Empirical Analysis of Production and Productivity of Indian Spices

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The aim of this paper is to compare the growth rate in the production as well as productivity of the King and Queen of spices i.e., Black Pepper and Cardamom in two states, Kerala and Karnataka which are the leading producers of spices in India, the paper makes use of secondary data. the article highlights that the spice growers are switching their crops from pepper to cardamom and other plants. This can be caused by the reduction in productivity of pepper, and also in general, pepper cannot be grown as cardamom or paddy again on the same piece of land. Besides, the pepper price fluctuation is smaller than cardamom and other crops. However, the decrease in pepper productivity is above the degree of pepper price stability and this study highlights the plantation sector, more specifically, spices which contribute largely to the Indian economy, and which is often an underutilized sector despite its vast potential.

Keywords: area, growth rate, production, productivity, spices

INTRODUCTION

The Indian economy has greatly diversified into agriculture and into the plantation sector more specifically over the decades firstly. This sector is supremely different as compared to other agriculture and allied sectors, as they are usually export-oriented or import replacements. India, which is also regarded as the home of spices, was trading spices with the ancient Roman civilization and Chinese civilization (Malhotra, 2014). Indian spices are most desired overseas owing to their exquisite aroma/ fragrance, taste, medicinal and texture properties. India has been leading in the production and trade of spices since the Vedic age. India is the world's biggest domestic spice market. It still continues to dominate over the world spices market due to its rising demand in western cuisines along with changing consumer preferences, greater awareness of the medicinal values of the various spices when used as seasonings in food despite significant changes occurring in various sectors. The geographical and climatic features of South India and more specifically, Kerala have enabled the country in the production of quality spices which are most sought after globally (Shinoj and Mathur, 2006). Also, history reveals that the taste of "Black gold" pepper, as well as the flavor of the "Queen of spices" cardamom, have attracted numerous foreigners to the nation. The total spices exported from India in the year 2017-18 were 1.08 billion kgs with a value of US$ 3.11 billion.

The main importers of Indian spices around the world include Germany, Malaysia, Saudi Arabia, UK, Thailand, Iran, UAE, China, Vietnam, and the US. The main spices grown in the state are cardamom, pepper, tamarind, ginger, garlic, fenugreek, fennel, dill seed, cumin, turmeric, coriander, clove, chilli, celery, ajwain, curry powder, mint oils, spice oils, and nutmeg (Sharangi and Pandit, 2018).India held a monopoly status in the production and export of spices for a considerably longer period of time but due to varying situations, India has been facing stiff competition from numerous spices producing nations. Some of its core competitors in the world pepper market include Vietnam, Brazil, Indonesia, Malaysia, and Thailand while countries like Sri Lanka, China, and Madagascar despite producing pepper do not pose a significant threat in the international market. Similarly, in the international cardamom market, Guatemala (which is India's main competitor) supplies cardamom at an extremely low price as compared to the price of Indian cardamom while countries like Honduras, Costa Rica, Sri Lanka, Tanzania, as well as Papua New Guinea, produce cardamom in small quantities (Gayathri and Saravanan, 2014).

Currently, India which is the biggest manufacturer, consumer as well as exporter of spices in the world produces approximately 75 of the 109 spices types identified by ISO: "International Organization for Standardization" and accounts for 50 percent of the global spice trade. During the year 2015-16, India exported about 8,43,255 tons of Rs.16,238.23 crores (US$ 2,482.83 million) spices and spice products (Meena et al., 2018). There was a growth of 9% in exports in terms of rupees and 2% in US dollars terms (IBEF, 2016).The State of Kerala accounts for more than 90 percent production of pepper in India with a major chunk coming in from the districts of Idukki and Wayanad. Kerala has a noteworthy share in the production of pepper with about 1.8 lakh hectares of land under pepper cultivation accounting for the production of more than 50,000 tons of pepper annually. Likewise, approximately 70,000 hectares of cardamom land are cultivated which produces an average of 6,500 tons of cardamom on an annual basis. Kerala has about 45,000 hectares of land under cardamom cultivation which accounts for the production of 5,000 tons of cardamom annually (Boyal and Mehra 2016). Idukki district contributes to more than 80% of the cardamom being produced in the state. The current research specifically purposes to compare the growth rate in the area under cultivation, production as well as productivity of the King & Queen of spices *i.e.,* Black Pepper and Cardamom in two states, Kerala and Karnataka which are the leading producers of spices in India (also regarded as the Hub of Spices" in southern parts of India).

