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RESEARCH NOTES

Economics of Cardamom Cultivation in Kerala

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The three important concepts - costs, return and profitability need to be analysed while assessing the economics of any production activity. Among these, the most controversial one is the computation of cost of cultivation, especially for perennial crops, which have long gestation periods. Estimation of imputed costs like family labour further adds to the problem of calculating the cost of cultivation of agricultural produce. An attempt has been made here to estimate the cost of production of cardamom in Kerala. Also an attempt is made to work out the relative profitability of cardamom using cost-benefit analysis, net present value and internal rate of return. The analysis of the cost and return from the cultivation and the production of cardamom will provide a synoptic view of the economics of production of this spice crop in Kerala.

COST OF PRODUCTION OF CARDAMOM IN KERALA: A PRELUDE

The cost of cultivation is very important in the formulation of agricultural price policies. Detailed inquiries into the cost of cultivation are very costly and cannot be conducted as an annual routine. At the farm level, the relative profitability, which is determined by the value of output and the cost of cultivation, is one of the important factors influencing the allocation of resources, including land for alternative crops by the farmers (George 1988).

The estimation of unit cost of production is an important item of information necessary for evolving rational price policies and development strategies of crop production. Such a price policy can influence the acreage allocations at the farm level. Even without such estimates, farmers by their experiences formulate, though not scientifically, the relative profitability of various crops they are cultivating. Such a rough estimate is one of the reasons, along with price policy of the government, which influences the crop decision. Realising the importance of reliable estimates of the cost of production of individual commodities, the Ministry of Agriculture, Government of India, through its comprehensive scheme on cost of cultivation of principal crops generates cost estimation of major crops at the state and national levels. For Kerala, the scheme covers only two principal crops, viz., paddy and tapioca. Even in the case of these two crops, the estimates remain unpublished for reasons not known.

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The Department of Economics and Statistics, Government of Kerala, conducts cost of cultivation studies annually for selected crops in the state. An obvious limitation of these estimates is that they treat perennial crops like coconut, arecanut, rubber, pepper, cardamom etc., almost like annual crops, disregarding their complexities such as gestation lags, age structure, long life span etc. The annual cost estimates derived by the National Bank for Agriculture and Rural Development (NABARD) is intended for commercial banking operations. Hence the scope of these estimates is limited to the paid out cost alone. Moreover, the NABARD estimates are based on scanty data collected through sample surveys that are not based on scientific sampling framework. Hence the statistical validity of these estimates is often questionable. Various commodity boards established in the states for specific crops like rubber, coconut, cashew, pepper, cardamom, etc., are yet to make any serious efforts to generate cost estimates. Keeping in view these aspects, the paper attempts to compute the cost of cultivation of cardamom and to analyse the relative profitability and export competitiveness of cardamom cultivation in Kerala.

METHODOLOGY AND DATA

Economic evaluation of perennial crop cultivation is complex due to gestation lags and long life span. No widely accepted methodology is available for estimating the unit cost of production of such crops. The Life Cycle Approach, though theoretically sound, cannot be employed due to several practical difficulties. The next best alternative suggested is to obtain cross section samples of different age groups and organise them in such a way as to represent the Life Cycle. The present study follows this approach for the estimation of the cost of cultivation of perennial crop, cardamom.

Study Area and Sample Design

The territorial spread of the field of investigation is confined to three major cardamom producing districts in the State. A less restricted two-stage stratified random sampling design is made use of for the study. Three centres, viz., Idukki, Wynad and Palakkad, were selected for the spice crop, based on the area and production of this spice. For the selection, the study relied on the data supplied by the Directorate of Economics and Statistics, Government of Kerala. The data were collected from three size classes, viz., small (less than 0.50 acres), medium (0.50 to 2 acres) and large (above 2 acres) and four age-groups of cardamom. The maximum yielding life of cardamom, according to many cultivators is 15 years; only four age groups were taken into account, viz., (a) 0 to 1, (b) 2 to 3, (c) 4 to 8 and (d) above 8 years. From each size class and age-group category, one holding each was selected from three centres at random. Thus, as listed above, 36 sample growers were selected for the study. Secondary data is used for analysing the export competitiveness of cardamom. The data collected relate to the agricultural year from June 2003 to May

2004. All inputs and outputs are evaluated at 2003-04 prices. The researcher is very much aware of the limitations, which are encountered at the time of data collection, tabulation, data processing and analysis. It was done within the limitation of an individual researcher. The researcher is responsible for the shortcomings if any.

