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A STUDY ON VALUE CHAIN ANALYSIS OF CASTOR IN SALEM AND NAMAKKAL DISTRICT, TAMIL NADU

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ABSTRACT

Oilseed crops are the second most important agricultural product after cereals, accounting for 14% of total planted land. These oilseeds are mostly grown in rainfed conditions and provide a source of income for small and marginal farmers in the country's arid and semi-arid habitats. Castor is a commercially significant plant across the world. Castor may have evolved in the tropical regions of both India and Africa. This study was conducted in the Salem and Namakkal district of Tamil Nadu. These districts were chosen purposively because they were largest castor producing districts in Tamil Nadu. Five villages were chosen from each block, with five sample farmers chosen from each village, to carry out the research. Thus, the total sample size of the farmers accounted to 100. Data were collected from the sample farmers and other value chain actors by personal interviews with the assistance of a comprehensive interview schedule. The statistical techniques like percentage analysis, cost and returns, price spread analysis and Garrett ranking technique were used. Results showed that majority of sample farmers (49 per cent) were of 35 to 50 years of age; 64 per cent had the secondary education; 91 per cent of the respondents had agriculture as their main occupation; 49 per cent of the farmers had small land holding; 49 per cent of farmers earned between Rs.1 to 2 lakhs; 64 percent of the farmers had 15-30 years of experience. And 41-50 aged intermediaries predominantly involved in castor marketing and value addition; experienced intermediaries involved in marketing of castor.

INTRODUCTION

Oilseed crops are the second most important agricultural product after cereals, accounting for 14% of total planted land. India, along with the United States, China, and Brazil, is one of the world's four major participants, being a key oilseed grower, oil producer, importer, and exporter. These oilseeds are mostly grown in rainfed conditions and provide a source of income for small and marginal farmers in the country's arid and semi-arid habitats. The majority of vegetable oil produced in India comes from nine oilseeds: castor, rapeseed, mustard, sesame, safflower, niger, soybean, and sunflower, which constitute the edible group, and linseed and castor, which form the non-edible group. The plant Castor (Ricinus communis L.) belongs to Euphorbiaceae family (DOR, 2013). Three nations (India, China, and Brazil) contributed 93 percent of the world's supply of castor oil in 2019-20. Because production is focused mostly in these three nations, overall castor production varies greatly from year to year owing to variations in rainfall and the size of the planting area. As a result, this concentration has resulted in the production of cyclic castor. Thus, diversifying castor producing zones and increasing irrigation output should help to lessen the climatic influence on castor supply oil (DRMR, 2015).

With 92 percent of total world castor oil output, India leads global castor production and dominates international castor oil trade. The oil content of the Indian type of castor is 48%, of which approximately 42% may be extracted while the cake remains the rest. Castor grows well in tropical climates and has a crop life of 4-5 months (Singh et Al., 2013, 2014). It is cultivated in India in July-August and harvested in January-February. Arrivals at the market begin in January and continue until the middle of May. Gujarat, Andhra Pradesh, Tamil Nadu, Odisha, and Rajasthan are the leading castor-growing states. It is also grown in Uttar

Pradesh, Maharashtra, Karnataka, Madhya Pradesh, and Bihar (DVVOF, 2017; Safdar *et al.*, 2023). According to government estimation, the total area under castor seed cultivation in India for the year 2020-21 (April-March) will be 826,120 hectares. This was a 15% decrease from the previous year. In 2020-21, total seed production in India is expected to reach 1.902 million tonnes, against 1.953 million tonnes in the previous year.

With an area of 15,000 hectares, Tamil Nadu is a prominent castor growing state in India. Salem, Namakkal, Erode, Dharmapuri, and Perambalur are the major castor producing districts. Castor is mostly grown in Tamil Nadu as a rainfed crop or as an intercrop with groundnut. The main seasons for castor farming in Tamil Nadu are June-July and November-December. Castor hybrid production as a pure crop in a rainfed ecosystem is 1800 kg per hectare and 3000 kg per ha in an irrigated ecosystem. In Tamil Nadu, popular castor hybrids include YRCH 1, DCH 519, and GCH 4 (Hema, 2018).