REVIEW OF LITERATURE

Several studies have been done in the area of production and productivity of spices, Abdullah (2015) made a detailed study of the various aspects of production, processing and marketing of pepper. He gives a detailed description of the cultivation practices, processing, channels of marketing, domestic and international market, problems and suggestions for improving the return of the producers and traders. However, the study was mainly intended to analyse the role of cooperative societies and to observe the future scope of cooperative sector in the field of pepper marketing. The study has not considered marketing problems of individual cultivators and traders. Sudha and Ramprabu (2019) studied India's cardamom trade with Middle East' clearly points out the changing pattern of India's cardamom trade with the Gulf countries. With the support of statistical data, economics of cardamom cultivation and the prospects of the sector have been discussed in detail. According to him, high price of Indian cardamom is the reason for declining export volume and competitive pricing strategy is the only solution to the problem. Anbuchelvi (2019) studied the problems and prospects of exports of value-added spices in general and spice oils and oleoresins in her project report named 'Problems and prospects of Exports of Spices Oils and Oleoresins from India'. The study has covered the processing of spices, oils, major market trends in expo problems, export incentives, review of the export volume of producing countries, and distribution problems of value-added spices. The study gives some valuable indications about the future possibilities of spices relating to processing and value additions. Murugan (2018) in the report 'Volume of trade and its impacts on the economic development of Kerala', made a comprehensive study of the role of trade in Kerala's economy, including the structure and composition of Kerala's foreign trade and the interstate commodity flows. Spices are prominent export products and hence their trade significance has been discussed in detail. This study points

out the scope and potentials of the spices of Kerala and also highlights the comparative advantages of spices over the other agricultural products of Kerala. Sreekumar (1990) in his project 'The test launch study of Milma Cardamom Milk', discusses the effectiveness of test launching of cardamom milk by Milma. The report reveals that the project was a failure. Defective marketing system with inadequate dealer push, inadequate distribution network, inadequate advertisements etc. are highlighted as the major reasons for the failure. Had the project been a success it would have been highly beneficial to the cardamom producers. The conclusion of the report indicates that even though the test launching was a failure the opportunity still prevails as untapped.

Pruthi (1993) Major Spices in India; this book throws light on the importance of spices in Indian economy. It has classified the spices on the basis of their comparative economic importance and parts of plants used. Each spice has been dealt with in detail related to processing, distribution, post-harvest techniques, storage and marketing practices. Natarajan (2006) in their book 'Marketing Management', describes the normal channels of distribution of agricultural as well as industrial goods. In their opinion, the specific peculiarities of agricultural commodities make their distribution more difficult and so the normal channels followed for industrial products cannot be fully resorted for agricultural commodities. Multiplicity of intermediaries, loss of weight and volume in transit, lack of organization, forced village sales, perishable nature of the produces, multiplicity of market charges, adulteration and market malpractices, inadequate storage, transportation and communication facilities etc. are noted as the other major problems in agricultural marketing. Ravindranet al (2012) in their book 'Modem marketing', classified markets of agricultural commodities into different groups based on specific characteristics and highlighted the major differences between the marketing procedure and features of manufactured goods and agricultural commodities. They have noticed the major defects of agricultural marketing and suggested remedial measures for solving such defects and problems. They have also described the importance of international marketing along with the major activities involved in the process including market and product selection, market entry, distribution channels, pricing in global markets, international marketing research etc. Butt aet al (2013) in their article, 'cardamom development past and present', describe cardamom development in India, considering past performance and future possibilities in the world market. They observed that the emergence of Guatemala as a major producing country is real threat to Indian cardamom. The major constraints in the Indian cardamom industry also have been investigated. The study also compares the area, yield, production, and productivity in India with that of Guatemala and suggests various schemes and programmers required to renovate the sector.

METHODOLOGY

Despite the plantation sector (spices in particular) having a significant political, economic and cultural contribution to the nation, the sector has always been neglected by the academic and research fraternity. This could possibly be the reason why there are limited studies focusing on the aspects of production, productivity, and area especially when it comes to spices. Secondary data relating to the area under cultivation, production as well as productivity of Black Pepper and Cardamom from the states of Kerala and Karnataka which are the leading producers of spices in India (also regarded as the Hub of Spices" in southern parts of India) was collected from websites, research papers, journals, books, newsletters, spice board. It is expected that the results may provide substantial evidence in reflecting how best the potential of this sector can be tapped.

