A Study on Freight Movement and Its Assessment in Kerala

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ABSTRACT

Easy and efficient movement of goods is a prerequisite for a sustainable economy. The supply of essential goods according to their demand in a large country like India is a challenging task. Kerala being a consumer state in India depend on other states for almost all commodities of daily consumption. This work deals with the analysis of freight movement data and various aspects on the working of goods transport industry in Kerala state of India.

Introduction

A well-connected and coordinated system of transport is important for the sustained growth of a country. Transportation industry has seen massive growth over the recent years. With the spread of road network to all parts of the country, the overall output of the system has multiplied. All the major modes of transport, namely surface, water and air, have improved their efficiency to help the movement of people and goods.

Establishment of industries and advancements in technologies has resulted in a greater production of goods which in turn resulted in need of transportation of goods from one place to another. Goods vehicles like lorries, trucks, tippers, trailers, auto rickshaws etc. play a vital role in the movement of goods. As the goods vehicle drivers are constrained with time and responsibilities they bear, these heavy vehicles often met with accidents and the cost of such an accident is comparatively high. The population of vehicles has been growing consistently over the past two decades in India. The same increasing trend has been followed by the Goods vehicles till 2015. Since then the rate of newly registering good vehicles has been diminishing. The major reason for this downfall is the crisis faced by the industry due to the surging fuel, operations and maintenance cost.

Kerala being a consumer state, depend on other states for almost all commodities of daily consumption. Inter –state goods movement in Kerala are handled predominantly by road based private goods carriers, followed by Government owned rail network, private operated inland waterways (IWT) and coastal shipping. It was observed that more than 80% of the goods movements are oriented towards the State while hardly 20% of the movements were made from Kerala to other States.

In this background, it was important to study the characteristics of goods transportation in Kerala. This work deals mainly on how the goods vehicle industry helps to sustain the commodity demand in the state. An analysis of both primary and secondary data of goods vehicles was conducted. From these data, details of major commodities, their routes, the cost involved and vehicle operating expenses can be identified. Major issues in goods vehicle operations in Kerala could also be identified from the primary data collection.
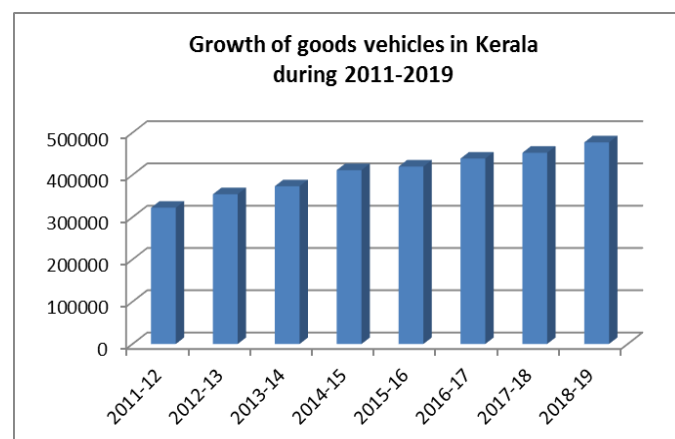

Figure 1. Growth of goods vehicles in Kerala

Study Area

The study is intended to include the whole of Kerala and it was divided into three regions, namely North, South and Central Kerala. In northern Kerala, data were

collected from various towns in Kannur, Kozhikode and Malappuram districts. In central Kerala, surveys were done in Kanjikode in Palakkad and Vallarpadam

Scope and Objectives

The major objectives of this study are

1. To study the operation of goods industry in Kerala
2. Identify the problems faced the industry

The Scope of the study is limited to the goods vehicles plying in the state of Kerala in India.

Data Collection

Secondary Data: Check-posts

A one-month data corresponding to the month of March 2017 from 65 out of all the 83 check-posts in Kerala were obtained for this purpose. This data corresponds to the tax regime before the introduction of the Goods and Service Tax (GST) all over India. A total of 10,48,576 loaded goods & vehicles were recorded to have passed through the check posts during the month of March 2017.

