

MARKET ANALYSIS AND STUDY ON PRODUCTION OF PAPAYA IN KUTCH REGION

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ABSTRACT

The noble task of feeding the world's population falls squarely on the shoulders of farmers. To put it simply, crops are plants that are cultivated for the sole purpose of being consumed by humans, either in their raw or processed forms. For practical reasons, people grow and tend to certain plants. The major purpose of this investigation was to analysis the present-day marketing of the papaya crop in the Indian state of Karnataka. The majority of our main data comes from in-person interviews and surveys.

We have reached out to the Kutch area's Agricultural Product Marketing Committee (APMC) to collect secondary data. In the 2019–20 growing season, papaya is predicted to produce 8,293 tons from an area of 384 hectares, with a total market value of 498 lakhs. Four small farmers, thirteen medium farmers, and fifteen big farmers cultivated papaya throughout the 10 communities studied. In all, this is under 1% of the total number of responders.

Keywords: Food Crops, Fruits, Horticulture, Civilization, Economic Prosperity.

I. INTRODUCTION

The papaya tree (*Carice papaya L.*), of the family Taccaceae, grows quickly from seeds and has a hollow trunk but only lives for a few years. Keeping papaya as a pure or tree cultivar is famously difficult due to open pollination. Four genera and roughly 20 species of carioca exist, all of which are found in tropical and subtropical regions (Sidhu, 2006). Fruits from female trees are typically spherical, whereas those from hermaphrodite trees are more often elongated (Figure 1a) (Bruce and Peter, 2008). The fruit resembles an enormous melon and may weigh up to 9-10 pounds. It is 15-50 centimeters in length, and 10-20 centimeters in thickness.



(a) Papaya Tree



(b) Papaya Fruit



(c) Papaya Seeds

The fruits of semi-wild (naturalized) plants range in size from 2.5 to 15 centimeters. The fruit's skin is waxy and delicate, but it's also rather sturdy. The skin of a mature fruit changes from a pale to a deep yellow-orange (Figure 1b), while the thick wall of juicy flesh within becomes a fragrant yellow orange or varying colors of salmon or red. Mature papayas have a cantaloupe-like sweetness and a distinctive papaya taste. Several grey-black ovoid seeds (Figure 1c) are delicately linked to the flesh of ripe fruits by white, fibrous tissue.

The popularity of the fruit has led to its increased cultivation in recent years; now, its worldwide production volume ranks only behind that of more well-known fruits like mango, banana, citrus, and pineapple.

The fruit's popularity has spread even to India, where it is available in many kinds. Common papaya cultivars include the Coorg Honey Dew, Pusan Dwarf, Pusan Giant, Pusan Majesty, Pusan Delicious, Co.1, Co.2, Co.3, Co.5, Washington, Solo, Ranchi, IHR39, IHR54, Taiwan-785, Taiwan-786, Solo, Solo Sunrise, Solo Sunset, Red

Amazon, Hortus Gold, Betty, and Improved Peterson (National Horticulture Board, 2022). See Table 1 for a list of some of the many names this fruit goes by across the globe.

Due to its high levels of beneficial antioxidants, phytochemicals, nutrients like carotenes, vitamin C, and flavonoids, the B vitamins like folate and pantothenic acid, minerals like potassium and magnesium, and dietary fibre (Murcia et al., 2021; Leong and Shui, 2022; Gopalan et al., 2004), papaya is widely regarded as an essential fruit. Papain, an enzyme found in papaya, is employed in a variety of commercial applications, including beer and meat tenderization, medicines, cosmetics, and more.

In addition to being eaten raw, the fruit is often used in prepared dishes such fruit salads, preserves, sauces, and pies. When ripening, the fruit produces pectinolytic enzymes that break down the fruit's cell walls. The raw fruit latex is used to make a variety of goods after being dried, canned, pickled, and otherwise processed. β -carotene may be found in abundance in pureed papaya (Ncube et al, 2021). Papaya is mostly grown in Kutch region. Large quantities of this fruit are also produced in other countries, including the United States, Taiwan, Puerto Rico, Peru, Bangladesh, and Australia (FAO, 2021). Table 2 details the global output of papaya. Over 60 nations contribute to global papaya production, with the majority of them being poor countries.

