A Study on Extent of Use of Drip Irrigation System by Sugarcane Farmers in Telangana State, India

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Abstract

Sugarcane Farming is one of the important segments of Indian agriculture because it is raw material to sugar industry for which India ranks second in the world economy. Under the depleting groundwater scenario, productivity of high water requiring crops like sugarcane can only be sustained using water-economizing techniques like drip irrigation. The study was carried out to assess the extent of use of drip irrigation system in sugarcane crop. For this purpose, 240 sugarcane growers in three districts Telangana state were taken as study respondents. This paper has made an attempt to reveal the extent of use of drip irrigation system by sugarcane farmers. The study revealed that 32.50 per cent of the sugarcane drip farmers fell under the category of low extent of use followed by medium, high extent of use, very high and very low extent of use respectively.

Keywords

Extent of use, Sugarcane, Drip, Drip irrigation in sugarcane etc.

Introduction

Drip irrigation is an efficient method of providing irrigation water directly into soil at the root zone of plants and thus, minimizes conventional losses such as deep percolation, runoff and soil erosion. Unlike surface irrigation, drip irrigation is more suitable and economical if it is introduced in water scarce areas having undulated topography, shallow and sandy soils and for wide spaced high value crops. It also permits the utilization of fertilizers, pesticides and other water-soluble chemicals along with irrigation water resulting in higher yields and better quality produce. Hence, drip irrigation system is regarded as panacea for many of the problems in dry land agriculture and improving the efficiency in irrigated agriculture. Apart from being a water intensive crop, sugarcane has been cultivated mainly under surface method of irrigation, where water use efficiency is very low (35-40 per cent) owing to substantial evaporation and distribution losses (Sivanappan, 1994). Unlike surface method of irrigation, under drip method of irrigation, water is supplied directly to the root zone of the crops through a network of pipes, which saves enormous amount of water by reducing evaporation and distribution losses. This method is rapidly gaining importance in the area where water is scarce and high value crops are produced. Accordingly Telangana Micro Irrigation project (TSMIP) was carved
out of AP Micro Irrigation Project. Drip irrigation technology requires relatively higher amount of fixed capital and therefore, farmers are getting subsidy from TSMIP. In several cases, even after the adoption of drip irrigation, the farmers discontinued drip irrigation due to lack of maintenance, irrelevant cultural background and unreliable water supply (Kulecho and Weatherhead, 2005). This paper has made an attempt to study the extent of use of drip irrigation system in sugarcane crop.

Materials and Methods

List of operations in drip irrigation system maintenance practices were prepared. These were divided into two groups as operations to be done before and at the time of installation of drip system and operations to be done frequently in drip irrigation system. 9 operations were listed with Yes and No response categories for the operations to be done before and at the time of installation and 18 operations were listed with frequently, seldom and never response categories for the operations to be done frequently in drip irrigation system. Total 27 operations were listed to elicit the response on extent of use of drip irrigation system in sugarcane crop. A score of ‘1’ and ‘0’ was assigned to Yes or No responses respectively for the set of 9 statements in operations to be done before and at the time of installation of drip irrigation system. A score of ‘2’, ‘1’ and ‘0’ was assigned to frequently, seldom and never responses respectively for the set of 18 statements in operations to be done frequently in drip irrigation system. Combined score of two sets were taken for the score of each respondent total score for extent of use.

Results and Discussion

The results in the Table 1 and Figure 1 indicated that, 32.50 per cent of the sugarcane drip farmers fell under the category of low extent of use followed by medium (27.08%), high extent of use (18.33%), very high (11.67%) and very low extent of use (7.08%) respectively.

The low extent of use of drip irrigation system by sugarcane farmers could be due to medium to low level of information management behaviour, medium knowledge, less number of trainings undergone, medium to low level of innovativeness. Sugarcane is being a perennial crop the acid treatment cannot be done during the crop period because of crop damage. The acids which are used for the shock treatment of drip irrigation system were not easily available in the market.

Table 1 Distribution of the sugarcane drip farmers according to the extent of use of drip irrigation system in sugarcane crop N=240

| S.No. | Category    | Frequency | Percentage |
|-------|-------------|-----------|------------|
| 1     | Very low    | 17        | 7.08       |
| 2     | Low         | 78        | 32.50      |
| 3     | Medium      | 65        | 27.08      |
| 4     | High        | 44        | 18.33      |
| 5     | Very high   | 28        | 11.67      |
### Table 2: Extent of adoption of maintenance practices in drip irrigation System by sugarcane farmer

| S. No. | Operations to be done at once before and at the time of installation of drip system | YES | NO | T.S | M.S | Rank |
|--------|----------------------------------------------------------------|-----|----|-----|-----|------|
| 1      | Soil properties, water quality should be checked                 | 184 | 56 | 184 | 0.77 | V    |
| 2      | Levelling of the land should be done                            | 220 | 20 | 220 | 0.91 | II   |
| 3      | For paired row system spacing of the laterals should be 6 feet to 8 feet | 85  | 155| 85  | 0.35 | VIII |
| 4      | In paired row planting method one lateral should be placed between two adjacent rows of cane | 80  | 160| 80  | 0.33 | IX   |
| 5      | Spacing of the drippers is 40 to 90 cm depending on the soil type | 196 | 44 | 196 | 0.82 | IV   |
| 6      | Installation of the drip should be as per accurate design       | 212 | 28 | 212 | 0.88 | III  |
| 7      | Operate the drip system 12-24 hours for to bring soil moisture at field capacity at the time of planting | 223 | 27 | 223 | 0.93 | I    |
| 8      | System should be flushed before start of the crop               | 168 | 72 | 168 | 0.70 | VI   |
| 9      | In sand filter level of sand should be maintained               | 150 | 90 | 150 | 0.62 | VII  |

