

# SPICE ROUTE: LOGISTIC JOURNEY OF SPICES IN RETAIL SUPPLY CHAIN PERSPECTIVE

**Paulrajan Rajkumar<sup>1</sup>**

**Abstract:**

The aim of this paper is to report the findings of the study of the routes and the distance traveled by spices from the farming location to the consumer in traditional and organised retailing. This research study is primarily exploratory in nature, and the research instruments include interviews and survey through questionnaires with players in the spice supply chain. The study is to track the spice routes by the retailers for assessing the current state of the supply chain management practices, and evaluate 'food mileage' clocked by them. 'Food miles' is a relatively recent concept in retailing and result of this study reveals that significant increase in food miles in the case of organised retailers. Longer food miles of spices are an indicator of the shift towards organised retailing. The speed at which spices reach their destination as well as the time taken between any two points was not observed. This is the limitation of this study, and also the scope for further research. The research study is not aimed at finding the factors related to the food mileage.

*Keywords:* retail, spices route, food mileage, logistics, supply chain.

*JEL classification:* L81; L83; L91

## INTRODUCTION

Spices constitute an important group of horticultural crops. The marketing of spices is not a new activity; the spice trade has been in practice for more than thousand years, across continents. However, over a period of time, trade practices have changed. This exploratory study is to understand the logistical operations of spice trading. It is limited to the logistical operations of cooking spices in the city of Chennai. The logistical chain of spice marketing is carried by two distinctly different business operators; organised and traditional retailers. Organised refers to marketing activities undertaken by licensed retailers, that is, those who are registered for sales tax, and income tax, and business is managed by professionals as a firm or limited company or cooperatives. Traditional refers to those who operate in unorganised markets with different outlet formats – mom and pop shop, non permanent shops in the market, and pavement and road side vendors. From the cultivation of the spices to their delivery to the customers, lots of

---

<sup>1</sup>Paulrajan Rajkumar, Professor, Saveetha Engineering College, Anna University, Chennai, India.

activities are carried out. Spices travel long distances to reach the consumer's kitchen. Every kilometer of the journey is a cost addition to the product price. There is a need to understand and assess the 'Food Mileage' of every spice. This undertaken study reveals the food mileage of selected five spices. Indian traditional grocery retail is not well organised in fact, it is unorganised and fragmented. Corporate business houses are active in the retail business of low volume and high value spice crops; the study indicates that the entry of corporates in grocery retailing is the beginning of advanced retailing practices.

### SPICE ROUTE

At various periods in history, spices have been as valuable as gold and silver. In 1498, Soon Vasco da Gama arrived at Calicut after the first direct sea voyage from Europe, a sea route that has linked Venice to South East Asia through Arabia. Establishment of this route predominately used for spice trading is known as the 'Spice Route'. The spice route had ignited the world economy from the end of the "Middle Ages" well into the "Modern Age". The middle age spice route was over seas and intercontinental and the driving force was the search for a way to reach the supply base. The modern spice route is not only global, but also intra-national, in search of customers. The route and the distance traveled is a logistical, distributional factor, which is very critical for any product in retail marketing, especially, the spices used in cooking through retail market. The customer buys spices in small quantities for domestic use, but the transportation cost has a huge impact on their prices. India is consuming almost all its spice production, and the "Spice Route" within the country is as important as the ancient route.

### SPICE SCENARIO OF INDIA

India is known as the home of spices and produces a wide variety of spices like black pepper, cardamom, ginger, garlic, turmeric, chilli and a large variety of tree and seed spices. India is a producer, consumer and exporter of most of the spices and spice products. Out of the 109 spices listed by the ISO, India produces as many as 75 in its various agro climatic regions. India accounts for about 45% of the global spice exports, though exports constitute approximately 8% of the estimated annual production of spices. Spice production in India, like much of the agriculture in the country, is undertaken in millions of tiny holdings and determines the livelihood of a large portion of the rural population (Spices Board 2011). Table 1 lists (Spices Board) the production of spices in India.

