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Vegetable consumption preferences among consumers in Ratnapura, Sri Lanka

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ABSTRACT: This study investigates the important preferences for vegetables consumption at market level and explore the relationship of consumers' socioeconomic characteristics on those preferences. The research has conducted at Ratnapura district in Sri Lanka. Data collected from 400 vegetable purchasers by a structured type questionnaire. The results from the exploratory factor analysis categorized the variables into nine factors including; customer services, convenience, food safety, efficiency, product attributes, economical price, appealing place to buy, extra services and consumer appreciation. Moreover, the relationship between age, gender, marital status, education and profession of the consumers and their household income and those vegetable consumption factors were analyzed using multiple regression. The stakeholders must be much responsible with supplying better quality vegetables to the consumers while keeping the worthy sanitary level in both products and marketplace. They should run through appropriate arrangements to keep longer lasting freshness in vegetables with nonexistence of physical damages or chemical residuals on them. Keep the trustworthiness of the consumers regarding the quality of the vegetables and the service of the marketplace are always important things.
Keywords: ratnapura consumers, vegetable consumption, Sri Lanka

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Introduction

Food and agriculture sector of Sri Lanka is being able to contribute with the economic development of the nation in an adequate level while comprising food security, capital formation and agriculture trade with number of opportunities for the future (Mudalige, 2010). Depending on the favorable areas of grown, vegetables are divided in to two major categories as up country vegetables and low country vegetables. Temperate vegetables which were named as up country vegetables are grown perfectly with cool climatic conditions in central hilly area of the country with a higher elevation. And low country areas with dry and hot weather are been suitable for tropical vegetables which were named as low country vegetables. Beans, Cabbage and Beetroot are the major up country vegetables while Brinjals, Ladies fingers and Ridge gourds are the common low country vegetables (Central Bank of Sri Lanka, 2017). In 2015, the cultivation of vegetables was recorded by Ag-stat data as up country vegetables in approximately 31,288 hectares with a production of 483,855 metric tons, low country vegetables nearly 1.67 % of the total arable land of the country with producing 614,655 metric tons. This amount was approximately adequate for a consumption of 140g/day/person of the Sri Lankan population (Department of Census and Statistics, 2015).

Daily intake of vegetables for an adult should be at least 200g. As portions this is 5 portions/day (Ministry of Health Nutrition and Indigenous Medicine, 2011). But Sri Lankan vegetable consumption is less than this level. As examples from the study of Jayathissa et al. (2014) the average vegetable consumption of the country was 194.95 g/ day/ person. Perera and Madujith (2012) with regard to the selected group of undergraduates were came with the results as mean vegetable consumption of the sample had reached to 127.01 g/day/person. Peltzer and Pengpid (2012) mentioned among school children of 13 to 15 age group consumption of vegetable portions mean value 1.9 portions/day/ person. In the age group of 18 to 69 vegetable consumption of the country has studied by Ministry of Health Nutrition and Indigenous Medicine (2015). That study mentioned mean vegetable consumption/ day on males 3.0portions/person and females 3.1 portions/person. In gender wise this vegetables consumption was studied by Perera and Fernando (2017) and the results were as only 68.6% of men and 77.3% of women consume vegetables at least 3 days/ week. This less vegetables consumption level has resulted economic losses for the persons in vegetable market channel. The vegetables farmers were thoroughly affected by this situation than middlemen of the channel. Because when they have cultivated, they do not receive an exact market and a reasonable price to sell their production (Rajapaksha, 2015).

Vegetables are reached to consumer through different marketing channels (Sandika, 2011). Marketing channel is a set of interdependent organizations or persons involved in the process of production and distribution of a product or a service (Moore and Pareek, 2006). Usually a competition is generated among different marketing channels for profit maximization. A task is given to salespersons to devise marketing activities and gather fully integrated marketing programmes to generate, communicate and distribute value for consumers. By all those activities are tried to serve the need of targeted marketing segment while generating optimum income (Baran et al., 2008).

