

**FIELD INVESTIGATION OF SELECTED SOCIO-ECONOMIC AND
ESSENTIAL CULTIVATION PRACTICES IN TOMATO CROP UNDER
SEMI-ARID ECOSYSTEMS**

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ABSTRACT

A field investigation was revealed that 50.59 per cent of the respondents belongs to middle age group who had completed their high school education constitutes up to 38.82 per cent. 69.42 per cent of them were belongs to medium sized family group consisting of five to seven (5-7) members. 49.41 per cent belongs to small farmers who are cultivating tomato as prime crop in one third to two third portion of their total cultivated area throughout the year. Among them 45.89 per cent had more than three years and less than ten years of experience in tomato cultivation. 85.89 per cent were not practicing the soil testing practice before the cropping, 24.70 per cent were practicing ploughing as over practice, and 74.11 per cent were habit of maintaining excess plant population per unit area. 34.11 per cent were applying more chemical fertilizers than the recommended dose, 85.9 per cent were not practicing green manure crops application. 72.95 per cent were applying high dosage of pre-emergent weedicides. Similarly, 54.11 per cent and 34.12 per cent were applying higher than the recommended of both insecticides and fungicides respective, 45.88 per cent were spraying 4000 liters of spray solution and 32.94 per cent of the farmers were spraying 4500 liters of spray solution per acre per crop, similarly, 67.05 percent were practicing 60 irrigations per crop and 71.76 percent were irrigating 0.5 to 4.0 liters per plant, 61.17 percent were practicing every alternate day and 45.88 per cent were following ½ to 1.5 hour as duration of irrigation for each irrigation.

Keywords: Field investigation, Cultivation practices, Tomato crop, Semi-arid ecosystems, Farmers

INTRODUCTION

A ground examination was taken up to understand the some social characteristics like age, education level, family size and the experience in the field of tomato cultivation along with the economic features more especially the farm income of the farmers who are cultivating the tomato

as prime crop. The study also included the essential cultural practices needs to be followed in the tomato based farming. The enquiry on each cultural practice and its operational intensity was studied through their responses. The methodology, sampling procedure and the results obtained are presented in the following headings.

METHODOLOGY

The research methodology followed was an open and structured interview schedule was developed including the farmers social profiles and economic features in part A and the selected cultural practices essentially needs to be followed in the field. Questions were framed and the possible responses were collected and same were subjected to statically analysis.

MATERIAL AND METHODS

Sampling procedure followed during the course of investigation

A. Socio-economic features:

The sample villages were randomly selected based on the area under said crop especially from three hobalies belonging to Chintamani Taluka From each village 20 households are selected and in Muragamalla hobali field experiment with the adoption of Package of Practice (PoP) 25 respondents were selected, in total 85 respondents from villages belongs to three habalies i.e. Kaiwara, Muragamalla and Chintamani Kasaba. The schematic diagram of the sampling procedure followed was presented as below (Fig: 3.1)