The study of castor value chain analysis would aid in analyzing the roles of the different actors involved in the castor value chain, as well as in studying the constraints and opportunities for enhancing the efficiency of the value chain partners. A well-managed value chain would minimize production costs while enhancing market efficiency and farmer profitability. The findings would aid in making decisions and overcoming constraints in castor production and selling, and this advancement might assist to maintain and sustain castor farmers' revenue.

Research Methodology:

Selection of study area

This study was conducted in the Salem and Namakkal district of Tamil Nadu. These districts were chosen purposively because they were largest castor producing districts in Tamil Nadu. The area under castor was 1166 hectares and 1416 hectares in Salem and Namakkal district respectively. Similarly the production was 357 tonnes and 416 tonnes respectively (Government of Tamil Nadu, 2021)

Sampling design

In the second stage of sampling, two districts were chosen based on the largest area under castor cultivation. In Salem, two blocks namely Pethanaickenpalayam and Attur; in Namakkal two blocks namely Trichengode and Elachipalayam were selected blocks were selected based on area under castor. In the third stage, five villages were chosen from each block, with five sample farmers chosen from each village, to carry out the research. Thus, the total sample size of the farmers accounted to 100.

Figure 1. Selection of sample farmers

Figure 1. depicts the sampling procedure followed to select sample farmers in the study area.