This study was aimed to explore the vegetable consumption preferences among consumers in Ratnapura, Sri Lanka. Then by that to provide recommendations to the marketing community on how to improve their qualities to attract consumers for purchasing vegetables. This is beneficial for both the persons in marketing community for their economy and for consumers for their good health condition. The variables to use in this study has been composed through literature searching on various researches about the same study area in recent years. To be more identical with the selected population, the studies those had concluded in Asia has taken in to account. Some major variables that consumers contemplate at vegetables purchasing from previous studies are summarized such as quality of vegetables (Fayaz et al., 2014; Aryal et al., 2009; Masoom et al., 2015; Jayathilake and Mahaliyanarachchi, 2007), better availability (Bulsara and Trivedi, 2016), easy access to market (Bulsara and Trivedi, 2016), hygiene of the market (Ramachandra and Rani, 2011), good service from staff (Alam and Rana, 2013; Jeevananda, 2011), and reasonable price (Matanda et al., 2000).

Materials and Methods

Sampling techniques and Data collection

Ratnapura district in Sri Lanka was selected as the study area. It is one of the major districts which has a suitable combination of various socioeconomic characteristics of the population having both urban and rural lifestyles. Moreover, it is an area of cultivating up country and low country vegetables in commercial scale. The data has been collected from the adult population of the district who are engaged in consumption at the market basically. According to age of majority, the age of adulthood is started from 18 years of age. The sample size in this study was calculated using the formula given by Yamane's in 1973 (Israel, 1992).

$$n = \frac{N}{1 + N(e)^2} \quad \text{-------- (1)}$$

The population (N) was based on the Department of Census and Statistics (2017). According to that the entire number of the population above 18 years of age is 843,834. Using a 5 % of acceptable error (e), the sample size (n) was calculated and rounded to 400 respondents. The convenience sampling method was engaged to select potential respondents. Then a structured type questionnaire was employed to gather relevant information from the respondents. The following data were collected during January to February 2018.

Data Analysis

The consumption preferences of vegetables, vegetable markets and strategies of vegetable marketers were gathered as 38 variables. The information on how much importance is given by respondents to each statement was obtained using a five-point Likert scale from "extremely important" to "not at all important" responses with a score of 5 to 1. Exploratory factor analysis was employed to manage and reduce the number of original variables into a smaller group of new factors (Hair et al., 2006). The resulted chart was simplified by applying Varimax rotation for an easier interpretation. Before the analysis, to be confirmed about the dataset adequacy for factor analysis, the Kaiser-Meyer-Olkin (KMO) test and the Bartlett's test of sphericity (BTS) was functioned. The KMO test is a measure of sampling adequacy that witnesses the proportion of variance in the variables. A KMO value higher than 0.70 suggests the data set is sufficient for the particular analysis (Leech et al., 2011). The BTS is the test for overall significance of all correlations within a correlation matrix. If the BTS result is large and significant, the appropriateness of the factor analysis for the data set is confirmed (Hair et al., 2006).

Consumption behavior can be differentiated in consumer vise depending on variables which are their age, marital status, family income, education (Pratap, 2017). Therefore, the multiple regression analysis was employed to investigate the relationship of vegetable consumption factors and socioeconomic characteristics of consumers. Test for multicollinearity and homoscedasticity are done after running the regression model. These tests are usually diagnostic tests to support that the model is a best linear unbiased estimator (BLUE). Those tests were on satisfactory level. The equation can be written as follows:

$$VCF_i = a_0 + a_1 INC + a_2 PRO + a_3 EDU + a_4 STA + a_5 AGE + a_6 GEN + e \quad \text{------- (2)}$$

Where:

VCF_i is vegetable consumption preference factors i (using factor score results from exploratory factor analysis);

a_i is regression coefficient;

INC is 1, if the monthly household income of the respondent is 278 USD or more, 0 if less than;

PRO is 1, if the profession of the respondent is in government or private sectors, 0 if otherwise;

EDU is 1, if the highest education of the respondent is less than secondary school (Advanced Level), 0 if otherwise;

STA is 1, if respondent is married, 0 if otherwise;

AGE is 1, if the respondent's age is below 40 years old, 0 if otherwise;

GEN is 1, if respondent is male, 0 if female; and

e is error term.

