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Attitude of Kinnow Growers toward Drip Irrigation System in Haryana State, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The study measured the attitudes of Kinnow growers towards Drip Irrigation System for Kinnow production. The study was conducted in purposively selected district of Sirsa and Hisar of state Haryana because of the maximum number of Kinnow growers under Drip Irrigation System. From each district, two blocks were selected also based on maximum number of Kinnow growers under Drip Irrigation System. After that 20 respondents were selected randomly from each selected block thus making a total sample of 80 respondents. An interview schedule consisting of measuring devise of dependent and independent variables along with the face data of responses were used for collecting responses of respondents. The data collected were tabulated, analyzed, Interpreted and meaningful inferences drawn. The study shows that majority of respondents (72.50%) had most favourable attitude towards Drip Irrigation System. On the technical aspect, the study indicates that more than two third of respondents (63.80%) had favourable attitude, 71.20 Per cent respondents belonging to favourable attitude towards economical aspect, more than half (57.50%) of the respondents had most favourable attitude towards social aspects, a majority of the respondents (83.70%) were found to have most favourable attitude towards input management aspect and nearly about two thirds (61.20 %) of the respondents had most favourable attitude towards water management aspect of Kinnow production under Drip Irrigation System.

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1. INTRODUCTION

India is the second largest producer of fruits after China, with a production of 99.07 million metric tonnes of fruits from an area of 6.66 million hectares [1,2]. A large variety of fruits are grown in India, of which mango, banana, citrus, guava, grape, pineapple and apple are the major ones. Haryana state ranks 9th in citrus production. Haryana state has been divided into two regions *viz*: north-east and south-west depending on the agro climatic conditions [3-6]. Drip Irrigation is basically precise, slow and artificial application of water in the form of discrete continuous drops. Through this system of irrigation, water reaches the root drop by drop and hence it is an economic method of irrigation. Drip Irrigation has been popularized in Haryana and 26,570 ha. has been covered under Drip Irrigation System to improve product quality and maximize scare irrigation water use [7-10]. Sirsa is the most famous district for producing the Kinnow in Haryana and also front runner district in the production of Kinnow. With the background in view, this study on Kinnow production under Drip Irrigation System in Haryana was undertaken in the Sirsa and Hisar districts.

2. METHODOLOGY

The study was conducted in Sirsa and Hisar district of Haryana. These districts were selected purposively because of the maximum number of Kinnow growers under Drip Irrigation System. From each district, two blocks Dabwali and Ellenabad from Sirsa district and Adampur and Hisar-II from Hisar district were selected again purposively, as these blocks have maximum Kinnow growers under Drip Irrigation Systems in their respective district. After this a list of all the beneficiaries, who have installed Drip Irrigation System at their farm was prepared from each of the four selected blocks. From each block 20 Kinnow growers using Drip Irrigation System for Kinnow production were selected, randomly. In this way a total number of 80 Kinnow growers using Drip Irrigation System were selected for the present study. An interview schedule consisting of measuring devise of dependent and independent variables along with the face data of responses was used for collecting responses of respondents. The data so collected were tabulated, analyzed and interpretation to draw meaningful inferences.

3. RESULTS AND DISCUSSION

3.1 Kinnow Growers' Attitude towards Drip Irrigation System

3.1.1 Overall attitudes of Kinnow growers towards Drip Irrigation System for Kinnow production

It is evident from Table 1 that majority of respondent (72.50%) had most favourable attitude towards Drip Irrigation System. However, the remaining 27.50 per cent were having favourable attitude however, none of the respondent had unfavourable attitude towards Drip Irrigation System. The results regarding the overall attitude of Kinnow growers towards Drip Irrigation System revealed that all the respondents had highly favourable and positive attitude towards Drip Irrigation System. It shows that farmers understand the importance of judicious use water for crop production. This might be due to the fact that the farmers have realized by experience the importance of Drip Irrigation System as improved water saving farm technology.

3.2 Aspect Wise Attitude of Kinnow Growers toward Drip Irrigation System

The data obtained from the Kinnow growers five major aspects i.e., technical aspect, economical aspect, social aspect, input management and water management of attitude towards Drip Irrigation System were further analyzed and the results so obtained have been presented in Table 2.