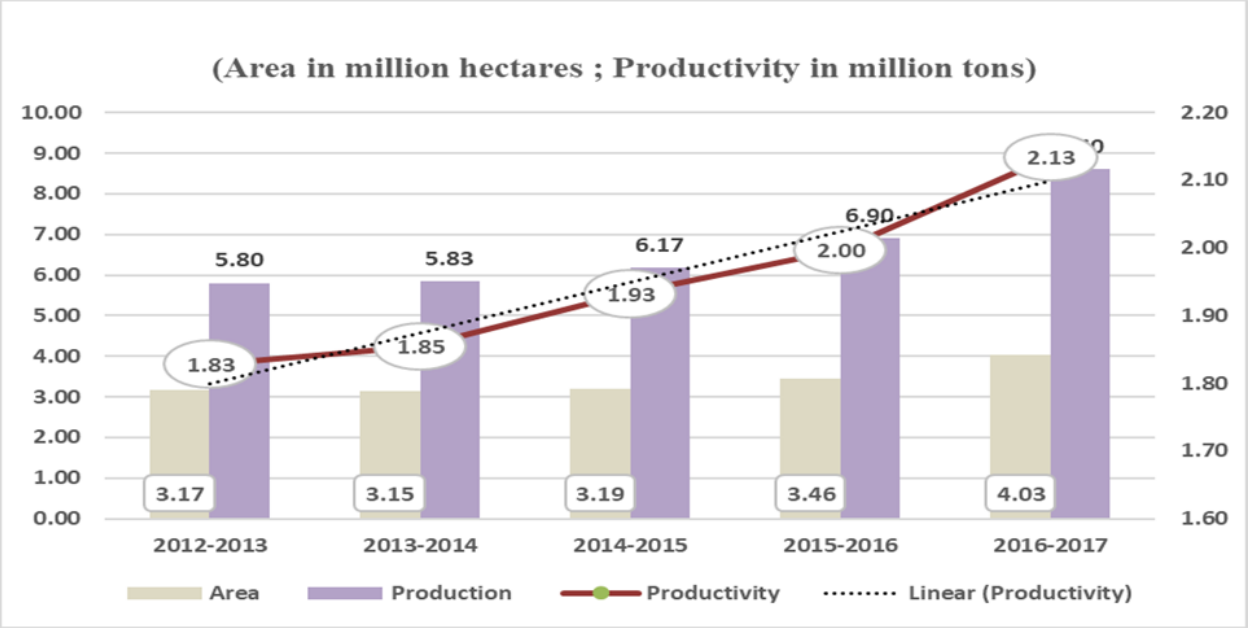
The need for a detailed and systematic analysis of India's spices sector and production together with export operations is imperative (Abraham, 2018). The major spices *viz.,* cardamom and pepper are taken up for this study; a selection is exclusively centered on its importance in total spices production and export. The current research would surely go a long way in improving the efficiency and performance of this sector substantially as by covering a few spice growing regions, the pulse of the market can be sensed. The study was carried out from June 2017 to August 2018 while the Statistical Package for Social Science (SPSS.10) was used to analyze the data. Data were analyzed using tables, charts, and diagrams. Statistical techniques like percentile and Descriptive analysis were used to analyze the data. The study has been formulated with

a hypothesis: The production of spices has substantially increased but the growth rate varies with the category. The study was limited to two states Kerala and Karnataka which are leading producers in the King and Queen of spices i.e., Black Pepper and Cardamom due to time as well as resource restrictions (Devi Priya and Thyagarajan, 2020).

RESULTS AND DISCUSSION

India is one of the most vibrant spice sectors in the Indian agricultural trade and the largest national market in the world for spices. Conventionally, Spices were grown organically in small farms in India.

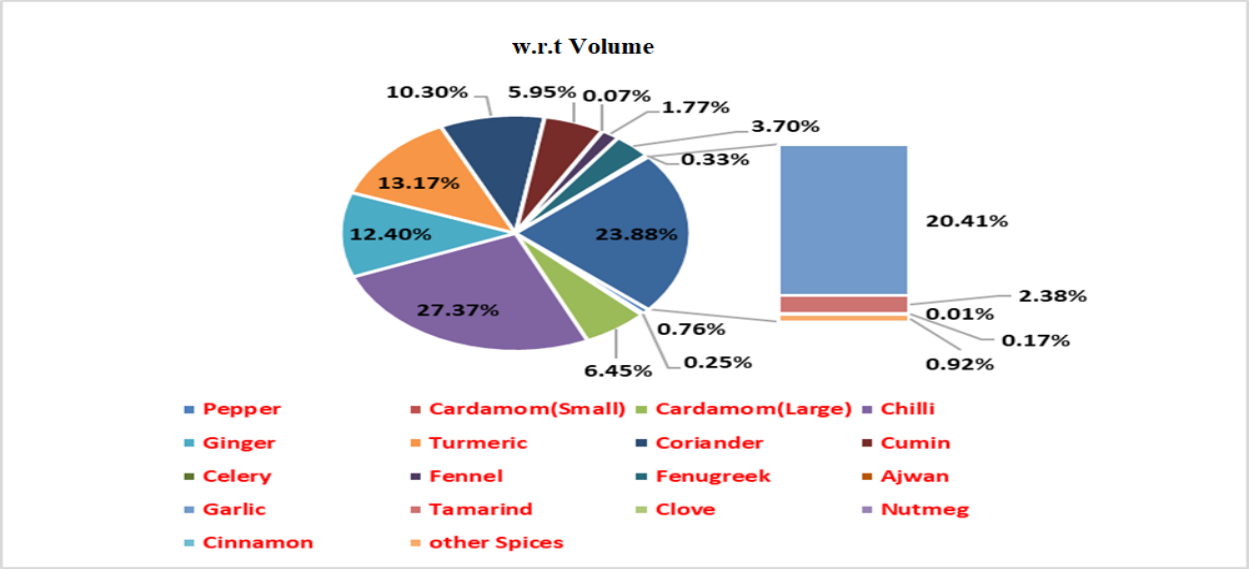
FIGURE 1
PRODUCTION SCENARIO OF SPICES IN INDIA