**Table 1.** Production of spices in India

Spice	Year 2003-04	Year 2004-05	Year 2005-06	Year 2006 07	Year 2007-08	Year 2008-09
Pepper	65000	62000	50000	50000	50000	46745
Chilli	1289340	1376580	1023128	1325273	1371250	1353796
Ginger	545280	647160	810934	721539	710476	795028
Turmeric	587130	751869	867074	856464	826030	892213
Corriander	405390	296050	257068	287647	286377	416663

Table 1. (continued)

Spice	Year 2003-04	Year 2004-05	Year 2005-06	Year 2006 07	Year 2007-08	Year 2008-09
Cumin	202980	176068	199854	176511	264860	283000
Fennugreek	79683	62745	38990	55780	67645	95833
Garlic	747780	739879	624794	833157	1088800	1009116
Tamarind	183871	194032	192186	190073	188278	193873
Others	111817	113140	114808	164209	209366	192583
Total	4218271	4419524	4178836	4660653	5063082	5278851

Among the various spices grown in the country, the chilli is the most widely grown spice with a share of 33.7 per cent in the total production. The demand for chilli as a spice, its oleoresins and as a natural colouring material is growing in the domestic as well as the international market. Turmeric has a share of 21.6 per cent in the total production of spices (GOI 2008).

### Spice demand scenario

The Indian economic policy has attracted global players to India in every industrial sector (Saxena and Sahay 2000). The retail industry has witnessed a great advancement into organised trading. The evolution of organised retailing had been initiated in a big way by the entry of corporates, both domestic and global. Though fruit, vegetable and grocery retail has been considered as a very low margin business, the market potential has attracted Indian business houses and corporates, making foray through different models, like single-format, multi-format or integrated urban-rural model (Sengupta 2008). Currently, organised retailers are establishing themselves in the metropolitan cities and urban markets. Spices are sold by the organised retailer in packs ranging from 10 g to 500 g. Traditional Indian retailers account for 12 million retail outlets all over the country and more than 40 percent of them sell vegetables and grocery (IBEF 2012). The Indian food retail consists of staple commodities comprising grains, pulses, spices and vegetables. Traditional retailing is not very much organised and which amounts to 97% of the total market (Ernst and Young 2006), extremely localized and highly fragmented with large a number of intermediaries. The rural market and the majority of the urban markets are served by traditional retailers. There are two classifications of their formats, stores and non-stores. Spices like Chillies, Turmeric and Garlic are sold by the traditional retailers, both in stores and in non-stores formats.

More than 90 per cent of the total production of spices in India is domestically consumed and the remaining is exported. The ‘Cooking Spices’, the spices used in cooking contribute to the household consumption of spices in India. Table 2 shows the consumption pattern of spices in India and Table 3 (MoA 2008, 23) shows the demand pattern of one of the spices — Turmeric in India during the year 2008–09 (Spices Board 2011).

**Table 2.** Consumption pattern of spices in India

Year	Production ('000 tonnes)	Domestic Consumption ('000 tonnes)	Domestic Consumption (%)
2000-01	3002.29	2766.37	92.14
2001-02	3343.85	3100.65	92.73
2002-03	3027.58	2748.43	90.78
2003-04	4218.27	3929.74	93.16
2004-05	4419.52	4024.86	91.07
2005-06	4178.84	3782.69	90.52
2006-07	4660.65	4230.01	90.76
2007-08	5063.08	4725.37	93.33
2008-09	5278.85	4858.13	92.03

**Table 3.** Demand Pattern of Turmeric during 2008–2009

Category	Demand (%)
Household	41.67
Institutional	9.17
Oleoresin	9.17
Pharmacy	8.33
Dyeing Industry	8.33
Exports	7.50
Polish & wastage	7.50
Seeds	8.33
Total	100.00

The spice trading sector is highly fragmented with a large number of intermediaries. The wholesale trade in India is also characterised by the presence of thousands of small commission agents, who operate strictly at a local level. In many cases, the small producers - mostly several hundred thousand small-holders, sell their crops to the local spice dealers for resale at the big market. Food processing firms also purchase spices through intermediaries called brokers.

Though India is a leading producer of spices in the world, only a very small portion is exported. The export of spices is limited to the firms in the organised sector, which are very few in number and rest of the firms in this business are mostly small family-owned proprietary level organisations.

