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Original Article**Horticulture-Based Food Processing as a Driver of Secondary Agriculture in South Gujarat****F. M. Sahu***Assistant Professor, Centre of Excellence on Post Harvest Technology, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat- 396450, India***Corresponding author: fmsphct@nau.in**Received: 16/03/2026**Published:22/03/2026***ABSTRACT**

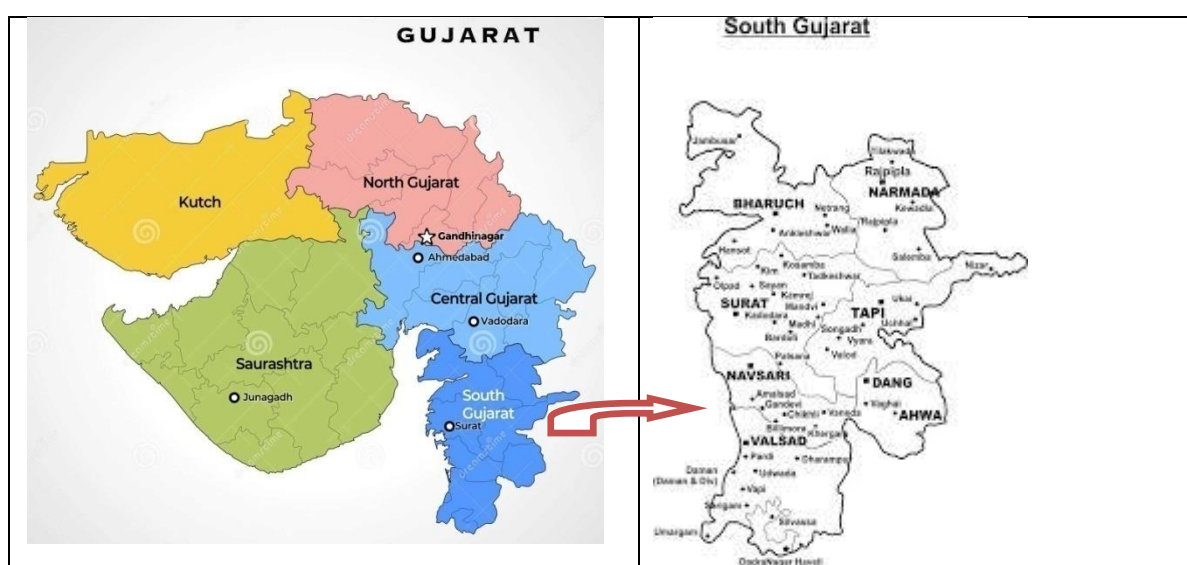
Secondary agriculture plays a vital role in enhancing farmers' income by promoting value addition, processing, and efficient utilization of agricultural produce. South Gujarat, comprising districts such as Surat, Bharuch, Navsari, Valsad, Dang, Narmada, and Tapi, possesses a strong horticultural resource base supported by favorable agro-climatic conditions, fertile soils, and assured irrigation. The region produces a wide range of fruits and vegetables including mango, banana, sapota (chikoo), papaya, okra, and cucurbits, which provide substantial opportunities for food processing and value addition. However, the perishable nature of horticultural commodities often results in post-harvest losses estimated at 20–30 percent due to inadequate storage, transportation, and market infrastructure. Secondary agriculture, through food processing activities such as pulping, dehydration, pickling, and minimal processing, provides an effective strategy to reduce these losses while improving product shelf life and market value. South Gujarat has gradually developed a diversified food processing ecosystem consisting of fruit pulp industries, dehydration units, snack processing industries, dairy processors, and cold storage infrastructure. Government initiatives, including support from the Ministry of Food Processing Industries, Gujarat Agro Industries Corporation, and state horticulture programs, have further strengthened the farm-to-factory linkage. The integration of production, processing, and marketing through value chain development and Farmer Producer Organizations has created opportunities for rural employment, agro-entrepreneurship, and sustainable agricultural growth in the region.

Keywords: Secondary agriculture; Horticultural processing; Value addition; South Gujarat.**1. Background and Relevance to Secondary Agriculture**

Secondary agriculture is a crucial component of agricultural development, as it focuses on value addition through processing, preservation, packaging, storage, and marketing of primary agricultural produce. By creating a strong linkage between farm production and markets, it contributes to enhanced farmer income, reduction of post-harvest losses, generation of rural employment, and

overall rural industrialization. Within secondary agriculture, horticulture-based food processing assumes particular significance because fruits and vegetables are highly perishable but possess substantial potential for conversion into value-added products with extended shelf life and higher market value.

