

## Future for Black Pepper is not that Bleak

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BLACK PEPPER is native of the Western Ghats in India. This plant was domesticated by the Kerala farmers in Malabar region as a part of their indigenous agroforestry systems at least 3,000 years back and was one of the first of the oriental spices to be introduced into Europe. It is indeed this spice that had paved the way for many of political changes in world in general and India in particular. The world history reveals that the Venetian traveller Marco Polo came to Malabar coast in the year 1292 and on his return he wrote several stories on the "King of Spices". Italian sailor Christopher Columbus got a ship from the Spain Kingdom in the year 1492 to bring pepper from India. In the process he discovered the West Indies in that year and South America six years later. Though Columbus could not find the route to India Portuguese Navigator, Vasco-De-Gama, sailing around the cape of Good Hope, reached Calicut in Malabar Coast in 1498 to return with three ship loads of pepper. The Arabs, who were enjoying the monopoly of the pepper trade with Malabar Coast until then, were enraged at this and wars were fought over them. Again in 1599 when the Dutch Spices Trade company raised the price of pepper, a group of 24 merchants in London organised a trading firm — The East India Company—for ruthless competition. This company was expanded and gradually began to make political intrusions in the country and eventually succeeded in making India Colony of British Empire (Purseglove *et al* 1981, Resengarten, 1969).

While in Europe, pepper for its precious value and rareness was used for payment of court fines, custom duties, rents and taxes, in China, a part of the salary of all civil and military officials was paid in the form of this commodity (T'ien 1982).

It had not only made fascinating social, economic and political history, but also was one of the prime source of fabulous foreign exchange for India for external debt services. As a matter of fact, India held the monopoly in the world pepper production as well as trade until the beginning of the nineteenth century. At some time during the period of the Roman Empire in Europe it was introduced into Java (presently a part of Indonesia) by Hindu settlers. Early in the nineteenth century pepper was introduced

to Chinese planters in Malay by the British and later it was taken to Sarawak (presently both are parts of Malaysia). From there it spread to different parts of South-East Asia. During 1920s this spice was taken to Brazil by the Japanese settlers. During the course of time these countries organised their pepper sector intensively. As a consequence India lost her pride of place as world leader both in respect of production and export of black pepper.

### Objectives

This paper briefly reviews the trends in production and export of pepper in India in comparison with her major competitors. It also endeavours to discuss the prospects and constraints.

### Methods and Materials

The data-base of the International Pepper Community, Jakarta, Indonesia was used to study the trends in area, production, yield rate and exports of pepper over these years. It was, however, supplemented by the country reports and published materials on pepper wherever it was felt necessary. Trends in area, production, productivity, export, export earnings and prices are shown in Tables 1 to 6 in that order. The major pepper growing countries, namely, India, Indonesia, Malaysia and Brazil have been considered for discussion. Since pepper is a perennial crop which is not subject to short run adjustment in supply and demand, the annual trends have been worked out over five yearly average between 1961-85.

### Results and Discussion—

#### PRODUCTION TRENDS

As has already been mentioned, production of pepper as a commercial crop began in Malabar region of present Kerala State some 3,000 years ago. As we look back across recorded history, we find that the pepper production in India prior to the invasion of Hyder in 1764 was of the order of 4,300-5,800 tonnes per annum (Milburn, 1825). After various vicissitudes India's production could reach the level of over 31,000 tonnes and this country again became world leader in pepper between 1947 and 1949. At that time India accounted for 80 per cent of the world pepper production. It

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is this country's misfortune that in the following years pepper production fell back and tended to stagnate at between 20,000 tonnes and 25,000 tonnes during the 1950s and between 22,000 tonnes and 28,000 tonnes throughout the 1960s and early 1970s.

It was only in 1977 that the production could touch its 1947 level and rise marginally in the following year. But in the subsequent years the output had crashed to 1960s level.

