Economics of Krishik Bandhu Drip Irrigation: An Empirical Analysis

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Abstract

The impact of Krishik Bandhu (KB) drip irrigation has been reported on productivities, incomes and benefit-cost ratios of sugarcane, banana, chilli and cotton in 51 villages of Tamil Nadu, Maharashtra and Madhya Pradesh states. The crop productivities, incomes and benefit-cost ratios under drip irrigation method have been found far higher in all the crops and in all the selected regions of these three states compared to those under the conventional flood irrigation method. The KB drip irrigation technology has been found to be far superior than the flood irrigation method.

Introduction

Agriculture is the primary occupation of a major proportion of the Indian population. There have been considerable variations in both the total quantity and distribution of rainfall in the recent past. This has resulted in the inadequate supply of irrigation water and a decline in the groundwater table as well. But, assured supply of irrigation water in adequate quantities is essential for improving crop productivities. The demand for irrigation water is witnessing a rapid growth in India.

Maharashtra has the highest area under micro irrigation with about 219696 ha, followed by Tamil Nadu and Madhya Pradesh (TERI, 2005). Drip irrigation is a proven method of efficient use of water in agriculture. Besides saving a considerable quantity of water, it increases crop productivity and reduces the total cost of cultivation (INCID, 1994).

The International Development Enterprises, India (IDEI), which has been working on water saving technologies, has developed an Affordable Drip Irrigation Technology Intervention (ADITI). It is quite beneficial for the small and marginal farmers.

This drip irrigation technology is simple and flexible. It can work in the ways that are more dynamic and fruitful than any other sophisticated irrigation technology. The IDEI has developed a variety of low cost drip irrigation technologies of which Krishik Bandhu (KB) drip irrigation technology is one. The KB drip irrigation technology is being adopted in different parts of India. It can be effectively adopted in undulating lands, rolling topographies, barren lands and shallow soils (Shivanappan, 1994). Therefore, it was proposed to evaluate its impact on productivities, incomes and benefit-cost ratios of a variety of crops in different regions of Tamil Nadu, Maharashtra and Madhya Pradesh.

Methodology

For the purpose of this study, in all 165 farmers, spread over 51 villages in the Erode region of Tamil Nadu, Indore region of Madhya Pradesh and Jalgaon region of Maharashtra states, were interviewed. The necessary data were collected from the sample farmers who had adopted the KB drip irrigation technology. The major crops raised under the KB drip irrigation technology were sugarcane and banana in the Erode region, chilli in the Indore
region, and cotton and banana in the Jalgaon region. The economics of these crops were worked out in terms of productivity, income and benefit-cost ratio, both under the KB drip irrigation method and the conventional flood irrigation method and the results so computed have been compared. The sample size selected for the study has been presented in Table 1.

<table>
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<tr>
<th>District</th>
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<th>Flood</th>
<th>Sample size</th>
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<td>20</td>
<td>40</td>
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<tr>
<td></td>
<td>Banana</td>
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<tr>
<td>Indore</td>
<td>Chilly</td>
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<td>20</td>
<td>43</td>
</tr>
<tr>
<td>Jalgaon</td>
<td>Cotton</td>
<td>21</td>
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<td>42</td>
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<tr>
<td></td>
<td>Banana</td>
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<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>84</td>
<td>81</td>
<td>165</td>
</tr>
</tbody>
</table>

Table 1. Sample size for the survey carried out in three regions of Tamil Nadu, Madhya Pradesh and Maharashtra states

Results and Discussion

This section focuses on the various advantages of the KB drip irrigation technology adopted by the sample farmers in comparison with those under the conventional flood irrigation method. The estimates made in respect of productivity, income and benefit-cost ratio for sugarcane and banana in the Erode region of Tamil Nadu, chilli in the Indore region of Madhya Pradesh and cotton and banana for the Jalgaon region of Maharashtra (Tables 2 and 3) have been evaluated region-wise.

Erode Region

Sugarcane Crop

There was a saving of Rs 6450.00 (14 per cent) in the total cost of cultivation of sugarcane under the KB drip irrigation technology compared to that under the flood irrigation method. Though the costs of ploughing, land preparation, application, seeding and plant protection measures were identical in both the KB drip irrigation technology and flood irrigation method, a net saving in costs occurred due to lower irrigation costs in the former. In fact, the costs incurred in respect of harvesting and transportation were more in the KB drip irrigation technology due
to increased production of sugarcane per acre, but these additional costs were more than compensated by the fertigation facility imbeded in the KB drip irrigation technology. The fertigation facility provided a saving in the cost of fertilizer application to the extent of 37 per cent.

