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### Perception of Farmers About Water Use Efficiency in Potato

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**Abstract:** Water use efficiency is defined as yield of plant product (tonnes of wheat grain,  $Y$ ) per unit of crop water use (mega liters of water lost by evapo-transpiration,  $ET$ ), and is important in all areas of plant production. The present study was carried out in Banaskantha district. The total area under potato cultivation is highest in Banaskantha district. Banaskantha district has twelve talukas, out of these twelve talukas, three talukas *viz.* Deesa, Lakhani and Dantiwada were selected purposively as these talukas are having large area under potato cultivation. Nearly half (47.50%) of the respondents were in the middle age group. Maximum number of respondents had medium annual income (80.00 per cent). Nearly half (49.16%) of the farmers were having medium size of land holding. So far as cropping intensity is concerned, 41.67 per cent of the respondents had medium cropping intensity. The variables *viz.* land holding, cropping system and type of irrigation were found having significant and positive relationship with farmers' perception. A great majority (92.50%) of the respondents perceived that MIS increase the water use efficiency and ranked first. 91.67 per cent of the respondents had perceived that organic matter in the soil increase. Majority 92.50 per cent of the respondents had adopted micro irrigation and ranked first followed by use of organic matter 79.16 per cent and ranked second.

**Keywords:** Water use efficiency, cropping intensity

#### INTRODUCTION

Water use efficiency is defined here as yield of plant product (tonnes of wheat grain,  $Y$ ) per unit of crop water use (mega litres of water lost by evapo-

transpiration,  $ET$ ), and is important in all areas of plant production.

Water use efficiency ( $Y/ET$ ) is the outcome of an entire suite of plant and environmental processes

operating over the life of a crop to determine both  $Y$  and  $ET$ . Consequently, biomass production per unit  $ET$ , has been used extensively as an interim measure of water use efficiency.  $ET$  comprises non-productive evaporation ( $E$ ) of water from the soil surface and productive transpiration ( $T$ ) of soil-stored water by the plant. Evaporation of free water from leaf surfaces adds to non-productive evaporation (interception evaporation). The basic equation describing  $ET$  distinguishes productive and non-productive evaporation.

Agriculture is the main economic activity in the district. Many farmers are not knew about water use efficiency and facing the problems on water stress.. Thus, view perception of farmers towards water use efficiency in Banaskantha district is felt necessary with following objectives.

### OBJECTIVES

To study the personal characteristics of farmers

1. To study personal characteristics of farmers.
2. To study relationship between personal characteristics and perception of farmers about water use efficiency in potato.
3. To know the perception of farmers about water use efficiency in potato
4. To study the adoption of different practices for increasaing water use efficiency in potato

### METHODOLOGY

The present study was carried out in Banaskantha district. The total area under potato cultivation is highest in Banaskantha district. Banaskantha district has twelve talukas, out of these twelve talukas, three talukas *viz.* Deesa, Lakhani and Dantiwada were selected purposively as these talukas are having large area under potato cultivation. Following four villages from each three talukas were purposively selected

for the study. Thus, 120 farmers were selected for present study.

Sr. No.	Name of taluka	Name of villages	No. of farmers
1	Deesa	1. Malgadh	40
		3. Rampura	1.
		4. Vasna	
2	Lakhani	5. Sarkari golia	40
		7. Manki	
		8. Dera	
3	Dantiwada	9. Nilpur	40
		11. Ranpur	1.
		12. Lodpa	
TOTAL			120

### RESULT AND DISCUSSION

The facts and findings derived after analyzing the data have been presented under the following sub heads.

It can be observed from Table 1 that nearly half (47.50 %) of the farmers were in the middle age group followed by old age group (35.84 %). Only 16.66 per cent of the farmers were in young group. Maximum number of respondents had medium annual income (80.00 per cent) followed by low annual income (15.00 %). Only 5.00 per cent of the respondents had high annual income. Nearly half (49.16%) of the farmers were having medium size of land holding. Whereas, 25.00 per cent of the respondents had small size of land holding followed by 15.84 per cent of the respondents had marginal size of land holding. Only 10.00 per cent of the respondents had large size of land holding. So far as cropping intensity is concerned, 41.67 per cent of the respondents had medium cropping intensity followed by 35.00 per cent and 10.00 per cent of the respondents had high and low cropping intensity respectively. A great majority (82.50 %) of the respondents had sprinkler irrigation followed by 10.00 per cent of the respondents had drip irrigation. Only 7.50 per cent of the respondents had flood irrigation.