Concepts and Methods of Cost Estimation

There are a number of problems in estimating the cost of cultivation of individual crops. Farm cost is the combination of materials and services of heterogeneous nature and, therefore, a number of conceptual and methodological issues are involved in estimating the cost of cultivation of individual crops. The controversial issues mainly relate to the treatment of hired and family labour, interest on owned fixed capital, interest on working capital, rental value of owned land, provisions for risk and uncertainty, allocation of joint costs, evaluation of farm assets, etc. Before formulating various cost concepts suitable to local situation, it is relevant to discuss some theoretical issues related to the cost and income concepts adopted by the farm management studies in India that are generally used for estimating cost and returns from crop production in Indian agriculture. The pertinent questions that emerge in the debate on cost and income concepts used in the farm management studies are:

1. Is it profit maximisation or maximisation of gross output or surplus over paid out cost, which is the motivating factor behind producers' decisions in the farm?
2. Whether the use of owned inputs on a farm determined by market prices, or do other factors that govern its use.

No acceptable answer has been so far provided in regard to these questions. The concept 'C', used in Farm Management Studies, which includes paid out cost and imputed costs of inputs like family labour and owned land have been criticised on various grounds. When profits were calculated at cost 'C' level, Indian farming becomes unremunerative. The reliability of cost 'C' as an appropriate and valid concept for understanding decision making in a peasant economy is at times questioned (Bharadwaj, 1974). The imputation norm for inputs especially family labour is justified on the ground of opportunity cost involved in the family labour. Generally, the prevailing market wage rate is used to impute value of family labour. This is questioned on the ground that in Indian agriculture there exist a sizeable under-employed labour and hence the opportunity cost tends to zero. Similar issues were raised regarding imputation of rental value of owned land, interest on owned capital, etc. (Sau 1976).

Realising the seriousness of the problem involved, Government of India had appointed two special expert committees to review and revise the methodology of estimating the cost of production of principal crops. In the present study the following cost and income concepts are formulated for estimating the cost of

production of cardamom in the study area among four cultivating groups. These concepts slightly vary from the concepts developed by the Expert Committee headed by Hanumantha Rao (Government of India, 1990) because wide classifications of costs are not essential for the present exercise. As per the recommendations of the Expert Committee, the items of cost of cultivation cover both the paid out costs and the imputed costs. The paid cost includes (1) hired labour (human + animal + machinery), (2) maintenance expenses on owned animals and machinery, (3) expenses on material inputs, (4) depreciation on implements, machinery and farm building, (5) land revenue, (6) miscellaneous expenditure, (7) interest on working capital. The imputed costs consists of value of family labour, rent of owned land and interest on owned fixed capital for which the farmer does not incur any cash expense (Government of India, 1990). Table 1 presents the classification of cost items according to different cost concepts.

TABLE 1. CLASSIFICATION OF COST ITEMS

| (1) | (2) |
|--------|---|
| Cost A | ⇒ Consist of cash and kind expenses (Paid out costs) actually incurred by the cultivators. They include value of hired labour and bullock labour + value of owned bullock labour + hired machinery charges + value of purchased seeds, manure, fertiliser and plant protection, repair and maintenance charges of implements and machinery, irrigation charges, land revenue and land taxes, interest on working capital + other unforeseen expenses. |
| Cost B | ⇒ Cost A + Depreciation of fixed Capital + Interest on fixed capital |
| Cost C | ⇒ Cost B + Imputed value of family labour |
| Cost D | ⇒ Cost C + Rental value of land |

In the above classification Cost A represents the net paid out cost, Cost B is the gross paid out cost, Cost C, which includes imputed family labour in the cost of production and cost D becomes the comprehensive cost of production.

