

Black Pepper

A Commodity Profile

ICAR Network Project on Market Intelligence



Department of Agricultural Economics
Kerala Agricultural University
Thrissur, Kerala



Prepared by

K. Jesy Thomas, Anil Kuruvila, Chitra Parayil, Jayasree K. and Arsha Balakrishnan

© 2014, Kerala Agricultural University

Published in

April 2014

Printed at

Lumiere Printing Works, Thrissur



809307

11 2014

Dr. K. Jesy Thomas is Professor and Head of the Department of Agricultural Economics at College of Horticulture, Vellanikkara, Kerala Agricultural University, Thrissur, Kerala - 680 656. email: k.jessythomas@kau.in

Dr. Anil Kuruvila is Associate Professor in Agricultural Economics at College of Agriculture, Padannakkad, Kerala Agricultural University, Kasaragod, Kerala - 671 314. email: akuruvila@gmail.com

Dr. Chitra Parayil is Assistant Professor in Agricultural Economics at Regional Agricultural Research Station, Pattambi, Kerala Agricultural University, Palakkad, Kerala - 679 306. email: parayilchitra@gmail.com

Jayasree K. is Senior Research Fellow in the Department of Agricultural Economics at College of Horticulture, Vellanikkara, Kerala Agricultural University, Thrissur, Kerala - 680 656. email: jaysrie@gmail.com

Arsha Balakrishnan is Senior Research Fellow in the Department of Agricultural Economics at College of Horticulture, Vellanikkara, Kerala Agricultural University, Thrissur, Kerala -680 656. email: arshab30@gmail.com

Contents

Preface	i
Acknowledgement	ii
List of Tables	iii
List of Figures	iv
List of Annexures	iv
Executive Summary	v
1 Introduction	1
1.1 Location and Physical features	1
1.2 Climate and Rainfall	1
1.3 Irrigation	2
1.4 Land use pattern and Operational Holdings	3
2 Cropping Pattern	5
3 Fertilizer consumption	8
4 Agricultural Marketing	9
4.1 State Government Organizations	9
4.1.1 Vegetable and Fruit Promotion Council Keralam	9
4.1.2 Kerala State Horticultural Products Development Corporation Limited	9
4.1.3 Kerala Kerakarshaka Sahakarana Federation	9
4.1.4 Kerala State Co-operative Rubber Marketing Federation Limited	10
4.1.5 Kerala State Co-operative Marketing Federation	10
4.1.6 Kerala Agro Industries Corporation Limited	10
4.1.7 Kerala State Warehousing Corporation	10
4.1.8 Oil palm India Limited	11
4.1.9 Plantation Corporation of Kerala	11
4.2 Commodity Boards	11
5 Black Pepper	12
5.1 Introduction	12
5.2 Global Scenario	12
5.3 Indian Scenario	15
5.4 State-wise Scenario	16
5.5 District-wise Scenario	17
5.6 Climatic and Soil Requirements of Black Pepper	18
5.7 Black Pepper Production Systems in India	18
5.8 Reasons for lower productivity of Black Pepper in India	19

5.9	Major technological breakthroughs	19
5.10	Schemes for Black Pepper	21
5.10.1	Schemes funded by Government and other Agencies	21
5.10.1.1	Scheme for “Pepper Development”	21
5.10.1.2	Development programmes funded by National Horticulture Mission	22
5.10.2	Schemes funded by the Spices Board	22
5.10.2.1	Project on Improving Production and Productivity of Pepper in Idukki	22
5.10.2.2	Export Development and Promotion of spices through “Promotion of Indian spice brands abroad”	22
5.10.2.3	Export Development and Promotion of Spices through “Infrastructure Development”	23
5.11	Harvesting and Post Harvest Management	24
5.12	Value added products	25
5.13	Marketing of Black Pepper	26
5.13.1	Futures Trading in Black Pepper	28
5.14	Price Behaviour of Black Pepper	29
5.14.1	Decomposition of Time Series Components of Black Pepper Prices	30
5.14.1.1	Trend	30
5.14.1.2	Seasonality	31
5.14.1.3	Cyclical Variation	31
5.14.1.4	Irregular Variation	31
5.15	International Trade in Black Pepper	32
5.15.1	Export Orientation of Black Pepper	32
5.15.2	Quality Aspects for Trade	34
6	Conclusion	36
7	References	36
8	Annexures	37

Preface

The trade liberalization policies have brought challenges as well as opportunities for Indian agriculture as it has increased integration with the world market. The Liberalization-Privatisation-Globalisation policies have shifted risk from the government to the farm households. In such a dynamic environment, market intelligence is of utmost importance not only in decision making but also for assuring remunerative prices for the commodities produced by the farmers.

The Agricultural Market Intelligence Centre (AMIC) of Kerala Agricultural University is functioning in the Department of Agricultural Economics, College of Horticulture, Vellanikkara, Thrissur as part of the “Network Project on Market Intelligence” funded by ICAR with National Centre for Agricultural Economics and Policy Research (NCAP), New Delhi as the lead centre. The primary objectives of this project are to provide short term price forecasts to farmers for selected agricultural commodities for effective decision making and to conduct regional case studies on price movements, marketing infrastructure and farmers’ decision making. The Kerala Agricultural University is one of the 17 collaborating centres of the Project in the country. The mandate crops for the KAU centre are black pepper, coconut and tapioca.

The centre is coming out with a publication “Black Pepper-A Commodity Profile”, the first in the series. It gives a bird’s eye-view on the agricultural scenario in the state of Kerala. It also covers in detail the importance of black pepper from a national and global perspective, the marketing behaviour, trade aspects and the price behaviour.

We hope this publication would be useful for researchers, developmental experts, extension agencies and training personnel working on black pepper and related issues in the country.

Authors

Acknowledgement

The Network Project on Market Intelligence was made possible by funding from the Indian Council for Agricultural Research under the aegis of which this publication is made. The authors would like to thank ICAR and the lead centre, the National Centre for Agricultural Economics and Policy Research, New Delhi for enabling a publication of this kind. The technical guidance provided by Dr. Ramesh Chand, Director, NCAP, Dr. Raka Saxena, the Principal Investigator and other scientists at the lead centre of the project is gratefully acknowledged. The authors are grateful to Kerala Agricultural University for granting permission to take up the research project.

The authors are responsible for any errors of fact or interpretation in this publication.

List of Tables

1	Agro-Climatic Regions of Kerala	2
2	Source-wise Net Irrigated Area in Kerala	3
3	Land Use Pattern of Kerala	4
4	Status of Operational Holdings in Kerala	5
5	Dynamics in share of Area under Different crops in Gross Cropped Area	5
6	Area, Production and Productivity of Major Crops in Kerala	6
7	Cropping Systems of Kerala	7
8	Consumption of Fertilizers in Kerala	8
9	Country-wise area under Black Pepper	12
10	Global Production and Exports of Black Pepper	13
11	Area, Production and Productivity of Black Pepper in India	16
12	Scenario of Black Pepper in Major Producing States	16
13	Value of Output of Black Pepper in India	17
14	District-wise Area of Black Pepper in Kerala	18
15	Climatic and Soil Requirements of Black Pepper	18
16	Important Cultivars of Black Pepper and their Characteristic features	19
17	Improved Varieties of Black Pepper and their Characteristic features	20
18	Financial Outlay for the Scheme on Pepper Development	21
19	Cost of Cultivation of Black Pepper in Kerala	23
20	Details of Black Pepper Traded in Futures Market	28
21	Export Intensity of Production of Black Pepper in India	33
22	Export of Black Pepper from India	33
23	Changing Share of Countries in Black Pepper Exports from India	35

List of Figures

1	Country-wise area under Black Pepper	13
2	Country-wise production of Black Pepper	14
3	Country-wise export of Black Pepper	15
4	Trends in area, production and productivity of Black Pepper in India	15
5	Crop Calendar for Black Pepper in Kerala	25
6	Marketing Channel of Black Pepper	27
7	Behaviour of monthly prices of Black Pepper in Indian Rupees	29
8	Behaviour of monthly prices of Black Pepper in US Dollar	29
9	Trend analysis of black pepper prices	30
10	Seasonal variations in Black Pepper prices in Kochi Market	31
11	Cyclical variations in Black Pepper prices in Kochi Market	31
12	Irregular variations in Black Pepper prices in Kochi Market	32
13	Changing share of Black Pepper exports from India in World Exports	32
14	Export of Black Pepper from India	33

List of Annexures

1	Area, Production and Productivity of Black Pepper in India	38
2	Exports of Black Pepper from India	39

Executive Summary

The state of Kerala is characterised by the cultivation of trade dependent crops which are either export oriented or import substituting. The liberalization of agricultural sector in the country has increased the integration with the world market prices. India is the third largest producer and fourth largest exporter of black pepper, the 'King of Spices'. The country is also a major consumer of black pepper in the world. Until 1990, till the emergence of Vietnam as the prime producer and exporter, India occupied the top position in production and export of black pepper. This profile on black pepper traces the dynamics of the agricultural economy in the state of Kerala and the importance of black pepper from a national and global perspective, production, marketing, trade, institutional support and price behaviour of black pepper.

1. Introduction

Kerala, 'the God's own country', is known for its lush green landscape, forest cover, abundant water bodies and long coastline. The agricultural sector contributed 8.95 per cent of the Gross State Domestic Product in 2012-13. The share has been falling steadily over the years and there had been negative growth in this sector in all the years of the XIth Plan except in 2008-09. However, this sector is very significant from the point of view of rural livelihood options, food security, raw material for the food processing industries and exports. It is the agricultural sector which gives character to the state and various initiatives have been taken to promote the agricultural and allied sectors of Kerala.

1.1 Location and Physical features

The state of Kerala with a total geographical area of 38,863 sq. km, accounts for about 1.18 per cent of the geographical area of the country. Kerala lies within 74° 52' and 72° 22' East longitudes and 8°18' and 12° 48' North latitudes, and has an undulating topography with plain lands, valleys and hills. The Western Ghats, which forms the eastern part of the state, rise from a very low altitude of few hundred meters up to 2000 m on an average. There are mainly three broad physiographic divisions in the state, viz., the high lands, mid lands and low lands. The low land is adjacent to the coast and extends up to an altitude of 7.5 m above MSL. The high land is on the eastern part consisting of hills and mountains of the Western Ghats and it extends from 75 m above MSL and beyond. In between the high lands and the low lands is the mid land having an undulating topography which extends from 7.5 to 75 m above MSL.

1.2 Climate and Rainfall

Kerala lies in the humid tropical climatic region, where the main climatic factor is the rainfall. The average annual rainfall of the state is 3000 mm, 65 to 70 per cent of which is received during South West monsoon (June-September), 18 to 22 per cent during North East monsoon (October-December) and the remaining as pre-monsoon showers. The average temperature of the state varies between 21°C and 33°C. The agro-climatic regions of the state are presented in Table 1. There are five agro-climatic regions in the state and there is a zonal research station in each region. Coconut, pepper and tapioca are grown in all these regions. The northern zone accounts for about 10.57 lakh hectares followed by the high altitude region covering an area of 9.17 lakh hectares.

