



## AN ECONOMIC ANALYSIS OF EXPORT PERFORMANCE OF BLACK PEPPER IN INDIA

Thomas Felix K<sup>1\*</sup>, Arivarasan S<sup>2</sup> and David Rajasekar D<sup>3</sup>

<sup>1,2,3</sup>Department of Agricultural Economics, Tamil Nadu Agricultural University,  
Coimbatore (641 003), Tamil Nadu

### ARTICLE INFO

#### Article History:

Received 10<sup>th</sup> April, 2016  
Received in revised form 29<sup>th</sup> May, 2016  
Accepted 15<sup>th</sup> June, 2016  
Published online 28<sup>th</sup> July, 2016

#### Key words:

Markov chain, Black pepper, India

### ABSTRACT

Indian black pepper trade in International markets accelerates the growth of Indian economy. Studying change in share of black pepper to different countries, improve the welfare of black pepper growers. In this regard, an attempt was made to quantify the changing structure of Indian black pepper exports. The main objective of the present study was to analyse the direction of trade in black pepper export. In this regard, secondary data, mainly quantity of black pepper exports from India was collected from Spices Board, Cochin and International Pepper Community for a period of 2002-03 to 2014-15. The Markov chain analysis model was computed through linear programming method to assess the transition probabilities for the major Indian black pepper export markets using Lingo Programming computer package. Accordingly, USA retained 72.32 per cent, UK retained 56.98 per cent and of share of Indian black pepper export. that the countries pooled under 'others category', USA and UK would be the more stable importers of the black pepper from India in future and country like Canada was not found as the stable importer.

© Copy Right, Research Alert, 2016, Academic Journals. All rights reserved.

### INTRODUCTION

The flow of international trade has become the subject of a great deal of research. This is mainly because, exports from a country not only represent a way to achieve economic growth, but also provide foreign exchange earnings needed to import the capital and intermediate goods for domestic production and debt servicing obligations (Lord, 1991).

Black pepper (*Piper nigrum*L.) famous as "Black Gold" and also known as "King of Spices" India is one of the largest producers of black pepper, after China and Vietnam. A wide variety of black pepper is traded at an International level, with India as one of the top five exporters of black pepper, along with Vietnam, Indonesia, Brazil and Malaysia (Trade and Development Report, 2012). Agriculture is the most promising resource sector for India since most of other economic activities are dependent on this sector, including marketing, processing and export of agricultural products. Accordingly, further attention was made in the present study on the exporting marketing of one of the Agricultural commodities in India, Black pepper.

### METHODOLOGY

#### Direction of trade-Markov chain model

Markov chain analysis was employed to analyze the structural change in any system whose progress through time can be measured in terms of single outcome variable (Dent, 1967). In the context of current application, structural change was treated as a random process with seven importing countries for black pepper the assumption was that the average export of black pepper from India amongst importing countries in any period depends only on the export in the previous period

and this dependence was same among all the periods. This was algebraically expressed as

$$E_{jt} = \sum_{i=1}^n E_{it-1} * P_{ij} + e_{jt}$$

Where,

$E_{jt}$  = exports from India to the  $j^{\text{th}}$  country in the year  $t$ ,  $E_{it-1}$  = exports of  $i^{\text{th}}$  country during the year  $t-1$ ,  $P_{ij}$  = the probability that exports will shift from  $i^{\text{th}}$  country to  $j^{\text{th}}$  country,  $e_{jt}$  = the error term which was statistically independent of  $E_{it-1}$ ,  $n$  = the number of importing countries. The transitional probabilities  $P_{ij}$ , which could be arranged in a  $(c \times n)$  matrix, have the following properties.

$$\sum_{i=1}^n P_{ij} = 1, \text{ Where } 0 \leq P_{ij} \leq 1$$

Thus, the expected export share of each country during period 't' was obtained by multiplying the exports to these countries in the previous period (t-1) with the transitional probability matrix. Thus transitional probability matrix (T) was estimated using linear programming (LP) framework by a method referred to as minimization of Mean Absolute Deviation (MAD).

$$\text{Min } OP^* + I e$$

Subject to

$$X P^* + V = Y, GP^* = 1, P^* > 0$$

where,

$P^*$  -Vector of the probabilities  $P_{ij}$ ,  $O$  -Vector of zeros,  $i$  - Appropriately dimensional vectors of areas,  $e$  -Vector of

absolute errors, Y - Proportion of exports to each country, X - Block diagonal matrix of lagged values of Y, V - Vector of errors, G - Grouping matrix to add the row elements of P arranged in P\* to unity.

