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A study on tender coconut demand estimation and its consumer preference

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Abstract

Coconut water is a natural isotonic beverage with electrolytic balance similar to the human blood. Hence called as 'fluid of life'. Its composition is similar to the composition of Oral Rehydration Solution recommended by the World Health Organization. This study was aimed to estimate the demand for tender coconut and to know the major factors influencing its consumer preference. Sixty consumer respondents were selected randomly in Hubli-Dharwad Municipal Corporation, Karnataka for primary data collection. Analytical techniques like multiple regression and descriptive statistics were used. The price coefficient was negatively significant (-3.87). This indicated the decreased tender coconut consumption with increase in price. The coefficient for dummy variable (season) was negatively significant (-50). The R^2 found to be 73 per cent. It was observed that there were many factors influencing consumer preference. Majority of the consumers preferred it because of its body cooling and nutritional properties. Most of the consumers disagreed the factor, doctor was suggested to drink, but on the other hand were consuming as they were aware of its nutritional benefits. Some of the respondents opined that tender coconut prices were not according to their budget.

Keywords: Tender coconut water, tender coconut, demand estimation, consumer preference

Introduction

Coconut, a traditional plantation crop, has been existed in India since a very long period, dating back to 3,000 years. It is a perennial tree with a monocotyledon palm. Coconut palm (*Cocos nucifera* linn.) is a unique horticultural plant and regarded as oil seed palm. It belonged to the order Arecaceae and family Palmae. It is believed to be originated from Sri Lanka.

The coconut palm may be regarded as one of the valuable things gifted to mankind by the nature. Coconut tree is referred as 'The tree of life' and as 'Kalpavruksha', because each and every part of it is used for mankind. The coconut fruit is considered as the 'Lakshmi phal', the fruit of wealth. It has occupied a significant place in Indian traditional medicine, the Ayurveda. It was mentioned in many ancient Indian literatures and has been an integral part of religious offerings, celebrations and auspicious occasions since early ages. Still there is a striking place for coconut in this modern world as it is ceremonially integrated with man's day to day life especially in the Hindu religion. It is majorly seen in tropical and sub-tropical areas and has been cultivating in more than ninety countries of the world. It was grown in about 12.30 million hectares of land which constituted about 0.7 per cent of the world's net cropped area with a production of about 60.78 million tonnes of coconuts. Major countries involved in coconut production and trade were situated in Asia, East & West Africa, Oceania, Central & South America and in West Indies. (FAO, 2017). In terms of total world's coconut area and production, India contributed about 16.91 per cent and 18.87 per cent respectively. Among the major coconut producing countries, India ranked third in both area (2.08 million hectares) and in production (11.46 million tonnes) followed by Philippines, which stood first in area and second in production (3.61 million hectares area and production 14.04 million tonnes) and Indonesia, second in area and first in production (3.26 million hectares area and production 18.98 million tonnes). The productivity of coconut in India was 10,345 nuts per hectare (FAO, 2017). In India, coconut cultivation has been seen in almost all the states having coastal area but mainly concentrated in four Southern states viz., Andhra Pradesh, Tamil Nadu, Kerala and Karnataka which contributed about 89.09 per cent in total area and 90.93 per cent in total production. A total area of 2.17 million hectares in India was under coconut cultivation and the total production was 21,384.33 million nuts with a productivity ranging to 9,815 nuts per hectare during 2018-19 (Coconut Development Board). During 2018-19, regarding the coconut, Karnataka ranked second in area (6,15,260 ha) followed by Kerala (7,56,890 ha) whereas in production Karnataka stood third (5,123.23 million nuts) followed by Kerala (7,631.35 million nuts) and Tamil Nadu (5,311.05 million nuts). In case of productivity,

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Andhra Pradesh ranked first (13,563 nuts per hectare), Tamil Nadu stood second (12,144 nuts per hectare) and Telangana stood third (10,400 nuts per hectare) (Coconut Development Board).

All parts of coconut tree like nuts, leaves, spathe, husk, seed, trunk and even the inflorescence is used for one or other purpose. It is used as a source of food, beverage, oil, fibre, medicines, clothing, utensils, toys and recreational items. The coconut is consumed in its various forms like tender nut for water and mature nut both as fresh and dried forms for cooking. The by products like the coconut cake, shell, husk are used to make various products like coir, fibre, charcoal, activated carbon, geotextiles and coir pith which are having multiple uses. These products constitute raw materials for the industrial sector, thus contributing to the country's national income.

