

Consumer Awareness and Support for Sustainable Cashew Processing Units: Evidence from Goa, India

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Abstract:

Cashew is an important horticultural and Agro-processing product associated closely with the economic and cultural identity of Goa. Although the crop was originally introduced into Goa by the Portuguese during the sixteenth century, cashew has gradually become an integral component of the state's agricultural, processing, tourism, and local food economy. This study investigates consumer awareness and perceptions concerning the sustainability of cashew processing units in Goa and examines the factors that influence consumer preferences and purchasing decisions. A quantitative research approach was adopted for the study. Primary data were collected from 101 valid respondents in Goa through a structured questionnaire based on a five-point Likert scale. The collected information was analysed using SPSS with the help of frequency distributions, descriptive statistics, standard deviation, Cronbach's Alpha, and Chi-square tests. The findings indicate that consumers attach considerable importance to supporting local Goan farmers, maintaining kernel quality, ensuring appropriate product labelling, and preserving traditional processing practices. However, the findings also reveal inadequate public awareness regarding the decline in the number of cashew processing units operating in the state. Education was not found to have a statistically significant association with awareness of this decline. In contrast, household income demonstrated a statistically significant relationship with consumers' willingness to pay a premium for Goan-origin cashew products. The study concludes that strengthening consumer awareness, supporting local producers, improving processing technology, and promoting the distinctive identity of Goan cashews can contribute to the long-term sustainability of the industry.

Keywords: Cashew Industry, Consumer Awareness, Consumer Perception, Sustainability, Cashew Processing Units, Goa

1. Introduction

Cashew is among India's prominent horticultural crops and has considerable importance within the country's agricultural and food-processing sector. The cashew tree originated in Brazil and was brought to India by the Portuguese during the sixteenth century. In Goa, its initial

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cultivation was primarily associated with soil conservation, particularly the prevention of soil erosion. Over the years, however, cashew cultivation expanded beyond its original purpose and developed into an economically significant agricultural activity.

The cultivation and processing of cashew subsequently spread across different regions of India and other parts of Asia, Africa, and Latin America. The crop is valued not only for its edible kernel but also for the various products and by-products obtained during processing. India has developed a substantial cashew-processing industry and has historically occupied an important position in the international cashew market. The expansion of domestic consumption and international demand has further strengthened the importance of cashew processing as an agro-based economic activity.

Goa occupies a distinctive position in the history and development of India's cashew sector because the crop was introduced into the region before spreading to other parts of the country. Located along India's western coast and forming part of the Konkan region, Goa possesses geographical and climatic conditions that support cashew cultivation. The state's cashew-processing sector has also contributed to employment generation, particularly among rural communities and women involved in labour-intensive processing activities.

Cashew has gradually become closely associated with Goan food culture and tourism. Visitors to the state commonly encounter cashew products in local markets, traditional foods, beverages, and packaged products. The perceived flavour, quality, and regional identity of Goan cashews contribute to their appeal among consumers. These characteristics provide an opportunity for local processors to differentiate their products from cashews originating from other regions.

Despite these advantages, the Goan cashew-processing industry faces several structural and competitive difficulties. Producers and processing units encounter competition from neighbouring states, particularly Maharashtra and Karnataka, where raw cashew availability can provide advantages to local processors. Dependence on external sources of raw material, rising production costs, labour-related issues, technological limitations, and competition within domestic and international markets have created additional pressure on local processing units.

The decline in the number of operating cashew-processing units is particularly concerning. Goa reportedly had approximately 77 operational cashew-processing units in 2005, whereas the number has subsequently declined to around 30. This substantial reduction raises concerns regarding the continuity and sustainability of the sector. It also highlights the need to understand whether consumers are aware of this development and whether their purchasing preferences can contribute to supporting the survival of local processing units.

Consumer behaviour has an important role in determining the sustainability of regional industries. Consumers may support local production through their preference for locally manufactured products, willingness to pay premium prices, concern for farmers, appreciation of traditional production methods, and demand for environmentally responsible packaging. Therefore, understanding consumer attitudes towards Goan cashew products can provide useful insights for processors, policymakers, farmers, and other stakeholders.