Results and Discussion

Respondent's socioeconomic characteristics

The finding indicates that 54.5 % of the respondents out of the total study sample were male and 45.5 % were female. Many of the respondents were mature working aged people, 70.0 % of them were between 25-54 years of age with an average age of 41.1 years. Around 77.0 % of them were married while 22.3 % were single.

In addition, the respondents were characteristically low educated people, 86.6 % of them had studied up or below to advanced level (13 years in the school) whereas 5.8 % had followed a particular diploma and 1 % had a post graduate qualification. They were at different occupation levels, 46.0 % of them work in government or private sectors, and 25.8 % in agricultural sector. Regarding monthly household income of the respondent, 50 % of them had reached to monthly household income. Fifty percent of them had reached to monthly household income between 145.32 – 298.72 USD and 31.0 % reached to had monthly household income between 298.73 –1,024.37 USD income level with the average income of 278.01 USD.

Factor analysis results

With regards to the importance of each vegetable consumption preferences, the exploratory factor analysis with Varimax orthogonal rotation was applied to reduce these variables. The BTS achieved (x^2 = 5417.8, P<0.01) as statistical significance and KMO value was 0.883, confirming that the data set was appropriate for factor analysis. Nine vegetable consumption factors from 38 variables were specified by Latent root criteria (eigenvalues greater than 1.00). Almost 58.17 % of the total variance could be explained by these nine vegetable consumption factors. An adequate reliability among these factors was illustrated by the Cronbach's Alpha values ranged from 0.798 to 0.830. The results of the factor loading for each vegetable consumption factors are documented in **Table 1.**

Table 1 Varimax rotated factor loadings of consumer's preferences on vegetable consumption in Ratnapura, Sri Lanka (n=400)

Variables	Factors [a]									Com.[b]
	VCF_1	VCF_2	VCF_3	VCF_4	VCF_5	VCF_6	VCF_7	VCF_8	VCF_9	
Trust between seller and consumer	**0.666**	0.023	0.078	-0.119	0.137	0.117	0.204	0.033	0.106	0.603
Staff is very polite	**0.660**	0.037	0.106	0.203	0.045	0.238	0.020	0.145	0.225	0.634
Unique taste of vegetables	**0.572**	-0.068	0.378	0.103	0.281	-0.159	0.025	0.088	0.111	0.517
Sales crew is supportive to consumers	**0.494**	0.22	0.145	0.184	0.124	0.092	0.003	0.159	0.095	0.648
Manage a better quality of vegetables	**0.492**	0.115	0.214	0.217	0.113	0.038	0.316	0.211	-0.040	0.644
Pre packed vegetables	-0.072	**0.779**	-0.006	0.08	0.129	0.143	0.102	0.076	0.117	0.514
Facilities to buy other household items	0.229	**0.656**	-0.041	0.137	-0.058	0.214	0.173	0.250	-0.031	0.539
Minimally processed vegetables	0.070	**0.645**	0.037	0.118	0.176	-0.037	-0.140	0.080	0.260	0.531
Provide additional services	0.185	**0.617**	0.089	0.201	-0.048	0.241	0.203	0.186	0.063	0.638
Have graded and sorted	0.080	**0.519**	.0190	0.249	0.377	0.171	0.237	-0.159	0.126	0.604
Facility to use credit cards	0.210	**0.474**	0.372	0.227	0.046	-0.135	0.003	0.159	0.095	0.646
Should be fresh	0.132	-0.016	**0.719**	0.129	-0.01	0.067	0.151	0.072	0.016	0.614
Should be nutritious	-0.002	0.196	**0.681**	0.143	0.148	0.227	0.06	-0.047	-0.067	0.585
No pest and disease damages	0.243	0.035	**0.510**	-0.07	0.216	-0.126	0.064	0.112	0.08	0.605
Free from physical damages	0.074	-0.213	**0.488**	-0.028	0.421	-0.021	0.076	0.223	0.075	0.529
Area is in good sanitary condition	0.473	0.074	**0.487**	0.008	0.0108	0.016	0.182	-0.007	0.143	0.533
Free from chemical residuals	0.419	0.029	**0.475**	0.162	0.072	-0.057	0.086	-0.237	0.183	0.427
Easy access to the market	0.124	0.186	0.191	**0.741**	0.024	0.150	0.061	0.206	0.006	0.590
Near place to home/office	0.057	0.245	0.103	**0.716**	0.015	0.177	-0.028	0.281	0.003	0.497
Vehicle parking facility	0.06	0.127	0.125	**0.598**	0.089	0.100	0.283	-0.159	0.028	0.602
Desired variety should be always available	0.172	0.106	-0.069	**0.440**	0.328	0.269	0.113	0.134	-0.032	0.657
Relevant size of vegetable	-0.006	0.22	0.136	-0.133	**0.691**	0.292	0.066	0.057	-0.035	0.610
Expected shape of vegetable	0.106	0.152	.236	0.084	**0.688**	-0.048	0.011	0.085	0.104	0.608
Relevant colour of vegetable	0.456	-0.104	0.058	0.129	**0.577**	-0.068	0.170	-0.047	0.073	0.451
Expected maturity of vegetable	0.319	-0.102	0.055	0.297	**0.466**	-0.048	0.011	0.085	0.104	0.573
Unique firmness	0.433	0.247	0.142	0.186	**0.454**	-0.139	0.158	0.062	-0.126	0.685
Expect a lower price	0.135	0.196	-0.077	0.076	-0.009	**0.723**	-0.078	-0.046	-0.046	0.562