### SPICE SUPPLY CHAIN

As the term ‘supply chain’ is more relevant for the manufacturing sector as it involved in transformation of materials. Whereas for perishable, we use the term ‘logistics’ represent the activities involved in moving the produce from the farmers to customers. The Council of Logistics Management defines logistics as the process of planning, implementing and controlling the efficient flow and storage of raw materials, in-process inventory, finished goods, services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements. (CLM 2001; Mentzer et al. 2001, 16).

Farmers produce and offer their spices directly to the consumers or through various players in the market. There are several players who are operating in the spice market, viz. agents, auctioneers, food processors, wholesalers and retailers. The farmers themselves sell their produce directly to the end consumers as sellers in the local markets; as regulated and unregulated ‘Farmers markets’, they sell to intermediaries – agents and organised retailers. The market place is in close proximity to their farm land and customers accessing the market are also nearby. Farmers selling Chillies, Turmeric and Garlic directly to the customers are amount to a very small fraction by volume. Farmers sell the bulk of their produce to agents and auctioneers. The agents buy even small quantities of produce from farmers and transfer them to wholesalers directly or through another agent. The auctioneers are those who have entered into a buying contract with the farmers for the whole or partial quantity of the produce and sell the produce to an agent or a wholesaler. Auctioneers also transfer the spices to wholesalers directly or through another agent.

Wholesalers sell to retailers, both traditional and organised retailers and to customers, who buy in large quantities. The whole sale market is a vital link in the spice supply chain. Both the traditional and organised retailers are invariably dependent on the whole-sale market in different proportions. Every spice has its whole-sale market; for Chilies, Guntur in Andhra Pradesh and Virudhunagar in Tamil Nadu are major markets. The spice processors buy spices from the agents, auctioneers, brokers and wholesalers. Processors who work for organised retailers and export business houses get supplies of raw spices from the corporate sources or directly from the farmers who have a contractual obligation of the supply of spices with the organised retailers. Processors do all or some of the activities like curing, drying, cleaning, sorting, grading, grinding, granulation profiling, colouring, blending, polishing and packing of spices.

## **FOOD MILEAGE**

The term ‘Food Miles’ (or ‘Food Kilometers’) refers to the distance food travels from the location where it is grown to the location where it is consumed; in other words, the distance food travels from the farm to the plate. Food miles do not refer to the input material, effort, efficiency or energy of the crop yield. Food miles are a way of attempting to measure how far food has traveled to reach the consumer. That includes the journey from the farm to the processor, from the processor to the retailer and finally from the retailer to the consumer. Studies estimate that processed food in the United States travels over 2080 km and fresh produce travels over 2400 km., before being consumed (Hill 2008).

Food mileage has been expressed in kilometers and mileage is the average value of the customer’s destination in Chennai. The food mileage calculated for the spices routed through organised retailing is based on the organised retailer’s outlets in Chennai. The food mileage is the Weighted Average Source Distance – WASD (Pirog and Benjamin 2003). The formula for the WASD is:

$$\text{WASD} = \frac{\sum \{( \text{Crop weight in Kg} ) \times ( \text{Distance traveled in km} )\}}{\sum ( \text{Crop weight in Kg} )}$$

“Food Mileage” is an indicator to evaluate the impact on the economic, social and ecological system and it associates quality food availability, food wastage and disposal. ‘Food miles’ is a factor to understand the inefficiency of the food supply chain. From the economic or business perspective, every food mile means cost. Every mile addition in transport is an addition to the cost of the goods. The customer pays for it. Food mileage calculations are limited to domestic retail consumption and the export activities shown in the figures are for better clarity.

## **OBJECTIVE OF THE STUDY**

The objective of this study is to investigate the current logistical practices of different players in the marketing of Spices, and to formulate logistical models. Organised marketers are likely to eliminate middlemen by going for direct dealing with farmers. Because of the added values and the changing customer expectations, organised grocery marketing is expected to grow and make an impact in the market. Thus, to understand the logistical activities of traditional and organised retailers of spices is important, because logistics plays a major role in retail spice marketing. Hence, this study has been under taken to understand the facts of logistical practices of spice markets.