Table 1 Agro-Climatic Regions of Kerala

Agro-climatic Zone	Area in hectares	Districts	Major Soil Types	Suitable Crops
Northern Zone KE-1	1057350	Malappuram, Kozhikode, Kannur and Kasaragod	Laterite Sandy soil	Rice, Coconut, Banana, Tapioca, Cashew, Pepper , Sesamum, Rubber, Ginger, Mango, Jackfruit, Cocoa, Cardamom, Vegetables
Southern Zone KE-2	665455	Thiruvananthapuram, Kollam, Pathanamthitta, Alappuzha and Kottayam	Laterite Sandy loam Alluvial soil	Rice, Coconut, Banana, Tapioca, Cashew, Pepper , Sesamum, Rubber, Ginger, Mango, Jackfruit, Cocoa, Cardamom, Vegetables
Central Zone KE-3	759675	Palakkad, Thrissur and Emakulam excluding the high ranges	Laterite Sandy loam Alluvial soil Black soil	Rice, Coconut, Banana, Tapioca, Cashew, Pepper , Sesamum, Rubber, Ginger, Mango, Jackfruit, Cocoa, Vegetables
High Altitude Zone KE-4	917050	Wayanad, Idukki and high ranges of Palakkad, Kollam and Thiruvananthapuram	Laterite Loamy soil	Rice, Pulses, Sugarcane, Palmyra, Pepper , Cardamom, Arecanut, Cashew, Banana, Tapioca, Coconut, Rubber, Mango
Problem Areas Zone KE-5	478350	Onattukara, Pokkali and Kole lands	Alluvial soil	Rice, Tapioca, Pepper , Banana, Mango, Jackfruit, Sesamum, Coconut, Sugarcane

Source: Package of Practices and Recommendations, Kerala Agricultural University, 2011

1.3 Irrigation

Rivers of varying lengths and widths and their tributaries constitute the drainage system of the state. Out of the 44 rivers, 41 originate from the Western Ghats and flow towards the west and drains to the Arabian sea, while three of them originate from Western Ghats within Kerala and join the Bay of Bengal. The longest river is the Bharathapuzha and has a length of about 374.4 km. Most of the rain water received in Kerala during monsoon period flows to sea within 48 hours of rainfall because of the characteristic geographic terrain of the state. Private wells are the major source of irrigation in Kerala accounting for about one-third of the net irrigated area while the source of irrigation for about 20 per cent of the net irrigated area is government canals (Table 2).

Table 2 Source-wise Net Irrigated Area in Kerala (2011-12)

Source of Irrigation	Area in hectares	Percentage share in Net Irrigated Area
Government Canal	81737	19.99
Private Canal	1971	0.48
Government Tanks	1724	0.42
Private Tanks	45388	11.10
Government wells	265	0.06
Private wells	136928	33.49
Minor irrigation	9220	2.25
Other sources	106613	26.07
Tube wells	25068	6.13
Total	408914	100.00

Source: Agricultural Statistics, 2011-12, Department of Economics and Statistics, Government of Kerala

1.4 Land use pattern and Operational Holdings

In TE 2011-12, the gross cropped area in Kerala constituted about 68 per cent of the total geographical area and it has declined by more than 3.5 lakh hectares between TE 2001-02 and TE 2011-12 which was contributed by decline in both the net area sown and area sown more than once (Table 3). The land put to non-agricultural uses has shown a continuously increasing pattern over the years and was 9.92 per cent in the TE 2011-12. A drastic increase in fallow land other than current fallow could be observed especially between TE 2001-02 and 2011-12. Current fallow in the state increased from 1.13 per cent in TE 1981-82 to 1.96 per cent in 2011-12. The cropping intensity in Kerala exhibited an increasing pattern from 131.7 per cent in TE 1981-82 to 135.9 per cent in TE 2000-01, which subsequently decreased to 128.9 per cent in TE 2011-12.

More than 96 per cent of the operational holdings in the state are in the category of marginal holdings and with the exception of all other categories, the holdings in this size-class alone have increased while all others have decreased. These marginal holdings operate only about 59 per cent of the total area operated in the state resulting in an average marginal holding size of 0.13 ha (Table 4). The average holding size of all the holdings in the state was as low as 0.22 ha in 2010-11.

Table 3 Land Use Pattern of Kerala (in hectares)

Category/Particulars	TE 1981-82	TE 1991-92	TE 2001-02	TE 2011-12
Total Geographical Area	3885497 (100.00)	3885497 (100.00)	3885497 (100.00)	3885497 (100.00)
Forests	1081509 (27.83)	1081509 (27.83)	1081509 (27.83)	1081509 (27.83)
Land put to non-agricultural uses	266591 (6.86)	294560 (7.58)	376205 (9.68)	385335 (9.92)
Barren and uncultivable land	83186 (2.14)	59803 (1.54)	29310 (0.75)	19724 (0.51)
Permanent pastures and other grazing land	5475 (0.14)	2204 (0.06)	217 (0.01)	155 (0.004)
Land under miscellaneous tree crops	61521 (1.58)	35592 (0.92)	15846 (0.41)	3826 (0.10)
Cultivable waste	128084 (3.30)	98269 (2.53)	60436 (1.56)	95035 (2.45)
Fallow land other than current fallow	27132 (0.70)	26589 (0.68)	33486 (0.86)	51662 (1.33)
Current Fallow	43807 (1.13)	44688 (1.15)	76430 (1.97)	76676 (1.97)
Net Area Sown	2188176 (56.32)	2242291 (57.71)	2212060 (56.93)	2063451 (53.10)
Area sown more than once	693208 (17.84)	777735 (20.02)	793153 (20.41)	595847 (15.33)
Gross Cropped area	2881384 (74.16)	3020027 (77.73)	3005213 (77.34)	2659299 (68.43)
Cropping Intensity	131.7	134.7	135.9	128.9

Source: Statistics for Planning and Agricultural Statistics, 2011-12, Department of Economics & Statistics, Government of Kerala.

Note: 1. Figures in parentheses denote per cent to total geographical area

2. For the TE 2011-12 alone, newly included categories of land use namely marshy land, still water, waterlogged area and social forestry account for 0.01, 2.67, 0.08 and 0.07 per cent of the total geographical area respectively

Table 4 Status of Operational Holdings in Kerala

Size Class (Hectares)	Number		Area (Hectare)		Average Size of Holding (Hectare)	
	2005-06	2010-11	2005-06	2010-11	2005-06	2010-11
Below 1.00	6602443 (95.6)	6579692 (96.3)	895786 (57.6)	885644 (58.6)	0.14	0.13
1.00 - 1.99	214832 (3.1)	180171 (2.6)	284820 (18.3)	282305 (18.7)	1.33	1.57
2.00 - 3.99	69710 (1.0)	57028 (0.8)	178574 (11.5)	159075 (10.5)	2.56	2.79
4.00 to 9.99	14858 (0.22)	12044 (0.18)	78757 (5.07)	64063 (4.24)	5.3	5.32
10.00 and above	2449 (0.04)	1854 (0.03)	116889 (7.52)	119729 (7.92)	47.73	64.58
All Sizes	6904292 (100.0)	6830789 (100.0)	1554826 (100.0)	1510816 (100.0)	0.23	0.22

Note: Figures in parentheses denote per cent to column total

2. Cropping Pattern

The dynamics in the cropping pattern of the state is presented in Table 5.

Table 5 Dynamics in share of Area under different crops in Gross Cropped Area

Crop	TE	Share in	TE	Share in	TE	Share in	TE	Share in
	1981-82	GCA(%)	1991-92	GCA(%)	2001-02	GCA(%)	2011-12	GCA(%)
Paddy	800605	27.8	561400	18.6	339866	11.3	218453	8.2
Coconut	660215	22.9	855100	28.3	918845	30.6	789986	29.7
Arecanut	61117	2.1	63800	2.1	87498	2.9	101190	3.8
Tapioca	245607	8.5	149500	5.0	112573	3.7	73879	2.8
Pepper	107377	3.7	171233	5.7	201498	6.7	143002	5.4
Cardamom	54160	1.9	55280	1.8	41372	1.4	41478	1.6
Cashew	140385	4.9	116800	3.9	90414	3.0	48957	1.8
Banana & Plantains	49603	1.7	63833	2.1	99255	3.3	104898	3.9
Pineapple	5534	0.2	4700	0.2	10445	0.3	9658	0.4
Mango	60654	2.1	74867	2.5	89116	3.0	67163	2.5
Jack fruit	60568	2.1	70533	2.3	75878	2.5	81223	3.1
Tea	35852	1.2	34567	1.1	36180	1.2	36946	1.4
Coffee	57949	2.0	78067	2.6	84556	2.8	85029	3.2
Cocoa	22375	0.8	11567	0.4	8602	0.3	12455	0.5
Rubber	230337	8.0	417400	13.8	474101	15.8	671665	25.3
Gross Cropped Area	2881384	100.0	3020027	100.0	3005213	100.0	2659299	100.0

Note: TE denotes Triennium Ending averages of area in hectares, GCA denotes Gross Cropped Area

Kerala is characterized by the cultivation of many perennial crops like coconut, arecanut, cashew, black pepper, rubber, tea, coffee, cardamom, clove, nutmeg, cinnamon, cocoa, mango, jack, tamarind and papaya, the majority of which are either export oriented or import substituting. The major seasonal crops grown in Kerala are paddy, pulses, tapioca, vegetables, sweet potato, tubers, groundnut, ginger, turmeric, etc., while the annual crops grown in the state include sugarcane, banana, plantain, pineapple, betel leaves, etc.

The Gross Cropped Area (GCA) in the state increased from 28.8 lakh ha in TE 1981-82 to 30.2 lakh ha in TE 1991-92, which showed a drastic decline to 26.6 lakh ha in TE 2011-12 (Table 5). Coconut alone accounted for about 30 per cent of the GCA followed by rubber accounting for about 25 per cent of the GCA. About 70 per cent of the GCA was accounted by four crops viz., rubber, coconut, paddy and black pepper. The area under paddy has declined substantially from about 8 lakh ha in TE 1981-82 to 2.2 lakh ha in TE 2011-12 and decline in the share of paddy in the GCA during the corresponding period was from 27.8 per cent to 8.2 per cent. There was a three-fold increase in area as well as share of rubber in the GCA from the TE 1981-82 to TE 2011-12. Between the TE 2001-02 and TE 2011-12, the area under rubber increased by about 2 lakh ha and the crops which lost the acreage to rubber were paddy, coconut, tapioca and pepper. In all the trienniums under consideration, arecanut, banana and jack fruit have shown an increasing trend. The area, production and productivity of major crops of Kerala in the TE 2011-12 are presented Table 6.

Table 6 Area, Production and Productivity of Major Crops in Kerala (TE 2011-12)

Crop	Area (Hectares)	Production (Tonnes)	Productivity (Kilogram/Hectare)
Paddy **	218453	563356	2581
Coconut *	789986	5632	7126
Arecanut	101190	112765	1114
Tapioca	73879	2493915	33752
Pepper	143002	41742	317
Cardamom	41478	8652	209
Banana	56338	467988	8290
Cashew	48957	35771	735
Tea	36946	57668	1561
Coffee	85029	64358	757
Rubber	622913	771690	1252

Note: ** Paddy production in terms of rice and *coconut production and productivity as million nuts and nuts per hectare respectively

Table 7 Cropping Systems of Kerala

Cropping System	Sequence/Combination of crops
Coconut Based System	Coconut + Pepper +Banana Coconut + Pepper + Tuber Crops Coconut + Pepper + Tuber Crops +Banana Coconut + Tuber Crops
Rice Based System	Rice - Rice - Fallow Rice - Rice -Vegetables Rice - Rice -Pulses Rice - Tapioca Rice - Rice -Sesamum Rice - Rice - Green manure
Rubber Based System	Rubber (Immature phase) + Banana Rubber (Immature phase) + Pineapple Rubber + Cover crops
Coffee based System	Coffee + Ginger Coffee + Pepper Coffee + Cardamom + Pepper
Arecanut Based System	Arecanut + Pepper Arecanut + Tuber Crops
Banana Based Sytem	Banana + Vegetables Banana + Tuber Crops

The major cropping system of Kerala is coconut based (Table 7). Kerala is characterised by homestead cultivation with multiple or mixed cropping having different crop combinations. In coconut based system, crops like pepper are trailed on coconut trees and tuber crops and banana are grown as intercrops in coconut gardens utilising the light and space effectively. In rice based cropping system, vegetables, pulses, tapioca, sesamum and green manure are grown in sequence or the land is left fallow for one season. Because of the increase in area under rubber, the rubber based cropping system with intercrops like pineapple and banana in the immature phase of rubber is widely followed in the state in the recent past. In the coffee based system, pepper is grown on shade trees with ginger and cardamom as intercrops. The other cropping systems are either arecanut or banana based cropping systems.