TABLE 1—TRENDS IN WORLD PEPPER AREA

	Average area ('000 ha./year)					
	1961—65	1966—70	1971—75	1976—80	1981—85	1986
World .. .. .	166.2	184.3	183.0	202.7	234.9	231.3
of which :						
India .. .. .	102.6 (61.7)	117.2 (63.6)	107.6 (58.8)	105.2 (51.9)	109.4 (46.6)	107.0 (46.3)
Indonesia .. .. .	29.0 (17.5)	32.8 (17.8)	38.9 (21.3)	48.6 (24.0)	74.4 (31.7)	80.0 (34.6)
Malaysia .. .. .	5.5 (3.3)	5.8 (3.2)	7.5 (4.1)	11.6 (5.7)	12.2 (5.2)	8.0 (3.5)
Brazil .. .. .	3.6 (2.2)	5.1 (2.8)	7.7 (4.2)	16.5 (8.1)	25.8 (11.0)	22.0 (9.5)

(Figures in the parentheses express the percentage of the world.)

If we consider the trends both in area and production of pepper in India against world scenario, it is disappointing to observe that, by and large, they remained stagnating around 110,000 hectares and 25,000 tonnes during the long period of 1961—85 while in the world, as a whole, there was significant growth during this period.

World area under pepper registered a steady rise from about 1,66,000 hectares in 1961—65 nearly 2,35,000 hectares in 1981—85. In percentage term this increase comes to an impressive 41.3 per cent in 25 years. As far as the competitors to India are concerned, pepper area in Malaysia could double, while it was raised by two and a half times in Indonesia and by more than six folds in Brazil (Table 1).

In the matter of production there was a spectacular 52 per cent increase from an annual average of about 1,08,000 tonnes in 1961—65 to some 1,64,000 tonnes in 1976—80 in world, but in the subsequent periods it came down drastically due to set back in other major producing countries. It was observed that there was noticeable reduction in pepper production in Indonesia during the late 1960s and early 1970s. Similarly, there was serious crisis in Malaysia and Brazil during the 1980s (Table 2). However, here it is to be noted that Brazil, a non-starter until 1920s could attain the position of world pepper leader with a magnificent record of an average production of 45,400 tonnes per annum during the late 1970s (Das, 1980).

TABLE 2—TRENDS IN WORLD PEPPER PRODUCTION

	Average production ('000 tonnes/year)					
	1961—65	1966—70	1971—75	1976—80	1981—85	1986
World .. .. .	107.7	106.9	125.4	164.1	129.9	122.6
of which :						
India .. .. .	26.0 (24.1)	25.4 (23.8)	24.6 (19.6)	24.2 (14.8)	25.3 (19.5)	45.0 (36.7)
Indonesia .. .. .	36.9 (34.3)	26.8 (25.1)	27.3 (21.8)	39.0 (23.7)	37.5 (28.9)	30.5 (24.9)
Malaysia .. .. .	25.3 (23.5)	25.6 (24.0)	32.1 (25.6)	34.9 (21.3)	22.6 (17.4)	12.0 (9.8)
Brazil .. .. .	6.1 (5.7)	12.5 (11.7)	22.4 (17.8)	45.4 (27.7)	35.5 (27.3)	22.0 (17.9)

(Figures in the parenthesis express the percentage of the world.)

We may now look at the estimated productivity per hectare which is considered as an important trend-setter like land under the crop. It is seen that India's pepper productivity remained fairly stable at a precariously low level of around 230 kg. per hectare, while other major pepper producers could benefit from very high levels of yield rate. Indonesia and Malaysia, however, could not sustain their respective 1961-65 level high productivity due to various factors. Brazil might have also been greatly concerned over the sharp fall by more than half of its average pepper yield during the 1980s from the 1970s average level. Despite this, the fact remains that during 1981-85 period the average productivity of Indonesia, Malaysia and Brazil was about two-and a quarter times, eight times and six times the average yield rate in India (Table 3).

However, before drawing any firm conclusion on the trends in India's pepper area, production and productivity, one may keep in mind that the official estimates are based on certain assumptions and for this reason they may necessarily not be nearer to the actuals. Unlike other pepper growing countries where it is largely grown in a specialised plantations, in India bulk of this spice comes from millions of small holders, mostly in Kerala where they raise a few vines as mixed crop in their homestead gardens. It is, therefore, extremely difficult to make precise estimates of area as well as production of pepper in India. It may, perhaps, be appropriate to point out at this stage that besides the official estimates, we get the non-official estimates on pepper production in India each year. These non-official estimates come from the pepper trade circle. The striking feature of the estimates of the pepper trade circle is that they are always quoted 5,000 to 10,000 tonnes more than that of the official estimates (Das, 1984).

