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CONSUMER PRICE VOLATILITY AND HOUSEHOLD BEHAVIORAL DYNAMICS: AN EMPIRICAL STUDY ON COCONUT OIL PRICE FLUCTUATIONS

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RESEARCH ARTICLE

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Abstract

This study empirically assesses the impact of price volatility in essential agricultural commodities on consumer behavior and household budget allocation, focusing on coconut oil users in Malappuram District, Kerala. Primary data collected from 60 household end-users via a structured questionnaire were analyzed using weighted average ranking, One-Way ANOVA, Chi-Square Test of Independence, and One-Sample t-tests. The empirical findings demonstrate universal dependence on coconut oil. Price instability severely impacts household monthly budgets and significantly alters brand preferences. One-Way ANOVA reveals no statistically significant difference in perceived financial budget impact across income brackets, establishing price volatility as a pervasive, socio-economic pressure across all social classes. However, Chi-Square testing confirms a statistically significant association between household monthly income level and immediate behavioral coping mechanisms. The study highlights a strong need for state-led price stabilization and PDS fair-price shop optimization.

Keywords: *Consumer Behavior, Price Volatility, Elasticity of Demand, Coconut Oil, ANOVA, Chi-Square, Fair Price Shops, Malappuram.*

Introduction

Coconut oil serves as a traditional cooking medium, and cultural staple across Kerala. In regional economies like Malappuram district, domestic price fluctuations trigger immediate economic actions across household budgets. Retail price movements in coconut oil are governed by complex multi-factor interactions including seasonal yield patterns, climate variability, agricultural wage dynamics, market intermediaries, and global edible oil trends. Understanding how primary end-users perceive, adjust to, and absorb these price shocks is supreme for regional economic policy design, consumer welfare initiatives, and price stabilization frameworks.

Statement of the Problem

Frequent and unpredictable spikes in coconut oil prices create substantial friction in household monthly budgeting. While retail traders and wholesalers adjust margins dynamically, final household consumers absorb the underlying price strain. Consumers adopt varying mitigation strategies—ranging from immediate usage reduction and brand switching to temporary substitution with cheaper vegetable oils. Furthermore, public awareness regarding underlying structural price drivers and government intervention tools (such as Fair Price / Ration Shops) remains uneven across demographics. This study analyzes awareness levels, immediate behavioral adjustments, and the systemic economic burden imposed on household consumers

Review of Literature

Nagendra (2013), in *"Production and Marketing of Coconut with Special Reference to Tumkur District,"* observed that coconut marketing was dominated by multiple intermediaries and recommended government-supported collection and marketing centres to improve market efficiency. Jaganathan et al. (2016), in *"Coconut Sector Trade and Marketing,"* highlighted the importance of product diversification, value addition, and the adoption of quality standards to enhance the competitiveness of the coconut sector. Bhoopathy et al. (2016), in *"A Study on Marketing Problems of Coconut with Special Reference to Coimbatore District,"* reported that price fluctuations, inadequate marketing facilities, and the influence of intermediaries were the major marketing challenges faced by coconut farmers. Kavitha (2017), in *"Economic Analysis of Production and Marketing of Coconut in*

Kozhikode District of Kerala," identified five marketing channels and found the producer–consumer channel to be the most efficient, while labour shortages and price fluctuations were the major constraints.
Raghavi et al. (2019), in *"Review on Area, Production and Productivity of Coconut in India,"* reported that the coconut sector plays a significant role in India's economy by generating employment and supporting the livelihoods of small and marginal farmers. Jayasekhar et al. (2019), in *"Coconut Sector in India Experiencing a New Regime of Trade and Policy Environment: A Critical Analysis,"* found that increasing palm oil imports adversely affected the domestic coconut industry and recommended strengthening marketing and processing infrastructure.

Research Gap

Although previous studies have examined coconut production, marketing channels, trade policies, and marketing challenges, limited research has focused on the impact of coconut price fluctuations on consumer buying behaviour. The present study attempts to address this gap by analysing how changes in coconut prices influence consumers' purchasing decisions.

Research Objectives

- To examine consumer consciousness regarding the primary causes and determinants of coconut oil price fluctuations.
- To evaluate the operational and financial impact of price volatility on household monthly budgets and consumption patterns.
- To assess public awareness regarding the role, pricing, and effectiveness of Government Fair Price Shops (PDS).
- To formulate actionable policy suggestions for state agencies, farmers, and household consumers.

Research Hypotheses

To empirically evaluate household economic dynamics, three primary statistical hypotheses were formulated:

- **Hypothesis 1: There** is no significant difference in the perceived budget impact of coconut oil price fluctuations across different monthly household income groups.
- **Hypothesis 2:** There is no significant association between monthly household income level and immediate consumer reaction (reducing usage vs. switching oils) during price hikes.
- **Hypothesis 3:** Overall consumer awareness regarding the role and subsidies of Government Fair Price Shops is not significantly higher than the neutral benchmark level ($\mu_0 = 3.0$).

