PROBLEMS AND PROSPECTS OF ADOPTION OF DRIP IRRIGATION SYSTEM IN TAMIL NADU

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ABSTRACT

The study was conducted with 240 drip irrigation to identify the reasons for discontinuance of drip irrigation system, reasons for continued adoption, the area of modification is needed in the drip irrigation system as perceived by farmers and finalization of an area of modification of needed in discussion with scientists. The results clearly showed that cent percent of farmers were expressed that salt deposition in the lateral, rat & rodents damage, majority of them not able to replace the laterals after the damage, lack of knowledge about the drip system maintenance, not able to monitor the drippers continuously, lack of follow up activities or service from the drip company, Inferior lateral quality and not able to get spare parts to change the affected part of drip system from the drip company are the important reasons for discontinuing the drip irrigation system. The farmers are adopting the drip irrigation system continuously due to their interest in repairing the problem, installed the good quality laterals by giving additional money in addition to allotted scheme money and able the replace the laterals after two years. Lateral tolerant to rat and rodent damage, low-cost water treating method, implements or machinery to roll out and spread the laterals are the areas of modification is needed in the drip irrigation system as perceived by farmers.

KEYWORDS: Drip Irrigation, Problems, Adoption & Discontinuance

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INTRODUCTION

Water is becoming a scarce commodity due to various reasons. Various strategies have been formulated and implemented considering the water availability and requirement for future use by both central and state governments. One such method introduced relatively recently in Indian agriculture is micro-irrigation, which includes both drip and sprinkler method of irrigation. Micro-irrigation (MI) is proved to be an efficient method in saving water and increasing water use efficiency as compared to the conventional surface method of irrigation where water use efficiency is only about 35-40 percent.

Drip irrigation was initially introduced by the Agricultural universities and other research institutions in India with the aim to increase the water use efficiency in crop cultivation. Realizing this situation Government of India introduced various promotional schemes namely National Mission on Micro Irrigation (NMMI), the National Committee on Plasticulture Applications in Horticulture (NCPAH), National Horticultural Mission, National Agricultural Development Project etc. with the subsidy to farmers in all the states. As a result, the area under drip irrigation has increased positively in the country. Over the last ten years, significant growth has been achieved in the area under drip method of irrigation in absolute term in many states. (GOI, 2004)

In Tamil Nadu, drip irrigation was implemented in 1, 53,437 ha. Tamil Nadu is one of the important states in the implementation of Micro-irrigation next to Maharashtra. Even though a lot of efforts were taken to increase the area under drip irrigation system both by Government of India and Tamil Nadu by various schemes. It is not able to achieve the expected area under drip irrigation. To get the intended benefits, the system must function efficiently during the entire growing season. Failure at a critical point in the crop production cycle can cause loss of the entire crop. The farmers are discontinuing the drip irrigation after one or two years of adoption though they have incurred much on it.

Clogging of drippers mainly due to poor quality of water has been a inherent problem observed in certain parts of the country. It is realised that the normal acid treatment does not help to mitigate the problem. Therefore, studies need to be carried out to devise de-logging measures in such areas. (Narayanamoorthy 1996). It is observed that the price of micro-irrigation accessories such as emitters, filters, laterals, etc. vary between shops and places. Sometimes farmers do face problem in getting spare parts in time. It is necessary to provide quality drip materials in time for farmers for the speedy adoption of micro-irrigation. To avoid price variation and non-availability problem of spare parts, special efforts should be undertaken in the advanced districts headquarters, taluk headquarters and even at block level. (Narayanamoorthy 1996)

One of the important reasons for the low spread of this technology even in the water-scarce area is the availability of highly subsidized canal water as well as electricity for irrigation pump sets. Appropriate pricing policies on these two inputs may encourage the farmers to adopt this technology. (Kulkarni 1987).

Under these circumstances, it is essential to identify the reasons for discontinuance of drip irrigation system in all aspects and work out the possible solutions for scaling up the adoption of drip irrigation system. Keeping this in view, the study was undertaken with an objective to identify the reasons for discontinuances and reason for continued adoption and also to find out the area of modification is needed in the drip irrigation technology as perceived by farmers.