Source: Spice Board India, 2019–20

As per the production statistics (See Figure 1) obtained from the State Agri/Hort. Departments/DASD Kozhikode, it's evident that the production of Spices has been showing an increasing trend. The volume of spice production in the year 2016-2017 was around 8.6 million tons which is comparatively 32.5 percent higher than the year 2012-2013. Irrespective of the area under cultivation, the Productivity rate of spices is also observed to be showing an increasing trend. The highest growth rate in production is observed between the years 2015-2016 and 2016-2017. In the last five years, the total area under spice cultivation has increased by 8 lakh hectares. India is the center for black pepper as well as cardamom. Due to this nativity, Pepper is considered as one of the most significant spices in India and so is called the "King of Spices" and also "Black Gold of India". It is followed by Cardamom which is also recognized as the "Queen of Spices". While spice crops are grown in comparatively limited units, they are a significant share of international trade compared to food crops (Rosengarten, 1969).

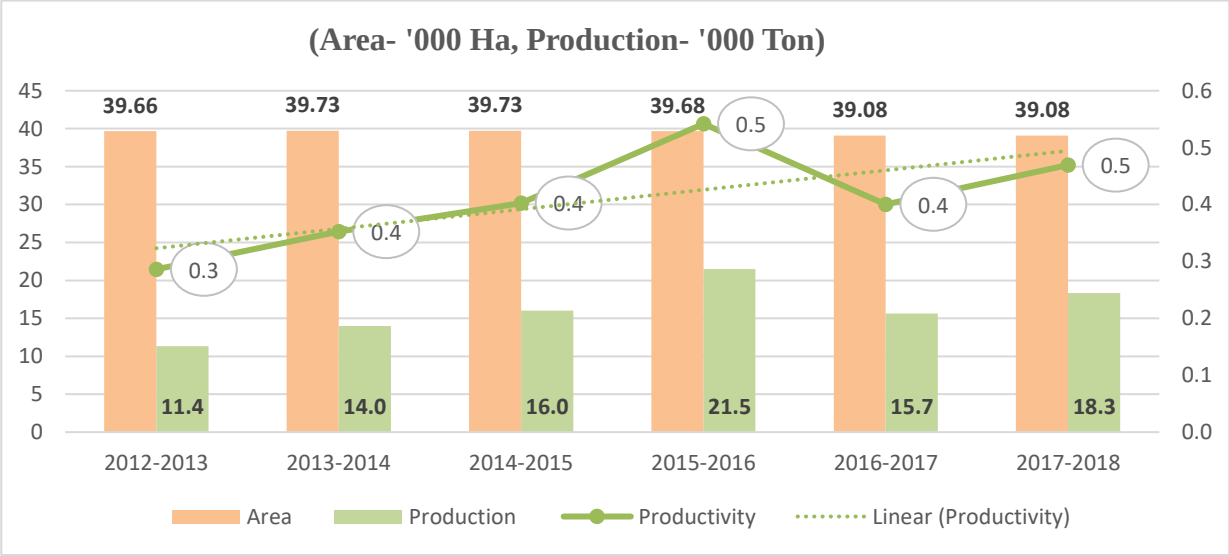
FIGURE 2
PERCENTAGE SHARE OF SPICES IN PRODUCTION



Source: Spice Board India, 2019–20

Among the various spices produced in India (See Figure 2), chilli accounts for a maximum production share of 27.37 percent in terms of value followed by Garlic and turmeric with a share of 20.41 percent and 13.17 percent. Both small and large cardamom together accounts for 7 percent and Pepper constitutes about 0.75 percent. The majority of the cardamom and pepper production in the nation is from the Tamil Nadu, Karnataka &Kerala states. In Kerala, cardamom is produced in almost all 14 districts, but the potential places for cardamom production are Idukki, Wayanad, and Palakkad out of which Idukki district alone accounts for more than 60% of the total output cardamom in Kerala while Hassan, Chikmagalur, Kodagu, and Shimoga are the main cardamom growing regions of Karnataka (Nair, 2011).