Primary Data: Vehicle Operators

After the analysis of secondary data, primary data were collected for trucks in Kerala. The total study area was divided into three regions namely north, central and southern Kerala. Data were collected from fixed sample of vehicles from each region.

The sample selection was based on Bill Godden sample size formula for finite and infinite population, which was found useful in similar works. Thus the required sample sizes corresponding to each region were calculated. The Bill Godden formula for the sample size is defined for both finite and infinite population.

For an infinite vehicle population, where population is greater than 50000, the following equation is used

$$SS_i = \frac{Z^2 \times P \times (1-P)}{C^2}$$

Where
SS_i = Sample Size (i= infinite)
Z = Z-value (e.g., 1.96 for a 95 percent confidence level)
P = Percentage of Population picking a choice
C = Confidence interval expressed as decimal

terminal yard in Cochin. In southern Kerala, Truck drivers were surveyed from Thiruvananthapuram and Kollam districts.

Data Analysis

Analysis of Secondary Data
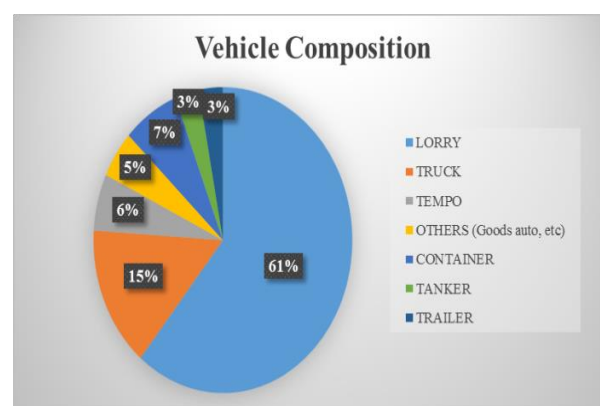
Secondary data collected were analysed

Figure 2. Vehicle Composition

Type of goods transported were divided mainly into three categories,

1. Perishable goods
2. Non-perishable goods
3. Hazardous goods

Perishable goods are those which becomes inconsumable within a short period and which has to reach the customer as quickly as possible for satisfactory use. Fish, meat, egg and milk products are some of the examples of perishable goods. Non-perishable goods are those which whose quality does not deteriorate as fast as perishable goods. Most of the food grains, household equipment's and consumer goods come under non-perishable goods. Hazardous goods, as the name suggests, these are goods which are potentially dangerous and may lead to severe problems if it is mishandled or improperly stored or roughly transported. The major goods categorized by these three types are listed in Table 1.

Table 1. List of Major Goods Transported

Perishable	Non perishable
Wheat	Aluminum products

Perishable	Non perishable
Edible oils	Asbestos
Edible seeds	Asphalt
Fish	Automobiles
Legumes	Bricks & tiles
Other food grains	Cement
Bakery items	Chemical Products
Alcoholic prod.	Coir & jute products
Animal feeds	Electrical goods
Dry fruits	Fertilizers
Milk products	Glass products
Culinary nuts	Household products
Floriculture	Iron & steel products
Soft drinks	Machinery goods
Medical - Surgical	Construction materials
Natural spices	Other goods
Fruits, vegetables	Other metal products
Ice	Paints & varnishes
Eggs	Plastic products
Food items	Plumbing & sanitary
Rice & paddy	Rubber products
Oils	Sand & gravel
Coconut products	Spare parts
Provisional items	Stationary items
Cereals (grains)	Textile products
Meat	Timber products
Horticulture	Waste materials
	Empty barrels
	Leather goods
	Gas items
	Gold
	Gems
	Marbles & granite