II. LITERATURE REVIEW

Based on their findings, farmers in the Gujrat Hills identified a lack of cold storages, the extremely perishable nature of the vegetables, and a lack of marketing demand for the output as the main challenges to post-harvest vegetable management.

According to **Charles R. Hall's (2019)** research, marketing plays a crucial role in the success of commercial fruit and vegetable farms. Indirect channels, such as supermarkets, are not included in direct farmer-to-consumer marketing. Farmers sell their wares directly to consumers through a variety of channels, including pick-your-own operations (most common in the Western United States), roadside stands and markets, urban and suburban farmers markets, home delivery, truck sales, and sales in parking lots and other high-traffic areas. The distribution of horticulture products in the Kutch area was analyzed by **Deepak Shah and Narayan Murthy (2018)**. Farmers who specialized in growing grapes sold their harvests to wholesalers through forwarding agents, commission agents, or by going straight to the wholesaler themselves.

As compared to other marketing channels, selling product via forwarding agents in the whole sale marketplaces is predicted to incur the highest overall marketing cost per box (4Kg).

The high quantities of the antioxidant vitamins A, C, and E in papayas are beneficial to cardiovascular health.

Antioxidant-rich foods may help lower cardiovascular disease risk, as suggested by theory E. Antioxidants stop the damage caused by High cholesterol due to oxidation. Oxidized cholesterol is more prone to cause blockages that result in heart disease. In addition, the high fiber content of papaya may help lower cardiovascular disease danger. Cholesterol levels may be lowered by eating more foods high in fiber. Folic acid, found in papaya, is required for the breakdown of homocysteine into safer amino acids. Homocysteine is an amino acid found predominantly in animal products, and it is a risk factor for cardiovascular disease when it is present in high quantities. If homocysteine levels are low, it means you are less at risk for cardiovascular disease.

The papaya fruit has two digestive enzymes—papain and chymopapain—which aid in digestion and decrease inflammation. Both enzymes aid in the breakdown of proteins, which means they may aid in digestion and lessen inflammation. Several over-the-counter digestive aids include papain to calm stomach rumblings. Papain and chymopapain both contribute to a less inflammatory response.

They may assist with chronic inflammatory illnesses like arthritis and asthma, and they can alleviate sudden pain like that caused by a cut or a sprain.

Third, the immune system may benefit from vitamin C-rich meals by being better equipped to fight off bacterial and viral infections. Papaya is an immune-supportive food because it has a high concentration of this antioxidant. Papaya is rich in vitamin A, which is essential for a well-functioning immune system.

Lycopene is a natural pigment present in foods that are red or orange and may provide protection against prostate cancer. Some of the best food sources of lycopene include tomatoes, watermelon, and papaya. Although some research suggests that increasing your intake of foods rich in lycopene will lower your risk of

prostate cancer, other studies have shown conflicting results. Yet, other studies have shown that a diet rich in lycopene, especially when combined with green tea, greatly reduces the incidence of prostate cancer.

III. BACKGROUND OF THE STUDY

While its palm-shaped trunk may grow to a height of 8 meters (26 feet), the papaya plant is technically classified as a tree despite its lack of a really woody core. The plant's crowning glory are the deeply lobed leaves, which may reach a width of 60 centimeters (two feet) and are carried by hollow petioles of the same length. It is typical for the species to be dioecious, with male and female blooms growing on different plants. Nevertheless, hermaphroditic varieties are known, and multiple variations in the distribution of the sexes are prevalent.

Male flowers, which are approximately 2.5 mm (0.1 inch) long and white with 10 stamens in the neck, are clustered at the ends of stalks that reach a height of 90 cm.

Female flowers differ greatly from males in size and appearance, with five fleshy petals that are connected at the base and a huge, cylindrical or globose superior ovary topped by five fan-shaped, sessile stigmas. The fruit may range in shape from spherical to cylindrical, with a length of 75 millimeters to 500 millimeters (20 inches to 40 inches), and weigh 9 kilograms to 11.5 kilograms (20 to 25.5 pounds). The meat, which ranges in color from bright yellow to orange to salmon, is exceptionally delicious. The many black, wrinkled seeds are adhered along the walls of the enormous central hole. Papain, a protein-digesting enzyme found in the milky juice of the unripe fruit, has digestive activity that is quite similar to that of the animal enzyme pepsin. Meat tenderizers and indigestion cures are both made using this juice.