Coconut water can be seen as a natural isotonic beverage with the electrolytic balance similar to human blood. Hence, it is called as 'fluid of life'. During pacific war (1941-1945) coconut water was siphoned directly from the nuts to give emergency plasma transfusions to wounded soldiers. It contains more potassium (294mg) than any of the sports drinks, has less sodium and rehydrates naturally. The tender coconut water composition is similar to the composition of Oral Rehydration Solution (ORS) recommended by the World Health Organization (WHO). In addition to the salts and sugars it contains amino acids, minerals and fatty acids. It lowers blood pressure, eliminates swelling in hands and feet, normalises the intestinal function and helps in increasing metabolism, ease burns, heals damages caused by antibiotics and toxins in digestive system, relieves spasms, fever, head ache, stomach pain and stomach upsets, diarrhoea and gives strength to the heart and restores energy to the weak.

The coconut water improves digestion and helps in the absorption of other nutrients. Hence coconut water was considered as the next best canned drink. Pregnant women drink eagerly because they believe that the coconut water gives their babies strength. The anti-bacterial, anti-fungal and anti-viral properties of the lauric acid present in tender coconut water helps in improving the immunity system. The medium chain fats of the coconut water are similar to the fats observed in mother milk, showing the similar nutritional effects and helps to fight against yeast, fungi and other viruses (Nwakunte and Chinasa, 2018) [7].

It has been reported that coconut water has potential anti-tumour and immune stimulatory effects but yet to be tested. The coconut water can be a potential health food ingredient with a chemo preventive effect (Mohammed *et al*, 2019) [5].

Nutritional value of tender coconut water

Particulars	Value per 100 gm
Total solids	5.40%
Reducing sugars	2.00%
Minerals	0.50%
Proteins	0.10%
Fat	0.10%
Minerals	
Potassium	247mg
Sodium	48mg
Calcium	40mg
Magnesium	15mg
Phosphorous	6.3mg
Iron	79µ
Copper	26µ

The consumers prefer tender coconut due to many reasons and it is of interest to know the different factors that influence the consumers' attitude towards tender coconut purchase. Hence this study was conducted to know the major factors of consumer preference. An attempt was also made to estimate the demand for tender coconut in the study area.

Materials and Methods

The study was under taken in Hubli-Dharwad Municipal Corporation in Karnataka. The primary data was collected from randomly selected tender coconut consumers. A total of sixty consumers were personally interviewed using pre-tested and well-structured schedules. The technique of multiple regression was used for the demand estimation of the tender coconut in the study area. The independent variables used were the retail price of the nut, monthly income of the consumer and the season in which the nuts were demanded by the consumers. Dummy variable was used for the season. For summer, the dummy variable was given a number '0' and for other seasons (winter and rainy), number '1' was given. The month wise number of tender nuts taken by the consumers was taken as dependent variable. The equation was given below and was solved by using Ordinary Least Square (OLS) technique.

$$Q_d = A + X_p + Y_i + S_d$$

Q_d = quantity demanded in number of nuts

A, X, Y, S = coefficients

p = retail price of the nut

I = monthly income of the consumer

d = dummy variable (summer = 0, other = 1)

For studying the factors influencing consumers' preference towards tender coconut, descriptive statistics was used. The statistical techniques like percentages were used.

Results and discussion

Table 1 represented the socio-economic profile of the consumers. Majority of the consumers were belonging to the age group of 30-40 years accounting to 50 per cent of the total respondents, followed by the age group of 20-30 years (25%), less than 20 years (13.3%) and 40-50 years (8.3%). Only two consumers were of more than 50 years age (3.3%). Thus, it helped in knowing the perception of the consumers in an overall way by including the consumers of different ages.

With reference to the literacy range, a wide range of respondents were studied. Most of the consumers studied between the 10th-12th standard, accounting to 45 per cent of the total respondents. About 30 per cent of the consumers studied less than 10th standard and about 25 per cent of respondents were graduated (>12th standard).

The information on the income levels showed that most of the consumers were earning more than ₹ 30,000 per month (46.6%) followed by the income group of ₹ 20,000 to ₹ 30,000 per month (30%). The least number of consumers (23.3%) were earning less than ₹ 20,000 per month. Thus, consumer respondents were diversified as they belonged to the low, medium and high-income levels. It helped in studying the factors influencing the consumer preference in a broad way.

Table 1: Socio economic profile of the consumers

S. No	Group	Number	Percentage
1	Age group		
	<20	8	13.33
	20 -30	15	25.00
	30 - 40	30	50.00
	40 -50	5	8.33
	>50	2	3.33
2	Literacy group		
	<10th	18	30.00
	10th - 12th	27	45.00
	>12th	15	25.00
3	Income group		
	<20,000	14	23.33
	20,000 – 30,000	18	30.00
	>30,000	28	46.66

For demand estimation, the month wise number of tender nuts taken by different consumers was obtained which constituted the dependent variable. The independent variables taken were retail price of each nut, monthly income of the consumers and the season in which they consumed tender coconut. A dummy variable was used to indicate the season. Summer was denoted by '0' and other seasons by '1'. The results were showed in the Table 2.