South Gujarat provides an excellent regional context for understanding and promoting secondary agriculture. The region comprises seven districts—Surat, Bharuch, Navsari, Valsad, Dang, Narmada, and Tapi—and is characterized by a rich and diverse horticultural resource base. Favorable agro-climatic conditions, including high rainfall, fertile alluvial soils, and assured irrigation, support intensive cultivation of fruits and vegetables. In addition, proximity to major urban consumption centers, industrial hubs, and port facilities ensures efficient movement and marketing of processed agricultural products. These factors together create a supportive ecosystem for the growth of horticulture-based food processing industries.



South Gujarat is well known for the commercial cultivation of mango (particularly Kesar), sapota, banana, jackfruit, papaya, okra, pointed gourd, brinjal, amaranthus, and cucurbits, ensuring year-round availability of raw materials for processing units. However, these commodities are highly susceptible to post-harvest losses due to inadequate handling, storage, and marketing infrastructure. Food processing units such as fruit pulp and juice plants, dehydration units, dairy processors, and snack food industries play a vital role in minimizing these losses, improving shelf life, and enhancing value realization.

At the state level, Gujarat has emerged as a leader in agro-based industries due to its strong industrial infrastructure, skilled manpower, and progressive farming community. The Comprehensive Agro Business Policy (2016–2021) further strengthened the sector by promoting value addition, rural employment, and investment in agri-clusters, mega food parks, cold chains, and export-oriented units. Key features of the policy included capital investment subsidies, interest subvention, freight assistance, skill development programs, and support for technology adoption. Overall, South Gujarat exemplifies successful integration of horticulture with food processing under secondary agriculture,

offering valuable insights for developing scalable and sustainable agro-industrial models across India.

2. Horticultural Resource Base of South Gujarat

South Gujarat constitutes one of the most dynamic horticultural regions of western India, supported by fertile alluvial soils, high rainfall, a humid tropical climate, and assured irrigation facilities. These favorable natural conditions, coupled with progressive farming practices and efficient market connectivity, have enabled the region to make a substantial contribution to Gujarat's overall horticultural production. Beyond supplying fresh produce to domestic markets, this strong resource base forms the backbone of the expanding food processing and secondary agriculture sector in the region.

Table 1. South Gujarat District wise estimated area, production and productivity of horticultural crops for the year 2024-25

District	Fruits		
	Area (ha)	Production (MT)	Productivity (MT/ha)
Surat	14419	246418	17.09
Narmada	14749	810647	54.96
Bharuch	17194	978545	56.91
Dang	8029	49697	6.19
Navsari	44565	373015	8.37
Valsad	46274	360957	7.80
Tapi	11668	264551	22.67
Region Total	156898	3083830	19.65
State Total	444125	8581591	19.32

Fruit crops represent the core strength of South Gujarat's horticulture. Mango occupies a dominant position, with the region gaining national recognition for Kesar mango, valued for its superior flavour, aroma, and processing suitability. Major mango-growing districts such as Valsad and Navsari supply fruits for table use as well as for processing into pulp, juice, nectar, and other value-added products. Seasonal surpluses during peak harvest periods underline the importance of processing units in reducing post-harvest losses and stabilizing market prices. Sapota (chikoo), particularly prominent in Navsari district, contributes significantly to fresh consumption and emerging processing avenues, including pulp and dehydrated products.

Table 2 South Gujarat District wise estimated area, production and productivity of major fruits crops for the year 2024-25

District	Mango			Sapota			Banana			Jackfruit		
	Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)
Surat	10893	78275	7.19	892	9180	10.29	2180	151668	69.57	14	131	9.36
Narmada	3758	28148	7.49	19	212	11.16	9932	743408	74.85	0	0	0.00
Bharuch	3572	25037	7.01	395	3612	9.14	10765	877318	81.50	0	0	0.00
Dang	5844	41731	7.14	34	352	10.35	49	2502	51.06	18	140	7.78
Navsari	35321	239720	6.79	8052	71021	8.82	832	51229	61.57	39	323	8.28
Valsad	38626	258325	6.69	2334	29850	12.79	1032	58566	56.75	37	271	7.32
Tapi	7055	45210	6.41	88	957	10.88	1542	98085	63.61	29	262	9.03
Total	105069	716446	6.82	11814	115184	9.75	26332	1982776	75.30	137	1127	8.23
State total	184032	1272639	6.92	24622	243612	9.89	60081	4216812	70.19	241	1849	7.67