Procedure Adopted for the Evaluation of Cost Items

The issues involved mainly relate to treatment of hired human labour and family labour, cost of fixed capital and working capital, rental value of owned land, managerial cost, allocation of joint costs, transport and marketing charges, etc.

Hired Human Labour Cost

Hired human labour cost is one of the important constituents of the direct costs of crop production. It is evaluated from the actual wages paid by the employer (farmer).

Family Labour Cost

The valuation of family labour is a controversial issue among farm economists. Considering these discussions, it has been decided to evaluate the family labour cost

at the market wage rate prevailing in the locality. The managerial functions performed by the family members are evaluated on the basis of the time spent with the family, the labour rate and the actual expenses incurred for travelling, etc.

Cost of Fixed Capital (Excluding Land)

Cost of fixed capital or the interest on fixed capital is evaluated at the rate of 10 per cent per annum on the present value of fixed assets. In the present study depreciation charges of fixed assets is worked out by the Straight Line Method using the formula

$$\text{Depreciation} = \frac{\text{Original cost} - \text{Junk value}}{\text{Life of the asset}}$$

In case the original values of the fixed capital is not available, depreciation is estimated on the basis of the present value and the remaining life of the asset.

Interest on Working Capital

Two major problems are involved in the valuation of interest on the working capital. They are, the rate of interest and the period over which interest is charged. In this study, working capital is evaluated in terms of (a) owned and (b) borrowed (institutional + non- institutional) capital. While for the borrowed capital the actual interest paid out is taken into account, the interest on owned capital is evaluated at the rate of 12.5 per cent per annum for half the crop year. (This is the maximum rate fixed by the Government of Kerala for financing).

Rental Value of Owned Land

A number of alternative procedures to compute rental value for owned land have been suggested. Important among them are 1) an appropriate rate of interest on the value of land. 2) Market rent and 3) a fixed proportion of the output. Since renting of land is common in the study areas and further, land values are very high due to pressures external to agriculture, we have resorted to estimate the rental value of owned land on the basis of prevailing rents in the village for identical type of land. When such information is not available, especially for cardamom, one-fifth of the value of agricultural produce from the land is considered as the rental value.

Allocation of Joint Costs

The expenditure incurred or imputed for some of the cost items relate to the farm as a whole. Such joint costs are allocated to individual enterprises in proportion of the area under each crop. Depreciation on farm buildings and implements, land rents,

land revenue, cesses and taxes and interest on owned fixed capital, etc., are such costs, which are allocated to individual crop enterprises in proportion to their areas. For computing the cost share of i-th crop, the cost of joint inputs is apportioned in the following manner.

- (i) Repair and maintenance of implements – in proportion to the time used for the cultivation of i-th crop to total use of the equipments.
- (ii) Fixed capital (excluding land) – in proportion to the time utilised for the cultivation of i-th crop to total use of these equipments.
- (iii) Manure, fertilisers and pesticides – in proportion to the standard area under the crop to total cropped area.
- (iv) Rental value of land – in proportion to the area under the crop to total area under cultivation.

Cost Estimation for Cardamom

In the present study for obtaining a life cycle for the perennial crop of cardamom, four age groups are taken into account, namely, (a) 0 to 1 year, (b) 2 to 3 years, (c) 4 to 8 years and (d) above eight years. The required data from each centre and size group for these four age groups for cardamom have been obtained for the estimation of cost and return.

