

Original Research Article

Knowledge of farmers regarding improved tomato cultivation practices in the Mokokchung district of Nagaland.

Abstract:

The present study was conducted to ascertain the socio-economic profile of the respondents and determine the level of knowledge of tomato growers towards improved tomato cultivation practices. The study was conducted in the district of Mokokchung at Ongpangkong block, Nagaland. Mokokchung district comprises of 9 blocks out of which only one block, namely Ongpangkong was selected purposively ~~on the basis of~~based on the maximum area under tomato cultivation. From the selected block, six villages were selected ~~from from~~ each village 20 farmers were selected randomly. A comprehensive structured interview schedule was prepared to cover all aspects of the improved tomato cultivation practices~~covering all aspects of the improved tomato cultivation practices was prepared~~. The items included in the interview schedule were structured questions and ~~objective type~~objective-type questions which were suitable to all categories of respondents. The data was collected from ~~them, them and~~ analyzed using MS-excel to draw a logical conclusion. The study inferred that majority of the respondents possessed high school level education with land holding less than 2.5 ~~acres, and~~acres and had a medium level of extension contact. The overall knowledge level of the respondents was found under medium level. The local extension officials and scientists should take appropriate knowledge promotional strategies such as training, demonstrations, exhibitions, etc., to improve the respondents' knowledge~~along with scientists should take appropriate knowledge promotional strategies such as training, demonstrations, exhibitions, etc., to improve the knowledge of the respondents~~.

Key words: *Improved tomato cultivation practices, Nagaland, Tomato growers, Knowledge.*

Introduction:

Vegetables were grown in India ~~since for~~since for thousands of years but nowadays it had become an important commercial enterprise at both national and international level (Kumar, 2014). In recent years, ~~the~~ vegetables have become an essential requirement of the daily human diet,

because of its nutritional value. Tomato (*Lycopersicon esculentum*) is one of the important and popular fruit vegetables, which had its origin in Central and South ~~America~~America, and which belongs to the ~~night-shade~~nightshade family, Solanaceae. Numerous varieties of tomato are widely grown in temperate climates across the world, with the help of greenhouses allowing its production throughout the year and in cooler areas. Tomato may be regarded as king of vegetables for its wide economic use and also is called as a "poor man's orange" because it contains more or less same nutrients which orange possesses. About tomato, doctors have the view that "A tomato a day keeps doctors away". Tomato is cultivated ~~in-on~~3295 hectares of land (Gowda, 2009). Tomato cultivation is location specific. It requires enough care right from sowing to ~~post-harvesting~~post-harvesting operations. ~~Necessary~~A necessary package of practices must be followed for better yield. It demands complete knowledge of production and post-harvest technology. It must be adopted by farmers in ~~the~~ right manner and at right time. (Sharma *et al.*, 2015). The Naga tree tomatoes are locally known as 'Sei Bangenuo' — the name is a derivation from the Tenyidie dialect which translates to 'tree tomato'. The fruit looks a lot like ~~tomato, but~~tomato but bears an egg-like shape. With over 30 species around the world, the Naga tree tomato is also called 'tamarillo'. It was given the GI number 374 between April 2014 and March 2015. Ongpangkong block under Mokochung district provides suitable climatic condition for tomato cultivation. The condition of the soil as well was very much suitable for the cultivation of ~~tomato—~~tomatoes and other horticultural crops (Singh *et al.* 2021). Commercialization of ~~tomato—~~tomatoes was already implemented, but productivity was less due to improper technical knowledge and awareness, etc. Therefore, this study has been made to know the root causes that are responsible for low production due to non-adoption and delay in adoption of recommended practices in tomato cultivation. Keeping all those researchable issues in mind, the following specific objectives were formulated for the study.

- To ascertain the socio-economic profile of the respondents.
- To determine the level of knowledge of the respondents towards improved tomato cultivation practices.