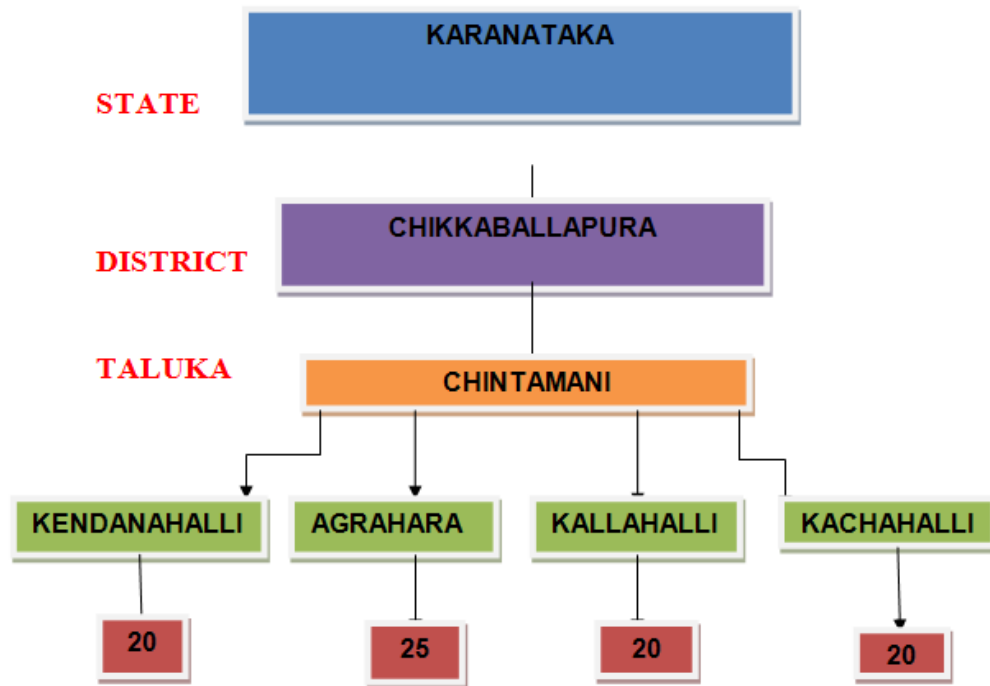


Fig. 1: Schematic diagram of sampling procedure practiced in the study area

B. Essential and Cultural practices needs to be followed in tomato crop:

The methodology followed to understand the level of existing tomato cultivation practice in the field the criteria followed are presented as below table

Table 1: Gauge of adoption percent of various recommended cultivation practices in Tomato

S.No.	Recommended practice	Estimation procedure
1	Type and percent of Hybrids usage	$\frac{\text{Actual hybrids}}{\text{Recommended hybrids}} \times 100$
2	Optimum plant population per unit area	$\frac{\text{Actual No. of seedlings}}{\text{Recommended No. of Seedlings}} \times 100$
3	Rate of application of Farm Yard Manure	$\frac{\text{Actual quantity of FYM applied}}{\text{Package suggested or recommended}} \times 100$

4	Soil testing rate	Actual no of soil tests ----- X 100 Recommended rate
5	Quantity of Nitrogenous fertilizers application during planting	Actual quantity ----- X 100 Recommended
6	Quantity of Nitrogenous fertilizers application after planting	Actual quantity ----- X 100 Recommended
7	Quantity of Phosphorous fertilizers application	Actual quantity ----- X 100 Recommended
8	Quantity of Potash fertilizers application	Actual quantity ----- X 100 Recommended
9	Quantity of herbicides or weedicides application	Actual dosage of application ----- X 100 Recommended
10	Frequency of irrigations	Actual number of irrigations ----- X 100 Recommended no. of irrigations
11	Frequency of fungicides spray	Actual no of spray ----- X 100 Recommended
12	Frequency insecticide spray	Actual no of sprays ----- X 100 Recommended
13	Quantity of NSKE application	Actual quantity ----- X 100 Recommended quantity
14	Practice of African marry gold as trap crop	Actual No. of rows ----- X 100 Recommended rows

EXPERIMENTAL RESULTS

A. Selected Socio-economic features:

1. Age

The study indicated that all the respondents in the study area revealed that 21.17 percent of the respondents fit in the young (youth) age group, whereas 50.59 percent of the respondents fall in the category of middle age group and only 28.24 percent of the respondents were comes under in the slab of old age group.

2. Education

Pertains to education of the respondents revealed that the 14.11 percent of the respondents were illiterate, 18.82 % percent of the respondents had their primary education, 23.53 percent of the respondents had done their higher primary education, whereas 38.82 percent of the respondents were studied up to high school level and only 4.72 percent of the respondents were studied up to Pre university level and college level.

3. Size of the family

The family structure of the respondents shows that majority (69.42 %) percent of them are medium size in group consisting of five to seven persons per household and 14.11 percent and 16.47 percent of respondents (farmers) were small and large family group respectively consisting of below four members in small family and more than seven members in large family.

4. Type of the family

Among the selected respondents it was observed that the majority were in joint family system and they constitute up to 61.18 percent and the remaining 38.82 percent of the respondents were belongs to the nucleus family type.

5. Land area operating size

The distribution of land holdings and its operation among the respondents implies that majority were in medium size category, i.e.49.41 percent whereas 42.38 percent were fit in the category of large famers group and only 8.23 percent of the respondents were comes in the category of small farmers. The medium and large farmers group constitutes to 91.79 percent, hence continuity in tomato farming as one of the major crop and thus it was observed that the tomato crop is occupied to about 1/3rd and 2/3 rd of the total cultivated area among these group of respondents

in the study area. The details of the socioeconomic features of the respective study were presented as follows (Table: 1)

Table 2: Socio-economic characteristics of the selected households in the study area

(N= 85)

