Int. Journal of Management and Development Studies **4(3)**: 301-309 (2015)
ISSN (Online): 2320-0685. ISSN (Print): 2321-1423

Supply Chain Strategies for Green Edible Agricultural Products in India: A Farmer Perspective

Vinoth. M[1] and N. Santhosh Kumar[2]

Abstract: Today, India is one of the largest producers of milk, fruits, cashew nuts, coconuts and tea in the world. It is also well known for the production of wheat, vegetables, sugar, fish, tobacco and rice. Certain types of agriculture such as horticulture, organic farming, floriculture, genetic engineering, packaging and food processing have the potential to see a surge in revenues through exports. Over the past few years, the government has stressed on the development of horticulture and floriculture by creating vital infrastructure for cold storage, refrigerated transportation, packaging, processing and quality control. The main objective of this research is to determine the supply chain strategies for green edible agricultural products with specific reference to Indian agricultural practices: a former perspective. The nature of the research is Descriptive method, and the sample size is 251 respondents from various locations in Tamilnadu and data collection method used in the research is "Questionnaire Method". Data was analyzed by using SPSS 16.0. Findings, suggestions and conclusions were made by keeping an eye on the objectives. There is paucity of studies regarding Indian agricultural practices and its relationship with supply chain management of green edible products, Majority of the consumers prefer green edible products consumption. Some consumers purchase green edible products giving rise to need for study of awareness , perception, attitude, purchase intension of green edible products and There is no model literature review indicate that there is no integrated marketing communication of green edible agricultural products.

Keywords: Green Edible Agricultural Products, Agriculture Products Marketing, Consumption, Supply Chain

Indian Agriculture

Since Independence, India has made a lot of progress in agriculture in terms of growth in output, yields and area under crops. It has gone through a Green Revolution (food grains), a White Revolution (milk), a Yellow Revolution (oilseeds) and a Blue Revolution (aquaculture). Today, India is one of the largest producers of milk, fruits, cashew nuts, coconuts and tea in the world. It is also well known for the production of wheat, vegetables, sugar, fish, tobacco and rice. Certain types of agriculture such as horticulture, organic farming, floriculture, genetic engineering, packaging and food processing have the potential to see a surge in revenues through exports. Over the past few years, the government has stressed on the development of horticulture and floriculture by creating vital infrastructure for cold storage, refrigerated transportation, packaging, processing and quality control. If India wishes to optimize the production and export

[1]Research scholar, Research and Development Center, Bharathiyar University, Coimbatore, Tamilnadu, India.
[2]Assistant professor, Faculty of management, SRM University, Kattankulathur, Tamilnadu, India.
Corresponding author: Vinoth .M can be contacted at: vinosmit@gmail.com
Any remaining errors or omissions rest solely with the author(s) of this paper

potential of these commodities, then it is essential to improve these facilities, marketing and export networks much further.

Indian Organic Agriculture

Organic agriculture offers trade opportunities for farmers in the developing and developed countries. This market of organic products is expected to grow globally in the coming years and high growth rates over the medium term (from 10-15 to 25-30 %) are expected (Yussefi and Willer, 2002). This organic market expansion makes it possible for farmers to reap the benefits of a trade with relatively high price premiums (Yussefi and Willer, 2002). However, this market is not very well known to most farmers, especially those living in the developing countries. Furthermore, information about it is not readily available to farmers in the developing countries. The absence of sufficient technical and market information and financial support also means that few farmers will risk changing their method of production.

Green Edible Agricultural Products

The organic movement in India has its origin in the work of Howard (1940) who formulated and conceptualized most of the views which were later accepted by those people who became active in this movement. Organic farming is a production system which avoids, or largely excludes, the use of synthetic fertilizers, pesticides, growth regulators, and livestock feed additives. The objectives of environmental, social, and economic sustainability are the basics of organic farming Stockdale el.al (2001). The key characteristics include protecting the long-term fertility of soils by maintaining organic matter levels, fostering soil biological activity, careful mechanical intervention, nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, effective recycling of organic materials including crop residues and livestock wastes and weed, and diseases and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, and resistant varieties. A great emphasis is placed to maintain the soil fertility by returning all the wastes to it chiefly through compost to minimize the gap between NPK addition and removal from the soil Chhonkar (2002). Today, the burgeoning population pressure has forced many countries to use chemicals and fertilizers to increase the farm productivity for meeting their ever-increasing food requirements. The prolonged and over usage of chemicals has, however, resulted in human and soil health hazards along with environmental pollution. Farmers in the developed countries are, therefore, being encouraged to convert their existing farms into organic farm.

