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World Pepper Market and India: An Analysis of Growth and Instability

Traditionally, pepper (*piper nigrum*), known as the 'black gold' or the 'king of spices', has been produced in the three tropical countries, namely, India, Indonesia and Malaysia. Later on, Brazil, Thailand, Sri Lanka, Madagascar and Vietnam also have entered the field. According to the International Pepper Community (IPC) data, during 1987 to 1990, while the world pepper production increased by about 51 per cent from 142 thousand tonnes to 215 thousand tonnes, world exports recorded an increase of only 29 per cent *i.e.*, from 119 thousand tonnes to 153 thousand tonnes. The inadequate increase in export demand has, to a large extent, brought a sharp decline in the prices of black pepper from $ 5,027 a tonne in 1987 to $ 1,985 a tonne in 1990. The IPC, which commands 85 to 90 per cent of the world production and exports of pepper through its four member countries - India, Indonesia, Malaysia and Brazil -, has not been able to control the downward trend in the prices.

Pepper has been a traditional item of international trade of India. Its sweet pungency and flavour has played a leading role in establishing India's relationship with the major centres of civilisation. India, known as the 'kingdom of pepper', had a dominant position in the world production and export of pepper until the beginning of the nineteenth century. However, India's share in the world area under pepper crop and production has declined from 70 and 66 per cent in 1950-51 to 46 and 30 per cent in 1990-91 respectively. In terms of exports also, India's contribution has drastically come down from 56 per cent of world exports to 23 per cent during the above period. In particular, during the period 1987-88 to 1990-91, the quantity and value of pepper exported have declined from 39.58 thousand tonnes and Rs. 235.97 crores to 34.43 thousand tonnes and Rs. 111.04 crores respectively. Further, the yield of Indian pepper is the lowest among the major producing countries. Thus there is a reversal in India's monopoly power in the production and exports of pepper. Thus present study aims to undertake a temporal analysis of the world pepper market and export performance of India. In specific terms, the study attempts to examine *(i)* the growth and instability of world pepper market during the period 1975 to 1990 and *(ii)* the export performance of Indian pepper in terms of growth, direction, competitive position and terms of trade during the period 1950-51 to 1990-91.

METHODOLOGY AND DATA

To estimate the growth rates of pepper trade indicators, an exponential model of the type $Y_t = ae^{bt}$ ($\ln_e Y_t = \log a + bt$) has been fitted, using Ordinary Least Squares (OLS) technique. Decadewise growth rates have been estimated by fitting kinked exponential function (Boyce, 1986). In this function, the discontinuity between segments of a piecewise regression (if separate exponential trend lines were fitted for different periods) has been eliminated by imposing linear restrictions. Discontinuous growth rates for four sub-periods are given by the following equation:

$$\ln Y_t = a_1D_1 + a_2D_2 + a_3D_3 + a_4D_4 + (b_1D_1 + b_2D_2 + b_3D_3 + b_4D_4)\, t + u_t$$

where Y_t is the relevant trade indicator, u_t is the error term and D_j ($j = 1, 2, 3, 4$) is a dummy variable which takes the values 1 in the j-th sub-period and 0 otherwise. In order to estimate continuous growth rates of the four sub-periods, from the above equation, three-kinked exponential model is derived by imposing linear restrictions such that the sub-period trend lines meet at k_1, k_2 and k_3:

$$a_1 + b_1k_1 = a_2 + b_2k_1$$
$$a_2 + b_2k_2 = a_3 + b_3k_2$$
$$a_3 + b_3k_3 = a_4 + b_4k_3$$

Substituting for a_2, a_3 and a_4 and taking $a_1D_1+a_1D_2 = a_1$, we get the exponential model with three kinds:

$$\ln Y_t = a_1 + b_1 (D_1t + D_2k_1 + D_3k_1 + D_4k_1) + b_2 (D_2t - D_2k_1 - D_3k_1 + D_3k_2 - D_4k_1 + D_4k_2) + b_3 (D_3t - D_3k_2 - D_4k_2 + D_4k_3) + b_4 (D_4t - D_4k_3) + ut$$

OLS estimate of the respective coefficients, b_1, b_2, b_3 and b_4, give the exponential growth rate in the four sub-periods.