Table 3 South Gujarat District wise estimated area, production and productivity of major vegetables crops for the year 2024-25

District	Okra			Pointed Gourd			Amaranthus		
	Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)
Surat	16483	236073	14.32	4245	72908	17.18	553	5764	10.42
Narmada	956	9493	9.93	49	895	18.27	0	0	0.00
Bharuch	3146	32909	10.46	2206	37502	17.00	485	6042	12.46
Dang	2933	43348	14.78	15	206	13.73	0	0	0.00
Navsari	2999	38086	12.70	215	3756	17.47	7	56	8.00
Valsad	2767	25834	9.34	695	13198	18.99	28	273	9.75
Tapi	8899	126061	14.17	550	8385	15.25	117	609	5.21
Total	38183	511804	13.40	7975	136850	17.16	1190	12744	10.71
State total	93955	1168871	12.44	12709	213083	16.77	2530	28604	11.31

(Table 1,2 and 3 Source: <https://doh.gujarat.gov.in/Home/HorticultureCultivation>)

Banana is cultivated extensively due to favourable soils and year-round irrigation, providing a continuous supply of raw material for fresh markets and processing industries producing chips, puree, flour, and infant foods. Papaya, known for its short duration and high productivity, is increasingly utilized for cubes, pulp, and ready-to-eat products. Collectively, these fruit crops ensure a reliable raw material base essential for sustainable processing operations.

Vegetable production in South Gujarat is characterized by diversification, staggered planting, and multiple cropping cycles, ensuring year-round availability. Major vegetables such as tomato, brinjal, okra, cucurbits, and leafy greens support both fresh markets and processing activities, including paste, puree, dehydration, and ready-to-cook products. In addition, spices and plantation crops such as turmeric and arecanut, though grown on limited areas, enhance economic diversification and create niche opportunities for specialized processing. Overall, the diverse and continuous horticultural output of South Gujarat provides a strong foundation for value addition and agro-industrial development

3. Need for Food Processing and Value Addition

(a) The Problem of Post-Harvest Losses

Despite high productivity and economic potential, horticultural crops in South Gujarat are highly perishable and vulnerable to post-harvest losses, which commonly range from 20–30 percent. These losses are mainly attributed to improper harvesting and handling practices, inadequate cold storage and transportation facilities, and inefficient market systems. The region's warm and humid climate further accelerates physiological deterioration, microbial spoilage, and mechanical damage, particularly during peak harvesting periods. Seasonal production gluts often exceed the capacity of existing infrastructure, compelling farmers to sell produce at distress prices or incur losses due to spoilage. Such inefficiencies reduce farm income and weaken the stability of the horticultural economy.

(b) Secondary Agriculture as a Strategic Solution

Secondary agriculture, through food processing and value addition, provides an effective and sustainable response to post-harvest challenges. Food processing acts as a vital link between farm production and consumer markets by transforming raw, perishable commodities into stable, storable, and marketable products. Timely processing after harvest significantly reduces quantitative and qualitative losses while maintaining nutritional quality. Techniques such as pulping, dehydration, freezing, pickling, and minimal processing extend shelf life and enable marketing beyond the harvest season, thereby improving price realization.

(c) Economic and Social Benefits

Value-added products generally command higher market prices than raw produce, directly improving farmer profitability. In addition, food processing units generate substantial rural employment in activities such as sorting, grading, processing, packaging, storage, and distribution. Small-scale and household-level processing enterprises promote entrepreneurship, particularly among rural youth and women's self-help groups, contributing to inclusive rural development.

(d) Processing Potential Specific to South Gujarat

South Gujarat is uniquely suited for horticulture-based processing industries. Kesar and Alphonso mangoes are ideal for pulp, concentrate, and export-oriented processing, while bananas offer scope for wafers, flour, puree, and fig. Vegetables and spices further support dehydration, paste production, and ready-to-eat products, strengthening agro-industrial growth in the region.

4. Food Processing Ecosystem in South Gujarat

Building on its strong horticultural resource base, South Gujarat has gradually developed a diversified and resilient food processing ecosystem that plays a pivotal role in secondary agriculture and rural economic development.