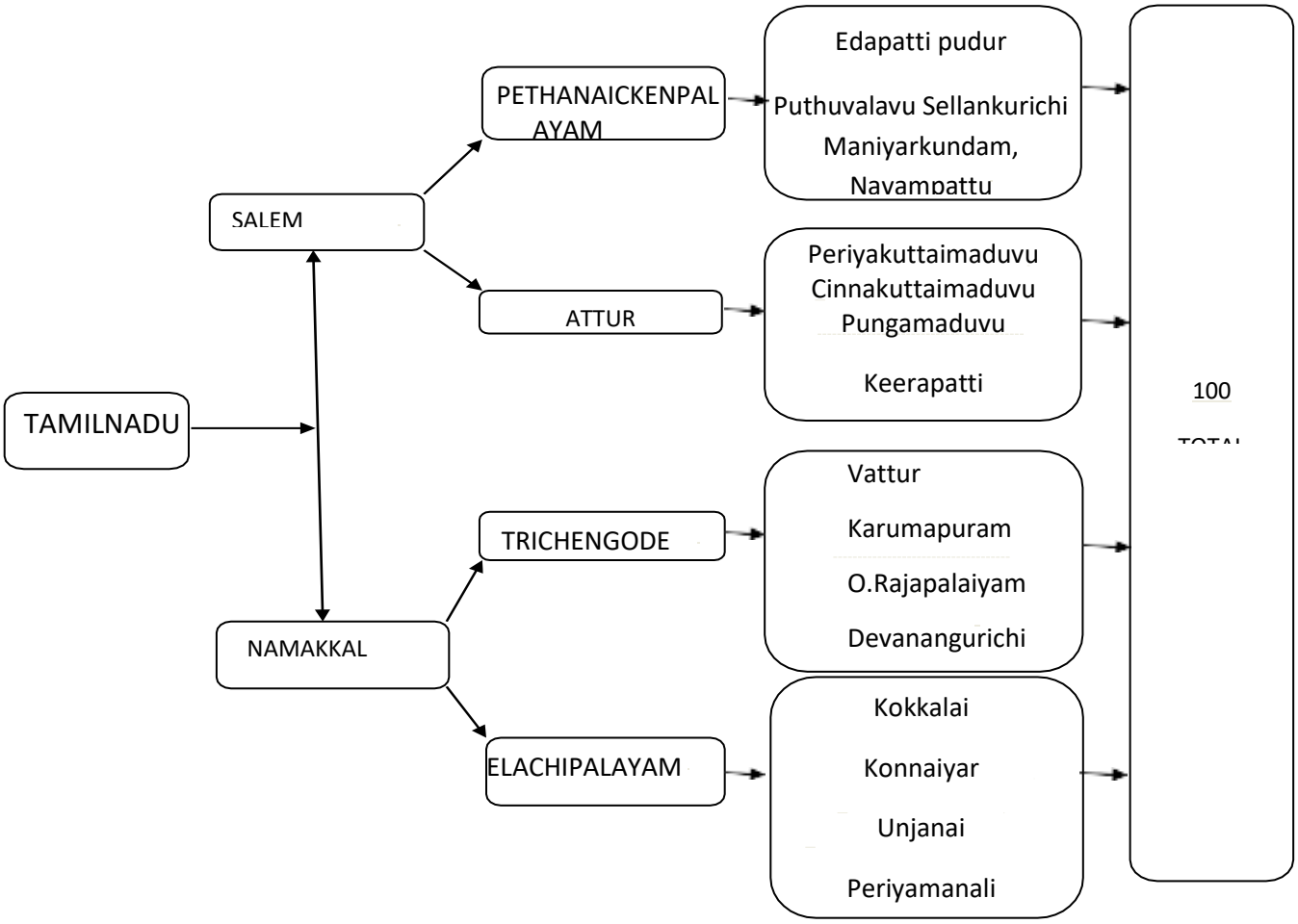

Figure 2. Selection of sample intermediaries

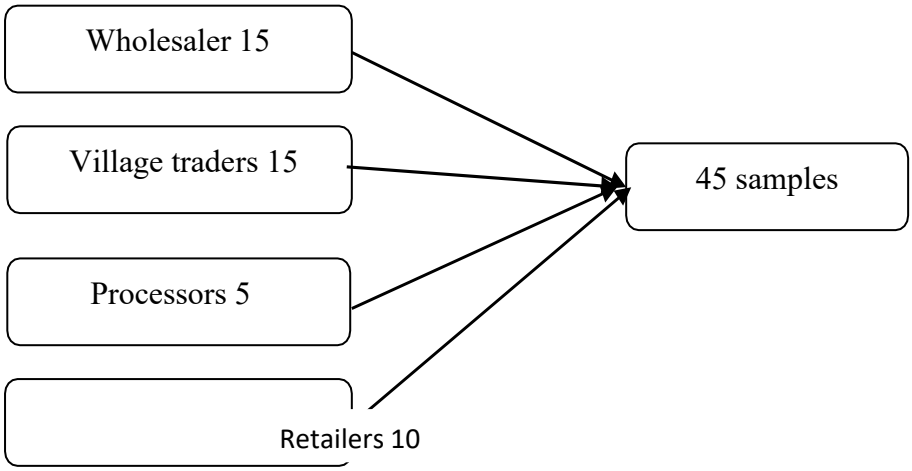

Figure 2. depicts the sampling procedure used to select the intermediaries such as wholesalers, retailers, processors, and exporters for the study.

Collection of data

Secondary Data

General information about the district, such as total population, land utilization pattern, cropping pattern, agro-climatic conditions, rainfall and irrigation sources were gathered from records available at the respective district's statistical office, Government publications and other authentically published materials.

Primary Data

The primary data for the study were collected through personal interviews with the assistance of a comprehensive interview schedule. For each value chain intermediaries, a separate interview schedules was developed. The farmer interview schedule covered topics such as general characteristics, details on cultivation practices, fixed cost of input, marketing details, and cultivation challenges. The schedule for intermediaries included information such as general characteristics, quantity procured, information about costs incurred, profits realized, and challenges faced by them. The collected data was tabulated, processed, mathematically and statistically analyzed.