Apart from these major perishable and non-perishable goods, a few hazardous goods are also transported heavily within Kerala. LPG explosives and petroleum products are the most common forms of hazardous goods transported.
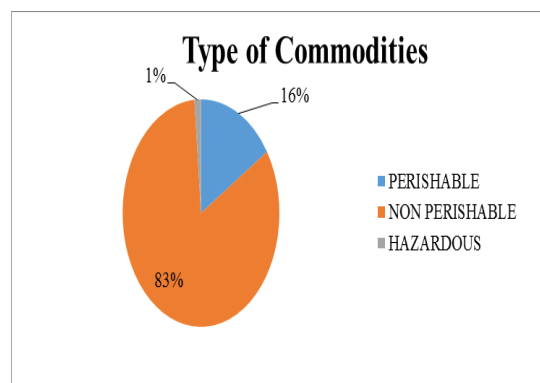

Figure 3 Types of commodities

Figure 3 shows the percentage of goods transported under each category. 83% of goods were of Non-perishable type while 16% were of perishable type. The proportion of major goods transported in both perishable and non-perishable goods is depicted in the pie chart given in Figure 4 and Figure 5.
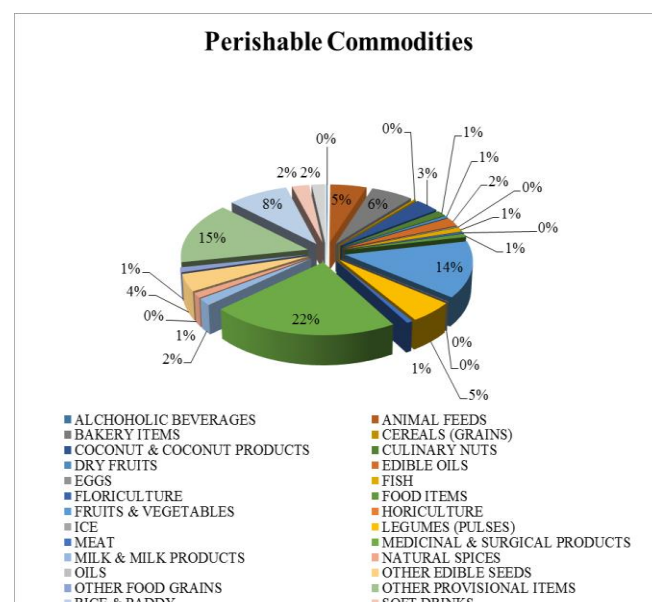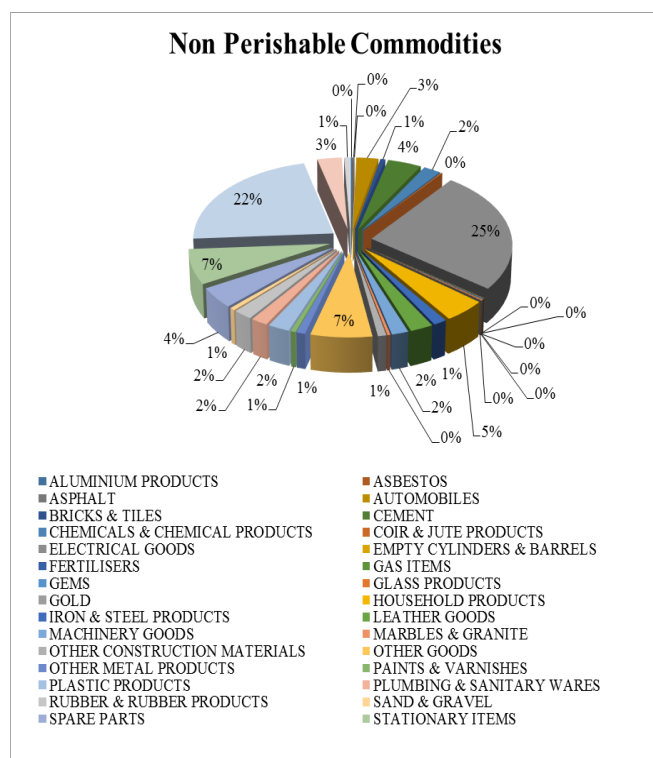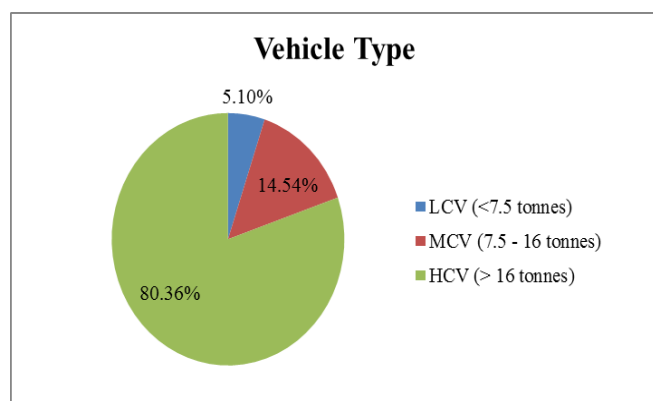
Figure 4 Major perishable commodities