(a) Foundation of the Ecosystem: Diverse Processing Units

The food processing sector in South Gujarat comprises micro, small, medium, and large-scale enterprises, enabling efficient utilization of the region's varied agricultural produce. Fruit and vegetable processing units form the backbone of this ecosystem, converting seasonal surpluses into jams, pickles, sauces, purees, canned vegetables, and minimally processed products. These units are instrumental in reducing post-harvest losses and stabilizing prices during peak harvest periods.

Mango processing represents a flagship activity, particularly in Valsad and Navsari districts, which are well known for Alphonso and Kesar mangoes. Numerous pulp and dehydration units supply industrial-grade mango pulp to beverage, confectionery, and export markets, along with value-added products such as mango leather and flakes. Similarly, South Gujarat's high banana production has encouraged the growth of banana-based enterprises producing wafers, fig, puree, and flour. Some processors have adopted integrated utilization of banana stems and pseudo-stems for fibre and compost, improving overall resource efficiency.

Table 4 List of horticulture based food processing industries in south gujarat

Sr. No	Name of Processing unit	District	Brand name	Products
1	Patson Foods (India) Pvt. Ltd.	Navsari	Rasanand	Mango pulp
2	Vimal Agro Products Pvt. Ltd.	Surat	Swad	pickles, mango pulp
3	Harshad Mango Products Pvt. Ltd.	Bharuch	Hampa	Mango pulp
4	Tapi Fruit Processing Limited	Surat	Tapi	fruit products (juices, pulps, candies)
5	Food and Inns Pvt. Ltd	Valsad	Madhu	Mango and guava pulp
6	R. K. Agro Processing	Valsad	R K Cashew	Cashew Nut processing
7	Kamdhenu Foods - Morriko Pure Foods Pvt Ltd	Valsad	Kamdhenu	Dehydrated fruits and vegetables
8	Balaji Wafers Private Limited	Valsad	Balaji	Potato chips and wafers
9	Ambica Haldar Farm & OTLO FPO	Dang	Samruddhi	Turmeric (haldi) products

(b) Dairy, Snacks, and Ready-to-Eat Products

The region has also witnessed growth in dairy processing and snack food industries, supported by strong milk procurement systems and traditional Gujarati food expertise. Automated production of khakhra, thepla, instant mixes, and ready-to-eat meals caters to expanding urban and export markets, including the Indian diaspora.

(c) Catalyst for Growth: Industrial Infrastructure and Cluster Development

Cluster-based infrastructure, particularly the Gujarat Agro Infrastructure Mega Food Park at Mangrol (Surat), has accelerated sectoral growth. With plug-and-play facilities, cold chains, storage, and quality laboratories, the park strengthens farmer–processor linkages and positions South Gujarat as an emerging food processing hub.

5. Role of Government and Institutional Support

Government and institutional support plays a decisive role in the development of secondary agriculture, particularly in regions such as South Gujarat, where rich horticultural resources coexist with challenges like post-harvest losses, price volatility, and fragmented marketing systems. Bridging the farm-to-factory gap requires coordinated interventions in infrastructure creation, capacity building, technology transfer, and policy support. In South Gujarat, agencies such as the Gujarat Agro Industries Corporation (GAIC), Ministry of Food Processing Industries (MoFPI), State Department of Horticulture, ICAR institutes, and the State Agricultural University (SAU) system have collectively enabled the transformation of primary horticultural production into value-added, market-oriented enterprises.

(a) Farm-to-Factory Linkage: A South Gujarat Perspective

South Gujarat is a major producer of mango (Kesar and Alphonso), banana, sapota, and diverse vegetables. Traditionally, farmers faced problems related to perishability, seasonal gluts, and limited local processing facilities, resulting in distress sales and income instability. Government-led interventions aim to create an enabling ecosystem in which produce flows efficiently from farms to processing units for grading, processing, packaging, branding, and marketing. Through targeted schemes and institutional convergence, the region is gradually shifting from dependence on fresh produce markets towards a value-chain-based agro-industrial model, strengthening farmer income security and rural economic sustainability.

