

Studies on factors influencing the drip irrigation adoption, constraints and remedial measures to increase area under drip irrigation

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■ **ABSTRACT** : The study was conducted on Drip and Surface Irrigation banana crop in Dharwad district of Northern Karnataka during the year 2010 -11 and 2011-12. The 100.00, 96.59, 92.05, 90.91, 87.50, 73.86 and 53.41 per cent drip irrigation farmers were influenced by the benefits like saving in water, labour, easy application of water, increased yield, reduced weed growth, better quality produce and to avail subsidy, respectively for drip adoption. The 87.50, 65.91, 48.86, 39.77, 35.23, 30.68 and 26.14 per cent drip irrigation farmers were influenced by neighbours and relatives, Private Agencies, Agricultural Assistants, Assistant Horticulture Officers, Non-Governmental Organizations, Television and Radio, respectively for drip adoption. The 100.00, 98.86, 87.50, 80.68, 78.41, 73.86, 71.59, 69.32 and 64.77 per cent of drip irrigation farmers were having constraints like complicated procedures in getting loan, delay in sanction of loan, non availability of soluble fertilizers, inadequate supply of electricity, choking of laterals and drippers, initial investment is high, inadequate follow up services by drip agencies, non availability of quality materials and rodents damage to the laterals, respectively. The remedial measures suggested to improve drip performance and to increase area under drip irrigation are, the persons involved in design and layout of drip irrigation systems are to be properly trained, supply of good quality materials should be ensured, follow up services are to be ensured, solutions for the rodents damage, training the farmers on maintenance of the drip irrigation systems, ensure the adequate supply of the soluble fertilizers and immediate sanction of loan simplifying the procedure or providing cent per cent subsidy.

■ **KEY WORDS** : Subsidy, Soluble fertilizers, Remedial measures, Performance, Maintenance

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India has made a appreciable progress in creating irrigation potential. However, it is still insufficient to meet the long term requirement of irrigation. The ever increasing population has put tremendous pressure on food demand. Every unit of available land resource and other critical inputs needs to be exploited to reap maximum benefits. In future, the most critical input happens to be water, which has become scarce. In an effort to make irrigation more efficient to obtain more crop per drop, farmers have adopted alternatives to flooding and other conventional irrigation methods. Among all the irrigation methods drip irrigation is an efficient method to provide irrigation water directly into the soil at the root zone of plants and it permits the irrigator to limit the watering closely to the crop water requirements.

■ METHODOLOGY

The study was conducted in Dharwad district in

Karnataka state and among the five taluks of Dharwad district, three taluks namely Dharwad, Hubli and Khalghatagi were purposively selected based on the highest area under drip irrigation. The village wise list of drip irrigation farmers was obtained from the Deputy Director of Horticulture, Dharwad district. The revenue villages were arranged in descending order based on the drip area and top ten villages in each taluka were selected. The selection of the farmers was made on the basis of major crops, holding size and year of plantation. The study was restricted to those crops which are in normal yielding stage, accordingly banana was the only crop and hence it was selected for the study. The seventy five per cent of the farmers who have installed drip irrigation system for banana, planted during 2009-10 amounting to eighty eight were selected from the Dharwad, Hubli and Khalghatagi taluks of Dharwad district by following proportionate random sampling technique. The corresponding number of farmers

with all criteria except drip irrigation were selected randomly from surface irrigation farmers. Keeping in view the objectives a structured interview schedule was prepared by reviewing the previous research studies, discussing with the experts and professional workers. The data was collected by both the drip and surface irrigation farmers by personal interview method. Appropriate statistical tools such as frequency distribution, percentage, mean, range and standard deviation were worked out to summarize data and draw the inferences.

■ RESULTS AND DISCUSSION

It was observed from the data presented in the Table 1 that, 100.00, 96.59, 92.05, 90.91, 87.50, 73.86 and 53.41 per cent farmers were influenced for adoption of drip irrigation by the benefits like saving in water, labour, easy application of water, increased yield, reduced weed growth, better quality produce and to avail subsidy, respectively.