Methodology:

Tomato is a major commercial vegetable crop in Mokochung district; Hence this district had selected purposively for the study. Further at Ongpangkong block was selected from

Mokokchung district. A list of tomato growing villages was prepared with the help of DHO, Mokokchung. Only six villages namely Longkhum, Ungma, Mangmetong, Aliba, Chungtia, and Mokokchung were selected randomly and considered for study ~~on the basis of~~ based on larger area coverage. A list of tomato growers of each selected village was prepared with the help of DHO, Muzaffarpur. Twenty tomato growers were taken from each selected village. Thus, a total number of 120 tomato growers were constituted as the sample for the study. Considering the objectives and the variables selected for the study, a comprehensive structured interview schedule ~~was prepared to cover all aspects of the improved tomato cultivation practices covering all aspects of the improved tomato cultivation practices was prepared.~~ The items included in the interview schedule were structured questions and ~~objective type~~ objective-type questions ~~which that~~ were suitable to all categories of respondents. The data was collected from them, ~~and~~ analyzed using MS-excel to draw logical ~~finding~~ findings. Appropriate quantification devices were used to quantify the variables included in the study and they were mean, percentage, frequencies, standard deviation, ~~correlation~~ correlation, and regression analysis.

Results and Discussion:

Table 01: Socio-Economic profile characters of the respondents

S. No.	Socio-Economic profile characters	Number	Per cent
1.	Age		
	Young	36	30.00
	Middle	60	50.00
	Old	24	20.00
2.	Educational status		
	Illiterate	08	06.66
	Functionally literate	13	10.86
	Primary school education	17	14.16
	Middle school education	20	16.66
	High school education	26	21.66
	Higher secondary education	18	15.00
	Collegiate education	18	15.00
3.	Occupational status		
	Agriculture alone	60	50.00
	Agriculture + Business	18	15.00
	Agriculture + Labour	30	25.00
	Agriculture+ Government / Private services	12	10.00
4.	Marital Status		
	Married	111	92.50

	Unmarried/Divorced/Separated	9	7.50
5.	Size of land holding		
	Up to 2.5 acres	63	52.50
	2.5 acres to 5 acres	41	34.17
	More than 5 acres	16	13.33
6.	Family size		
	Small	66	55.00
	Medium	42	35.00
	Big	12	10.00
7.	Annual Income		
	Very low income (Upto 1 Lakh)	08	06.67
	Low income (1 to 2 lakhs)	34	28.33
	Medium income (2 to 3 lakhs)	36	30.00
	High income (Above 3 lakhs)	42	35.00
8.	Extension agent contact		
	Low	36	30.00
	Medium	57	47.50
	High	27	22.50
9.	Social participation		
	Low	59	49.17
	Medium	40	33.33
	High	21	17.50
10.	Training exposure		
	Low	100	83.40
	Medium	19	15.80
	High	1	0.80
11.	Scientific orientation		
	Low	32	26.67
	Medium	77	64.17
	High	11	09.16
12.	Mass Media Exposure		
	Low	32	26.67
	Medium	37	30.83
	High	51	42.50

From table 01, majority (50.00%) of the tomato growers comes under 36-45 age category (middle), whereas a young tomato farmers contributed 30.00% in this study and one-fifth (20.00%) of the study accounted with old age tomato growers. The majority (21.66%) of the farmers were completed their high school education, followed tightly by the tomato growers who have completed middle school education (16.66%), higher secondary school education (15.00%), collegiate education (15.00%) and primary school education (14.16%), few farmers (10.86%) have not attained the formal education but they were remained to functionally literate and less than 10.00 ~~per cent~~percent (06.66%) of the tomato growers were remain to be illiterate. Half