(b) Key Supporting Agencies and Their Roles

(i) Gujarat Agro Industries Corporation (GAIC)

GAIC functions as the nodal agency for promoting agro-based industries in Gujarat and acts as a bridge between farmers, entrepreneurs, financial institutions, and government departments. By implementing central and state schemes, GAIC provides capital subsidies—often up to 35 percent—under initiatives such as the PM Formalisation of Micro Food Processing Enterprises (PMFME). In South Gujarat, GAIC support has facilitated the establishment of mango pulp units, banana powder and wafer units, vegetable processing plants, and cold storage facilities. These interventions create localized demand for horticultural produce, reduce post-harvest losses, and ensure assured markets

during peak harvest periods. Notably, Surat district is notified as an Agri Export Zone for mangoes and vegetables, further strengthening export-oriented processing.

Table 5 List of One District-One Product (ODOP) for south gujarat

Sr. No	District	One District-One Product (ODOP)
1	Surat	Banana based Products
2	Narmada	Banana based Products
3	Bharuch	Banana based Products
4	Dang	Finger Millet (Ragi) based Products
5	Navsari	Mango based Products
6	Valsad	Sapota based products
7	Tapi	Sorghum based Products

(Source: https://mofpi.gov.in/sites/default/files/odop_list_of_35_states_and_uts.pdf.)

(ii) Ministry of Food Processing Industries (MoFPI), Government of India

At the national level, MoFPI provides strategic direction and financial assistance for strengthening India's food processing sector. Flagship schemes such as the Pradhan Mantri Kisan Sampada Yojana (PMKSY) support mega food parks, agro-processing clusters, cold chain infrastructure, and value-addition facilities. In South Gujarat, MoFPI-supported projects have catalyzed large-scale investments in fruit, vegetable, dairy, and spice processing, particularly in Surat, Navsari, and Valsad districts. These initiatives improve logistics, strengthen farmer–processor linkages, and promote export-oriented production, thereby reinforcing the regional secondary agriculture framework.

(iii) State Department of Horticulture, Government of Gujarat

The State Department of Horticulture plays a critical role in promoting high-value horticultural crops suited to South Gujarat's agro-climatic conditions. Through various schemes, it supports the cultivation of mango, banana, vegetables, and plantation crops, alongside post-harvest infrastructure such as pack houses, grading and sorting units, and small-scale processing facilities. The Centre of Excellence for Floriculture and Mango at Chanvai, Valsad, serves as a major hub for training and innovation, offering hands-on programs in nursery management, mango canopy management, floriculture, and sustainable practices. BAIF's DHRUVA program, supported by NABARD, boosts tribal incomes and market readiness by developing small, integrated "Wadi" orchards of fruits such as mango, cashew, and guava on degraded lands in South Gujarat, incorporating value-added processing units (e.g., mango processing in Lachhakadi), particularly for tribal and smallholder farmers in districts like the Dangs and Narmada.

(iv) ICAR Institutes and State Agricultural Universities (SAUs)

ICAR institutes and State Agricultural Universities, particularly Navsari Agricultural University (NAU), provide the scientific backbone for secondary agriculture in South Gujarat. Through research, extension, and capacity-building activities, these institutions support crop improvement, production technologies, post-harvest management, and food processing innovations. A strong network of five Krishi Vigyan Kendras (KVKs) under NAU facilitates technology transfer across the region. Notable contributions include the development of the '**Sonpari**' mango variety by NAU, characterized by superior pulp quality, extended shelf life, and export suitability. Another landmark achievement is the GI tagging of Amalsad Chikoo, jointly pursued by NAU and GUJCOST, which enhances product authenticity, branding, and export potential while benefiting local cooperatives and farmers.

(c) Support Mechanisms Strengthening Secondary Agriculture

Government and institutional interventions are operationalized through capital subsidies, infrastructure support, cold chain development, training and skill development programs, and promotion of Farmer Producer Organizations (FPOs). These mechanisms reduce financial risks, improve post-harvest management, and empower small and marginal farmers through collective action and better market negotiation.

(d) Strengthening the Farm-to-Factory Ecosystem

Mango-based FPOs in South Gujarat exemplify the success of integrated support. With GAIC-assisted pack houses and MoFPI-linked processing units, raw mangoes are converted into pulp for domestic and export markets. This coordinated approach ensures fair prices, minimizes wastage, and demonstrates the effective realization of secondary agriculture in the region.

