

Constraints/Challenges Faced By Farmers in Adoption of Micro Irrigation In Ranga Reddy District Of Telangana

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Abstract

A study on adoption pattern and farmers' behavior towards micro irrigation was conducted in Ranga Reddy district of Telangana state in the year 20119-20. In the study, 120 farmers and 10 dealers from the study area were interviewed to know their awareness, adoption pattern, knowledge level and preferences, constraints faced by farmers in adoption of micro irrigation in Ranga Reddy district of Telangana state. The study revealed that the farmers' awareness and knowledge level about the micro irrigation technology was high and major problems faced by farmers after micro irrigation system installation were emitters clogging, pipe leakage, pipe blockage, fertigation problem, post installation service by company, motor burning, salt sedimentation on upper layer of soil and improper installation which leads to frequent repair and maintenance. Majority of the farmers faced the "financial constraints" like initial installation cost is very high, high cost of maintenance, subsidy provision is less, loaning procedure is complex and inadequate credit facilities for the farmers.

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I. Introduction

In the changing agricultural scenario World over and shift towards precision farming, micro irrigation happens to be the technology capable of providing more efficient utilization of water. The availability of adequate, timely and assured supply of water is an important determinant of agricultural productivity. Irrigation raises cropping intensity and crop yields besides facilitating changes in cropping patterns. The green revolution in the country has come mainly from increase in land productivity of the inputs *viz.* irrigation, high yielding varieties, seeds and fertilizer nutrients, irrigation alone is said to have contributed 60 per cent to growth in agricultural productivity (Directorate of Economics and Statistics, 2013). High level of investment in major and minor irrigation projects has reduced the dependence of agriculture on monsoon. On the other hand, creation of intensive surface water irrigation facilities and excessive use of canal water has resulted in the problems of water logging, soil salinity, *etc.* Also, ground water is declining very fast due to over-exploitation of water resources through increased bore wells and inefficient use of water due to adoption of flood irrigation system. Poor management of water as a resource has lead to scarcity of water and at times when it is most needed.

Water is a relatively scarce resource in India since we have 17 per cent of the world's population and only four per cent of the usable fresh water at global level. Irrigation is the sector that uses water the most. Nearly 80 per cent of the world's water resources are used for irrigation. In India also irrigation uses more than 80 per cent of the available water. The water resources in India are estimated at 4000 cubic kilometer given the geographical area of 3.29 million hectares and an average annual rainfall of 1170 mm and nearly 50 per cent of this water is lost due to evaporation, percolation, and sub- surface flows to oceans and only 1953 billion cubic meter of water is available for usage (Global AgriSystem, 2014).

To increase area under micro irrigation, Government of India launched the Pradhana Mantri Krushi Sinchayi Yojana (PMKSY) in 2015-16 by combining ongoing schemes. Under the more crops per drop component of the PMKSY, small farmers get paid to the tune of 55 per cent of cost of micro-irrigation systems; other farmers get 45 per cent of the unit cost. The task force on micro irrigation, 2004 had estimated a potential of 69.5 million hectare under micro irrigation. Presently, area under micro irrigation in India is 7.73 million hectare (Drip-3.37 million hectares and Sprinkler-4.36 million hectares). The top five states in India for area under micro irrigation are Rajasthan (16.85 lakh hectare), Maharashtra (12.71 lakh hectare), Andra Pradesh (11.63 lakh hectare), Karnataka (8.47 lakh hectare) and Gujarat (8.29 lakh hectare). The potential for micro-irrigation is estimated as 69.5 million hectare and cereal crop tops in the list with 29.6 lakh hectare. Seven states in the country were identified having potential for micro-irrigation of more than 80 per cent. However, it will take long time to achieve this potential if the current target of achieving 0.5 million hectare per year is adopted and still 61.8 million hectares of land is untapped potential (Priyan and Panchal, 2017)

In India, 58 per cent of the gross area under irrigation utilizes the ground water. Since 1970, the ground water has been increasingly contributing to agricultural production and income. The contribution of ground water to agricultural income increased from Rs 2200 crores in 1970 to Rs 13200 crores in 1993 while surface water increased from Rs 7700 crores to Rs 11500 crores. Tube wells are now the largest source of irrigation in the country and their share has increased from one per cent in 1960–61 to 37 per cent in 1999–2000. Since this sector has almost no dependence on the government, it is growing at a rapid rate and it is estimated that one million wells are added every year (Directorate of Economics and Statistics, 2013).