Literature Review

Toolsema, Linda (2009) examines in a vertical differentiation model where both duopolists supply the same two qualities of an otherwise homogeneous product, we derive the critical level of the interfirm switching cost needed to sustain monopoly pricing. In particular, we show how a decrease in the intrafirm switching cost may cause a decrease in this critical value, thereby facilitating monopoly pricing. Authors apply the results to a setting with green and nongreen products—in particular electricity—and discuss implications for policy measures intended to stimulate the production and consumption of green products. Staniskis and Jurgis (2011) suggested that consumer demand and consumption, if shifted to a sustainable pattern, in theory, should influence producers to meet that demand with sustainable production processes, greater choice of green products, and different consumption options, for instance, services instead of products. At the same time, increased choice and expanded consumption options should drive

down relative prices, make green goods and services more affordable and accessible, and create a closed cycle leading to sustainable consumption and production (SCP) system. The paper reviews different cases of resource efficient and cleaner production as well as sustainable products and services developed in Austria, Bulgaria, Estonia, Lithuania, and Spain. These research cases were selected from the presentations at the second international conference 'Sustainable consumption and production: how to make it possible,' held on September 28-30 in Kaunas, Lithuania. An overwhelming message of the review is that the best results could be achieved when all stakeholders work together for a common vision of SCP for current and future generations. Multi stakeholder cooperation together with new economics approach is challenging, but essential for the planet currently imperilled by overpopulation and over-consumption and, for the first time in human history, facing the situation of breaching the planetary boundaries.

Statement of the Problem

It is the pattern of movement of produce from farm to the ultimate consumer which plays a crucial role in assessing the returns to the farmer. The better returns, stable price and attractive terms of trade will induce the cultivators to produce more and market a major proportion of what they produce. So it can be said that unless the supply chain improves to increased production will not attract the cultivators in the desired strength, Existence of better market competition and prevalence of adequate infrastructural facility in the form of better roads, transportation, storage, market information etc. Play a decisive role in improving the market structure, conduct and performance and thereby, the economic status of the cultivators. Hence, appropriate growth of market structure appears to be important in this context for increasing the marketing efficiency and rationalized market margins and to reduce the costs it becomes imperative to understand the nature and extend of market competition, marketing margins, costs and price spread.

Research Gap

Green Growth policies which place a premium on environmental protection may constrain agricultural output, reduce global food security and entail adjustments in the use of human, financial and natural resources. The implications of Green Growth for agriculture in the longer-term are mutually-reinforcing in terms of environmental sustainability, economic growth and social well-being. The complementarities and differences between Green Growth and agriculture are reviewed in more detail below in terms of traditional economic factors (i.e. productivity, farm incomes, employment) and environmental factors (i.e. natural resource use, pollution, biodiversity) as well as broader social factors (i.e. food security, poverty reduction, rural development). While this report discusses Green Growth with a focus on primary agriculture, there is a much longer agro-food supply chain including processing and distribution which has Green Growth implications. The end results will depend on the policy instruments adopted and the structural adjustment measures which are put in place to ease the transition to a greener agricultural sector. **(OECD - Organization for Economic Cooperation and Development)**

Research Questions

1. How demographic impact supply chain management of green edible agricultural products?
2. What are the variables of dimensions that compose preference and satisfaction of supply chain management for green edible agricultural products

Need and Motivation for Study

- There is paucity of studies regarding Indian agricultural practices and its relationship with supply chain management of green edible products.
- Majority of the consumers prefer green edible products consumption. However while making a purchase decision was paradoxically taken. Some consumers purchase green edible products giving rise to need for study of awareness, perception, attitude, purchase intension of green edible products.
- There is no model literature review indicate that there is no integrated marketing communication of green edible agricultural products.

Research Objectives

1. To study and document agricultural practices of green edible agricultural products with specific reference to Indian agricultural practices with focus on Tamilnadu farmers.
2. To study farmer's attitude towards green edible agricultural products.

Research Hypotheses

The following hypotheses are designed for testing:

H_{01}: There is no significant difference in preference of green edible agricultural products with respect to the academic qualification of the consumer.

H_{02}: There is no significant difference in purchase intensions of green edible agricultural products with respect to the gender.

H_{03}: There is no significant difference between consumer's attitude and purchase behavior of green edible agricultural products.

Research Methodology

The major aim of this study to analyze supply chain management of green edible agricultural products with specific reference to Indian agricultural practices. Bivariate and multivariate analysis were used for analyze the data and structured Questionnaire was used for collecting the data. The approximate sample size is 570 from the farmers in Tamilnadu state. The data were analyzed based on the research objectives of the study.

Contribution of the Study

- The present research will address the issue of marketing mix consisting of product, price, promotion, physical distribution, people, process and physical evidence with respect to green edible agricultural products.
- There are paucity of studies that integrate Indian farming practices in the supply chain management of green edible agricultural products.