The data presented in Table 2 revealed that the 87.50 per cent drip irrigation farmers were influenced for adoption of drip irrigation by neighbours and relatives for their drip adoption, 65.91 per cent farmers by private agencies, 48.86 per cent farmers were by Agricultural Assistants, 39.77 per cent farmers were by Assistant Horticulture Officers, 35.23 per cent farmers were by Non-Governmental Organizations, 30.68 per cent farmers were by television and 26.14 per cent farmers were by radio for their drip adoption. Similar results were reported by Waghdare *et al.* (1998), Dilip and Intodia

(1999) and Patel and Patel (2000).

The data presented in Table 3 on extent of drip irrigation practices adopted by the banana drip irrigation farmers to know the level of drip adoption revealed that the 61.36 per cent farmers cleaned sand filter regularly, 30.68 per cent farmers cleaned partially and the remaining 7.95 per cent farmers did not cleaned the sand filter. The screen filter was cleaned by 60.23 per cent farmers, 28.41 per cent farmers cleaned partially and the remaining 11.36 per cent farmers did not cleaned the screen filter. The main and sub main pipes were cleaned by 42.05 per cent farmers, 51.14 per cent farmers cleaned partially and the remaining 6.82 per cent farmers did not cleaned the main and sub main pipes. The lateral pipes cleaned by 46.59 per cent farmers, 44.32 per cent farmers were cleaned partially and the remaining 9.09 per cent farmers did not cleaned the lateral pipes. The drippers were cleaned by 48.86 per cent farmers, 46.59 per cent farmers cleaned partially and the remaining 4.55 per cent farmers did not cleaned the drippers.

The data on extent of drip irrigation practices adopted by the drip irrigation farmers presented in the Table 4 revealed that the 9.09 per cent farmers having low level of drip adoption (scores less than 9), 48.86 per cent farmers having medium level of drip adoption (scores between 9 to 15) and the remaining 42.05 per cent having high level of drip adoption (scores more than 15). The mean was 11.97 and 5.75 was the standard deviation.

The constraints in drip irrigation adoption by the drip

Table 1: Influencing factors for adoption of drip irrigation

| Sr. No. | Benefits | Respondents (n = 88) | | Rank |
|---------|----------------------------------|----------------------|------------|------|
| | | Frequency* | Percentage | |
| 1. | To save water | 88 | 100.00 | I |
| 2. | To save labour | 85 | 96.59 | II |
| 3. | Easy application of water | 81 | 92.05 | III |
| 4. | Increased yield | 80 | 90.91 | IV |
| 5. | Reduced weed growth | 77 | 87.50 | V |
| 6. | To obtain better quality produce | 65 | 73.86 | VI |
| 7. | To avail subsidy | 47 | 53.41 | VII |

* Multiple responses

Table 2 : Influencing persons/media for adoption of drip irrigation

| Sr. No. | Influencing sources | Respondents (N = 88) | | Rank |
|---------|---------------------------------|----------------------|------------|------|
| | | Frequency* | Percentage | |
| 1. | Neighbours and relatives | 77 | 87.50 | I |
| 2. | Private agencies | 58 | 65.91 | II |
| 3. | Agricultural Assistants | 43 | 48.86 | III |
| 4. | Assistant Horticulture Officers | 35 | 39.77 | IV |
| 5. | Non Governmental Organizations | 31 | 35.23 | V |
| 6. | Television | 27 | 30.68 | VI |
| 7. | Radio | 23 | 26.14 | VII |

