



A STUDY ON THE EFFICIENCY OF WATER USE AND KNOWLEDGE OF IRRIGATION MANAGEMENT PRACTICES

Darling B. Suji and J. Vasanthakumar

Department of Agricultural Extension, Faculty of Agriculture, Annamalai University,
Annamalainagar - 608002 (Tamilnadu), India.

Abstract

A Study was conducted in Kanayakumari district to find out the knowledge of irrigation management practices. The study reveals that 53.67 percent were found to possess medium level of knowledge. Age showed a positive and significant relationship towards their knowledge. “Neerindramaiyathu Vulagu” said the ancient Tamil saint Thiruvalluvar. Without water the world does not live and the earth cannot exist only as a dead planet like others in the solar system. Water and land are the two important assets of any country and proper utilization of them can bring prosperity to living society. A future gain in irrigation depends on increasing water use efficiency, rather than increasing water supply. This means using more efficient, low-cost and locally-adapted technologies to reduce water loss. Small-scale irrigation can help farmers to increase yields. Drip irrigation can cut water use by 70 percent on high-value fruit and vegetable crops. The present study was undertaken to study the extent of knowledge level of the respondents on irrigation management practices.

Key words: Irrigation management, domestic water, living society.

Introduction

Water is no longer an infinite resource and warning signals regarding water scarcity are being received year after year. The domestic water needs have already become the victim of vagaries of monsoon. Indiscriminate use and conflict amongst competing users have adversely affected the water resource availability and sustainability. The water resource of India especially the fresh water resources are facing multitudes of challenges affecting the availability, accessibility, utility and sustainability. So we have to use the available water efficiently. In many tropical countries, agriculture consumes 80 to 90 percent of all water used. Unfortunately, large percentages of this water are lost through inefficient irrigation, evaporation from storage tanks and open pipes, or run off due to degraded soil. More than 40% of global land is under arid or semi-arid climatic conditions. In the arid and semi-arid environments water is the most limiting factor in reducing agricultural production. Drought is a complex process that needs to be understood by many disciplines in order to overcome and minimize the damage that it causes. The responses of plant to drought is also complex because conditions vary in the frequency of dry and wet periods, the degree and timing of drought and

the patterns of soil and atmospheric water deficits. Over the past forty years many crop breeders and plant physiologists have made great efforts to improve the drought tolerance of a range of agricultural and horticultural crops.

Materials and Methods

The study was carried out in Kanyakumari district. There are four taluks in Kanyakumari district *viz*; Agastheeshwaram, Thovalai, Kalkulam and Villavancode. All the four taluks were identified for collection of data. One block from each taluk was selected randomly and the selected blocks were Agastheeshwaram, Thovalai, Thiruvatar and Killior from Agastheeshwaram, Thovalai, Kalkulam and Villavancode taluk respectively. From each block, one village was randomly selected. Thus a total of four villages *viz*; Theroor, Vellamadam, Arumanai and Karungal were selected for data collection from Agastheeshwaram, Thovalai, Thiruvatar and Killior blocks respectively. The lists of farmers in the selected villages were obtained from village extension workers concerned. The respondents were selected by random sampling. The required numbers of respondents (300) were selected from four villages by identifying equal

number of respondents (75) from each of the villages. The data were collected from 300 farmers. To find out the knowledge level and adoption of irrigation management practices a well structured interview schedule was used for the data collection. The irrigation management practices recommended by State Agricultural Department were chosen to test the knowledge and adoption of the respondents. The knowledge test consisted of 15 items and this was translated in to vernacular language for final data collection. The data were collected from the selected farmers through personal interview method. To assess the knowledge level, a score of two was given for every correct response and a unit score was assigned to every incorrect response.

Results and Discussion

Overall knowledge level on irrigation management

The overall knowledge level of respondents on irrigation management was assessed and the findings are given in Table 1.

It may be observed from Table 1 that majority of the respondents (53.67 percent) were found to possess medium level of knowledge and 28.33 per cent of them had low level of knowledge. The remaining 17.66 percent of the respondents had high level of knowledge on various dimensions of irrigation management. These results may be due to more extension agency contact, mass media exposure and high educational status of the respondents. The result is in accordance with the outcome of the study of Jeyashree (2004).