FIGURE 3
PRODUCTION SCENARIO OF CARDAMOM IN KERALA

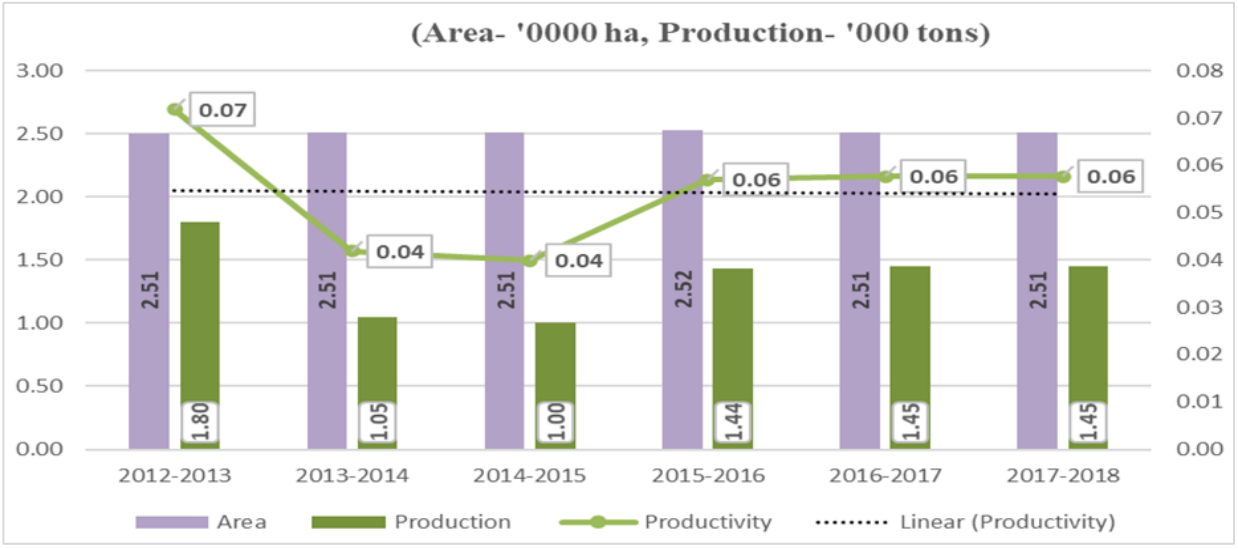


Source: Spice Board India, 2019–20

As per the production estimates (See Figure 3) *(Cardamoms: Estimate by Spices Board)*, the maximum production of cardamom in the state during the year 2015-2016 was about 21.5 thousand tons. However, the area under cultivation was high (39.73 thousand hectares) during the years 2013-2014 and 2014-2015. It's also evident from the figure that the productivity i.e., Yield /Ha continues to be growing for the last 5 years in spite of a fall during 2016-2017 which was due to the prolonged dry weather in the Idukki district severely affected the crop yield. In several cases, the plants had been partially or fully destroyed due to the dry weather that occurred during the specific year, but it has been estimated that it would reach a maximum of 0.5 and the improvement in cultivation practices may also be one of the reasons behind this steady growth. Although only in 7 Kerala districts is cardamom cultivation, approximately 14.68 percent is occupied by spice and condiments cultivation. The total cardamom cultivation area for 2017-18 was 39,080 hectares. The key cardamom cultivation is found in the district of Idukki whose contribution to 79.75 percent of the total area. The district of Wayanad contributes about 10.54 percent area to the total cardamom cultivation area and it occupies the 2nd position in terms of area. As compared to the previous years, the cardamom cultivation area demonstrates a static pattern and cardamom cultivation during the agricultural year 2011-12 with a maximum area of 41,600 Ha was found during the study of the area over 10 years which has been comparatively 4.4 percent higher than the maximum production of the last 5 years.