Theoretical Framework

This research integrates established economic and behavioral models:
1. Classical Price & Supply Theory: Explains price movements as equilibrium shifts resulting from seasonal supply contractions or climate shocks in agricultural plantation crops.
2. Consumer Demand & Elasticity Theory: Evaluates Price Elasticity of Demand (PED). While coconut oil is culturally inelastic in Kerala, low- and middle-income groups demonstrate high cross-price elasticity when threshold pricing is breached.
3. Welfare Economics & Public Distribution Systems (PDS): Analyzes state intervention through subsidized distribution to mitigate market failures and inflationary burdens on vulnerable consumer segments.

Research Methodology

Table 2: Research Design and Methodological Profile

Parameter	Specification/Methodology
Research Design	Descriptive cum Empirical Analytical Research
Geographical Scope	Malappuram District, Kerala
Sampling Method	Non-Probability Convenience & Purposive Sampling (End-Users Only)
Sample Size	N = 60 Households
Data Sources	Primary: Pre-tested Structured Questionnaire Secondary: CDB Bulletins, Govt. Reports, Commerce Journals
Statistical Tools	Percentage Analysis, Weighted Average Ranking, One-Way ANOVA, Chi-Square Test (χ^2), One-Sample t-test

Data Analysis, Results & Hypotheses Testing

Demographic Profile of Respondents

Table 3: Socio-Demographic Breakdown of Respondents (N=60)

VARIABLE	CATEGORY	NO. OF RESPONDENTS	PERCENTAGE (%)

Gender	Male	5	8.3
	Female	55	91.7
Age Group	Below 20 years	1	1.7
	20 – 35 years	15	25.0
	36 – 50 years	37	61.7
	Above 50 years	7	11.7
Occupation	Household / Homemaker	51	85.0
	Salaried Employee	5	8.3
	Business / Trader	3	5.0
	Student	1	1.7
Monthly Income	Below ₹20,000	6	10.0
	₹20,001 – ₹40,000	40	66.7
	₹40,001 – ₹60,000	11	18.3
	Above ₹60,000	3	5.0

Source: Primary Data

The sample is predominantly female (91.7%) and homemakers (85.0%), reflecting that women manage household commodity procurement and are directly sensitive to price changes. Middle-aged respondents (36–50 years) comprise 61.7% of the sample, and 66.7% belong to the middle-income bracket (₹20,001–₹40,000).

Usage Patterns & Volatility Awareness

All 60 respondents (100%) report regular coconut oil consumption. Purchase frequency is predominantly weekly (61.7%), followed by monthly (23.3%), daily (10.0%), and yearly (5.0%). Cooking is the primary usage purpose (58.3%), while 35.0% utilize it for multiple household purposes. Seasonal factors are cited by 58.3% as the main driver of price changes, followed by low production (23.3%) and export-import changes (15.0%).

Weighted Mean & Ranking Analysis

Five-point Likert response data were evaluated using weighted mean scoring: Score = $\Sigma(f_i \times w_i)$ where weights range from 1 (Strongly Disagree/Low) to 5 (Strongly Agree/High).

Table 4: Weighted Average Ranking - Awareness of Price Determinants

Factor / Dimension	Weighted Score	Mean Score	Rank
Coconut production levels directly affect oil prices	269	4.48	I
Seasonal changes influence coconut oil prices	259	4.32	II
Role of export-import policies in price shifts	258	4.30	III
Global edible oil market trends impact domestic prices	257	4.28	IV
Middlemen and traders influence price fluctuations	254	4.23	V

Table 5: Weighted Average Ranking - Household Impact of Price Fluctuations

Impact Dimension	Weighted Score	Mean Score	Rank
Rising coconut oil prices strain monthly household budget	267	4.45	I

Price hikes force reduction in purchased quantity	259	4.32	II
Price changes alter cooking or consumption routines	258	4.30	III
High prices force temporary switch to alternative oils	254	4.23	IV
Causes financial stress due to price unpredictability	243	4.05	V

Source: Primary Data

Inferential Statistical Hypothesis Testing

Test 1: One-Way ANOVA – Household Income vs. Perceived Budget Impact
Null Hypothesis (H_{01}): Perceived household budget impact does not significantly differ across monthly household income categories.
Statistical Test: One-Way Analysis of Variance (ANOVA) at $\alpha = 0.05$ significance level.
Results: Calculated F-Statistic = 0.0740 | p-value = 0.9737 | Degrees of Freedom = (3, 56)
Decision & Conclusion: Since $p = 0.9737 > 0.05$, we fail to reject H_{01}. There is no statistically significant difference in perceived budget strain among income groups. Coconut oil price volatility inflicts uniform, widespread budget pressure across low, middle, and upper-income households.