Non Perishable Commodities

- ALUMINIUM PRODUCTS
- ASBESTOS
- ASPHALT
- AUTOMOBILES
- BRICKS & TILES
- CEMENT
- CHEMICALS & CHEMICAL PRODUCTS
- COIR & JUTE PRODUCTS
- ELECTRICAL GOODS
- EMPTY CYLINDERS & BARRELS
- FERTILISERS
- GAS ITEMS
- GEMS
- GLASS PRODUCTS
- GOLD
- HOUSEHOLD PRODUCTS
- IRON & STEEL PRODUCTS
- LEATHER GOODS
- MACHINERY GOODS
- MARBLES & GRANITE
- OTHER CONSTRUCTION MATERIALS
- OTHER GOODS
- OTHER METAL PRODUCTS
- PAINTS & VARNISHES
- PLASTIC PRODUCTS
- PLUMBING & SANITARY WARES
- RUBBER & RUBBER PRODUCTS
- SAND & GRAVEL
- SPARE PARTS
- STATIONARY ITEMS

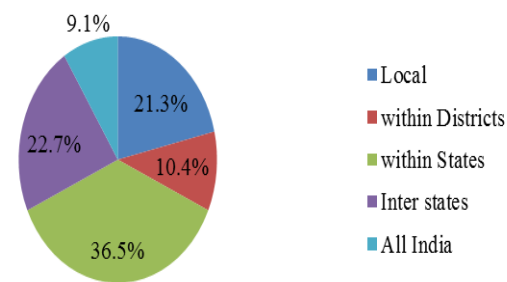**Figure 5** Major non-perishable commodities

Analysis of Primary Data

Primary data were collected by conducting a questionnaire survey on goods operators and drivers in all three regions of the study area.
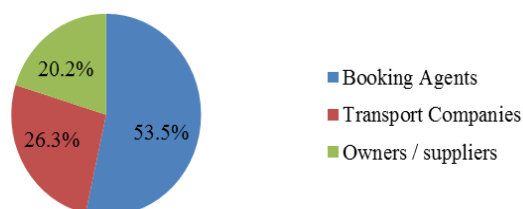
Based on the analysis, the details regarding the goods operations were studied. The observed characteristics are represented by the following charts.
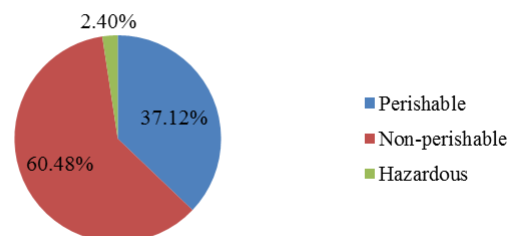

Vehicle Type

- LCV (<7.5 tonnes): 5.10%
- MCV (7.5 - 16 tonnes): 14.54%
- HCV (> 16 tonnes): 80.36%

Figure 6 Types of goods vehicles

Common routes

- Local: 21.3%
- within Districts: 10.4%
- within States: 36.5%
- Inter states: 22.7%
- All India: 9.1%