RESEARCH METHODOLOGY

The study was conducted in four districts namely Dharmapuri, Villupuram, Madurai and Sivagangai districts with well-constructed interview schedule. The districts namely Dharmapuri and Villupuram were selected as progressive districts in the adoption of drip irrigation and Madurai & Sivagangai districts were selected as less progressive in the adoption of drip irrigation in consultation with scientists of Water Technology Centre, TNAU, Coimbatore. Chinnasalem and Kallakuruchi block in Villupuram district, Aarur and a poppireddypatti block in Dharmapuri district, Alanganallur and Sellampatti block in Madurai district and Sivagangai and Thirupattu block in Sivagangai district was selected in consultation with Deputy Director of Horticulture of Sivagangai & Madurai districts and the programme coordinators of KVK, Tindivanam and Dharmapuri districts.

The causes for discontinuation of drip irrigation system are identified in selected four districts through a personal interview with farmers who have implemented the drip irrigation and discontinued. In each district, 30 farmers who have adopted the irrigation system and discontinued are surveyed. Totally 120 farmers were contacted to find out the reasons for discontinuance.

Also, the practices followed by farmers in continuing the drip irrigation system are identified in all the four districts with 30 farmers each through personal interview. Totally 120 farmers are interviewed to find out the practices followed by farmers for continuing drip irrigation system. The areas of modification needed in drip irrigation technology are identified with all the 240 farmers in more and less progressive districts.

The areas identified for modification in drip irrigation technology as perceived by farmers are discussed with scientists of Horticultural College and Research Institute, Periyakulam and Agricultural College and Research Institute, Madurai for finalization of possible areas for modification. Data were collected and discussed with a scientist of TNAU. Percentage analysis and cumulative frequency were used to analyze the results and for interpretation.

RESULTS AND DISCUSSIONS

Reasons for Discontinuance of Drip Irrigation Systems

The results clearly showed that cent percent of farmers was expressed that salt deposition in the lateral is one of the most important problems in drip irrigation systems and it leads to discountenance of drip irrigation systems. The salt is deposited in the lateral within six months of installation. It blocks the inner drippers in the laterals and leads to total blockage. This study is similar to the studies of Narayanamoorthy 1996.

Also, cent percent of the farmers have expressed that rat and rodents damage is another important reason for discontinuance of drip systems. The rat damaged the laterals to sharpen the teeth, particularly in the inline drippers. Sometimes it breaks the laterals in nearby drippers it leads to wastage of water and prevents the water flow to other plants. Rodents namely squirrel damaged the lateral for water. If water is available in a nearby field or places the damage is less in laterals. This study is similar to the studies of Chopra, 1996.

Ninety-five percent of farmers is not able to replace the laterals after the damage. They are mostly small and marginal farmers and engaged only in agriculture and not having any additional income leads to an inability to purchase the laterals. Also, they cannot get a subsidy for laterals from the department due to rules in the implementation of drip irrigation. These findings are similar to the findings of Kulkarni (2005)

Lack of knowledge about the drip system maintenance is another one of the important reason and it was expressed by 93.33 percent of farmers. The farmers are not having knowledge about the laterals, sub-main and fertilizer tank maintenance. Farmers those who are having knowledge in the drip maintenance and they are continuously adopting the drip irrigation. The department officials are providing training to farmers about drip system maintenance at the time of installing the drip system theoretically. Farmers should get practical oriented hands-on training in problems of drip maintenance.

Farmers reported that they are not able to monitor the drippers continuously as one of the reason for discontinuance with 91.66 percent. Farmers have to monitor the drippers in all laterals daily to avoid the blockage and salt formation. If they monitor the drippers daily and cleaning the blockage or salt formation by small beating in the area of drippers solved the permanent blockage of drippers. Most of the farmers are not able to monitor the drippers daily and allow the salt formation and complete blockage.

Ninety percent of farmers were expressed that lack of follow up activities or service from the drip company leads to discontinuance. Most of the drip company not attending the farmer's inquiry after installation of the drip irrigation. Even after a frequent call to drip company field staff, farmers are not able to get the solution to their problem. After getting the amount from the department for particular farmer the company field staff not responding to the amount settled farmers.

Inferior lateral quality is one of the important reasons for discontinuance of drip irrigation systems and it was expressed by 81.66 percent of farmers. Low-quality laterals are supplied to accommodate the subsidy amount leads to

lower mm size. This inferior quality damaged within a period of six months. Farmers those who are having economic access to spend additional amount to get good quality laterals continued the drip irrigation system.