Table 1. Overall attitude of Kinnow growers toward Drip Irrigation System for Kinnow production (N=80)

Sr. No.	Attitude	Score / rang	Frequency	Percentage	Mean
1.	Unfavourable	<34	00	00.00	
2.	Favourable	34-68	22	27.50	73.063
3.	Most favourable	>68	58	72.50	

3.2.1 Technical aspect

It is seen from the Table 2 that more than two third of respondents (63.80 %) had favourable and positive attitude towards technical aspect of Drip Irrigation System for Kinnow production. One third of respondent (33.70 %) had most favourable attitude toward technical aspect of Drip Irrigation System and remaining only 2.50 per cent of respondents had unfavourable attitude toward technical aspects of Drip Irrigation System.

3.2.2 Economical aspect

The respondents belonging to favourable and most favourable attitude towards economical aspect of Drip Irrigation System for Kinnow production were found to be 71.20 and 25.00 per cent, respectively Whereas, only 3.80 per cent had unfavourable attitude (Table 2).

3.2.3 Social aspect

The Table 2 further revealed that more than half (57.50%) of the respondents had most favourable and 40.00 per cent of them had favourable attitude and only 2.50 per cent of farmer had unfavourable attitude towards social aspects of Drip Irrigation System for Kinnow production. The study has brought to surface that most of the respondents (97.50%) of the opinion that the Kinnow production under Drip Irrigation System will improve the social status of farmers in the society.

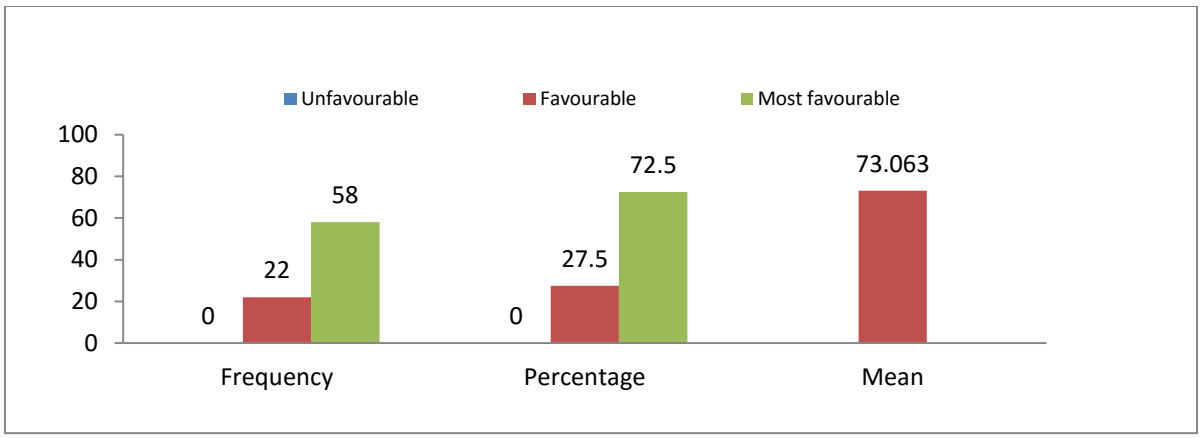

Fig. 1. Overall attitudes of Kinnow growers towards Drip Irrigation System for Kinnow production

Table 2. Aspects wise Kinnow growers' attitude toward Drip Irrigation System (N=80)

Sr. No.	Attributes	Categories	Scale / range	Frequency	Percentage	Mean
1	Technical aspect	Unfavourable	<13	20	2.50	
		Favourable	13-26	51	63.00	25.30
		Most favourable	>26	27	33.70	
2	Economical aspect	Unfavourable	<8	3	03.80	
		Favourable	8-16	57	71.2	14.52
		Most favourable	>16	20	25.00	
3	Social aspect	Unfavourable	<7	02	02.50	
		Favourable	7-14	32	40.00	14.87
		Most favourable	>14	46	57.50	
4	Input management aspect	Unfavourable	<3	00	00.00	
		Favourable	3-6	13	16.30	07.60
		Most favourable	>6	67	83.70	
5	Water management aspect	Unfavourable	<5	01	01.30	
		Favourable	5-10	30	37.50	10.73
		Most favourable	>10	49	61.20	

3.2.4 Input management aspect

A great majority of respondents (83.70%) were found to have most favourable attitude towards input management aspect of Drip Irrigation System for Kinnow production and 16.30 per cent had favourable attitude. None of the farmer had unfavourable attitude towards input management aspect of Drip Irrigation System for Kinnow production. This shows that farmer is highly impressed with the input management capacity of the Drip Irrigation System technology for Kinnow production.

