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FACTORS INFLUENCING THE PRODUCERS' MARKET CHANNEL CHOICE IN FRUITS SUPPLY CHAIN: A STUDY IN KERALA STATE, INDIA

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Abstract

The present study was undertaken with the main objectives of analysis fruits supply chain and factors affecting producer's channel choice in Kerala State, India. For the purpose of the study, both primary and secondary sources of data were comprehensively used and analyzed. Secondary data sources were obtained from the Vegetable and Fruits Promotion Counseling of Kerala (VFPCK, Horticulture Mission National Board (HCMNB) in Kerala and Horticulture Market Promotion Office (HPMPO) and related reviews of literatures where as primary data were collected from 384 sampled fruit producing local farmers selected on proportionate sampling method. The collected data were processed through tabulation and analyzed using statistical tools such as percentage, frequencies, standard deviation, chi-square and binary logistic regression analysis. The result of binary logistic regression analysis reveals that explanatory variables such as market access, *land size, the storage facilities, market price, transportation access, access to market information, the production quality and quantity and middlemen interactions were found to have significant effects on the fruit supply chain and the producers' market channel choice in the study area. Based on the findings, conclusions and recommendations were forwarded to empower the producer's market channel choices and restructure the marketing system of the fruit market in Kerala.*

KEY WORDS

Supply chain, Fruits, Producers' Market Channel Choice, etc,

1. BACKGROUNDS OF THE STUDY

1.1 INTRODUCTION

Kerala is a consuming State which is depending on other States for its agricultural production requirements(Kerala, 2014). The staple foods like rice, fruits and vegetables are imported from AndraPadesh, Tamil Nadu, Karnataka, Maharashtra, whereas the other types of crops like wheat are brought from Punjab and Haryana. Along with transporting long distances with no cold chain infrastructure

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facilities, the major products that are imported from outside of the State have serious quality defectiveness. Therefore, maintenance of quality of products and upkeep of health and safety of consumer is always a distressing issue.

According to the study carried out by Halder & Pati(2011) Kerala State shares relatively low level of income from the agriculture sector when compared with any other states in the country while the relative share of the service sector was the highest. Most of the agriculture varieties particularly fruits / vegetables are growing largely as subsidiary crops rather than as a main crop in the state (Kalidas. et. al., 2016). In addition, the major problem encountered in the agricultural sector is lack of enhancing new technology to scaling up productivity and lack of proper networking of producer to the consumer in supply chain system. The producers who engaged their livelihood on farming activities have been suffering from lack of land, agricultural extension supports and credit facilities for improving the productivity.

The primary investigation assessed on producing potential of the state reveals that agricultural varieties namely, tea plants, tapioca, plantains, cashew, coffee, rubber and fruits such as, pineapple, mango, banana and other forest produces grow in different climatic regions (Profile & Kerala, 2014). The fresh fruit shares nearly 32 percentage of food crop cultivated covering about 3,09,709 Hect and largely cultivated in the Palakkad district that contributes 14 percentage of the state's total volume (Kerala, 2014). The current scenario of the state shows that some improvements have been made focusing on some selected areas such as vegetable and fruits, coconut and tea plantations in Thrissur, Palakkad and Idukki districts respectively. The annual Vegetable and Fruits Promotion Council office in Kerala (VFPCK) (2015) details of data base sheet report shows that 100,000 local farmers who are associated with the council are organized as a 5,100 Self Help Group (SHGs) of which each SHGs has between 15 - 20 farmers. Since the government has undertaken the developmental initiatives implementing at State wise level, some improvements also have been appearing in the sector. According to Sheoran A & M (2015) in fresh fruit and vegetables production area and production Kerala shares 314,560Ha for producing 2,584,010 MT of fresh fruit and 146,000Ha and 5,445,580MT for of vegetables while Maharashtra shares 1,585000Ha and 10,021000 MT and 726000Hect and 10,112,000 MT for producing of fruits and vegetables respectively.