Against this background, the present study examines consumer awareness and perceptions concerning the sustainability of cashew-processing units in Goa. It further evaluates the relationship between selected demographic characteristics and consumer awareness and willingness to pay for Goan-origin cashew products.

1.1 Objectives of the study

1. To examine the demographic characteristics of consumers purchasing cashew products in Goa.
2. To assess consumers' awareness regarding the reduction in the number of cashew-processing units in Goa.
3. To evaluate consumer perceptions towards the sustainability of cashew-processing units in the state.
4. To determine consumer preferences and willingness to pay a premium for Goan-origin cashew nuts.

1.2 Conceptual Framework

The sustainability of cashew-processing units in Goa is influenced by several interconnected factors. Consumer demographics, awareness, perceptions, purchasing preferences, and market conditions collectively shape the demand for locally processed cashew products.

Demographic characteristics such as education and household income may influence consumers' awareness and purchasing behaviour. However, the present findings indicate that educational attainment does not have a statistically significant relationship with awareness regarding the decline of cashew-processing units. Household income, on the other hand, shows a significant association with willingness to pay a premium for Goan-origin cashew products.

Consumer perceptions also constitute an important component of the framework. Factors such as support for local farmers, kernel quality, appropriate product labelling, environmentally responsible packaging, traditional Goan processing practices, and fair wages influence how consumers evaluate sustainable cashew products.

The willingness of consumers to pay a premium represents an important market-based mechanism for supporting sustainability. When consumers are willing to pay more for locally produced and responsibly processed cashews, processors may have greater opportunities to invest in quality improvement, technology, packaging, and sustainable practices. Nevertheless, external competition from neighbouring states and international markets continues to pose challenges to the long-term viability of Goan processing units.

1.3 Hypothesis

The following hypotheses were formulated for empirical examination:

H1: Consumers' educational characteristics are significantly associated with their awareness of the decline in Goan cashew-processing units.

H2: Consumers attach greater importance to supporting local farmers and maintaining kernel quality than to fair wages when evaluating sustainable cashew processing.

H3: Household income is significantly associated with consumers' willingness to pay a premium price for sustainably processed Goan-origin cashew nuts.

1.4 Theoretical Foundation

The sustainability of the Goan cashew-processing sector can be examined through established strategic management frameworks, including SWOT analysis, PESTLE analysis, and Porter's Five Forces.

SWOT Analysis

A SWOT framework identifies the internal and external factors influencing the sustainability of the industry. Strengths include the established identity of Goan cashews, consumer recognition, traditional processing knowledge, availability of skilled labour, and continuing domestic demand. Weaknesses include dependence on externally sourced raw cashew, limitations in processing technology, rising operational costs, and labour-related difficulties. Opportunities are associated with increasing consumer interest in organic and locally sourced products, product diversification, value addition, improved branding, geographical identity, and government assistance. Threats include competition from neighbouring states, cheaper imported products, fluctuations in international prices, climate-related agricultural risks, and the availability of substitute products such as almonds and walnuts.

PESTLE Analysis

The PESTLE framework helps explain how external environmental conditions influence the industry. From a political perspective, government policies, subsidies, incentives, and agricultural development programmes can influence the performance of processing units. Economic factors include changes in raw-material prices, labour costs, international market conditions, and consumer purchasing power. Social factors include changing dietary preferences, health awareness, consumer interest in local products, and the cultural importance of cashews in Goa. Technological developments in processing, packaging, storage, and quality control can improve productivity and product consistency. Legal considerations include food-safety requirements, labour regulations, product standards, and packaging and labelling requirements. Finally, environmental concerns relating to waste management, resource utilisation, packaging materials, and climate variability are increasingly relevant to sustainable cashew processing.

Porter's Five Forces

Porter's Five Forces framework provides an additional perspective on competitive conditions within the cashew-processing industry. The bargaining power of suppliers may be considerable because processing units depend heavily on the availability and price of raw cashew. The bargaining power of buyers is also significant because consumers can compare prices and purchase cashews from different regions. The threat of substitutes is substantial because consumers can choose alternative nuts such as almonds, walnuts, pistachios, and other snack

products. The threat of new entrants is moderate because processing requires investment, supply arrangements, technical knowledge, and market access. Finally, competitive rivalry remains intense because processors compete on price, quality, availability, branding, and market reach. Within this competitive environment, sustainability and regional identity can provide a differentiation strategy for Goan cashew processors. A strong association between local production, farmer support, traditional practices, quality, and responsible processing may strengthen consumer preference for Goan-origin products.