3.2.5 Water management aspect

A perusal of the data presented in Table 2 shows that near about two third (61.20 %) respondents had most favourable attitude and 37.50 per cent had favourable attitude about water management aspect. Only 1.30 per cent of respondents had unfavourable attitude towards water management aspect of Kinnow production under Drip Irrigation System.

Even through the number of respondents with unfavourable attitude for water management aspect is very low even, steps may be taken to improve the technology for fully acceptance as this technology is mainly meant for water management aspect.

3.3 Item Wise Attitude Score of Respondents

3.3.1 Item wise attitude score of respondents regarding technical aspect

The mean score of each statement was obtained by adding the weights given to the statement by respondent divided by the total number of the respondent. The mean score was worked out for each statement and rank positions were assigned on the basis of their mean score.

It is apparent from Table 3 that the highest mean was for the statement “In Drip Irrigation there is no effect of high wind velocity on equal distribution of water as in case of sprinkler irrigation” (M= 1.94), followed by the statement “Drip Irrigation is highly effective in sandy soil” (M = 1.64). “The Drip System is not beneficial where hard crust of soil form after irrigation” (M = 1.59) occupied 3rd position. “Clogging of dripper is frequent” (M = 1.56) and “Suitable fertilizers are available for use with Drip Irrigation System” (M = 1.55) occupied rank 4th and 5th, respectively.

It also appears from the Table 3 that the statement “Drip System is useful in minimizing soil erosion”, “It is water efficient technology” and “Drip Irrigation System is good for fruit orchards” occupied jointly 6th position with a mean score 1.54. “PVC pipes are damaged due to cultivation operation” (M = 1.49). “Drip Irrigation is equally effective in all types of soil” (M = 1.44), “Drip Irrigation System is a simple technology” with (M = 1.40), “Pressure gauge is used by farmers to check the cleaning need of filters” (M = 1.36), “Drip System improves the quality of fruit crops” (M = 1.34) and “Farmer regularly flushes the lateral line” with mean score 1.19 occupied 8th, 9th, 10th, 11th and 12th ranks, respectively. The statement “Drip Irrigation System does not interfere with the movement of farm machinery” and “Post installation service is easily available” and occupied rank 13th with a mean score 1.16 followed by “Drip Irrigation hinders the development of root zone of the plants and ultimately reduces the fruit production” (M = 1.14), “Sub main line and cleaning of filters” (M = 1.13), and “Drip Irrigation System is a useless technology” (M = 0.05) were found 14th, 15th, and 16th ranks, respectively.

3.3.2 Mean attitude score of respondent’s economic aspect

From the economical aspect data presented in Table 4 showed that “Drip Irrigation System causes no hindrance in farming operation” got 1st rank with mean score 1.63 followed by the statement “There is no need to make irrigation channels and check basin for Drip Irrigation System” with mean score 1.55 and 3rd rank was occupied by “There is minimum loss of fertilizer through Drip Irrigation method” mean score 1.53.

The statement “Land leveling is not essential for Drip Irrigation System” (M = 1.48), “Drip Irrigation achieves higher and better quality crop yield” (M = 1.47), “Drip Irrigation System is only pump show of Govt. department as it is not good than conventional irrigation system in Kinnow orchards” (M = 1.46), “Drip Irrigation saves the crop from frost” (M = 1.44), “Parts are not easily available in market as in case of defect” (M = 1.34), “This technology improves economic condition of farmer” (M = 1.29), and “Drip Irrigation System is also beneficial for commercial crops like cotton, sugar cane etc.” (M = 1.03) had got 4th, 5th, 6th, 7th, 8^{th,} 9th and 10th ranks, respectively.