* Multiple responses

Table 3 : Extent of drip irrigation practices adopted by the farmers

| Activities | Respondents (N = 88) | | | | | |
|----------------------------------|-----------------------|-------|----------------|-------|----------|-------|
| | Done | | Partially done | | Not done | |
| | No* | % | No* | % | No* | % |
| Cleaning sand filter | 54 | 61.36 | 27 | 30.68 | 7 | 7.95 |
| Cleaning screen filter | 53 | 60.23 | 25 | 28.41 | 10 | 11.36 |
| Cleaning main and sub main pipes | 37 | 42.05 | 45 | 51.14 | 6 | 6.82 |
| Cleaning lateral pipes | 41 | 46.59 | 39 | 44.32 | 8 | 9.09 |
| Cleaning drippers | 43 | 48.86 | 41 | 46.59 | 4 | 4.55 |
| Checking pressure | 17 | 19.32 | 58 | 65.91 | 13 | 14.77 |
| Checking drifter discharge | 15 | 17.05 | 62 | 70.45 | 11 | 12.50 |
| Irrigation schedules | 21 | 23.86 | 54 | 61.36 | 13 | 14.77 |
| Fertigation | 48 | 54.55 | 37 | 42.05 | 3 | 3.41 |

* Multiple responses

Table 4 : Distribution of drip irrigation farmers based on level of drip adoption

| Variable | Category | Respondents (N = 88) | |
|------------------------|-------------------------------|-----------------------|------------|
| | | Frequency | Percentage |
| Level of drip adoption | Low (Less than 9 score) | 8 | 9.09 |
| | Medium (Between 9-15 score) | 43 | 48.86 |
| | High (More than 15 score) | 37 | 42.05 |
| | Mean | 11.97 | |
| | SD | 5.75 | |

Table 5: Constraints in drip irrigation adoption

| Sr. No. | Constraints | Respondents (N = 88) | | Rank |
|---------|---|-----------------------|------------|------|
| | | Frequency* | Percentage | |
| 1. | Complicated procedures in getting loan. | 88 | 100.00 | I |
| 2. | Delay in sanction of loan. | 87 | 98.86 | II |
| 3. | Non availability of soluble fertilizers | 77 | 87.50 | III |
| 4. | Inadequate supply of electricity | 71 | 80.68 | IV |
| 5. | Choking of laterals and drippers. | 69 | 78.41 | V |
| 6. | Initial investment is high. | 65 | 73.86 | VI |
| 7. | Inadequate follow up services by drip agencies. | 63 | 71.59 | VII |
| 8. | Non availability of quality materials. | 61 | 69.32 | VIII |
| 9. | Rodents damage to the laterals. | 57 | 64.77 | IX |

* Multiple responses

irrigation farmers presented in the Table 5 revealed that the 100.00, 98.86, 87.50, 80.68, 78.41, 73.86, 71.59, 69.32 and 64.77 per cent of drip irrigation farmers were having constraints like complicated procedures in getting loan, delay in sanction of loan, non availability of soluble fertilizers, inadequate supply of electricity, choking of laterals and drippers, initial investment was high, inadequate follow up services by drip agencies, non availability of quality materials and rodents damage to the laterals, respectively. Similar results were reported by Achutraj and Radhakrishnamurthy (2000), Choudhary and Kadam (2000), Shashidhara *et al.* (2007) and Timbadia *et al.* (2008).

The remedial measures were suggested to improve the performance of drip irrigation systems and to increase the area under drip irrigation. The remedial measures suggested are persons involved in design and layout of drip irrigation systems are to be properly trained, supply of good quality materials should be ensured, follow up services are to be ensured, solutions for the rodents damage, training for the farmers on maintenance of the drip irrigation systems, ensure the adequate supply of the soluble fertilizers and immediate sanction of loan simplifying the procedure or provide cent per cent subsidy.

Conclusion:

The farmers were influenced for adoption of drip irrigation by the benefits like saving in water, labour, easy application of water, increased yield, reduced weed growth, better quality produce and to avail subsidy, respectively. Regarding influencing sources for the adoption of drip irrigation farmers were influenced by neighbours and relatives, Private agencies, Agricultural Assistants, Assistant Horticulture Officers, Non-Governmental Organizations, television and radio for their drip adoption. They were also having constraints and to overcome constraints remedial measures were suggested and these will help to bring more area under drip irrigation.

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