The survey objective is to analyse the present retail market scenario of spices and understand the underlying logistical supply chain of spices both for traditional and organised retail industry to enable to calculate their food mileage of them. An exploratory study has been carried out to calculate the food miles for five spices and understand the travel route in traditional and organised retailing. As the Indian spice market is very huge, the study has been carried out to explore the logistical practices in the Chennai retail market and the whole sale markets for spices at Erode, Virudhunagar, Rajapalayam and Sankarankovil taking in to consideration the resource and location constrains the researchers have to work under.

The findings of this study are useful to understand the logistical practices of spice retailing between the current Indian traditional retailers and evolving organised retailers. As the time taken between any two points was not observed, the speed at which the spices reach their destination and the intermediate storage durations have not been studied. This is the limitation of this study and also the scope for further research. The efficiency of the different modes of the transport system and infrastructural facilities are out of the scope of this study.

## **RESEARCH METHODOLOGY**

This study is an exploratory one. Nine organised retailers, listed in table 4, wholesaler merchants who constitute 40 numbers, 30 commission agents, 10 Spice processors from Erode, Virudhunagar and Sankarankovil, 3 spice product manufacturers, 50 traditional retailers and 110 customers from Chennai were interviewed for the collecting data. Personal interviews and questionnaires were the instruments used. The questionnaire consists of open ended questions and the interview is a semi structured. Secondary data was collected from the Spice Board’s marketing offices at Chennai and the field office at Rajapalayam.

Five spices viz Chillies, Garlic, Ginger, Pepper (Black) and Turmeric have been selected for the study based on the volume of transaction and the rough estimate of consumption by the Erode Turmeric Merchants Association at Erode. The study revealed two distinct and primary logistical routes adopted one each by the traditional retailers and organised retailers. The Spices that traveled through those routes log different mileages. The data collected were, compiled and analysed. The effects of the ‘Food Mileage’ on both the retail models for the spice food chain are tracked.

**Table 4.** List of organised retailers

Sl. No.	Name of the player
1	Food Bazaar (Pantaloon Retail (India) Ltd)
2	More (Trinethra Superretail Ltd.)
3	Reliance Fresh (Reliance Retail Ltd.)
4	Spencer’s Retail Ltd
5	Subhiksha Retail Ltd.
6	Daily Life Super Market
7	Grace Super Market
8	Jeevan buy N save
9	Kovai Pazhamuthir Solai

#### **TRADITIONAL RETAIL MILEAGE**

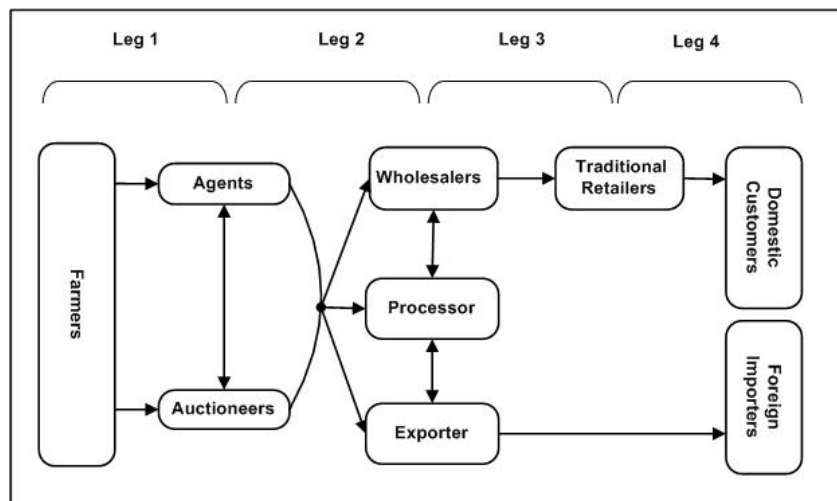
The ‘Traditional retail model’ is the route for the logistical flow of cooking spices which is predominantly followed currently in traditional grocery retail. Figure 1 outlines the spice logistics of the traditional retail model. The players involved in this model are the farmers, agents (commission agents), auctioneers, wholesalers, spice processors and the traditional retailers of all types of formats. Farmers are the cultivators of spices and the source of supply. They are small measured by their land holding and yield volume of crops, and are highly fragmented across geographical areas. In this traditional retail model, farmers sell their produce to customers and to the intermediates. Agents, auctioneers, wholesalers and traditional retailers are merchants and intermediaries in spice marketing. Agents and auctioneers are the first level of intermediaries in the spice supply chain and they transfer the crops from the farmers to the wholesalers or processors. The numbers of transfers of ownership as well as transshipments of spices depend upon the number of agents present, between the farmers and the wholesalers. An agent operates locally (‘Local’ refers to the geographic location where it was produced or close by) from small shops and works for one or more wholesalers and/or processors.

