



VALUE CHAIN ANALYSIS OF SAPOTA (CHIKU) FROM SOUTH GUJARAT.

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Abstract : The purpose of this study is to analyse the Sapota value chain in South Gujarat. As Navsari District in South Gujarat is the country's largest producer of sapota. It has a well-developed Sapota Marketing Co-operatives network in South Gujarat, as well as a strong APMC Marketing infrastructure. At the moment, no study has been undertaken on the value chain analysis of Sapota (Chiku), which necessitates a thorough examination of value chain activities and their associated costs along the sapota chain in South Gujarat. UNIDO's Agri. Value Chain Approach was used to assess its supply chain to the Delhi market. It was discovered that while Delhi's retailers receive the highest value in terms of price, they do not engage in substantial value chain activities in practice. The Sapota marketing cooperative adds the most value, followed by Delhi-based C&F agents. Similarly, the APMC Commission Agent in South Gujarat adds the most value (C.A). This paper addresses the value added at each stage and potential areas for improvement for the value chain's primary actors. This article discusses the Sapota supply chain in India's South Gujarat region via Sapota Marketing Co-operatives.

IndexTerms – Sapota Value chain, Value chain Analysis

1. Introduction

Sapota (*Achras zapota*), commonly known as chiku, is mostly produced for its fruit in India. Sapota, most commonly referred to as chiku, is a popular Indian fruit. Due to its tenacity. It is the most common plant found in kitchen gardens. It attracts to both young and old due to its sweetness and thick pulp. According to a Times of India News article by (Kaushik, 2017), Navsari District is the largest producer of sapota in South Gujarat. Additionally, the report indicates that Navsari produces Sapota and supplies it to the market except during the Monsoon season. Sapota is cultivated on an area of 156.1 thousand hectares in India, with an annual production of 13.08 lacs MT (Indian Horticulture at Glance, 2018). It is planted around the Shivalik hill between Jammu and Dehradun. Sapota is the most popular fruit tree in Chandigarh and Panchkula kitchen gardens. In Gujarat, West Bengal, Karnataka, Andhra Pradesh, Maharashtra, and Tamil Nadu, sapota is widely farmed.

Sapota is primarily grown in south Gujarat. According to the (Director of Horticulture, Government of Gujarat, 2018), the area under Sapota cultivation is 14037 Hectares, producing 166163 Metric Tons. Sapota is primarily grown in Navsari District, followed by Valsad and Surat. Gujarat produces 2.26 million metric tonnes of sapota on 21660 hectares of land. Gujarat is second only to Karnataka in the production of Sapota (Chiku). Karnataka and Gujarat account for more than half of India's sapota production. 1.6 lakh metric tonnes of Sapota Production in Gujarat occurred in Navsari, Valsad, and Surat districts, with Navsari leading the way in Sapota Production in Gujarat. Sapota farming covers 14037 hectares in South Gujarat, producing 1,66,163 Metric Tons. Navsari District is the largest producer of Sapota in India.

In South Gujarat, Sapota ranks second in fruit production and trade. It is also, after mango, one of the most traded fruit crops in south Gujarat. It is discovered that it is traded through two chains, based on observations and interactions with farmers and Sapota marketing stakeholders. The sapota supply chain is divided into two distinct supply chains. Co-operative marketing supply chains and traditional APMC supply chains. In agricultural development, a value chain method helps identify weak places in the chain and activities to add additional value. A value chain in agriculture describes the actors and actions that move agricultural products from field production to final consumption, adding value to the commodity at each stage. Processing, packing, storage, transportation, and distribution are all part of a value chain, which might be a vertical linkage or a network between multiple separate corporate entities. (NAARM, 2013). Because it is a major fruit crop and the Navsari District is the country's largest producer of sapota, it is necessary to conduct a value chain analysis that can provide significant insight into the value added in the sapota supply chain from farm to fork in the hands of consumers. At different levels of the supply chain, each actor performs value chain activities, which must be investigated in terms of value. This research looks into the various value chain tasks that each participant in both supply chains does. This research looks into the value chain activities that take place on the ground for both supply chains.

2. Objectives of Study

This study carried out with following objectives.

1. To Study Area & Production of Sapota in South Gujarat.
2. To Study the Sapota Marketing in South Gujarat.
3. To identify Sapota Supply chain in South Gujarat.
4. To conduct Value chain analysis of Sapota in South Gujarat.
5. To Identify constraints in Sapota Value chain in identified sapota supply chains.

3. RESEARCH METHODOLOGY

3.1 Primary data

The primary data for the cost of Sapota cultivation was obtained by surveying 70 progressive farmers from the 20 Amalsad Co-operatives, 10 Gadat Co-operatives, and 10 Bagayat Co-operatives and 10 Farmers from APMC Billimora, 10 Farmers from APMC chikhli and 10 farmers from APMC Valsad. All the respondents for Primary survey were selected purposively.