3. Fertilizer consumption

The details of fertilizer consumption in the state in different trienniums are presented in Table 8. The share of nitrogen in total fertilizer consumption increased from 37 per cent in TE 1991-92 to 48 per cent in TE 2011-12. While the share of phosphorus in total fertiliser consumption declined and then remained constant, that of potash was found to decline continuously in different trienniums. The per hectare consumption of fertilisers increased for nitrogen while it decreased and then increased for phosphorus, potash and the total. The per hectare consumption of total fertiliser in Kerala was 92 kg per hectare in TE 2011-12.

Table 8 Consumption of Fertilizers in Kerala

Nutrient/ Triennium	Nitrogen (N)	Phosphorous (P ₂ O ₅)	Potash (K ₂ O)	Total N+P+K
Total Fertilizer Consumption (Tonnes)				
TE 1991-92	85106 (37)	51260 (23)	91224 (40)	227590 (100)
TE 2001-02	79078 (42)	39604 (21)	58549 (37)	187321 (100)
TE 2011-12	127146 (48)	55454 (21)	82356 (31)	264956 (100)
Fertilizer Consumption per hectare of Gross Cropped Area (kg/ha)				
TE 1991-92	28.2 (37)	17.0 (23)	30.2 (40)	75.4 (100)
TE 2001-02	27.9 (43)	13.4 (21)	23.2 (36)	64.5 (100)
TE 2011-12	40.0 (44)	20.7 (23)	31.0 (34)	91.7 (100)

Source: Economic Review, Kerala

Note: Figures in parantheses indicate per cent to row totals

4. Agricultural Marketing in Kerala

There are no statutory regulations on marketing prevailing in Kerala as the state does not have APMC act. Government and Local Self Government institutions provide the necessary marketing infrastructure. Six wholesale agricultural markets are functioning in Kerala, three each in urban and rural areas. They are owned by the government and function under the Department of Agriculture. Out of the 1290 markets functioning in Kerala, 85 markets are functioning in the Municipal Corporation area, 129 in Municipality area and 1076 markets in Grama Panchayats respectively.

4.1 State Government Organizations

The following state level organizations are involved in procurement and marketing of agricultural commodities:

4.1.1 Vegetable and Fruit Promotion Council Keralam (VFPCCK)

It is an ISO 9001-2000 certified company registered under section 25 of Indian Companies Act 1956 and has been established to bring about overall development of fruit and vegetable sector in Kerala. The Self Help Groups (SHGs) conceptualized by the council form the base units for all the interventions like extension, rural credit, group marketing, Participatory Technology Development (PTD), value addition and exports. The primary objective of the council is to improve the livelihood of vegetable and fruit farmers by empowering them to carry on vegetable and fruit production, value addition and marketing as a profitable venture in a sustainable way. At present 175 VFPCCK farmers markets (Swasraya Karshaka Samithis) are functioning across Kerala.

4.1.2 Kerala State Horticultural Products Development Corporation Limited (HORTICORP)

Kerala State Horticultural Products Development Corporation Limited (HORTICROP) is a fully owned Government Company incorporated in the year 1989. The main activities of HORTICORP are procurement of vegetables and fruits, marketing of vegetables and fruits through retail outlets of HORTICORP, scientific storage facility, distribution of seeds and planting materials, participation in state and national agricultural exhibitions and organising fairs during festival seasons.

4.1.3 Kerala Kerakarshaka Sahakarana Federation (KERAFED)

It is the apex co-operative federation of coconut farmers in Kerala and is the largest producer of coconut oil in India. KERA brand of coconut oil is produced by

KERAFED from copra of the finest quality, directly procured from coconut growers in Kerala. The produced coconut oil is marketed through out the country as “KERA” brand of coconut oil.

4.1.4 Kerala State Co-operative Rubber Marketing Federation Limited (Rubber Mark)

The Kerala State Co-operative Rubber Marketing Federation Limited popularly known as Rubber Mark was incorporated in 1971, as an apex institution of the primary rubber marketing co-operatives in Kerala. It is a professionally managed organization of 38 member societies throughout the state of Kerala with active participation of the Rubber board and the government of Kerala. Rubber Mark is the only government agency in India which procures Natural Rubber directly from the farmers, processes and sells the processed rubber to tyre and shoe companies within India.

4.1.5 Kerala State Co-operative Marketing Federation (MARKETFED)

It was established with the prime objective of socio-economic betterment of the farming community numbering around 30 lakhs. Since its inception as an apex body for Primary Marketing Co-operative Societies in Kerala, it has been striving to provide better marketing facilities, fair prices for the produce, direct purchase of the commodities whenever required for stabilizing the commodity market, elimination of intermediaries and middlemen, uninterrupted supply of agricultural inputs at fair prices and on easy terms of payment and finally exploring and establishing export markets for traditional agricultural commodities like black pepper, cardamom, turmeric, dry ginger, cocoa, tapioca etc. With the paramount motive of welfare to the farmers, MARKETFED is now successfully handling a variety of agricultural commodities and inputs like fertilizers and pesticides.

4.1.6 Kerala Agro Industries Corporation Limited

The Kerala Agro Industries Corporation Ltd. (KAIC) is a joint venture of Government of India and Government of Kerala established in 1968. It is a premier institution in the state promoting mechanisation and modern technology in agriculture, setting up of agro based industries, production of value added products, civil construction, infrastructure development, waste management solutions etc. KAIC acts as an implementing agency for various schemes under state and central governments.

4.1.7 Kerala State Warehousing Corporation

All types of agricultural commodities and other commodities notified by the

government from time to time are accepted for storage in the warehouse. The idea behind the whole warehousing scheme is to give scientific storage to the agricultural produce and also to arrange easy credit and holding power to the agriculturists to enable them to get better price for their produce. A warehouse receipt incorporating the quantity, quality, market value and particulars of insurance against fire, theft and burglary is also issued to the depositor. The warehouse receipt is negotiable in nature and can be pledged in any bank.

4.1.8 Oil palm India Limited

Oil Palm India Limited was established with the objective of propagating oil palm cultivation in the country and more particularly in Kerala. From 1983 onwards the company started functioning as a joint venture of the Government of Kerala and Government of India. Oil Palm India Limited has got a total planted area of 3646 hectares of plantation spread over in three estates viz., Yeroor, Chithara and Kulathupuzha in Kollam district, Kerala. The crude palm oil / palmolein is produced from oil palm fruit bunches and marketed through its sales outlets.

4.1.9 Plantation Corporation of Kerala

The Plantation Corporation of Kerala Ltd, the largest plantation company in public sector was formed in 1962, by the Government of Kerala. The purpose of establishment of Plantation Corporation was to accelerate the agro-economic development of Kerala. It is producing centrifuged latex, raw cashew nuts, oil palm fresh fruit bunches, arecanut, black pepper etc. and marketing these commodities to different stakeholders.

4.2 Commodity Boards

The commodity Boards viz., Spices Board, Tea Board, Coffee Board and Coconut Development Board are involved in marketing and international trade of specific agricultural commodities.

5. Black Pepper

5.1 Introduction

Black pepper (*Piper nigrum*) the 'King of Spices' is a perennial climbing vine grown for its berries, extensively used as a spice and in medicinal preparations.

5.2 Global Scenario

The share of India in total cultivated area of black pepper in the world increased from about 42 per cent in 2001 to about 46 per cent in 2006 and it declined to 38 per cent in 2010 (Table 9).

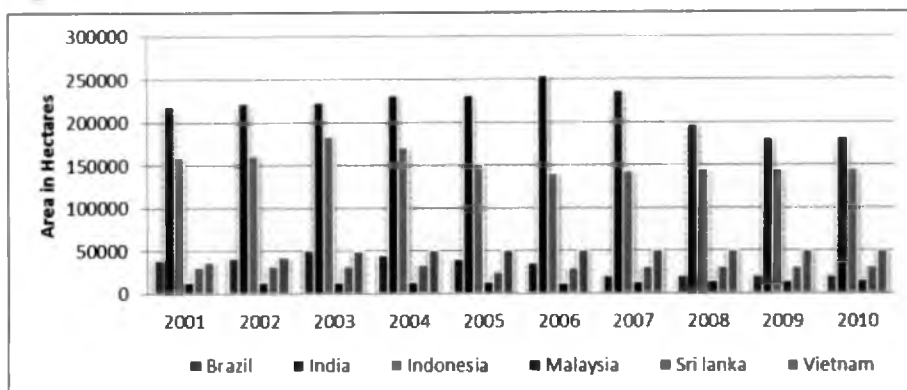
Table 9 Country-wise area under Black Pepper (in hectares)

Year	Brazil	India	Indonesia	Malaysia	Sri lanka	Vietnam	Others	World
2001	39000 (7.5)	218670 (41.8)	159884 (30.6)	13400 (2.6)	30794 (5.9)	36106 (6.9)	25,092 (4.8)	5,22,946 (100.0)
2002	41000 (7.6)	222460 (41.5)	160606 (29.9)	13100 (2.4)	31378 (5.8)	42000 (7.8)	25,890 (4.8)	5,36,434 (100.0)
2003	50000 (8.7)	223060 (38.6)	184000 (31.9)	13000 (2.3)	31970 (5.5)	48800 (8.4)	26,800 (4.6)	5,77,630 (100.0)
2004	45000 (7.9)	231880 (40.6)	171000 (29.9)	13000 (2.3)	32437 (5.7)	50000 (8.8)	27,800 (4.9)	5,71,117 (100.0)
2005	40000 (7.4)	231800 (43.1)	150000 (27.9)	12700 (2.4)	24739 (4.6)	50000 (9.3)	28,800 (5.4)	5,38,039 (100.0)
2006	35000 (6.4)	253730 (46.1)	140000 (25.5)	12235 (2.2)	29156 (5.3)	50000 (9.1)	29,800 (5.4)	5,49,921 (100.0)
2007	20000 (3.8)	236180 (45.2)	142500 (27.3)	13023 (2.5)	29976 (5.7)	50000 (9.6)	30,800 (5.9)	5,22,479 (100.0)
2008	20000 (4.1)	196297 (40.2)	145000 (29.7)	13487 (2.8)	30665 (6.3)	50000 (10.2)	32,477 (6.7)	4,87,926 (100.0)
2009	20000 (4.2)	181299 (38.3)	145000 (30.6)	13608 (2.9)	30506 (6.4)	50000 (10.6)	33,345 (7.0)	4,73,758 (100.0)
2010	20000 (4.2)	182000 (38.2)	145000 (30.4)	15000 (3.1)	30714 (6.4)	50000 (10.5)	33,800 (7.1)	4,76,514 (100.0)

Source: International Pepper Community Note: Figures in parentheses indicate per cent to column totals

With the exception of Vietnam, which exhibited an increasing share from 6.9 per cent to 10.5 per cent, the area in all major black pepper growing countries were either stagnant or exhibited a declining trend in the last decade. In spite of the reduction in world area under black pepper, the area in Vietnam increased from about 36000 ha in 2001 to 50000 ha in 2010.

Figure 1 Country-wise Area under Black Pepper



The changing share of countries in the global production and exports of black pepper is given in Table 10.