TABLE 3—TRENDS IN WORLD PRODUCTIVITY OF PEPPER

	Average productivity (kg./ha./year)					
	1961-65	1966-70	1971-75	1976-80	1981-85	1986
World .. .. .	648	580	685	810	553	530
of which :						
India .. .. .	253	217	229	230	231	421
Indonesia .. .. .	1,272	817	702	803	504	381
Malaysia .. .. .	4,600	4,414	4,280	3,009	1,853	1,500
Brazil .. .. .	1,694	2,451	2,909	2,752	1,376	1,000

According to the author, the estimates of the pepper trade circle are relatively more reliable as these are generally based on market arrival of the crop in each season, while the official estimates are based on area estimates that suffer from inherent constraints, as stated earlier. Being an exclusively small holder cash crop, the market arrival is expected to be pretty close to the production level in a given season. Besides this, when we look at the export figures we find that very little remain for domestic market if the official estimates for pepper are taken as valid. But we are sure that the internal consumption in India is not less than 10,000 to 12,000 tonnes in any year. In that case, the pepper trade circle estimates seem to be somewhat more acceptable. And once we accept the non-official estimates we can not say that India's position among leading pepper producers had slipped to third or fourth place

at any time. But it does not make any qualitative change in the situation that India's pepper production has been stagnating and her share in world production has been eroded considerably.

It is noteworthy that in the year 1986 when all the three major competitors to India in pepper sector had suffered badly in their production, this country could have a record harvest of 45,000 tonnes in that year. Thus, India secured back her post-World War eminence of number one rank in world pepper community but with a much reduced share of 36.7 per cent.

#### EXPORT TRENDS

Since black pepper is, by and large, an export-oriented commodity, the trends in its export closely follow the trends in production of this spice. The

internal consumption of the pepper growing countries are of this order : India 10,000 — 12,000 tonnes, Indonesia 5,000—8,000 tonnes; and Brazil 2,700—3,000 tonnes. However, in Malaysia by far the entire output enters export market.

In a global perspective the pepper export rose from an average of some 57,000 tonnes per annum in 1961—65 to nearly 126,000 tonnes in 1981—85. In other words, the export growth was as high as 120 per cent in a period of 25 years. On the other hand, India's relative share in world trade of pepper slipped from a virtual monopoly position in the 1940s to nearly 34 per cent in 1961—65; to 24 per cent in

1971—75; and to 20 per cent in 1981—85. The export growth in Brazil during 1961—85 was something fantastic. What was loss to India, more or less that was gain to Brazil. Indonesia and Malaysia could somehow manage to retain their respective shares of around 30 per cent each upto 1976—80 but thereafter failed to maintain their share due to crisis in production and consequent, lack of surplus available for export. Eventhough India was losing her share in export front due to increase in the volume of world export of pepper, this country was continuing to trade an average of 22,000 tonnes per annum in international markets between 1961 and 1985 (Table 4).

TABLE 4—TRENDS IN WORLD EXPORT OF PEPPER

	Average export ('000 tonnes/year)					
	1961—65	1966—70	1971—75	1976—80	1981—85	1986
World .. .. .	57.2	79.7	92.8	117.1	125.7	110.7
of which :						
India .. .. .	19.2 (33.6)	22.9 (28.7)	23.0 (24.0)	21.2 (18.0)	25.8 (20.5)	44.0 (39.7)
Indonesia .. .. .	18.0 (31.5)	20.5 (25.7)	21.5 (23.2)	31.4 (31.4)	35.1 (27.9)	24.5 (22.1)
Malaysia .. .. .	14.5 (25.4)	23.5 (29.5)	28.7 (30.9)	35.6 (30.4)	22.5 (17.9)	15.0 (13.6)
Brazil .. .. .	3.9 (6.8)	9.9 (12.4)	15.8 (17.0)	25.0 (21.4)	37.1 (29.5)	20.1 (18.2)

(Figures in the parenthesis express the percentage of the world).

#### EXPORT EARNINGS

Once upon a time, black pepper was considered as 'Black Gold' when this commodity was very scarce and India was the only source of supply in the world market. The importance of this spice in those days could easily be understood from the historical events that had taken place both in its home—India—as well as in other parts the world. In the words of Rosengarten "Kings sent expeditions in search of them, merchants risked life and fortune to trade in them, wars were fought over them, whole populations were enslaved, the globe was explored". For many ages pepper remained as a staple article of commerce between India and Europe and it was perhaps the only primary product which had significant economic importance as foreign exchange earner.