The processors do all the processing activities from curing to the packing of spices. Processors can be broadly classified into two groups, based on the operational modalities. One group of processors, who carryout spice processing for wholesalers (or organised retailers or exporters). Raw spice sourcing and some case package materials with specific brands are taken care by the wholesalers. The processor processes the spices as per the instructions and specifications of the wholesalers. Contrary to this, another group of processors who buy the spices from agents, auctioneers, brokers and the wholesalers, process the spices and supply the ‘processed spices’ to wholesalers.

The traditional retailers buy the spices in bulk from wholesalers, and sell them directly to the customers in small quantities for household consumption. Customers who buy for commercial establishments like hoteliers procure their spices from the whole sale market directly.

The Food Mileage values for the selected five spices for this study are shown in the Table 5. Spice logistics has four legs as shown in figure 1 and operations in the individual legs are:

- Leg 1:* The first move in this logistical journey starts with the transportation of the spice crops from the farmland to the agent. Farmers are responsible for bringing the spices to the agent's premises. In case of contact, the auctioneers take care of the transportation from the farmland to his premises and transportation is the seller's responsibility for the transaction of crops between the agents and the auctioneers. The modes of transport are mini truck, farm tractor, bullock cart, bi cycle, tricycle, motor cycle and head loads.
- Leg 2:* The outward transportation from the agents to the wholesalers is handled by the agents. The mode of transport is (temperature) unconditioned trucks and for shorter distances farm tractors are used. The agents make arrangement to pickup the crops directly from the farming locations to deliver at the wholesaler's premises for huge volumes of produce.
- Leg 3:* Traditional retailers, cart vendors and commercial customers buy very small volume and make their own arrangement for transport from the wholesale market to their destinations, along with other vegetables and grocery. The retailers jointly hire a truck to share the transportation cost. The regular modes of transport for them are the mini trucks, motor cycles, bi-cycles, tricycles, and push carts.
- Leg 4:* Domestic customers shop at traditional retail stores which are conveniently located close to their residence, and walk down. The average distance is less than half a kilometer (average distance has been rounded off as 1 kilometer in table 5).



**Figure 1.** Spice Logistics of the Traditional Retail Model



**Table 5.** Food Mileage in the Traditional Retail Model

Spice	Leg 1	Leg 2	Leg 3	Leg 4	Total Mileage (km)
Chilies	10	600	30	1	641
Garlic	10	880	30	1	921
Ginger	15	1250	30	1	1296
Pepper (Black)	25	1250	30	1	1306
Turmeric	15	550	30	1	596