| Operations to be done frequently in drip irrigation system | Frequent | Seldom | Never | T.S | M.S | Rank |
|------------------------------------------------------------|----------|--------|-------|-----|-----|------|
| 10 Regular back flush of the sand filter (*once in a day)  | 65       | 160    | 15    | 290 | 1.2 | VIII |
| 11 Change/ rectify the media if the media is getting rounded off in the sand filter | 7        | 33     | 200   | 47  | 0.2 | XVI  |
| 12 In case of screen filters checking the filter element and gasket closely | 89       | 113    | 38    | 291 | 1.21| VII  |
| 13 The system should always be flushed after any repairs    | 120      | 86     | 34    | 326 | 1.36| VI   |
| 14 Check the pressure gauges and ventury                    | 106      | 79     | 55    | 291 | 1.21| VII  |
| 15 Wash the filter elements before starting fertigation     | 84       | 98     | 58    | 266 | 1.11| X    |
| 16 Flush the laterals weekly/ fortnightly                    | 186      | 45     | 9     | 417 | 1.74| II   |
| 17 Fertigation should be done in the middle of an irrigation event | 165     | 68     | 17    | 398 | 1.66| IV   |
| 18 After the completion of the fertigation, irrigation should be continued for another 15 minutes | 154     | 75     | 21    | 383 | 1.59| V    |
| 19 Concentration of the fertilizers in effective root zone should not exceed 1000 ppm | 25       | 63     | 152   | 113 | 0.47| XIII |
| 20 Acid treatment with chlorine 10-20 ppm                    | 11       | 38     | 191   | 60  | 0.25| XV   |
| 21 Inject the acid and keep it for 30-60 minutes once in 3 months for acid treatment | 10       | 45     | 185   | 65  | 0.27| XIV  |
| 22 Shut the system for 24 hours during acid treatment        | 12       | 35     | 193   | 59  | 0.25| XV   |
| 23 Flush all the sub mains and laterals after acid treatment | 48       | 95     | 97    | 191 | 0.79| XI   |
| 24 Rodents and pest should be controlled                     | 112      | 52     | 76    | 276 | 1.15| IX   |
| 25 Clogged emitters should be cleaned and if not working, should be replaced | 196      | 34     | 10    | 426 | 1.77| I    |
| 26 Care should be taken to prevent leakage                   | 175      | 63     | 2     | 413 | 1.72| III  |
| 27 Regular checking of valves and pressure gauges for uniform irrigation | 163      | 71     | 7     | 142 | 0.59| XII  |
Fig.1 Distribution of the respondents according to their extent of use of drip irrigation system in sugarcane crop N=240

The important problem of farmers i.e. availability of groundwater for irrigation purpose was overcome by drip irrigation system as they can irrigate additional area with available water by adopting drip irrigation system; the farmers were satisfied with this feature and they were not taking care about maintenance of system. Lack of proper knowledge on operation and maintenance of drip irrigation system, poor after sales services by MI company employees, lack of availability of spare parts and chemicals for cleaning of drip irrigation system might be the reason for low extent of drip irrigation system use. The results are in conformity with the findings of Katkar and Milind (2006).

Further, the rank wise analysis (Table 2) of extent of adoption of various maintenance practices in drip irrigation system by sugarcane farmers indicate that In the operations to be done before and at the time installation of the drip irrigation system the first rank was obtained on the operation of operate the drip system 12-24 hours for to bring soil moisture at field capacity at the time of planting followed by levelling of the land should be done, installation of the drip should be as per accurate design, spacing of the drippers is 40 to 90 cm depending on the soil type, soil properties, water quality should be checked, system should be flushed before start of the crop, in sand filter level of sand should be maintained, for paired row system spacing of the laterals should be 6 feet to 8 feet and in paired row planting method one lateral should be placed between two adjacent rows of cane. In operations to be done after installation of drip irrigation by sugarcane farmers the first rank was obtained on the operation of clogged emitters should be cleaned and if not working, should be replaced, flush the laterals weekly/ fortnightly, care should be taken to prevent leakage, fertigation should be done in the middle of an irrigation event, after the completion of the fertigation, irrigation should be continued for another 15 minutes, the system should always be flushed after any repairs, check the pressure gauges and ventury, in case of screen filters checking the filter element and gasket closely, regular back flush of the sand filter (*once in a day), rodents and pest should be controlled, wash the filter elements before starting fertigation, flush all the sub mains and laterals after acid
treatment, concentration of the fertilizers in effective root zone should not exceed 1000 ppm, inject the acid and keep it for 30-60 minutes once in 3 months for acid treatment, shut the system for 24 hours during acid treatment and change/rectify the media if the media is getting rounded off in the sand filter.

Most of the sugarcane farmers were under the category of low extent of use of drip irrigation system. Most of the sugarcane farmers adopting the practice of operating the drip system 12-24 hours for to bring soil moisture at field capacity at the time of planting before and at the time of installation and clogged emitters should be cleaned and if not working after installation.

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