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TRENDS AND FLUCTUATIONS IN PRICES AND OUTPUT OF CARDAMOM IN INDIA

It is well-known, after Kalecki's classic exposition, that conditions of supply play a crucial role in the formation of prices in agriculture.[1] Though his analysis was confined to short-term price changes, this may be extended to long-term price changes of many perennial crops, the supply of which are marked by a relatively long gestation period. Many of these crops are characterized not so much by 'point output', but by 'continuous output' through parts of the year thereby affecting the pattern of stock holding. Consequent to these conditions of supply, it is of interest to investigate the formation of prices of such commodities.

The aim of the present study is to examine the formation of prices of the small variety of cardamom grown in India,[2] 70 per cent of which originates in the State of Kerala. Therefore, though the study deals with the all-India picture, the emphasis is on Kerala.

This paper is organized in four sections. Section I deals with the changes in the product market, section II discusses the internal market structure and section III analyses the trends and fluctuations in prices. Section IV analyses the inter-relationships between prices and conditions of supply with the associated structural changes.

I

SHARE IN INTERNATIONAL MARKET

Historically speaking, cardamom began to be cultivated in India, primarily as an export crop and it still continues to be so for export, accounting for 60 to 70 per cent of production. The prime market for cardamom is the Middle East[3] where its major use is in the preparation of *Gahawa* which has deep roots in Arab social custom. Because of the very favourable demand conditions the exporters from India were finding it easy to trade in this world market segment. However in recent years, this situation has undergone considerable changes.

1. M. Kalecki: Theory of Economic Dynamics, Monthly Review Press, New York, 1965.
2. There are two varieties of cardamom, namely, small and large. All the cardamom of international commerce is of the small variety. Large cardamom is grown mainly in Sikkim, Indonesia and Mainland China. In India the small variety of cardamom is grown only in the Southern States of Kerala, Tamil Nadu and Karnataka.
3. The estimated import demand for Indian cardamom by zones in the world market for the mid-seventies is given below:

World zones	Middle East	Nordia	Other East European countries	Eastern Europe	Other Asian countries	Others	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Import demand (metric tonnes) ..	3,635	605	220	265	635	200	4,960
Per cent share ..	61·19	12·20	4·40	5·30	12·01	4·10	100

Source: Cardamom Board of India/Internatonal Trade Centre, UNCTAD/GATT: Market Survey of Cardamom in Selected Middle East and West European Countries, Cochin/Geneva, 1979

About 60 per cent of the world import demand for cardamom comes from the Middle East and this demand has been increasing in recent years because of the oil boom and the consequent increase in per capita income. At the same time, the Indian share in the world trade has declined sharply owing mainly to the inability of India in keeping pace with the competing countries in increasing production and yield.

As is evident from Table I, the world trade in cardamom has grown at a rate of 13 per cent per year during the seventies. India's production and export during this period grew only at a rate of 8 per cent and 7 per cent respectively. The deteriorating performance of India in the world market is mainly on account of the rapid strides made by Guatemala during this period.

During the early seventies, Guatemala accounted for 20 per cent of the world trade; its share increased to 55 per cent by 1979-80. The production which was 970 tonnes in 1970 increased to 4,200 tonnes by 1980. Such increase was achieved through expansion of area under the crop and enhancement of yields through improved cultivation techniques. Consequently, they have been able to compete successfully with India in the world market on the price front. The price of cardamom from Guatemala in recent years

TABLE I—EXPORT OF CARDAMOM FROM INDIA AND GUATEMALA*

(*metric tonnes*)

Year (1)	World trade (2)	Export from India (3)		Export from Guatemala (4)	
1970	N.A.	—		979	
1971	3,220	2,127	(66)	719	(22)
1972	2,049	1,340	(65)	650	(31)
1973	3,419	1,357	(40)	1,200	(35)
1974	4,178	1,814	(43)	1,472	(35)
1975	4,600	1,579	(34)	1,700	(36)
1976	4,056	1,420	(35)	1,904	(46)
1977	5,156	2,400	(47)	2,264	(43)
1978	5,099	2,527	(50)	2,107	(41)
1979	6,275	2,651	(42)	3,445	(54)
1980	7,585	2,792	(36)	4,225	(55)

Source: Government of India: Cardamom Statistics (1979-80), Cardamom Board, Cochin, 1981.

*Total world trade of cardamom is obtained by aggregating the export from India, Guatemala, Tanzania and Sri Lanka. The export from Tanzania and Sri Lanka comes to 7 to 10 per cent of the total world trade.