Although the crop yields under the ground water irrigation were found to be one to three times higher than the surface irrigation due to greater control over the management of resource unlike the surface irrigation through canal irrigation, there is an urgent need to improve the efficiency of ground water use. Over exploitation of ground water as pointed out above will be disastrous in the long term. Therefore, increasing water use productivity in agriculture is important so that the resultant savings could be made available to the other high priority or economically more efficient sectors.

The micro irrigation technology has the potential to really double the area under irrigation through judicious use of water with efficiency as high as 80 to 90 per cent as compared to 30 to 50 per cent in case of surface irrigation. Under such condition, management of irrigation requires adequate attention for efficient utilization of every drop of water. Micro irrigation systems have 80 to 90 per cent irrigation efficiency (Drip), 65 to 85 per cent irrigation efficiency (Sprinkler) and are capable of increasing yield by 30 to 100 per cent with 50 to 70 per cent water saving and making 40 per cent reduction in fertilizer as well as electricity demand because water is directly applied to effective root zone of plants through net work of plastic pipe. Thus, there is a scope to increase the irrigated area by two to three times if micro irrigation system is adopted in horticultural crops.

At present, Telangana Micro Irrigation Project, a unique and comprehensive project is being implemented in Telangana state, and area covered under micro-irrigation is 7.42 lakh hectares (Micro Irrigation Projects, Telangana state, 2019). Technological interventions like the drip and sprinkler method of irrigation can aid significantly in achieving higher water use efficiency there by aiding in bringing more area under irrigation. Higher yields will result because of the efficient and timely use of water by the crop.

II. Materials and Methods

Ranga Reddy district was selected purposively as micro irrigation technologies are gaining importance in recent times in this district because Ranga Reddy district is adjacent to Hyderabad city and farmers in this district are major suppliers of vegetables and flowers to the city of Hyderabad. Two mandals with the highest micro irrigation area from Ranga Reddy district was selected purposively. From each mandal three villages with the highest micro irrigation area were selected. The lists of farmers who are adopting micro irrigation technologies were prepared from the selected villages and 20 farmers for each village were selected randomly. 120 micro irrigation farmers and 10 micro irrigation dealers were selected for which data was collected for analyzing the present study. Thus, total sample size for the present study was 130. Survey method was used to collect the required data from the selected respondents with the help of a well-structured pre-tested-questionnaire for the agricultural year 2019-20.

III. Results and Discussions

CONSTRAINTS/CHALLENGES FACED BY FARMERS IN ADOPTION OF MICRO IRRIGATION IN RANGA REDDY DISTRICT OF TELANGANA

The results show that out of 120 respondents in the sample, all the respondents (100 percent) were aware of micro irrigation systems.

Problems faced by farmers after installation of micro irrigation system

From fig. 1 it can be observed that 42.5 per cent of farmers were not facing any problem whereas, 57.5 per cent of farmers were facing problems after installation of micro irrigation. The major problems faced by farmers after micro irrigation system installation were emitters clogging, pipe leakage, pipe blockage, fertigation problem, post installation service by company, motor burning, salt sedimentation on upper layer of soil and improper installation which leads to frequent repair and maintenance.