A telephonic conversation was also carried out with five commission agents who act as C&F (Carry & Forward Agents) for Sapota Marketing Co-operatives and 15 whole sellers of the Delhi Market based at Delhi Azadpur Mandi and Delhi, respectively. In addition, 30 retailers in Delhi were surveyed using a telephonic survey after receiving contact details from commission agents and wholesalers in the Delhi market.

3.2 Secondary Data

The area and production data for Sapota were collected from the Area & Production Report Director Horticulture, Government of Gujarat Area, and the whole sale and retail price data were retrieved from the National Horticulture Board website. The wholesale price and retail price were collected from the NHB price and arrivals report. The arrivals, prices, and costing of activities are retrieved from the Annual Reports of the Co-operatives and APMCs of south Gujarat.

3.3 Analytical Method

For analysing the value chain of the Sapota, the UNIDO (United Nations Industrial Development Organization) Agri. Value Chain Analysis Method is adopted. The value at each level was calculated using the formula shown in the World Economic Forum 2009 Proceedings.

3.4 Scope and Limitations

The Delhi Market is the primary destination market for both co-operative chains and regular APMC supply chains, accounting for around 90% of sapota. As a result, value chain analysis was limited to the Delhi market. As a result, the value chain study focused exclusively on the market and city of Delhi.

4. RESULTS AND DISCUSSION

4.1 Area & Production of Sapota in South Gujarat

Sapota is mainly cultivated in south Gujarat. According to the Gujarat Government's Director of Horticulture, the area under Sapota cultivation is 14037 Hectares, producing 166163 Metric Tons. Sapota is primarily grown in Navsari District, followed by Valsad and Surat. Gujarat produces 2.26 million metric tonnes of sapota on 21660 hectares of land. Gujarat is second only to Karnataka in the production of Sapota (Chiku). Karnataka and Gujarat account for more than half of India's sapota production. 1.6 lakh metric tonnes of Sapota Production in Gujarat occurred in Navsari, Valsad, and Surat districts, with Navsari leading the way in Sapota Production in Gujarat. Sapota farming covers 14037 hectares in South Gujarat, producing 1,66,163 Metric Tons. Navsari District is the largest producer of Sapota in India.

4.2 Sapota Marketing in South Gujarat

Sapota is the second largest producer and exporter of fruits in South Gujarat. Additionally, it is one of the most traded fruits in south Gujarat, second only to mango. According to observations and interactions with farmers and Sapota marketing stakeholders, it is traded via two chains. (I) Co-operative Chain and (II) Traditional APMC chain.

It demonstrates that there are two distinct supply chains for Sapota in South Gujarat. Sapota is mostly traded via cooperative channels, followed by regular channels. According to discussions with Sapota marketing cooperatives and APMC officials, 55 % of Sapota is traded via the cooperative channel, whereas 35% is traded via the traditional APMC channel. As a result, it is deduced that there are two distinct types of Sapota Supply Chains in South Gujarat.

4.3 Sapota Supply Chain Across South Gujarat

As a results of this study and engagement with stakeholders in the Sapota supply chain, these two supply chains for sapota have been identified, commencing in South Gujarat and terminating in the main destination market of Delhi.

(I) Co-operative Chain

The Co-operative marketing is strong in South Gujarat. There are 10 Cooperative societies are carrying out Sapota Marketing from South Gujarat. Amalsad, Gadat, Gandevi, Ajrai, Dhanori, Manekpor, Vedchaa, Abrama, Navsari Bagayat, Kharel marketing co-operative. The Amalsad Co-operative is the Biggest and the oldest Co-operative society for Sapota Marketing. The Amalsad cooperative accounts for approx. 45% of Marketing share of Sapota Marketing through Co-operative chain. Due to its High Market share Amalsad its supply chain was analyzed with Value chain perspective. Other Co-operatives are also marketing Sapota in high value Markets Delhi for Sapota.

During the major marketing season of November to June, the Sapota marketing cooperative sends 90% of total Sapota intake to a single C&F agent who acts as a commission agent in Delhi Azadpur Mandi and is solely responsible for Sapota Marketing Ahead in chain. The Sapota Marketing Cooperative enters into a yearly contract with a C&F Agent in Delhi to protect farmers' prices.

Amalsad Cooperative is one of India's most successful instances of cooperative marketing in the fruit and vegetable sector. It supplied around 18% of the Sapota supply in the Delhi Azadpur mandi trade in 2016-17. Due to its successful supply at Delhi's high-value market, a value chain analysis up to the Delhi market was conducted.

