

Research Article

# Knowledge of tomato cultivation technologies among tribal women

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**SUMMARY :** To study the knowledge of tribal women for tomato cultivation technologies, ten villages from two Panchayat Samities *i.e.* Garhi and Talwara in tribal dominated Banswara district of Rajasthan were selected for the study purpose. With the specific objective entitled the impact of National Agricultural Innovation Project in terms of knowledge of tomato cultivation technologies by the tribal women. The project had enhanced their knowledge and made them enable in adopting new innovations in the field of agriculture.

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**KEY WORDS :**

Knowledge, Tribal Women, Tomato cultivation technologies, National Agricultural Innovation Project

## BACKGROUND AND OBJECTIVES

Horticulture crops play a unique role in India's economy by improving the income of the rural people. Cultivation of these crops is labour intensive and as such they generate lot of employment opportunities for the rural population. Women are very important segment in development from local to global levels. It makes significant contribution to economic and social development as citizens, workers and mothers. Women particularly in tribal areas are generally less responsive to improved technologies as they are not exposed to these techniques. So to have the adequate contribution of tribal women in development of the country, it is imperative that the tribal women are trained in agriculture and its allied technology. The farming community has been facing rising input costs, declining returns from the inputs, uncertain market, increasing role of market in agriculture and blurring of distinction between the domestic market and the international market. To assist them in these changing require technological support. Hence, World Bank aided National Agricultural Innovation Project (NAIP) led by

ICAR was initiated to facilitate an accelerated and sustainable transformation of the Indian agriculture.

The Maharana Pratap University of Agriculture and Technology, Udaipur implemented one project *i.e.* Livelihood and nutritional security of tribal dominated areas through integrated farming system and technology models through Krishi Vigyan Kendra in Banswara district under III<sup>rd</sup> component of NAIP on 20<sup>th</sup> October 2007 for the period of five years. Since NAIP has already completed more than three years of its implementation in the district and till now no systematic research efforts has been made to know about to what extent the project has been able to achieve the objectives set forth. Therefore, the present study had been planned to review the project in terms of its impact on the tribal women.

## RESOURCES AND METHODS

To study the knowledge of tribal women for tomato cultivation technologies, ten villages from two Panchayat Samities *i.e.* Garhi and Talwara in tribal dominated Banswara district of

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Rajasthan were selected for the study purpose. Sample for the study consisted of 90 tribal women, 8-10 from each village of operational area of NAIP. In order to know the impact of project a matching sample of 30 tribal women were also selected from one village which was 10-15 km away from operational area of NAIP. Thus, total 120 tribal women were selected for sample. Interview schedule was developed and personal interview and observation techniques were used to collect data from the respondents. The interview schedule consisted of two sections *i.e.* background information and knowledge of tribal women for tomato cultivation technologies. Frequency distribution, percentage, mean per cent score and z test were used to analyze the data.

### Knowledge of the respondents regarding cultivation of tomato :

*Overall knowledge of respondents in tomato cultivation technologies :*

To know the overall knowledge of the respondents in tomato cultivation technologies, they were grouped into three categories *viz.*, poor, average and good knowledge category. The results are presented in Table 1.

**Table 1 : Distribution of respondents by their overall knowledge in tomato cultivation technologies**

Categories	Participants (n=90)		Non participants (n=30)	
	f	%	f	%
Poor	1	1.11	21	70
Average	79	87.7	9	30
Good	10	11.11	0	0

Percentage distribution of participants and non-participants in knowledge categories is presented in Table 1. Data presented in the table demonstrate that majority of the participants (87.7%) were in the category of average knowledge and only 30 per cent non-participants were in same category.

Data also show that majority of the non participants fell under the category of poor knowledge where as in case of participant it was only 1.1 per cent. None of the non-participant possessed good knowledge but 11.11 per cent participants fell in the category of good knowledge. A critical view of the data in the table show an impact of NAIP in study area.

The knowledge of participants and non participants in various components of tomato cultivation technologies is presented in Table 2. Data presented in the table depicts that knowledge of participants regarding major five components was higher *viz.*, climate and soil (83.8MPS), improved seed variety (50.22 MPS), cultivation practices (90.10 MPS), plant protection practices (33.42 MPS) and harvesting and

post harvest management (59.16 MPS) than the non-participants *viz.*, 16.6, 2.6, 66.11, 13.84 and 36.67 MPS, respectively. The table also shows that overall MPS of participants regarding knowledge of tomato was 52.93 and it was 30.90 for non participants. Table 2 also shows that participants possessed higher knowledge in all components than the non-participants and there was a significant difference in the knowledge of participants and non participants in all five components of tomato cultivation at 1 per cent level of significance.