Farmers reported (80.23 percent) that they are not able to get spare parts to change the affected part of drip system from the drip company. Farmers frequently needed the drippers and connectors to repair the drip laterals system. Drip Company is not supplying the spare parts on time leads to discontinuance.

Farmers are not able to get a solution for drip system related problems from the department officials and it was expressed by 73.33 percent. The staffs in the department are not having sufficient knowledge in drip maintenance system. They depend on the drip company staff to give solution to the problem faced by the farmers. The results are similar to the results of Narayanamoorthy, 1996 (c).

Three fifths of the farmers (62.50 percent) are having pre attitude mindset that drip water is sufficient for the crop, the flooding the field will give more yield. The farmers are not convinced the quantity of water released from drippers particularly for perennial crops. Those who are not having water problems they prefer the flood irrigation only.

In sugarcane crop, the farmers are not practicing the intercultural operation particularly detaching. The farmers are not able to enter into the sugarcane field after five months and they are not monitoring the drippers leads to damage of laterals by blockage or salt formation. This reason was expressed by 56.66 percent of farmers.

Reasons for Continued Adoption of Drip Irrigation Systems

The farmers are adopting the drip irrigation system continuously even more than 10 years with managing the problems occurred in the drip system. The survey was conducted those who adopted the drip system continuously to identify the reasons for continued adoption. The results revealed from the above table that 97.50 percent of farmers were expressed farmers interest in repairing the problem is the most important reason for the continued adoption of drip irrigation. Some of the farmers are continuously monitoring the drippers and laterals daily when they irrigate and remove any blockage in the lateral by small beating in the area of drippers. Also, they replaced the blocked and damaged drippers immediately.

Farmers installed the good quality laterals by giving additional money in addition to allotted scheme money is prolonged the formation of salt and also blockage. This is another one important reason for the continued adoption of drip irrigation and it was expressed by 91.67 percent farmers. Usually, in the subsidy scheme, they are allotting 12 mm lateral and this 12 mm laterals is damaged easily by rodents and rat and also the salt formation has occurred within a short period of time.

Ninety percent of farmers were expressed that they are able to replace the laterals after two years. The farmers are maintaining the laterals by replacing damaged drippers and damaged parts by connectors for the particular time, after that they are replacing with new one leads to the continued adoption of drip irrigation system. The follow-up services rendered by drip company field staff is one of the important reasons for the continued adoption and it was expressed by 87.50 percent of farmers. In some areas the farmers are having good relation with the drip company field staff and this paves the way for maintenance of drip irrigation system. The farmers requesting the drip company field staff to carry out the acid treatment to laterals when they needed. The field staff also carried out the acid treatment to break the salt formation then and there. This work leads to the continued adoption of drip system and it was expressed by 77.50 percent of farmers.

The drip company field staff conducting hands-on training in acid treatment techniques to the farmers when they had a problem of blockage and salt formation. The learned farmers practicing the acid treatment in their local method after the end of each crop period. This reason was expressed by 72.50 percent of farmers for their continued adoption.

Farmers those are having frequent contact with extension officials continued the adoption of drip irrigation system (52.50 per cent). The extension officials are giving a solution to the problem faced by farmers in the drip irrigation system by their experience and also getting guidance from the specialist in the drip system. Nearly fifty percent of farmers replacing the damaged laterals by getting repeated subsidy from the department. Getting subsidy for additional land or getting in their family member name and placing the lateral in the previous same field. Forty percent of farmers are managing the problems in the drip system and continuing their adoption with the help of services rendered by the sugar factory extension staff. The field staff frequently visited the sugarcane field and provided the advice for drip maintenance system also.

Area of Modification is Needed in Drip Irrigation Systems as Perceived by Farmers

The farmers were asked to give the area of modification is needed in drip system components. All the farmers were perceived that they need laterals tolerant to rat and rodent damage. The lateral is the main component in the drip irrigation system and all the farmers were facing the problem in the lateral only. At present the technology transfer team recommending acid treatment for laterals at the end of each crop or once in six months. Majority of the farmers (75.83 per cent) expressed that instead of acid treatment to laterals they need an easy method of treating water quality. They expressed that the problem water should be treated with low cost before delivering to laterals.