Efficiency of water use

Efficiency of water use is the most common term and is generally used to relate water use and crop production considering only the input and output relations. It may be expressed as the ratio of dry weight of produce i.e., the yield to the volume of water used by the crop as evapotranspiration, or the total amount of water used in the field.

Efficiency of water use for Paddy

The results on distribution of respondents according to their efficiency of water use for paddy are given in Table 2.

It may be observed from Table 2 that majority of the respondents (60.67 per cent) had low water use efficiency followed by medium water use efficiency (25.33 percent). Only 14.00 per cent had high water use efficiency. This may be due to the surplus supply of water, they are not using the water efficiently. This is in line with the findings of Venkatachalam (2005) and Vignesh (2006).

Table 1: Distribution of respondents according to their knowledge level on irrigation management.

S.No	Category	Number of respondents	Per cent
1	Low	86	28.67
2	Medium	161	53.67
3	High	53	17.66
	Total	300	100.00

Table 2: Distribution of respondents according to their efficiency of water use for paddy (n = 300).

S.No	Category	Number of respondents	Per cent
1.	Low	182	60.67
2.	Medium	76	25.33
3.	High	42	14.00
	Total	300	100.00

Table 3: Distribution of respondents according to their efficiency of water use for Banana (n=300).

S.No	Category	Number of respondents	Per cent
1.	Low	184	61.33
2.	Medium	64	21.33
3.	High	52	17.34
	Total	300	100.00

Table 4: Distribution of respondents according to their efficiency of water use for tapioca (n=300).

S.No	Category	Number of respondents	Per cent
1.	Low	26	8.69
2.	Medium	93	31.00
3.	High	181	60.33
	Total	300	100.00

Efficiency of water use for Banana

The results on distribution of respondents according to their efficiency of water use for banana are given in Table 3.

It may be observed from the Table 3 that majority of the respondents (61.33 percent) had low water use efficiency followed by medium water use efficiency (21.33 per cent). Only 17.34 per cent had high water use efficiency. This may be due to the surplus supply of water, they are not using the water efficiently. This result is in line with the findings of Vignesh (2006) and Flora (2007).

Efficiency of water use for Tapioca

The results on distribution of respondents according to their efficiency of water use for tapioca are given in Table 4.

It may be observed from Table 4 that more than sixty per cent of the respondents (60.33 per cent) had high efficiency of water use followed by medium efficiency of water use (31.00 per cent). Only 8.69 percent had low efficiency of water use. This may be due to efficient

use of available water from rain. This is in line with the findings of Jeyashree (2004).

Relationship between socioeconomic and psychological characteristics of the respondents with their knowledge on water management practices

The zero-order correlation was computed to know the relationship of the socio-economic and psychological characteristics of respondents with their knowledge on water management. The results are given in Table 5.

Out of the eighteen independent variables taken for analysis, age, education, farming experience, innovativeness, risk orientation, and scientific orientation was found to have positively, significant relationship with the knowledge on water management.

Age showed a positive and significant relationship towards knowledge. As the farmers grow older they gain more knowledge. This might have resulted in positive and significant relationship of age with knowledge. This finding is in line with the findings of vignesh (2006).

Educational status was found to have positive and highly significant relationship with the knowledge on water management practices. Obviously, educated respondents develop a positive attitude towards every possible source of knowledge. This finding is in line with the findings of Jeyashree (2004).

Table 5: Zero-order correlation of characteristics of respondents with their knowledge (n=300).

Variable No.	Independent variables	Correlation coefficient
X ₁	Age	0.089**
X ₂	Education	0.169**
X ₃	Occupation	0.025NS
X ₄	Farm size	-0.011NS
X ₅	Farming experience	0.135*
X ₆	Annual income	0.028NS
X ₇	Cropping intensity	0.021NS
X ₈	Irrigation intensity	-0.004NS
X ₉	Productivity	0.010NS
X ₁₀	Source of irrigation	-0.039NS
X ₁₁	Method of irrigation	0.030NS
X ₁₂	Social participation	-0.103NS
X ₁₃	Extension agency contact	-0.007NS
X ₁₄	Innovativeness	0.161**
X ₁₅	Risk orientation	0.131*
X ₁₆	Scientific orientation	0.136*
X ₁₇	Economic motivation	-0.031NS
X ₁₈	Mass media exposure	0.033NS

** Significant at 1 per cent

* Significant at 5 per cent

NS Non-significant

Farming experience showed a positive and highly significant relationship with their knowledge on water management practices. As the farming experience increases their experience made them to gain more knowledge. This is in line with the findings of Vignesh (2006).