Table 3. Mean attitude score of respondents regarding technical aspect (N=80)

Sr. No	Technical aspect	Mean	Rank
1.	In Drip Irrigation there is no effect of high wind velocity on equal distribution of water as in case of sprinkler irrigation.	1.94	1
2.	Drip Irrigation is highly effective in sandy soil.	1.64	2
3.	The Drip System is not beneficial where hard crust of soil form after irrigation.	1.59	3
4.	Clogging of dripper is frequent.	1.56	4
5.	Suitable fertilizers are available for use with Drip Irrigation System.	1.55	5
6.	Drip System is useful in minimizing soil erosion.	1.54	6
7.	It is water efficient technology.	1.54	6
8.	Drip Irrigation System is good for fruit orchards.	1.54	6
9.	PVC pipes are damaged due to cultivation operation	1.49	7
10.	Drip Irrigation is equally effective in all types of soil.	1.44	8
11.	Drip Irrigation System is a simple technology.	1.40	9
12.	Pressure gauge is used by farmers to check the cleaning need for filters.	1.36	10
13.	Drip System improves the quality of fruit crops.	1.34	11
14.	Farmer regularly flushes the lateral line	1.19	12
15.	Drip Irrigation System does not interfere with the movement of farm machinery.	1.16	13
16.	Post installation service is easily available	1.16	13
17.	Drip Irrigation hinders the development of root zone of the plants and ultimately reduces the fruit production.	1.14	14
18.	Sub main line and cleaning of filters.	1.13	15
19.	Drip Irrigation System is a useless technology.	0.05	16

Table 4. Mean attitude score of Kinnow growers regarding economic aspect (N=80)

Sr. No.	Economical aspect	Mean	Rank
1.	In Drip Irrigation System there is no problem in farming operation.	1.63	1
2.	There is no need to make irrigation cannels and check basin for Drip Irrigation System.	1.55	2
3.	There is minimum loss of fertilizer through Drip Irrigation method.	1.53	3
4.	Land leveling is not essential for Drip Irrigation System.	1.48	4
5.	Drip Irrigation achieves higher and better quality crop yield.	1.46	5
6.	Drip Irrigation System is only pump show of govt. department as it is not good than conventional irrigation system in Kinnow orchards.	1.45	6
7.	Drip Irrigation saves the crop from frost.	1.44	7
8.	Parts are not easily available in market as in case of defect.	1.34	8
9.	This technology improves economic condition of farmer.	1.29	9
10.	Drip Irrigation System is also beneficial for commercial crops like cotton, sugar cane etc.	1.03	10

3.3.3 Mean attitude score of Kinnow growers regarding social aspect

Table 5 shows that "Drip Irrigation System enhances the social status of farmer" occupied top rank with mean score 1.61 followed by "Drip Irrigation System is socially acceptable technology" with mean score 1.58, "Drip Irrigation System increases the working efficiency of farmer" with mean score 1.56 occupied 3rd rank. The statement "Drip Irrigation System owning farmers have high social participation" (M = 1.54), "Social contact of farmer increases by adopting Drip Irrigation" (M = 1.51), "Farmers having Drip Irrigation System purchase better agriculture implements" (M = 1.47), and "Drip Irrigation System technology improves the living standard of the farmers" (M = 1.45), listed 4th, 5th, 6th and 7th ranks, respectively. "This technology has no effect on the social sphere of the farmers" and "Installation of Drip Irrigation System on farm increases the reputation of farmers among the fellow farmers" with same mean score 1.33 occupied 8th ranks. The remaining social aspects of attitude "Farmers having Drip Irrigation System purchase more agriculture land" and "Farmers

have no interest in Drip Irrigation System" got 8th and 9th ranks with mean score 1.20 and 0.24, respectively.

3.3.4 Mean attitude score of Kinnow growers regarding input management aspect

Among the input management aspects "Drip Irrigation effectively introduces fertilizer in the root zone with the irrigation water" Fetched top position mean score 1.59 followed by "By adopting Drip Irrigation farmer are realizing the importance of micro irrigation technology" with mean score 1.53.