Note:— Figures in brackets give the respective shares in world trade.

N.A. = Not available.

has been about 3 to 7 (US) dollars lower per kg. than that from India.[4] Besides, the quality of cardamom produced in Guatemala is comparable in characteristics with the export grade from India. Such advantages helped Guatemalan exporters to penetrate into the prime markets of Indian cardamom. Consequently, India has already lost her dominant position in the world market. Unhealthy practices (like sending consignments not conforming with samples) followed by some Indian exporters and the inconsistent export policy of the Government of India have also been contributing to the deteriorating performance of India.[5]

As a result of all these factors, the rate of growth of export from India in recent years has been lagging behind the world trade in cardamom. The impact of the changes in the world market on domestic prices and production will be evident from a discussion of the structure of the domestic market and changes in supply.

II

INTERNAL MARKET STRUCTURE

The trade in cardamom in India is what may be called a regulated trade. The regulation is in the form of restricting the entry of persons into the different functional categories, *viz.*, exporters, dealers and auctioneers. The declared purpose of such regulation is to ensure a fair price for the product and the timely payment of the sale proceeds.

At the apex of this regulated trade structure are a small number of exporters. The larger number of dealers in the market, apart from acting as a link between the planter and the assembling market, act also as agents to the exporters. Besides, they are also involved in the domestic trade. The exporters' profit margin is estimated to be around 10 per cent of the domestic value (Table II). We have no idea of the profit margin of the dealers and local traders.

An important aspect of the market structure is the existence of an efficient auction system, which ensures fair prices to the larger planters who take their produce to the auction centre. Most of the small growers sell their produce to the local dealers and merchants and therefore the price they get is much lower than that received by the larger planters. The small quantities of produce per cultivator at each harvest, lack of curing facilities, and the need for immediate cash are the factors which compel the small growers to go in for distress sales.

4. Compared to India, the cost of production of cardamom in Guatemala is much lower. This arises out of two factors: higher productivity and lower wages. As regards productivity, Guatemala obtains about 250 kilograms of dry produce per hectare, whereas in India it is less than 60 kilograms. Though inter-country comparison of cost and wages is beset with problems, it can be said that the Guatemalan wages are no higher than the wages ruling in India.

5. An excellent example of the unimaginative export policy of the Government of India is best illustrated by the interference in the export trade in 1977. In January 1977, the Government imposed an export duty of Rs. 50/kg. of cardamom. This sudden imposition of the export duty upset the whole trade circles leading to an almost standstill of the export in the next three months. Subsequently, the export picked up only when the duty was reduced to Rs. 10 per kg. See for details, Cardamom Board of India/International Trade Centre: *op. cit.*

TABLE II—STRUCTURE OF THE CARDAMOM MARKET* (1979-80)

1.	Number of registered estates ('000)	29·2
2.	Total area under cultivation ('000 ha.)	85·8
3.	Production (metric tonnes)	4,500·0
4.	Number of auction centres	13·0
5.	Sales through auction (as percentage of total production)	69·4
6.	Average auction price (Rs./kg.)	134·8
7.	Number of licensed dealers and commission agents	23·0
8.	Number of exporters	9·0
9.	Quantity exported (as percentage of total production)	58·6
10.	Unit export price (Rs./kg.)	184·2
11.	Estimated cost of export (Rs./kg.)	31·0
12.	Exporters' trade margin (as percentage of the export value per kg.)	10·3

Source: Same as in Table I.

*The following factors contribute for a part of the production moving to the consuming market without touching the auction centres: (1) Unlike in many other plantation crops, the traders are also producers and they directly deal with exporters. (2) Most of the very large planters move their product direct to the exporters so as to conceal their income.

The marketing structure is integrated with production through credit. At the auction centres sales are effected against post-dated cheques. There is thus an in-built credit facility extended by the growers to the traders which in turn is guaranteed by the auctioneers. Only a portion (roughly about 25 per cent) of the total amount involved is paid in cash at the time of effecting the sale. The remaining part is paid in instalments.