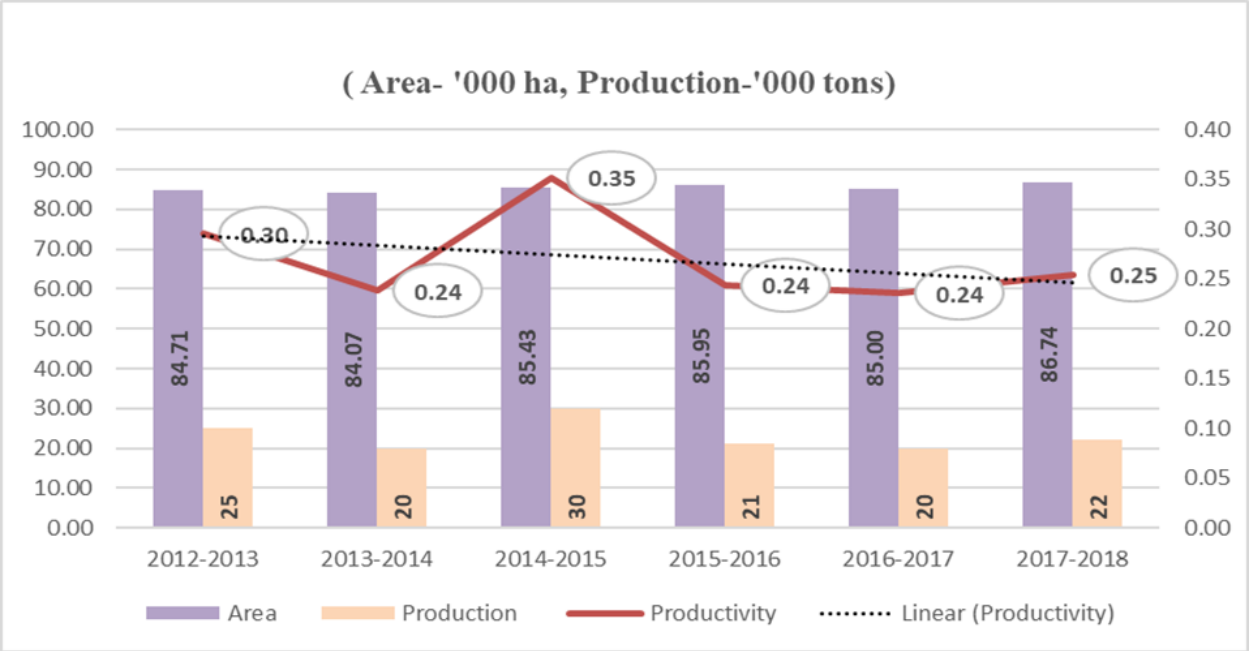
Next to Kerala, Karnataka has more area under cardamom cultivation, and generally, in Karnataka, cardamom is cultivated as an intercrop between areca nut and coffee. Although cardamom production (See Figure 4) has decreased in the state over the past few years, it remains an important crop in some parts of the state. Chikmagalur, Shimoga, Hassan, and Kodagu are the main cardamom-growing regions of Karnataka. The area under cardamom cultivation was 25.1 thousand hectares during 2012-2013 and it remains the same in 2017-2018. The maximum production of cardamom in the last 5 years was during the year 2012-2013 accounting for a volume of 18,000 tons with a productivity rate of 0.07. The productivity rate of cardamom remained low (Varghese, 2004) *ie.*,about 0.04 during the years 2013-2015 but after that, an increasing trend was observed. The lowest production of cardamom in the last 5 years was during the year 2014-2015 which was about 1000 tons. As per the production estimates of the year 2015-2016, among the different districts of Karnataka, the maximum production was in the Kodagu district followed by Hassan and Chikmagalur. The major varieties of cardamom grown are Nelyani, Malabar 1, and Mudigere in Chikmagalur, and in the case of Hassan District, both pure and mixed crops with pepper, Arecanut, banana, etc., cardamom is produced.