Forty-five percent of farmers need a machinery to roll out and spread the laterals at the end of each crop. Farmers are facing the problem to roll out the laterals at the end of crop and spread the lateral at the time of the beginning of next crop. Some of the drip companies are supplying the laterals with four holes dripper at low cost. It prolongs the period of total blockage of laterals. One-third of farmers (36.25 percent) perceived that they need four holes dripper in the laterals. When the laterals are not exposed to the sun directly, the salt formation in the laterals is delayed even the water quality is not good. This was expressed by 27.50 percent farmers. They need small machinery or tool to cover the lateral with soil.

Finalization of Areas of Modification needed in the Drip Irrigation System

Table 1

Sl. No	Areas of Modification needed as Perceived by Farmers	Suggestions Offered by Scientists
1	Lateral tolerant to rat and rodent damage	<ul style="list-style-type: none"> To avoid the squirrel damage water in small pot may placed in the trunk of coconut tree. Higher end MM size (Good quality) laterals may be used Fume repellent chemical may be used as coating materials while manufacturing the laterals to prevent the rat damage after carrying out the research.
2	Easy method of salt treatment (Treating the water quality)	<ul style="list-style-type: none"> Using high quality laterals with periodical acid treatment may be carried out. Research may be conducted in low cost salt water treatment plant.
3	4 holes in lateral instead of two (It will prolong the total clogging)	Research may be conducted because we cannot maintain the pressure in drip irrigation system and also there will not be uniform water distribution.

4	Machinery or Implements to cover the lateral with soil (It will prolong the salt formation)	Research may be conducted at least for wider spacing crops
5	Machinery to roll out and spread the lateral (End of the crop)	Low cost machinery may be developed.

CONCLUSIONS

The study concluded that the government has to provide high quality lateral or higher end mm size lateral to farmers within the subsidy amount. In addition to training given to farmers at the time of implementation, hands-on training in drip irrigation system maintenance may be given in their field after one year of implementation. Effective followup service may be provided by the department officials and by the drip company extension personnel. Para extension workers may be developed in drip irrigation maintenance at the block level. Providing subsidy for laterals after two years of implementation. Research may be conducted to develop the fume repellent chemicals coated laterals, small implements or machinery to roll out and spread the laterals and training may be given to field extension staff of state departments in drip irrigation system maintenance

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APPENDICES

Table 2: Reasons for Discontinuing the Drip Irrigation Systems

(n= 120)

Sl. No	Reasons for Discontinuance	Number	Per cent
1	Salt deposition	120	100.00
2	Rat and rodents damage	120	100.00
3	Inferior Lateral quality	98	81.66
4	Lack of knowledge about drip system maintenance	112	93.33
5	Not able to get solution for drip system related problem from department	88	73.33
6	Lack of follow up activities from drip company	108	90.00
7	Not able to monitor the drippers continuously	110	91.66
8	Not suitable to sugarcane crop	68	56.66
9	Not able to get needed drip spare parts	97	80.23

Table 2: Contd.,			
10	Farmers not convinced about drip water is sufficient for crop (Flooding the field will give more yield)	75	62.50
11	Not able to replace the laterals by farmers	114	95.00

Table 3: Reasons for Continued Adoption of Drip Irrigation Systems

(n= 120)

Sl. No	Reasons for Continued Adoption	Number	Per cent
1	Farmers interest to rectify the problem	117	97.50
2	Installed the quality laterals by giving additional money	110	91.67
3	Replacing the laterals with repeated subsidy	57	47.50
4	Drip company follow up	105	87.50
5	Hands on training – Acid treatment by company people	87	72.50
6	Acid treatment by company people on need basis	93	77.50
7	Frequent contact with extension officials to solve the problem	63	52.50
8	Able to replace the laterals after two years	108	90.00
9	Sugar factory field staff follow up	48	40.00

Table 4: Areas of Modification is Needed in the Drip System as Perceived by Farmers

(n= 240)

Sl. No	Areas of Modification Needed as Perceived by Farmers	Number	Per cent
1	Rat and rodent damage tolerant Lateral	240	100.00
2	Easy method of salt treatment (Treating the water quality)	182	75.83
3	4 holes in lateral instead of two (It will prolong the total clogging)	87	36.25
4	Machinery or Implements to cover the lateral with soil (It will prolong the salt formation)	66	27.50
5	Machinery to roll out and spread the lateral (End of the crop)	108	45.00