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## Extent of adoption of micro irrigation technology in potato crop

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**Abstract**

Adoption is a decision to make continue full use of an innovation, while adoption process is a mental process through which an individual passes from first hearing about an innovation to its final adoption. The study was carried out in Banaskantha district of Gujarat state during 2018-19. The multistage sampling (three stage) technique was used for selection of taluka, villages and respondents. Among the 14 talukas of Banaskantha district Deesa, Palanpur and Dantiwada were purposively selected from Banaskantha district on the basis of maximum potato crop area. Five villages were selected from each selected taluka on the basis of highest number of potato growers. Thus, total 15 villages having highest number of potato growers were selected. A list of farmers who have installed micro irrigation technology on their farm was obtained from taluka panchayat office. Ten respondents from each village were selected by using random sampling techniques making a sample of 150 respondents. The result indicated that more than two-third of the potato growers (70.00 per cent) have medium level of adoption of micro irrigation technology. While 16.66 per cent and 13.34 per cent of potato growers have low and high level of adoption of micro irrigation technology, respectively. And also observed that the variables viz., education, social participation, land holding, annual income, attitude towards MIT, risk orientation, economic motivation and source of information had positive and significant correlated with extent of adoption of micro irrigation technology.

**Keywords:** MIT (Micro irrigation technology), adoption

**Introduction**

The water is needed for diverse purposes viz., agriculture, industry, domestic use, energy sector etc. In India, only Agriculture sector accounts for over 85 percent of total water uses (Katkar 2006) [3]. The term "micro-irrigation" describes a family of irrigation systems that apply water through small devices. These devices deliver water onto the soil surface very near the plant or below the soil surface directly into the plant root zone. There are main two types of micro irrigation; Drip irrigation, Sprinkler irrigation. Drip irrigation is defined as the practice, slow application of water in the form of discrete or continuous or tiny streams or miniature sprays through mechanical devices called emitters or applicators located at selected points along water delivery lines. Sprinkler irrigation is a method of applying irrigation water which is similar to natural rainfall; water is distributed through a system of pipes usually by pumping. Potato (*Solanum tuberosum*), annual plant in the nightshade family (Solanaceae), grown for its starchy edible tubers. Taking this in view, the present study entitled as "Impact of micro irrigation technology on productivity and income of potato growers of Banaskantha district of Gujarat state" was planned with the following objectives.

**Objectives**

- i. To study the selected characteristics of the potato growers
- ii. To measure the extent of adoption of micro irrigation technology in potato
- iii. To estimate the relationship between selected characteristics of the potato growers and extent of adoption of micro irrigation technology

**Methodology**

The present investigation was carried out in Banaskantha district of Gujarat state during 2018-19. The present study was confirmed to "Ex-Post Facto" research design as the independent variables were already operated in the study area. The multistage sampling (three stage) technique was used for selection of taluka, villages and respondents. Among the 14 talukas of Banaskantha district Deesa, Palanpur and Dantiwada were purposively selected from Banaskantha district on the basis of maximum potato crop area. Five villages were selected from each selected taluka on the basis of highest number of potato growers. Thus, total 15 villages having highest number of potato growers were selected.

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A list of farmers who have installed micro irrigation technology on their farm was obtained from taluka panchayat office. Ten respondents from each village were selected by using random sampling techniques making a sample of 150 respondents.

## Results and Discussion

Selected characteristics of the potato growers were classified into four groups, viz., personal, socio-economical, psychological and communicational. The results in these regards have been presented under following sections.

### Personal variables

#### Age

The data in the Table 1 indicated that one half (50.67 per cent) of the potato growers are from the middle age group, followed by 44.67 per cent and 4.66 per cent in the old and young age group, respectively. The probable reason may be that the GGRC has started functioning since last two decades. During young age they have adopted MIT and reached up to middle age. (Safi 2017 and Dhandhukia 2014) <sup>[9, 1]</sup>.

**Table 1:** Distribution of potato growers according to their age

Sr. No.	Categories of age	Frequency	Per cent
1.	Young age (up to 35 years)	07	04.66
2.	Middle age (36 to 50 years)	76	50.67
3.	Old age (above 50 years)	67	44.67
Total		150	100.00

#### Education

The data in the Table 2 indicated that nearly one half (46.00 per cent) of the potato growers are having primary level of education, followed by 24.00 per cent of potato growers have middle level and 16.00 per cent of potato growers can read and write. Only 6.00 per cent and 3.33 per cent potato growers have high school and graduation or post graduation respectively whereas, 4.67 potato growers are illiterate. The probable reason might be that the nearly half farmers having no alternate income source except agriculture for study so they are engaged in farming work. So in other words, literacy status of potato growers was primary level. (Parmar 2014) <sup>[6]</sup>.