Innovativeness showed a positive and significant relationship with the knowledge on water management practices. This shows more the innovativeness more will be the knowledge. It is obvious that innovativeness could contribute to the knowledge, for more the innovativeness more the farmers would try to acquire information about the new technologies. This is in line with the findings of Balamurugan (2001), Suji (2003) and Punitha (2005).

Risk orientation showed a positive and highly significant relationship with knowledge. Risk orientation developed the respondent's ability to face the problems in farming. More risk orientation otherwise means their readiness to accept the new ideas. Such a stage of mind would have naturally prompted them to seek for more information from various sources and hence would have enabled them to gain more knowledge. Thus, increase in risk orientation increases the knowledge of respondents. This finding is in line with the findings of Saravanan (2005) and Vignesh (2006).

Scientific orientation was found to be significantly correlated with knowledge of the respondents. Respondents with more scientific orientation will gather information on new technologies. Scientific orientation might have enabled them to seek more and more new technologies with scientific basis. From this it is clear that farmers with higher scientific orientation gained more knowledge. This finding is in line with the findings of Punitha (2005) and Flora (2007).

Regression of socioeconomic and psychological characteristics of respondents with their knowledge on water management

Regression was computed to know the relationship of characteristics of the respondents with their knowledge on water management. The results are given in Table 6.

It could be observed from the Table 6 that all the eighteen variables together explained 0.576 per cent of variation in knowledge. The 'F' value 4.206 was found to be significant. It could be concluded that a linear functional relationship between independent variables and dependent variables could be established.

Out of the eighteen independent variables taken for analysis, farming experience, and scientific orientation were positively significant at 0.01 percent probability. Age,

Table 6 Regression of socio-economic and psychological characteristics of respondents with their knowledge on water management (n=300).

Variable No.	Variables	Regression coefficient	Standard Error	't' Value
X ₁	Age	0.320	0.988	1.971*
X ₂	Education	0.750	0.416	0.725*
X ₃	Occupation	0.004	0.532	0.065NS
X ₄	Farm size	-0.259	1.092	-1.475NS
X ₅	Farming experience	0.440	0.175	2.691**
X ₆	Annual income	-0.273	0.207	-0.034NS
X ₇	Cropping intensity	0.003	0.024	0.042NS
X ₈	Irrigation intensity	-0.025	0.280	-0.421NS
X ₉	Productivity	0.001	0.120	0.031NS
X ₁₀	Source of irrigation	-0.018	0.319	-0.307NS
X ₁₁	Method of irrigation	0.007	0.316	0.115 NS
X ₁₂	Social participation	-0.147	0.417	-1.475 NS
X ₁₃	Extension agency contact	0.002	0.121	0.035 NS
X ₁₄	Innovativeness	0.444	0.280	0.724*
X ₁₅	Risk orientation	0.667	0.330	2.051*
X ₁₆	Scientific orientation	0.554	0.621	2.528**
X ₁₇	Economic motivation	0.429	0.353	1.022 NS
X ₁₈	Mass media exposure	0.037	0.122	0.622 NS

R²=0.576 F=4.206

** Significant at 1 per cent

* Significant at 5 per cent

NS Non-significant

education, innovativeness and risk orientation were positively significant at 0.05 percent probability.

Of the eighteen variables taken for analysis, age, education, farming experience, innovativeness, risk orientation and scientific orientation would increase the knowledge by 0.320, 0.750, 0.440, 0.444, 0.667, and 0.554 units respectively.

Age showed a positive and significant relationship towards knowledge. As the farmers grow older they gain more knowledge. This might have resulted in positive and significant relationship of age with knowledge. This finding is in line with the findings of Saravanan (2005).

Education was found to have positive and highly significant relationship with the knowledge on water management practices. Obviously, educated respondents develop a positive attitude towards every possible source of knowledge. This finding is in line with the findings of Jeyashree (2004).

Farming experience showed a positive and highly significant relationship with their knowledge on water management practices. As the farming experience increases their experience made them to gain more knowledge. This is in line with the findings of Karpagam

(2004).

