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TABLE IV—AVERAGE DAILY (CASH) WAGE RATES OF TEA PLANTATION LABOUR IN THE PRINCIPAL TEA-GROWING STATES IN INDIA (1957-65)

| States*               | Average daily wage rates (in Rs.) |                   |        |                 |       |                 |
|-----------------------|-----------------------------------|-------------------|--------|-----------------|-------|-----------------|
|                       | Male                              |                   | Female |                 | Child |                 |
|                       | 1957                              | 1965              | 1957   | 1965            | 1957  | 1965            |
| Assam .. .. .         | 1.50                              | 1.90<br>(126.7)** | 1.45   | 1.79<br>(122.6) | 0.77  | 0.95<br>(123.4) |
| West Bengal .. .. .   | 1.54                              | 1.83<br>(118.8)   | 1.45   | 1.72<br>(118.6) | 0.84  | 1.00<br>(119.0) |
| Tripura .. .. .       | 1.19                              | 1.41<br>(118.5)   | 1.06   | 1.25<br>(117.9) | 0.59  | 0.69<br>(116.9) |
| Bihar .. .. .         | 1.19                              | 1.45<br>(121.8)   | 1.06   | 1.45<br>(136.8) | —     | —               |
| Uttar Pradesh .. .. . | 1.00                              | 1.03<br>(103.0)   | 1.00   | 1.03<br>(103.0) | —     | —               |
| Madras .. .. .        | 1.64                              | 1.93<br>(117.7)   | 1.24   | 1.45<br>(116.9) | 0.72  | 0.87<br>(120.8) |
| Mysore .. .. .        | 1.90                              | 1.88<br>(172.5)   | 0.85   | 1.43<br>(163.2) | 0.58  | 0.96<br>(165.5) |
| Kerala .. .. .        | 1.58                              | 1.75<br>(110.7)   | 1.19   | 1.30<br>(109.2) | 0.72  | 0.86<br>(119.4) |

\*Excluding Himachal Pradesh and the Punjab.

Source : Computed from Tea Statistics, Tea Board, India, 1957-58 and 1967-68.

\*\*Figures in brackets denote changes in wage rates in 1965 over the base year 1957=100.

## TRAVAILS OF TEA INDUSTRY—AN ECONOMIC APPRAISAL

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### THE PROBLEM

While world demand for tea shows increasing trend what matters to Indian tea is differential rate of consumption in different countries of both high income and developed, and low income and developing economies. Countries of Europe and North America have declining per capita consumption of tea whereas countries of Asia and Africa and Oceania have in general an increasing trend for per capita consumption of tea. Further studies of income elasticities of demand for tea in the developed countries which are the traditional market for Indian tea indicate that income elasticities are generally low for common tea and are slightly high for quality tea [3]. On the supply side, India occupies a strategic place with an area of 347,657 hectares producing 382.5 million kgs. and with productivity of 1,100 kgs. per hectare. Indian tea faces stiff competition and aggressive pro-

N. B. : Figure in the bracket denotes to the literature cited under 'References' at the end of the paper.

motional strategies from Ceylon and African countries in world tea market for common tea. The position of India in respect of quality tea is, however, still favourable.

#### SOME EMPIRICAL RESULTS

An attempt was made to formulate and test empirically a production model which could explain production behaviour of the tea industry. Due to aggregative nature of the data used for analysis, the results reported below need careful interpretation. Unlike the earlier studies [2,4,8,9,10] the present one was concerned with a perennial crop and its involved problems. The function was specified to include production of tea as dependent variable and the independent variables were area-lagged by six years, yield per unit of area, price of tea-lagged by one year, and time [1]. The underlying assumptions were that (i) tea bushes would be ready for plucking at the sixth year of planting [12], (ii) yield was contemporaneously influencing production, and (iii) lagged price could be assumed to represent expected price. The last assumption might be received with reservation in the world of 'adaptive expectations.' Nevertheless, if one considers the nature of decisions on plucking of tea the assumption is plausible.