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Table 1 Varimax rotated factor loadings of consumer's preferences on vegetable consumption in Ratnapura, Sri Lanka (n=400) (Cont.)

Variables	Factors [a]									Com.[b]
	VCF_1	VCF_2	VCF_3	VCF_4	VCF_5	VCF_6	VCF_7	VCF_8	VCF_9	
Facility to bargain	-0.169	-0.023	0.050	0.195	0.055	**0.711**	0.026	0.187	0.172	0.532
Provide discounts and offers	0.042	0.212	0.085	0.419	-0.036	**0.631**	0.006	0.122	0.064	0.698
Expect a reasonable price	0.407	0.053	0.155	0.010	0.075	**0.524**	0.042	0.087	-0.291	0.705
Good display of vegetables	0.121	0.008	0.230	0.033	0.078	-0.079	**0.739**	0.073	0.058	0.577
Allow for self-service	0.212	0.183	-0.030	0.174	0.025	0.016	**0.614**	0.130	-0.187	0.508
Attractive environment	0.160	0.064	0.178	0.047	0.131	0.018	**0.589**	0.031	0.359	0.536
Open for extended hours	0.335	0.265	0.166	0.083	0.014	0.021	-0.002	**0.627**	0.057	0.540
Presence of many types of vegetables in the market	-0.092	0.176	-0.080	0.163	0.187	0.123	0.263	**0.625**	-0.021	0.636
Non-seasonal availability	0.128	0.138	0.045	0.343	0.117	0.308	0.046	**0.504**	0.126	0.558
Children attraction	0.099	0.273	0.047	-0.026	0.043	-0.051	0.014	0.070	**0.736**	0.601
Personal attention to each consumer	0.327	0.132	0.097	0.051	0.111	0.126	0.101	-0.008	**0.597**	0.567
Eigenvalues	9.09	3.40	1.88	1.54	1.43	1.36	1.22	1.14	1.05	
Total Variance explained %	23.92	8.96	4.96	4.05	3.76	3.57	3.20	2.99	2.76	
Cumulative of the variance explained %	23.92	32.88	37.84	41.89	45.65	49.22	52.42	55.41	58.17	
Number of items	5	6	6	4	5	4	3	3	2	
Cronbach's α	0.798	0.810	0.818	0.809	0.812	0.824	0.823	0.815	0.830	

[a] Factor loading for an absolute values greater than 0.4 are in bold.