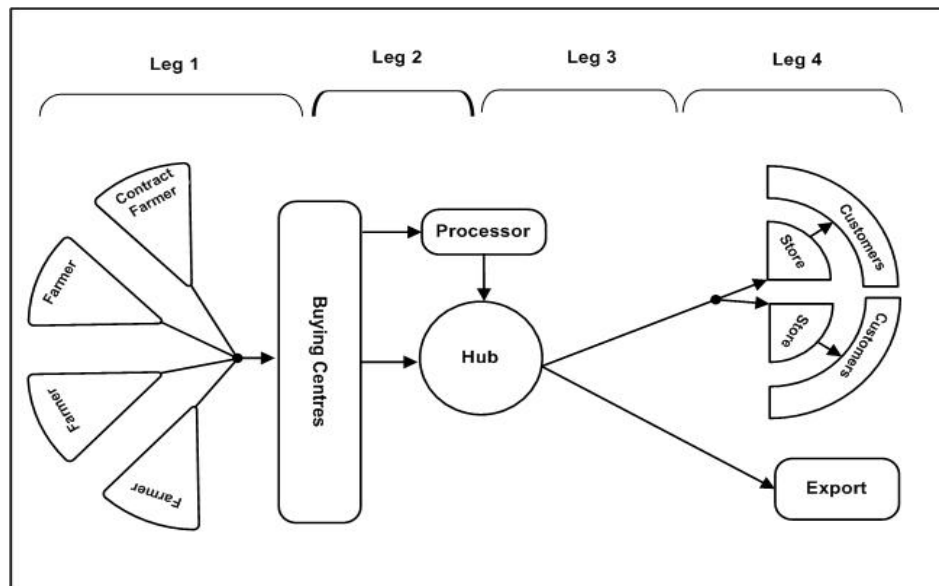
### ORGANISED RETAIL MILEAGE

At present the organised route of spices has been dominated by organised exporters, who are not in the vegetable and grocery retail business. The role of organised retailers is increasing on the high volume domestic sale of spices. The organised grocery retailers who are in the vegetable and grocery retail and sell spices are adopting the 'Hub and Spock' model of supply chain with minor modifications to fit in to their marketing and logistical strategies of their organisations. Figure 2 illustrates the logistics of the organised retail model of grocery and vegetable retail marketing. Fewer players are involved in this model compared to the traditional retailing model. Farmers, organised retailers, processors, wholesalers and customers form this chain. The buying centers, hub and stores (retail outlets) are the operational units of the organised retailers. Small farmers and contract farmers, who executed a trade contact with the organised retailers, are the primary source of supply to the organised retailers. The buying centers purchase vegetables, spices and pulses directly from the farmers and transport them to the hubs. A hub is served by one or more buying centers and a buying center serves to one or more hubs. A hub infrequently buys small volumes of spices like garlic from the local wholesale market to balance the demand-supply gap. The hub inturn distributes the goods to the stores attached to it. The processors process the spices, which are either supplied by the hub or received from buying centers and pack the processed spices and spice products in the organised retailers' own store brands. A store is served by only one hub and sells goods in retail quantity to the customers.

The Food Mileage values for the selected spices for this study are shown in the Table 6. Food logistics has four legs and operations in the individual legs are:

*Leg 1:* Farmers transport vegetables, pulses and spices from the farming location to the buying centers. The modes of transport are mini trucks, farm trackers, bullock carts, bi-cycles, tricycles, motor cycles and head loads. The buying centers arrange to pick up the produce in a truck from the farm gates of the contract farmers.

*Leg 2:* The transport of goods from the buying centers to the hub is arranged by the buying centre and the mode of transport is unconditioned trucks.



**Figure 2.** Spice Logistics of the Organised Retail Model

*Leg 3:* Goods are transported from the hub to the stores twice a day and collect stores return (disposal) from the stores to the hub once a day. Mode of transport is unconditioned small trucks.

*Leg 4:* The customers buy and pick up vegetables and groceries from the organised retail stores. Home delivery is provided by the stores for a shorter coverage area and high value of purchase.

**Table 6.** Food Mileage in the Organised Retail Model

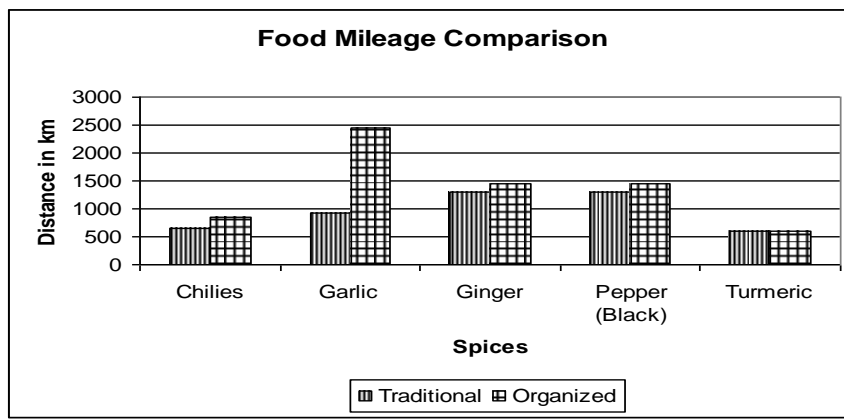
Spice	Leg 1	Leg 2	Leg 3	Leg 4	Total Mileage (km)
Chilies	15	800	30	5	850
Garlic	15	2400	30	5	2450
Ginger	15	1400	30	5	1450
Pepper (Black)	15	1400	30	5	1450
Turmeric	15	550	30	5	600

## CONCLUSION

Traditional and organised retailers follow distinct logistical routes and clock different food mileages. Organised retail trade has resulted in more and more goods traveling ever-increasing distances from cultivation to ultimate consumption. There is a paradigm shift from the local food system to the global food system. Lesser food mileage refers to more of local foods, and greater mileage refers to more of global foods in our dietary habits. Of the five spices assessed, the model wise comparison of mileage is depicted in Table 7 and Figure 3.