1.2 STATEMENT OF THE PROBLEM

In the Kerala State, the fruits supply chain management operational performance is inefficient and large numbers of the chain actors are bottle necked in various factors. In Kerala State, majority of the agriculture product wholesalers and particularly fruit sellers have no adequate cold storage space of buffer stock and hence imports most of products from the neighboring states of which are less in quality and have shorter shelf life. According to the study conducted by Ashby (2006), there is recurrent occurrence of quality loss resulting from insufficient storage spaces and misuse of both time and temperature. Furthermore, during the import of the major food

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an item transporting along long distance with no cold chain infrastructure facilities leads to damages in qualities, quantities, and adversely affect health and safety of the food items. The study conducted by El-ramady, Domokos-szabolcsy, Abdalla, Taha, & Fári (2013) and Kalidas K .et. al., (2016) reveals that due to lack of systematically joint coordination of producers with end users, and the limited access to have pre-harvest, post-harvest cooling technology, and institutional supports, the fruit-producing farmers have been suffering by incurring nearly 30% of wastages and ending in distress sales.

1.3 RESEARCH QUESTION

1. What are the major factors that affecting fruit producers market channel choice?

Objective of the Study

- To examine the factors that affecting fruit producers market channel choices in selected districts of the Kerala State.

1.4 SIGNIFICANCES OF THE STUDY

The findings of this study indicate directions to the policy makers to use as a reference for designing and implementing appropriate strategies in the fruit supply chain management in both the studied areas. Further, the findings will throw a light creating awareness on the fruits growers, traders, retailers, vendors and customers or final consumers to actively participate in the existed supply chain management of the fruits. Besides to that, research scholars, academic staffs, practitioners, and data analysts will also use the study as a reference book for their further investigation.

1.5 REVIEW OF LITERATURES

Concepts and applications of the supply chain management are interactive in nature and involves in various chain activities, such as; item identification and tracking, manufacturing, retailing, transportation, warehousing, distributing and finally payment transaction (Min, 2015). Supply chain operation management is coordination along the activities aligning in planning and controlling, procuring, and building buyer-customer relationship ensuring consistent customer satisfaction (Thakkar, Kanda, & Deshmukh, 2012). For successfully achieving the goal of the supply chain management internal and external integration is imperative (Elmuti, Minnis, & Abebe, 2008). In the agriculture sector, supply chain management comprises multi-dimensional activities such as input supply, production process, post-harvest, transportation, storage, marketing, distribution and coordinating external environments (Chopra & Meindl, 2014).Supply chain management is scrutinized by Power (2005) as to avoid communication barriers and remove redundancies coordinating and closely monitoring through direct networking process. That means, efficient supply chain management can control overall movements of the wares passing through different market channels (Azlina, Abdul, & Abdul, 2014). Supply chain management is a systematical integration with different chain actors to collaboratively functioning in the

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activities that plays vital roles in agricultural production in general and in fruit products in particular.

According to Halder & Pati (2011) reports the relative share of agriculture in the Kerala state income was the lowest when compared with any State in the country while the relative share of service sector was the highest. Recently, Sheoran A & M(2015) described on the 2013th annual report of the all Indian State wise level of fresh fruit and vegetables production area,. The report says that the production that Kerala shares 13145600 hect for producing 2584010 MT of fresh fruit and 146000 hect and 5445580 MT for of vegetables while Maharashtra shares 1585000 hect and 10021000 MT and 726000 hect and 10112000 MT for producing of fruits and vegetables respectively. The fresh fruit shares nearly 32 percentage of food with covering about 3,09,709 Ha and largely cultivated in the Palakkad district that contributes 14 percentages of the State total volume (G. O. F. Kerala, 2014). The Vegetable and Fruits Promotion Council office in Kerala (VFPCK) (2015) annual report details of data base line sheet shows that 100,000 local farmers are associated with the council are organized as a 5,100 Self Help Group (SHGs) of each SHGs has between 15 - 20 farmers.

3. METHODS AND METHODOLOGIES OF THE STUDY

3.1 STUDY POPULATION

The population for the study includes 384 fruit producers, ten (10) wholesalers, sixteen (16) retailers, eleven (11) intermediaries, five (5) local collectors and 2 Vegetable and Fruits Promotion Council office in Kerala (VFPCK) experts and one (1) *Horticulture Market Promotion Officer and one (1) (HPMPO) program director.*

3.2 SAMPLING PROCEDURES

Based on the geographical overages potential to produce the fruits, Kerala State is further categorized into three different regions namely, northern, central and southern parts. Thus, Trivandrum, Ernakulum and Palakkad districts were selected from southern, central and northern Parts of Kerala State respectively. Since the population number of the fruit producers are infinite, to describe the sample size of the respondents, producers, simplified formula which provided by (Kothari, 2015) was used.

$$n = \frac{z^2 \frac{\alpha}{2} p(p-1)}{e^2}$$

Whereas,

n = implies the required sample size

P = is supposed to estimated proportion of respondents. As a researcher want most conservatively sample size and take the value of p = 0.5 and q = 0.5 (1-q).