The remaining statements "Training of technical knowledge is required for operating Drip Irrigation System", "Enhance the sense of economic use of water among the farmers" and "Farmer is reluctant to repair Drip System" with mean score 1.51, 1.50 and 1.41 occupied 3rd, 4th and 5th rank, respectively.

3.3.5 Mean attitude score of Kinnow growers regarding water management aspect

The Table 7 Shows that the statement "Farmers are also adopting the idea of water harvesting and storage by using Drip Irrigation" occupied 1st rank with 1.68 mean score followed by "Surface runoff of irrigation water can be eliminated by Drip Irrigation System" (M = 1.63). The statements "Under limited water resources Drip Irrigation is economical than Conventional irrigation system", "In Drip Irrigation System, quantity of water can be controlled according to crops need". "Higher water application efficiency normally be obtained by Drip Irrigation", "With judicious use of Drip Irrigation evaporation losses and deep percolation of water is very low [11-13]" and "Drip Irrigation applies water frequently at very low rate to achieve efficiency" had 3rd, 4th, 5th, 6th and 7th ranks with mean score 1.61, 1.60, 1.54, 1.40, and 1.29, respectively.

Table 5. Mean attitude score of Kinnow growers regarding social aspect (N=80)

Sr. No.	Social aspect	Mean	Rank
1.	Drip Irrigation System enhances the social status of farmer.	1.61	1
2.	Drip Irrigation System is socially acceptable technology	1.58	2
3.	Drip Irrigation System increases the working efficiency of farmer.	1.56	3
4.	Drip Irrigation System owning farmers have high social participation.	1.54	4
5.	Social contact of farmer increases by adopting Drip Irrigation.	1.51	5
6.	Farmers having Drip Irrigation System purchase better agriculture implements.	1.46	6
7.	Drip Irrigation System technology improves the living standard of the farmers.	1.45	7
8.	This technology has no effect on the social sphere of the farmers.	1.33	8
9.	Installation of Drip Irrigation System on farm increases the reputation of farmers among the fellow farmers.	1.33	8
10.	Farmers having Drip Irrigation System Purchase more Agriculture land.	1.20	9
11.	Farmers have no interest in Drip Irrigation System.	0.24	10

Table 6. Mean attitude score of respondents regarding input management aspect (N=80)

Sr. No.	Input management	Mean	Rank
1.	Drip Irrigation effectively introduces fertilizer in the root zone with the irrigation water.	1.59	1
2.	By adopting Drip Irrigation farmer are realizing the importance of micro irrigation technology.	1.53	2
3.	Training of technical knowledge is required for operating Drip Irrigation System.	1.51	3
4.	Enhance the sense of economic use of water among the farmers.	1.50	4
5.	Farmer is reluctant to repair Drip System.	1.48	5

Table 7. Mean attitude score of respondents regarding water management aspect (N=80)

Sr. No.	Water management	Mean	Rank
1.	Farmers are also adopting the idea of water harvesting and storage by using Drip Irrigation.	1.68	1
2.	Surface runoff of irrigation water can be avoided by Drip Irrigation System.	1.63	2
3.	Under limited water resources Drip Irrigation is economical than conventional irrigation system.	1.61	3
4.	In Drip Irrigation System, quantity of water can be controlled according to crop requirement.	1.60	4
5.	Higher water application efficiency normally be obtained by Drip Irrigation	1.54	5
6.	With judicious use of Drip Irrigation, evaporation losses and deep percolation of water is very low.	1.40	6
7.	Drip Irrigation applies water frequently at very low rate to achieve efficiency.	1.29	7

4. CONCLUSION

The majority of Kinnow growers had most favourable attitude towards Drip Irrigation System. The remaining were having favourable attitude. moreover, none of the respondent had unfavourable attitude towards Drip Irrigation System. In case of selected aspects under study viz; Technical, Economical, Social, Input management and Water management most of farmers were under favourable to most favourable attitude toward Drip Irrigation System. Through the findings of the study regarding existing attitude level of the farmers towards Drip Irrigation System and its various technical aspects the attitude of farmers can be sifted in order to increase the most favourable attitude if the planners, executors, researchers and administrators will provide different sources and methods of information about the Drip Irrigation System in an effective manner so most favourable attitude should be developed to boost-up the adoption of technology.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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