As has already been discussed earlier, with the change of events India lost her grip over the 'King of Spices' and it did not remain any longer as 'Black Gold' when world supply started stepping up. With the subsequent developments in new India both in the primary and industrial-cum-manufacturing sectors, the share of pepper in total export earnings of India has come down to around one per cent of the total export earnings from all sources. When we consider the groups of spices, the export earnings from pepper takes an impressive share varying from 30 to 60 per cent with the exception of a few bad years (Table 5).

TABLE 5—INDIA'S EXPORT EARNINGS FROM PEPPER IN RELATION TO TOTAL SPICES AND ALL COMMODITIES

(Rs. million)

Year	Export earnings from			Col. 2 as	Col. 2 as	Col. 3 as
	Pepper	Spices	All commodities	% of col. 3	% of col. 4	% of col. 4
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1960-61	85	164	6,602	51.8	1.2	2.5
1965-66	111	230	8,056	48.2	1.3	2.8
1970-71	152	388	15,352	39.2	0.9	2.5
1975-76	338	727	40,428	46.5	0.8	1.8
1976-77	382	760	51,732	50.2	0.7	1.5
1977-78	490	1,400	53,751	35.0	0.9	2.6
1978-79	280	1,550	57,250	18.1	0.5	2.7
1979-80	335	1,217	59,990	27.5	0.5	2.0
1980-81	387	930	67,107	41.6	0.6	1.4
1981-82	284	925	78,059	30.7	0.3	1.2
1982-83	294	929	88,034	31.6	0.3	1.0
1983-84	413	1,116	97,707	37.0	0.4	1.1
1984-85	605	2,090	1,17,437	28.9	0.5	1.7
1985-86	1,725	2,825	1,10,120	61.1	1.5	2.5

Export statistics reveal that despite stagnation in the volume of Indian pepper export for at least, 25 years until 1986, the export earnings from this commodity has shown a positive growth obviously due to steady rise in the unit value realisation. In 1960-61 the export earnings from pepper was of the order of Rs. 85 million. It was Rs. 152 million in 1970-71 when the unit value went up to Rs. 8.50 per kg. in that year from Rs. 5 in 1960-61. The year 1977-78 was a remarkable year in the Indian pepper history when unit value steadily rose to Rs. 20.10 per kg. and export earning rose to a new

high of between Rs. 490 million and Rs. 500 million (Das., 1985).

Thereafter with a declining trend of unit value realisation, the export earnings for India also followed similar trend as there was no growth in the volume of export. From 1984-85 the trend was reversed with the sharp increase in the unit value and India had an impressive Rs. 605 million earnings in that year and Rs. 1,725 million in the following year (Table 5 and 6).

TABLE 6—TRENDS IN PRICES OF PEPPER (Rs. Kg.)

Year	Cochin market	Unit value realisation from export	New York (Malabar variety)
1970-71	6.50	8.50	9.50
1971-72	6.30	7.70	8.30
1972-73	5.30	7.20	8.80
1973-74	6.40	9.30	10.70
1974-75	10.40	13.10	15.20
1975-76	11.40	14.00	17.10
1976-77	14.40	18.60	19.20
1977-78	17.20	20.10	21.70
1978-79	17.00	18.50	16.90
1979-80	15.10	16.00	13.30
1980-81	13.60	14.80	15.50
1981-82	12.90	13.60	14.50
1982-83	12.50	13.00	44.30
1983-84	13.50	16.00	19.30
1984-85	22.70	23.80	26.30
1985-86	37.80	45.90	45.50
1986-87	48.90	N.A.	55.20

An examination of the trends in prices of pepper would suggest that the prevailing prices in local markets are closely related to the unit value realisation which in turn is closely associated with the international prices (Table 6). Pepper being export-oriented commodity its international price obviously influences the domestic market price of the producing countries. It is, however, interesting to note that per kg. price in the international market in the last three years has been rising consistently. It rose from Rs. 19.30 in 1983-84 to Rs. 26.30 in 1984-85, to Rs. 45.50 in 1985-86 and again to Rs. 55.20 in 1986-87. Similar trend also has been reflected in the domestic sector. Does it mean that we are going back to the era of 'Black Gold'? It may perhaps be prudent to pin our hopes with abundant caution.