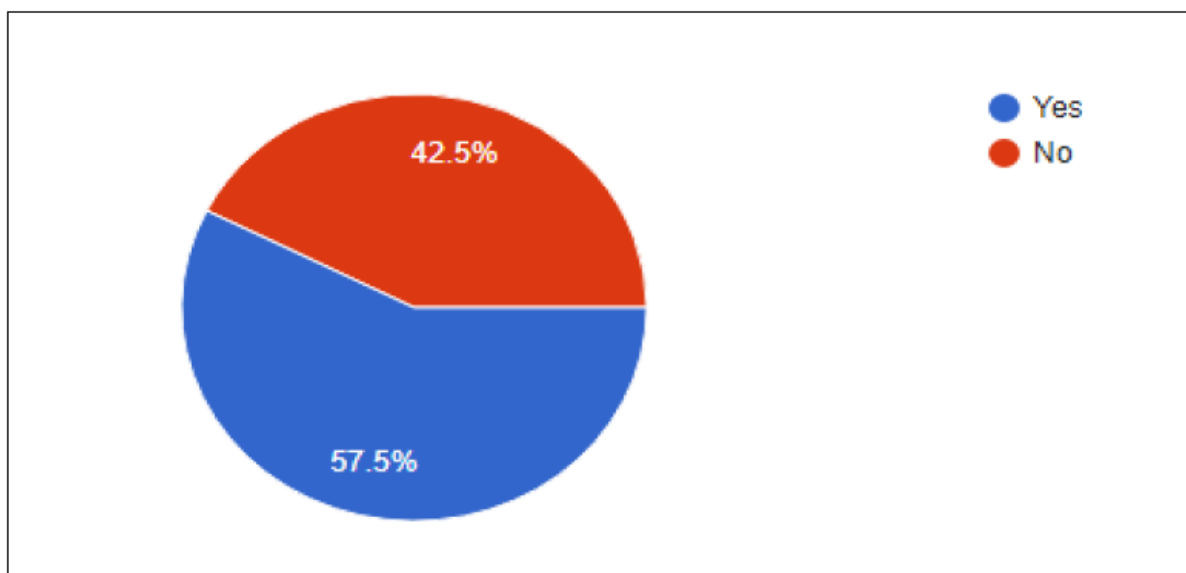


Fig. 1 Are you facing any problem after installation

Constraints encountered by the farmers in adoption of drip irrigation technology

Agriculture is undergoing rapid scientific advancements during these days. There is no dearth of technical know-how but the most complex and significant problem is dissemination of new farm technologies and its utilization by the farmers. There is a tremendous gap between existing knowledge, knowledge utilization and production. Hence, an attempt was made to identify and analyze the constraints faced by the respondents in adoption of micro irrigation technology. The constraints encountered by the respondents were categorized into five categories namely technical, infrastructural, financial, educational, climatic and geographical constraints. The constraints have been presented in descending order of the ranks.

A critical examination of data in table 1 reveals that majority of the farmers faced the “financial constraints” (63.9 Mean Score) installing micro irrigation technology as initial installation cost is very high, high cost of maintenance, subsidy provision is less, loaning procedure is complex and inadequate credit facilities for the farmers. Due to high cost and complexity of procedures, the respondent might have perceived this category as the most dominant category of constraints in adoption of drip irrigation technology. Hence, it was ranked first. Similarly the “technical constraints” was the second most important category of constraints with mean score of 56.04. Other constraints like educational constraints and infrastructural constraints were accorded third and fourth ranks with mean score of 48.08 and 44.91, respectively. The climatic and geographical constraints were the least perceived constraints with the mean score of 39.83.

Hence, it could be concluded that among all, the financial constraints were the most perceived ones by the farmers and climatic and geographical constraints were observed as the least important.

Table 1 Constraints as encountered by the farmers in adoption of drip irrigation technology

S No.	Particulars	Total score	Mean Score (M.S)	Rank
1	Financial constraints	7669	63.9	I
2	Technical constraints	6725	56.04	II
3	Educational constraints	5770	48.08	III
4	Infrastructural constraints	5390	44.91	IV
5	Climatic and geographical constraints	4780	39.83	V

Rate the constraints faced by framers on micro irrigation system by using five point Likert scale

A Likert Scale is a type of rating scale used to measure attitudes or opinions. With this scale, respondents are asked to rate items on a level of agreement regarding constraints faced. The objective of sub heading is to know the constraints faced by framers on micro irrigation system. It is measured on five point Likert scale having items like Strongly disagree = 1, Disagree = 2, Neutral = 3, Agree = 4 and Strongly agree = 5.

