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Talukdar Bidyasagar
Master Research Fellow,
Agricultural Economis & Farm
Management, Biswanath College
of Agriculture, AAU, Jorhat,
Assam, India

Baruah Utpal
Master Research Fellow,
Agricultural Economis & Farm
Management, Biswanath College
of Agriculture, AAU, Jorhat,
Assam, India

Barman RN
Professor and Head (Agricultural
Economis & Farm Management,)
Biswanath College of
Agriculture, Assam, India

Correspondence
Talukdar Bidyasagar
Master Research Fellow,
Agricultural Economis & Farm
Management, Biswanath College
of Agriculture, AAU, Jorhat,
Assam, India

The supply chain management of Brinjal in the Darrang district of Assam (INDIA)

Talukdar Bidyasagar, Baruah Utpal and Barman RN

Abstract

The study found that Cold Chain Facilities; Fragmented Supply Chain; Linkages and Integration between the partners; Taxation Issue; Infrastructure Facilities; Cost of Packaging Material; Technology and Techniques; Farmer's Knowledge and Awareness; Quality and Safety standards; Processing and Value Addition; Supply Chain inefficiency; Farmers income; Supply chain losses and wastage of fresh produce; Transportation facilities; The coefficient multiple determinations (R²) was found to be 0.961 which indicates that the 96.1 % variation in the dependent variable was described by the explanatory variables included in the model. It was found that post-harvest loss cost have significant (P value < 0.01) contribution to total marketing cost of vegetables in Darrang district, while handling, transportation and packaging costs were not found to be significant factors to contribute for total gross output value where assembling and storage were found to be negatively contributing factor but insignificant

Keywords: Cold Chain Facilities, assembling, post-harvest loss cost, Supply Chain, middlemen, price, farmers

1. Introduction

Vegetables are rich and comparatively cheaper source of vitamins. Consumption of these items provides taste, palatability, increases appetite and provides fiber for digestion and to prevent constipation. Their consumption in plenty fair amount of protein. Vegetables are mainly important because 280 gms of vegetables are required per day/per man by ICMR recommendation. Supply chain is the coordination of material flows, information flows and financial flows among all the participating organizations so as to ensure that the right product in the right place, at the right price, at the right time, and in the right condition. Supply Chain Management plays an important role in marketing of goods and services, supply chain has played major role across the world in varied sectors. Supply Chain Management not only helps to cut costs, but also adds to maintain and improve the quality of goods and services delivered. Where Rais M and Sheoran A (2015) [3] were also found their study that supply due to enormous waste during post-harvest storage and handling caused by improper bagging without crating, lack of temperature controlled vehicles, unavailability of cold chain facilities in various parts of country for preserving the produce. In marketing of vegetables, which are perishable in nature, Supply Chain plays a crucial role.

2. Objective of the Study

Hence the present study has been conducted with the following objectives:

- 1) To study the factors influencing the supply chain of brinjal

3. Methodology

The present study was carried out in the Darrang district of Assam. Darrang District is situated in between Kamrup and Sonitpur District. For better administration, The District of Darrang (undivided) had been created with effect from July, 1983 converting the erstwhile Sub-Division of Mangaldai. To identify all these factor the Darrang district was selected. In the district further considering the acquaintance of the investigator with the district it was decided to carry out the investigation in the district and to collect information from the Two Markets Kharupetia Regulated market and besimari regulated market. Two important markets viz Kharupetia and Besimari were selected and from the surrounding three villages were selected randomly from which bulk of products comes to the market. A simple random sample was drawn without replacement from different categories of farmer for detailed analysis. On the basis of operational land holding farmers were listed from each villages as marginal, small, medium, and large (Economic survey of Assam, Govt of Assam, 2014) [1] and appropriate sample size of 20 percent from marginal, small, medium and large farmer was drawn

respectively. Data collected through schedules and questionnaire's pertained to the year 2014-15.

3.1 Factor influencing supply chain

Data collected from various sources was subjected to arithmetic treatments were done. The chapter plan, tabulation models and data analysis were made as per objectives to draw inferences. Some statistical tools were also used to draw inference with time series data as well as primary level data.

The Cobb-Douglas functional form was used to analyze the influence of various factors towards rice marketing. In 1928, Charles Cobb and Paul Douglas presented the view that production output is the result of the amount of labour and physical capital invested. This analysis produced a calculation that is still in use today, largely because of its accuracy.