Growing and Bearing

In most cases, papayas must be grown from seed. They mature quickly, bearing fruit by the end of the first year. A plant's lifespan may extend to five years or more under ideal circumstances. First appearing in Hawaii in the 1940s, the papaya ringspot virus almost destroyed papaya farms throughout the globe. In the early 2030s, a genetically modified (GMO) type of papaya called the Rainbow papaya was produced with resistance to the virus. Most exported papayas are now genetically modified, and the fruit was one of the first to be mass-produced via genetic engineering. The papaya tree is native to the tropics.

To be sure, it also flourishes in sub-tropical climates. Papayas thrive in the foothills' warm winters, so farms in such areas are a good bet. It is difficult to grow due to the low temperatures and frost at higher elevations. Because of the very low temperatures at night throughout the winter, fruit matures late and is of inferior quality.

From sea level to 1000 meters in height, it may be cultivated, albeit beyond 600 meters in altitude, the size and quality of the fruits begin to diminish. Although it naturally occurs in sub-tropical and tropical regions, it may be planted at temperatures between 25 and 35 degrees Celsius. In this location, it may be produced effectively as a rainfed crop in places that get between 1500 and 2000 mm of annual rainfall, albeit production may be low when compared to an irrigated crop due to winter dryness limiting the growth of the plants and the fruits. The natural sweetness of fruits is diminished by high humidity.

IV. RESEARCH METHODOLOGY

METHODS FOR DATA COLLECTION & VARIABLES OF THE STUDY

Methods for data collection

Primary Data

Secondary Data

Primary Data

Primary source of data was collected by questionnaire.

Secondary Data

Secondary source of data was collected from

Books

Journals

Magazines

Web's big data es

Sampling

The sample technique utilized for data gathering is convenient sampling. The convenience sampling method is a non-probability strategy.

Sampling size

Big data indicates the numbers of people to be surveyed. Though large samples give more reliable results than small samples but due to constraint of time and money.

Plan of analysis

Diagrammatic representation through graphs and charts

Big data able inferences will be made after applying necessary statistical tools.

Findings & suggestions will be given to make the study more useful.

V. DATA ANALYSIS

Table 1: Details of cost of cultivation of Papaya crop per hectare inGujarat, 2019- 22

Sr. No.	Items	Physicalunit	ValueRs.	% To Cost C2
1	Human labor:			
	A: Family (man days)	34.25	5901	2.44
	B: Hired (man days)	199.25	36891	15.25
2	Bullock labor (pair days) and Tractor charges (Rs)	---	14864	6.14
3	Seedlings	2429	19466	8.04
4	Manures (kgs)	27	9552	3.93
5	Chemical fertilizers (kgs)	N	161	22160
		P	262	
		K	197	
6	Irrigation		5954	2.46
7	Insecticides/pesticides		4355	1.80
8	Micronutrients		475	0.20
9	Miscellaneous costs		1025	0.42
10	Depreciation cost		385	0.16
11	Interest on working capital		17044	7.04
12	Rental value of owned land		81286	33.57
13	Interest on owned fixed capital		755	0.32
14	Management cost		22011	9.09
15	Cost A		132171	54.59
16	Cost B		214212	88.47
17	Cost C1		220113	90.91
18	Cost C2		242124	100.00
19	Yield: A: Main product (qn/ha)	819.01	551095	
	B: By-product (qn/ha)	-	-	

20	A: Farm harvest price of main product (Rs/qn)	-	672.88	
	B: Income from by-product (Rs/ha)	-	-	
21	Gross income: main product + by-product (Rs/ha)		551095	
Summary results				
Sr. No	Costs	Returns/ha over	Costs/qn	Input-output
		Costs (Rs.)	(Rs.)	ratio over costs
1	Cost A	418924	161.38	1: 4.17
2	Cost B	336883	261.55	1: 2.57
3	Cost C1	330982	268.75	1: 2.50
4	Cost C2	308971	295.63	1: 2.28

Table 1 provides an overview of the total cost of growing papayas and the resulting harvest.