The use of KB drip irrigation technology provided an additional yield of about 9 tonnes of sugarcane per acre and fetched an additional net profit of Rs 16063.00. The benefit-cost ratio was 1.55 in the KB drip irrigation technology and 1.12 in the conventional flood irrigation method. The production of sugarcane under the KB drip irrigation technology outweighed that under the flood irrigation method in the Erode region of Tamil Nadu.

### Banana Crop

The net saving in the total cost of cultivation per acre of banana under the KB drip irrigation technology was to the tune of Rs 6313.00 (20 per cent) as compared to that under the flood irrigation method. There was a substantial saving of Rs 3500.00 (78 per cent) in the KB drip irrigation technology. The total costs incurred for banana in the Erode region were Rs 25012.00 per acre, while those under the flood irrigation method were Rs 31325.00. The total income per acre obtained from banana under the KB drip irrigation technology was of the order of Rs 1,13,520.00 and that under the flood irrigation method was Rs 77,990.00. The additional net profit by the KB drip irrigation technology was almost equal to the total net profit obtained under the flood irrigation method.

The benefit-cost ratio of the banana crop under the KB drip irrigation technology was of the order of 4.54, while that under the flood irrigation was only 1.85. Thus, growing banana under the KB drip irrigation technology was far more profitable than that under the flood irrigation method. The KB drip irrigation technology was found to be superior to the conventional method of flood irrigation in banana cultivation.

### Indore Region

#### Chilli Crop

The total cost of cultivation per acre of chilli crop under the KB drip irrigation technology was marginally lower than that under the flood irrigation method, but the yield of chilli crop under the KB drip irrigation technology was almost double of that under the flood irrigation method. Consequently, the net profits under the KB drip irrigation technology were more than double of those under the flood irrigation method. The benefit-cost ratio was 5.68 in the case of KB drip irrigation technology, while that under the flood irrigation method was only 2.95.

Production of the chilli crop was a far more productive venture under the KB drip irrigation technology than under the flood irrigation method.
Jalgaon Region

Cotton Crop

The total cost of cultivation per acre of cotton under the KB drip irrigation technology was Rs 10579.00, while that under flood irrigation method was Rs 12456.00. Thus, there was a saving of Rs 1875.00, constituting 15 per cent, although a higher cost was incurred on picking in the case of KB drip irrigation technology on account of higher yield to the tune of half a tonne. The net profit earned per acre of cotton in the case of KB drip irrigation technology was of the order of Rs 18541.00, whereas that under the conventional flood irrigation method was only of Rs 5544.00. The benefit-cost ratio in the former case was 2.75 while that in the latter case was only 1.44.

Banana Crop

There was a saving of Rs 5105.00 in the total cost of cultivation of banana under the KB drip irrigation technology compared to that under the flood irrigation method. The saving in the cost was considerable, 25 per cent of the cost incurred on the cotton produced under the flood irrigation method. The KB drip irrigation technology fetched an additional yield of 1.3 tonnes of banana and registered a benefit-cost ratio of 5.46, while that under the conventional flood irrigation was only 3.69.

Conclusions

The KB drip irrigation technology has been found quite beneficial in several respects. It has provided higher yields per acre to the tune of 18 per cent in sugarcane and 39 per cent in banana in the Erode region of Tamil Nadu, 73 per cent in chilli in the Indore region of Madhya Pradesh and 55 per cent in cotton and 5.3 per cent in banana in the Jalgaon region of Maharashtra, besides savings in the total cost of cultivation per acre to the extent of 14 per cent in sugarcane and 20 per cent in banana in the Erode region, 7 per cent in chilli in the Indore region, and 15 per cent in cotton and 25 per cent in banana in the Jalgoan region. It also produced much higher benefit-cost ratios, ranging from 1.5 in sugarcane production in the Erode region to 5.68 in chilli production in the Indore region. There has been a considerable saving in labour cost in the application of irrigation water in the case of KB drip irrigation technology besides facilitating fertigation.

Acknowledgements

The authors are grateful to the IDEI for providing financial support for carrying out this study. They are also thankful to Mr I H Rehman, Director, TERI, for his encouragement during course of study. They thank the anonymous referee for his useful suggestions.

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