Tools for analysis:

Raw data were processed and analyzed using appropriate statistical techniques. The analytical techniques employed in this study were:

- Percentage Analysis
- Cost and returns
- Price spread analysis
- Farmer's share in consumer rupee
- Marketing efficiency by Acharya method
- Garret ranking technique

Results and Discussion:

Mapping the Castor value chain actors

Role of actors in Castor value chain

1. Farmer (Producer)

Well drained red loamy fertile soil was preferred for the cultivation of castor. Local and University variety seeds were used for castor cultivation. Irrigation was given immediately after sowing of seeds followed by weekly irrigation depending upon weather condition; Other cultural practices like weeding and spraying were done by the farmer. Hence, the role of the farmer is to produce the castor seeds.

2. Village Traders

The wholesalers purchased the produce from the farmers. They sold the produce to the wholesalers and processors.

3. Wholesaler

The wholesalers purchased the produce through Village traders or directly from the farmers. They sold the produce to the processors and consumers. Processors used produces foroil making and consumers purchased the oil for household and other uses.

4. Processor (Oil miller)

The processors purchased the produce from the wholesalers or through village traders, and they did value addition activities like drying, cleaning, sorting, processing, extraction of oil and they finally sold it to retailer or consumers.

5. Retailer

Retailers received castor oil from the processor through price negotiation. Retailers were breaking the bulk quantity and selling small or needed quantity to the consumers.

6. Consumer

Consumers bought the value added products directly from processors and also from the retailers and used it for consumption purposes.

Value chain

In the present study, value chain is defined as "the people and activities that bring agricultural product like castor from obtaining inputs and production in the field to the consumer, through stages such as processing, packaging and distribution."

The castor value chains identified for castor in the study area are as follows;

Value chain I

Farmers – Village Trader – Wholesaler - Processors (Oil miller) - Retailers - Consumers

Value chain II

Farmers - Wholesalers - Processors (Oil miller) – Retailers - Consumers

Value chain III

Farmers - Processors (Oil miller) - Retailers – Consumers

In the value chain I & II the processors purchased the product from the farmers through village traders or wholesalers and process the product and sold it to retailers or consumers. In the value chain III, the processors purchased the product from the farmers directly and process the product and sold it to retailers or consumers.

Castor Value chain Mapping

In the value chain I, processors purchased the product from the farmers through village traders and wholesalers. Castor is processed into oil and oilcake and sold them to the retailers. Farmers did primary value addition activities like drying, cleaning, decorticating,

grading and packing the castor. Village trader and wholesaler performed repacking, storing and grading the product whereas the processor did major value addition of the castor in this chain. They also performed pressing, filtering, packing and labeling function. The retailers stored the product and sold the required quantity to consumers.

In the value chain II, the castor was purchased by wholesalers from the farmers and sold to processors. They performed similar functions as that of value chain I. Farmers, wholesaler, processor and retailer perform similar function as that of value chain. The retailers stored the product and sold the required quantity to consumers.

In the value chain III, oil processor received the product directly from the farmers. The processors sold the product after value addition directly to the retailers. They performed similar functions as that of value chain II. The retailers store the product and sold the required quantity.

Analysis of price spread and marketing efficiency of castor in different Value chain

Price Spread across the Value chain

The marketing cost, marketing margin and price spread for one quintal of castor were calculated and the results are presented in Table 1.

Table 1. Price spread analysis of castor

S.No	Particulars	Value chainI	Value chainII	Value chainIII
1	**Farmers**			
	Net price received	5495 (56.09)	5543 (57.19)	5650 (58.94)
	Marketing cost	115 (1.17)	113 (1.16)	110 (1.14)
	Gross price received	5610 (57.26)	5656 (58.36)	5760 (60.08)
2	**Village Traders**			
	Price paid	5610 (57.26)	-	-
	Marketing cost			
	Marketing margin	45 (0.45)	-	-
	Price received	155 (1.58)	-	-
3	**Wholesalers**	5810 (59.30)	-	-
	Price paid			
	Marketing cost	5810 (59.30)	5656 (58.36)	
	Marketing margin	80 (0.81)	90 (0.92)	-
	Price received for oil	190 (1.93)	195 (2.01)	-
4	**Processors**	6080 (62.06)	5941 (61.30)	-
	Price paid			
	Marketing cost	6080 (62.06)	5941 (61.30)	5760 (60.08)
	Marketing margin	530 (5.41)	545 (5.62)	545 (5.68)
	Price received	1380 (14.08)	1390 (14.03)	1405 (14.65)
	Price received for oil cake	7990 (81.56)	7876 (81.27)	7710 (80.42)