The data used in the present study were from the annual series for the period 1948-1967 published by the Tea Board [13] and F.A.O. [3]. Ideally, data on production of different grades with corresponding prices are required but only the data on total production were available. The price series is related to annual averages at Calcutta auctions. In view of the close relationship between the prices at Calcutta and that of Cochin and London auctions the Calcutta prices were assumed to be a reliable indicator of the price variable in the model. Furthermore, the major share of tea trade passes through Calcutta auctions. From the price series the years 1952 and 1954 were excluded because of their abnormal variations. Subject to the above assumptions and data limitations, the results should be interpreted. The results of regressions are :

$$Y = -161.56 + 0.41260 x_1 + 0.33989 x_2 + 0.21300 x_3 + 1.65310 x_4$$

(60.1800)      (1.1752)      (0.07430)      (1.0410)      (2.1389)....(1)

$$R^2 = 0.978; \quad D.W. = 1.547$$

$$Y = -34.47 + 0.33875 x_2 + 0.18600 x_3 + 2.27250 x_4$$

(12.1100)      (0.07181)      (0.9950)      (1.1730)      ..... (2)

$$R^2 = 0.978; \quad D.W. = 2.597$$

where,

- Y = Production in million kgs.
- $x_1$  = Area in hectares lagged by six years.
- $x_2$  = Yield in kgs. per hectare.
- $x_3$  = Price per kg. at Calcutta auctions.
- $x_4$  = time (1948 = 1).

In the first equation, the coefficient of yield, and the intercept alone were significant even though the coefficient of multiple determination ( $R^2$ ) is as high as 0.98. An examination of zero-order correlation matrix in the context of  $R^2$  [6,7] and partial correlation coefficients [5]<sup>1</sup> reveals the presence of multicollinearity. Specifically, inter-correlations between the time and the lagged area, and the time and the yield were 'harmful.' In the alternative regression equation (2) lagged area was excluded. With  $R^2$  remaining the same, the coefficients of yield, time, and the intercept become significantly different from zero. The coefficient of price remained not significant from zero.<sup>2</sup> Conceptually, the trend variable could not be ignored since the trend was reported to be very highly significant in variations in yield over time [11].<sup>3</sup> Under the system represented by the data, production variations over time are accounted by yield variations. The disturbing information is that neither the prices of products nor the planted area could explain much of the variations in production.

There are possibly two explanations:

First, the market structure bordering oligopsony or near monopsony in tea auctions could have generated less dependence of producers on price variability in making plucking decisions. Furthermore, due to manipulation of stocks in bonded warehouses and speculative deals, markets become less communicative and less reliable for decisions at the production end. This would imply that the tea producer continues to rely on resource productivity in order to be in business. Higher or lower income earnings for a given period are determined by world prices which, in general, are exogenous so far as the production of Indian tea is concerned.

Second, the tea industry had an advantage of the increased investment and increased yield in response to war-time incentives which produced a sort of 'hump' conditions which had to be continued, irrespective of price fluctuations, to keep the resource-use at full capacity. Micro level analysis is necessary to verify and confirm this proposition.

One would conclude tentatively, then, that market imperfections mask the role of prices as an effective arbiter of production adjustment and resource-use. The possibilities of alternate enterprises in tea plantations are limited and with committed resources, the future of tea industry lies in exploring new external markets and modernizing its production, processing and marketing structures.

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1. The relevant 't' statistic is

$$t_{ij}(v) = \frac{r_{ij} \sqrt{N-n}}{\sqrt{1-r_{ij}^2}}$$

where,  $r_{ij}$  = Partial correlation coefficient.  
 $N$  = Number of observations.  
 $n$  = Number of independent variables.  
 $v$  = Degrees of freedom

2. Alternative regressions with the following set of independent variables were tried: (a) yield and price, (b) time and price, and (c) time and yield. In none of the above regressions were the coefficient of price significantly different from zero.  $R^2$  was respectively 0.97, 0.94, and 0.98. Deletion of time or yield proved 'harmful' whereas omission of prices could be seen not 'harmful.'

3. The fitted equation was:  $Y = 680.531 + 11.6043t^{**} + 0.2969t^{2**}$   
 Origin = 1941, Y = yield in kgs. per hectare, t = year.

\*\* Significant at 1 per cent level.

## SOME OPERATIONAL CRITERIA FOR MODERNIZATION

The action programme for meeting and solving these problems and strengthening the competitive power of Indian tea in world market should include production of quality tea, reduction of production, processing and marketing costs, and rationalization of the tax structure.

*Production of Quality Tea*

The quality of Indian tea can be improved through planned introduction of new strains of high-yielding and high quality tea for replanting, replacement and extension of plantations. In 1963, trees of age over 60 years covered 21.4 per cent of total area ; 52.1 per cent were of the age-group between 26 and 60 years [12]. Replanting should be taken up in those plantations such that trees of age below 60 years are kept for economic production. A replanting subsidy scheme at the rate of Rs. 3,500 per hectare on plains and Rs. 4,500 per hectare on hills was announced in 1968 by the Government. Apart from planting of improved strains, the quality of tea can be improved by proper plucking and processing of tea leaves. Research for selection of promising strains and testing their performances in different agro-climatic regions, fixing optimum level of fertilization and efficient plant protection schedules, and careful plucking and processing plans should be given greater attention and encouragement.