**Table 2 : Comparison of participants and non-participants knowledge of tomato cultivation technologies**

Sr.No.	Component	MPS (P)	MPS (NP)	Z value
1.	Climate and soil	83.88	16.6	21.42*
2.	Improved seed variety	50.22	2.6	16.92*
3.	Cultivation practices	90.10	66.11	9.00*
4.	Plant protection practices	33.42	13.84	10.79*
5.	Harvesting and post harvest management	59.16	36.67	27.00*
	Overall	52.93	30.90	24.07*

\*Indicate significance value at P=0.05

*Component wise in depth knowledge of the participants :*

The results pertaining to in depth knowledge of the participants has been presented as follows:

### Climate and soil :

For better vegetable production women should have knowledge about suitable soil and appropriate climate for tomato cultivation. In depth knowledge assessment of the participants in various aspects of climate and soil (Table 3) revealed that all the participants knew that both *Zaid* and *Kharif* season are the suitable season for tomato cultivation. In case of suitable type of soil and appropriate temperature, majority (67.70%) of the participants were aware that sandy loam is suitable soil and 24-28<sup>o</sup> C is appropriate temperature. Rest of the respondents reported for black cotton soil and red soil. During the data collection it was found that in study area the soil was of black cotton and red soil, it might be one of the reason for such findings.

**Table 3: Distribution of respondents on the basis of their knowledge about climate and soil for tomato cultivation (n=90)**

Sr. No.	Particulars	Participant	
		f	%
1.	Soil type	61	67.70
2.	Season		
	(a) <i>Zaid</i>	90	100
	(b) <i>Kharif</i>	90	100
3.	Suitable temperature	61	67.70

**Improved seed varieties :**

By adoption of improved vegetable cultivation practices, the productivity of any crop can be increased up to reasonable level. In spite of all the efforts if due attention is not given at the initial stage of selection of seed, then expected results in terms of productivity cannot be achieved. Hence, the women should have knowledge regarding this aspect. Data presented in Table 4 indicate that Dev is a improved variety of tomato, has high temperature tolerance capacity and is a drought resistant variety as reported by 86.6 per cent, 44.4 per cent and 34.4 per cent participants, respectively and Maharaja which is also one of the improved variety and has low temperature tolerance capacity was known by 65.5 per cent and 20 per cent participants. During the discussion it was found that though participants were not able to mention improved variety but knew that all certified seeds are improved variety seeds.

**Table 4 : Distribution of respondents on the basis of their knowledge about improved seed variety of tomato (n=90)**

Sr. No.	Particulars	Participant	
		f	%
1.	Improved varieties		
	Dev	78	86.66
	Maharaja	59	65.55
2.	High temperature tolerant variety (Dev)	40	44.44
3.	Low temperature tolerant variety (Maharaja)	18	20
4.	Drought resistant varieties	31	34.40

**Cultivation practices :**

Information pertaining to cultivation practices of tomato with respect to sowing, seed rate, spacing, weeding, irrigation and fertilizer application is presented in Table 5. Data presented in the table depict that cent per cent participants knew that sowing of tomato is done through transplanting of seedlings, July-August is suitable time for sowing in *Kharif* and 2 -3 times weeding is required for tomato crop. More than 80 per cent participants knew the sowing time in *Zaid* (January-February), seed rate of local seed (400-500 g/ha), spacing for *Zaid* crop (30x45cm), spacing for *Kharif* crop (45x60 cm) and name of fertilizer (NPK) used in tomato crop. Further data reveal recommended quantity of farm yard manure (20-25 tons/ha) and number of irrigations required (12-15 times) were known by 74 -77 per cent participants. The overall view of the table shows that majority participants had knowledge of tomato cultivation practices was high among the participants. The reason might be that most of the cultivation practices are performed by the women and required a little technical knowledge.

**Table 5 : Distribution of respondents on the basis of their knowledge about cultivation practices of tomato(n=90)**

Sr. No.	Particulars	Participant	
		f	%
1.	Sowing method	90	100
2.	Sowing time in <i>Zaid</i>	77	85.50
3.	Sowing time in <i>Kharif</i>	90	100
4.	Seed rate of local seed	87	96.60
5.	Seed rate of hybrid seed	48	53.33
6.	Spacing for <i>Zaid</i>	88	97.70
7.	Spacing for <i>Kharif</i>	76	84.40
8.	weeding required	90	100
9.	Irrigation	70	77.7
10.	Fertilizer	84	93.30
11.	Quantity of fertilizer	25	27.77
12.	Quantity of FYM	67	74.40

**Plant protection practices for tomato :**

Information pertaining to knowledge of participants regarding plant protection practices is presented in the Table 6. Data presented in the Table 6 depict knowledge of participants about plant protection practices under five major aspects *i.e.* Soil treatment, seed treatment, disease control, insect and pest control and equipment required for seed treatment.

**Soil treatment :**

Phorate is most commonly used pesticide for soil treatment. Data presented in the table show that it was known to 65.55 per cent participants but its recommended quantity was known to one-fourth of the participants. Further very few participants were aware regarding carbofuron and its recommended quantity.