**Table 2:** Distribution of potato growers according to their level of education

Sr. No.	Education level	Frequency	Per cent
1.	Illiterate	07	04.67
2.	Functionally literate	24	16.00
3.	Primary school	69	46.00
4.	Middle school	36	24.00
5.	High school	09	06.00
6.	College/Post graduation	05	03.33
Total		150	100.00

### Social participation

The data in Table 3 indicated that nearly two-third (62.00 per cent) of the potato growers are having membership of one organization, followed by 24.67 per cent of them have membership in more than one organization and 3.33 per cent have no membership. Only 10.00 per cent potato growers are office holders. The probable reason for this may be potato growers that who adopt MIT might have felt that memberships in village organizations are necessary for the development. (Safi 2017) <sup>[9]</sup>.

**Table 3:** Distribution of potato growers according to their social participation

Sr. No.	Social participation	Frequency	Per cent
1.	No participation	05	03.33
2.	Membership in one organization	93	62.00
3.	Membership in more than one organizations	37	24.67
4.	Membership with office bearer	15	10.00
Total		150	100.00

### Socio-economical variables

#### Land holding

The data in the Table 4 indicated that more than one third (40.00 per cent) of potato growers have 1.00 to 2.00 ha of land holding, followed by 38.00, 12.67 and 9.33 per cent have up to 1 ha, 2.01 to 4.00 ha and above 4.00 ha of land holding, respectively. The probable reason might be that the farmers having large family size because of large family they have possess small and fragmented land holding. (Patel *et al.* 2017 and Parmar 2014) <sup>[7, 6]</sup>.

**Table 4:** Distribution of the potato growers according to their land holding

Sr. No.	Land holding	Frequency	Per cent
1.	Marginal (up to 1.00 ha)	57	38.00
2.	Small (1.01 to 2.00 ha)	60	40.00
3.	Medium (2.01 to 4.00 ha)	19	12.67
4.	Big (above 4.00 ha)	14	09.33
Total		150	100.00

#### Annual income

The data in the Table 5 indicated that more than two-third of the potato growers (68.00 per cent) have semi medium to medium annual income, followed by 22.00 per cent and 10.00 per cent of potato growers have low and high annual income, respectively. The probable reason may be adoption of MIT increased their income per unit area. (Safi 2017; Patel *et al.* 2017 and Parmar 2014) <sup>[9, 7, 6]</sup>.

**Table 5:** Distribution of potato growers according to their annual income

Sr. No.	Annual income	Frequency	Per cent
1.	Low annual income (up to ₹ 1,00,000/-)	33	22.00
2.	Semi Medium (in between ₹ 1,00,001- ₹ 2,50,000)	68	45.33
3.	Medium (in between ₹ 2,50,000 to ₹ 5,00,000)	34	22.67
4.	High annual income (above ₹ 5,00,000/-)	15	10.00
Total		150	100.00

### Psychological variables

#### Attitude of respondents towards micro irrigation technology

The data in the Table 6 indicated that more than two-third of potato growers (69.33 per cent) have moderately favourable attitude towards micro irrigation technology whereas, 16.00 per cent and 14.67 per cent of potato growers are possessed highly and less favourable attitude towards micro irrigation technology, respectively. This might be due to the fact that potato growers might have motivated through tremendous benefits of micro irrigation technology under acute shortage of water as well as they were provided with financial incentive under central and state sponsored motivational

schemes for micro irrigation which might have played a major role in building up favourable attitude. (Safi 2017)<sup>[9]</sup>.

**Table 6:** Distribution of the potato growers according to their attitude towards the micro irrigation technology

Sr. No.	Attitude	Frequency	Per cent
1.	Less favourable (up to 65.79 score)	022	14.67
2.	Moderately favourable (in between 65.79 to 78.45 score)	104	69.33
3.	Highly favourable (above 78.45 score)	024	16.00
Total		150	100.00

Mean = 72.12

S.D. = 6.33

### Risk orientation

The data in the Table 7 indicated that nearly two-third (65.34 per cent) of potato growers have medium risk, followed by 25.33 per cent and 9.33 per cent of them have low and high risk orientation, respectively. The probable reason behind the present finding is that due to favourable land for potato crop and medium level land holding of potato growers, they might have preferred to take risk in adoption of modern irrigation technology.

**Table 7:** Distribution of the respondents according to their risk orientation

Sr. No.	Risk orientation	Frequency	Per cent
1.	Low (up to 21.12 score)	38	25.33
2.	Medium (in between 21.12 to 28.22 score)	98	65.34
3.	High (above 28.22 score)	14	09.33
Total		150	100.00

Mean=24.67

S.D. = 3.55

### Economic motivation

The data in the Table 8 indicated that more than two-third (69.33 per cent) of the potato growers have medium level of economic motivation, followed by 16.67 percent and 14.00 per cent of potato growers have high and low level of economic motivation, respectively. The probable reason for the above situation might be that majority of the potato growers might have considered agriculture as more remunerative occupation as compared to other occupations. (Safi 2017)<sup>[9]</sup>.