The instability index is calculated using the following statistic from the residuals (e_i) of the exponential trend equation.

$$II = \sqrt{\frac{\sum_{i=n}^{n} e_i^2}{(n-k)}}$$

where e_i = residual of i-th observation,
n = number of observations,
k = number of parameters estimated.

Basic data for the study have been drawn from various issues of *Spices Export Review*, *Cocoa, Arecanut and Spices Statistics* and *Pepper Statistical Year Book.*

GROWTH AND INSTABILITY OF WORLD PEPPER MARKET

To get an overall idea about the world pepper market, an analysis of pepper exports of producing countries is attempted at the outset. World pepper exports from the producing countries have increased more than five times from 27.8 thousand tonnes in 1950 to 153 thousand tonnes in 1990. Among the producing countries, the major exporters of pepper are India, Indonesia, Brazil and Malaysia, accounting for 29.74, 24.37, 19.38 and 15.64 per cent respectively of the world exports during the period 1986 to 1990.

An examination of the growth and instability in pepper exports of producing countries between 1975 and 1990 reveals that Sri Lanka recorded the highest annual compound growth rate of 24.59 per cent with a high degree of instability (1.04) (Table I). This is, however, mainly due to its low base in the initial year. Among the other countries, positive and statistically significant growth rate has been recorded only in the case of India. In terms of stability too, India's performance seems to be better. Strikingly, the growth rate of total exports from the producing countries was statistically insignificant.

TABLE I. EXPORT QUANTITY, GROWTH RATES AND INSTABILITY INDICES OF PEPPER EXPORTS OF MAJOR PRODUCING COUNTRIES (1975 TO 1990)

Country (1)	Quantity exported (thousand tonnes) 1975 (2)	1990 (3)	Growth rate (per cent) (4)	Instability index (5)
India	22.40	35.20	3.68*	0.25
Brazil	17.80	25.00	1.13	0.30
Indonesia	26.50	13.01	-0.50	0.30
Malaysia	33.80	26.46	-4.63*	0.25
Madagascar	3.50	1.37	-5.14*	0.26
Sri Lanka	0.10	2.71	24.59*	1.04
World[a]	104.60	153.00	1.34	0.16

Sources: 1) *Pepper Statistical Year Book*, International Pepper Community, Jakarta, Indonesia (Annual issues).
2) *Cocoa, Arecanut and Spices Statistics*, Directorate of Cocoa, Arecanut and Spices, Government of India, Calicut.

* Statistically significant at 99 per cent confidence interval.

a. Total exports from producing countries, which exclude exports from the importing countries.

Growth and Instability of Pepper Imports: A Taxonomy

Developed countries, such as the U.S.A., Singapore, Hong Kong, the erstwhile U.S.S.R. (hereafter the U.S.S.R.), West Germany (now United Germany) and France, are the major importers of black pepper in the world. As can be seen from Table II, the import performance of these countries shows a divergent picture. The growth rates range from a negative level of 2.56 per cent for Argentina to a high and positive level of 11.64 per cent for Saudi Arabia; and the instability indices vary between 0.07 for Japan and 0.55 for Egypt.

