the knowledge level of the respondents.

S. No.	Statements	Response					
		Fully correct		Partially correct		Not correct	
		f	*%*	*f*	*%*	*f*	*%*
1.	Soil types suitable for tomato crop: Well drained loamy soils	**7**	**5.83**	**95**	**79.17**	**18**	**15**
2.	Climate:	**41**	**34.17**	**71**	**59.16**	**8**	**6.67**
3.	Soil testing	**0**	**0**	**7**	**5.83**	**113**	**94.17**
4.	Time of sowing:	**99**	**82.5**	**21**	**17.5**	**0**	**0**

	a) Summer (April – May) b).Autumn (August – September)						
5.	Planting material: seeds	**120**	**100**	**0**	**0**	**0**	**0**
6.	Seed rate: Varieties – 300-350 g/ha Hybrid – 100- 150g/ha	**30**	**25**	**80**	**66.67**	**10**	**8.33**
7.	Irrigation	**0**	**0**	**0**	**0**	**120**	**100**
8.	Spacing: a). 60 cm X 45 cm b). 45 cm X 30 cm	**10**	**8.33**	**81**	**67.5**	**29**	**24.17**
9.	Varieties: Vaishali, Avinash, Rohit, Arka, Rocky, Cherranjeevi, Marglove, Shillong Selection-1	**5**	**4.17**	**90**	**75**	**25**	**20.83**
10.	FYM : 25 t/ ha	**8**	**6.67**	**97**	**80.83**	**15**	**12.5**
11.	Fertigation	**0**	**0**	**0**	**0**	**120**	**100**
12.	**Growth regulators: Spray** 1.25 ppm (625 ml in 500 litres of water) Triacontanol at 15 days after transplanting and at full bloom stage	**4**	**3.33**	**116**	**96.67**	**3**	**2.5**

Table.2. indicate 79.17 percent of the respondents have partial knowledge about the soil type suitable for tomato cultivation i.e. well drain loamy soil. About 59.16 per cent of the respondents have partial knowledge about the climate suitable for tomato cultivation. Majority of the respondents i.e. 94.17 per cent has no knowledge about soil testing .Majority of the respondents i.e. 82.5 per cent has full knowledge about the sowing time .100 per cent of the respondents were fully correct about the planting material of tomato. About 66.67 per cent of the respondents has partial knowledge about the seed rate per hectare.100 per cent of the respondents do not have knowledge about irrigation practices since the study area was a rain-fed area as they depend on

rainfall for the crop. About 67.5 per cent of the respondents have partial knowledge while 24.17 per cent about the spacing required in tomato cultivation. About 4.17 per cent of the respondents are correct about the varieties whereas 75 per cent are partially correct and 25 per cent of the respondents are not correct about the varieties for tomato cultivation. 80.83 per cent are partially correct about FYM requirement. 100 percent of the respondents do not have any knowledge about fertigation since the study areas depend on rain for irrigation. Majority (96.67 per cent) of the respondent has partial knowledge about application of Growth Regulator application.64.17 per cent of the respondents has no knowledge about seed treatment. Similar findings were reported by **Hadole *et al.* (2017), Pole (2018), Ansari *et.al* (2021) and Sangavi (2021).**

Table.2. Distribution of the respondents based on the overall level of knowledge (n=120)

S. No.	Knowledge level	Response	
		Frequency	Percentage
1	Low	4	3.33
2	Medium	94	78.33
3	High	12	10

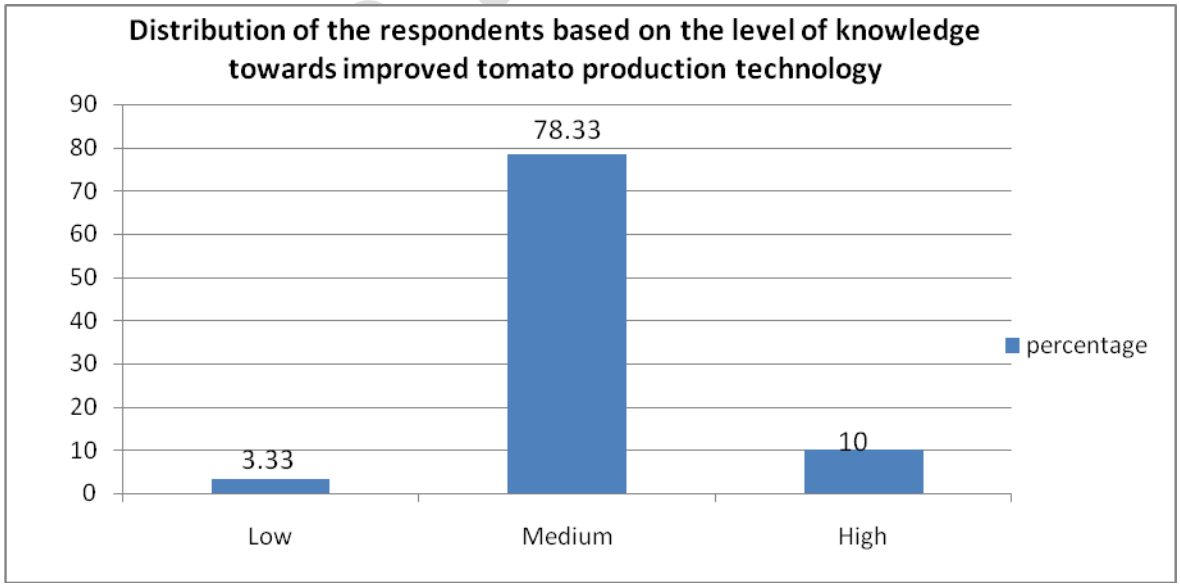

Fig. 1.Distribution of the respondents based on the overall level of knowledge

From the above table 2 and figure .1, it is found that the level of knowledge towards tomato production technology is medium with 78.33 per cent followed by and high knowledge level 10 percent respectively and low knowledge level at 3.33 per cent.

Table 3: Association between selected independent variables with knowledge of the respondents.

Sl. No	Variables	Correlation Coefficient
1	Age	0.054NS
2	Education	0.063 NS
3	Annual Income	0.102 NS
4	Marital status	0.125NS
5	Family type	0.014 NS
6	Size of family	0.079 NS
7	Occupation	0.199 NS
8	Land holding	0.292 **
9	Farming experience	0.289**
10	Mass media exposure	0.020 NS
11	Extension contact	0.410**
12	Sources of information	0.511**

* = Significant at p = 0.01% * = Significant at p = 0.05 % NS = Non Significant

The result of correlation analysis in above table revealed the significance and non-significance of the socio- economic profile of the people and their level of knowledge of improved cultivation practices of tomato.

To ascertain the relationship between profile of the respondents and their knowledge of improved cultivation practices of tomato in the area, the co-efficient correlation was worked out.

Table.3. revealed that independent variables like land holding, farming experience, extension contact and sources of information are significantly associated with knowledge of farmers. Further, the variables age, education, annual income, family type, size of family, and occupation was found to be non-significant with the knowledge of farmers towards improved cultivation practices of tomato.

CONCLUSION

It is conclude that majority of the respondents has medium level of knowledge (78.33 per cent) followed by and high knowledge level at 10 per cent and low knowledge level at 3.33 per cent. Co-efficient of correlation (r) analysis indicated that land holding, farming experience, extension contact and sources of information are significantly associated with knowledge of farmers whereas variables like age, education, annual income, family type, size of family, and occupation was found to be non-significant with the knowledge of farmers towards improved cultivation practices of tomato.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

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