(50.00%) of the tomato ~~farmers~~ farmers' occupation was agriculture alone. One-fourth (25.00%) of the farmers were the agricultural laborers, followed by 15.00 ~~per cent~~ percent and 10.00 ~~per cent~~ percent of the ~~famers~~ farmers were doing agriculture along with business and agriculture along with government/ private ~~services~~ services, respectively. Higher percentage of the tomato growers had a small family (55.00%), followed by medium (35.00%) and big family (10.00%). More than half (52.50%) of the farmers hold less than 2.5 acres of land, followed by 34.17 per cent of the tomato growers comes under 2.5 to 5 acres category, and 13.33 per cent of the tomato growers hold more than 5 acres of land. Annual income of the tomato growers of the study area showed that (35.00%) of the respondents had an income of more than 5 lakhs. Whereas (30.00%) of respondents had an income 3 to 5 lakhs followed by 28.33 ~~per cent~~ percent of the respondents who had an annual income between 1 to 3 lakhs. A very less percentage of respondents (06.67%) had income below 1 lakh. ~~Higher~~ A higher percentage of the tomato growers had low level of social participation (49.17%), followed by medium (33.33%) and high (17.50%) ~~level~~ level of social ~~participation~~ participation, respectively. ~~Majority~~ The majority of the tomato growers (83.40%) had attended ~~lessa~~ smaller number of trainings followed by 15.80 per cent of the tomato growers had participated in medium level of trainings and remaining 0.80 per cent of the tomato growers had high level of trainings participated. Majority of the tomato growers had medium (47.50%) level of extension contact, whereas the 30.00 ~~per cent~~ percent of the tomato growers had low level of extension contact and nearly one-fourth (22.50%) of the tomato growers had high level of extension contact. Majority (64.17%) of the tomato farmers had medium level of scientific orientation, followed by 26.67 per cent and 09.16 per cent of the tomato farmers had low and high level of scientific ~~orientations~~ orientations, respectively. Majority (42.50%) of the farmers had high level of mass media exposure followed by 30.80 ~~per cent~~ percent of the tomato farmers had medium level of mass media exposure. About, 24.44 ~~per cent~~ percent of the tomato growers developed low level of mass media exposure.

Table 02: Knowledge level of the Farmers

Table 2.1 . Distribution of tomato growers according to their statement wise knowledge.

Sl. No.	Recommended cultivation Practices	Fully Known		Partial Known		Not Known	
		F	%	F	%		
1.	Varieties recommended	49	40.83	71	59.17		
2.	Sowing time	79	65.83	41	34.17		
3.	Seed treatment	90	75.00	30	25.00		
4.	Seed rate	77	64.17	43	35.83		
5.	Field preparation	74	61.67	46	38.33		
6.	Method of sowing	75	62.50	45	37.5		
7.	Spacing	59	49.17	61	50.83		
8.	Manures & fertilizers	53	44.17	67	55.83		
9.	Methods of irrigation	69	57.50	51	42.50		
10.	Weed management	55	45.83	65	54.17		
11.	Disease identification	112	93.33	08	6.67		
12.	Disease control	89	74.17	31	25.83		
13.	Pest control	86	71.67	34	28.33		
14.	Harvesting	101	84.17	19	15.83		
15.	Yield	95	79.17	25	20.83		

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From the table, it was evident that higher percentage of the farmers had knowledge on varieties (40.83%), majority (65.83%) of growers possessed correct knowledge on sowing time. Majority of the respondents had ~~correct~~corrected knowledge about the practices of seed treatment (75.00%). More than half (64.17%) of tomato growers had correct knowledge about seed rate. About 61.67 and 62.50 ~~per cent~~percent of respondents had knowledge about field preparation and method of sowing. Whereas 49.17 and 44.17 per cent of respondents had knowledge about spacing and manures and fertilizers. From the results it could be observed that majority (93.33%) of respondents had knowledge on disease identification. The reason might be that diseases identification was an important practice ~~which that~~was specially performed in

tomato cultivation. Majority of tomato growers had ~~correct~~corrected knowledge on weed management (45.83%), disease control (74.17%), pest control (71.67%), harvesting (84.17%) and yield (79.17%).