Method of Cost Estimation

In the present study, cost and yield per unit of cardamom cultivated in three centres each and three size groups each are estimated. The estimated cost and yield for this spice at the centre level and size level are then used to examine the relative profitability. Initially the cost is estimated for each size. Simple average of these size group level estimates is then taken to generate the estimates at the centre level and then for the whole study area level. At these levels, the sample design itself is a self-explanatory one. The procedure for estimating the cost at the farming group level is as follows:

Let C_{jk} be the cost incurred by the k-th holding in the j-th age group and n_j is the number of holdings selected from the j-th age group. Then,

$$\bar{C}_j = \frac{\sum_{k=1}^{n_j} C_{jk}}{n_j}$$

is an unbiased estimate of the cost per holdings in the j-th age group. Hence,

$$\hat{C}_j = N_j \bar{C}_j$$

$$\hat{O}_j = N_j \bar{O}_j$$

Where \hat{C}_j is the total cost of the j-th age group, N_j is the total number of holdings selected from the j-th age group and \bar{C}_j is the cost per holding in the j-th age group. And \hat{O}_j is the total output of the j-th age group and \bar{O}_j is output per holding in the j-th age group.

Now,

$$\hat{C} = \frac{\sum_{j=1}^4 \hat{C}_j}{\sum_{j=1}^4 A_j}$$

gives the estimate of cost per acre and

$$\hat{Y} = \frac{\sum_{j=1}^4 O_j}{\sum_{j=1}^4 A_j}$$

gives the estimate of yield per acre.

where \hat{C} is the total cost of the whole age groups, A_j is the number of acres of land put into cultivation under j-th age group.

Dividing \hat{C} by \hat{Y} we get an estimate of cost per unit produce. In the present study cost per acre and cost per unit produce is used for the analysis. The procedure given above is adopted for the estimation of per acre cost and yield of cardamom.

Relative Profitability Analysis

To analyse the relative profitability of cardamom, we made use of financial evaluation measure like Net Present Value (NPV), Benefit Cost Ratio (BCR) and Internal Rate of Return (IRR) (Harberger, 1972). An on-farm benefit-cost analysis is the most appropriate analytical tool to measure the overall profitability of farming operation for an individual farmer or a group of farmers. While different parameters may be used for the analysis at different levels, a positive NPV provides a necessary, but insufficient indication of the acceptability of a particular crop or crops. A rational land holder will prefer more satisfaction to less in terms of land uses and NPV. Hence, he prefers the land use, with the high NPV at any given level of risk. Land use, which has a higher NPV than another at any given level of risk, is said to statistically dominate the other (Anderson *et al.*, 1977). If a farmer does not receive

adequate net income from following a crop practice he will not continue it, while another farmer may solve such problems intuitively or through practical experience. Unfortunately, such an estimate may not properly incorporate all the variables from the cost side. To redress this problem one has to scientifically estimate the cost and return with appropriate methods.

For financial evaluation of perennial crop under consideration we require a stream of cost incurred over the years and the returns realised during its life period. As the study is confined to a few centres, a life cycle representing the entire life period of the crop is practically difficult. To overcome this, as mentioned earlier, different age groups are classified and costs and return of the crop under different age groups are obtained through a survey. We use the NPV, BCR, and IRR investment criteria to measure the profitability of cardamom. This will give the relevant criteria to measure profitability of perennial crops. This will also be helpful in identifying the extent of influence of economic motive behind crop selection. The computational formulas are given below:

Net Present Value (NPV)

$$NPV = \sum_{t=1}^n \frac{B_t}{(1+\delta)^t} - \sum_{t=1}^n \frac{C_t}{(1+\delta)^t}$$

Benefit Cost Ratio (BCR)

$$BCR = \sum_{t=1}^n \frac{B_t}{(1+\delta)^t} / \sum_{t=1}^n \frac{C_t}{(1+\delta)^t}$$

Internal Rate of Return (IRR)

$$IRR = \sum_{t=1}^n \frac{B_t - C_t}{(1+\delta)^t} = 0$$

Where,

- B_t is the benefit obtained in the year 't',
- C_t is the cost incurred during the year 't',
- δ is the discount rate,
- t is the age of the crop.

The estimates of BCR and NPV are done at Cost C and Cost D levels. The costs and benefits are discounted at a rate of 10 per cent, 12 per cent, and 15 per cent.