The Cobb-Douglas production function reflects the relationships between its inputs - namely physical capital and labour - and the amount of output produced. It's a means for calculating the impact of changes in the inputs, the relevant efficiencies, and the yields of a production activity. Here's the basic form of the Cobb-Douglas production function:

$$Q(L, K) = A * L^{\beta} * K^{\alpha}$$

To find out the influence of different factors on the marketing

	Coefficients	Standard Error	t Stat	P-value
Intercept	2.466029676	0.166612577	14.80098155	2.63455E-28
Assembling	0.027392871	0.053079857	0.51606904	0.606805717
Handling	0.252748446	0.048990081	5.159175952	1.05825E-06
Storage	0.031741118	0.036340042	0.87344748	0.3842554
Transportation	0.282942741	0.057641657	4.908650388	3.08252E-06
Post-Harvest loss	0.110966097	0.03561441	3.115764021	0.002321506*
Packaging	0.186153639	0.027907234	6.670443983	9.59365E-10

Multiple R = 0.980, R² = 0.961, Adjusted R² = 0.959, F-ratio = 5.887*

*significant at 1% level of significance, ** significant at 5% level of significance

The Cobb Douglas production function model was found to be best fit since the F-ratio was highly significant (at 1% level of significance). The coefficient multiple determinations (R²) was found to be 0.961 which indicates that the 96.1 % variation in the dependent variable was described by the explanatory variables included in the model. It was found that post-harvest loss cost have significant (P value < 0.01) contribution to total marketing cost of vegetables in Darrang district, while handling, transportation and packaging costs were not found to be significant factors to contribute for total gross output value where assembling and storage were found to be negatively contributing factor but insignificant.

5. Conclusion

It was found that post-harvest loss cost have significant contribution to total marketing cost of vegetables in Darrang district, so many post-harvest losses are direct results of factors before harvest. Fruit and vegetables that are infected with pests and diseases, inappropriately irrigated and fertilized, or generally of poor quality before harvesting, can never be improved by post-harvest treatments. Very often the rate of commodity loss is faster if the quality at harvest is below standard. Thus, the processes in the attainment and maintenance of quality from production, harvesting, handling and marketing must be considered a unified system. The success of preserving the harvest-fresh quality of produce demands control of each step in the system depends on the previous stop and therefore is a chain of interdependent activities. Deepak Hajoary (2016) [5] also found in his study

of rice a regression analysis was done to draw inferences on data. All the values are written in monetary terms (rupees). The regression equation is given below.

Cobb-Douglas production function was used to explain the relationship of input and output. Cobb-Douglas production function was used to estimate the factors influencing the supply chain of vegetable. The form of Cobb- Douglas production function was as follows:

$$Y = a AS^{b1} H^{b2} S^{b3} T^{b4} PH^{b5} P^{b6} eu$$

Where, Y, AS, H, S, T, PH, P are the values (in Rs.) of total marketing cost assembling, handling, storage, transportation, post-harvest loss and packaging. The intercept has been denoted by 'a' and 'bi' is the slope coefficient of the associated variable, where i = 1...6. All the values were converted into value term in per ton basis. Linear regression model was used after converting the value of variables into natural log.

The research has been divided into various themes according to the issues in the supply chain of brinjal like Assembling, Handling, Transportation, Post-harvest loss, Storage loss and Packaging.

4. Discussion and Results

4.1 Factor influencing the supply chain of brinjal

that Vegetable need to be stored carefully after harvest. Quality control technique for safety for vegetable has to be set up. The study and research conducted on the Supply chain of brinjal in Darrang district suggest that there is an improper supply chain management, lack of cold chain infrastructure and Food Processing units which are leading to maximum inefficiencies and resulting to losses and wastage of brinjal. Where Kalidas. K *et.al* also found in their study that supply chain management encompasses the planning and management of all activities. The entire supply chain of F&V is laden with the issue of post-harvest losses and wastages due to long and fragmented chain, dependency on intermediaries, poor road infrastructure, inefficient Mandi system, inadequate cold chain infrastructure facilities, high cost of packaging, poor quality of distribution, weak link in supply chain etc. which resulting to poor price realization of growers on one hand and exorbitant prices paid by consumers on the other end.

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