6. Value Chain Integration: From Farm to Market

South Gujarat, endowed with fertile alluvial soils, assured irrigation from rivers such as the Narmada and Tapi, and a climate conducive to high-value horticultural crops, occupies a strategic position in India's agricultural economy. Its proximity to major consumption centers like Surat and Mumbai, along with excellent connectivity to ports such as Hazira, provides a strong advantage for developing an integrated, market-oriented agricultural system. Realizing this potential requires a transition from production-centric farming to a secondary agriculture model based on value chain integration from farm to market.

(a) The Imperative of Value Chain Thinking in South Gujarat

Despite high productivity, traditional horticultural systems in South Gujarat face challenges such as post-harvest losses, price volatility, fragmented markets, and weak farmer bargaining power. Value chain integration addresses these constraints by linking production, processing, logistics, and marketing into a coordinated system. Instead of selling raw produce at the farm gate, farmers become stakeholders in organized supply chains delivering quality-assured, processed, and branded products. This approach strengthens backward linkages with farmers and forward linkages to domestic and international markets, improving income stability and enhancing regional agri-economic resilience.

(b) Backward Linkages: Organizing the Farm Gate

Effective integration begins at the farm level through aggregation, quality management, and post-harvest handling. Farmer Producer Organizations (FPOs) play a critical role in aggregating produce from small and fragmented holdings, ensuring volume consistency and improving negotiation power. In districts such as Navsari and Valsad, horticulture-based FPOs are emerging as reliable suppliers to processors and retailers. Decentralized collection centers located near production areas facilitate cleaning, sorting, and grading, reducing delays after harvest. Standardized grading based on size, maturity, and quality enables segmentation of produce for export, domestic retail, or processing. Given the region's warm and humid climate, pre-cooling and cold storage infrastructure is essential. Integration of pre-cooling units, cold storages, and refrigerated transport significantly reduces losses and ensures steady supply to processing units and markets.

Table 6 List major cold storage in south gujarat

Sr. No.	Cold storage	District
1	Hitech Frozen facilities Pvt Ltd	Surat
2	AgriFresh Cold Storage	Surat
3	Nature Fresh Cold Storage	Surat
4	Harsiddhi CA Cold Storage	Navsari
5	Desai Fruits And Vegetables Pvt. Ltd	Navsari

(c) Forward Linkages: Adding Value and Reaching Markets

The forward segment of the value chain generates maximum economic value through processing, packaging, branding, and market access. South Gujarat has strong potential for minimal, secondary, and tertiary processing of fruits and vegetables into products such as fresh cuts, pulps, purees, jams, pickles, and ready-to-eat foods. Improved packaging enhances shelf life, safety, and market appeal, while regional branding and GI-tagged products strengthen identity and premium pricing. Proximity to urban retail and institutional markets ensures stable demand, while access to Hazira port enables export-oriented supply chains complying with international quality and traceability standards.

7. Challenges in Horticultural Processing

Horticultural processing in South Gujarat has significant potential due to the region's strong production base of fruits such as mango and chikoo and a wide range of vegetables. However, several interrelated climatic, structural, technical, and regulatory challenges continue to limit the sector's growth and efficiency. Addressing these constraints is essential for strengthening secondary agriculture, reducing post-harvest losses, and improving farmer incomes.

a) Climatic Risks Affecting Raw Material Supply

Despite generally favourable agro-climatic conditions, increasing climate variability poses a major risk to consistent raw material supply. Erratic rainfall, unseasonal storms, floods, and heat waves often affect both yield and quality of horticultural crops. For example, untimely rains

during the mango harvest cause fruit drop and spoilage, reducing the availability of processing-grade produce. High temperatures and humidity accelerate physiological deterioration, leading to increased losses before produce reaches processing units. Such uncertainties create supply volatility and complicate production planning for processors.

b) Seasonal Availability and Underutilization of Processing Capacity

Horticultural crops are largely seasonal, resulting in uneven availability of raw materials throughout the year. Consequently, many processing units operate at peak capacity only during harvest seasons and remain underutilized during off-season periods, increasing costs and lowering profitability. Units dependent on single crops, such as mango or tomato, are particularly vulnerable due to limited diversification in processing portfolios.

c) Limited Technical Expertise and Technology Adoption

Small-scale and rural enterprises dominate the sector, often relying on outdated technologies and traditional methods. This leads to lower efficiency, inconsistent quality, and higher wastage. Limited access to technical training, modern equipment, and extension services further constrains technology adoption and skill development.

d) Quality and Food Safety Compliance Constraints

Compliance with food safety regulations such as FSSAI regulations and export standards remains challenging for small and medium processors due to inadequate hygienic infrastructure, limited food testing facilities, and weak traceability systems. Overcoming these challenges requires coordinated interventions in climate resilience, diversification, capacity building, and regulatory support.

