DETERMINANTS OF A LINEAR REGRESSION MODEL: A STUDY ON THE MARKET STRUCTURE OF A LOCAL BRINJAL VARIETY OF UDUPI DISTRICT

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Introduction:

Brinjal, a popular vegetable crop in India is primarily grown by marginal and small farmers. Brinjal is also the fourth important vegetable crop grown in India after Potato, Tomato and Onion. The total production of Brinjal in India in the year 2012-13 was 13,4,44,000 Tonnes, on 722,000 hectares of land. The Production of Brinjal in the State of Karnataka is 4,21,000 Tonnes grown on 373,000 hectares of land. (Year 2012-13, NSSO reports, 2014).

History of ‘Mattu Brinjal’:

A special variety of Brinjal named ‘Mattu Brinjal’ or ‘Udupi Brinjal’ is cultivated by around 150 small farmers in a place called ‘Mattu’ near Udupi. This special variety of Brinjal is believed to have a history of more than five hundred years. From time immemorial, Brinjal has been used as a vegetable in India. The reference of Brinjal is made in the renowned ancient Indian epic ‘Ramayana’. The Uttaradhyana sutra, the Prajapana Sutra and Jatakas, the ancient texts of Buddhists and Jains refer the existence and use of Brinjal (Om Prakash 1961). Brinjal is believed to have originated in the India Subcontinent (Paroda and Aurora, 1999). Brinjal was originally named as ‘Varthaku’ in Sanskrit and later went on to be called by different names in many languages. In India, it is known as ‘Baigan’ in Hindi and ‘Badane’ in Kannada. The term ‘Gulla’ seems to have evolved independently in ‘Tulu’, the spoken dialect of Dakshina Kannada and Udupi district of Karnataka. Due to its unique taste, the ‘Matti Brinjal’ has been assigned the Geographical Indication (GI) tag. The GI tag is a collective community tag and not an individual right. It is given to protect the geographical right and avoid misuse of geographical name. Such a tag will enhance the market identity of the famed ‘Matti Gulla’. Despite its exclusivity tag the awareness and availability of ‘Matti Gulla’ (Brinjal) is restricted to Udupi and Dakshina Kannada districts. In addition to limited distribution, another problem faced by the Matti Gulla growers is the right price for the produce due to the existence of middlemen. The efforts to expand markets to cities like Bangalore, Mumbai and the Middle East has not met with much success due to an inefficient marketing system.

Marketing woes:

Mattu Brinjal is grown on 110 acres of land. Even after satisfactory production and harvest, the farmers’ troubles do not stop after production. The farmers have to undergo the woes and perils of marketing. The
distribution channel is considerably long and involves many intermediaries. The consumers pay a very high price for the agriculture produce and the major chuck of the price is pocketed by middlemen.

**Figure 1: Distribution Channel of Mattu Brinjal:**

The first Mattu Brinjal crop is harvested in the month of October. During this period, the crop is big in size and the produce is less affected by pest attacks. The harvested crop of about 25-30 farmers is pooled together under the Mattu Brinjal Growers association to collectively command a better price from the wholesalers, who bargain on price. At the start of the season, the farmers command a good price. The price takes a decreasing trend as the season progresses and drops considerably at the end of the season in March every year. At the end of the season, the farmers suffer losses.

**Chart 1: Mattu Brinjal – Price* variations from farm to fork**
Source: Field survey, October 2015. * Price: Maximum price for each month under each category

Price variations are caused by the existence of middlemen. A typically long distribution channel is encountered when the produce is collected and transported by the wholesalers to Kundapura and Karkala Taluks. The wholesalers sell the produce to local agents in these taluks. The lengthiest chain comprises of 3 nodes, before it reaches the consumer.