[b] Com. stand for communality values.

The nine vegetable consumption factors can be labelled in accordance with the significant loading variables those were obtained for each factor and were explained as follows: Factor one (VCF_1): is interpreted as 'Customer services' which is the consumers' favored for some better human relationships at the market. Factor two (VCF_2): is loaded highly on pre packed, graded and sorted, minimally processed characters in vegetables, facilities to pay by credit cards, provision of additional services and can buy everything at one stop has been assimilated by this factor. Therefore, this factor is named as 'Convenience'. Factor three (VCF_3): is described as 'Food safety' because significant loading on unique characteristics of vegetables and the degree of safety and hygienic conditions. Factor four (VCF_4): is high loading of time saving at purchasing such as easy access, nearby place, vehicle parking and presence of desired varieties were grouped under this factor. Therefore, has been labelled by means of 'Efficiency'.

Factor five (VCF_5): is named as 'Product attributes' which is concerned with the expected relevant characters of vegetables and the qualities of vegetables for buyers. Factor six (VCF_6): is labelled as 'Economical price' because high loaded on expectations of price. Factor seven (VCF_7): relatively high loading in attractive environment is recorded. Therefore, this factor named as 'Appealing place to buy'. Factor eight (VCF_8): has been taken to mean as 'Extra services' for the reason of high factor loading in extended service hours and should provide vegetables throughout the year without a seasonality. Factor nine (VCF_9): is concerned with the arrangements of the store to attract children and giving personal attention to consumers. Therefore, this factor named as 'Consumer Appreciation'. The proportion of each variable's variance to be explained

by the factors is specified by the communalities. If this value is equal to 0.5 or more than that then it is desirable (Hair et al., 2006). In here these values are retained from 0.427 to 0.705 which is almost acceptable.

Relationship between respondent characteristics and vegetables consumption factors

The results of multivariate regression analysis on of the vegetable consumption factors and the respondent's socioeconomic characteristics in Ratnapura, Sri Lanka are presented in Table 2. The results showed that models 1, 5 and 8 are statistically significant (P<0.01). Also, models 2- 4 and 6 are statistically significant (P<0.05). The coefficients of determination (R^2) of almost of models were low. This could be suggested as consumers' preferences on vegetable consumption was unique among consumer wise individually.

Table 2 Multivariate regression of the vegetable consumption factors and socioeconomic characteristics of consumers in Ratnapura, Sri Lanka (n=400) [a]

Vegetable consumption factors	Independent variables							R^2
	Constant	*INC*	*PRO*	*EDU*	*STA*	*AGE*	*GEN*	
VCF_1 Customer services	-1.622	-0.406	-1.971**	3.238***	0.437	0.724	-0.044	0.135***
VCF_2 Convenience	-1.928	0.990	-0.752	1.310	2.391**	0.148	0.280	0.331**
VCF_3 Food safety	-0.178	-1.989**	-0.969	1.485	0.328	1.675	-1.019	0.144**
VCF_4 Efficiency	-3.137***	0.042	2.046**	2.720***	1.235	1.019	0.760	0.224**
VCF_5 Product attributes	-0.524	-1.659	-1.358	2.470	0.527	1.717	-1.469	0.267***
VCF_6 Economical price	-1.280	1.702	2.398**	-0.127	1.390	-0.503	0.185	0.188**
VCF_7 Appealing place to buy	-0.717	-0.408	-0.559	1.782	-0.210	0.885	-0.312	0.048
VCF_8 Extra services	-3.165***	-0.606	-0.736	2.680***	2.975***	0.529	0.947	0.181***
VCF_9 Consumer appreciation	-1.979**	0.199	0.235	2.531**	-0.055	0.424	0.706	0.022

[a] Variables and models significant at **P<0.05 and *** P<0.01

The main results from **Table 2** illustrated that monthly household income is negatively related to Food safety. This implies that customers with low household income are likely to perceive this factor as significantly more important in purchasing vegetable than the high household income customers. The reason may be due to vegetable is important food item for daily consumption to the low-income families and they also have the high expectation to receive safety and healthy vegetables to consume at home. Consumers with a higher income range habitually depend on processed foods and animal based food items in their daily consumption. They spent lesser percentage of money on vegetables which is agreed to the study of Chikkamath et al. (2012).