1.5 Problem Statement

The Goan cashew-processing industry is experiencing several challenges that threaten its long-term sustainability. These include inadequate availability of locally sourced raw cashew, dependence on external supplies, technological limitations, labour-related issues, rising production costs, and growing competition from other regions and international markets.

At the same time, consumers are increasingly considering issues such as product quality, environmental responsibility, local economic development, ethical production, and regional identity when making purchasing decisions. Despite the established reputation of Goan cashews, there remains limited empirical understanding of consumer awareness concerning the decline in local processing units and the extent to which consumers are willing to support sustainable local processing through their purchasing behaviour.

The reduction in the number of operating processing units further intensifies the need for investigation. Therefore, the present study seeks to identify consumer perceptions, awareness levels, preferences, and willingness to pay for Goan-origin cashew products. The findings can assist policymakers, processors, farmers, and other stakeholders in developing strategies aimed at strengthening the sustainability of the sector.

2. Literature reviews

Veeranjaneya Polisetty et al. (2017) – *A Study on Cashew Manufacturing Process*. The study explains the various stages involved in converting raw cashew nuts into finished products. The processing sequence includes cleaning, water soaking, roasting, shell removal, drying, grading, and other activities required to prepare cashew kernels for consumption and marketing.

K. Dhivya et al. (2022) – *A Study of Growth and Performance of Cashew Nut Production in Tamil Nadu*. The study highlights the competitive position of Indian cashew processing units in the production and marketing of cashew products. It also discusses changes in the finished-product market, particularly declining prices, which have adversely affected the income and economic position of cashew farmers.

Dr. T. Sisili (2017) – *Analysis of Cashew Nut Production in Kerala State*. The study examines the production and productivity of cashew nuts in Kerala. Cashew is considered an important snack and is widely associated with household consumption and social occasions. The analysis evaluates cashew production across different districts and areas of the state to understand its overall productivity.

Patil P. J. (2016) – *Food Processing Technology and Packaging: A Case Study of the Indian Cashew Nut Industry*. The study identifies processing and packaging as major concerns within the Indian cashew industry. Inadequate processing practices can negatively influence kernel quality, resulting in lower market prices and affecting the profitability of individual processing units as well as the broader cashew market. The study also emphasizes the importance of maintaining the nutritional value of cashew kernels during processing.

H. R. Bhoomika et al. (2018) – *Problems and Prospects of Cashew Cultivation in India*. The study discusses the growing international demand for cashew nuts as a popular snack and examines the major challenges and future opportunities associated with cashew cultivation. It covers issues arising throughout the value chain, beginning with farmers and extending to processors involved in the production and marketing of cashew nuts.

Shyam S. Bhat et al. (2019) – *A Study on Profitability and Performance Evaluation Model for Cashew Processing Units: A Study with Special Reference to Kaladhar Cashew Industries*. The study evaluates the financial performance and profitability of a cashew processing unit. It examines indicators such as the sales ratio and net profit ratio over the period from 2013 to 2018 to assess the operational and financial performance of the industry.

Reema Jennifer et al. (2021) – *A Study of the Cashew Industry in Karnataka*. The study points out that cashew processing is highly labour-intensive and creates considerable employment opportunities, particularly for women in rural areas. It also emphasizes the international reputation of Indian cashews for their quality, flavour, and appearance. However, variations in the quality of raw cashew nuts produced in different regions can influence India's ability to maintain a strong position in the global cashew market.

K. Madhura (2020) – *An Empirical Study on Issues and Challenges in the Working Conditions of Female Labourers Engaged in Cashew Industries*. The study focuses on the working conditions and welfare of women employed in cashew processing units. It examines the difficulties faced by female workers in balancing employment and family responsibilities and proposes measures to improve their welfare. The study also emphasizes the need for appropriate social security provisions and safeguards for women workers in the cashew industry.