Growers Association: It is very primitive to say that the intermediary linkages can be fully eliminated. Even though costs are getting escalated with no added value, it is a well-accepted fact that intermediaries are responsible for the creation of macro and micro markets, thereby being responsible for larger and wider markets. The intermediary and linkage system practiced in agriculture is imbibed in the Indian culture and therefore it is difficult to adopt western models like contract farming and co-operative farming with relative ease. Growers associations are existent in some villages of Udupi District. These associations function in a highly unstructured way with very less participating members opting for membership. Mattu, a small village in Udupi Taluk, which is popular for its famed Mattu Brinjal has about 200 farm families engaged in agriculture. The Mattu Brinjal growers association was formed in the year 2012 mainly because Mattu Brinjal was assigned a ‘Geographical Indication’ tag for its unique taste. The main objective of forming the Mattu Brinjal Growers Association was to gain the GI tag, which is only given as a community right. The benefits of a Co-operative model is however not reaped by the farmers of this region as 80% of the farmers are classified as small and marginal with the size of land holding of less than 2 acres. The farmers are unable to voice their opinion in decision making and therefore do not participate effectively towards the success of the cooperative movement.

Objectives of the study:

- To study the market and distribution structure of Mattu Brinjal in Mattu village.
- To design a model to quantify the impact of producer organizations on existence of physical markets and number of agents in the channel of distribution.
- To make suggestions based on the findings.

Materials and Methods:

The study is conducted through focus group interviews in Mattu village. A group of farmers of Mattu village and marketing experts from the Zonal Agricultural Research Station were consulted to identify the channel of distribution and study the methods adopted in the pricing of Mattu Brinjal at the farmers market. Regular meetings were organized with farmers of Mattu village to understand the existence of markets, the challenges related to pest attacks to crops, channel of distribution and the
impact of the existence of middlemen in the supply chain on the price of the crop. The Mattu farmers gather at the Mattu village school for meetings on regular occasions to discuss on various aspects related to production and marketing of Mattu Brinjal. A structured questionnaire was designed which included demographic and socio-economic details of the farmers. The data on the current marketing system, price of crops based on seasonality and harvest, existing of middlemen, the status of farmer’s affiliation to the growers association etc. was collected and analysed by using descriptive statistics. Pearson’s Correlation technique, Linear Regression analysis and ANOVA techniques were used to quantify the impact of producer organizations on the existence of physical markets and its related linkages.

### Table 1: Meaning and Measurement of variables:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Meaning</th>
<th>Labels</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affiliation status</td>
<td>The affiliation status of farmers to producer organizations</td>
<td>Individual – 1, Group-2</td>
<td>Nominal</td>
</tr>
<tr>
<td>Number of Agents</td>
<td>The number of nodes likely to be present in the distribution of Mattu Brinjal from farm to fork</td>
<td>Frequencies</td>
<td>Interval Scale</td>
</tr>
<tr>
<td>Existence of Markets</td>
<td>Lower number of farmers markets (a place where farmers meet consumers to exchange goods for consideration)</td>
<td>Yes – 1, No -2</td>
<td>Nominal</td>
</tr>
</tbody>
</table>

**Figure 2: Proposed Model**

Hypothesis Testing:

**Null Hypothesis:** \( H_0 \): Affiliation status of farmers is not dependent on Number of agents and existence of markets.

OR

\( H_0 \): The predictors Number of Agents and Existence of markets have no explanatory power on affiliation status.
Conclusion: The outcome of testing the proposed hypothesis would provide direction to design a well-structured market that will benefit the farmers. The impact of such design is to create more buyers for Mattu Brinjal by increasing its consumption. The hallmark of a good supply chain should be to reduce costs of operation and create value to the end user. Unfortunately, the agriculture sector in India is flawed by the existence of middlemen in the supply chain who add to the costs of the produce, but do not create any value to the consumers. The field of fundamental research and applied research is focused to find out the solution for the long persisting problem of the existence of middlemen. This study attempts to contribute to academic literature by proposing a model that directs the formation of Farmers Producer Organization (FPO’s).

References:


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**Sant Kumar, P.K Joshi, Surendra Pal, (2004)**

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R squared measures the variability in the dependent variable explained by the independent variables in a linear regression model. Adjusted R square measures the proportion of the variability