III

TRENDS AND FLUCTUATIONS IN PRICES

A basic element in the formation of cardamom price is the moderate storability of the product. This necessitates market clearance within the crop year, thereby ruling out speculation. Within these limits, the formation of prices in the domestic market takes place in following manner. Depending upon the intensity of summer drought, availability of pre-monsoon rainfall, and the quantum of rainfall during the June-July period, the trade circles are able to forecast the crop prospects in the forthcoming season. This is aided by the fact that many of the dealers and exporters are also plantation owners. If the expected production is much lower than the normal production, a significantly higher price than that ruling in the previous year is set at the beginning of the season. If, on the other hand, the

expected production is much higher than the normal production a much lower price is set. Average prices for the years do not deviate very much from the opening prices most of the years, but deviate from the opening prices in abnormal years when forecasts go wrong. This is evident from Table III. It may be seen that the wide variations in prices are associated with sharp increases in production.

TABLE III—DEVIATIONS OF AVERAGE PRICES FROM THE OPENING PRICES AND PEAK PRICES AT PEAK SALES

Year	100 × Average price—Opening price / Opening price	Indices of production (1970-71=100)	100 × Peak sales / Total sales	100 × Peak prices / Opening prices
(1)	(2)	(3)	(4)	(5)
1971-72	— 9·75	127	53 (3)	95
1972-73	+30·52	80	55 (3)	139
1973-74	+19·78	88	68 (4)	109
1974-75	+ 1·36	96	58 (3)	96
1975-76	+24·92	96	68 (3)	122
1976-77	+11·77	90	73 (3)	130
1977-78	+ 5·59	136	61 (3)	104
1978-79	+ 3·24	136	58 (3)	115
1979-80	—12·00	155	56 (3)	94
1980-81	+ 2·50	155	56 (3)	110

Source: 1. Same as in Table I.
2. Government of India: Cardamom, Vols. 12 to 15, Cardamom Board, Cochin.

Note:— 1. Data pertain to auction sales in Kerala.
2. Figures in brackets in col. (4) correspond to the number of months in which the peak sales are effected.

As the export value of cardamom crucially depends on its green colour, which has a tendency to fade as time elapses, the traders are keen to acquire as much of the crop at the peak harvest season (September to December) as possible. Since the arrivals in the market are governed by the level of prices to acquire the bulk of the crop immediately after the harvest, the level of prices ruling then should be higher compared to other seasons. Consequently, prices rule high during the peak harvesting period and thereby a high proposition of sales.

An important aspect of the movement of prices is the short-term cyclical fluctuations. These fluctuations are seen to occur in the following manner: prices remain stable or tend to increase during a certain period followed by a sharp fall. They remain low for the next few years, then start moving up and continue to increase or remain stable for another period; the process of decline and subsequent increase repeats itself (Table IV). What is particularly interesting are the turning points of upswings and downswings in prices recurring alternatively at almost regular intervals.

TABLE IV—WHOLESALE PRICES OF CARDAMOM

Year	1954	1957	1960	1963	1966	1969	1972	1975	1978	1981
Price (Rs./kg.)	20·64	22·00	21·72	13·72	50·80	75·98	52·40	93·43	218·54	141·00

Source: For the years 1954 to 1963, Government of Mysore: Marketing of Cardamom in Mysore State, Department of Marketing, Bangalore, 1965. For the rest, Government of India: Cardamom Statistics, Vols. I to V, Cardamom Board, Cochin.

Note:—The prices reported here are for the Saklespur market, trends of which are comparable to the trends in other markets.

As to the long-term, the prices show a significant upward trend, a ten fold rise in 25 years. The highest prices during the upswings have increased from about Rs. 22 to Rs. 76 to Rs. 218 per kg. in successive cyclical fluctuations and the corresponding rise of lowest point is from Rs. 13 to Rs. 39 to Rs. 108 per kg.

Though the long-term trend in prices has a lot to do with the general buoyancy on the demand side, the short-term trend in fluctuations has a significant bearing on the conditions of supply.

IV

INTER-RELATIONSHIP BETWEEN PRICES AND CONDITIONS OF SUPPLY

Changes in Supply and Its Impact on Prices

As is evident from Table V, between the three sub-periods, *viz.*, 1964-69, 1970-76 and 1977-81 clear jumps in production are noted, whereas within sub-periods small increases in the early part of the periods are observed. Thus, production has been showing a quantum jump. When these jumps are seen along with the movement of prices, it is observed that the jumps in production are marked by sharp decreases in prices (in the case of the jump around 1977-78 the fall in prices was not immediate. This is probably because the year 1976-77 was an especially bad year). Such an association points to the force with which demand and supply govern the prices. As seen from Table I, world export demand has been rising at a steady rate whereas production—the Indian component destined for export, which is about 35 per cent now was much higher earlier—has been rising in jumps. Because of a

steady increase in one and a jump increase in the other there would be periods when supply is below demand followed by supply overtaking demand. It may be seen, then, that the upswings and downswings in prices are clearly related to these gaps and excesses. It needs to be noted that this ties up well with the earlier discussion of determination of price itself.

