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ECONOMIC ANALYSIS OF IRRIGATED PLANTATIONS: A CASE STUDY OF KAMALIA

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While determining the economic feasibility of Kamalia irrigated plantation, it was found that 0% rate of interest the total cost and income ha-1 annum-1 was Rs. 196.53 and Rs, 1711.61, respectively. Only 34% of total expenditures on afforestation was incurred during first 24 years (148-72) and the remaining 66% during the last 8 years (1973-80). About 67% of the total standing volume consisted of *Dalbergia sissoo* (Shisham) alone. *Monts alba* (Toot) and other growing species constituted only 10% of total volume. *Prosopis glandulusa* (Mesquite) which is a serious weed for forest constituted 21% of the total afforestation. Net profit at 0% interest rate was Rs. 1515.08% ha-1 annum-1.

INTRODUCTION

Irrigated plantations can prove most important productive forests by adopting suitable management practices. These plantations help to generate economic benefits and ameliorate climatic conditions of surrounding environmenl. . At present due to mismanagement of the concerned plantation, the desired benefits have not been achieved. Lerche and Khan (1966) reported that in judging the performance of one acre, there would be no scope for irrigated forestry unless concepts of added values are taken into consideration.

Economic competition between tree raising and crop husbandry has made it inevitable to conduct a study on the cost and income of irrigated plantations. The objective of present investigation was to determine the cost and return values of Kamalia irrigated plantation taken as representative of other plantation and to suggest the ways to investigate the benefits from these plantations.

MATERIALS AND METHODS

The cost, income and net return of Kamalia irrigated plantation from 194R-90 at 0'1,) rate of interest were analysed. The land was the fixed factor in this enterprise. The data on cost include value of afforestation ami wages of labour employed, while income was comprised of major forest products (growing stock of medium and large size timber) and macro-forest products (small sized timber and branch wood, grazing and grass cutting, temporary cultivation lease money and miscellaneous).

Value of growing stock was estimated in cubic feet by adopting conversion factors (volume table used by the Forest Department). The cost and income values ha-I annum-1 were calculated as follows:

a. Cost of production ha-t annum-I $= \dfrac{\text{Total expenditure}}{\text{Total area x Duration}}$

b. Income ha-1 annum-1 $= \dfrac{\text{Total income}}{\text{Total area x Duration}}$

Net profit, received from the venture was calculated by deducting total cost from income incurred during the entire period.

RESULTS AND DISCUSSION

Cost analysis: The total cost for the plantation area of 4398 ha was estimated Rs. 27.66 million over the period of 32 years (Table 1). The cost included cost of land Rs. 16.29 million, afforestation cost Rs, 9.97 million and management cost Rs. 1.39 million.

Tab.le 1. Cost analysis 01' Kamalia irrigated plantation

Particulars	Cost (million Rs.)	Cost (ha·1 annurrr i)	Cost (%)
Land	16.29	116	59
Afforestation	9.97	71	36
Management	1,39	10	5
Total cost	27.66	197	HX)

It is important to note that information regarding the cost parameters were compiled through secondary data managed by the Forest Department. The actual annual cost was Rs. 196,53 ha·1 annum!- as compared to the initial cost of Rs. 24 ha-1 annurrr! for Kamalia irrigated plantation (Kausar, 1969). The above difference in annual cost can be largely attributed to prevalence of high inflation rates throughout 32 years period in the country and unusual devaluation in local currency in 1970-71.

The cost of land was the single largest component in the enterprise and constituted 59% of the total cost while afforestation and management cost was 36% and 5%, respectively.

Timewise cost: The timewise cost analysis showed that the expenditure incurred on the project during the first year of plantation was the highest because of purchase of land which, being very heavy investment, determine the economic efficiency and profitability of a plantation.

During the successive 6-8 years, after the first year of heavy investment, some expenditure was incurred at almost steady rate because the levelled land was not available for any extensive planting. Beyond 1956, the cost increased until 1971, fluctuating year to year on account of investment in pruning, thinning, kana weed stubbing of the plantation. In 1972, an expected very heavy investment of Rs. 2.2 million was made on afforestation on account of the ravages hy the devastating flood of the year.