For the present analysis cost has been examined in two dimensions, viz., cost per unit area and cost per unit produce. Cost per unit area will provide us with a glimpse of the intensity of input use and the technological variations between new entrants to the production of this major spice and the farmers as well as planters already

established in the production of this spice. To assess production efficiency and to provide a guideline for price fixation, cost per unit produce is worked out. Also the study examines the cost variation, if any, between different centres as well as different sizes. Finally, the relative profitability of this major spice using benefit-cost ratio concepts are discussed.

Cost Per Acre

It is evident from the analysis that cost per acre is the highest in large size groups followed by medium and small size groups. As the cost is high, yield also is high as compared to the other two size groups. When we make a thorough analysis about the cost components of different size groups, it is clear that under small size the outlay on manure and fertilisers is Rs. 5264. It is higher than that of the other two size groups. But the yield per acre under small size is far below than the other two counterparts. It is evident that the small size groups are applying more cowdung and manure. Since every small and marginal farmer is having cows and buffaloes at home, they are applying more manure and cowdung. When we impute value for that, usually the cost of this component will go up. From this, it is evident that a combination of both chemical fertilisers and cowdung is a must for boosting high yield.

TABLE 2. SIZE-WISE AND TOTAL BREAK-UP OF AVERAGE COST PER ACRE

| Cost components (1) | <i>(cost in Rs.)</i> | | | |
|---|----------------------|---------------|--------------|--------------|
| | Small (2) | Medium (3) | Large (4) | Total (5) |
| Hired Labour | 3910.00 | 9702.46 | 10094.00 | 6972.65 |
| Seedlings | 6400.00 | 6300.00 | 7400.00 | 7800.00 |
| Manure and chemical fertilisers | 5264.00 | 3100.00 | 4820.00 | 4743.22 |
| Plant protection | 460.61 | 361.00 | 1470.50 | 1442.16 |
| Mulching, shading and tying | 369.19 | 428.00 | 560.00 | 452.00 |
| Repair and maintenance | 243.24 | 121.95 | 409.57 | 403.65 |
| Miscellaneous expenses | 166.92 | 126.05 | 212.55 | 210.84 |
| Drying | 746.62 | 675.61 | 1202.17 | 1190.39 |
| Interest on working capital | 662.39 | 325.33 | 986.86 | 973.59 |
| Tax @ 4 per cent | 1076.00 | 1622.00 | 2567.60 | 1430.80 |
| Cost A | 19299.72 | 22762.40 | 29723.96 | 25619.30 |
| Depreciation of fixed capital | 199.00 | 217.07 | 159.57 | 162.67 |
| Interest of fixed capital (10 per cent) | 15.96 | 21.71 | 50.34 | 16.27 |
| Cost B | 19549.05 | 23001.18 | 29933.87 | 25798.24 |
| Imputed value of family labour | 2746.62 | 456.10 | 159.57 | 628.56 |
| Cost C | 22295.67 | 23457.28 | 30093.44 | 26426.80 |
| Rental value of land | 5390.00 | 6958.00 | 8575.00 | 7154.00 |
| Cost D | 27685.67 | 37371.28 | 38668.44 | 33580.80 |
| Yield | 110.00 | 142.00 | 175.00 | 146.00 |

Source: Computed from field survey.

Size-wise and Total Break Up of Cost Per Kilogram

As clear from Table 3 cost per kilogram of cardamom is the highest in small size group and lowest in the medium size groups. Application of the recommended package of practices and the efficient management of farms are often cited as the major reasons for the lowest cost per kilogram under medium size groups.

The size-wise and total break-up cost per kilogram of cardamom reveals that the estimated unit cost under small, medium, large and total are Rs.251.69, Rs.214.19, Rs.220.96 and Rs. 230.01 respectively. When compared with the medium and large size groups the estimated unit cost is very high under small size group. The component of imputed value of family labour is estimated as Rs.24.97 in small size group. While in medium and large size groups the shares of imputed value of family labour are Rs.3.21 and 0.91 respectively. If we include the rental value to arrive at comprehensive cost the small size cultivators are not benefiting much. It is interesting to note in this regard that most of the small size cultivators are forced to continue the cultivation as a matter of survival. Table 3 presents a clear picture of the unit cost of cardamom per kilogram size-wise as well as total.