S.No.	Particulars	Frequency	Percent (%)
1	Age group		
	a. Up to 30 years	18	21.17
	b. 31 to 50 years	43	50.59
	c. Above 51 years	24	28.24
2	Education		
	a. Illiterate	12	14.11
	b. Primary Education	16	18.82
	c. Higher Primary Education	20	23.52
	d. High School	33	38.82
e. Pre University College	4	4.70	
3	Size of the Family (No. of members)		
	a. Small family (Up to 4)	12	14.11
	b. Medium size (5-7)	59	69.42
	c. Large family (>7)	14	16.47
4	Type of family		
	a. Nucleus family	33	38.82
	b. Joint family	52	61.18
5	Land holdings distribution		
	a. Small farmers (< 2.5 acres)	7	8.23
	b. Medium farmers (2.51 to 5.0 acres)	42	49.41
	c. Large farmers (> 5.1 acre)	36	42.36

B. Study of selected essential cultural practices in tomato based farming.

1. Soil test

The foremost step for the operation of scientific cultivation practices the soil testing was the prerequisite to operate on-farm farming practices based on the soil test results and more especially the nutrients management, in the study area in the existing cropping field it was investigated that among the selected respondents only 14.11 percent were doing the soil tests occasionally and rest of the 85.89 percent were not having any type of knowledge on soil test.

2. Type of seed & planting material usage

Among the respondents only 7.05 percent were practicing the zonal recommended planting material but majority 81.17 percent are using private company recommended 11.76 percent were practicing both as and when available.

3. Age of the transplanting seedlings

With respect to the age of the seedlings recommended age is 22 to 24 days which were stout and disease free and must be highly viable, the investigation in this regard reveals that bulk of the respondents i.e. 68.23 percent were adopted 25-30 days old seedlings and 18.82 percent of the farmers were using more than 35 days old seedlings and 12.95 percent of them were using 22-24 days old seedling which s optimum age for transplanting in the main field.

4. Maintenance of optimum plant population

The recommended package of practice the optimum plant population per unit area is based on the both intra and inter row spacing, among the selected respondents in the existing field it was observed that majority (74.11 percent) were practicing below the recommended spacing (3.0 ftX1.0 ft), 15.30 percent are practicing little more spacing than the recommended (3.5 ft x1.5ft) and remaining 10.59 percent were practicing more wider spacing (4.0 ftX2.0 ft) than the recommended.

As per the recommended spacing the optimum plant population per unit area was 9990 plants per acre whereas the 74.11 percent of the respondents were maintained 14,875 per acre in 3.0 ft X 1.0 ft spacing, 15.30 percent were maintained 8,608 plants per acre and 10.59 percent of the respondents were maintained 5,573 plants per acre.

Table 3: Age of the seedlings for transplanting and maintenance of optimum plant population existing practice in tomato crop

N=85

S.No	Recommended practice	Existing practice	Frequency (No.)	Percent (%)
1	Transplanting age of the seedlings a. 22 to 24 day old	Age of the seedlings at usage in the field a. 22 to 24 days old b. 25-30 days old c. > 30 days old	11 58 16	12.95 68.23 18.82
2	Maintenance of optimum plant population per unit area a. As per 3.0 ft X 1.4 ft (9990 plants per acre)	Existing practice in the field a. 3.0 ft X 1.0 ft (14,875 plants per acre) b. 3.5 ft X 1.5 ft (8608 plants per acre) c. 4.0 ft X 2.0 ft (5573 plants per acre)	63 13 9	74.11 15.30 10.59
3	Total		85	100

5. Transplanting bed preparation and quantity of farm yard manure application

For the preparation of transplanting bed greater part (65.88 percent) of the selected respondents were practicing more than the recommended (i.e. 2 times ploughing and 1 time harrowing) and 24.70 percent were practicing as over practice (3 times ploughing & 2 times harrowing) and only 9.42 percent were on-par (2 times ploughing & 1 time harrowing)

Similarly nearly 61.17 percent of the respondents were practicing application of farm yard manure on – par (12 tons per acre) with the recommended dosage whereas 28.24 percent were

practicing less than (5 tons per acre) the recommended and only 10.58 percent were practicing more than (15 tons per acre) the recommended dosage.