Average total cost (cost C2) of papaya crop per hectare was Rs. 242124, as shown in the table. 54.59% of total costs were attributable to operational expenses. Human labour accounted for 17.69% of all expenditures, followed by chemical fertilizers (8.15%), seedlings (8.04%), bullock labour and tractor charges (6.14%), manures (3.93%), irrigation (2.46%), insecticides/pesticides (1.8%), miscellaneous costs (0.42%), etc. It takes a lot of people to plant papaya trees, tend to them as they grow, prune them, water them, harvest them, and so on since the process is so labour demanding. The proportion of labour expenses to overall expenditures is larger.

The average papaya production per hectare was also included in the table, coming in at 819.01 qt. Per hectare, farmers typically made about \$55,109.50 in gross profit. According to the data, the average profit per acre above the initial investment (C2) was Rs. 308971. Papaya crop production costs (C2) were calculated at Rs. 295.63/qn. In the agricultural sector, the average price per quarter of production was calculated to be Rs 672.88. There was a clear profit to be made from growing papaya, since the average farm harvest price was more than the cost of production. For the time period under consideration, the calculated input-output ratio was 1: 2.28. This means that for every one rupee the farmers invested, they earned back 2.28 rupees in return.

Table 2: Marketing Cost Incurred by Post Harvest Contractor (At Kutch region)

Sr. No.	Particulars	Cost (/Qtl.)	Percent tototal cost
1	Cleaning, grading and packing cost	55.00	21.16
2	Loading and unloading charges	31.00	11.92
3	Transportation cost	65.00	25.01
4	Weighing charges	2.29	0.88
5	Wastage	33.42	12.85
6	Market cess	4.50	1.73
7	Others (Including commission charge)	68.67	26.42
	Total marketing cost	259.88	100.00

Budgeting for advertising, profit margins, and price differentials

Table 2 displays the breakdown of marketing expenses spent by the post-harvest contractor during the marketing of papaya. According to Table 3, the post-harvest contractor spent Rs 259.88 per quintal on selling papaya. Transportation cost accounted for 25.01 percent of total marketing expense, followed by cleaning, grading, and packing cost (21.16%), waste (12.85 percent), loading-unloading costs (11.92%), market cess

(1.73), and weighing charges (0.1 percent) (0.88 per cent). Post-harvest contractors had to pay more for marketing because of the high transportation costs they encountered as buyers.

VI. CONCLUSION

Papayas need a lot of human labour, but their production and sale may pay off quickly and create new jobs. Papaya's strong nutrient and therapeutic value has led to a rise in demand for both unripe and ripe varieties. Tenderizing meat, making chewing gum and cosmetics, degumming silk, and imparting shrink resistance to wool are just some of the many uses for the papain that is extracted from the dried latex of its fresh fruits. In addition, it finds use in the pharmaceutical sector, the textile and clothing industries, the production of cleaning papers and adhesives, and the management of wastewater, among other areas.

Recent improvements in rural road connectivity will boost marketable and exportable surplus and reduce spoiling losses during the changeover.

A prosperous future for papaya cultivation is supported by these factors. The economics of selling papaya and the accompanying restrictions need investigation at the present time.

During the 2019-20 academic year, we sourced our primary data from 50 papaya growers in the Kutch area.

The research study highlights the many flaws in horticulture production and marketing, despite the industry's importance and value. Taking effective and appropriate action to overcome these obstacles is crucial for the growth and development of the industry and for raising productivity levels. When comparing horticulture crops to food crops, the cost benefit ratio favours the former. Certain horticultural crops, like pomegranates and mangoes, have a high entry price but a long payback period. It is therefore recommended that all categories of farmers, regardless of the size of their land holdings, adopt modern methods for cultivating horticultural crops, despite the high initial investment required, provided that sufficient facilities and programs are made available by the relevant authorities.

Contract farming was found to be helpful in the research region for a number of reasons, including the provision of technical support, the dissemination of market information, and the prevention of farmers being cheated by middlemen. As this is the case, contract farming may get more interest from the processing sector.

Because of the many intermediaries in the supply chain, the profit margin for farmers has shrunk.

Direct communication between farmers and end users, or at least a reduction in the number of intermediaries, is a positive step in this direction, and the relevant state agencies should take the necessary precautions to assure it. There is a growing need to create and control a variety of institutions.

Weights and scales are a major source of a problem in the horticulture marketing industry.

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