TABLE II. COUNTRYWISE QUANTITY, GROWTH RATE AND INSTABILITY INDEX OF PEPPER IMPORTS (1975 TO 1990)

Country (1)	Imports (thousand tonnes) 1975 (2)	1990 (3)	Growth rate (per cent) (4)	Instability index (5)
Saudi Arabia	0.80	6.38	11.64*	0.34
Netherlands	1.50	6.09	8.61*	0.21
Egypt	0.64	1.92	8.23*	0.55
Belgium	1.10	2.88	7.12*	0.10
France	5.80	11.96	4.12*	0.08
U.S.S.R.	8.31	16.90	3.91*	0.08
Japan	3.10	5.90	3.91*	0.07
U.S.A.	24.97	37.88	3.19*	0.09
West Germany	8.16	15.02	2.78*	0.08
Spain	1.48	2.03	2.74*	0.16
Canada	2.29	3.14	2.52*	0.08
U.K.	2.89	5.25	2.49*	0.08
Yugoslavia	0.68	1.10	2.08	0.41
Italy	3.33	3.10	-0.01	0.10
Argentina	1.60	1.35	-2.56	0.30
World[a]	106.50	195.51	4.19*	0.09

Source: Same as in Table I.

* Statistically significant at 99 per cent confidence interval.

a. Total world imports include exports from producing and importing countries.

For a more detailed analysis in this regard, pepper importing countries have been classified into a four-fold taxonomy (Sen, 1989), based on growth rates and instability indices. The classification presented in the following exhibit reveals that *(i)* the growth and instabilities of pepper imports of Saudi Arabia, the Netherlands, Belgium and Egypt were greater than those of the world average. The share of these countries in world imports was only 17 per cent. *(ii)* Significantly, there was not a single country with high growth rates and low instability. *(iii)* Low growth rate and high instability of imports were observed in the case of Spain, Yugoslavia, Argentina and Italy, which indicates that they have a low priority in imports. *(iv)* It is quite important to note that around half of the world imports of pepper were accounted by the fourth category of countries, whose growth rates and volatility were less than those of the world average.

EXHIBIT: CLASSIFICATION OF PEPPER IMPORTING COUNTRIES BY GROWTH AND INSTABILITY

Growth	Instability			
		High		Low
(1)		(2)		(3)
High	(I)	Saudi Arabia Netherlands Belgium Egypt	(II)	None
Low	(III)	Spain Yugoslavia Argentina Italy	(IV)	U.S.S.R U.S.A. France U.K. Japan West Germany Canada

In conjunction with the above observations, the following inferences can made. *(i)* In general, there was a trade-off between growth and stability in imports of the countries. *(ii)* In view of the high instabilities and also relatively lower share of the first category of countries, there is less scope for exporting to this region. *(iii)* The low level of priority in pepper imports of the third category of countries again limits the scope for exports. *(iv)* The low level of instability of the fourth category of countries implies that they can be considered as a fairly high priority class of countries for pepper exports. However, if the cause for the low growth could have arisen due to gradual saturation of markets in those countries, there is little to be done on the part of the exporting countries.

Export Prices of Major Pepper Producing Countries

Since the competitive power of traditional commodities in the international market depends crucially upon price, it is expedient to analyse the price movements of pepper. Table III reveals that since 1987 there was a steep fall in pepper prices in respect of major producing countries. The annual compound growth rates of prices of pepper during 1965 to 1990 were 6.93, 7.54, 8.02, and 6.15 per cent for India, Indonesia, Malaysia and Brazil respectively. a high degree of volatility in prices was witnessed in respect of every country which might have been mainly due to the drastic fall in prices after 1987.

TABLE III. INTERNATIONAL PEPPER PRICES, GROWTH RATES AND INSTABILITY INDICES OF MAJOR PRODUCING COUNTRIES (1965 TO 1990)

Country (1)	Price (US cents/lb) 1965 (2)	1987 (3)	1990 (4)	Growth rate (per cent) (5)	Instability index (6)
India	40.58	226.08	91.18	6.93*	0.83
Indonesia	36.27	227.96	90.40	7.54*	1.53
Malaysia	27.55	227.76	88.80	8.02*	1.21
Brazil	37.00	216.97	85.96	6.15*	0.88

Source: Same as in Table I.
* Statistically significant at 99 per cent confidence interval.

