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Relationship between socio economic characteristics of onion growers and the impact of drip irrigation system in Tamil Nadu

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Abstract

Drip irrigation is an efficient method of delivering water directly to plant roots, minimizing evaporation and runoff. It enhances water use efficiency, reduces weed growth, and improves crop yield. This system is particularly beneficial in arid regions and for high-value crops. Fayed (2020). This study investigates the relationship and contribution made by the independent variables towards the impact of drip irrigation system of Onion growers using simple correlation and multiple regression analysis. The analysis was made using Pearson's correlation co-efficient analysis and multiple linear regression analysis. The survey was conducted to collect primary data from 119 cotton growing farmers in Thondamuthur block of Coimbatore district. Findings reveal that Correlation co-efficient of procurement of irrigated area showed positive significant correlation at five per cent level of probability. The R2 value was 0.649. The R2 value has shown that all the variables contributed 64.90% variation in the impact of drip irrigation system among the respondents. The variables effect of drip irrigation on production (X10) and satisfaction with drip irrigation system (X15) showed positive significant contribution at one per cent level of probability. Further, one-unit increase in the following independent variables *viz*., educational status (X2), effect of drip irrigation on production (X10), maintenance of system (X11), economic motivation (X12), scientific orientation (X13) and satisfaction with drip irrigation system (X15) would increase the impact of drip irrigation system by 0.281, 1.179, 0.741, 0.799, 0.617 and 0.584 units respectively. This study recommends that the interventions should be created to embrace appropriate communication technology and the use of contemporary ICTs in order to spread farm information at a rapid rate drip irrigation using Onion farmers.

Keywords: Drip irrigation, onion growers, correlation, multiple regression, impact of drip irrigation system

Introduction

Water is by far the most valuable renewable resource, essential to farm and to meet the everyday activities of the people. The already available 'water' resource is depleted by intensive agriculture and an increase in the population. This really is a difficult scenario and therefore it takes time to preserve the ' water ' and make effective use of it because ' water ' is essential for all living organisms for their survival. Water is obligatory for divergent intents *viz*., agriculture, industry, domestic use, energy sector etc., Singh (2007) [2].

Significant water shortage is being experienced in many countries, particularly in India. Since agriculture is the largest water consumer (84.00%) in India, more prudent use of water in agriculture needs to be the first priority, Aayog (2015) [1]. While the significance of irrigation is fully grasped to improve crop development, appropriate usage of water has always been rarely practiced in our country. Farmers usually seek an irrigation technique that is most effective with less water, less manpower, less fertilizer, and less energy consumption. Among the water discharging techniques used, the drip irrigation system is the sophisticated technique to solve the multiple water loss issues and other challenges such as labour, resources and water conservation.

For expanding the horticultural generation, the significance of water system is completely acknowledged, however the best possible utilization of water is only here and there rehearsed in our nation. Formalized and governed irrigation improves plant production reduces water cost, preserves land, includes more region under irrigation and therefore gives prosperity. Drip irrigation system is the propelled strategy to defeat the different issues of water misfortunes like drought, underground water depletion etc., This technique is quickly picking up significance in the zone where water is at alarm and high esteem crops are created. Drip irrigation system is a viable and proficient technique for giving water straightforwardly to the root zone of plant. Hence, drip irrigation system is considered as one of the quickest growing advances in present day water system horticulture.

In fact, the advantages of the drip irrigation scheme are obtained only when, in their local scenario, it is efficiently adopted and used by individual farmers. There is a continuous demand for Onion shallots all around the year throughout the world. However, the production of Onion fluctuates from year to year. The low production results in a hike of the price which creates discomfort among consumers and farmers. With this background, the present study aimed at finding out the association and contribution of the profile of onion growers with the impact of drip irrigation system using correlation and multiple regression analysis.

Materials and Methods

The study was conducted in the Thondamuthur block of Coimbatore district, Tamil Nadu. Coimbatore ranks first in the productivity of small Onion in Tamil Nadu. Horticultural crops are predominantly grown in the Thondamuthur block, among which small Onion tops the table with high productivity. The study was conducted in five villages of the block, with maximum production *viz*., Devarayapuram, Ikkarai Boluvampatti, Narasipuram, Vellimalaipattinam and Pooluvampatti. The ex-post facto research design was used in the study. A sample size of 119 was selected as total, from two percent of the Onion farmers using the drip irrigation system in that specified block by using Proportionate Random Sampling method. The statistical tools used in this paper was Pearson's correlation co-efficient analysis and Multiple linear regression analysis to find out the association and contribution of independent variables to the impact of drip irrigation system of Onion growers.

Results and Discussions

Correlation and multiple regression analysis of independent variable with impact of drip irrigation system

The contribution of independent variables to the impact of drip irrigation system of Onion growers was studied using simple correlation and multiple regression were worked out and the results presented in Table 1.