The global production of black pepper has exhibited an increasing pattern from about 1.96 lakh tonnes in TE 1992 to 3.3 lakh tonnes in TE 2012. India accounted for the highest share of 30.5 per cent of world production in TE 1992, and was closely followed by Indonesia with a share of 29.9 per cent. Even with an increase

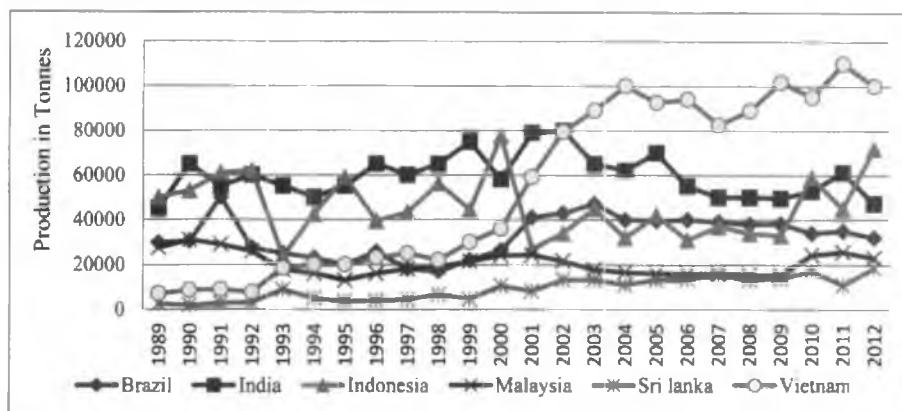
Table 10 Global Production and Exports of Black Pepper

Country/Details	Brazil	India	Indonesia	Malaysia	Srilanka	Vietnam	Others	World
Production (Tonnes)								
TE 1992	36005 (18.3)	60000 (30.5)	58667 (29.9)	28667 (14.6)	2698 (1.4)	8451 (4.3)	26469 (13.5)	196478 (100.0)
TE 2002	36795 (14.2)	72333 (28.0)	46167 (17.9)	23300 (9.0)	10765 (4.2)	58200 (22.5)	18927 (7.3)	258278 (100.0)
TE 2012	33667 (10.2)	53707 (16.2)	58667 (17.7)	24276 (7.3)	15594 (4.7)	101667 (30.7)	43067 (13.0)	330643 (100.0)
Exports (Tonnes)								
TE 1992	33756 (20.9)	24258 (15.1)	52926 (32.8)	25387 (15.8)	2265 (1.4)	15868 (9.8)	6707 (4.2)	161168 (100.0)
TE 2002	29667 (17.0)	23229 (13.3)	36237 (20.7)	22182 (12.7)	5415 (3.1)	55345 (31.7)	2725 (1.6)	174799 (100.0)
TE 2012	30849 (12.1)	20213 (7.9)	52029 (20.3)	12955 (5.1)	9263 (3.6)	117407 (45.9)	13133 (5.1)	255850 (100.0)
Exports as share of Production (%)								
TE 1992	94	40	90	89	84	188	25	82
TE 2002	81	32	78	95	50	95	14	68
TE 2012	92	38	89	53	59	115	30	77

Source: International Pepper Community Note: Figures in parantheses indicate per cent to row totals

in production of about 12,300 tonnes from TE 1992 to TE 2002, the share of India in global production declined to 28 per cent in TE 2002. With the exception of Vietnam and Sri Lanka, the share of all major pepper producing countries declined between TE 1992 and TE 2012. The increase in global production was almost accounted by Vietnam and the share of the country increased from about 4 per cent in TE 1992 to about 31 per cent in TE 2012. From 2003 onwards Vietnam became the major producer of black pepper pushing India to the second position and subsequently India drifted to third position behind Indonesia in 2010.

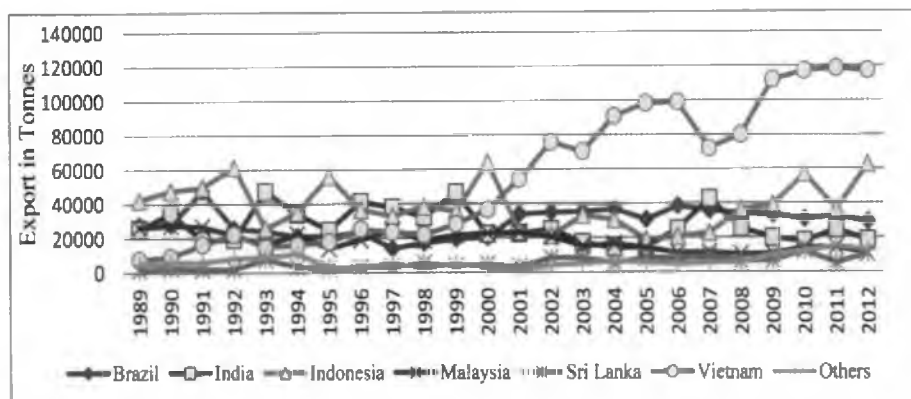
Figure 2 Country-wise Production of Black Pepper



The world exports of black pepper increased from 1.61 lakh tonnes in TE 1992 to 2.6 lakh tonnes in TE 2012. As a reflection of the pattern in production, with the exception of Vietnam and Sri Lanka, the share of all other major producing countries in world exports declined during the period from TE 1992 to TE 2012. The exports from India as a share of world exports almost halved from 15.1 per cent in TE 1992 to 7.9 per cent in TE 2012.

Vietnam has emerged as the major exporter of black pepper with a share of the country increasing by about five times from 9.8 per cent in TE 1992 to 45.1 per cent in TE 2012, while the actual quantity of exports increased by about 10 times in the above period. At present, India as an exporter of black pepper is only in the fourth position behind Vietnam, Indonesia and Brazil. While all the major exporters, with the exception of India, export more than 90 per cent of the production, the export intensity in production was always less than 40 per cent in India. This could be attributed to the increasing domestic demand as well as consumption of black pepper and also the decreasing production in the country resulting from declining

Figure 3 Country-wise Export of Black Pepper

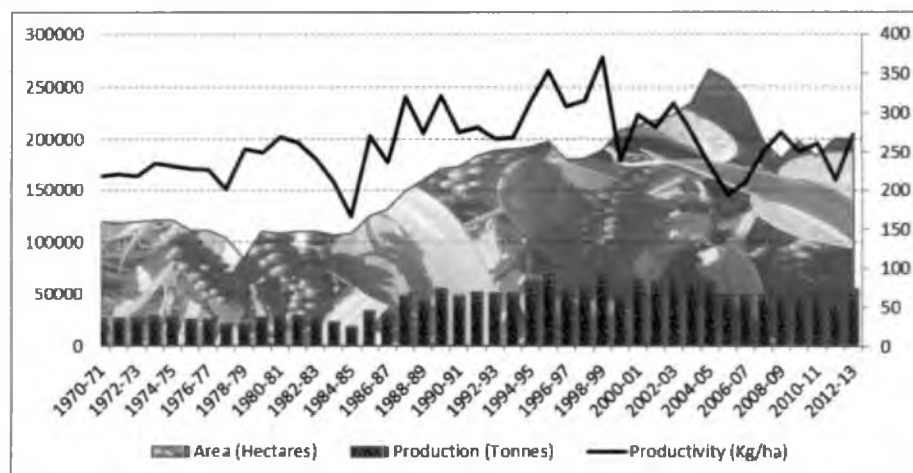


area and low productivity. The export intensity of production for Vietnam is more than 100 per cent in some of the trienniums and this might be due to the fact that the exports in a particular year may be lagged production released from storage or the country might be importing from other producer countries and then re-exporting to other countries.

5.3 Indian Scenario

India is the leading consumer of black pepper in the world. The country was the major producer till 2000 and before 1990s, was the major exporter of black pepper in the world.

Figure 4 Trends in area, production and productivity of Black Pepper in India



Area under black pepper in India increased upto 2004-05, after which it has exhibited a declining trend. The triennium averages of area increased upto TE 2001-02 after which it decreased by about 24,000 ha while the production decreased by about 16,000 tonnes (Table 11, Annexure 1). The productivity in the country was less than 300 kg per hectare in all the trienniums and it never exceeded 375 kg in any of the years from 1970-71 to 2011-12.

Table 11 Area, Production and Productivity of Black Pepper in India

Trienniums	Area (Hectares)	Production (Tonnes)	Productivity (kg/ha)
TE 1981-82	110343	28807	261
TE 1991-92	182340	50240	275
TE 2001-02	218673	65043	298
TE 2011-12	195514	48667	249

Source: Spice Statistics and www.indianspices.com

5.4 State-wise Scenario

The major black pepper producing states in India are Kerala, Karnataka and Tamil Nadu. The respective shares of these states in area, production and productivity of black pepper are given in Table 12.

Table 12 Scenario of Black Pepper in Major Producing States

State/Particulars	Kerala	Karnataka	Tamil Nadu	India
Area (Hectares)				
TE 1991-92	173320 (95.05)	2915 (1.59)	2195 (1.20)	182340 (100.0)
TE 2001-02	201500 (92.14)	7937 (3.62)	4043 (1.84)	218673 (100.0)
TE 2011-12	171951 (87.94)	20609 (10.54)	2935 (1.50)	195514 (100.0)
Production (Tonnes)				
TE 1991-92	48710 (96.95)	735 (1.46)	460 (0.91)	50240 (100.0)
TE 2001-02	55570 (85.43)	1877 (2.88)	890 (1.36)	65043 (100.0)
TE 2011-12	21547 (44.27)	16413 (33.72)	907 (1.86)	48667 (100.0)
Productivity (Kilogram/hectare)				
TE 1991-92	281	252	210	275
TE 2001-02	276	236	220	298
TE 2011-12	125	796	309	249

Source: Spice Statistics and www.indianspices.com

Note: Figures in parentheses indicate per cent to row totals

The area under Black Pepper in India increased from 1.82 lakh hectares in TE 1991-92 to 2.18 lakh hectares in TE 2001-02 and it declined to 1.95 lakh hectares in TE 2011-12. This decline in area could be mainly attributed to decline in acreage under black pepper in Kerala. While share of Kerala state in area under black pepper has declined between TE 2001-02 and TE 2011-12 from about 95 per cent to 87 per cent, the decline in share of production was quite substantial from about 97 per cent to 44 per cent. The state of Karnataka has exhibited an increasing trend in area and production and with about 10 per cent share in area and 35 per cent of the production in the country in TE 2011-12, which is an indication of the very high productivity in the state. The decline in production of about 16,376 tonnes between TE 2001-02 and TE 2011-12 could be mainly attributed to the decline in production in Kerala as a result of declining area and low productivity. Even though area is increasing and productivity is high in Karnataka, the declining trend in Kerala offset the increasing trend in Karnataka, ultimately leading to a fall in production in the country.

The share of Kerala in the value of pepper output in the country has shown a continuously declining pattern over the years. As evident from Table 13, the share of Kerala in the value of output of pepper in the country has declined from 87.1 per cent in TE 2001-02 to 75.7 in TE 2010-11.

Table 13 Value of Output of Black Pepper in India

Trienniums	Value of Pepper Output (Rs. lakhs)		Share of Kerala in Value of output in India (%)
	Kerala	India	
TE 2001-02	72901	83714	87.1
TE 2005-06	48815	60352	80.9
TE 2010-11	59854	79059	75.7

Source: State-wise estimates of value of output from Agriculture and Allied activities, 2013

5.5 District-wise Scenario

District-wise scenario of black pepper in Kerala is given in Table 14. Idukki, Wynad and Kannur are the major black pepper growing districts. Idukki district was accounting for about 50 per cent of the area under black pepper in Kerala during TE 2011-12. The share of Wayanad has declined from about 22 per cent to about 10 per cent from TE 2001-02 to TE 2011-12. This could be attributed to the increased disease incidences as well as destruction of pepper standards due to pest infestation.