Whether or not Indian pepper has enjoyed price advantage over its competing countries can be gauged by examining the relative price movements. Twenty-six yearly observations of relative prices of the period 1965 to 1990 revealed that India lost its premium over Indonesia on five occasions, six times over Malaysia and four times over Brazil. During the remaining occasions India had enjoyed price advantage over the above countries. The results of the inter-temporal analysis of variation in relative prices during two sub-periods, *i.e.*, from 1965 to 1977 and from 1978 to 1990 are presented in Table IV (price figures are yearly averages for the respective periods). It can be noted that during the second sub-period India's price advantage against Indonesia and Malaysia has declined but it improved against Brazil. From the above analysis, it can be inferred that India has enjoyed price advantage over other countries but in recent yea it has started declining.

TABLE IV. AVERAGE PRICES OF PEPPER OF MAJOR PRODUCING COUNTRIES AND ITS PERCENTAGE TO INDIAN PEPPER

(US cents/lb in New York market)

Period (1)	India (2)	Indonesia (3)	Malaysia (4)	Brazil (5)
1965-77	55.6	52.4	48.2	52.0
	(100)	(94)	(87)	(94)
1978-90	133.1	128.3	123.5	104.2
	(100)	(96)	(93)	(78)
1965-90	94.3	90.3	85.9	78.1
	(100)	(96)	(97)	(83)

Source: Pepper Statistical Year Book, International Pepper Community, Jakarta, Indonesia (various issues).
Note: Figures in brackets represent price relatives expressed as per cent.

The following observations can be made from the above analysis of international scenario of pepper trade: *(i)* The rate of growth of world exports of pepper was insignificant.*(ii)* Compared to other producing countries, India's export performance was good in terms of both growth and stability. *(iii)* In general there was a lack of stable market for pepper exports. And *(iv)* India's price premium over other countries, which was favourable, shows a tendency to disappear over recent years.

PERFORMANCE OF PEPPER EXPORTS FROM INDIA

Pepper plays a significant role in the spice exports of India. In 1990-91, the country exported spices valued at Rs. 239 crores of which 46 per cent was accounted by pepper alone. About 70 to 80 per cent of the annual production of pepper was exported. The quantity of pepper exported from India has increased from 15.64 thousand tonnes in 1950-51 to an all time record of 39.58 thousand tonnes in 1987-88 and, thereafter, it has declined to 34.43 thousand tonnes in 1990-91. Corresponding to the quantity exported, export earnings and unit price have increased from Rs. 20.4 crores and Rs. 13.04 per kg in 1950-51 to Rs. 235.97 crores and Rs. 59.62 per kg in 1987-88 and since then it plumped to Rs. 111.04 crores and Rs. 32.25 per kg respectively in 1990-91.

The annual compound growth rates of quantity, export value and unit price were 2.26, 8.39 and 5.99 per cent respectively during 1950-51 to 1988-89 (Table V). Decadewise growth rates show that compared to all other decades, the eighties recorded the highest growth rate in the above three variables. However, the rate of growth during the two quinquennial periods of the eighties shows that the first half of the decade has recorded substantial growth. On the other hand, the later half withnessed significant reversal. Thus the drastic fall in the unit value and the consequent negative impact on export earnings, in recent times, were quite noticeable. In general, the instability of quantity exported was lower than the instabilities of export value and unit price realisation.

TABLE V. COMPOUND GROWTH RATES AND INSTABILITY INDICES OF SELECTED INDICATORS OF PEPPER EXPORTS FROM INDIA

	Quantity		Export value		Unit value	
Period (1)	Growth rate (per cent) (2)	Instability index (3)	Growth rate (per cent) (4)	Instability index (5)	Growth rate (per cent) (6)	Instability index (7)
1950-59	0.94	0.18	-27.02*	0.51	-29.81*	0.42
1960-69	1.20*	0.14	10.64*	0.26	10.54*	0.24
1970-79	-0.31	0.22	10.62*	0.30	10.53*	0.19
1980-89	6.89*	0.15	28.27*	0.45	17.67*	0.32
1950-89	2.26*	0.16	8.39*	0.36	5.99*	0.27
1981-85	14.16*	0.11	54.91*	0.33	35.70*	0.25
1986-90	-2.56	0.04	-17.08*	0.16	-14.15*	0.12

Source: Spices Export Review, Trade Information Service, Spices Board, Government of India, Cochin (Annual issues).