Test 2: Chi-Square Test of Independence – Income vs. Immediate Behavioral Reaction
Null Hypothesis (H_{02}): Household monthly income level and immediate consumer reaction during price increases are independent.
Statistical Test: Pearson's Chi-Square Test of Independence (χ^2).
Results: Calculated χ^2 Value = 20.3129 | p-value = 0.0161 | Degrees of Freedom (df) = 9
Decision & Conclusion: Since $p = 0.0161 < 0.05$, we reject H_{02}. There is a statistically significant association between income level and immediate behavioral response. While 80% overall reduce usage, lower-income households exhibit significantly higher propensities to switch to alternative cooking oils or purchase in reduced quantities compared to higher-income brackets.

Test 3: One-Sample t-Test – Public Awareness of Fair Price Shops (PDS)
Null Hypothesis (H_{03}): Mean awareness regarding Government Fair Price Shops is equal to or less than neutral benchmark ($\mu_0 \leq 3.0$).
Statistical Test: One-Sample Student's t-test (N = 60, Sample Mean $\bar{X} = 4.1833$, SD S = 0.6830).
Results: Calculated t-Statistic = 13.4277 | p-value = 6.82×10^{-20} (Two-tailed $p < 0.001$)
Decision & Conclusion: Since $p < 0.001$, we reject H_{03}. Public awareness regarding fair price shops, ration card eligibility, and subsidized distribution is significantly higher than the neutral baseline.

Results & Statistical Analysis

The statistical evaluation revealed a coherent relationship between perceived impact, actual financial flexibility, and policy awareness.

Table 6: Summary of Statistical Tests and Empirical Outcomes

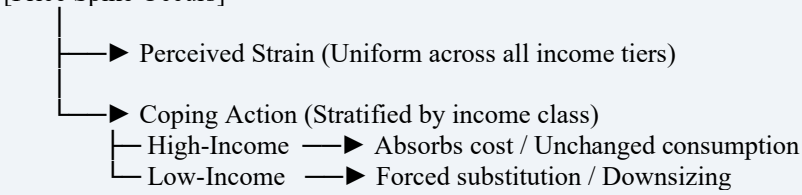
Hypothesis / Focus	Statistical Test	Key Parameter / Metric	p-value	Empirical Decision	Core Finding
H01: Perceived Strain	One-Way ANOVA	Difference across income strata	0.9737	**Fail to Reject H01**	Budget strain is felt uniformly across all income groups.
H02: Behavioral Action	χ^2 Test of Independence	Purchasing habit adjustments vs. income	0.0161	**Reject H02**	Coping actions (switching/cutting back) depend heavily on income.
H03: PDS Awareness	One-Sample t-test	Awareness score vs. neutral mean	< 0.001	**Reject H03**	Public awareness of subsidized options is overwhelmingly high.

Divergence between Perceived Strain and Behavioral Action

A central contribution of this study is resolving the apparent divergence between Test 1 and Test 2. While ANOVA results indicate that subjective dissatisfaction and perceived strain are uniform across economic tiers ($p = 0.9737$), the χ^2 test confirms that physical adjustments to purchasing habits are highly income-dependent ($p = 0.0161$).

• **Attitude vs. Capability:** Subjective budget strain measures an attitude. Higher-income households acknowledge and feel the financial pinch, yet possess sufficient liquidity to maintain baseline consumption.
• **Forced Adaptation:** Lower-income households experience the same psychological strain but lack economic absorption capacity, forcing them to modify consumption patterns (e.g., downsizing purchases or substituting lower-cost culinary oils).

Conceptual Behavioral Model:



Summary of Findings

- **Universal Necessity:** 100% of sampled households use coconut oil regularly, underlining its status as a primary essential commodity.
- **Pervasive Budget Impact:** ANOVA testing confirms that budget strain caused by price spikes is uniform across income classes ($p = 0.9737$).
- **Income-Driven Behavioral Coping:** Chi-Square analysis proves that immediate coping mechanisms depend significantly on income status ($p = 0.0161$). Lower-income families exhibit greater brand and oil switching behavior.
- **High Awareness & Demand for Policy:** Consumers show high awareness of price drivers (Production Rank I, Seasonal Rank II) and Fair Price Shops ($t = 13.43$). 90% demand stricter government price regulation and 80% advocate enhanced support for farmers.

Suggestions & Recommendations

1. Establishment of a Price Stabilization Fund (PSF): The state government should establish a dedicated buffer fund to procure raw coconut during peak production and release oil during lean periods, stabilizing market prices.
2. Strengthening the Public Distribution System (PDS): Ensure uninterrupted and subsidized coconut oil supply through ration shops to protect low- and middle-income families from retail spikes.
3. Farmer Support & Modernization: Provide production incentives, credit facilities, and mechanized climbing equipment to coconut farmers to maintain yield stability and mitigate cost-push inflation.
4. Consumer Budgeting Guidance: Educate consumers on planned bulk purchasing during price troughs and efficient consumption practices.

Conclusion

This study confirms that coconut oil price volatility imposes significant financial strain on households. While price shocks affect all income groups uniformly in terms of budget stress, immediate behavioral adjustments vary by income status. High public awareness and strong support for state intervention underscore the urgent need for a dual policy framework: stabilizing retail consumer prices through PDS supply while ensuring remunerative prices and infrastructure support for coconut farmers.

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