Innovativeness showed a positive and significant relationship with the knowledge on water management practices. This shows more the innovativeness more will be the knowledge. It is obvious that innovativeness could contribute to the knowledge, for more the innovativeness more the farmers would try to acquire information about the new technologies.

Risk orientation showed a positive and highly significant relationship with knowledge. Risk orientation develops the respondent's ability to face the odds in farming. Thus, increase in risk orientation increases the knowledge of respondents. This finding is in line with the findings of Vengatachalam (2005).

Scientific orientation was found to be significantly correlated with knowledge of the respondents. Respondents with more scientific orientation will definitely gather information on new technologies. This finding is in line with the findings of Flora (2007).

Relationship between socioeconomic and

Table 7: Zero-order correlation of socio-economic and psychological characteristics of respondents with their adoption (n=300).

Variable No.	Independent variables	Correlation coefficient
X ₁	Age	-0.065NS
X ₂	Education	1.135*
X ₃	Occupation	0.002NS
X ₄	Farm size	-0.043NS
X ₅	Farming experience	0.118*
X ₆	Annual income	-0.059NS
X ₇	Cropping intensity	0.015NS
X ₈	Irrigation intensity	0.032NS
X ₉	Productivity	0.007NS
X ₁₀	Source of irrigation	-0.014NS
X ₁₁	Method of irrigation	-0.004NS
X ₁₂	Social participation	0.112NS
X ₁₃	Extension agency contact	0.015NS
X ₁₄	Innovativeness	0.047NS
X ₁₅	Risk orientation	0.180**
X ₁₆	Scientific orientation	0.175**
X ₁₇	Economic motivation	0.060NS
X ₁₈	Mass media exposure	-0.005NS

** Significant at 1 per cent

* Significant at 5 per cent

NS Non-significant

psychological characteristics of the respondents with their extent of adoption of water management practices.

Zero-order correlation of socio-economic and psychological characteristics of respondents with their adoption.

The zero-order correlation was computed to know the relationship of the socio-economic and psychological characteristics of respondents with their adoption on water management. The results are given in Table 7.

It could be observed that out of the eighteen independent variables taken for analysis, education, farming experience, risk orientation and scientific orientation were found to have positively significant relationship with the adoption of water management practices.

Education was found to have positive and highly significant relationship with the adoption of water management practices. Obviously, educated respondents develop a positive attitude towards every possible source of knowledge and it leads to increased adoption. This finding is in line with the findings of Jeyashree (2004).

Farming experience showed a positive and highly significant relationship with their adoption of water

management practices. As the farming experience increases their experience made them to gain more knowledge and they adopt new technologies. This is in line with the findings of Umaidurai (1996).

Risk orientation showed a positive and highly significant relationship with adoption behaviour. Risk orientation develops the respondent's ability to face the odds in farming. Thus, increase in risk orientation increases the adoption behaviour of respondents. This finding is in line with the findings of Vengatachalam (2005).

Scientific orientation was found to be significantly correlated with adoption behaviour of the respondents. Respondents with scientific orientation will definitely gather information on new technologies and would have enthused them to adopt technologies. This finding is in line with the findings of Flora (2007).

Regression of socioeconomic and psychological characteristics of respondents with their adoption of water management practices

Regression was computed to know the relationship of characteristics of the respondents with their adoption of water management practices. The results are given in Table 8.

Table 8: Regression of socio-economic and psychological characteristics of respondents with their adoption of water management practices (n=300).

Variable No.	Variables	Regression coefficient	Standard Error	't' Value
X ₁	Age	-0.040	0.223	-1.240NS
X ₂	Education	0.211	0.082	2.889**
X ₃	Occupation	-0.004	0.120	-0.317NS
X ₄	Farm size	-0.038	0.247	-1.220NS
X ₅	Farming experience	0.026	0.026	0.801NS
X ₆	Annual income	0.043	0.002	1.386NS
X ₇	Cropping intensity	0.011	0.201	0.321NS
X ₈	Irrigation intensity	-0.010	0.063	-0.833NS
X ₉	Productivity	0.132	0.060	2.501**
X ₁₀	Source of irrigation	-0.008	0.072	-0.690NS
X ₁₁	Method of irrigation	0.007	0.071	0.574NS
X ₁₂	Social participation	0.005	0.094	0.464NS
X ₁₃	Extension agency contact	2.000	0.900	2.274*
X ₁₄	Innovativeness	0.214	0.087	2.124*
X ₁₅	Risk orientation	1.115	0.462	2.811**
X ₁₆	Scientific orientation	0.692	0.286	2.612**
X ₁₇	Economic motivation	-0.233	0.080	-2.783NS
X ₁₈	Mass media exposure	-0.004	0.027	-0.368NS

R²=0.663

F=5.126

** Significant at 1 per cent

* Significant at 5 per cent

NS Non-significant

It could be observed from the Table 8 that all the nineteen variables together explained 0.663 per cent of variation in adoption. The 'F' value 5.126 was found to be significant. It could be concluded that a linear functional relationship between independent variables and dependent variables could be established.