High cost of installation

The below bar graph (Fig. 2) indicates the constraints faced by farmers on micro irrigation system. Out the total 120 respondent farmers, 51.7 per cent of the farmers “Agree” that cost of installation for micro irrigation are high. Whereas, 23.3 per cent, 18.3 per cent and 5.0 per cent of farmers “Neutral”, “Strongly

Agreed”, and “Disagreed” that the cost of installation for micro irrigation is high. Further, 1.7 per cent of farmers “Strongly Disagreed” that the cost of installation for micro irrigation is high. It can be concluded that majority of the farmers (more than 50 per cent) have the opinion that cost of installation for micro irrigation is high.

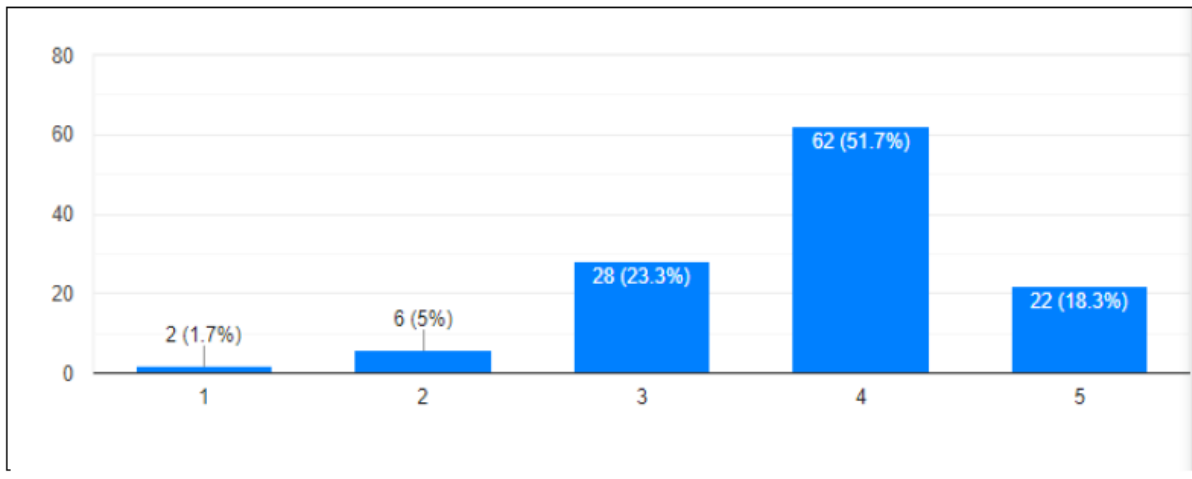


Fig. 2 High cost of installation

Maintenance cost is more

The below bar graph (Fig. 3) indicates the constraints faced by farmers on micro irrigation system. Out the total 120 respondent farmers, 44.2 per cent of the farmers “Agree” that cost of repair and maintenance for micro irrigation system is high. Whereas, 25.8 per cent, 19.2 per cent and 6.7 per cent of farmers “Neutral”, “Disagreed”, and “Strongly Disagreed” that the cost of repair and maintenance for micro irrigation is high. Further, 4.2 per cent of farmers “Strongly Agreed” with the opinion of cost of repair and maintenance for micro irrigation are high. It can be concluded that majority of the farmers (48.4 per cent) have the opinion that cost of maintenance for micro irrigation is high.