Table 1: Correlation and multiple regression co-efficient of profile of respondents with their impact of drip irrigation system *(n=119)

S. No.	Variables	'r' value	Partial Regression Coefficient (b)	Standard Error	't' value
X1	Age	0.004	0.472	0.281	1.683NS
X2	Educational status	0.398**	0.281	0.124	2.255*
X3	Annual income	0.078	0.062	0.281	0.222NS
X4	Area under drip irrigation	0.259**	0.009	0.238	0.039NS
X5	Information seeking behavior	-0.048	0.182	0.189	0.962NS
X6	Source of irrigation	0.128	0.381	0.282	1.351NS
X7	Farming experience in drip irrigation	-0.017	-0.381	0.256	-1.488NS
X8	Procurement of irrigated area	0.198*	0.096	0.259	0.371NS
X9	Effect of drip irrigation on production	0.590**	1.179	0.219	5.392**
X10	Maintenance of system	0.369**	0.741	0.224	3.303*
X11	Social participation	0.138	0.227	0.262	0.157NS
X12	Economic motivation	0.492**	0.799	0.293	2.730*
X13	Scientific orientation	0.497**	0.617	0.231	2.675*
X14	Training's undergone	0.033	0.107	0.266	0.403NS
X15	Satisfaction with drip irrigation system	0.274**	0.584	0.283	2.066**

*- Significant at 5% level R2 = 0.649 **-Significant at 1% level F = 12.688
NS-Non- significant a = 27.503

Correlation analysis

From Table 1 it is observed that one variable *viz*., procurement of irrigated area (X9) showed positive significant correlation at five per cent level of probability. Table 36 also revealed that seven variables *viz*., educational status (X2), area under drip irrigation (X4), effect of drip irrigation on production (X10), maintenance of system(X11), economic motivation (X12), scientific orientation (X13), satisfaction with drip irrigation system (X15) showed positive significant correlation at one per cent level of probability. The table further shows that remaining six variables *viz*., age (X1), annual income (X3), information seeking behaviour (X5), source of irrigation (X6), farming experience in drip irrigation (X7), training's undergone (X14) did not have any significant association with impact of drip irrigation system.

Multiple regression analysis

Multiple regression analysis was taken up to find out contribution of independent variable to the impact of drip irrigation system of Onion growers. The R2 value was 0.649. The R2 value has shown that all the variables contributed 64.90 per cent variation in the impact of drip irrigation system of Onion growers and the F value was found to be 12.688.

Therefore, the equation was worked out and given below.

Y1 = 27.503 + 0.472 (X1) + 0.281 (X2) + 0.062 (X3) + 0.009 (X4) + 0.182 (X5) + 0.381 (X6) - 0.381 (X7) + 0.096 (X8) + 1.179 (X9) + 0.741 (X10) + 0.227 (X11) + 0.799 (X12) + 0.617 (X13) + 0.107 (X14) + 0.584 (X15).

The results indicated that the variables *viz*., effect of drip

irrigation on production (X10) and satisfaction with drip irrigation system (X15) showed positive significant contribution at one percent level of probability. Educational status (X2), maintenance of the system (X11), economic motivation (X12), and scientific orientation (X13) had positive and significant contribution at five per cent level of probability.

Results indicated that one-unit increase in the following independent variables *viz*., educational status (X2), effect of drip irrigation on production (X10), maintenance of the system (X11), economic motivation (X12), scientific orientation (X13) and satisfaction with drip irrigation system (X15) would increase the impact of drip irrigation system by 0.281, 1.179, 0.741, 0.799, 0.617 and 0.584 units respectively.

Contribution of educational status towards impact of drip irrigation system

As the educational status (X6) increases, Onion farmers need to possess adequate knowledge and skills to improve the benefits obtained through drip irrigation system may also increase. This may be the reason for contribution of educational status to improve the impact of drip irrigation system among Onion farmers.

Contribution of Effect of drip irrigation on production towards impact of drip irrigation system

Effect of drip irrigation on production (X10) had shown positive and significant contribution with impact of drip irrigation system. The quality, quantity, size and colour of the shallots may tend to improve if irrigated through drip irrigation system.

Contribution of maintenance of the system towards impact of drip irrigation system

From the study, it could be revealed that maintenance of the system (X11) contributed positively with the impact of drip irrigation system due to the trend that if the drip irrigation system is maintained in good condition then the system will be durable and may last for prolonged duration, which in turn, helps the farmers to obtain higher benefits of drip irrigation system.

Contribution of economic motivation towards impact of drip irrigation system

The contribution of economic motivation (X12) with impact of drip irrigation system was found to be positive and significant. This explained that greater the level of economic motivation, greater would be the impact of drip irrigation system. The reason might be that economic motivation is the basic character up on which motives and other attributes will be built. Also, it helps the psychological conditions of an individual to motivate himself to achieve higher income and profit.

Contribution of scientific orientation towards impact of drip irrigation system

The variable scientific orientation (X13) had a positive significant association with impact of drip irrigation system. The likely cause may be that that farmers with strong scientific orientation will usually prefer to cultivate the Onion based on scientists and extension personnel's production recommendations. Hence scientific orientation has contributed significantly to the impact of drip irrigation system.

Contribution of Satisfaction with drip irrigation system towards impact of drip irrigation system

Satisfaction with drip irrigation system (X15) with the impact of drip irrigation system was found to be positive and significant. This inferred that if there is satisfaction in the usage of drip irrigation system, then there will be higher adoption and benefits for the Onion farmers using drip irrigation system.

Conclusion

There is still an intense need to educate drip users about installing, maintaining and managing the drip irrigation system by arranging unique farmers training programs for drip users by Extension professionals and State Department of Agriculture. Majority of respondents had medium level of impact. Hence efforts are needed to improve these characters by providing information on different information sources and motivate them to access different sources, organize field exposure visits to successful farmers, farmer extension functionaries and researchers in the field of drip irrigation to improve the farming performance through efficient and sustainable utilization of water and farm inputs.

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Competing Interests

The authors have declared that no competing interests exist.

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