Going back to the changes in output, it may occur due to the operation of two sets of factors: (*a*) fluctuations in yields caused by weather, incidence of pests and diseases, etc., and (*b*) changes in output due to changes in the planted acreage. Because of the gestation period in production, changes in planted acreage will get reflected in output only after an interval of about six years.[6] Both the changes in planted acreage and in the productivity of plantations, apart from weather and other non-market forces, are basically a function of the farmers' response to changes in prices.

Conoeptually, it is possible to estimate the extent to which the above-mentioned factors contribute to changes in output. However, such an exercise is ruled out because of lack of data on the different variables affecting changes in output. The available data permit us only to indicate the direction in which the different factors are moving over time and their possible effect on output.

TABLE V—TRENDS IN PRODUCTION AND PRICES OF CARDAMOM IN INDIA

Year (1)	Prices (Rs./kg.) (2)	Production (metric tonnes) (3)	Simple averages (4)
1964-65	20	2,200	
1965-66	42	2,000	
1966-67	46	2,700	2,283
1967-68	48	2,400	
1968-69	54	2,100	
1969-70	89	2,300	
1970-71	62	3,170	
1971-72	38	3,785	
1972-73	57	2,670	
1973-74	65	2,780	2,950
1974-75	76	2,900	
1975-76	102	3,000	
1976-77	157	2,400	
1977-78	173	3,900	
1978-79	199	4,000	
1979-80	177	4,500	4,160
1980-81	164	4,400	
1981-82	108	4,000	

Source: Compiled from Government of India: Cardamom Statistics, Vols. I to V, Cardamom Board, Cochin.

6. Once replanting or new planting is done, the plant may start yielding by the third year and will reach its normal level by the fifth or sixth year. Hence the lag of about six years.

Effect of Price on Output

The output response to price may be thought to have two components: a productivity component and an area component. Taking the productivity component first, it is seen that (Table VI) at the all-India level the productivity per hectare showed a declining trend whereas area has been showing consistent increases. Roughly about 45 per cent of the increase in area took place in Kerala and the remaining in Karnataka and Tamil Nadu. In Kerala the productivity per hectare has shown a slight increase (about 25 per cent over twenty years) whereas in the other two States it showed a declining trend.

Coming to the area response to price, due to lack of data on planted acreage of cardamom (both in terms of replanting and new planting), it is not possible to assess the impact of 'area effect' on the growth of output over time. The only way we can derive some insight into this question is by looking at the trends in production, as the yield question is already taken care of.

If increases in area respond to increases in prices then the timing of the increase in area should correspond to the timing of the increase in prices. When the production figures with a time-lag of about six years were seen along with the price figures (Tables IV and V), *i.e.*, say the production

TABLE VI—AREA AND PRODUCTIVITY OF CARDAMOM IN INDIA*

(*area* = '000 *ha.*)
(*productivity* = *kg./ha.*)

Year	All-India		Kerala		Karnataka		Tamil Nadu	
	Area	Yield	Area	Yield	Area	Yield	Area	Yield
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1958-59	53·7	58·8	29·8	44·6	18·5	72·2	5·8	80·6
1959-60	54·7	58·9	28·5	44·1	20·0	74·9	6·1	73·3
1960-61	55·7	57·2	28·6	44·0	21·2	70·4	5·9	75·8
1961-62	54·7	55·4	28·6	44·6	20·4	60·9	5·5	73·7
1977-78	83·1	46·9	52·0	55·7	24·1	29·0	7·0	42·6
1978-79	85·1	46·9	53·2	54·7	24·8	32·0	7·0	42·3
1979-80	92·7	48·5	55·1	59·8	28·2	30·1	9·4	37·4
1980-81	93·9	46·8	56·3	54·9	28·2	35·4	9·4	32·1

Sources: For the years 1958-59 to 1961-62, data are taken from Government of Mysore: Marketing of Cardamom in Mysore State, Department of Marketing, Bangalore, 1965. For the rest of the years, the data are taken from Cardamom Board (1981).