8. Opportunities for Secondary Agriculture Development

South Gujarat offers substantial opportunities for the expansion of secondary agriculture due to its diverse horticultural base, favourable climate, and proximity to major domestic and export markets. The region is a leading producer of mango, banana, sapota, papaya, and a wide range of vegetables, yet a significant portion of this output remains underutilized because of perishability and price fluctuations. Strategic promotion of food processing, value addition, and agri-entrepreneurship can convert surplus produce into high-value products, reduce post-harvest losses, generate rural employment, and accelerate regional economic growth.

(a) Fruit and Vegetable Dehydration and Minimal Processing

Fruit and vegetable dehydration and minimal processing represent highly promising avenues for secondary agriculture in South Gujarat. Processes such as drying, freezing, juicing, and pickling extend shelf life while retaining nutritional and sensory quality. Products including dried mango slices (aam papad), banana chips, dehydrated chikoo, okra and brinjal flakes, chili powder, and ready-to-use vegetable mixes have strong domestic and export demand. The tropical climate of Navsari and Valsad districts is well suited for low-cost solar drying technologies. With research and extension support for improved pre-treatments and hygienic processing, small-scale and community-based units—especially women-led self-help groups—can actively participate in value addition.

(b) Processing of Surplus and Grade-Out Produce

Processing surplus and grade-out produce into pulp, purees, jams, jellies, concentrates, and powders offers significant scope for value realization. South Gujarat is particularly suitable for mango pulp from Kesar and Alphonso varieties, banana powder for health foods, chikoo pulp, and vegetable-based pickles and sauces. Centralized processing hubs, mobile units, and linkages with bakeries, dairies, and beverage industries can further enhance utilization and profitability.

(c) Region-Specific Value-Added Products

Developing region-specific products rooted in local food culture enables differentiation and premium branding. Opportunities exist for spice blends, traditional mixes, essential oils, and value addition to underutilized fruits such as jamun and custard apple. Niche branding can attract urban and export markets.

(d) Agro-Startups and Rural Entrepreneurship

Secondary agriculture also supports agro-startups in cold chains, agri-waste utilization, digital services, and agri-tourism. With institutional incubation such as **NAU's SSIP2.0** and policy support for skill development and seed funding, can nurture entrepreneurial talent and promote sustainable rural livelihoods., South Gujarat can emerge as a vibrant hub of inclusive and sustainable secondary agriculture.

CONCLUSION

South Gujarat exemplifies a robust and forward-looking model of secondary agriculture, where a strong horticultural resource base is effectively integrated with food processing, value addition, and market-oriented development. The region's diverse production of mango, banana, sapota (chikoo), papaya, and vegetables provides a reliable raw material foundation for processing industries, enabling the transformation of highly perishable produce into stable, high-value products. This integration reduces post-harvest losses, enhances product quality, and extends market reach across domestic and export channels.

The development of food processing ecosystems in South Gujarat—supported by diversified processing units, cold chain infrastructure, and cluster-based industrial facilities—has generated significant economic and social benefits. Farmers gain improved price realization, reduced exposure to market volatility, and stronger linkages with organized supply chains through FPOs and processing enterprises. At the same time, food processing activities have created employment opportunities across aggregation, storage, processing, packaging, logistics, and marketing, contributing to inclusive rural development.

Strong government and institutional support has been central to this transformation. Policy initiatives, capital subsidies, food parks, and targeted schemes implemented by agencies such as GAIC, MoFPI, the State Department of Horticulture, ICAR institutes, and State Agricultural Universities have strengthened farm-to-factory linkages and encouraged private investment and entrepreneurship. Research-driven innovations, improved cultivars, post-harvest technologies, and institutional recognitions such as GI tagging have further enhanced product differentiation and competitiveness.

Overall, South Gujarat demonstrates how strategic integration of production, processing, and marketing can drive sustainable agricultural growth. By leveraging agro-climatic advantages, research and extension support, modern infrastructure, and efficient market access, the region has transitioned from a supplier of raw horticultural produce to an emerging hub of value-added food products. This experience provides a scalable and replicable framework for strengthening secondary agriculture and rural prosperity in horticulture-rich regions across India.

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