

Comparative Economic Analysis of Irrigation Methods For Sustainable Quality Mulberry Leaf Production

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Abstract

A comparative economic analysis of drip, drip with subsidy and furrow system of irrigation in quality mulberry leaf production was undertaken in Kolar district, eastern dry zone of Karnataka. The study reveals that the per hectare total variable cost incurred on furrow, drip and drip with subsidy was Rs 93,467, Rs 62,274 and Rs 62,274, respectively. While the per hectare total cost on furrow and drip irrigation system was Rs 96,337 and Rs 77,852 respectively. However, the peasants who availed subsidy at the rate of 50% of the drip irrigation system incurred Rs 71,552 of total cost, there by saving an amount Rs 24,787. Further the net return hectare on furrow, drip and drip system with subsidy was Rs 23,661, Rs 42,148 and Rs 48,448 based on the average annual water used for irrigation. An additional net return per hectare of Rs 18,487 and Rs 6,300 was obtained for without and with subsidy in drip irrigation system, which is of Rs 24,787 that could be used to repay the loan availed for installing the drip irrigation system. Thus, shifting from furrow irrigation to drip irrigation system and drip with subsidy, estimated benefit cost ratio (B : C) of 1.24 : 1, 1.54 : 1 and 1.68 : 1 was found indicating 30 and 44% additional net profit in drip and drip system with subsidy to the peasants.

Key words : Furrow system, Drip system, Subsidy, Scarcity, Minimization.

Climatologically India is a land of diversity. Indian rainfall is monsoon type and confined for a shorter period of time, it is uneven and often low. The main constraint in crop production is securing adequate irrigation facilities through surface irrigation system consisting of channels, ridges and furrows. On surface irrigation system lot of water is lost to due to soil seepage, runoff and evaporation. Efforts are made to minimize this water loss and recently the drip irrigation system has been designed using inexpensive low density plastic pipeline to convey the water directly to the plant from the water source. This inclusive of sub-lateral pipelines (dripper lines) and emitters. The philosophy of this system of quality mulberry leaf production scores two important points : Primarily Scarcity of water and secondarily increased cultivable area. Scarcity is the central malady of every society and various types of economic resources and land, water, labor, capital and entrepreneurship used in producing goods and services. Because of this scarcity all clients face the problem of choosing the technology : How to ration the commodity in time, and how to provide for the maintenance and the growth of the system. Technology refers to the choice of the irrigation technique with mini-

mization of cost in mulberry production. Since mulberry can normally be produced with different techniques other things remaining constant, the problem arises to which technique to use. Sharathchandra et al. (1), Sikdar and Chandrashekar (2) opined that the malady of water loss can be minimized through drip irrigation system with sustained mulberry leaf production. Further Murlidhar et al. (3) confirmed that mulberry crop can be cultivated profitably in water scarce areas and in soils of low moisture holding capacity. Since water is one of the most important requirement of plant life, it is reported that adequate inputs like water and moisture with proper cultural properties have helped to increase mulberry leaf yield from 15,000 to 35,000 kg per year (4). Contemporarily prevalence of drought conditions causing fast depletion of ground water resource can be answered through drip irrigation system for maximizing leaf yield through minimization of costs and water usage compared to furrow irrigation system. Since water is scarce in every economy, when more of it is used to produce some crops then less is available to other crops. Therefore the society faces the problem of choosing the technique which results in the least possible costs to produce each unit of mulberry it wants. Also price

mechanism in a mixed economy like ours, altered by government through subsidy. Hence, a comparative economic analysis was made on irrigation methods with and without subsidy for sustainable quality mulberry leaf production.

Methods

The empirical cross-section data in comparative economics between furrow, drip and drip with subsidy irrigation method in quality mulberry leaf production were collected by choosing farmers purposively and randomly with three stage design during 2008-09 from 90 respondents of Chintamani, Kolar and Shidlaghatta taluks. The data were pooled for computation of costs and returns on furrow, drip and drip with subsidy.