Table 14 District-wise Area of Black Pepper in Kerala

Area (Hectares)	Idukki	Wayanad	Kannur	Kerala
TE 2001-02	58652 (29.1)	43256 (21.5)	23737 (11.8)	201500 (100.0)
TE 2011-12	86507 (50.3)	16380 (9.5)	9600 (5.6)	171951 (100.0)

Source: Agricultural Statistics, www.ecostat.kerala.gov.in

Note: Figures in parentheses indicate per cent to the last column

5.6 Climatic Requirements of Black Pepper

Being a humid tropical plant, black pepper thrives well in hot humid climate with adequate rainfall. Fairly long spells of dry weather followed by fairly heavy showers as received during South-West and North-East monsoons are conducive for the successful cultivation of black pepper. It is a shade loving plant but too much shade affects flowering and fruiting. Free drainage and plenty of organic matter are necessary for satisfactory growth. Black pepper is grown as a mixed crop with almost all garden and plantation crops and the cultural operations given to the main crop is usually shared by black pepper and the only additional operation required to be carried out separately is manuring.

Table 15 Climatic and Soil Requirements of Black Pepper

Parameter	Requirement
Climate	Warm humid tropical climate
Physiography	Undulating hill slope
Annual rainfall	200-300 cm
Temperature	10°C - 40°C
Relative humidity	60-95%
pH	4.5-6.0
Elevation	Sea level to 1500m MSL
Drainage	Well
Stoniness	Nil
Texture	Loamy fine sand
Soil depth (cm)	Deep (100-150 cm)

5.7 Black Pepper Production Systems in India

Black Pepper is grown in India as a

- Crop in the backyard of every farm or homestead.
- Mixed or intercrop trailed on various trees in the gardens and homesteads.
- Pure crop on slopes and in valleys of low hills.
- Mixed crop on shade trees in cardamom, tea and coffee plantations.

5.8 Reasons for lower productivity of Black Pepper in India

- Predominant cultivation as an intercrop.
- Continuous cultivation of poor yielding vines.
- Existence of senile and unproductive vines.
- Losses due to pest and disease attack and drought.
- Non-adoption of appropriate agronomic practices.

5.9 Major technological breakthroughs

Table 16 Important cultivars of black pepper and their characteristic features

Cultivar	Quality attributes					Features
	Fresh mean yield (kg/vine)	Oleoresin (%)	Piperine (%)	Essential oil (%)	Drriage (%)	
Aimpirian	4 to 5	15	4.7	2.6	34	Good for higher elevations, good in quality, late maturing
Arakkulam Munda	2	9.8	4.4	4.7	33	Moderate and regular bearer
Balankotta	1 to 2	9.3	4.2	5.1	35	Moderate and irregular bearing
Karimunda	2 to 3	11	4.4	4	35	Suitable for all pepper growing areas, high yielder, shade tolerant
Kalluvally	1 to 2	8.4 to 11.8	2.5 to 5.4	3	35 to 38	Good yielder with high dry recovery, drought tolerant
Kottanadan	5	17.8	6.6	2.5	34 to 35	High yielding, drought tolerant
Kuthiravally	3	15	6	4.5	35	High yield, good quality
Narayakodi	1 to 2	11	5.4	4	36	Moderate yielder with medium quality
Neelamundi	2	13.9	4.6	3.3	33 to 34	Good yielder, tolerant to Phytophthora infection
Vadakkan	3	10.8	4.2	3.2	-	Medium quality and yield

Source: Black Pepper Guide, Directorate of Arecanut and Spices Development

Table 17 Improved varieties of black pepper and their characteristic features

Variety	Mean yield (kg/ha)	Dry recovery (%)	Quality attributes			Features
			Piperine (%)	Oleoresin (%)	Essential oil (%)	
Panniyur- 1 (KAU)	1242	35.3	5.3	11.8	3.5	Not suited to heavily shaded areas
Panniyur- 2 (KAU)	2570	35.7	6.6	10.9	-	Shade tolerant
Panniyur- 3 (KAU)	1953	27.8	5.2	12.7	-	Late maturing
Panniyur- 4 (KAU)	1277	34.7	-	9.2	-	Stable yielder
Panniyur- 5 (KAU)	1098	-	5.5	12.3	3.8	Tolerant to shade
Panniyur- 6 (KAU)	2127	32.9	4.9	8.3	1.3	Suited to all black pepper tracts
Panniyur- 7 (KAU)	1410	33.6	5.6	10.6	1.5	Suited to all black pepper tracts
Subhakara (IISR)	2352	35.5	3.4	12.4	6	Suited to all black pepper tracts
Sreekara (IISR)	2677	35	5.3	13	7	Suited to all black pepper tracts
Panchami (IISR)	2828	34	4.7	12.5	3.4	Late maturing
Pournami (IISR)	2333	31	4.1	13.8	3.4	Tolerant to root knot nematode
PLD-2 (IISR, CPCRI, Palode)	2475	-	3.3	15.5	3.5	Suited to Thiruvananthapuram and Kollam districts of Kerala
IISR Shakthi	2253	43	3.3	10.2	3.7	Tolerant to <i>Phytophthora</i> foot rot
IISR Thevam	2481	32	1.65	8.15	3.1	Tolerant to <i>Phytophthora</i> foot rot; Suited to high altitudes and plains
IISR Girimunda	2880	32	2.2	9.65	3.4	Suited to high altitudes
IISR Malabar Excel	1440	32	4.95	14.6	4.1	Suited to high altitudes; Rich in oleoresin

Source: Black Pepper Guide, Directorate of Arecanut and Spices Development

5.10 Schemes for Black Pepper

5.10.1 Schemes funded by Government and other Agencies

5.10.1.1 Scheme “Pepper Development” implemented during 2013-14 under development of spices with budget provision of ₹ 1125 lakhs implemented by the Department of Agriculture with the following objectives

- Revitalization of existing pepper gardens.
- Area expansion – Establishment of new garden.
- Production of good quality planting materials of HYVs of pepper through departmental farms and decentralised nurseries.
- Revitalization of Spice Samithies.
- Encourage cultivation of bush pepper in premises of houses.

The components of the Scheme are

- Establishment of decentralised nurseries
- Revitalization of pepper gardens (2nd year assistance)
- Revitalization of pepper gardens (1st year assistance)
- Revitalization of Spice Samithies
- Establishing new garden (Area Expansion)
- Production of planting materials through Departmental farms

Table 18 Financial Outlay for the Scheme on Pepper Development

Component	Physical target	Total Cost per unit (₹)	Assistance per unit (₹)	Total Assistance (₹ in Lakhs)
Establishment of decentralised nurseries	30 No.s	60000	30000	9.0
Revitalization of pepper gardens (2 nd year assistance)	3505.6 ha	30000/ha	7500/ha	262.92
Revitalization of pepper gardens (1 st year assistance)	500 ha	30000/ha	15000/ha	75.0
Revitalization of Spice Samithies	250 No.s	25000	25000/ha	62.5
Establishing new garden (Area Expansion)	2000 ha	40000/ha	40000/ha	400.0
Total				809.42

5.10.1.2 Development programmes funded by National Horticulture Mission (NHM) implemented through State Horticulture Mission since 2005-06 especially in Idukki district. The major programmes undertaken are

- Establishment of model nurseries
- Establishment of small nurseries
- Establishment of tissue culture units
- Establishment of new gardens
- Rejuvenation/replacement of old gardens
- Promotion of protected cultivation
- Promoton of Integrated Nutrient Management and Integrated Pest Management
- Organic farming

5.10.2 Schemes funded by the Spices Board

5.10.2.1 Project on Improving Production and Productivity of Pepper in Idukki District of Kerala

Assisted under NHM with an outlay of 230.58 crores. During the project period of five years from 2009 to 2013, 120 crores was provided by the National Horticulture Mission.

The activities of the scheme included

- Production of planting material
- Replanting/Rejuvenation of senile plantations
- Promoting production of organic inputs
- Promotion of Integrated Pest/Disease Management
- Human Resources Development
- Functional infrastructure

5.10.2.2 Export development & promotion of spices through “promotion of Indian spice brands abroad”

This Scheme aims to assist exporters in penetrating the developed markets through launching/promoting own brands or buying out existing brands. The scheme aims to promote Indian Spice Brands in new, sophisticated and affluent segments in foreign markets, targeted beyond the ethnic Indian population in these countries and in the Middle East. There are two activities assisted under the scheme *viz.*,

- (i) Product and Packaging Development and Bar Coding
- (ii) Brand Promotion.

5.10.2. 3 Export Development & Promotion of Spices through 'Infrastructure Development'

There are four components under the programme of 'Infrastructure Improvement' viz., (1) Adoption of Hi-Tech in Spice Processing (2) Technology and process upgradation (3) Setting-up/ upgradation of in-house quality control laboratory (4) Quality certification, validation of check samples, training of laboratory personnel for export development of spices and spice products. Providing assistance for these components are necessary to empower the industry to adopt such methods of processing the produce by which the country could acquire a distinct image as the source of quality/safe products, consistency in meeting quality requirements and obtain recognition for the country as the 'international processing hub'.

Cost of Cultivation of Black Pepper

Table 19 Cost of Cultivation of Black Pepper in Kerala (Rupees/Hectare)

Details	TE 2002-03	TE 2007-08	TE 2012-13
Hired human labour	7363 (54.2)	11504 (53.4)	22872 (60.7)
Machine	156 (1.1)	295 (1.4)	145 (0.4)
Seedlings	24 (0.2)	27(0.1)	306 (0.8)
Farm Yard Manure and chemical fertilizers	3820 (28.1)	5616 (26.1)	6992 (18.5)
Plant protection	40 (0.3)	54 (0.2)	106 (0.3)
Land tax and irrigation cess	74 (0.5)	87 (0.4)	135 (0.4)
Repair and maintenance charges of implements, machinery and building	281 (2.1)	331 (1.5)	1683 (4.5)
Interest on working capital	998 (7.3)	1841 (8.5)	3262 (8.7)
Other expenses	819 (6.0)	889 (4.1)	2196 (5.8)
Cost A	13594 (100.0)	21532 (100.0)	37698 (100.0)
Interest on fixed capital	1642	2436	3286
Cost B1	15236	23101	40984
Interest on land value	162365	196294	469341
Cost B	177601	236330	510325
Imputed value of household labour	1368	1678	3994
Cost C	178969	238186	514319
Value of output per hectare	25043	41660	60311

Source: Report on Cost of Cultivation of Important Crops in Kerala, Department of Economics and Statistics, Government of Kerala, Various Issues.

Note: Figures in parantheses indicate per cent to Cost A

As evident from Table 19, the paid out costs (Cost A) increased from Rs.13,594 in TE 2002-03 to Rs. 37,698 in TE 2012-13. Among the components of cost A, human labour accounted for more than 50 per cent in all the trienniums and it increased to

about 60 per cent in TE 2012-13. This could be attributed to harvesting and shade regulation of standards, which are highly labour intensive. Though the share of farm yard manure and fertilizers in cost A is continuously decreasing over the years, it accounted for 18.5 per cent in TE 2012-13. Since land value is very high in Kerala, cost B and consequently cost C also happen to be excessive. The value of output per hectare has increased by more than two times because of the rising prices of black pepper in recent years.