Figure 7 Common routes

Booking mediators

- Booking Agents: 53.5%
- Transport Companies: 26.3%
- Owners / suppliers: 20.2%

Figure 8 Booking mediators

Type of commodities

- Perishable: 37.12%
- Non-perishable: 60.48%
- Hazardous: 2.40%

Figure 9 Types of commodities

Perishable Commodities

- Cashew
- Coconut
- Oil
- Coffee
- Dry coconut
- Fruits
- Liquor
- Maida
- Onion
- Rice
- Wheat
- Spices
- Sugar
- Vegetables
- others
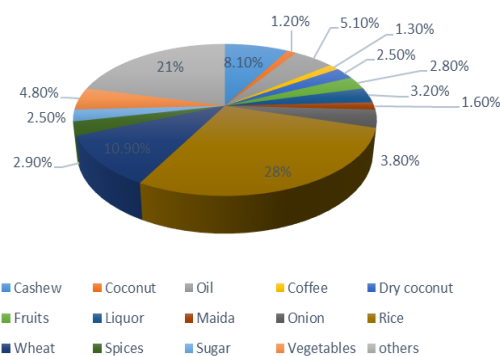
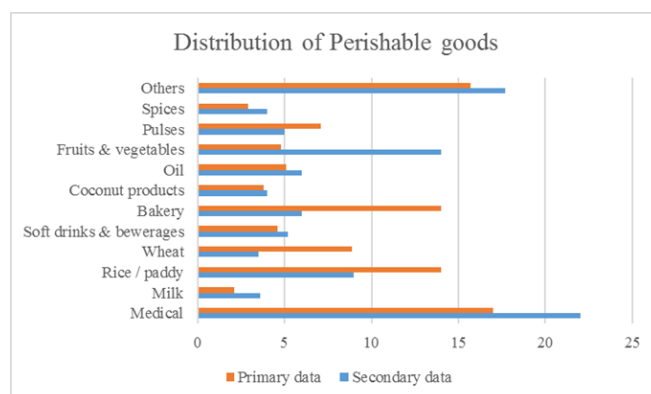**Figure 10** Perishable commodities as per

primary data

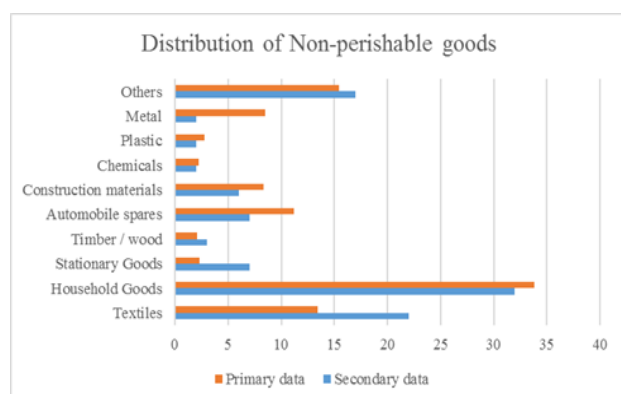**Figure 11** Comparison of perishable goods

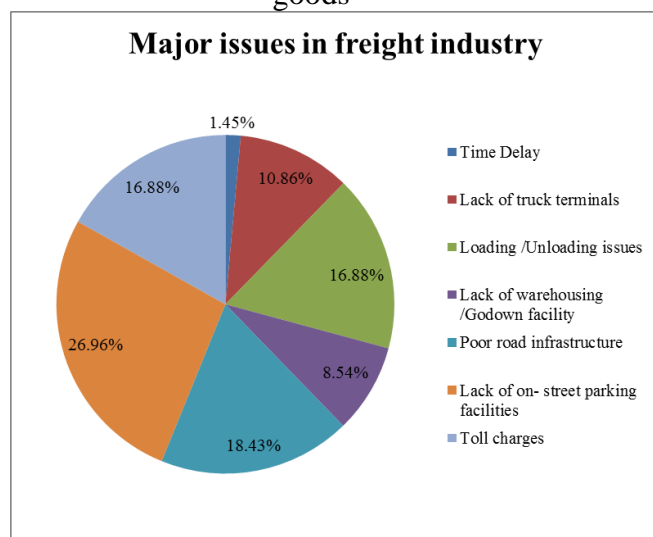**Figure 12** Comparison of non-perishable goods