**Seed treatment :**

Perusal of the Table 6 data reveals that 53.33 per cent participants knew the name of fungicide (Thiram) but very few (7.7%) participants knew its recommended quantity. Regarding bio-fertilizers (PSB) 33.33 per cent participants knew that seeds are treated with bio-fertilizers but very few knew insecticide (Chloropyriphos) and its recommended quantity.

**Disease control :**

With respect to knowledge of the participants about disease control aspect it was found that leaf curling is a major disease as reported by majority (76.66%) of the participants. They explained the symptoms of disease in their own language (Wagdi). Another disease was early and late leaf blight which was known to 32.22 per cent participants. Although they can identify these two major diseases but control measures were

**Table 6 : Distribution of respondents on the basis of their knowledge about plant protection practices of tomato (n=90)**

Sr. No.	Particulars	Participants	
		f	%
<b>1.</b>	<b>Pesticides and their quantity used for soil treatment</b>		
	Phorate	59	65.55
	10kg/ha	23	25.55
	Carbofuron	6	6.66
	25kg/ha	4	4.44
<b>2.</b>	<b>Pesticides and their quantity used for seed treatment</b>		
	Fungicides	48	53.33
	2 g/kg/ha	7	7.77
	Insecticides	9	10
	4 ml/l/ha	5	5.55
	Bio-pesticides	30	33.3
	0.5 kg/ha	8	8.88
<b>3.</b>	<b>Diseases and their control measures</b>		
	Early and late leaf blight	29	32.22
	Zeneb/Mencozeb	12	13.33
	2.5 kg/ha	2	2.22
	Leaf curling	69	76.66
	Rogor (Metasystox)	22	24.44
	2 ml/l spray	10	11.11
<b>4.</b>	<b>Insects and pesticides needed for their control</b>		
	Stem and fruit borer	68	75.5
	Endosulphan 35 EC	42	46.66
	1-1.5 l /ha	18	20
	White fly	85	94.44
	Rogor/metasystox	68	75.55
	0.5-1l/ha	2	2.22
	Jaisid	51	56.66
	Rogor/metasystox	20	22.22
	0.5-1l/ha	4	4.44
<b>5.</b>	<b>Equipment for seed treatment</b>	50	55.55

known to one fourth of the participants. The reason for such finding might be as because mostly application of pesticides is a skilled job and performed by male members, therefore, the women were not aware about this component.

#### **Insect and pest control :**

When knowledge of the participants was judged regarding insect and pest control it was found that almost all (94.44%) the participants knew white fly as the major insect in tomato and 75.55 per cent participants also knew the name of insecticide (Rogor) for its treatment. Similarly stem and fruit borer insect was known to 75.5 per cent participants

and 46.66 per cent participants also knew the name of insecticide (Endosulphan). Recommended dose was also known by 20 per cent of the participants. More than half of the participants also knew for insect Jaisid and name of insecticide (Rogor) for its control.

#### **Equipment for seed treatment :**

Seed dresser is one of the farm equipment used for seed treatment and it was known by more than half of the participants as depicted by the data in the table.

#### **Harvesting and post harvest management of tomato :**

Knowledge of participants regarding harvesting and post harvest management of tomato is presented in Table 7. Data in the table show that all the participants knew that tomato crop is ready to harvest after 80-90 days and can be plucked at half ripe stage and is used for cooking purpose. More than 80 per cent participants knew that total yield of tomato is 200-300 q/ha and can be used for salad purpose as well as to prepare sauce and chutneys. Reason for cracking in tomato fruits were known to majority of the participants. Few of the participants were having knowledge regarding 5 stages of harvesting; storage by cold storage and by preservation and also regarding storage recommended duration of storage for tomato. The reason might be that they are not having any cold storage facility in study area. Similarly Reddy *et al.* (2007) also investigated the knowledge and farming performance of Andhra Pradesh.

**Table 7 : Distribution of respondents on the basis of their knowledge about harvesting and post harvest management of tomato (n=90)**

Sr. No.	Particulars	Participants	
		f	%
1.	Harvesting time	90	100
	Suitable stage for harvesting	82	91.11
2.	Number of stages for harvesting	11	12.20
3.	Total yield	73	81.10
4.	Reason for cracking of fruits	68	75.55
5.	Storage		
	Cold storage	28	31.11
	By preservation	32	35.55
6.	Recommended duration of storage	7	7.77
7.	Uses of harvested tomato		
	Cooking	90	100
	Table purpose	86	95.50
	Preserved products	72	80

#### **Conclusion :**

Based on the findings it can be concluded that tribal women were satisfied with the tomato cultivation

technologies promoted under NAIP. The project had enhanced their knowledge and made them enable in adopting new innovations in the field of agriculture. Results also shows an impact of training programmes organized by KVK, Banswara under NAIP which can be clearly observed by the difference in the level of knowledge of participants and non-participants tribal women in tomato cultivation technologies. Participants knowledge was enhanced in terms of suitable climate and soil, improved seed variety, various cultivation practices, plant protection practices and in harvesting and post harvest management through trainings organized under the project.

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