Reliability

Reliability is the ratio of true variance to the total variance yielded by the measuring instrument. It indicates stability and also the internal consistency of a test. The reliability of a measure indicates the stability and consistency with which the instrument measures the concept and helps to assess the 'goodness' of a measure. A measure is reliable to the degree that it supplier consistent results.

Table 1: Reliability of Instruments used for study

Scale	Reliability (Cronbach Alpha Value)
Farmers perspective on green edible agricultural product	0.822

Inference

The desired value for reliability test is 0.5 and above. Overall reliability of the instrument is above 0.8 indicating good testing norm for internal consistency. So the result of the reliability test, which indicates that questionnaire, is more reliable for the further study.

Validity

The instrument is designed based on validated instruments from the literature survey. One hundred and five item questionnaires have given to the farmers those who are cultivating green edible agricultural product in Tamilnadu district, India and duplicate and ambiguous items are removed. A test survey has been conducted among fifty respondents to ensure face validity and based on the feedback 74 items are selected.

Analysis and Results

Structural Equation Models (SEM's)

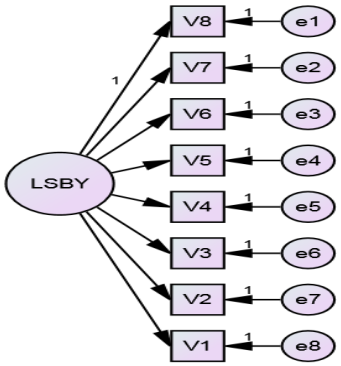
Structural Equation Models (SEMs), also called simultaneous equation models, are multivariate (i.e., multi- equation) regression models. Unlike the more traditional multivariate linear model, however, the response variable in one regression equation in an SEM may appear as a predictor in another equation; indeed, variables in an SEM may influence one-another reciprocally, either directly or through other variables as intermediaries. These structural equations are meant to represent causal relationships among the variables in the model. A cynical view of SEMs is that their popularity in the social sciences reflects the legitimacy that the models appear to lend to causal interpretation of observational data, when in fact such interpretation is no less problematic than for other kinds of regression models applied to observational data. A more charitable interpretation is that SEMs are close to the kind of informal thinking about causal relationships that is common in social-science theorizing, and that, therefore, these models facilitate translating such theories into data analysis.

To my knowledge, the only facility in S for fitting structural equation models is my SEM library, which at present is available for R but not for S-PLUS. The SEM library includes functions for estimating structural equations in observed-variables models by two-stage least squares and for fitting general structural equation models with multinomial errors and latent variables by full-information maximum likelihood. These methods are covered (along with the associated terminology) in the subsequent sections of the appendix. As I write this appendix, the SEM library is in a preliminary form, and the capabilities that it provides are modest compared with specialized structural equation software. Structural equation modeling is a large subject. Relatively brief introductions may be found in Fox (1984: Ch. 4) and in Duncan (1975); Bollen (1989) is a standard book-length treatment, now slightly dated; and most general econometric texts (e.g., Greene, 1993: Ch. 20; Judge et al., 1985: Part 5) takes up at least observed-variables structural equation models. Notes for Model (Default model)

Table 1: Name of the Independent Variable for Supply Chain Strategies for Green Edible Agricultural Products

Coding	Name of the Independent Variable
V1	Better quality of information
V2	Better quantity of information
V3	Flexibility
V4	Cost saving
V5	Forecasting
V6	Resource planning
V7	Reduced inventory level
V8	More accurate costing

Figure 1: Path Analysis and Diagram for Supply Chain Strategies for Green Edible Agricultural Products



Model Fit Summary

Table 2: CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	16	472.957	20	.000	23.648
Saturated model	36	.000	0		
Independence model	8	2258.243	28	.000	80.652

Table 3: RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.080	.777	.598	.432
Saturated model	.000	1.000		
Independence model	.414	.314	.118	.244

Table 4: Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.791	.707	.798	.716	.797
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 5: Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.714	.565	.569
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

Table 6: NCP

Model	NCP	LO 90	HI 90
Default model	452.957	385.841	527.494
Saturated model	.000	.000	.000
Independence model	2230.243	2078.013	2389.808

Table 7: FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	1.168	1.118	.953	1.302
Saturated model	.000	.000	.000	.000
Independence model	5.576	5.507	5.131	5.901

Table 8: RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.236	.218	.255	.000
Independence model	.443	.428	.459	.000

Table 9: AIC

Model	AIC	BCC	BIC	CAIC
Default model	504.957	505.684	569.059	585.059
Saturated model	72.000	73.636	216.229	252.229
Independence model	2274.243	2274.606	2306.293	2314.293

Table 10: ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	1.247	1.081	1.431	1.249
Saturated model	.178	.178	.178	.182
Independence model	5.615	5.240	6.009	5.616

Table 11: HOELTER

Model	HOELTER .05	HOELTER .01
Default model	27	33
Independence model	8	9

Inference

The desired value CMIN and degree of freedom for default model is 23.648, which is good and reliable; it is a fit model for mentioned independent variables. The actual default model value arrived is 23.648. So the variables are accepted to fit a structural equation modeling. From the

RMSEA table, it is inferred that the significant value for default model is 0.000, which is fit model at 5 percent level of significant.