* Statistically significant at 99 per cent confidence interval.

Direction of Pepper Exports

Over the years, there were significant changes in the direction of exports from India. Table VI shows that the share of the American zone has declined drastically from 63.6 per cent during 1951-56 to the nadir of 14.3 per cent during 1976-81 and, thereafter, it has again increased to 19.89 per cent during 1986-91. On the other hand, the share of East European region (non-market economies) has steadily increased from a mere 11.1 per cent during 1951-56 to the maximum of 70 per cent during 1976-81 and since then its share has declined to 52.79 per cent during 1986-91. This shows that corresponding to the decline in the share of the American zone, the share of the East European countries has increased and vice versa. The shares of other specified zones put together were not substantial.

TABLE VI. REGIONWISE SHARE OF INDIA'S PEPPER EXPORTS AND WORLD IMPORTS

(per cent)

Period/ Region (1)	1951-52- 1955-56 (2)	1961-62- 1965-66 (3)	1971-72- 1975-76 (4)	1976-77- 1980-81 (5)	1981-82- 1985-86 (6)	1986-87- 1990-91 (7)	World imports 1986 to 1990 (8)
American zone	63.6	30.3	23.6	14.3	17.2	19.9	25.8
Western Europe	15.1	11.2	8.1	6.8	14.2	14.9	24.6
Eastern Europe	11.1	43.4	59.4	70.0	58.1	52.8	14.0
East Asia	1.0	5.0	3.1	1.9	1.4	2.8	22.2
West Asia	1.3	5.2	3.8	5.4	5.6	5.4	4.4
Africa	0.7	2.1	0.4	1.3	2.4	3.0	5.8
Others	7.2	2.8	1.6	0.3	1.1	1.1	3.2

Sources: 1) George *et al.* (1989).
2) *Spices Export Review*, Trade Information Service, Spices Board, Government of India, Cochin (Annual issues).

Comparison of a given region's share in world pepper imports with the share of India's exports to that region during the period from 1986 to 1991 (Table VI) points out to two emerging trends: Firstly, whereas the East European region accounted for only 14 per cent of the world imports of pepper, 52.8 per cent of India's exports were directed to that region. Secondly, whereas the American zone and West European countries (market economies) together accounted for 50.4 per cent of the world imports, India's exports to these two regions accounted for only 34.8 per cent. Thus from the above observations it can be inferred that India's exports has tended to converge over the years.

The U.S.S.R., U.S.A., Canada, Italy, Poland, Czechoslovakia and Yugoslavia have been the countrywise major destinations of pepper exports from India. Among these countries, the U.S.S.R. accounted for a lion's share. During 1975 to 1990, on the basis of yearly average, 44 per cent of India's pepper exports were directed to the U.S.S.R., which in turn met around 82 per cent of the total pepper imports of that country (IPC). The corresponding figures for the U.S.A. were 16.39 and 14.0 per cent respectively. For the same period, countrywise annual compound growth rate of pepper exports was positive and statistically significant only in the case of the U.S.S.R. (3.38 per cent) (Table VII). Exports to the U.S.A., Canada and Italy showed positive growth rates which were, however, not statistically significant. Growth rates in the case of Poland and Czechoslovakia were negative. Among the countries considered, instability in exports were lower for the U.S.S.R., Italy and Canada and higher for Poland, U.S.A. and Czechoslovakia.