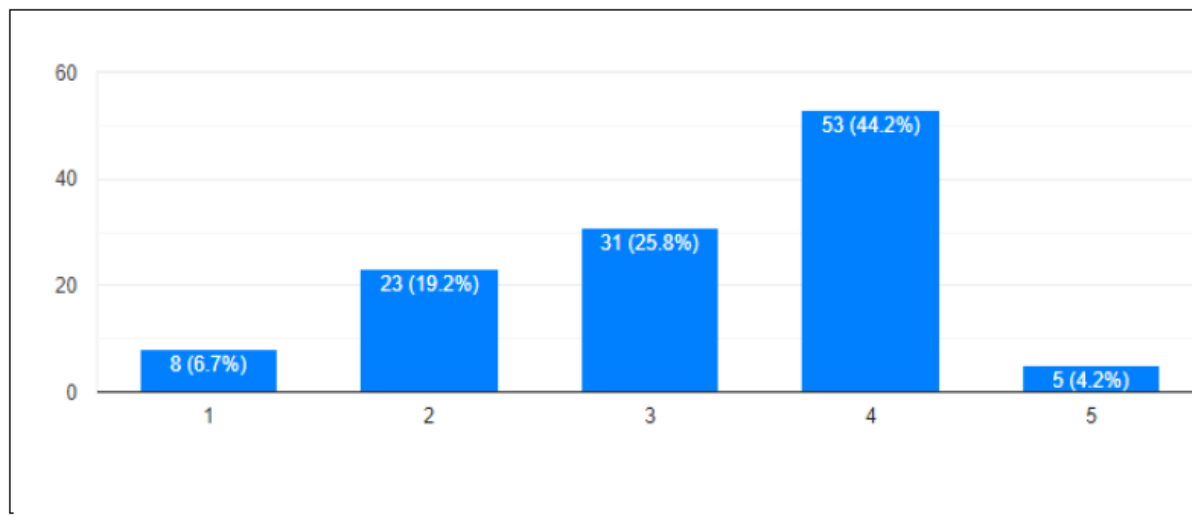


Fig. 3 Maintenance cost is more

Affects soil quality

The below bar graph (Fig. 4) indicates the constraints faced by farmers on micro irrigation system. Out the total 120 respondent farmers, 35 per cent of the farmers “Neutral” that usage of micro irrigation system affect soil quality. Whereas, 25.8 per cent, 21.7 per cent and 15 per cent of farmers “Disagreed”, “Agreed”, and “Strongly Disagreed” that the usage of micro irrigation affect soil quality. Further, 2.5 per cent of farmers “Strongly Agreed” that the usage of micro irrigation affects soil quality. It can be concluded that majority of the farmers (40.8 per cent) have the opinion that cost that usage of micro irrigation affect soil quality.

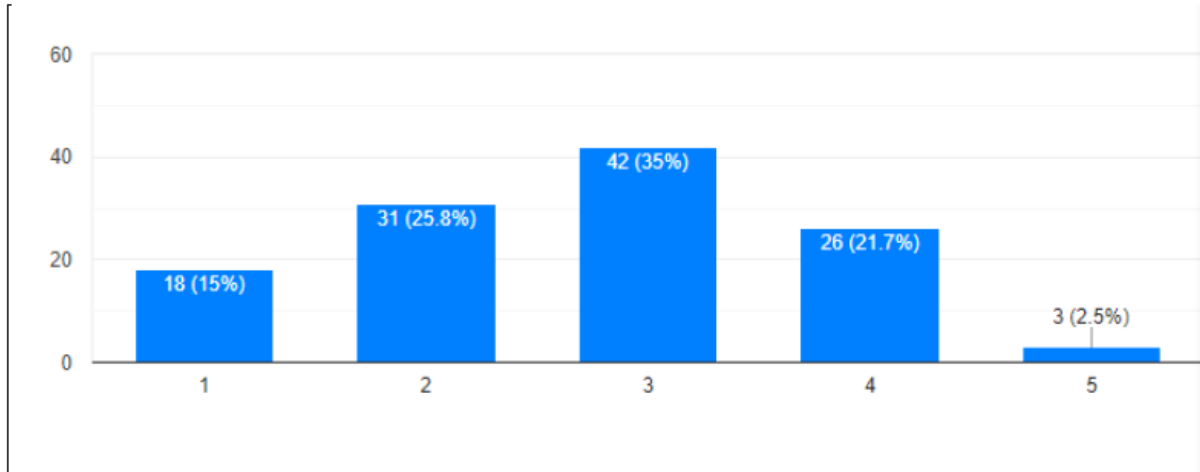


Fig. 4 Affects soil quality

No availability of parts

The below bar graph (Fig. 5) indicates the constraints faced by farmers on micro irrigation system. Out the total 120 respondent farmers, 41.7 per cent of the farmers “Agree” that non availability of micro irrigation system material parts. Whereas, 25.8 per cent, 15.8 per cent and 5.8 per cent of farmers “Neutral”, “Disagreed”, and “Strongly Agreed” that the non availability of micro irrigation system material parts. Further, 5.8 per cent of farmers “Strongly Disagreed” that the non availability of micro irrigation system material parts. It can be concluded that majority of the farmers (52.5 per cent) have the opinion that non availability of micro irrigation system material parts.