**Table 7.** Food Mileage of Traditional and Organised models

Model	Spice Mileage in Km				
	Chilies	Garlic	Ginger	Pepper (Black)	Turmeric
Traditional (T)	641	921	1296	1306	596
Organised (O)	850	2450	1450	1450	600
Difference (O - T) in Km	209	1529	154	144	4
Difference (O - T) in %	33	166	12	11	1



**Figure 3.** Food Mileage comparison (Model Wise)

One of the many factors that have contributed to higher ‘food miles’ for the organised retailer is the result of a wider sourcing of supplies closer to the harvest zones, which are located far away from the retail hubs. Other reasons for the increase in food miles are greater product availability at the retail outlets, particularly for seasonal items, which consumers now buy all the year round, and consumers being exposed to a wider range and higher quality spices. The organised retailers’ business strategy is to reduce the over all cost than the distance traveled. Food mileage is one of the factors along with the value density (ratio of the product value to the weight), utilization of vehicle capacity, and the average payload weight, to calculate the efficiency and profitability of the business. The result of this study reveals a significant increase in food miles in case of organised retailers. The present trend indicates that ‘food mileage’ is traded off with better utilization of cheaper manpower available in the rural areas, where major cultivation is located, continued business opportunity to marginal farm owners, persistent job availability to farm workers, and indirect job creation for professions associated with transportation and agriculture. The available diverse agro climatic regions, huge untapped rural resources, sharply rising food demand, wide market, growing modern market mechanisms, government’s initiatives, expected investments in agribusiness and infrastructure are the tilting factors of the rural market integrating into global supply chain.

## REFERENCE

- Ernst and Young. 2006. *The Great Indian Retail Story*. New Delhi, India: Ernst and Young.
- GOI Government of India. 2008. Spices. Government of India. <http://india.gov.in/sectors/agriculture/spices.php> (accessed December 9, 2008)
- Hill, Holly. 2008. Food Miles: Background and marketing. Fayetteville, AR: ATTRA - National Sustainable Agriculture Information Service. [www.attra.ncat.org/attra-pub/PDF/foodmiles.pdf](http://www.attra.ncat.org/attra-pub/PDF/foodmiles.pdf) (accessed September 19, 2008).
- IBEF India Brand Equity Foundation. 2012. Retail Industry: April-June 2011. Haryana India: IBEF. [www.ibef.org](http://www.ibef.org) (accessed January 21, 2012).
- Mentzer, John T., William DeWitt, James S. Keebler, Soonhong Min, Nancy W. Nix, Carlo D. Smith, and Zach G. Zacharia. 2001. Defining supply chain management. *Journal of Business Logistics* 22 (2): 1–25.
- MoA Ministry of Agriculture. 2008. Area and Production Statistics of Arecanut and Spices, ed. P. Premaja and P. K. Malathy. Calicut, Kerala: Ministry of Agriculture, Government of India.
- Pirog, Rich, and Andrew Benjamin 2003. Checking the food odometer: Comparing food miles for local versus conventional produce sales to Iowa institutions. Ames, IA: Leopold Center for Sustainable Agriculture, Iowa State University.
- Saxena, K. B. C., and B. S. Sahay. 2000. Managing IT for world class manufacturing: The Indian scenario. *International Journal of Information Management* 20 (1): 29–57.
- Sengupta, Anirban. 2008. Emergence of modern Indian retail: An historical perspective. *International Journal of Retail & Distribution Management* 36 (9): 689–700
- Spices Board India. 2011. Indian Spice Exports. <http://www.indianspices.com/html/s0420sts.htm> (accessed December 9, 2011)