FIGURE 4
PRODUCTION SCENARIO OF CARDAMOM IN KARNATAKA



Source: Spice Board India, 2019–20

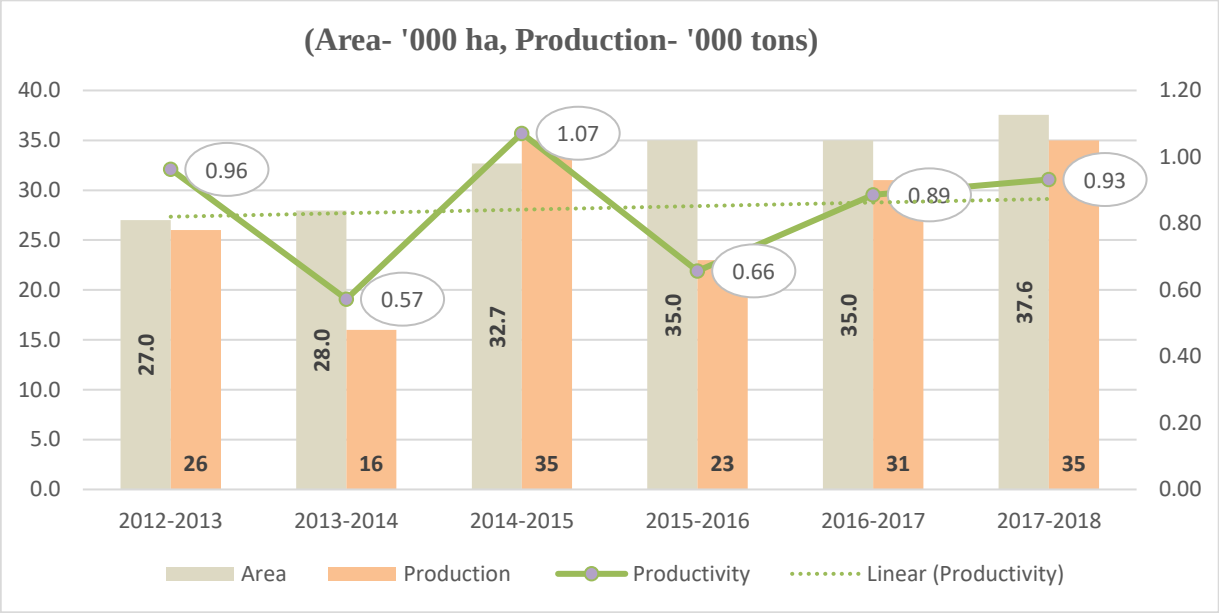
FIGURE 5
PRODUCTION SCENARIO OF PEPPER IN KERALA



Source: Spice Board India, 2019–20

In Kerala, the area under pepper cultivation during the year 2016-17 (See Figure 5) is 86,740 Ha and it is observed to be the maximum during the last five years. The maximum production of cardamom was during the year 2014-2015 with a productivity rate of 0.35, which was about a 31 percent increase in productivity as compared to the previous year 2013-2014. In the year 2016-2017, among the different districts of Kerala, Idukki district stood in the 1st position with 43,790 Ha area and the contribution to the state total was about 51.39 percent. During the last 10 years, Wayanad and Kannur districts occupied the next two high places in the area. Pepper is least cultivated in the Alappuzha district and in 2016-2017 the contribution was around 0.71 percent. Out of the last 10 years based on the area under cultivation, pepper production was maximum in the year 2007-08 which was around 1,75,679 Ha. Karimunda is the most accepted among all known Kerala cultivars. The other relevant cultivars are Kalluvally (North Kerala), Balankotta, Kuthiravally (Idukki and Kozhikode), Neelamundi (Idukki), Aimperian (Waynad), Narayakodi, Kottanadan (South Kerala). Pepper production in Kerala halved during the last few years. In 2008-09, the State produced over 41,000 tons on 1.75 lakh hectares and was the single largest producer along with few tracts of Karnataka, Kanyakumari, and Dindigul districts in Tamil Nadu. However, diseases like quick wilt had contributed greatly to the loss of production in Kerala. It is also evident from secondary sources that Kerala farms and plantations could not have contained pepper affecting diseases, like Pollu disease (Anthracnose) again caused by certain pathogenic fungi, slow wilt (slow decline) caused by parasitic nematodes, foot rot (quick wilt) caused by certain fungi (Phtyophthora), and some viral diseases. In addition, the monsoon pattern was wildly fluctuating. Farmers have noted that Kerala's relatively warmer areas are more and more unsuitable for pepper (Krishnakumar, 2012).

FIGURE 6
PRODUCTION SCENARIO OF PEPPER IN KARNATAKA



Source: Spice Board India, 2019–20

Karnataka has a remarkable share in the production and cultivation of pepper. The Malnad region of the state mainly Chikmangalur and Kodagu districts contribute more to pepper production and cultivation. Karnataka has also overtaken Kerala and has become the country's leading producer of pepper, thereby accounting for 45% of the overall production of pepper. The maximum production of pepper in the state was during the year 2013-2014, about 32,700 tons of pepper was produced with a productivity rate of 1.07 which was also observed to be the highest productivity rate during the last 5 years and the lowest productivity was observed during the year 2013-2014, which was about 0.57 percent. However, it was also estimated that in the year 2017-2018, the production of pepper in Karnataka could boost up to 37,600 tons which would be around a 6.9 percent increase in total production when compared to the previous year. In 2012-2013 The area under pepper cultivation was about 27,000 hectares and it had comparatively increased by 22.8 percent in 2016-2017 accounting for a production area of 35,000 hectares.