From the above analysis, it is clear that India dominated in the U.S.S.R.'s pepper market and her exports to that country maintained a steady growth with stability. On the other hand, India was not able to capture the U.S.A. market, while the U.S.A. is the biggest pepper importing country in the world. To elaborate, India has not only failed to increase its exports to the U.S.A. in tandem with the increased consumption in that country but also has not succeeded in maintaining the quantity already exported. Seemingly, countries like Brazil has taken advantage of the situation.

TABLE VII. COUNTRYWISE QUANTITY, GROWTH RATES AND INSTABILITY INDICES OF PEPPER EXPORTED FROM INDIA (1975 TO 1990)

Country	Quantity exported (thousand tonnes)		Growth rate (per cent)	Instability index
	1975	1990		
(1)	(2)	(3)	(4)	(5)
U.S.S.R.	9.41	19.44	3.38*	0.29
U.S.A.	7.73	3.14	7.80	0.97
Canada	1.41	1.13	1.19	0.35
Italy	2.32	1.29	1.92	0.32
Poland	0.79	0.10	-16.95*	1.07
Czechoslovakia	0.89	0.21	-3.10	0.66

Source: Same as in Table I.
* Statistically significant at 99 per cent confidence interval.

Regionwise Unit Price and Terms of Trade of Pepper Exported

The average yearly unit price realisation per kilogram of pepper during 1986 to 1990 was Rs. 49.36 for the East European region as against Rs. 45.32, Rs. 43.72, Rs. 38.61, Rs. 42.0, Rs. 44.9 and Rs. 47.03 for the American zone, West Europe, East Asia, West Asia, Africa and other countries respectively (Table VIII). The unit price realisation from the East European region was the highest and it was the lowest in the case of East Asia.

Regionwise terms of trade of an export commodity can be assessed by computing the shares of quantity and value of exports to a particular region in total exports. The relatively higher share of value than quantity exported to a particular region indicates that the terms of trade are favourable while exporting to that region (Dass, 1991). As evident from Table VIII, the terms of trade are consistently favourable in exporting to the East European countries during the period 1986 to 1990. This may be attributed to the timely bilateral rupee trade agreements with the countries in that region. For all other regions the terms of trade were unfavourable, except in some years. It indirectly implies that India was facing stiff competition in those regions.

TABLE VIII. REGIONWISE UNIT PRICE AND TERMS OF TRADE OF PEPPER EXPORTED FROM INDIA

(price in Rs./kg)

Region	1986		1987		1988		1989		1990		Average price
	Price	Terms of trade	Price	Terms of trade	Price	Terms of trade	Price	Terms of trade	Price	Terms of trade	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
American zone	54.5	0.94	58.6	0.99	45.4	1.01	36.6	0.74	31.6	0.90	45.3
Western Europe	55.8	1.03	52.5	0.90	43.6	0.98	38.0	0.86	28.8	0.83	43.7
Eastern Europe	56.2	1.04	61.3	1.04	45.3	1.02	47.5	1.07	36.7	1.05	49.4
East Asia	39.0	0.86	46.8	0.81	39.2	0.87	34.4	0.81	33.8	0.95	38.6
West Asia	39.5	0.74	58.7	1.00	42.7	0.96	35.1	0.80	33.8	0.97	42.0
Africa	51.3	0.52	55.1	0.94	46.5	1.05	37.8	0.88	33.8	0.92	44.9
Others	58.1	0.55	60.8	1.50	42.0	1.00	41.9	1.00	32.4	0.96	47.0

Source: Pepper Statistical Year Book, International Pepper Community, Jakarta, Indonesia (Annual issues).