If we go back to Tables 2, 3 and 4 we could see that world production has heavily come down from its previous level due to drastic fall in the productivity in these years, notably in Brazil, Malaysia and Indonesia. The world export has been badly affected on this account—the concerned figure declined from 133,651 tonnes in 1982 to 130,016 tonnes in 1983, to 119,530 tonnes in 1984, to 112,356 tonnes in 1985 and declined further to the level of 110,650 tonnes in 1986. The unexpected price rise in pepper could, therefore, be attributed to the severe crop loss simultaneously in three of the four major pepper producing countries with the exception of India. It is indeed, what was a loss for them was a gain for India as far as export earnings from pepper are concerned. It may be further stated here that India's unexpected gain pepper export was a cumulative effect of rise in both the unit value and volume of export during 1985 and 1986.

#### PROSPECTS

Taking into account India's recent performance in pepper sector one would certainly feel about developing a conscious strategy to bring its lost glory on a permanent footing and not as a passing phase. Before discussing on this, we may, perhaps, briefly review the factors that have contributed to the recent misfortune in competing countries in order to get an insight into the global scenario. As it appears, the problems leading to uncertainty in production in those countries are of the same nature as occasionally confronted in India. As far as the decline in pepper production in Brazil is concerned, that country had to pass through an unprecedented drought situation coupled with widespread incidence of foot-rot disease in pepper in virulent form. Most of the affected plantations need to be replanted. In the case of Indonesia, foot-rot was the major culprit followed by

adverse weather conditions manifested in excessive rainfall during the flowering stage. But in Malaysia probably things are little different. Even though the weather and entire ecosystem in Sarwak region are extremely favourable to pepper (which is evident from achieving highest level productivity in the world), the frequent wide price fluctuations, particularly during the early 1980s had a most damaging or disruptive effect on pepper production. Unlike other pepper growing areas where choices for alternative remunerative crops are limited, in Malaysia, farmers have been switching over to relatively more stable and profitable crops, such as fruits, vegetables and cocoa. There has been some sort of neglect in management besides crop substitution. In 1986, the area under pepper declined to 8,000 hectares from the level of 12,200 hectares in previous years. In other words, there was a sudden reduction of one-third of the area. The productivity too has recorded a steady fall from 4,600 kg. per hectare in 1961-65 to more 1,500 kg. per hectare in 1986, mainly due to poor management.

The prospect of Indian pepper is also very much linked with the above discussed factors, namely, weather, disease incidence and price behaviour. India was somewhat fortunate to have favourable weather, minimum disease incidence and attractive prices for pepper in the last three years. For these reasons, India's productivity and production could rise to encouraging levels. Due to prevailing high prices since 1984-85, pepper growers in Kerala have been paying considerable attention to this crop. There are indications that uptake of fertilisers has gone up, plant protection measures have been scrupulously followed and many of them have gone for replanting as well as new planting. The performance in 1986 could largely be attributed to management level.

It is also reasonable to expect similar behaviour from the pepper growers all over the world (including Malaysia) in the wake of favourable prices, provided weather remained merciful. In that situation, one would expect a very high level of world production and supply of this commodity in coming seasons. It is, therefore, not unrealistic to think that production in excess of the global demand can result in crash in pepper prices. Moreover, being only a minor ingredient in culinary sector, pepper is relatively both price and income inelastic. Hence, while making any strategy for India's pepper development, one must be vigilant about the programmes of the competing partners.

At present, the global demand for this spice veers around 130,000 tonnes annually worth Rs. 2,000 million. There are five major importers whose net imports exceeds 5000 tonnes a year. They are : the USA (32,700 tonnes), USSR (13,500 tonnes), West Germany (11,6000 tonnes), France (8,000 tonnes), Japan (5,200 tonnes) and UK (5,100 tonnes). The FAO has made a projection of world pepper demand at 1,62,000 tonnes in 1995, assuming a growth rate of 1.7 per cent per annum. We may anticipate 105,000 tonnes supply from other pepper growing countries—96,000 tonnes from the three major suppliers and 10,000 tonnes from several others including Srilanka, Thailand, Kampuchea and Papua New Guine. India should strive to corner the remaining 56,000 tonnes of world trade in pepper. Considering an internal demand for 13,000 tonnes the total production in India has to be planned around 69,000 to 70,000 tonnes by 1995.