**Table 8:** Distribution of potato growers according to their economic motivation

Sr. No.	Economic motivation	Frequency	Per cent
1.	Low (up to 23.91 score)	021	14.00
2.	Medium (in between 23.91 to 31.79 score)	104	69.33
3.	High (above 31.79 score)	025	16.67
Total		150	100.00

Mean = 27.85

S.D. = 3.94

### Communicational variables

#### Sources of information

The data in the Table 9 indicated that nearly two-third of potato growers (62.67 per cent) utilizes medium sources of information, followed by 19.33 per cent and 18.00 per cent who utilized high and low source of information, respectively. The probable reason behind the present finding is that the potato growers used the local source of information viz., friends, neighbours, relative, progressive farmers and village level worker for the upgrading his knowledge in new

agriculture technology. (Dhandhukia 2014 and Parmar 2014)<sup>[1, 6]</sup>.

**Table 9:** Distribution of the respondents according to their sources of information utilized

Sr. No.	Categories of information source used	Frequency	Per cent
1.	Low (up to 11.24 score)	27	18.00
2.	Medium (in between 11.24-17.04 score)	94	62.67
3.	High (above 17.04 score)	29	19.33
Total		150	100.00

Mean = 14.14

S.D. = 2.90

### Adoption of micro irrigation technology

Adoption is a decision to make continue full use of an innovation, while adoption process is a mental process through which an individual passes from first hearing about an innovation to its final adoption. The data in the Table 10 indicate that more than two-third of the potato growers (70.00 per cent) have medium level of adoption of micro irrigation technology. While 16.66 per cent and 13.34 per cent of potato growers have low and high level of adoption of micro irrigation technology, respectively. In general, a large majority of the potato growers (83.34 per cent) had medium to high level of adoption of micro irrigation technology.

**Table 10:** Distribution of potato growers according to their extent of adoption of micro irrigation technology

Sr. No.	Extent of adoption	Frequency	Per cent
1.	Low (up to 15.51 score)	025	16.66
2.	Medium (in between 15.51 to 19.73 score)	105	70.00
3.	High (above 19.73 score)	020	13.34
Total		150	100.00

Mean = 17.62

S.D. = 2.11

This might may be due to that the research area having high infiltration rate of soil, dry land area, low moisture holding capacity, high temperature and also risk orientation, economic motivation, favourable attitude towards micro irrigation technology and for saving the water losses in field so potato growers adopt the micro irrigation technology. (Parmar 2014 and Dhandhukia 2014)<sup>[6, 1]</sup>.

**Table 11:** Relationship between selected characteristics of the potato growers and extent of adoption of micro irrigation technology

Sr. No.	Independent variables	Correlation coefficient ('r' value)
I	Personal variables	
	X <sub>1</sub> Age	0.021 <sup>NS</sup>
	X <sub>2</sub> Education	0.182*
	X <sub>3</sub> Social participation	0.162*
II	Socio-economic variables	
	X <sub>4</sub> Land holding	0.167*
	X <sub>5</sub> Annual income	0.169*
III	Psychological variables	
	X <sub>6</sub> Attitude towards MIT	0.161*
	X <sub>7</sub> Risk orientation	0.160*
	X <sub>8</sub> Economic motivation	0.175*
IV	Communicational variables	
	X <sub>9</sub> Source of information	0.203*

\* = Significant at 5 per cent level, \*\* = Significant at 1 per cent level, NS = Not significant

The table 11 is indicated the results of correlation analysis that out of the nine independent variables, eight variables *viz.*, education, social participation, land holding, annual income, attitude towards MIT, risk orientation, economic motivation and source of information had positive and significant correlated with extent of adoption of micro irrigation technology. Age had positive and not significant correlated with extent of adoption of micro irrigation technology.

Thesis (Unpublished). Tamil Nadu Agricultural University, Coimbatore, 1977.

### Conclusion

In light of the above findings, following conclusions can be drawn. Due to that the research area having high infiltration rate of soil, dry land area, low moisture holding capacity, high temperature and also risk orientation, economic motivation, favourable attitude towards Micro irrigation technology and for saving the water losses in field so a large majority of the potato growers had medium to high level of adoption of micro irrigation technology. It was observed that the variables *viz.*, education, social participation, land holding, annual income, attitude towards MIT, risk orientation, economic motivation and source of information had positive and significant correlated with extent of adoption of micro irrigation technology. Age had positive and not significant correlated with extent of adoption of micro irrigation technology.

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