(II) Traditional APMC chain

In India, the APMC (Agriculture Produce Market Committee) is a traditional method of marketing. Gujarat enacted the APMC Act 1963 to regulate the marketing of agricultural commodities in the state. According to this act, all agricultural commodity trading in Gujarat must pass through the APMC. The APMC Bilimora, APMC Navsari, APMC Valsad, APMC Chikhli, and Amalsad Sub yard are the primary markets in South Gujarat for Sapota Trade. The APMC Billimora market is Sapota's most active market, with a sub yard in Amalsad and a main market in Bilimora. Around 70% of the Sapota Trade in APMC occurs in Bilimora. Following that are APMC Navsari, APMC Valsad, and APMC Chikhli.

Sapota Grades with Major Destination Markets

Sapota is classified mostly into three groups. **(1) Extra-large (2) Large (3) Medium.** The first two grades of Sapota are aimed at high-value markets such as Delhi and Jaipur, among others. The Medium Grade Sapota is distributed to adjacent local markets, traders, and the Maharashtra marketplaces of Jalgaon and Dhulia. The Approximate 90% of Sapota is forwarded to Delhi Market.

4.4 Sapota Marketing Channels

The marketing channels are the channels via which Sapota is distributed from the point of origin to the point of consumer distribution. The Channels are determined in consultation with stakeholders, cooperative officials, and APMC staff involved in Sapota Trading. The following is a video from the Sapota Marketing channel in South Gujarat. Each of Sapota's ten marketing cooperatives employs the same channel of distribution. It is noticed that six marketing channels exist, with cooperative marketing channels accounting for five of the six marketing channels now available. As cooperative channels contribute around 65 percent of Sapota marketing, while APMC-based marketing channels contribute 45 percent of Sapota marketing in South Gujarat. Amalsad Co-operative has the biggest supply share to the Delhi market of all the cooperatives.

- **Channel-1 : Farmer-APMC-CA-APMC CA/Whole seller- Retailer-Consumer**
- **Channel-2 : Farmer- Co-operative-C&F Agent- CA-Whole Seller-Retailer-Consumer**
- **Channel-3 : Farmer-Cooperative –C&F Agent-Retailer-Consumer**
- **Channel-4 : Farmer-Co-operative-C&F Agent- Organized Retailer-Consumer**
- **Channel-5: Farmer –Co-operative-CA (Local)-Retailer- Consumer**
- **Channel-6: Farmer-Co-operative-Traders (Maharashtra)-Retailers-Consumers**

4.5 Value Chain Analysis of Sapota

The value chain analysis was conducted in accordance with the UNIDO (United Nations Industrial Development Organization) value chain technique for the two supplier chains that exist for Sapota in south Gujarat. (I) Chain of Sapota Cooperatives (II) Chain of Traditional APMCs the outcome is provided below.

4.5.1 Value Chain Activities Across the Sapota Supply Chain

4.5.2 cost of cultivation of Sapota

The cost of cultivation for Sapota was calculated based on the 15th year of planting Sapota since Sapota trees produce optimally after the 15th year and the majority of Sapota growers in the Navsari Districts have more than 15 years old Sapota Orchards on their farms. All costs are expressed in hectares. According to a survey, the cost of cultivating Sapota during the year is approximately Rs. 3.71.

Table-1 Cost of Cultivation For Sapota (calculated on 15th year of Plantation)	
Particulars	Cost in Rupees
Organic Fertilizer and Labour	2900
Chemical Fertilizer	2700
Irrigation cost	2000
Inernal cultivation	1600
Misc. Labour	1000
Crop protection cost	500
Harvesting labour	35000
Transportation to Co-operative	2500
Total Cost Per Hectare	48200.00
Total Production in MT	13.00
Total Cost Per Rs. Per Metric Tons	3707.69
Total Cost per 20 Kg	74.15
Total Cost per KG	3.71

Source: Sapota Growing Farmers' Survey

4.5.3 Value chain costing across the Chain

The Value chain costing was calculated using the Formula of World Economic Forum 2009. It was calculated for both chains based on the Survey, Annual Reports of Co-operatives and APMCs and Interactions with stake holders of sapota supply chain. The outcome is given below.

5.5.3.1 Co-operative Value chain



Figure-1 Value chain of Sapota in Co-operative chain

Table -2 Value chain Activities conducted by each value chain actors in Co-operative chain

Value chain Actor	Value chain Activities performed	Value added Rs./Kg
Farmer	• Grading, Sorting	NA
Sapota Marketing Co-operative	• Grading, Sorting, Cleaning, Packaging, Transportation to Destination Market	7.68
C&F Agent Delhi	• Offloading, Grading, Sorting, Packaging, Transportation to Other Markets	5.48
Whole Seller	• Grading & Sorting, Packing, Transportation	4.69
Retailer	• Grading as per retail market requirement	32.45
Consumer	NA	NA

Source: Survey conducted across the Value chain actors

From the above shown table it can be inferred that Retailer in Sapota Value chain enjoys maximum share in the value chain in terms of value but conduct least number of value addition in the chain.