The price coefficient was found to be negatively significant (-3.87), which described that the tender coconut consumption decreased with increase in the price. The income coefficient was observed to be positive but non-significant. This explained that the tender coconut was a normal good whose demand increased with increase in the income. The coefficient for the dummy variable was negatively significant (-50). This denoted that the tender coconut consumption decreased during other seasons (winter and rainy) compared to summer on an average by 50 units. This clearly showed the seasonal effect on the tender coconut consumption. Most of the consumers opined that the tender coconut water helps to protect themselves from heat waves during summer. It was observed that the respondents who work in open conditions under the scorching sun consumed the tender coconut water twice daily on an average during the summer, while during other seasons, on an average of two nuts fortnightly. Thus, there was decreased tender coconut consumption during other seasons compared to summer, simultaneously reduced income of those people who solely depended on it. The R² was found to be 73 per cent. This depicted that about 73 per cent of the variation in tender coconut demand was explained by the independent variables taken (retail price of each nut, monthly income of the consumers and the season).

Table 2: Demand estimation of tender coconut

Variable	Coefficients	Standard Error	t Stat
Intercept	153.88***	16.31	9.43
Price	-3.87***	0.47	-8.17
Income	0.001	0.001	1.13
Season (dummy variable)	-50.14***	3.82	-13.12

(*** = Significant at 1% level of significance)

The various factors influencing the consumer preference towards tender coconut was given in Table 3. About 59 per cent of the consumers strongly agreed and 41 per cent agreed that the tender coconut drink was a natural product. Most of the consumers (52%) strongly agreed that it keeps body cool and the factor, nutritious was strongly agreed by 50 per cent of them. 45 per cent strongly agreed that it was good for health. The next most important factor superior than cool

drinks was agreed by 62 per cent, cures illness agreed by 59 per cent, easily accessible by 54 per cent, tastier was agreed by 54 per cent, free of chemicals agreed by 52 per cent and fits to budget was agreed by 50 per cent. Most of the consumers (69%) disagreed the factor, doctor was suggested to drink, but on the other hand were consuming as they were aware of its nutritional benefits. 26 per cent disagreed that they were not influenced by others during the coconut water consumption. All these factors created the positive attitude of the consumers towards the tender coconut water and were responsible for its preference. Albeit the respondents' awareness towards its nutritional and medicinal values, about 50 per cent of them were not planned the coconut water consumption. 27 per cent of the respondents disagreed that they don't like cool drinks meaning they like cool drinks over tender coconut. Mostly they were the youth of age less than 20 years. About 21 per cent of the respondents were influenced by the others. Some of the respondents (29%) were opined that the tender coconut prices were not according to their budget.

Table 3: Factors affecting consumer preference for tender coconut (Percentage %)

S. No	PARTICULARS	SA	A	CS	D	SD
1	Natural product	59.52	40.48	0.00	0.00	0.00
2	Tastier	21.43	54.76	23.81	0.00	0.00
3	Nutritious	50.00	35.71	14.29	0.00	0.00
4	Good for health	45.24	42.86	11.90	0.00	0.00
5	Free of chemicals	19.05	52.38	28.57	0.00	0.00
6	Superior than cool drinks	38.10	61.90	0.00	0.00	0.00
7	Fits to budget	0.00	50.00	21.43	28.57	0.00
8	Influenced by others	0.00	21.43	26.19	26.19	26.19
9	Not planned	0.00	50.00	21.43	26.19	2.38
10	Keeps body cool	52.38	47.62	0.00	0.00	0.00
11	Doctor suggested me to drink	0.00	30.95	0.00	69.05	0.00
12	I don't like cool drinks	0.00	45.24	28.57	26.19	0.00
13	Cures illness	19.05	59.52	21.43	0.00	0.00
14	It has medical value	33.33	40.48	26.19	0.00	0.00
15	Easily accessible	30.95	54.76	14.29	0.00	0.00

(Note: SA= Strongly Agree, A= Agree, CS= Can't Say, D= Disagree, SD= Strongly Disagree)

Conclusion

It was observed that price showed a negatively significant impact on the tender coconut demand whereas the impact of consumers' income was positive but non-significant. This showed that tender coconut was a normal good. The demand for tender coconut could increase if the prices decrease, which could be attained through efficient marketing. The seasonality effect was evident from the results. Hence to ensure stable flow of income to the people who depended on it, processing and value addition plays a major role. New and creative products like packaged tender coconut water need to be encouraged to overcome the problem of seasonality of demand. Varied group of consumers were studied to know the factors influencing consumer preference towards tender coconut. Many factors were observed in this regard. Majority of the consumers preferred it because of its body cooling and nutritional properties. Even though the consumers were aware of its benefits, half of them were not planned its consumption, influenced by others (21.43%) and prices did not fit to budget (28.57%).

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