3. Research Methodology

The study adopts a quantitative research design to examine the sustainability of cashew processing units in Goa from the perspective of consumer perceptions. To provide a comprehensive analytical foundation, the study incorporates established strategic frameworks, including SWOT Analysis, PESTLE Analysis, and Porter's Five Forces Model. These methodological tools facilitate a structured assessment of consumer views regarding the economic, social, environmental, and operational sustainability of cashew processing units. The findings generated through this approach may also provide useful insights for policymakers and other stakeholders in developing appropriate strategies and policies for promoting sustainable practices within the cashew processing sector.

3.1 Data Collection Method

A convenience sampling technique was employed to obtain responses from the participants. A total of 110 respondents were initially approached for the study. Following a thorough screening of the collected responses, 9 questionnaires were excluded because they contained incomplete information. Consequently, 101 valid responses were retained and considered for the final data analysis. The required information was gathered through a structured questionnaire based on a five-point Likert scale.

3.2 Data Analysis

Data were analysed using the Statistical Package of Social Science (SPSS). Descriptive statistics such as frequency, mean, standard deviation, and the Chi-squared test were used in the study. The results of the study strongly indicate strong consumer support for the sustainability of cashew processing units in Goa, and higher-income consumers are also willing to pay a higher price to purchase Goan-origin cashew nuts.

4. Interpretation

4.1 Reliability Statistics	
Cronbach's Alpha	N of Items
.737	19

The reliability analysis of the scale indicates the Cronbach's Alpha Value of .737, which is acceptable and determines the internal consistency in the data. This suggests that items used in the questionnaire are reliable for measuring the variable under study.

4.2 Demographics Profile of Respondents

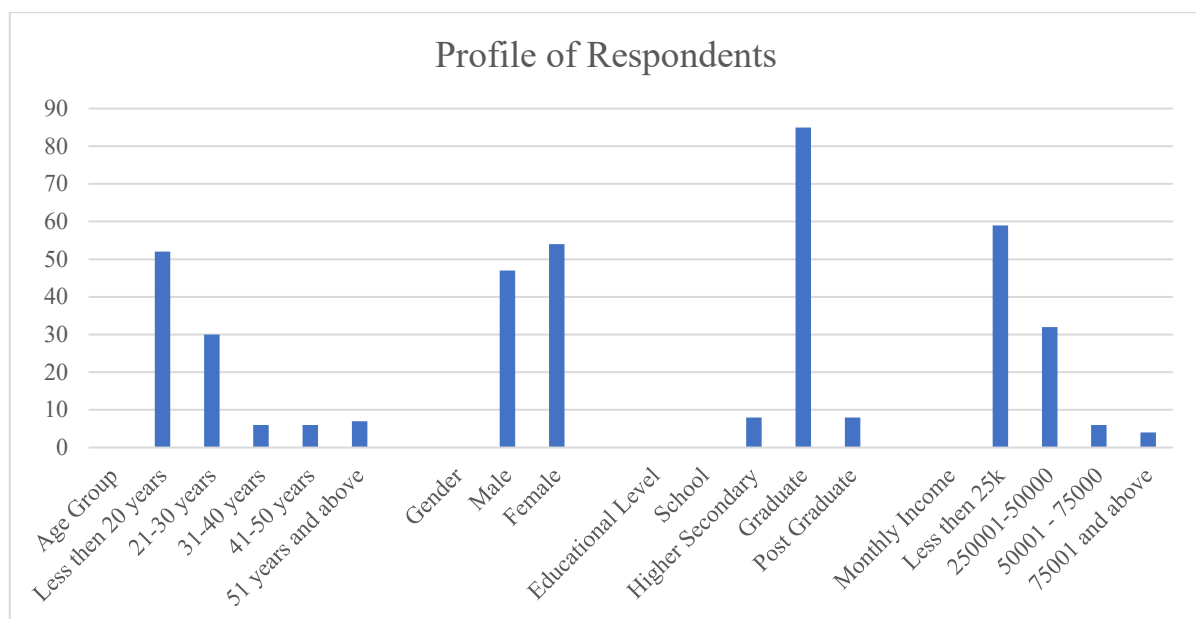


Figure 1: Demographic information of Respondents

Interpretation

The cashew consumer sample is youth-dominated, with more belonging to Generation Z. This clearly indicates that the youth prefer to buy more cashew nuts as a snack for their consumption. Gender has balanced representation, more in favour of female respondents. It clearly indicates women's preference for cashew nuts for household consumption. Respondents are highly educated, which explains the awareness of sustainability of Units, but they lack knowledge about the decline in the cashew processing units. The majority belongs to the lower-income group but is still ready to pay a premium price for Goan-origin cashew nuts for sustainability.