TABLE 3. SIZE-WISE AND TOTAL BREAK-UP OF AVERAGE COST PER KILOGRAM

| Cost components (1) | <i>(cost in Rs.)</i> | | | |
|---|----------------------|---------------|--------------|--------------|
| | Small (2) | Medium (3) | Large (4) | Total (5) |
| Hired labour | 35.55 | 68.33 | 57.68 | 47.76 |
| Seedlings | 58.18 | 44.37 | 42.29 | 53.42 |
| Manure and chemical fertilisers | 47.86 | 21.83 | 27.55 | 32.49 |
| Plant protection | 4.19 | 2.54 | 8.40 | 9.88 |
| Mulching, shading and tying | 3.36 | 3.01 | 3.20 | 3.10 |
| Repair and maintenance | 2.21 | 0.86 | 2.34 | 2.76 |
| Miscellaneous expenses | 1.52 | 0.89 | 1.21 | 1.44 |
| Drying | 6.79 | 4.76 | 6.87 | 8.15 |
| Interest on working capital | 6.02 | 2.29 | 5.64 | 6.67 |
| Tax @ 4 per cent | 9.78 | 11.42 | 14.67 | 9.80 |
| Cost A | 175.45 | 160.30 | 169.85 | 175.47 |
| Depreciation of fixed capital | 1.81 | 1.53 | 0.91 | 1.11 |
| Interest of fixed capital (10 per cent) | 0.15 | 0.15 | 0.29 | 0.11 |
| Cost B | 177.72 | 161.98 | 171.05 | 176.70 |
| Imputed value of family labour | 24.97 | 3.21 | 0.91 | 4.31 |
| Cost C | 202.69 | 165.19 | 171.96 | 181.01 |
| Rental value of land | 49.00 | 49.00 | 49.00 | 49.00 |
| Cost D | 251.69 | 214.19 | 220.96 | 230.01 |

Source: Computed from the field survey.

Age-wise Break-up of Cost Per Acre

The age-wise break-up of cost and yield throws light on the real problems and constraints of the cardamom cultivators. The yielding ages of cardamom as reported by many planters and cultivators range from 4 to 12. But due to many reasons known

as well as unknown, our cultivators are far behind to improve the yield of cardamom during the high yielding period. Table 4 presents the age-wise break up of cost per acre.

TABLE 4. AGE-WISE BREAK UP OF COST PER ACRE OF CARDAMOM

| Cost components (1) | Age- group | | | | Total (6) |
|---------------------------------|------------|------------|------------|-----------|--------------|
| | 0-1 (2) | 2-3 (3) | 4-8 (4) | >8 (5) | |
| Hired labour | 7337.00 | 4470.00 | 12250 | 7726 | 6972.65 |
| Seedlings | 8300.00 | 385.19 | 0.00 | 0.00 | 7800.00 |
| Manure and chemical fertilisers | 4360.00 | 4800.00 | 10625 | 3426 | 4743.22 |
| Plant protection | 361.00 | 539.22 | 3997.15 | 1064.33 | 1442.16 |
| Mulching, shading and tying | 600.00 | 768.00 | 268.41 | 248 | 452.00 |
| Repair and maintenance | 121.95 | 209.38 | 1264.71 | 199.39 | 403.65 |
| Miscellaneous expenses | 128.05 | 101.56 | 677.56 | 100.42 | 210.84 |
| Drying | 0.00 | 114.00 | 1008.00 | 936.00 | 1190.39 |
| Interest on working capital | 325.33 | 683.24 | 1783.85 | 822.01 | 973.59 |
| Tax @ 4 per cent | 0.00 | 372.40 | 1646.40 | 1391.60 | 1430.80 |
| Cost A | 21933.33 | 12070.58 | 31514.67 | 14522.15 | 25619.30 |
| Depreciation of fixed capital | 217.07 | 160.00 | 208.06 | 148.78 | 162.67 |
| Interest on fixed capital | 21.71 | 16.00 | 20.81 | 14.88 | 16.27 |
| Cost B | 22172.11 | 12246.58 | 31743.54 | 14685.81 | 25798.24 |
| Imputed value of family labour | 456.10 | 139.69 | 380.24 | 966.67 | 628.56 |
| Cost C | 22628.21 | 12386.27 | 32123.78 | 15652.47 | 26426.80 |
| Rental value of land | 1600.00 | 1862.00 | 6232.00 | 7644.00 | 7154.00 |
| Cost D | 24228.21 | 14248.27 | 40355.78 | 23296.47 | 33580.80 |
| Yield | 0.00 | 38 | 168 | 156 | 146.00 |