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$z^2\frac{\alpha}{2}$= 1.96 (value shows that level of 95% confidence interval)

e = 0.05 (implies that the margin error that the researcher can tolerates).

Thus, the total sample producers were 384. Finally, the sample producers were identified from three districts namely using proportionate random sampling technique.

3.3 *DATA SOURCE, TOOLS AND METHODS OF DATA COLLECTION*

For the study purpose, primary data was collected from the sample fruit producers. Both primary and secondary sources of data were comprehensively used and analyzed. Secondary data sources were obtained from the Vegetable and Fruits Promotion Counseling of Kerala (VFPCK, Horticulture Mission National Board (HCMNB) in Kerala and Horticulture Market Promotion Office (HPMPO) and related reviews of literatures where as primary data were collected from 384 sampled fruit producing local farmers selected on proportionate sampling method. Semi-structured questionnaire was prepared comprised of both open and closed ended questions and the same was administered among the sample producers.

3.4 METHOD OF DATA ANALYSIS

In order to examine and summarize the assembled data into understandable and meaningful form, econometrics models were used.

4. RESULTS OF BINARY LOGISTIC REGRESSION MODEL

At first, Chi-square test was used to check the model fitness and the result of Chi-square is found to be significant at P <5% level which confirms the model fitness.

Table-1: Omnibus Test of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	65.460	18	.000
	Block	65.460	18	.000
	Model	65.460	18	.000

Sources: Authors Compilation (2018)

The dependent variable in this model is the status of the fruits producers" channel choice in the fruit supply chain (Choice or Not choice) Where choice = 1 and 0 otherwise. As given in table 2, ten variables, seven variables were found to have significant effects on the producers' market channel choice in supply chain such as, market access, land size, the storage facilities, market price, transport cost, access to market information, quality of the product, quantity of the product and middlemen interactions at (p <0.05) level.

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Table 3 Result of Binary Logit Regression

Independent variables	B	S.E.	Wald	df	Sig.	Exp(B)
market access	3.173	0.483	2.333	1	.002**	.001
land size	-3.493	0.155	3.695		.005**	.083
the storage facilities	-2.121	0.212	2.011	1	.002**	0.12.
Market Price	1.468	0.205	1.295	1	.021*	082
Transport access	4.398	0.239	3.402	1	.036*	.443
middlemen interactions	-2.716	0.531	1.271	1	.002**	.642
Market Information access	-2.321	0.114	2.304	1	.018*	.384

Note: ***Significant at p< 0.05*

**Significant at p < 0.01*

SE = Standard error β= Regression coefficient

Sources*: Model output (2018)*

A variable factor which prevent the fruit producers, market channel choice in the supply chain were identified associating the existing phenomenon and significant effects of each explanatory variable was scrutinized one by one based on the binary logit regression analysis outputs.

Market Access: Regarding market access, logistic regression model is significant at (P < .002**) the significance level of 99%. The result of market access Beta coefficient value shows positive sign which means, as the market access of the fruit increases, the producers channel choice is increased. In other words, the Kerala government has been establishing rural and town centered regulated markets to facilitate direct connection between the producers and final consumers. This creates favorable condition for the producers' to supply their products at zero channel level.

LAND SIZE: Concerning land size, logistic regression model is significant at (P< .005**) the significance level of 99%. The result of land size Beta coefficient value shows negative sign of which mean that as land size is getting shrink more and more the fruit production quality and quantity will be decreased. In the Kerala State, majorities of the local famers have no own land and rent from the landlords for their agricultural activities. On the other hand, the expansion of real state investment in the state has been shrinking the faming land and rapidly changing to the urban. Therefore, land size has adverse effects on the producers' market channel choices.

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STORAGE FACILITY: Regarding storage facility, logistic regression model is significant at (P <0.002**) at the significant level of 99%. The model output of storage facility Beta coefficient value shows negative sign of which indicates that as the storage facility decreases, the producers' market channel choice will be decrease. Storage facility has a significant effect on the more perishable agricultural products like fruit and vegetables. If wholesale traders have no cold store facilities, they could not buy more products from the producers and most of the products go to waste. Now a days, the Kerala state faces in problem due to lack of cold store facilities at both open and regulated market centers. Therefore, majority of the fresh fruit-producing farmers are ending to produce the products from distressing sale.