5	**Retailers (Oil)**	1500 (15.31)	1500 (15.47)	1550 (16.16)
	Price paid			
	Marketing cost			
	Marketing margin	7990 (81.56)	7876 (81.27)	7710 (80.42)
	Price received	64 (0.65)	67 (0.69)	69 (0.71)
6	**Retailer (Oil Cake)**	128 (1.30)	130 (1.34)	135 (1.40)
	Price paid	8182 (83.52)	8073 (83.30)	7914 (82.55)
	Marketing cost			
	Marketing margin	1500 (15.31)	1500 (15.47)	1550 (0.47)
	Price received	45 (0.45)	46 (0.47)	49 (0.51)
7	**Consumers (Oil)**	69 (0.70)	72 (0.74)	73 (0.76)
	Price paid	1614 (16.47)	1618 (16.69)	1672 (17.44)
8	**Consumers (Oil Cake)**			
	Price paid	8182 (83.52)	8073 (83.30)	7914 (82.55)
	Price spread			
		1614 (16.47)	1618 (16.69)	1672 (17.44)
		9796	9691	9586
		2687	**2530**	**2264**

Value chain I

After the harvest, the castor growers added value to their produce by cleaning and drying the castor crop. After drying, farmers decorated the castor pods. Loading and unloading charge were Rs.44 per quintal, and the total cost of transportation from the farm to the mill and from the mill to the wholesaler was Rs.71 per quintal. The farmers received Rs.5610 per quintal from the village traders for their crops. The crop was sold by village traders to wholesalers for Rs.5810 per quintal. Village traders gained a profit of Rs.155 per quintal and they incurred a marketing cost of about Rs.45 per quintal. The product was then sold by the wholesalers to the processors for Rs.6084. Wholesalers gained a marketing profit of Rs.190 per quintal and incurred marketing cost of Rs.80 per quintal. Processors sold the goods to retailers for Rs.7990 per quintal of castor-equivalent oil and Rs.1500 per quintal of oil cake. Processors gained a marketing profit of Rs.1380 per quintal and incurred a marketing cost of Rs.530 per quintal. The oil retailer sold the product to the consumers for Rs.8182 with the marketing margin of Rs.128 per quintal, while they incurred a marketing cost of Rs.64 per quintal. Similar to this, oil cake retailers sold the produce to the consumers for Rs.1614 with the marketing margin of Rs.69 per quintal and they incurred the marketing cost was Rs.45 per quintal. From the table, the price spread of the Value Chain I was found to be Rs.2687 per quintal.

Value chain II

In the value chain II, the farmer sold the produce to wholesalers for Rs.5543 per quintal. Before the sale, the farmers did some cleaning, drying, and decorticating activities. The farmers incurred a marketing cost of Rs.113 per quintal during the transaction with the wholesalers. As a result, the farmers received a net price of Rs.5556 per quintal. The produce was purchased by wholesalers from farmers for Rs.5656 per quintal and incurred marketing cost of Rs.90 per quintal. The wholesalers sold the produce to processors for Rs.5997 per quintal with the marketing margin of Rs.195 per quintal. Processors sold the produce to oil retailers for Rs.7876 per

quintal with the marketing margin of Rs.1390 per quintal and incurred marketing cost of Rs.545 per quintal. Retailers purchased the oil cake from processors for Rs.1500 per quintal. The oil retailer sold the product to the consumers for Rs.8073 per quintal with the marketing margin of Rs.130 per quintal, while they incurred a marketing cost of Rs.67 per quintal. Similar to this, oil cake retailers sold the produce to the consumers for Rs.1618 with the marketing margin of Rs.72 per quintal and they incurred the marketing cost was Rs.46 per quintal. From the table, the price spread was determined to be Rs.2530 per quintal.