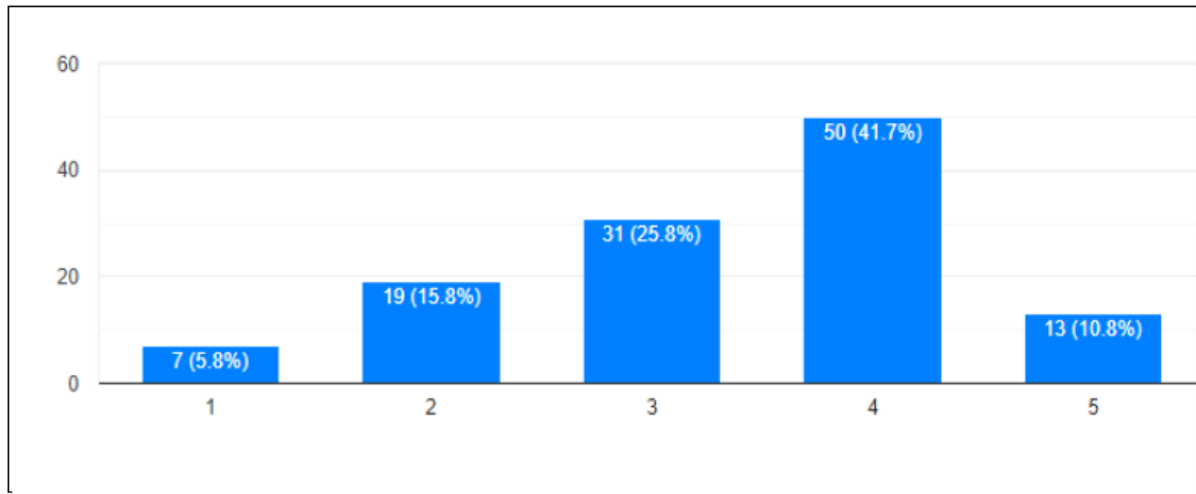


Fig. 5 Non availability of parts

Poor post installation services

The below bar graph (Fig. 6) indicates the constraints faced by farmers on micro irrigation system. Out the total 120 respondent farmers, 50.8 per cent of the farmers “Strongly Agree” that poor post installation services of micro irrigation system. Whereas, 39.2 per cent, 4.2 per cent and 3.3 per cent of farmers “Agreed”, “Disagreed”, and “Neutral” that the poor post installation services of micro irrigation system. Further, 2.5 per cent of farmers “Strongly Disagreed” that poor post installation services of micro irrigation system. It can be concluded that majority of the farmers (90.0 per cent) have the opinion that poor post installation services of micro irrigation system.