Table-3 Value Chain Costing across Sapota Co-operative Marketing Supply chain till Delhi Market

Supply Chain Actors	Cost of Production/Procurement per Kg. In Rs.	Marketing Price Received per Kg. In Rs.	Value Added in Per kg. In Rs.
Farmer Level	3.71	15.00	NA
Sapota Marketing Co-operative Level	15.00	22.68	7.68
C&F (Carry and Forward Agent) Level	22.68	28.16	5.48
Whole Seller Level (at Delhi Market)	28.16	32.85	4.69
Retailer Level (Delhi Market)	32.85	65.30	32.45
Consumer	65.30	NA	NA

Source: Data Received from the Value Chain Stake Holders and NHB Wholesale & Retail Price

The value addition at each level is calculated and it is discovered that the largest value addition occurs at the retailer level at Rs. 32.46 per kg, although in practice, retailers perform no substantial value addition activities other than sorting and making merchandise available to the consumer. The biggest value addition occurs at the cooperative level, at Rs. 7.60 per kg, followed by the C&F agent in Delhi and the Delhi-based whole seller. According to the above table, the Delhi-based retailer adds the most value to the chain in monetary terms but the least value in terms of value additions.

4.5.3.2 Traditional APMC Chain

The diagram below illustrates a generic value chain diagram for the traditional APMC chain.



Figure-2 Traditional APMC Value chain

Table-4 Value chain Activities conducted by each value chain actors in Traditional chain

Value chain Actors	Value chain Activities performed	Value added in Rs./Kg
Farmer	Washing, Grading, Sorting	NA
Commission Agent at APMC in South Gujarat	Grading, Sorting, Cleaning, Packaging, Transportation to Destination Market	10.00
Commission Agent at Delhi APMC	Offloading, Grading, Sorting, Packaging, Transportation to Other Markets	4.66
Whole Seller	Grading, Sorting, Packing, Transportation	4.69
Retailer	Grading as per retail market requirement	32.45
Consumer	NA	NA

Source: Survey conducted across the Value chain actors

As indicated in the above table, the traditional channel requires farmers to wash sapota prior to coming to the APMC Market for auctioning and selling sapota (Chiku). In comparison to the Co-operative chain, they receive immediate cash when they sell their produce. While C.A contributes the most value at the APMC in south Gujarat, Sapota Retailers adds the most value to sapota, comparable to the cooperative value chain.

Table-5 Value Chain Costing Across Traditional APMC Supply chain till Delhi Market

Supply Chain Actors	Cost of Production/Procurement per Kg. In Rs.	Marketing Price Received per Kg. In Rs.	Value Added in Per kg. In Rs.
Farmer Level	3.71	13.50	NA
Trader (C.A) at APMC Market Level in South Gujarat	13.50	23.50	10.00
Trader (C.A) at APMC Market Level in Delhi Market	23.50	28.16	4.66
Whole Seller Level (at Delhi Market)	28.16	32.85	4.69
Retailer Level (Delhi Market)	32.85	65.30	32.45
Consumer	65.30	NA	NA

Source: Data Received from the Value Chain Stake Holders and NHB Wholesale & Retail Price

In the traditional APMC chain in south Gujarat, the value added is Rs.10.00 per kg, compared to Rs. 7.68 in the co-operative chain. While the Commission Agent in Delhi adds a lower value of Rs. 4.66 per kg than the C&F Agent for Sapota Marketing Co-operative in Delhi Market. Other values in the Delhi market are comparable to those in the cooperative supply chain.

5. Constraints in Sapota Value Chain

The following constraints were identified after interactions with key value chain participants. Two major restrictions are noted at the farmer level. Post-harvest loss of Sapota at the farmer's field, along with a lack of required uniformity in Sapota ripening quality, resulted in a significant loss at the farmer's field. Similar constraints were detected in the Traditional APMC chain, including the absence of farmer grading and the unequal quality of Sapota, which are the chain's primary constraints. During transportation, the largest deterioration of Sapota occurs during the summer season, resulting in revenue loss for cooperatives and APMC traders in both chains. Due to natural ripening, sapota quality deteriorates during shipment, and grading and sorting are required at the C&F level, increasing the cost and financial strain on Receiving Traders in Delhi.

6. Conclusion

The Value chain Analysis of Sapota throws light on the Constraints and Opportunities for Improvement in Sapota Supply Chain benefiting all the actors of the Supply chain. It is also indicating to focus on Good Agricultural practices for reducing Post harvest Loss and quality commonality for Sapota. This study also suggesting that if Co-operative carry out direct marketing to the Retailer of Delhi it can get better prices and higher income to the farmers and contributing towards Doubling of Farmer's Income by 2022. It also points out that as retailer enjoys maximum share in value chain it shows opportunity for Sapota Retail in Delhi Market for business.

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