4.3 Chi-Square Tests (Education Vs Awareness)			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.562 ^a	4	.469
Likelihood Ratio	4.418	4	.352
Linear-by-Linear Association	1.656	1	.198
N of Valid Cases	101		

Interpretation

The p-value is 0.469, which is greater than 0.05; the result is not statistically significant. It clearly indicates that education level does not significantly influence awareness of the decline in cashew processing units.

4.4 Descriptive Statistics

	Mean	Standard Deviation	Standard Error
Eco-friendly packaging	3.86	1.428	.142
Fair wages	3.93	1.283	.128
Support for local Goan Farmers	4.12	1.351	.134
Maintaining high kernel quality	3.97	1.284	.128
Availability of Proper labelling	3.97	1.276	.127
Maintaining traditional Goan processing methods	3.96	1.356	.135

Interpretation

Consumers in Goa are strongly in support of local Goan farmers, with a high mean score. Kernel quality and proper labelling ranked immediately after it. The least preferred option has been fair wages, as consumers are more in favour of supporting local farmers.

Explanation of Hypothesis 1

The p-value is 0.469, which is greater than 0.05; hence, the result is not statistically significant. This clearly states that education level has no significant association with awareness of the decline in cashew processing units.

H2: Consumers place significantly higher importance on supporting local farmers and maintaining high kernel quality compared to fair wages.

Explanation of Hypothesis 2

Mean value of 4.12, which is higher than the other key attributes, clearly states that consumers

4.5 Explanation of the Hypothesis Chi-Square Tests (Education (IV) vs Awareness (DV))			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.562 ^a	4	.469
Likelihood Ratio	4.418	4	.352
Linear-by-Linear Association	1.656	1	.198
N of Valid Cases	101		

prefer to support local farmers; hence, the null hypothesis is rejected.

H3: There is a significant relationship between household income and willingness to pay a premium price for the sustainability of Goan-origin cashew nuts.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.914 ^a	9	.026
Likelihood Ratio	15.043	9	.090
Linear-by-Linear Association	1.281	1	.258
N of Valid Cases	101		

Explanation of Hypothesis 3

P-value is .026, which is less than 0.05; the test is statistically significant. There is a significant association between household income and willingness to pay a premium price. This clearly states that consumers with higher household incomes are willing to pay a higher price for Goan processed cashew nuts; hence, we reject the null hypothesis and accept the alternative.

4.5 Findings

This study provides significant insights into consumer perceptions regarding the sustainability of cashew processing units in Goa. The descriptive statistics reveal that consumers place strong importance on supporting local farmers, reflected in a mean score above 4. However, the results also show that education level and awareness of the decline of cashew units are moving in

opposite directions. At the same time, consumers with higher income levels demonstrate a greater willingness to pay a premium for Goan cashew nuts.

4.6 Conclusion

The study highlights that consumers value sustainability in Goan cashew processing units; there is a lack of awareness among youth. It is essential to engage and involve the younger generation and make them aware of the cultural, economic, and environmental importance of the cashew industry. This will help the local industry to grow and expand, and also ensure the long-term survival of the sector.

4.7 Suggestions

1. To conduct awareness campaigns, seminars, and workshops in various schools, higher secondary schools, colleges, and communities to educate the youth about the decline of the units and their sustainability.
2. The government should support the local farmers and manufacturers of the units by giving them various subsidies and incentives to promote the industry.
3. To encourage units to adopt modern technology for the entire manufacturing process and to maintain the quality of the kernel.
4. To promote the Goan cashew through branding and packaging by using the GI tag.
5. Framing of guidelines by the Government to avoid market distortion.

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