Source: Computed from field survey.

Relative Profitability of Cardamom

To estimate the profitability of cardamom a Profitability Index Method (Benefit-Cost analysis) based on three centres and three size groups are employed. Cardamom seedlings on an average start bearing fruits at the age of three. The yield is becoming stable from 5th to 8th year but gradually declines thereafter. As reported by the sample cultivators, the economic life of cardamom is assumed to be 10 years.

The B/C ratio is used to compare and contrast the profitability of cardamom. The Net Present Value of a project is equal to the present values of all the cash flows associated with the project. The NPV represent the net benefit over and above the compensation for time and risk and the decision rule associated with the NPV criterion is to accept the project of cardamom cultivation under Cost 'C' with positive NPV. The Profitability Index Method (B/C) is also a time tested method of evaluating the investment proposals. Profitability index also called as Benefit Cost Ratio (B/C) is the relationship between present value of cash inflows and the present values of cash out flows. The internal rate of return (IRR) of a project is the discount rate which makes its net present value equal to zero. The IRR method takes into account the time value of money. The Table 5 presents the NPV at different discount rates, B/C ratio at different rates, and IRR for cardamom.

TABLE 5. ECONOMIC APPRAISAL OF CARDAMOM AT COST C AND COST D LEVEL

| Category | Discount Rate | | | | | | IRR (8) |
|-----------------|---------------|------------|--------------|------------|--------------|------------|-------------|
| | @10 per cent | | @12 per cent | | @15 per cent | | |
| Cardamom (1) | NPV (2) | B/C (3) | NPV (4) | B/C (5) | NPV (6) | B/C (7) | |
| Cost C | 19509.32 | 1.16 | 15435.86 | 1.13 | 10377.09 | 1.10 | 25 per cent |
| Cost D | -4663.97 | 0.97 | -6392.05 | 0.95 | -8483.39 | 0.93 | 6 per cent |

Source: Computed from field survey.

It is evident from the table that the cultivation of cardamom is considered as economic up to cost 'C' level @ 10 per cent, 12 per cent and 15 per cent discount rates. Up to cost 'C' the NPV is positive, B/C ratio is greater than one and IRR is 25 per cent respectively. If we include rental value of land to the comprehensive cost of cultivation, the NPV turns negative, B/C ratio becomes less than one and IRR becomes 6 per cent.

Export Competitiveness of Cardamom

Since the internal demand for cardamom is very much absent in Guatemala, the country exports its entire output and has replaced India as the single largest exporter. Guatemala emerged as the single largest exporter of cardamom in the world because of two reasons: first, the country can produce the output at relatively lower cost of production. Second, the yield of cardamom is very high. It registers the higher yield of 250 kg per hectare. But the average annual productivity of cardamom in India ranges only 65 to 80 kg per hectare depending on the seasonal and timely showers.

By taking into advantage of these two factors, Guatemala quotes cardamom at a very low price as compared to Indian varieties. The price difference is depicted clearly through Table 6.