Table 4: Transplanting bed preparation and Farm yard manure application

S.No	Recommended practice	Existing practice	Frequency (No.)	Percent (%)
1	Transplanting bed preparation Two times ploughing and one time harrowing	a. 2 times ploughing & 1 time harrowing	8	9.42
		b. 3 times ploughing & 2 times harrowing	56	65.88
		c. 4 times ploughing & 3 times harrowing	21	24.70
2	Application of farm yard manure (FYM) a. 15 tons/acre	Application of farm yard manure (FYM)	24	28.23
		a. 10.0 tons per acre	52	61.17
		b. 12.00 tons per acre c. 15 tons per acre	9	19.58
3	Total		85	100

6. Application of oiled neem cake, green manure and chemical fertilizers

On-farm practice of application of oiled neem cake was observed that 32.95 percent of the selected respondents were using on-par with the package of, practice, 42.35 percent of the farmers were using less than the recommended and nearly 24.70 percent of respondents were using more than the recommended.

Similarly, application of green manures was observed that only 8.23 percent of the farmers were practicing as per the recommendations, 3.52 percent of the farmers were practicing very less than the recommended and very few (2.35 percent) were practicing more than the recommended, hence, the total percent of the respondents who were practicing green manure crops were only 14.1 percent and another 85.9 percent were not practicing green manure application.

With respect to the application of chemical fertilizers it was observed that among the selected respondents only 28.23 percent were applying lower dosage than the recommended whereas, 37.65 percent of the farmers were applying on-par with the recommendations and 34.11 percent were applying more than the recommended and nearly 91.76 percent of the respondents were using water soluble fertilizers through drip irrigation and remaining 8.24 percent were applying as basal and top dressing to the soil as soil application. In, addition, 49.41 percent of the respondents were using micronutrients and remaining 50.58 were not applying any type of the micronutrients.

7. Practice of planting African marigold as trap crop in tomato

The investigated findings with respect to the practice of the planting of African marigold crop showed that 22.35 percent of the respondents were not having the knowledge on trap crop and majority i.e. 60.0 percent of the respondents were practice of raising of fodder maize all along the border of the tomato crop but 17.65 percent of the respondents were responded as the raising of marigold may be the costly.

Table 5: Application of oiled neem cake, green manures and application of Chemical fertilizers

N=85

S.No	Recommended practice	Existing practice	Frequency (No)	Percent (%)
1	Application of oiled neem cake 1. 100 kg per acre	Application of oiled neem cake		
		a. As per PoP	28	32.95
		b. < PoP	36	42.35
		c.> PoP	21	24.70
2	Application of green manures 1. 2.0 tons per acre	Application of green manures		
		a. As per PoP	7	8.23
		b. < PoP	3	3.52
		c.> PoP	2	2.35
3	Application of chemical fertilizers a. 100:100:100 kg NPK per acre	Application of chemical fertilizers		
		a. As per PoP	32	37.65
		b. < PoP	24	28.23
		c.> PoP		

			29	34.12
4	Application of weedicides a. Allachlor 0.6 g/liter PE b. Butachlor 0.6 g/liter PE (PE= Pre emergent)	Application of weedicides a. Metribuzine 1.0 g/liter (It acts as both Pre emergent & Post emergent) a. As per PoP b. < PoP c.> PoP	5 18 62	5.88 21.17 72.95
5	Practice of planting African marigold as trap crop a. For every 16 rows of tomato one row trap crop & as boarder crop	Practice of planting African marigold as trap crop a. KNTC b. Fodder maize c. cost	19 51 15	22.35 60.00 17.64
Total			85	100

8. Application of weedicides in tomato

The application of weedicides revealed that the mass (72.95 percent) of the respondents were had the practice of applying more dosage and 21.17 percent of the farmers had the practice of less than the recommended and only 5.88 percent of the farmers were had the practice of using on-par with the recommended package of practice.

9. Application of plant protection chemicals

The practice of application of plant protection chemicals group includes the insecticides and fungicides. It was observed that the spray of insecticides, the bulk i.e. 54.11 percent of the respondents were spraying more than the recommended, 16.89 percent of the respondents were spraying less than the recommended and only 27.05 percent of the respondents were following the recommended and it was on-par practice, similarly, the spray of fungicides it was observed that 40.0 percent of the farmers were practicing on-par with the recommended package, 25.88 percent of the farmers were less than the recommended and 34.12 percent were practicing more than the recommended.

It was also observed that the number sprays and total spraying solution using on farm per crop in one acre was 48.23 percent of the respondents were spraying 15 times 27.05 percent were spraying 10 times and 24.20 percent of the farmers were spraying 20 times similarly 45.88 percent were spraying 4000 litres of spray solution 32.94 percent of the farmers were spraying 4500 litres of spray solution and only 21.17 percent were spraying 3500 litres of spray solution.