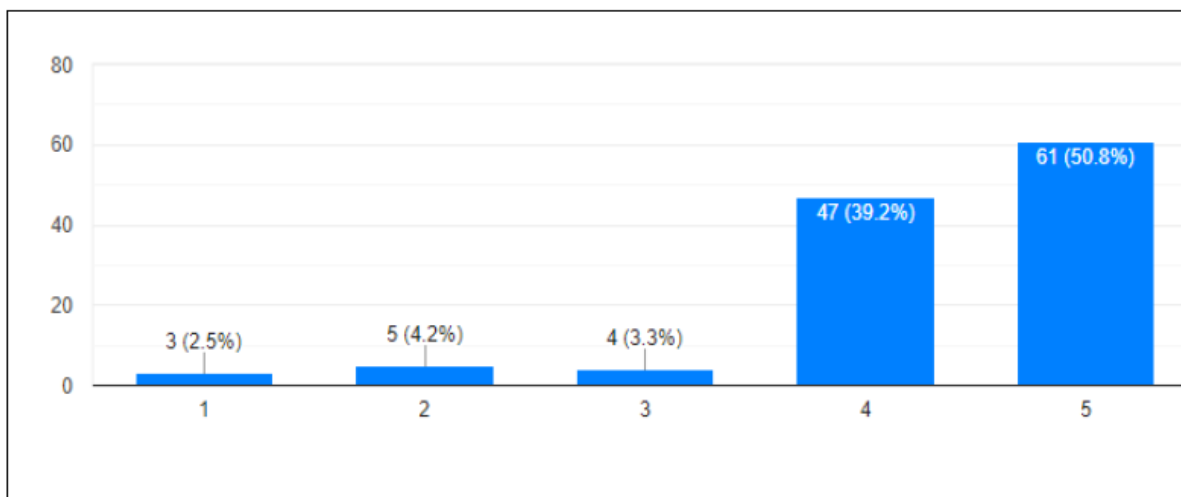


Fig. 6 Poor post installation services

Damaged by rodents, animals and fire

The below bar graph (Fig. 7) indicates the constraints faced by farmers on micro irrigation system. Out the total 120 respondent farmers, 40 per cent of the farmers “Agree” that micro irrigation system damaged by rodents, animals and fire. Whereas, 23.3 per cent, 22.5 per cent and 8.3 per cent of farmers “Strongly Agreed”, “Neutral”, and “Strongly Disagreed” that the micro irrigation system damaged by rodents, animals and fire. Further, 5.8 per cent of farmers “Disagreed” that the micro irrigation system damaged by rodents, animals and fire. It can be concluded that majority of the farmers (63.3 per cent) have the opinion that micro irrigation system damaged by rodents, animals and fire.

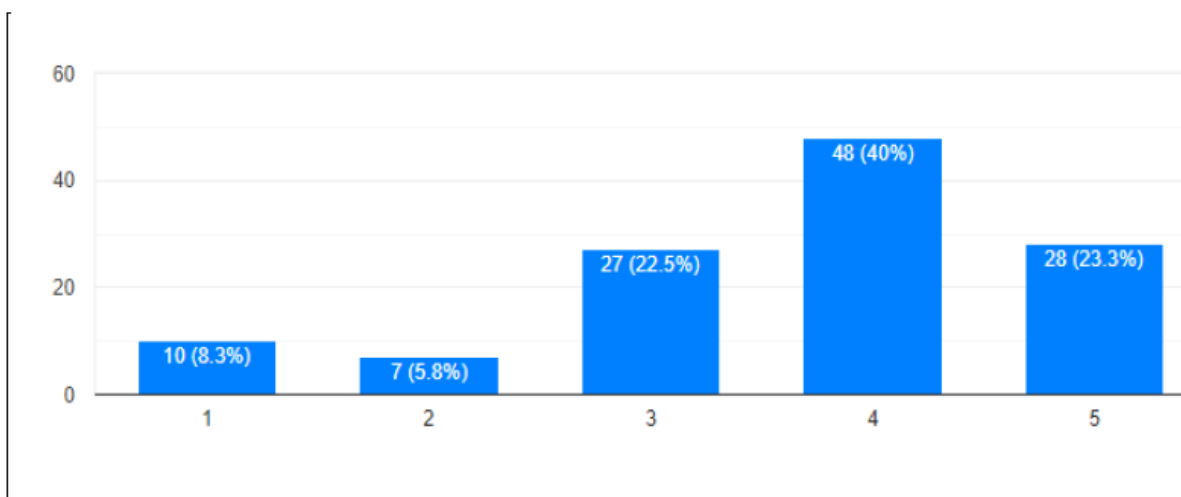


Fig. 7 Damaged by rodents, animals and fire

Availment of insurance

The below bar graph (Fig. 8) indicates the constraints faced by farmers on micro irrigation system. Out the total 120 respondent farmers, 64.2 per cent of the farmers “Strongly Agree” that no insurance on micro irrigation system. Whereas, 28.3 per cent and 7.5 per cent of farmers “Agreed” and “Neutral” that no insurance on micro irrigation system. Further, none of the farmer “Disagreed” and “Strongly Disagreed” that no insurance on micro irrigation system. It can be concluded that majority of the farmers (92.5 per cent) have the opinion that no insurance on micro irrigation system.