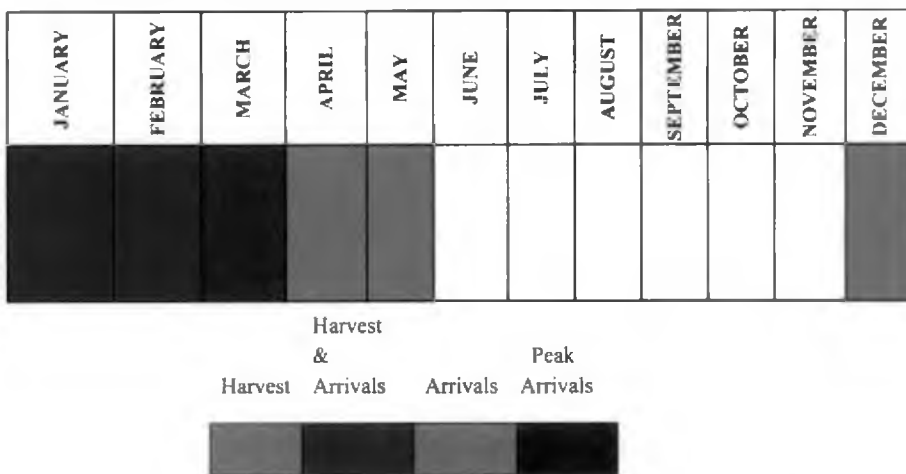
5.11 Harvesting and Post Harvest Management

In Kerala, black pepper flowers during May-June and light rains during this period are considered beneficial for the setting of fruit. Even though the vines begin to yield from the third year onwards they attain full bearing stage in the sixth or seventh year. The crop is ready for harvest in six to eight months from flowering. The harvest season extends from November to January in the plains and January to March in the hills. During harvesting the whole spike is hand-picked when one or two berries in the spike turn bright orange. The spikes are spread on a mat or threshing floor and the berries are separated from the spikes by rubbing them between the palms or trampling them under the feet and dried in the sun for 7-10 days. The optimum moisture content in dried pepper to prevent mould attack is 8-10 per cent. The berries can be separated manually or mechanically using threshers. Threshers with capacities varying between 0.5 to 1.5 tonnes per hour are available. This enhances speedy and hygienic separation of black pepper berries. When dried, the berries retain the characteristic wrinkled appearance of black pepper of commerce. A full bearing vine will yield one kilogram of dry pepper. A well looked after plantation of one hectare containing about 1000 vines should give a minimum yield of 1000 kilogram of dry pepper. However, yields of Indian varieties compare unfavourably with Sarawak (Malaysia) cultivated variety 'Kuching' which yields 18-22 kilogram berries per vine per year under conditions prevailing there.

The fresh berries are dipped in hot water for a minute before drying in the sun which results in an attractive black colour and also reduces the drying time. The recommended drying surfaces are bamboo mat coated with fenugreek paste, cement floor and high density black polythene which gives better appearance and cleanliness to the dried product. Mechanical driers such as copra dryer, convection dryer and cascade type dryers can also be employed for drying. The optimum temperature to be maintained in mechanical dryers should be around 60°C. The white pepper of commerce is prepared either from freshly harvested berries or dried black pepper using special techniques such as retting, steaming and decortication. The recovery of white pepper from ripe black pepper berries is about 25 per cent. Water steeping

is the most popular technique for preparing white pepper in which ripened pepper berries are soaked in water for 8-10 days and the outer skin is removed, washed and sun dried. The berries of Panniyur-1 are ideal for the preparation of white pepper.

Figure 5 Crop Calendar for Black Pepper in Kerala



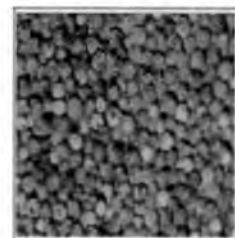
5.12 Value added products

Green Pepper: Green Pepper corns are the immature, fresh (green) berries of the pepper vine. These berries are plucked fresh from the vines and processed into various speciality products while retaining their natural green colour and flavour.



Different valued added products from green pepper are:

Freeze Dried Green Pepper: India is one of the very few countries which produce and supply freeze dried green peppercorns, wherein even the natural form of the green peppercorns is retained. This is a product which finds a wide application in instant soups and dry-meals on account of its special characteristics and subtle flavor. It is also used in the cheese industry and for preparation of pates. By virtue of its reconstitution characteristics it is a favorite choice for housewives.



Dehydrated Green Pepper: Dehydrated green peppercorns is used for grinding/cracking, in soup mixes and pepper mills and in meat, sausage and egg preparations. This is a premium quality dry pepper, dried under controlled conditions, yet keeping the natural green colour and giving out the best flavors packed in low-density plastic bags.



Green Pepper in Brine: These premium quality light green pepper berries, after removing all the stones and other foreign particles are kept in brine solution for about 45 days till the berries are matured. This process includes three times washing in fresh brine solution with salt solution and vinegar and then packing in jars with net drained weight of 25 kg each. Besides other applications, green peppercorns in brine is used for making sauces and in the food service sector.

Frozen Green Pepper: Frozen green peppercorns are used in fresh salads and frozen meals. Exports of these items are mainly directed to West Europe, though they are increasingly gaining acceptance in USA, Canada and other smaller markets. There are many units which are active in the production and export of green pepper products from India. These items are mainly produced for export only.

In the Indian context, pink/red pepper is the ripened pepper berries of the *Piper nigrum*. Pink/red peppercorns in brine, white pepper, sterilized black pepper, dehydrated black pepper, black, white and green pepper powders and cracked peppercorns are also produced and exported from India. Other value added products include green pepper sambal, green pepper sauce, ground black pepper, ground white pepper, pepper in medicinal use, pepper cookies, pepper oil, pepper oleoresin, pepper perfume, pepper mayonnaise, pepper potpourri, pepper sweet, pepper tea, pepper yoghurt and preserved green pepper

5.13 Marketing of Black Pepper

The farmers sell (either pre-harvest or post-harvest sales) black pepper to the local traders or village merchants who in turn sell to wholesalers with or without the involvement of commission agents. Then it is sold either to exporters or internal wholesalers in big cities, especially north India and then domestic retailers. The wholesalers carry out sorting and grading of pepper before selling in the terminal market. Brokers and commission agents play the important role of middlemen. The upcountry wholesalers transport the produce to Cochin where the sales will be initiated by commission agents. The commission agents are responsible for fixing the price level of black pepper and the process of price fixation is done

5.13 Marketing of Black Pepper

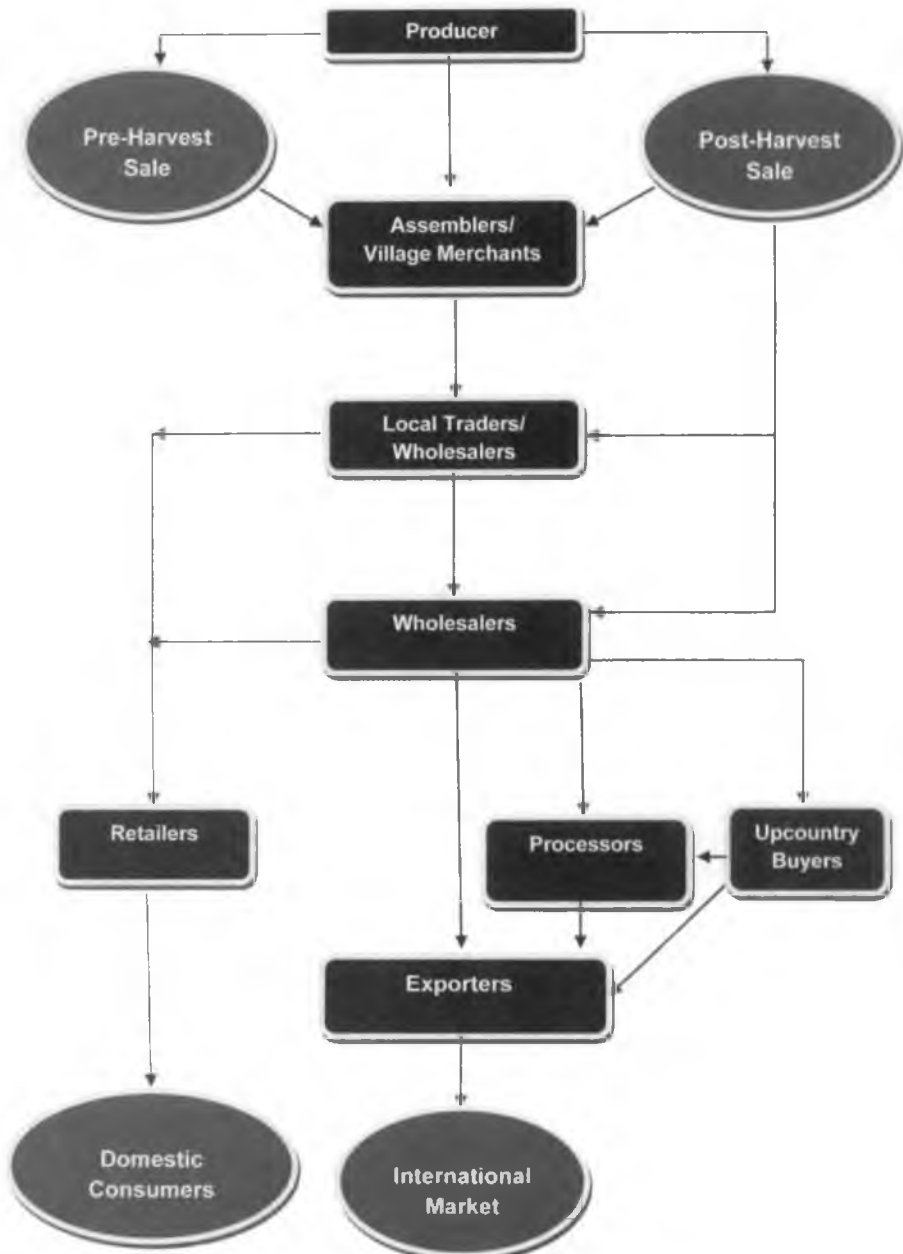


Figure 6 Marketing Channel of Black Pepper

after discussion with the brokers who are representatives of domestic wholesalers and exporters. At the exporters' premises, the load is processed, graded and stored and subsequently cleared for export.

The major market centres of black pepper in India are Cochin, Alleppey, Calicut, Nedumangad, Konni, Adoor, Pala, Alwaye, Thodupuzha, Chalakudy, Badagara, Cannanore, Tellicherry, Kanhangad, Kasaragod and Mumbai (www.indianspices.com)

5.13.1 Futures Trading in Black Pepper

Table 20 Details of Black Pepper traded in futures market

Year	Volume Lakh Tonnes	Value Rupees Crore	Share in Value of Commodities Traded (%)	
			Agricultural Commodities	All Commodities
2004-05	11.63	8334.28	2.1	1.5
2005-06	11.56	8029.83	0.7	0.4
2006-07	76.26	90727.61	6.9	2.5
2007-08	71.97	105323.74	11.2	2.6
2008-09	-	-		
2009-10	19.61	27705.73	2.3	0.36
2010-11	42.25	84786.09	5.8	0.71
2011-12	24.64	79518.79	3.6	0.44
2012-13	8.8	34742.45	1.6	0.20