## RESULTS AND DISCUSSIONS

### *Direction of trade of black pepper export from India*

Markov chain analysis was used to study the direction of trade by estimating the transitional probability matrices. The probability of retaining the previous period market share (gain or loss) was interpreted by studying the diagonal and off diagonal elements of transitional matrix. The transitional probabilities matrix for black pepper exports from India to major importing countries was presented in Table 1. A broad indication of the change in the direction of trade of black pepper in India was indicated for the period from 2002-03 to 2014-15. The five major countries imported black pepper from India were USA, Germany, UK, Italy and Canada. Further the black pepper export to remaining countries was pooled under the category of ‘other countries’.

**Table 1** Transitional probability matrix of black pepper export in India (2002-03 to 2014-15)

Country	U.S.A	Germany	U.K	Italy	Canada	Others
U.S.A	<b>0.7232</b>	0.0000	0.0000	0.0785	0.0501	0.1482
Germany	0.8652	<b>0.1348</b>	0.0000	0.0000	0.0000	0.0000
U.K	0.4302	0.0000	<b>0.5698</b>	0.0000	0.0000	0.0000
Italy	0.0000	0.3253	0.0000	<b>0.0198</b>	0.6549	0.0000
Canada	0.4160	0.0942	0.2142	0.2757	<b>0.0000</b>	0.0000
Others	0.0374	0.0615	0.0656	0.0000	0.0000	<b>0.8355</b>

It was inferred from the table that the probability matrix for Indian black pepper exported to the major countries. It was found that USA retained 72.32 per cent of share of Indian black pepper export for the period from 2002-03 to 2014-15. Whereas USA would lose its share of 14.82 per cent to the other countries, 7.85 per cent share to Italy and 5.01 per cent share to Canada. Besides USA gained considerable share from Germany (86.52 per cent), UK (43.02 per cent) and Canada (41.60 per cent).

The Germany was found to be another stable importer of Indian Black Pepper because it retained its original share 13.48 per cent over the period. It lost its major share of 86.52 per cent to USA. UK is another stable importer of Indian black pepper because it retained its original share of 56.98 per cent. It lost its major share to USA to the extent of 43.02 per cent. It gained from the share of Canada to the extent of 21.42 per cent and other countries from 6.56 per cent.

Hence UK would be one of the most stable importers in future and its growth might be higher in black pepper import from India. Italy had retained only 1.98 per cent of its original share and it was one of the stable importers of Indian black pepper. It lost its major share of 65.49 per cent to Canada and 32.53 per cent to Germany.

Canada had not retained its original share and it lost a major share of 41.60 per cent of its original share to USA, followed by Italy (27.57 per cent), UK (21.42 per cent) and Germany (9.42 per cent). The countries pooled under the other category retained 83.55 per cent of its original share. It further implied that even though they imported in lower quantities, there was high stability and they had retained most of its original share. It gained 14.82 percent of the USA’s share. Compared to major importing countries at present, the countries pooled under ‘others category’ would import more black pepper from India in near future.

In nutshell, it was inferred that the countries pooled under ‘others category’, USA, UK, Germany and Italy would be the stable importers of the black pepper from India in future and country like Canada was not found as the stable importer. Hence necessary steps should be taken to motivate Canada to import more black pepper from India.

## CONCLUSION AND POLICY IMPLICATIONS

The Markov chain analysis has revealed that the export shares to major destinations are on the decline. Consequently, appropriate steps should be initiated to increase India’s share in these countries by offering quality pepper at competitive prices than other producing countries.

## References

- Dent W. T. 1967. Application of Markov Analysis to International Wool Flows, Review of Economics and Statistics, 49(2): 613-616.
- Lord, M. 1991. Imperfect competition and international commodity trade. Oxford University Press.
- UNCTAD (TDR 2012). Trade and Development Report, 2012. Employment, Globalization and Development. United Nations publication, Sales No. E.10.II.D.3, New York and Geneva.

\*\*\*\*\*