At this stage, one may bear in mind that when the producing countries will be in a position to overcome the demand shortfalls, the price will be levelled up to its normal trend. We can, therefore, not expect that the prevailing higher prices will rule indefinitely. In order to succeed in the long run Indian pepper has no other option than to become cost effective through higher productivity. Keeping this in view, we may now identify the constraints and see whether the actions initiated are on the right path or not.

#### CONSTRAINTS

The following are the major constraints :

1. *Backyard farming*—Due to the very low land-man ratio, pure pepper plantations are becoming rare in Kerala. This spice is now mostly grown as a backyard crop along with several other crop species, such as, mango, jack fruit, sapota, tamarind, areca-nut and coconut which serve as the standard for pepper vines to trail. But improper spacings and overcrowding of crop species do not provide desirable environment for pepper and other crops to express their potentiality as nutritional and physiological stresses become limiting factors.

2. *Inadequate management*—Pepper is now grown under sheer neglect. Extensive growing prevails here. This system is characterised by low inputs. As could be seen, the unproductive nodes are not removed by pruning, timely and adequate manuring and mulching are not practised and plant protection measures are not followed. This is mainly due to the fact that the small holders have taken plantation crops as part-time farming for supplementary ear-

nings and their major interest is somewhere else. Unavailability of farm labour during peak seasons of operation and extremely high wage rate in Kerala also give rise to least management of their garden crops.

3. *Price instability*—Since pepper is an export-oriented crop its price in local markets is influenced to a great extent by prices in the international market. The supply volatility in the world trade is the major cause for price instability and a perennial crop like pepper suffers very badly in situation of uncertainty as the small holders are characteristically not risk-takers.

4. *Lack of replanting*—Pepper needs replanting after 15 years, but most of the gardens exist with very old plantations full of senile and uneconomic vines. Most of the gardens are seen to have lost as high as 50 per cent of vines either due to diseases, disorders or nutritional deficiencies over a period of time. But these gaps are not filled in time because of want of resources. The unavailability of adequate institutional finance on easy terms is the major constraint limiting replanting.

5. *Live standards*—In a pure plantation or even in a mixed cropping system pepper needs support to grow as it is a creeper. The commonly used standards or support for pepper in Kerala is *Erythrina indica*, locally known as 'Murukku'—a fast growing shade plant. However, the live standards pose a serious problem by becoming host to nematodes. They also take out a share from available plant nutrients that is meant for pepper. While the dead standards are ideal for use in pepper but their prohibitive cost discourages small holders.

6. *Poor soil health*—Pepper performs well under humus rich virgin soils but it is impossible to get such soil now in Kerala for this crop. The undulating, rolling lands left without proper terracing or other soil conservation measures have made Kerala soils devoid of nutrients because of high rainfall and consequent runoff. Without adequate manuring, one can not expect a reasonably good crop. Lack of application of fertilisers and mulch in pepper gardens has worsened the situation still further.

7. *Yield barrier*—This is one of the major limiting factor in pepper production as none of the popularly grown cultivars in India is a high yielder. Panniyur-I, a hybrid is the only high-yielding pepper available now and it gives two to four times higher yield than the local cultivars, depending upon the management level. But it has very limited coverage as it does not

perform well under heavy shade cast by other crop species in the homestead.

8. *Disease and pest problem*—In pepper gardens of Kerala the diseases, such as, 'quick wilt' and 'slow wilt', and nematodes pose serious problem as none of the cultivars including hybrid Panniyur-I is resistant or tolerant to these diseases and nematodes. Flea beetle or 'Pollu', a major pest of pepper causes considerable damage to the crop. The grubs of the cerambycid beetles also cause death of pepper vines by tunnelling.

9. *Lack of competitiveness*—In the international trade of spices, price comes as the first consideration and then comes quality. Malabar pepper, even though considered the best in certain important quality attributes or organoleptic characters, such as, aroma, flavour and pungency, on price front, it has become non-competitive as the overseas importers find it quite expensive compared to the prices quoted by the other countries.

10. *Poor services*—It is not unusual to hear complaints from importers about the poor services rendered by some of the Indian exporters. These complaints are of wide and varied nature, but the complaints, such as, despatch of goods not in conformity with the samples upon which sale had been concluded; non-adherence to delivery schedules and non-payment of commission in time have tended to loose confidence and thereby affected export prospects. The quality retail packaging materials, such as, extruded aluminium tin, moulded plastics are very expensive here. Though glass packs are cost effective, they again require strong durable cartons for shipping and handling.