10. Practice of irrigation

a. Number of irrigations per crop

The study indicated that 67.05 percent of the respondents were practicing 60 irrigations per crop, 23.52 percent of the respondents were using 50 irrigations and only 9.41 percent were using 40 irrigations per crop.

b. Quantity of water provided per irrigation

The study indicated that majority 71.76 percent of the farmers usage of water varies from 0.5 to 4.0 litres per plant per irrigation, 17.64 percent of the respondents were using 0.5 to 5.0 litres and only 10.58 farmers were using water varies between 0.5 to 3.0 litres of water per plant per irrigation.

c. Frequency of irrigation

It was revealed that bulk of the farmers 61.17 percent of the farmers were practicing every alternate day 24.98 percent of the farmers were using every day irrigation and 14.11 percent of the farmers were practicing four days once.

d. Duration of the irrigation

The findings indicated that 45.88 percent of the farmers were practicing 1.5 to 2.0 hours, 30.58 percent were practicing 0.5 to 1.0 hr and 23.32 percent were practicing more than 2.0 hours.

Table 6: Irrigation practice in Tomato crop

N=85

S.No.	Recommended practice	Existing practice	Frequency (No.)	Percent (%)
1	Irrigation at critical stages a. Establishment stage b. Flowering stage c. Fruiting stage Weekly once (24 lakh water)	A. Number of irrigations a. 40 irrigations b. 50 irrigations c. 60 irrigations	8 20 57	9.41 23.52 67.05
2	Quantity of irrigation water provided to each plant in each frequency of irrigation	B Quantity of water provided per plant a. 0.5 to 3.0 litters b. 0.5 to 4.0 litters c. 0.5 to 5.0 litters	9 61 16	10.58 71.76 18.82
3	Number or frequency of irrigation to the crop	C.Frequency of irrigation a. Every day once b. Alternated day once c. four days once	21 52 11	24.98 61.17 14.11
4	Total duration or time required for irrigation to entire crop in each frequency	D. Duration of irrigation a. ½ to 1.0 hr b. ½ to 1.5 hr c. ½ to 2.0 hr	26 39 20	30.58 45.88 23.52
5	Total		85	100

DISCUSSION

The findings indicated that majority tomato growers were medium to large size group and they are ready to invest the initial investment and able to borne the cost. Since their total cultivable area was continuously occupied either one third or two thirds by the tomato crop incessant flow of market money could play a crucial role for further investment. More alarming practice was application of synthetic fertilizers and indiscriminate spraying of both insecticides and fungicides. The continuous usage of these pesticides spray solution on crop will adds to soil and it makes soil highly erodability and it also develops the pest resistance in the ecosystem. The non practice of application of crop and soil required farm yard manure could leads to loosening of beneficial soil microbes and it becomes highly susceptible for erosion. Non practice of rising and incorporation of green manure crops will leads to non fixation of atmospheric nitrogen in the soil. Non practice of regular application of both bio-fertilizers and essential micronutrients could create the imbalanced nutrition in the root rhyzosphere region.

SUMMARY

A ground exploration was revealed that 50.59 percent of the respondents belongs to middle age group who had 38.82 percent of their higher primary education (high school level) and 69.42 percent of them were belongs to medium sized family group,61.18 percent were living in joint family system. 49.41 percent were medium type farmers who are cultivating tomato as prime crop. One third to two third portion of the total cultivated area is occupied by tomato throughout the year, 45.89 percent had more than three years and less than ten years of experience in tomato cultivation. The findings also revealed that 85.89 percent were not practicing the soil testing practice before the cropping 24.70 percent were practicing ploughing as over practice. 74.11 percent were maintained excess plant population per unit area. 34.11 percent were applying more chemical fertilizers than the recommended dose. 85.9 percent were not practicing green manure crops application. 72.95 percent were applying more dosage of pre-emergent weedicides. 54.11 percent insecticides and 34.12 percent fungicides application was more than the recommended respectively.45.88 percent were spraying 4000 liters of spray solution and 32.94 percent of the farmers were spraying 4500 liters of spray solution per acre per crop. 67.05 percent were practicing 60 irrigations per crop and 71.76 percent were irrigating 0.5 to 4.0 liters per plant, 61.17 percent were practicing every alternate day and 45.88 percent were following ½ to 1.5 hour for each irrigation.

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