In summary, the following points assume critical importance: *(i)* Though India's export performance has substantially improved during the first half of the eighties, it started declining since 1987-88. In particular, the decline in unit value and export earnings has been substantial. *(ii)* The direction of India's exports show that the share of the market economies has declined over the years and that of non-market economies has increased. It indirectly reveals that India was not able to compete in the market economies. (iii) Countrywise major destination of India's exports was U.S.S.R. and also India was the major supplier of pepper to that country. *(iv)* Though the U.S.A. has been the largest importer of pepper in the world, India's export to that country was not only low but it has been declining over the years. *(v)* Thus instead of getting diversified, India's export markets have been narrowing down over the years. *(vi)* India's exports to the East European region has fetched high unit price and favourable terms of trade.

POLICY IMPLICATIONS

Of late, pepper producing countries are facing serious problems due to the unfavourable trends in prices. At present, the international prices of black pepper are well below the Minimum Export Price (MEP) of one dollar per pound fixed by the IPC. Therefore, the IPC should effectively implement the MEP policy and the member countries must strictly follow it so as to ensure remunerative and stable prices. The international prices of pepper and their fluctuations were mainly due to the changes in the supply conditions rather than due to the demand factor. World demand for pepper will not vary much in view of its specific and fixed nature of uses. Hence, introduction of an efficient supply management system, either by maintaining a buffer stock by the IPC or voluntary retention by the producing countries, is required for obtaining higher prices and stabilising the inter- and intra-year variations. Efforts should be made to persuade the non-IPC countries like Vietnam, Thailand and Sri Lanka to join the IPC and thereby strengthen the bargaining power of the Community members. Further, attention has to be given to stimulate consumption in the importing countries, especially by popularising value-added pepper products.

India's pepper exports can be extremely sensitive to the recent opening up process in the East European region, which accounts for more than half of our exports through rupee trade agreements. Significantly, the disintegration of the Soviet Union, the largest pepper importing country from India, may make the situation more uncertain. Perhaps, the illusion of safe market provided by the East European region, with high unit value realisation and thereby favourable terms of trade, has made the country lethargic towards diversification of market. Hence, it becomes imperative that India should widen its base in other prospective markets.

So far, less than half of India's pepper export has been based on its competitive power. In the changed context, the growth of pepper export depends overwhelmingly on the competitive power in the general currency area markets. However, India's competitive power (in terms of relative prices) has been declining in recent years. Basically, two reasons can be attributed for the relatively lower pepper price of India's competitors:*(i)* The unit cost of production of pepper in those countries are less than that of India due to high yields. In India, the yield per hectare is only 411 kg as against 2,347 kg in Malaysia, 1,433 kg in Brazil and 496 kg in Indonesia (IPC). *(ii)* The domestic demand for pepper in those countries are negligible. While India annually consumes around 30 per cent of its production, the annual domestic consumption of Indonesia, Brazil and Malaysia is only 15, 17 and 3 per cent respectively.

The competitive power in the international market, *inter alia,* closely related to the unit cost of production. A research study (Jeromi, 1991) reveals that in Kerala pepper cultivation (under monocrop) takes place at the break-even point. Hence, the need to reduce the unit cost of production by enhancing yield assumes significance.

Product diversification may tend to provide a long-term solution to the deteriorating pepper export performance of India. The international market is adapting to the use of value-added pepper products like oil and oleoresin, curry powder, dehydrated green pepper, pepper in brine, pepper in consumer packs, pepper powder, etc. Pepper importing developed countries have been taking this opportunity by manufacturing value-added products, which they export in their own brand names. Although India has started the processing industries, their growth performance has not been very appreciable. In view of the numerous advantages associated with the processing industries, the need to provide sufficient encouragement to these industries gets added emphasis.

It has been estimated that the world demand for pepper by the turn of the century will be around 185 thousand tonnes. The target set for pepper exports from India by 2000 A.D. is Rs. 600 crores. To achieve this target India must be in a position to export about 75 thousand tonnes. The target may remain unrealistic unless measures are taken for reducing the cost of cultivation, increasing the yield, deepening and widening of markets and the development of value-added products. In conclusion, sustained growth in India's pepper exports thus calls for comprehensive review of all stages, *i.e.*, production, processing and marketing.

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