Of the eighteen variables taken for analysis, education, productivity, risk orientation and scientific orientation were positively significant at 0.01 per cent level of probability. Cropping intensity, extension agency contact and innovativeness were positively significant at 0.05 per cent level of probability towards adoption.

The analysis revealed that a unit increase in education, productivity, risk orientation, scientific orientation, extension agency contact and innovativeness would increase the adoption by 0.211, 0.132, 1.115, 0.692, 2.000 and 0.214 units respectively.

Education showed a positive and significant relationship with adoption behaviour. Education develops the respondent's ability to adopt new technologies. Thus increase in education increases the adoption behaviour of

respondents. This is in line with the findings of Jeyashree (2004).

Productivity showed a positive and significant relationship with adoption behaviour. Increase in yield motivates the respondent's ability to adopt new technologies. Thus increase in production increases the adoption behaviour of respondents. This is in line with the findings of Karpagam (2004).

Extension agency contact showed a positive and significant relationship with adoption behaviour. More contact with the extension agency develops the respondent's ability to adopt new technologies. Thus increase in contact with the extension agency increases the adoption behaviour of respondents. This is in line with the findings of Karthikeyan (2000).

Innovativeness showed a positive and significant relationship with adoption behaviour. This shows more the innovativeness more will be the adoption. It is obvious that innovativeness.

Could contribute to the adoption, for more the innovativeness more the farmers would try to adopt the new technologies. This is in line with the findings of Umaidurai (1996).

Risk orientation showed a positive and significant relationship with adoption behaviour. Risk orientation develops the respondent's ability to adopt innovations. Thus increase in risk orientation increases the adoption behaviour of respondents. This is in line with the findings of Jeyashree (2004) and Flora (2007).

Scientific orientation showed a positive and significant relationship with adoption behaviour. Scientific orientation develops the respondent's ability to adopt new technologies. Thus increase in scientific orientation increases the adoption behaviour of respondents. This is in line with the findings of Suji (2003) and Saravanan (2005).

This study clearly shows that majority of the farmers possess medium level of knowledge about irrigation management practices. Study has clearly indicated that the significant gain in knowledge on irrigation management on account of the trainings.

Conclusion

This study clearly shows that majority of the farmers possess medium level of knowledge about irrigation management practices. Study has clearly indicated that the significant gain in knowledge on irrigation management is because of the of the trainings they have attended.

References

- Flora, L.V. (2007). Sustainable water management through drip irrigation in Madurai District-an explorative study, Unpublished M.Sc. (Ag.) Thesis, TNAU, Madurai.
- Jayashree, B.S. (2004). A study on integrated water management technology under AICRP on water management, Unpublished M.Sc. (Ag.) Thesis, TNAU, Madurai.
- Karpagam, D. (2004). Case study on tank irrigation system and its consequences on Agriculture. Unpublished M.Sc. (Ag.) Thesis, TNAU, Coimbatore.
- Nandhini, N. (1995). Impact of Soil and Water Conservation Programme implemented by an NGO and Government organization - A comparative study. Unpublished M.Sc. (Agri.) Thesis, TNAU, Coimbatore.
- Saravanan, R. (2005). Role of farm women in water management technologies, Unpublished M.Sc. (Ag.) Thesis, TNAU, Coimbatore.
- Suji, D.B. (2003). "Adoption of Botanical Pesticides in Kanyakumari District", Unpublished M.Sc. (Ag.) Thesis, Annamalai University, Annamalinagar.
- Umaidurai, P. (1996). Irrigation Management Practices among trained Paddy Farmers-A comparative analysis, Unpublished M.Sc.(Ag.) Thesis, Agricultural College and Research Institute, Tamil Nadu Agricultural University, Madurai.