#### RESEARCH AND DEVELOPMENT STRATEGIES

Indian black pepper is now set for high-tech future. On the research side the efforts are on the way to evolve cultivars hybrids of high-yielding characters; resistant or tolerant to drought, diseases and pests as also superior in quality attributes like high oil and oleoresin contents. At National Research Centre for Spices (a sister Institute of Central Plantation Crops Research Institute) a breeding programme involving inter-cultivar hybridisation, clonal multiplication of hybrids followed by screening for resistance to quick wilt and nematodes has yielded useful results. The first batch of 22 hybrid lines are now undergoing yield evaluation. In order to solve a major problem of meeting the growing demand for quality planting materials for new planting as well as replanting, an efficient method for rapid multiplication of pepper rooted cutting has been standard-

ised. This method is superior over the conventional method as it gives 1 : 40 multiplication/year, costs less and gives over 95 per cent field establishment. Field studies have revealed that Karimunda variety performs better under shaded condition, while Panniyur-I has a tendency for excessive vegetative growth, poor spiking and poor berry setting under such environment. Another field trial to compare the performance of pepper on non-living and living standards has shown that the former results in about two-fold yield of that obtained on the latter, and the additional yield of a few years is adequate to compensate for the initial high investment on non-living supports. A systemic fungicide Metalaxyl at 500 ppm was found to control quick wilt. Spraying of Endosulfan (0.05%) twice (during June/July and Sept./Oct.) has been found very effective in controlling pollu beetle. Similarly, the application of Phorate 10G at the rate of 3 gm a.i. per vine per year has been found to check the nematode population to a very large extent (Bavappa, 1986).

The Directorate of Cocoa, Arecanut and Spices Development, Ministry of Agriculture, Government of India has launched several Centrally assisted programmes in both the conventional and non-conventional areas in the country for increasing the productivity and production of this spice. They include : new planting and replanting of elite varieties through the supply of rooted cuttings fertilisers and subsidies, rejuvenation of existing gardens and laying out demonstration and minikit trials.

The Spices Board has also initiated action on several programmes, particularly for improving post-harvest technology in collaboration with the concerned institutions. These programmes are : assessing the pesticide residues on the finished products, arresting bacteriological contamination in ground pepper by irradiation within safe limit; setting up of pilot plants and proto-types for cleaning, washing, drying and grading of pepper so that aflatoxin and other microflora contamination could be easily eliminated; undertaking self-life studies of spices in various flexible packaging materials and evaluating bulk packing containisation systems, and processing of pepper for better appearance without the application of mineral oils. The collaborating agencies are notably, Central Food Technology Research Institute (CFTRI), Bhaba Atomic Research Centre (BARC), National Research Centre for Spices (NRCS) and Indian Institute of Packaging (IIP).

Problem areas are no doubt many. However, our present strategies are adequate to mitigate

the challenges, provided they are sincerely implemented. If we want to take full advantage of high-tech future, the R & D efforts in product diversification backed by market promotion activities need

to be strengthened. This will ensure price stabilisation — a necessary condition for healthy growth of pepper industry.

#### REFERENCES

- Bavappa, K.V.A. (1986), Research at CPCRI. Central Plantation Crops Research Institute, Kasaragod-32-34.
- Das, P.K. (1980), Pepper Marketing Problems and Prospects. *PLACROSYM-III*. 324-342.
- Das, P.K. (1984), Trends in the Production and Trade of Pepper. *PLACROSYM VI*. Oxford & IBH. 409-418.
- Das, P.K. (1985), Cost-benefit Analysis of Pepper Cultivation in Kerala under Ideal Management. *Agri. Situation in India*. 40(5) : 397-400.
- Milbrun, W. (1925), *Oriental Commerce*. Black, Parry & Co. London.
- Purseglove, J.W. *et al*' (1981), *Spices*. Tropical Agricultural Series, Longman, London, Vol. I : 10-99.
- Rosengarten, F. (1969), *The Book of Spices*. Livingston Pub. Co.
- Tian Ju-K'ang (1982), China and Pepper Trade. *Hemisphere*. 220-222.

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