Model Fit Summary

Step 1: Variables for e-procurement in digital era are listed; in our research work. .
Step 2: From the variables identified in step 1, contextual relationship among the variables with respect to different pairs of variables are examined.
Step 3: The explained and assumed variables are theoretically examined and fitted with a model.
Step 4: A Structural Equation diagram is developed for variables, which indicates pair wise relationship among variables of the system under consideration.
Step 5: Model fit is developed from the Structural Equation diagram and the Default model summary is checked for supply chain strategies for green edible agricultural products. The independent variables are very much necessity for supply chain strategies for green edible agricultural products.
Step 6: Based on the contextual relationships in the reach ability matrix, a directed graph is drawn and the transitive links are removed.
Step 7: The resultant diagraph is converted into an Interpretive Structural Model by replacing variable nodes with statements

Suggestions

The following supply chain strategies are lead to improve business success of the green edible agricultural products with specific reference to Indian agricultural practices

- Better quality of information
- Better quantity of information
- Flexibility
- Cost saving
- Forecasting
- Resource planning
- Reduced inventory level
- More accurate costing

Conclusions

India has made a lot of progress in agriculture in terms of growth in output, yields and area under crops. It has gone through a Green Revolution (food grains), a White Revolution (milk), a Yellow Revolution (oilseeds) and a Blue Revolution (aquaculture). Today, India is one of the largest producers of milk, fruits, cashew nuts, coconuts and tea in the world. It is also well known for the production of wheat, vegetables, sugar, fish, tobacco and rice. Certain types of agriculture such as horticulture, organic farming, floriculture, genetic engineering, packaging and food processing have the potential to see a surge in revenues through exports. Over the past few years, the government has stressed on the development of horticulture and floriculture by creating vital infrastructure for cold storage, refrigerated transportation, packaging, processing and quality control. The main objective of this research is to determine the supply chain strategies for green edible agricultural products with specific reference to Indian agricultural practices: a former perspective. The nature of the research is Descriptive method, and the sample size is 251 respondents from various locations in Tamilnadu and data collection method used in the research is “Questionnaire Method”. Data was analyzed by using SPSS 16.0. Findings,

suggestions and conclusions were made by keeping an eye on the objectives. There is paucity of studies regarding Indian agricultural practices and its relationship with supply chain management of green edible products, Majority of the consumers prefer green edible products consumption. Some consumers purchase green edible products giving rise to need for study of awareness , perception, attitude, purchase intension of green edible products and There is no model literature review indicate that there is no integrated marketing communication of green edible agricultural products.

Authors' Note

This manuscript is the authors' original work, has not been published and is not under consideration for publication elsewhere.

References

A. Howard (1940) , An Agricultural Testaments, Oxford University Press.

E. A. Stockdale, N. H. Lampkin, M. Hovi (2001), "Agronomic and environmental implications of organic farming systems," Advances in Agronomy, vol. 70, pp. 261–327.

P. K. Chhonkar, "Organic farming myth and reality(2002)," in Proceedings of the FAI Seminar on Fertilizer and Agriculture Meeting the Challenges, New Delhi, India.

P. K. Sofia, R. Prasad, and V. K. Vijay(2006), "Organic farming-tradition reinvented," Indian Journal of Traditional Knowledge, vol. 5, no. 1, pp. 139–142.

S. Chandra and S. K. Chauhan (2004), "Prospects of organic farming in India," Indian Farming, vol. 52, no. 2, pp. 11–14.

K. K. M. Nambiar, P. N. Soni, M. R. Vats, D. K. Sehgal, and D. K. Mehta (1992), "AICRP on long term fertilizer experiments," Annual Reports 1987-88 and 1988-89, IARI, New Delhi, India.

S. Kalyan,(2005) "Development of sustainable farming system model for the Irrigated agro-ecosystem of Eastern UP, ICAR, Ad-hoc project," Final Annual Report, Department of Agronomy, Institute of Agricultural Science, Banaras Hindu University, Varanasi, India.

A. Inoko) (1984, "Compost as source of plant nutrients," in Organic Matter and Rice, S. Banta and C. V. Mendoza, Eds., IRRI, Los Banos, Philippines, pp. 137–146,.