Results and Discussion

The results on comparative economic analysis between furrow system, drip and drip irrigation with subsidy in quality mulberry leaf production are presented in Table 1. The total variable cost per hectare per year was highest of Rs 93,467 recorded from furrow system and it was Rs 62,274 in drip per year was highest of Rs 93,467 recorded from furrow system and it was Rs 62,274 in drip irrigation system minimized to the extent of 33%. The fixed cost was found to be Rs 2,872 in furrow system and the same was Rs 15,578 observed for drip without subsidy. While the same was Rs 9,278 with subsidy given to the farmers at 50% of total cost of drip irrigation unit. By availing the subsidy of Rs 28,000 per hectare a difference in fixed cost of Rs 6,300 per hectare could be availed for a period of ten years. The total cost for furrow and drip irrigation was found to be Rs 96,337 and Rs 77,852 respectively. Further, by adopting drip irrigation system with subsidy, a farmer incurred a total cost of Rs 71,552 and will be able to produce same quantity of leaf i.e. 60,000 kg per hectare per year with thrift of Rs (18,487 + 6,300) = 24,787. The added benefit from adopting drip irrigation system with subsidy can be utilized for repayment of loan amount of the unit within two and a half years after establishment of mulberry garden. Sikdar and Chandrashekar (2) indicated that under furrow irrigation water requirement for nine months per hectare was 5098,500 gallons, while the

Table 1. Comparative economics between furrow, drip and drip irrigation with subsidy in quality mulberry leaf production (Rs/ha per year).

Particulars	Furrow system (Rs)	Drip system (Rs)	Drip system with subsidy (Rs)
1 Operational Cost			
A Variable cost (establishment of mulberry garden for 6 months)	42640	32463	32463
B Variable costs (for remaining parts)	50827	29811	29860
Total variable cost for 1 year	93467	62274	62274
2 Fixed Cost			
A Depreciation (D)			
Initial cost (mulberry garden establishment for 6 months)	2842	2164	2164
Drip system cost			
a) Common head unit	Nil	280	280
b) Inline dripper system	Nil	5824	3024
B Interest (I)			
(The rate of agriculture loans is 10%)		5824	3024
C Maintenance and Repair			
Calculated to be about at 2.5% on capital)	Nil	1456	756
D Land Revenue (L)	30	30	30
Total fixed cost	2872	15578	9278
Total cost (1+2)	96339	77852	71552
Total returns = P × Q =	120000	120000	120000
Rs 2.00×60000			
Net returns (n)	23661	42148	48448
B : C ratio	1.24:1	1.54:1	1.68:1

same in drip system per hectare per year was 1833,381 gallons. So water used per hectare under conventional system can suffice for three hectares of quality mulberry leaf production in drip system.

The per hectare net returns accrued from furrow, drip and drip with subsidy were found to be Rs 23,661, Rs 42,148 and Rs 48,448 respectively, while the benefit cost ratios were 1.24 : 1, 1.54 : 1 and 1.68 : 1 for the three systems respectively. Shivakumar (5) opined that drip irrigation has enhanced the mulberry leaf yield from 25.5 to 31.9% while water use efficiency was increased from 35.6 to 40.6% and the nutrient use efficiency was increased from 14.1 to 55.6% respectively. It is inferred that the drip system with subsidy is the most beneficial system not only for water

economy in mulberry gardens of eastern dry zone of Karnataka, but also increased the area under quality mulberry leaf production. Hence clientele should strongly opt for drip with subsidy and arrange for loan facilities from the financial agencies as the project is economically profitable, technically feasible and viable and can be repaid within two and a half years. Optimization could be achieved either through maximization, minimization and combination of both. However, the study uses technology and government policy options deals with minimization criteria. The per hectare total variable marginal cost of Rs 31,193 which accounts for 33.33% reduction in cost of drip system, by shifting from conventional system. The scenario with respect to total cost reduction in drip system was Rs 18,487 which accounts for 20%. While the drip with subsidy the reduction was in the total cost. It can be concluded that by shifting from furrow system to drip system we can reduce the additional cost to the extent of 19% in drip, while using the policy option of allowing a subsidy to the extent of 50% would again reduce additional cost by 7% MOU (6) opined that flood system is considerably cheaper than the drip system, but the drip systems low annual operating cost outweighs its initial expense and make it

most financially viable, profitable and environmentally attractive system (7, 8).

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