TABLE 1
GROWTH RATE W.R.T PRODUCTION, AREA, AND PRODUCTIVITY OF SPICES IN INDIA

Growth Rate w.r.t Area, Production and Productivity of Spices in India			
Year	**Area (%)**	**Production (%)**	**Productivity(%)**
2013-2014	-0.85	5.61	1.40
2014-2015	1.47	5.45	4.03
2015-2016	7.65	10.60	3.20
2016-2017	21.29	19.75	6.44

Source: Spice Board India, 2019–20

As per the calculated Growth rate (See Table 1), it's evident that India has had a positive growth rate for the last three years in terms of Spice production and Productivity. During the year 2016-2017, the growth rate in terms of production was about 19.75 percent, in the case of Area of cultivation, it was about 21.29%&

6.44% in terms of overall productivity of spices in the country while the growth rate was observed to be less in the year 2013-2014.

TABLE 2
GROWTH RATE W.R.T CARDAMOM AND PEPPER - PRODUCTION, AREA AND PRODUCTIVITY IN KERALA AND KARNATAKA

Year	Growth Rate-Cardamom-Kerala			Growth Rate-Pepper-Kerala		
	Area (%)	Production (%)	Productivity (%)	Area (%)	Production (%)	Productivity (%)
2013-2014	0.18	18.93	18.79	-0.77	-25.00	-24.05
2014-2015	0.00	12.50	12.50	1.60	33.33	32.25
2015-2016	-0.13	25.59	25.69	0.60	-42.86	-43.72
2016-2017	-1.54	-37.40	-35.32	-1.12	-5.00	-3.84
2017-2018	0.00	14.67	14.67	2.01	9.09	7.23
Year	**Growth Rate-Cardamom-Karnataka**			**Growth Rate-Pepper-Karnataka**		
	Area (%)	**Production (%)**	**Productivity (%)**	**Area (%)**	**Production (%)**	**Productivity (%)**
2013-2014	0.12	-71.43	-71.63	3.38	-62.50	-68.19
2014-2015	0.00	-5.00	-5.00	14.43	54.29	46.58
2015-2016	0.63	30.41	29.97	6.63	-52.17	-62.98
2016-2017	-0.49	0.83	1.31	0.00	25.81	25.81
2017-2018	0.07	0.07	0.00	6.82	11.43	4.95

Source: Spice Board India, 2019–20

The calculated growth rate in Table 2 shows that the growth rate of cardamom in Kerala is Positive in terms of production and a negative growth rate of -0.13% and -1.54% is seen during the year 2016-2017 which is due to the decrease in area under cultivation. On the other hand, in the case of cardamom production in Karnataka, a steady decrease in productivity was observed during the year 2013-2014 with a -71.6% negative growth rate. Especially during the 5 years starting from 2013-2014, the pepper production in Kerala witnessed a huge decline in production, and in the year, 2015-2016 an unexpected negative growth rate of -42.8 per cent was seen in pepper production in Kerala. However, in Karnataka, pepper production had been increasing with the increase in area under cultivation as well as productivity. The hypothesis developed for the study was tested. The hypothesis being the production of spices has substantially increased but the growth rate varies with category (states /crop). From Figure 1 and Table I is evident that the spice production in the country had increased from 5.8 million tons in 2012-2013 to 8.6 million tons in 2016-2017 and comparatively this was almost a 32.5 percent increase during the last 5 years. The productivity had also increased by 14 percent. In the case of Table II, it could be understood that the growth rate varied between different spices, for example, positive growth was visualized in terms of cardamom production in Kerala but the growth rate of Pepper was observed for Karnataka, to be much better than Cardamom. From these data, it was evident that the overall production of spices had shown an increasing trend with the increase in productivity, but the growth rate varied between different states as well as different crops. Hence, the hypothesis was accepted.

CONCLUSION

The article highlights that the spice growers are switching their cultivation from pepper to cardamom and more. This could be because of the decline in pepper productivity or pepper could not be grown repeatedly in the same piece of land as cardamom or paddy. Besides, the pepper price differences are less than cardamom as well as other crops. However, the decrease in pepper productivity is above the degree of

pepper price stability. As the world economy becomes more dynamic, in order to improve the global competitiveness of Indian spices, it is imperative to increase production and productivity and reduce the cost of cultivation. Low productivity levels coupled with escalating costs involved in the production project of Indian spices to be expensive in the global market. To augment the productivity levels, technical interventions like hybridization along with tissue culture needs to be adopted vigorously. Spice cultivation with enhanced farming technologies should be popularized.

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