Table 2.2. Distribution of respondents according to their ~~Knowledge~~knowledge level

S.No	Category (Score)	Knowledge	
		Frequency	Percentage
1.	Low	33	23.33
2.	Medium	59	49.17
3.	High	28	27.50
4.	Total	120	100.00

From above table, it could be understood that higher percentage (49.17%) of the tomato growers possessed medium level of knowledge followed by high (27.50%) and low (23.33%) level of knowledge about recommended cultivation practices in ~~tomato~~tomatoes. The finding of the study was parallel to the finding of Upma *et.al.*(2012), Yadav *et.al.*(2018), and Yogendra *et.al.*(2021).

Table.03. Association between the independent variables and knowledge level of the farmers about improved tomato cultivation practices

S. No.	Characteristics	'r' value
X1	Age	-0.122
X2	Education	0.406**
X3	Occupation	0.177
X4	Marital status	0.156
X5	Family size	0.094
X6	Size of the total land holding under tomato cultivation	0.289*

X7	Annual income	0.204*
X8	Social participation	0.031
X9	Trainings exposure	0.361*
X10	Extension contact	0.367*
X11	Scientific orientation	0.140
X ₁₂	Mass media exposure	0.356*

NS = Not Significant; * = Significant at 5%, ** = Significant at 1%.

It could be understood from the table.17, that age, occupation, marital status, family size, social participation, and scientific orientation, had non-significant association with the knowledge level of the farmers about improved tomato production technology. Meanwhile, size of the total land holding under tomato cultivation, annual income, ~~trainings-training~~exposure, extension ~~contact~~contact, and mass media exposure had a positive and significant association with the knowledge level of the farmers about improved tomato cultivation practices at 5 per cent level of probability. In addition to this educational status had a positive and significant association with the knowledge level of the farmers about improved tomato cultivation practices at 1 per cent level of probability.

this manuscript lacks scientific discussion, it is necessary that the authors add the following paragraphs that would improve the scientific quality of the candidate manuscript;

In order to identify suitable adaptation practices to a certain territory, it is necessary to previously establish the groups of actors involved, defined by similar characteristics from the point of view of land use (Olivares y Hernandez, 2019), the production system (Olivares et al. 2018; Olivares et al. 2022), ethnicity (Olivares and Franco, 2015; Olivares et al. 2015), culture (Olivares et al. 2016; Olivares et al. 2021), the territory where they do agriculture (Olivares and Lopez, 2019; Olivares et al. 2019) and the productive chains to which they belong (Olivares, 2014; Olivares, 2016; Olivares et al. 2016). This stage facilitates the analysis of adaptation, since in general they will have similar threats, impacts, and feasibility attributes compared to the proposed actions (Olivares et al. 2012; Olivares et al. 2017).In addition to the producers who are the actors

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directly involved in the application of adaptation practices, there are other relevant actors in the reference region (Olivares and Hernandez, 2020; Olivares et al. 2020a; Olivares et al. 2020b), which will make it possible to strengthen adaptation measures while facilitating the adoption of these practices.

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Conclusion:

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Majority of the respondents possessed high school level education with land holding less than 2.5 acres and had medium level of extension agent contact. The present study reported that nearly half of the farmers belong to medium knowledge ~~category~~category, respectively. So, there is a scope for the extension system to educate the farmers about the improved package of practices to get higher yield and profits by designing ~~an appropriate extension strategies~~appropriate extension strategies like training, demonstrations, exhibitions, field days, field visits etc. Majority of tomato growers partially adopted ~~the~~critical practices such as; FYM, chemical fertilizers, and plant protection measures. Hence Suitable assistance from extension agencies is essentially required in motivating the growers to realize the importance of these critical practices to improve the production of ~~tomato~~tomatoes. In the tribal regions, a community radio system may be helpful to provide ~~the~~useful and necessary information for tomato cultivation in their local language.

Reference:

I suggest adding recent references which address the issue in question in Latin American territories. Suggested citations are for genuine scientific reasons that emphasize the current topic of study in context:

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