* The available data on area and yield have serious limitations. Yield is estimated by dividing total production with area. While production figures are reliable, area figures are not. The reasons for this are the following: The area figures are reported by the revenue department. The reporting is not based on any survey estimates, but by eye estimates. Since the crop is cultivated under forest conditions, unlike in other crops, the reliability of the latter type of estimates is very low. The State Governments revised the area figures (in the mid-sixties in Kerala and in the mid-seventies in Karnataka) based on the cardamom settlement surveys conducted by the Indian Council of Agricultural Research (ICAR). Thus the area figures available over time are not strictly comparable.

figures for the year 1976-77 along with the prices figure of 1970-71 and so on, the jumps in production correspond well with the upswing in prices, thereby confirming that area increases are responding to prices. There is a further confirmation of the same by the small increases of production (see Table V) in the early years of the sub-periods.

The small growers of cardamom appear to have responded more rapidly than others to the upswing in prices. Data on growth of plantations in Kerala provide some clue in this direction (see Table VII). The number of cardamom estates below 2 hectares in the State during 1964-65 was about 2,000 and they accounted for 28 per cent of the total number of estates and 8 per cent of the total area under the crop. By 1980-81, the number of estates below 2 hectares increased to 12,600 and their share in the total number of estates to 67 per cent and that of total area to 23 per cent. In other words, the growth of small growers accounts for the major part of the increase in the number of growers and to some extent increase in area under cardamom in Kerala.

It is significant to note that the increase in the number of growers and the extent of area under the crop took place mostly in the seventies, when cardamom cultivation emerged more attractive than other plantation crops. During the seventies, the rate of increase in cardamom prices has been much above that of other plantations like pepper, ginger, coffee and tea.

TABLE VII—TRENDS IN CARDAMOM ESTATES IN KERALA

Year (1)	Number of holdings less than 2 ha. (2)	Percentage of total holdings (3)	Enumerated area of less than 2 ha. category (4)	Percentage of total enumerated area (5)	Total number of estates (6)	Total enumerated area (ha.) (7)
1964-65 ..	2,120	28·00	3,040	8·0	7,571	38,000
1973-74 ..	5,550	56·31	5,888	14·3	9,844	41,000
1975-76 ..	9,817	62·75	9,959	19·6	15,643	50,751
1976-77 ..	10,407	63·50	10,570	20·3	16,374	51,830
1980-81 ..	12,673	66·75	12,351	22·6	18,985	54,497

Source: Government of Kerala: Economic Review, 1976, 1977, 1981, 1982, State Planning Board, Trivandrum.

7. For a detailed discussion of the factors underlying the growth of small growers in the cardamom sector and the implications of this phenomena to the development of the sector, see K. N. Nair *et al*: Development of Cardamom Plantations in the High Ranges of Kerala (Report of an Ex-Post Evaluation of a Scheme Financed by the NABARD), Centre for Development Studies, Trivandrum, June 1984.

V

CONCLUSION

The objective of the study, as stated at the very outset, was to analyse the formation of prices of the small variety of cardamom grown in India. In this process, we have examined the movement in cardamom prices and the inter-relationship between its prices and conditions of supply. Our main findings are the following:

1 The cyclical fluctuations in prices are to a very large extent due to the very definite conditions of supply, *viz.*, the increases in output through new planting and replanting becoming effective after a significant time lag.

2. The cyclical fluctuations in prices have implicit bearing on the conditions of supply through farmers' response. This has become all the more signifiant in recent years owing to the emergence of large number of small growers in the sector.

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FACTORS AFFECTING MILK PRODUCTION: A STUDY

Milk production is a complex process and can be conceived as a function of several variables. The knowledge of relative importance of the resource inputs influencing milk production is essential for the dairy farmer for introducing desirable changes in his operation at the micro level and for the policy maker for formulating plans for improvements in dairy cattle productivity based on sound economic principles at the macro level.

Production of milk depends on feeding, breeding and management of the animals. There are a number of other factors which affect milk production, *e.g.*, age at first calving, season of calving, service period, advancement of lactation, number of lactations, dry period after the previous lactation, frequency of milking, age of the animal, body weight, etc. They all have considerable impact on the milk yield of animals. While analysing the feed, the important fodders are dry and green fodders and feeds are concentrates. The major available fodders are local grass, jowar, bajra, pillipesara and jute in green fodders, paddy straw, bajra straw, *ragi* straw, jowar stalks, horsegram straw and jute stalks in dry fodders. The important concentrate feeds are rice bran, rice husk, pulses husk, broken rice, cotton seed, bajra grain, jowar grain, groundnut cake and gingelly cake. Of all the factors affecting milk production, feed and labour are the principal inputs. In this connection, by using Farm

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