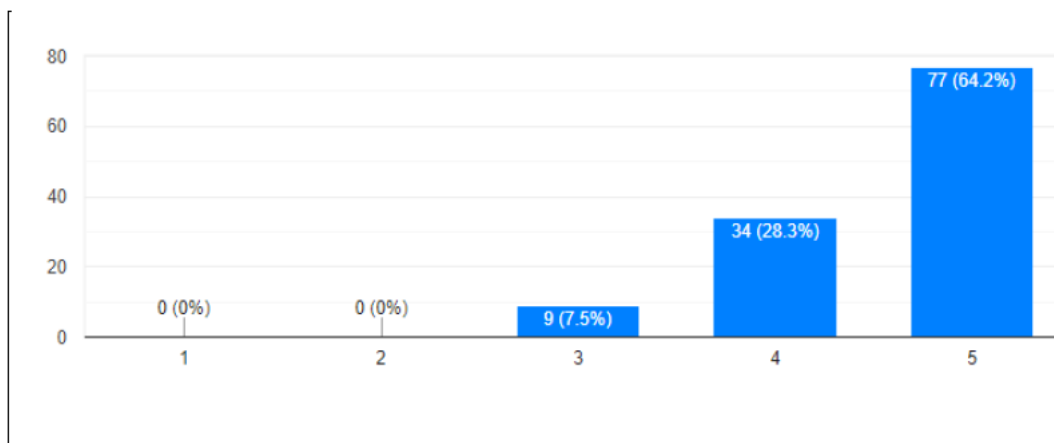


Fig. 8 Insurance Availment

Clogging problem

The below bar graph (Fig. 9) indicates the constraints faced by farmers on micro irrigation system. Out of the total 120 respondent farmers, 48.3 per cent of the farmers “Agree” that the more clogging problem in micro irrigation systems. Whereas, 44.2 per cent, 5.8 per cent and 1.7 per cent of farmers “Strongly Agreed”, “Neutral” and “Disagreed” that the more clogging problem in micro irrigation systems. Further, none of the farmer “Strongly Disagreed” that the more clogging problem in micro irrigation systems. It can be concluded that majority of the farmers (92.5 per cent) have the opinion that the more clogging problem in micro irrigation systems.

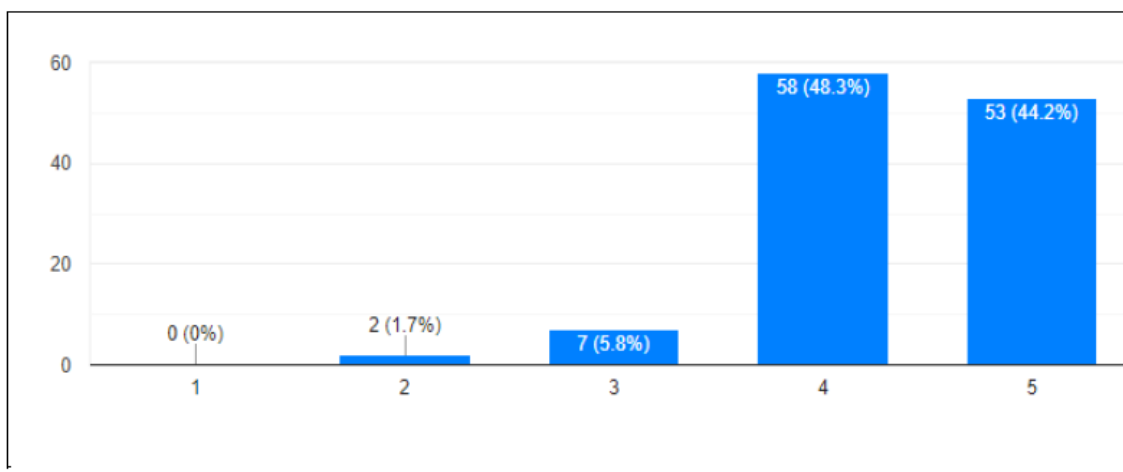


Fig. 9 clogging problem

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