Figure 13 Major issues faced by goods industry

Based on the analysis of questionnaire from the operators, the details regarding the goods operations were identified as follows. Majority of vehicles surveyed came under the categories. as depicted in figure. 6. It is observed that over 80% of the vehicles carrying goods were heavy commercial vehicles. 14%

vehicles among the remaining were medium commercial vehicles.

Common route type served by goods operators are shown in Figure 7. Most number of vehicles served inter-district trips within the state of Kerala. The inter-state trips were handled only by 22.7% of operators whereas 21.3% of vehicle operators plied only local routes. Considering the average trip distance, 37.2% of vehicles travelled less than 250 kilometers per trip. Nearly, 35% of vehicles showed average trip distance between 250 and 500 kilometers and remaining 25% vehicles plied on an average distance between 500 and 1000 kilometers per trip.

More than half of goods trips (53.5%) are booked through booking agents as shown in figure 8. The goods trips booked through Transport companies were around 26.3% where as those booked though owners and suppliers reached contributed to 20.2% of the total trips.

As identified from the secondary data, majority of vehicles (60.48%) that were surveyed as a part of primary data collection transported non-perishable commodities. Perishable commodities were transported by 37.12% of vehicles. The remaining 2.4% of vehicles carried unclassified and hazardous goods as shown in Figure 12.

The response from vehicle operators, as given in figure 13, show that the lack of on-street parking facilities is the most difficult problems faced by the goods industry in Kerala. 27% percentage of drivers/operators agreed over this point. 18.5% drivers attributed to poor road infrastructure as the reason for the problems in the industry. Issues in loading-unloading and high toll charges also contributed to the losses to the industry.

Results & Findings

The data corresponds to the characteristics and operation of goods vehicles plying in Kerala state. Secondary data included details of valid registered goods vehicles from Kerala Motor Vehicles Department. Primary data comprised of economic and operational aspects of goods vehicle operations collected from major commercial centers in Kerala.

Details from all the major check posts in Kerala for a period of one month are included. Analyses on this data can give a rough idea about the details regarding important routes, major goods transported and respective desire lines of important routes. Out of the 19,262 vehicles recorded on 5th of March 2017, the highest volume was noted for lorry and trucks, which comprises of 76% of total traffic. All the other goods modes were comparatively very less and were found to be less than 10%. Goods transported were categorized into perishable, non-perishable and hazardous classes. Based on the analysis, it was found that 83 percent of total goods transported were non-perishable goods, 16

percent perishable goods and 1 percent of hazardous goods. Of the perishable goods, the major proportions of goods were medicinal and surgical products which accounted to 22 percent. 15 percent were unclassified provisional items, 14 percent were fruits and vegetables, 8 percent were rice and paddy, 6 percent were bakery items.

The primary data included representative samples from North, Central and Southern Kerala. Respective sample sizes corresponding to each region fixed based on Bill Godden's sample formula. Out of the total goods vehicles sampled, 80% of vehicles were heavy goods vehicles of capacity more than 16 Tonnes. Most of the vehicles were less than 10 years old. Similarly, 37% of these vehicles served within the state where as 23% transported goods in interstate routes. Only 9% of vehicles had All India Permit. Various types of services are provided by the freight operators in Kerala. Of the total goods vehicles, 46% transported truck loads, 28% carried containers and the remaining were parcel carriers. More than 54% of truck services booking is done by booking agents, 26% of the vehicle booking is done through transport companies. Trip distance for the trucks varied between less than 50 kilometers to more than 1000 kilometers. 37% of trips were within 250 kilometers of distance. About 35% trips were between 250 and 500 kilometers. Only 3% of trips were more than 1000 kilometers.

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