TABLE 6. AVERAGE SPOT PRICES OF CARDAMOM IN INTERNATIONAL MARKETS
(IN US DOLLAR PER K.G. IN MIDDLE EAST MARKETS)

| Year (1) | Indian (Extra Bold) (2) | Guatemalan (Bold Green) (3) |
|-------------|----------------------------|--------------------------------|
| 1991- 92 | 16.22 | 11.82 |
| 1992- 93 | 15.38 | 9.89 |
| 1993- 94 | 15.93 | 10.24 |
| 1994- 95 | 17.39 | 7.66 |
| 1995- 96 | 9.58 | 6.33 |
| 1996- 97 | 10.31 | 5.69 |
| 1997- 98 | 12.02 | 4.79 |
| 1998- 99 | 11.50 | 4.80 |
| 1999-2000 | 13.96 | 13.10 |
| 2000-01 | 17.14 | 16.14 |
| 2001-02 | 16.58 | 14.92 |
| 2002-03 | 16.38 | 11.51 |
| 2003-04 | 12.89 | 11.51 |

Source: Government of India (2004).

As a result of their intensive cultivation, higher productivity and resultant lower unit cost, Guatemala has replaced India in most of her traditional markets, including the Middle East. George (2005) in his elaborate work opined that access to technical know-how to meet the specified standards is restricted. The additional production cost involved in meeting the standards specified and the other costs on items such as certification and control make it difficult for many countries to achieve market competition (George, 2005).

Based on the work of Bhalla (2004) on competitiveness of Indian agriculture, the general expectation is that with trade liberalisation, India would be able to increase its exports of agricultural commodities. But for cardamom, the results of the measures of competitiveness namely, Net Protection Coefficient (NPC), Effective Protection Coefficient (EPC), Effective Subsidy Coefficient (ESC) and Domestic Resource Cost (DRC) show that during the period, 1991-2002 to 2003-04, the coefficient values turned out to be unfavourable. It is a clear signal that cardamom is less competitive. With regard to cardamom we have only comparative disadvantage compared to our major competitor, Guatemala.

To make Indian cardamom competitive and to regain the lost position, productivity of cardamom in India has to be improved and the cost of production has reduced to a greater extent. Otherwise the industry cannot be competitive.

CONCLUSION AND POLICY SUGGESTIONS

In this paper an attempt was made to estimate the costs, returns and relative profitability of cardamom based on the primary survey conducted in selected centres and to make an analysis of export competitiveness. The researcher has employed a more scientific method of cost estimation. The empirical results emerging out of the analysis portrays that the cost of cultivation is significantly high in Kerala with regard to this major spice. If we include rental value of land to the comprehensive cost structure, the small and marginal farmers are at a losing ground. The small size farmers are cultivating this spice and sticking to this field only because they consider it a matter of survival.

From the size-wise analysis, it is clear that the cost of production per unit of cost (cost per kilogram) is very high in small size as compared to medium and large size groups. A concrete action plan needs to be implemented for creating awareness among the planters as well as the cultivators with regard to the recommended packages of cultivation.

A thorough analysis of the cost components revealed that the small size cultivators are applying more manure and cowdung and their imputed value is higher when compared to the other two counterparts. Yield per acre is very low among small size cultivators. The Agricultural Department of the Government, Agricultural University and the Spices Board should come forward to improve the productivity of cardamom in Kerala and to reduce the cost of production.

The economic appraisal of cardamom at cost C and cost D level really demands certain concrete action on the part of the Government and Spices Board. If we include rental value of land to the comprehensive cost of calculation the NPV turns negative, B/C ratio becomes less than one and IRR becomes 6 per cent.

It is implied that if we include imputed rental value of land to the comprehensive cost structure, cardamom cultivation becomes an unprofitable venture in Kerala. To make it profitable, the cultivator should get working capital at below 6 per cent. It is suggested that the Government should persuade the commercial banks for making available more loans to the cardamom cultivators at below 6 per cent interest. Also a special package from the part of the Government is needed to support the small and marginal cardamom farmers who are continuing to cultivate this crop purely as a matter of survival.

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