The high expenditure during the years 1973 to 1979 included cost of management and afforestation. Pace of planting remained quite high from 1976-80. It is interesting to note that only 34% of total expenditure on afforestation was incurred during first 24 years as against 66% during last 8 years. This is contrary to the normal pattern of planting entire areas as soon as possible. Belmen (1977) reported the same idea that the initial expenditure on planting over first few years increased tremendously in private forest of England and Wales.

Income analysis: The total income from the entire area for 32 years was Rs. 240.88 million including the income from sale of land (Table 2). This amounted to Rs. 1710.70 ha! annum' i. The major contributing factor

was the land in total income, which was Rs. 162.09 million. The share of major and minor forest products and growing stock in income was 32% collectively.

income from minor forest products lluctuated in this perid~1 without any visible pattern due to temporury cultivation leases which increases the income.

Table 2. Income analysis of Kamalia irrigated plantation

Particulars	Income (million Rs.)	Income (ha" annurnl)	Income (%)
Minor forest products	6.06	46.93 ",	3
Major forest products	12,34	87.69	5
Growing stock	58.98	419.08	25
Land	162.09	1157.00	68
Total income	239,47	r710.70	100

Taking into consideration the breakdown of growing stock in 1980, the *Dalbergia sissoo* comprised 68% of the income from growing stock, while *Prosopis glondlllloso, Morus alba* and *Eucalyptus cilriodora* comprised 21, 6 and 4% income, respectively. An income of the tunc of 1% was recovered from the growing stock of rare species like *Albizia lebbek, Bombax ceiba, Tamarix aniculata* and *Acacia arabica, Prosopis glandlllosa* which is a woody weed species comprised of 21% of the total income. This unusual high proportion of *Prosopis glondlllloso* should not be allowed to go beyond 4.5% with a view to avoiding negative impact on other suitable forest plant species. Quraishi (1979) noted that excessive weed trees were harmful for desired plantation and these should be eradicated to improve the forest quality.

Timewise income: Timewise income analysis presented that the largest income source was land because it was evaluated for sale during 1979-80 to find out the realistic conclusions of the study. During first 20 years, major income of 91% was from minor forest products because the forest trees were too small to generate any return. The

During the last 11 years, the income received from the sale of major forest products constituted 96% of the total income of this 11 years period, excluding income of growing stock and land. Income of major forest products during llJ73, I97fi, 1977 and 1980 alone was 65% of the income of last 11 years. The reasons for lack of intermediate income of major forest produce from }I>58 to 1968 was delayed planting, devastation of young tree crop by floods and delayed replanting.

The efforts should have been concentrated to increase intermediate income of tree crop, in addition to boost minor forest products during 1968-80. Unfortunately, there is no clear-cut pattern of income which is not compatible to any standard forest management system. Income from growing stock was available during the last year of the plantation when the volume of growing stock was realised and was converted into monetary terms according to the current market rates.

At 0% rate of interest, the net profit was to the extent of Rs. 1515 ha' annunr". This is highly exaggerated estimate of the real profit because of using actual values of

cost which was incurred years before end of the rotation. In spite of this exaggerated profit, it compares very unfavourably with other land uses such as wheat and rice rotation for Kamalia area.

Policy and management decisions are not totally based on economic analysis alone. Political, social factors also have their role in decision making processes. The economic factors should, however, be given increasingly more importance in all land using activities in particular and other factors should be taken as subsequent economic realities.

CONCLUSION

It is concluded that Kamalia irrigated plantation is hardly making any profit in true economic sense under present management system. It is, therefore, suggested that fundamental changes should be introduced in goals and system of management such as shortening of rotation by introducing fast growing species, adopting the concept of farm-forestry, improving irrigation system, increasing tree crop density and exploiting value added concept of localized grading, converting, seasoning, preserving for producing custom tailored products, packing and labelling.

There is a need to cutdown early expenditure, to increase early income and to enhance the value of final crop. Moreover, multipurpose use of these plantations should be initiated. For instance, the development of new tourist facilities in the area should be provided in order to increase the extra income and employment.

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