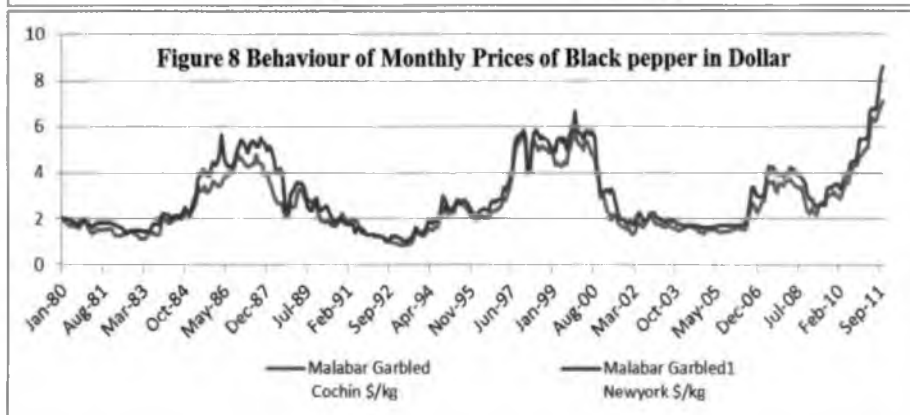
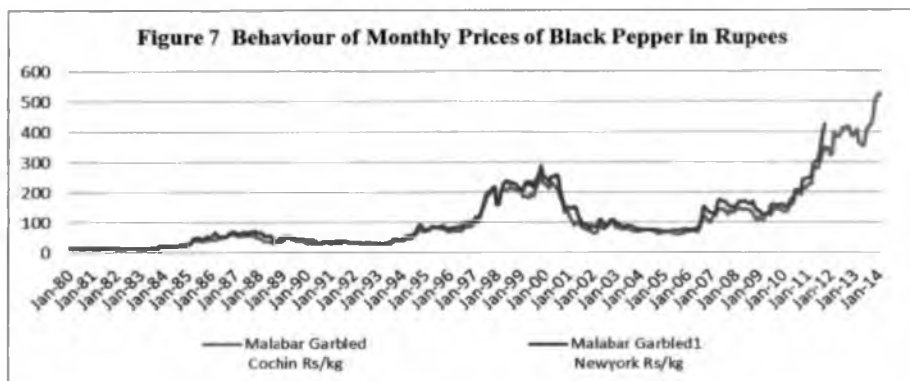
Source: Annual Reports of the Forward Market Commission, Government of India

Futures trading is permitted for black pepper at the National Exchanges, National Commodity and Derivatives Exchange Limited (NCDEX), Mumbai and National Multi Commodity Exchange of India Limited (NMCE), Ahmedabad and Indian Pepper and Spice Trade Association Exchange located at Kochi. The share of black pepper in the value of agricultural and total commodities traded increased from 2.1 per cent and 1.5 per cent respectively in 2004-05 to 11.2 per cent and 2.6 per cent in 2007-08 and declined subsequently to 1.6 per cent and 0.2 per cent in 2012-13 (Table 20). Even though the delivery of pepper is compulsory in all these exchanges, the direct benefit to small farmers or farmer groups from futures trading is very limited. Mostly, the beneficiaries in futures trading are large farmers, exporters and traders and even if it has helped, it has helped only in price discovery.

5.14 Price Behaviour of Black Pepper

The prices of black pepper are determined by a combination of factors affecting demand and supply including the black pepper output in India, domestic consumption, production in the world and major producing countries, weather parameters, stocks, price of other spices, export demand and import supply and other market sentiments including the futures prices.

The prices of black pepper in Indian rupee in the domestic and international markets moved closely from 1980 to mid 1995 (Fig.7). After 1995, there was a slight divergence between the two market prices and the international price was always higher than the domestic prices. The cyclical pattern of pepper prices was clearly demonstrated when the prices were plotted in US Dollar per kilogram. The first 11 year cycle was from 1983 to 1993 and the second cycle from 1993, showed some fluctuation near the peak values and reached the lowest value in 2004. The prices started increasing from 2005, crossed the eight dollar mark in 2011 and rose above Rs 500 in January 2014.



Price movement influences production and exports of black pepper. When world black pepper prices are high, new vines are planted and fertilizer usage goes up. The black pepper exporters also try to reduce their stocks during the periods of high price. Then, as the newly planted vines start to yield, production increases and the prices fall. When world black pepper prices are low, pepper vines are neglected and fertilizer usage decreases. Because producers neglect management, black pepper production stagnates or even declines, tightening the supply situation until black pepper prices rise again. This cycle of black pepper production and prices continues.

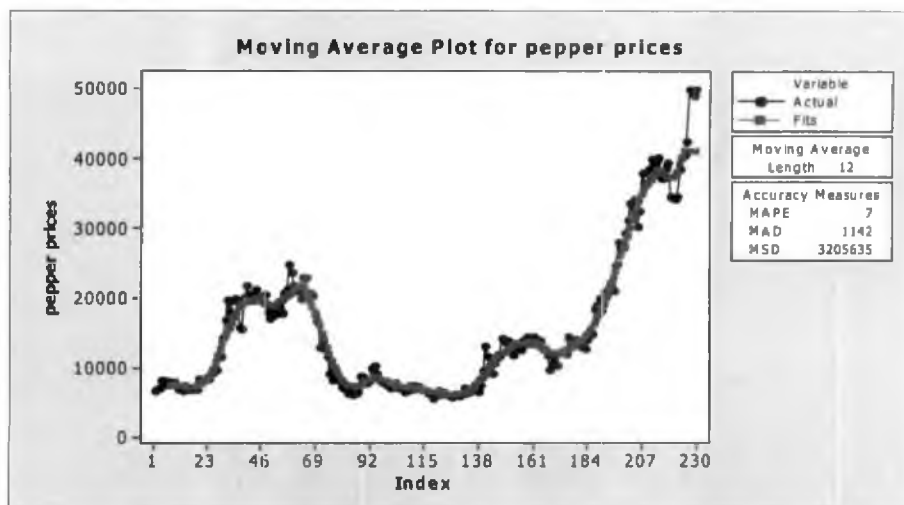
5.14.1 Decomposition of time series components of black pepper prices

The monthly time series data for ungarbled pepper prices in Kochi market from July 1995 to July 2013 was considered and a multiplicative model was used to study the components of the time series.

5.14.1.1 Trend

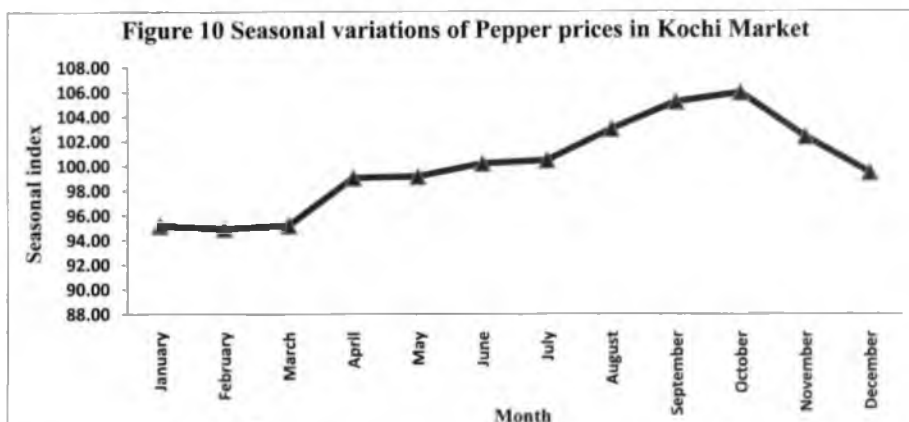
As the trend analysis using functional forms like linear, quadratic, cubic, compound, growth, logarithmic, sigmoid, exponential, inverse, power and logistic forms did not yield a satisfactory fit in terms of R^2 values and standard errors, trend lines were fitted with single exponential smoothing as plotted in Figure 9 given below. This fit had a Mean Absolute Percentage (MAPE) value of 7 per cent. As evident, the price of ungarbled pepper in Kochi market exhibited an increasing trend.

Figure 9. Trend analysis of black pepper prices



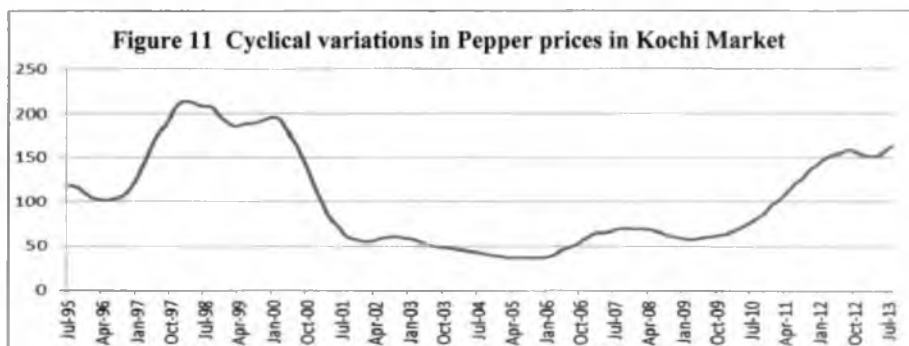
5.14.1.2 Seasonality

Black pepper is seasonal in production and hence the prices exhibit considerable seasonality (Fig. 10). In Kerala, the harvest season extends from November to January in the plains and January to March in the hills. The increasing phase of black pepper prices was observed from July to October with the peak price in October. The fall in price occurs from November to March, coinciding with the harvesting and months of peak arrivals.



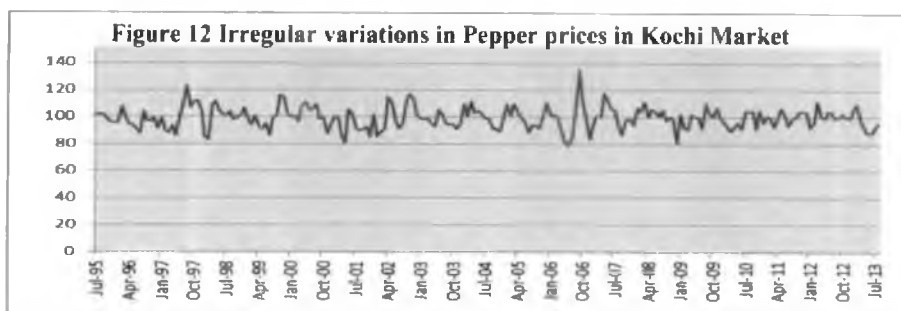
5.14.1.3 Cyclical Variations

Price cycles represent deviations in price levels from the average trend due to business sequences of booms and recession that appear in an economy. Cyclical movements are of longer duration, usually extending to a few years and are of different periodicity. From the analysis of price data under reference, a price cycle of six years, extending from 1996 April to 2002 April was found (Fig.11).



5.14.1.4 Irregular Variations

The random effect is the residual effect left after the trend, seasonal and cyclical effects have been removed from the original observations.



The indices of irregular variations have been worked out to capture the random effect (Fig. 12). It showed that black pepper prices were subjected to high irregular variations during the period under consideration. They represent random effect such as demand and supply shocks on account of climatic aberrations or due to speculative factors.

5.15 International Trade in Black Pepper

Black pepper is identified in international trade by its port of export or region of growing. Lampung is the black pepper grown in Lampung province of Sumatra and some other areas of Indonesia. Pepper grown in Alleppey district of the South West coast of India is called by the name Malabar pepper. Black pepper grown in the northern part of the Malabar Coast of India is called as Tellicherry pepper. Black pepper that grown in Sarawak State in Malaysia, along the north western coast of Borneo is known by the name Sarawak. Pepper produced in the State of Para on the Amazon River is the Brazilian pepper while the white pepper grown in the island of Bangka and exported through Pangkalpinang, a port on the south eastern coast of Sumatra is known as Muntok pepper.