*Reduction of Costs*

As regards production and marketing costs there seems to be a lot of scope for reduction through effecting economies of scale in production, processing and marketing. The size of an economic holding is determined by various agro-economic factors such as climate, elevation and soils, availability and cost of labour, transport facilities, capital management and equipment [3]. In the absence of any reliable alternative criteria, one would be satisfied to use the average resource productivity. In South India, 7,658 out of 8,336 estates have less than five hectares and cover only 9.12 per cent of total area whereas 144 out of 8,336 estates with size of above 200 hectares have 65.85 per cent of total area [12, 13].

TABLE I—RESOURCE EFFICIENCY IN TEA PLANTATIONS: 1963-65

| Particulars                       | South India |       |       | North India |       |       | All-India |       |       |
|-----------------------------------|-------------|-------|-------|-------------|-------|-------|-----------|-------|-------|
|                                   | 1963        | 1964  | 1965  | 1963        | 1964  | 1965  | 1963      | 1964  | 1965  |
| 1. Labour per hectare             | 2.34        | 2.26  | 2.22  | 2.59        | 2.44  | 2.40  | 2.54      | 2.40  | 2.36  |
| 2. Production in kgs. per hectare | 1,192       | 1,103 | 1,243 | 992         | 1,102 | 1,024 | 1,037     | 1,102 | 1,072 |
| 3. Production in kgs. per labour  | 509         | 488   | 560   | 383         | 446   | 426   | 409       | 455   | 454   |

Source : Tea Statistics, 1967-68.

It may, however, be seen from Table I that the average resource productivity measured in terms of production per unit of land and labour was relatively higher in South India than in North India even though sizewise relations are different in the two regions. For lack of relevant data on the relative cost structure and substitution of capital for labour in production, any generalisation on mechanization is not attempted here. Labour welfare measures and stipulation of minimum wages are claimed to be 'cost push' elements; but rising productivity through increased adoption of technology could offset such increases in wage bills. Unlike in the new settlements of Africa, the scope for mechanization in India is very much limited.

On the other hand, with the preponderance of small holdings the economic operation of processing would be extremely difficult for individual estate and therefore, custom work for processing is resorted to. The location of processing plants at optimal points in order to minimize cost of transport and other incidentals becomes very difficult since such plants providing for custom work are located in bigger estates. Apart from the advantages of technical economies being lost, other commercial advantages in capital markets, product and other factor markets also could not be availed of. This sort of advantages or lack of it is very significant in the context of oligopsony in buying tea and oligopoly in selling services including capital by intermediaries in markets. Co-operative processing units are organized in a number of locations to assist the small growers. The approach needs to be evaluated and adopted in a large measure if found efficient.

#### *Rationalization of Tax Structure*

The incidence of taxation on tea is a much debated question. It is argued that excessive burden of taxation saps the incentives for development of tea on rational lines ; and the increase in cost of tea due to duties and cess renders Indian tea in world market more expensive and to this extent the competitive position is weakened. The level of taxes and concessions for a given period is generally determined by the economic status of the plantation industry in terms of its competitive role in world market, import and export elasticities of teas and tax elasticities of revenues. Government has also granted relief for certain classes of tea producing units. In 1967 co-operative factories were exempted from 10 per cent of the basic excise duty and from the whole of special excise while other 'bought-leaf factories' were exempted from the whole of the special excise duty only. Instant tea was exempted from export duty from July, 1967. Concessions were granted in export duty for package teas export from August, 1967. Relief measures amounting to a little over Rs. 6 crores by way of reduction in excise and export duties were announced in 1968 [13]. The overall objective of tax policies should, however, concern with strengthening of the competitive power of the Indian tea industry in the world market. Essentially, it involves in evolving an optimum plan out of tax revenue matrix subject to the constraints of national objective function of larger economic growth and broader accent of welfare.

#### CONCLUSIONS

From what have been discussed in the preceding sections certain broad conclusions emerge. First, the strengthening of the Indian tea trade is imperative

in the wake of aggressive promotional strategies adopted by the competing tea-producing countries. Second, the major problem of Indian tea appears to be of its rising productivity and its dependence on powerful and organized buyers especially the brokers in the traditional markets. Third, on the production side, efficient management, rationalization of costs especially in processing and transport are necessary. Co-operative ventures on sound business lines are suggested to effect cost economies in production, processing and marketing. Rising productivity and rising cost are a paradox and this is due to imperfections of market both structural and spatial. Rising costs of labour and capital can be offset by a more than proportionate increase in productivity provided prices are favourable. This calls for revamping of markets covering new areas, restructuring markets through agreement between producing countries and well planned and intensive promotional strategies.

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