Profession is positively related to Efficiency and Economical price factors. Highest education level is positively related to Efficiency and Extra services factors. Similarly, personal status is positively related to Convenience and Extra services. This implies that the customer who work with government or private sector, low educated customer and married customer are likely to perceive those vegetable consumption factors as significantly more important than the others. These results showed that facilitate a friendly affable environment and a stress-free purchasing process at the market are considered as essential by the customer. Vegetable sellers must offer their foremost priority to develop better consumer relationships by being trustworthy, politeness and supportiveness towards the consumers. Moreover, different

preparations in the vegetables like minimally processed, pre packed, graded and sorted were favored by the consumer which offered time saving for their busy lifestyles.

Conclusion

There is a capability to come up with some important conclusions regarding consumer's' perception on the different strategies those were applied by the marketers on vegetables marketing in Ratnapura, Sri Lanka. As reported by them, the vegetable sellers must offer their foremost priority to develop better consumer relationships by being trustworthy, polite and supportive towards the consumers. This is essential with the sales staff also, because more than any other feature consumers were attracted to better personal relationships. The different preparations in the vegetables like minimally processed, pre pre-packed, graded and sorted were favored by consumers which offered time saving for their busy life styles. Similarly, some arrangements from the market were accepted by consumers such as vehicle parking, occurrence of additional services, facility to purchase other household items and ability to pay by credit cards to simplify their chore work.

Moreover, keeping a better standard level of the vegetables throughout the marketing channel is also, very important, because in addition to these requirements a higher consideration was presented by consumers on rescuing their better well-being through vegetables and market places. Fresh vegetables with healthy appearance and absence of any damages from both physical and biological causes were demanded by them. They were correspondingly expected improved arrangements for vegetables display in the market that not to expose for any contaminations together with proper containers and conditions to store them. These preferences were also assorted depending on the monthly household income and consumer's socioeconomic characteristics such as profession and education. -

Some important recommendations can be proposed by this study for the development of vegetables market in the country. Various kinds of individuals are given responsibilities by these recommendations. It is recommended to arrange a welcoming environment in the vegetable market by adjusting both human and other resources. In human resources should improve their personal relationship skills to negotiate with consumers. As other resources it is recommended to maintain better quality in vegetables and the market place. Moreover, there should maintain a better sanitary conditions in the market area, supply proper and safe parking places, keep the place open for extended hours per day, extra days per week and make the place into easy access of the consumers. Then correspondingly facilitate the whole shopping process by organizing the market place to purchase other household items and providing facilities for other services are also recommended with the results of this study.

Hence the request of consumers for safety vegetables with both an advanced nutritional level and free from health threats should be taken in to account by the individuals linked to different steps of the marketing channel. Primarily from farmer level the initial step would be deciding the types and time period of vegetables to grow according to consumer demand while managing the diversity of varieties and availability of them throughout the year. The various relevant practices and chemicals to apply on them should be decided according to a scheduled time period (crop calendar). This should depend on the keeping quality and unique characteristics that consumers are expected from the vegetables at the market. Due to the perishable nature of vegetables, at storage and transportation it is also critical to maintain a better shelf life to protect freshness and maturity.

Furthermore, conferring to consumer behavior changes depending on their family income and variances of vegetables purchasers' characteristics, can recommend the marketers to pay a substantial amount of attention on the statements include under 'Food safety', 'Convenience', 'Customer services', 'Efficiency', 'Economical price' and 'Extra service' factors. Other than the previously mentioned recommendations, provide essential conditions to receive quality products to consumers for their paid price and make the desired vegetables available in the market without seasonality are highly recommended. The marketers should try out with these recommendations to upgrade their vegetables marketing in the future.

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