5.15.1 Export orientation of Black Pepper

It could be observed from Table 21 that the share of export in production has

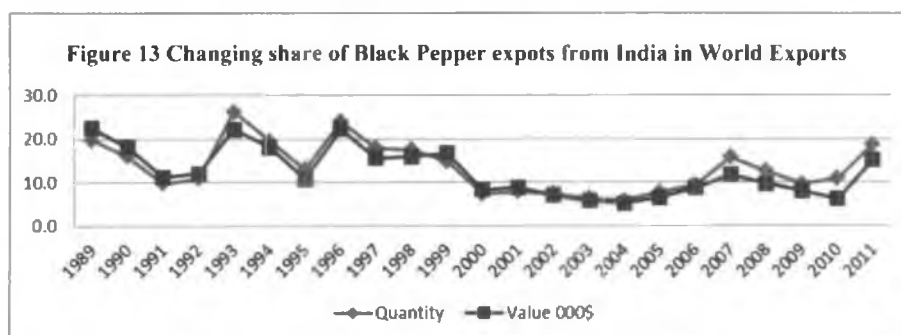


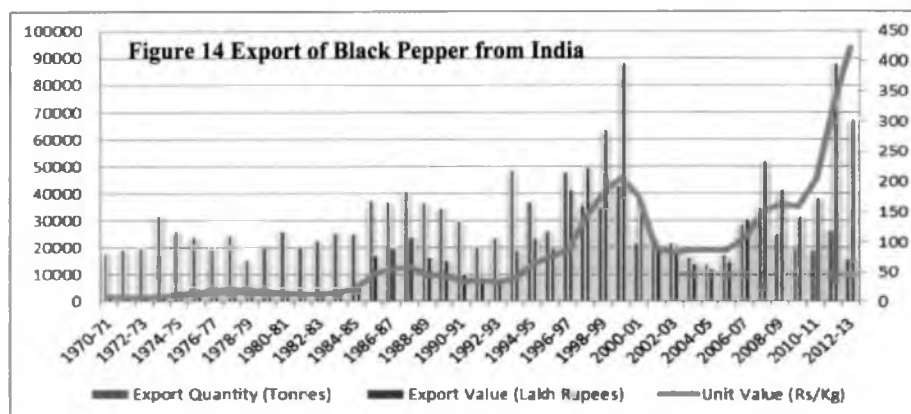
Table 21 Export Intensity of Production of Black Pepper in India

Trienniums	Production (Tonnes)	Export Quantity (Tonnes)	Percentage Share of Export in Production
TE 1972-73	26170	19059	73
TE 1982-83	28443	23188	82
TE 1992-93	50240	24780	49
TE 2002-03	65043	22105	34
TE 2012-13	48667	20517	42

Source: Calculations based on data published by Spices Board

Note: TE denotes Triennium Ending

declined in India. India exported almost three-fourth of the production in TE 1972-73 while it declined to one-third share in TE 2002-03, which further increased to 42 per cent in TE 2012-13. This could be attributed to the increasing domestic consumption of black pepper in India and increasing competition from other producers, especially, Vietnam. As per IPC estimates, about 50 to 60 per cent of Indian production is consumed in the country itself.

**Table 22 Export of Black Pepper from India**

Export/ Triennium	Export Quantity (Tonnes)	Export Value (Lakh Rupees)	Unit Value (Rs/Kg)
TE 1972-73	19059	1479	8
TE 1982-83	23188	3211	14
TE 1992-93	24780	8522	34
TE 2002-03	22105	25446	115
TE 2012-13	20517	64463	318

Source: Calculations based on data published by Spices Board

Note: TE denotes Triennium Ending

The share of India in world exports declined from more than 20 per cent in 1989 to about 10 per cent in 1991, which further increased to about 25 per cent in 1993. From 1996 onwards the share has shown a continuously declining trend from about 24 per cent to as low as six per cent in 2004. It again increased to 15.8 per cent in quantity terms in 2007 and again declined and started increasing from 2010 and in 2011 India exported about 19 per cent of world exports in quantity terms and the value of exports was 15 per cent of the world export value.

It could be observed from Figure 14 and Table 22 that the unit value of black pepper exports were very low in the 1970s and it remained low upto mid 1980s, because of which the value of exports were very low when compared to the quantity of exports from India. After 1985, the unit value of pepper exports started increasing and because of that the value of exports also increased and this trend continued upto 1998-99. This increase could be attributed to the devaluation of rupee and liberalisation policies implemented in India. From 2000 onwards the exports declined in both value and quantity terms upto 2005 and the unit value was less than ₹ 100 in some of the years. From 2006-07, the unit value started increasing whereas the quantity of exports exhibited a declining pattern and consequently the value of exports increased. The export unit value of black pepper crossed ₹ 400 mark in 2012-13.

The changing share of countries in black pepper exported from India is presented in Table 23. USA was the major export market for Indian pepper and accounted for the highest share in both quantity and value of pepper exports from the country. The share of USA in value and quantity of total black pepper exports from India has declined from about one-third in TE 1993 to 20 per cent and 15 per cent respectively in TE 2013. The other major export markets were UK, UAE and China.

5.15.2 Quality Aspects for Trade

The quality of black pepper is largely determined by berry size, colour, light berry content, damaged berries, moisture content, microbial load, presence of foreign matter like animal excreta, insect infestation etc. These factors are essentially determined by harvesting, processing and handling practices at the growers' level and grading and storage practices adopted at the exporters' level. Another quality aspect gaining importance is the microbial contamination level, which should not exceed the acceptable limits. In international markets, quality specifications for trade are laid out by the importing as well as the producing countries. The parameters assessed are extraneous matter, light berries, pinheads, bulk density, insects, excreta and microbiological aspects like presence of *Salmonella*, *E.coli*, aflatoxins etc.

Table 23 Changing Share of Countries in Black Pepper Exports from India

Country	Details	TE 1993	Share in Indian pepper exports	TE 2003	Share in Indian pepper exports	TE 2013	Share in Indian pepper exports
Australia	Value	4.9	0.7	12.3	1.3	80.5	1.3
	Quantity	367.9	0.7	770.3	0.8	2325.6	0.7
Canada	Value	20.1	3.0	37.3	4.0	88.5	1.4
	Quantity	1569.7	2.8	2454.2	2.6	2947.3	0.9
China	Value	-	-	0.7	0.1	157.2	2.5
	Quantity	-	-	58.3	0.1	9199.5	2.9
Germany	Value	16.6	2.5	21.9	2.4	87.0	1.4
	Quantity	1029.2	1.8	845.6	0.9	1296.5	0.4
France	Value	7.0	1.0	8.4	0.9	43.0	0.7
	Quantity	551.7	1.0	549.7	0.6	917.6	0.3
UAE	Value	13.4	2.0	29.8	3.2	147.8	2.3
	Quantity	1522.4	2.7	5186.3	5.6	8970.2	2.8
UK	Value	14.2	2.1	44.3	4.8	202.8	3.2
	Quantity	1265.0	2.3	3195.8	3.4	6022.8	1.9
USA	Value	234.4	35.2	302.5	32.7	1310.8	20.8
	Quantity	18753.8	33.5	27723.8	29.7	47949.6	15.1
Italy	Value	20.8	3.1	30.6	3.3	80.2	1.3
	Quantity	1627.4	2.9	1851.9	2.0	1913.5	0.6
Japan	Value	8.2	1.2	17.0	1.8	56.4	0.9
	Quantity	532.5	0.9	757.9	0.8	794.4	0.3
Netherlands	Value	9.2	1.4	21.3	2.3	72.5	1.2
	Quantity	733.7	1.3	1313.0	1.4	1646.9	0.5
Russia	Value	49.6	7.4	10.2	1.1	43.2	0.7
	Quantity	3899.4	7.0	1048.7	1.1	2455.9	0.8
Saudi Arabia	Value	4.4	0.7	13.7	1.5	66.3	1.1
	Quantity	485.4	0.9	1141.4	1.2	4034.9	1.3
Total	Value	666.6	100.0	924.4	100.0	6292.5	100.0
	Quantity	56059.6	100.0	93407.7	100.0	317709.2	100.0

Source: Computed with data from wits.org for pepper exports (HS 0904)

6 . Conclusion

India has lost its position as the leading producer and exporter of black pepper. The productivity of black pepper is also very low in India. The prices are dependent on many international factors and hence exhibit much volatility. It is imperative that India takes a retrospective view of what has happened so far and ponder over the prospects for success by formulating alternative management strategies and policies to boost the exports. Market intelligence could definitely help in improving the competitiveness and reducing the vulnerability of farmers to the implications of price volatility.

7. References

Spices Statistics (1991), Spices Board, Kochi

Spices Statistics (1998), Spices Board, Kochi

Spices Statistics (2004), Spices Board, Kochi

Statistics for Planning (2009), Directorate of Economics and Statistics, Kerala

Statistics for Planning (2005), Directorate of Economics and Statistics, Kerala

Statistics for Planning (2001), Directorate of Economics and Statistics, Kerala

Statistics for Planning (1995), Directorate of Economics and Statistics, Kerala

Statistics for Planning (1987), Directorate of Economics and Statistics, Kerala

Economic Review – 2012-13, Government of Kerala

M. Tamil Selvan, Madan, M.S., Homey Cheriyan and K. Manoj Kumar (2009), Black Pepper Guide, Directorate of Arecanut and Spices Development, Calicut, India

Websites

www.ecostatkerala

www.wits.org

www.indianspices.com (Spices Board)

www.ipcnet.org (International Pepper Community)

8. Annexures

Annexure 1. Area, Production and Productivity of Black Pepper in India

Year	Area (Hectares)	Production (Tonnes)	Productivity (Kg/ha)
1980-81	109290	29490	270
1981-82	111020	29230	263
1982-83	110440	26610	241
1983-84	107350	22710	212
1984-85	109400	18220	167
1985-86	125120	34000	272
1986-87	132810	31340	236
1987-88	149930	48090	321
1988-89	160740	44160	275
1989-90	171490	55190	322
1990-91	173430	47950	276
1991-92	184200	52010	282
1992-93	189390	50760	268
1993-94	190990	51320	269
1994-95	193270	60740	314
1995-96	198870	70230	353
1996-97	180260	55590	308
1997-98	181530	57330	316
1998-99	189840	70160	370
1999-00	209670	50120	239
2000-01	213860	63670	298
2001-02	218220	61460	282
2002-03	223940	70000	313
2003-04	235430	65000	276
2004-05	267112	62000	232
2005-06	257244	50000	194
2006-07	236177	50000	212
2007-08	198856	50000	251
2008-09	181299	50000	276
2009-10	198986	50000	251
2010-11	183780	48000	261
2011-12	201381	43000	214
2012-13	201381	55000	273

Source: Spice Statistics, Spices board and www.indianspices.com



809307

Annexure 2) Exports of Black Pepper from India

Year	Export Quantity (Tonnes)	Export Value (Rupees Lakhs)	Unit Value (Rupees/Kg)
1970-71	17970	1525	8.49
1971-72	19248	1483	7.70
1972-73	19958	1431	7.17
1973-74	31648	2953	9.33
1974-75	26341	3448	13.09
1975-76	24226	3388	13.99
1976-77	20527	3824	18.63
1977-78	24678	4951	20.06
1978-79	15719	2912	18.52
1979-80	20898	3352	16.04
1980-81	26364	3895	14.77
1981-82	20608	2798	13.58
1982-83	22592	2939	13.01
1983-84	25787	4135	16.03
1984-85	25420	6054	23.82
1985-86	37620	17248	45.85
1986-87	37083	20033	54.02
1987-88	41011	24058	58.66
1988-89	36908	16451	44.57
1989-90	34650	15335	44.26
1990-91	29985	10240	34.15
1991-92	20535	7432	36.19
1992-93	23821	7894	33.14
1993-94	48743	18910	38.79
1994-95	37264	23664	63.50
1995-96	26244	19630	74.80
1996-97	47893	41232	86.09
1997-98	35907	49636	138.23
1998-99	35109	63480	180.81
1999-00	42824	88258	206.09
2000-01	21830	38082	174.45
2001-02	22877	20369	89.04
2002-03	21609	17888	82.78
2003-04	16635	14277	85.82
2004-05	14148	12171	86.03
2005-06	17363	15095	86.94
2006-07	28726	30599	106.52
2007-08	35000	51950	148.43
2008-09	25250	41374	163.85
2009-10	19750	31393	158.95
2010-11	18850	38319	203.28
2011-12	26700	87813	328.89
2012-13	16000	67257	420.35

Source: Spice Statistics, Spices board and www.indianspices.com