Value chain III

In the value chain III, the farmer directly sold the produce to processors at the rate of Rs.5650 per quintal. Before the sale, the farmers did some cleaning, drying, and decorticating activities. The farmers incurred a marketing cost of Rs.110 per quintal when they transacted with the processors. Processors received the product from the farmers at the rate of Rs.5760 per quintal and incurred the marketing cost of Rs.545 per quintal. Processors sold the product to retailers for Rs.7710 per quintal with the marketing margin of Rs.1405 per quintal. Retailers purchased the oil cake from processors for Rs.1550 per quintal. The oil retailer sold the product to the consumers for Rs.8992 per quintal with the marketing margin of Rs.135 per quintal, while they incurred a marketing cost of Rs.69 per quintal. Similar to this, oil cake retailers sold the produce to the consumers for Rs.1672 with the marketing margin of Rs.73 per quintal and they incurred the marketing cost was Rs.49 per quintal. From the table, the price spread was found to be Rs.2264 per quintal.

5.3.1 Marketing efficiency in the value chain

Marketing efficiency is a metric for measurement of market performance. It is defined as "the movement of goods from the producer to the final consumer at the lowest possible cost while providing the service desired by the consumers are referred as marketing efficiency". The marketing efficiency of different value chains was estimated using Acharya's method. The results of marketingefficiency are presented in Table 2.

Table 2. Market efficiency in the value chains

S.No	Particulars (in Rs)	Value chain I	Value chain II	Value chain III
I	Total marketing cost	879	861	773
II	Net marketing margin	1922	1787	1613
III	Net price received by farmers	5495	5543	5650
	Acharya's marketing Efficiency [III/(I+II)]	**1.96**	**2.09**	**2.36**

According to the Table, the value chain III, namely Farmer – Processors (Oil Millers) - Retailers – Consumers was the most efficient value chain because it had the highest value chain efficiency (2.57) since it had fewer intermediaries than the other value chains.

Farmers share in consumer rupee:

The details of the farmers share in consumer rupee in Salem and Namakkal district for castor in the existing value chains are reported in the Table 3.

Table 3. Farmers share in consumer rupee

S.No	Particulars	Value chain I	Value chain II	Value chain III
1	Farmers selling price	5495	5543	5650
2	Consumer purchase price	9196	9691	9586
3	**Farmers share in consumer price**	**56.09**	**57.19**	**58.94**

From the table 3, it could be concluded that farmers share in consumer rupee ranged from 56.09 per cent to 58.94 per cent among the three value chains in the Salem and Namakkal district. In Salem and Namakkal district, value chain III held the highest farmers share with 58.94 per cent resulted in lower marketing cost and marketing margin followed by value chain II with 57.19 per cent. Due to the length of value chain I, the farmers share in consumer rupee (56.09 percent) was lesser. Results showed that by avoiding the regular traditional value chain resulted in minimizing the marketing cost, marketing margin and farmers could get a better share in the price paid by the consumer.

CONCLUSION

Creating awareness in the farmers about the value addition so that they bargain for a better share in the consumer's rupee. Identification and encouragement of rural entrepreneurs by training them in other value adding technologies, as castor has multiple uses and different end users, like paint manufacturing, soap industry uses and other products are needed. This will increase the farmer's due share in value addition process as domestic demand picks up and initiative from the industry becomes possible to have contract farming arrangements. New market networks have to be improved. Government's initiative is needed to create castor oil industrial park in Salem and Namakkal district by encouraging the private partnership so as to setup other related industries to castor. Specialized production of castor also can be taken up.

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