**Table 1**  
**Personal characteristics of farmers n = 120**

Sr. No.	Characteristics	Category	Number	Per cent
1.	Age	1. Young (Up to 35 years)	20	16.66
		2. Middle (In betn. 35 to 50 years)	57	47.50
		3. Old (Above 50 years)	43	35.84
2	Annual income	1. Low (Up to 68,000Rs)	18	15.00
		2. Medium (In betn. 680001 to 172000 Rs)	96	80.00
		3. High (Above 172000 Rs.)	06	5.00
3.	Land holding	Marginal (Up to 1.00 ha)	19	15.84
		Small (In betn 1.01 to 2.0 ha)	30	25.00
		Medium (In betn 2.01 to 4.0 ha)	59	49.16
		Large (More than 4.00 ha)	12	10.00
4.	Cropping intensity	Low - less than 150	28	23.33
		Medium -Between 150 to 200	50	41.67
		High – more than 200	42	35.00
5.	Type of irrigation	Drip irrigation	12	10.00
		Sprinkler irrigation	99	82.50
		Flood irrigation	07	7.50

**Table 2.**  
**Correlation co-efficient of selected independent variables with farmers' perception about water use efficiency. (n=120)**

Sr. No.	Characteristics	r' value
1.	Age	0.0494 NS
2.	Annual income	0.1025 NS
3.	Land holding	0.3068**
4.	Cropping intensity	0.4769**
5.	Type of irrigation	0.4625**

\*\* = Significant at 0.01 level of significance

NS = Non significant

Based on co-efficient of correlation, three variable *viz.* land holding, cropping system and type of irrigation were found having significant and positive relationship with farmers' perception about water use efficiency at 0.01 level of significance.

Whereas; age and annual income were failed to establish any significant relationship with farmers' perception about water use efficiency

It can be seen from Table 3 that, a great majority (92.50 %) of the respondents perceived that MIS increase the water use efficiency and ranked first. 91.67 per cent of the respondents had perceived that organic matter in the soil increase WUE even in sandy soil and ranked second. Majority (84.17%) of the respondents had perceived irrigation at hot day time reduces the WUE. Majority (77.50%) of the respondents had perceived WUE is less in dry areas where sandy soil is prevalent. Maximum (76.66 %) of the respondents had perceived that over and under supply of nutrient will reduce the WUE. About 75.00 per cent of the respondents had perceived that shallow depth of soil reduces the water use efficiency.

**Table 3**  
**Perception of farmers about water use efficiency in Potato (n=120)**

Sr. No.	Statement	No.	Per cent	Rank
1	Shallow depth of soil reduces the water use efficiency	90	75.00	VI
2	If the number of irrigation per unit time increases then the WUE will decrease	70	58.33	XI
3	Irrigation at hot day time reduces the WUE	101	84.17	III
4	Adoption of MIS actually increases the WUE	111	92.50	I
5	Mulching reduces water loss by evaporation, hence increases the WUE	82	68.33	VIII
6	Excess water actually harm the root of plants and reduces the water uptake by the plant	79	65.83	IX
7	Compacted saturated soil retain less water as compared to well pulverised saturated soil	50	41.67	XIV
8	WUE is less when leaching and evaporation loss is high	62	51.67	XIII
9	WUE is less in dry areas where sandy soil is prevalent	93	77.50	IV
10	Organic matter in the soil increase WUE even in sandy soil	110	91.67	II
11	Growing annual crop with light tillage (not more than 70 mm. depth) will reduce water loss	72	60.00	X
12	Over and under supply of nutrient will reduce the WUE	92	76.66	V
13	WUE will reduced if the soil temperature reduced to below 20 °C in warm season	37	30.83	XV
14	Well balanced fertiliser encourages good crop growth and yield thus increases the WUE	85	70.83	VII
15	More crop per unit of water consumption means more WUE	65	54.17	XII

**Table 4**  
**Extent of adoption of different practices for increasing water use efficiency in potato**  
 (n=120)

Sr. No.	Practices	Frequency	Per Cent	Rank
1	Not irrigating during hot time	82	68.33	IV
2	Adoption of MIS	111	92.50	I
3	Mulching	15	12.50	V
4	Organic matter	95	79.16	II
5	Use of balanced fertilizer	88	73.33	III

The data depicted in Table 4 indicate that majority 92.50 per cent of the respondents had adopted micro irrigation and ranked first followed by use of organic matter 79.16 per cent and ranked second. About 73.33 per cent of the respondents

had adopted balanced fertilizer means no over or under supply of nutrients. Nearly two third 68.33 per cent respondents not irrigating the crop during hot time. Only 12.50 per cents of the respondents had adopted mulching for increasing water use efficiency.

### CONCLUSION

Nearly half (47.50 %) of the respondents were in the middle age group. Maximum number of respondents had medium annual income (80.00 per cent). Nearly half (49.16%) of the farmers were having medium size of land holding. So far as cropping intensity is concerned, 41.67 per cent of the respondents had medium cropping intensity. The variables *viz.* land holding, cropping system and type of irrigation were found having significant and positive relationship with farmers' perception. A

great majority (92.50%) of the respondents perceived that MIS increase the water use efficiency and ranked first. 91.67 per cent of the respondents had perceived that organic matter in the soil

increase. Majority 92.50 per cent of the respondents had adopted micro irrigation and ranked first followed by use of organic matter 79.16 per cent and ranked second.