MARKET PRICE: Market price is one of determining factor of the fruit producers' market channel choice and logistic regression model is significant at (P< .021*) the significance level of 95%. The result of market price Beta coefficient value shows positive sing and it implies that as the market price increase, the producers' market channel choice will increase. As the current report of the Vegetable and Fruit Promotion Counsel in Kerala shows that the government has been subsidizing the fruit and vegetable producing farmers to directly supply their products to the regulated market at better prices. Therefore, market price has a gravity power to deflect the market channel to any direction since suppliers demand better price market channel.

TRANSPORT ACCESS: Concerning to the transport Cost, logistic regression model is significant at (P< .036*) the significance level of 99%. The result of transport cost Beta value shows positive sign of which implies that as transport facility increases, the producers' market channel choice will be increased. In the Kerala state, all the villages are well interconnected in networking roads access and the transport cost is cheaper for the local producers to bring their products to the market.

MARKET INFORMATION ACCESS: Concerning to the market information access, logistic regression model is significant at (P< .036*) the significance level of 95%. The result of market information access Beta value shows negative sign of which implies that market information asymmetry decreases the fruit producers' market channel choice.

MIDDLEMEN INSTRUCTIONS: Concerning to the middlemen instructions, logistic regression model is significant at (.002**) the significance level of 99%. The result of middlemen Beta value shows negative sign and this implies that increasing numbers of middlemen involvement in the supply chain will decrease the producers market channel choice. Therefore, in the Kerala state the majority of the producing farmers are under influences of the multiple intermediaries.

CONCLUSION

It may be concluded from the results of the binary logistic regression mode analysis, ten explanatory variables assumed to influence the fruit producers' market channel choices in the supply chain management. However, out of total, seven explanatory

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variables have significant effect among them three (market access, market price and transportation access) were found to have positive influences and where as four (storage facility, the middlemen involvement, land size and market information access) are negative on the producers market channel choice. The remaining two (quantity and quality of the product) variables have no significant effects on the fruits producers' market channel choice in supply chain. The Kerala state fruit-producing farmers have no pre cooling store to protect their products from high loss. On the other hand, most of local famers have no own land unable to produce high quality and quantity of marketable surpluses of the fresh fruit products. Due to an excess numbers of the middlemen involvements in the supply chain system, primary producers are not keeping their first market channel choice and high influenced to flow through predetermined channel of that makes them less beneficiary. Even though, the Kerala state has launched an active policy to scaling up the agriculture sector and its marketing system, however, the gap between producers to consumer is remained as unsolved constraining factor. Consequently, fruit growing farmers were being discouraged by current marketing activities and they are shifting different types of fruits from their yards replacing by other crops.

RECOMMENDATIONS

INCREASING NUMBERS OF REGULATED MARKET SYSTEM: The result of binary logit regression analysis show that Kerala State fruit supply chain system is highly dominated by middlemen (brokers) and wholesaler chain actors and due to this reason, the primary producers are not privileged to keep their market channel choice. The Kerala government should increase the numbers of the regulated market centers with zero channel base that create access for the producers, sellers and end users to functioning of the market at economic price.

REMOVING UNNECESSARY INTERACTIONS FROM THE SYSTEM: Brokers and a few numbers of the wholesale traders are more beneficiaries from the agricultural market in general, fruit markets in particular. Brokers are always distorting of the market channel involving in the system acting as if they are the major actors of the supply chain. However, their involvement has no contribution on value addition of the products and even increases unnecessary transaction costs to the final major chain actors particularly to the suppliers and customers. Therefore, the Kerala state agricultural market and revenue department should put necessary limitations on the brokers.

REVISING OF LAND MANAGEMENT POLICY: The finding depicts that the volume of the fresh fruits have been declining every before and the state is becoming more depending on the neighboring states in country due to lack land access for growing of agricultural verities like fruits. Therefore, the Kerala government should revise the land management policy and facilitate the land for agricultural activities.

IMPROVEMENT OF MARKET FACILITIES: Lack of market facility has significant effect the producers' market channel choice in the supply chain management system.

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Unless the producing farmers are well informed about market information regarding price and role of direct sale, it is difficult to protect them from the middlemen exploitations ensuring their benefits. Therefore, Vegetable and Fruits Promotion Counseling of Kerala (VFPCK, Horticulture Mission National Board (HCMNB) in Kerala and Horticulture Market Promotion Office (HPMPO) should create awareness on the fruit producers through training and discussions in the state.

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