Reliability and Relationship Analysis in Creating Markets for Vegetables: A study of farmers in Udupi District

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Introduction:

The Agriculture sector in India has undergone a structural change in the past few decades. This change has been brought about by the ever increasing income levels of the middle class population, changing demographic composition, growing health consciousness and demand for balanced diet. There has been also demand for variety on the food plates and this has changed the production pattern of farmers. All this has been facilitated by information technology. Information flow today, is not separated by distance and therefore the change in tastes and preferences of the consumers are easily heard and implemented by the producer growers. These changing demands of the consumers has resulted in the farmers recognizing the significant growth prospects prevailing in agriculture.

Dairy farming, horticulture, fisheries, livestock, poultry, medicinal and aromatic plants and organic products come under the realm of agriculture. A concentrated effort in scaling up of these sectors is evident as production, consumption and trade of these products has seen a consistent rise in the past few years.

These changing trends calls for an efficient use of farm inputs and integration of supply chain. This change has been ably supported by information technology. Information technology has transformed the patterns of production, consumption and trade by facilitating integration.

India is the most populous country, second only to China. Seventy two percent of the population of India lives in villages and the entire village population of India is directly or indirectly dependent on agriculture for their livelihood. The farmers are not able to obtain a fair price for their produce and create access to markets because of complex market systems. The farmers are at the mercy of too many actors in the supply chain who add woes and inflate the total costs. On the other hand, the farmers face a lot of difficulties in the production and marketing of their produce in terms of availability of seeds and water, manure, improper rain etc. The initial investment related to ploughing and planting is also very high. Unfavourable policy formulation towards the farmers and lack of implementation of such regulations forces the farmers to exit mainstream farming. The ever increasing demand for agriculture produce, coupled with increasing purchasing power and a young demographic composition of India results in inflated costs. Consumer in India pays up to 200 % more than the farm gate price

for fruits and vegetables, a lot more than his counterparts in China and United States of America, who pay about 100 % more than the farm gate price.   (AIMA Journal 2014)

An Overview of Agriculture in Udupi District

Udupi District is situated in the state of Karnataka in India. It was created in August 1997. The three taluks Kundapura, Karkala and Udupi were separated from Dakshina Kannada to form a new District. Being on one of the oldest education centres, Udupi district is also famous for its cuisine. Udupi district is surrounded by Dakshina Kannada district in the South, Uttara Kannada in the north, and Shimoga district in the north east and Chikkamanglur district in the east. Arabian Sea is on the west coast of Udupi district.

As per the 2011 census, Udupi has seen an increase in its population by 5.9 % over the last decade. Its population is 11, 77,908 with a sex ratio of 1093 females for every 1000 males and a literacy rate of 86.29%.

Udupi District thrives in the cultivation of rice and coconut powder and is famous for arecanut gardens. Cashew is grown in all three taluks but briskly traded in Karkala taluk. Cashew nut is the major revenue earner for the District. Facts reveal that 80% of the exports are sent to U.S.A, 15% to the United Kingdom and the remaining 5% to Canada and Australia.

(http://www.udupipages.com/education/agriculture.php referred on 15.06.2015)

Vegetation is undertaken by farm families mainly in Kukkehalli, Kokkarne, Mattu villages of Udupi District.

Objectives of the study:

- To retain variables with higher internal consistency in the creation of markets for farmers.

- To study the scope for the application of marketing strategies for vegetables.

Materials and Methods: Kukkehalli, Kokkarne are Mattu are three prominent villages involved in the cultivation of vegetables. 126 farmers (**S. Senguttuvan, 2015**) were picked for the survey with 50 farmers each from Kundapura and Udupi Taluk and 26 farmers from Karkala Taluk on the basis of agriculture land under cultivation. A structured questionnaire was used to collect responses from the farmers to analyse the production and marketing related problems encountered by farmers of these villages. Percentage analysis has been used for the analysis of level of income, size of the land holding and channels of distribution and to analyse multiple responses for problems encountered by farmers in cultivation. Chi-square is used to test the relationship between size of land holding and farmers access to markets.

Farmers Profile – Udupi District

Table 3: Distribution of sample group by level of Income (Farm families)

Income in Rs. Per Annum	N	%
Upto 1,00,000	66	52
1,00,001 – 2,00,000	52	41
2,00,001- 3,00,000	6	5
3,00,000 & above	2	2
∑	126	100

Table 4: Distribution of sample group by size of land holding

Size of the land holding (In acres)	N	%
< 1	30	24
1 - 2	74	59
2.01 – 3	0	0
3.01 – 4	0	0
4. 01 – 6	16	13
6.01 – 8	6	4
∑	126	100

Table 5: Channels of Distribution used for sale of Vegetables

Channels	N	%
Sale through agents to Dealers	94	75
Direct to APMC	6	4
Direct to Consumer	16	13
Agent to Consumer	6	5
Agents and APMC	4	3
∑	126	100

Table 5 shows that 75% of the sale of vegetables in the district are through agents. This shows the domination of supply chain actors. This trend does not benefit the farmers and the consumers and the consumers spend more and the farmers get a very meagre share of the market price.

Supply Chain with too many participants:

Supply chain with too many linkages is the primary reason for escalated costs. Too many actors in the supply chain lead to increased costs **(Yarn Srimanee, 2011)**. **Amit Sachan (2003)** and **Raghunath (2001)** identified multiple linkages and too many actors as two main reasons for price escalation. These actors exist between farmers and consumers, inflate the price and benefit out of this game without adding value in the supply chain **(V Mani, Rajat Agarwal & Vinay Sharma, 2014)**. 81 % of the Households in Udupi District (Census, 2011) live in rural areas. The members of these households who are consumers of vegetables and fruits have access to vegetables that are grown locally. Vegetables which are a regular part of the daily diet like potato, onion and tomato etc. which are not grown locally are purchased by these rural consumers at escalated costs, mainly fixed by these actors. Support price which is fixed by the regulator i.e. Agriculture Produce Marketing Committee (APMC) remains only on paper and is not practiced. A high percentage of the interviewed farmers

opine that the price of vegetables is set by market forces. Thus, rural consumers are inevitably exposed to such supply chains which have too many actors or participants.

Table 6: Analysis of data with multiple category responses-Problems encountered by farmers in finding markets for the sale of vegetables

Sl. No	Problems encountered	Frequencies	Percentages (%)
1	Transport	32	25
2	Crop	22	17
3	Finding markets	34	27
4	Pests/insect attacks	92	73
5	Facilities (Water & Storage)	60	48
6	Labour	34	27
	∑	126	

* Total exceeds 100% because of multiplicity of answers.

In table 8 the percentages are computed on the total sample size of 126. If these percentages are added up, they would exceed more than 100 percent. This is because of the multiplicity of answers as respondents were given more than one answer. Major problems that the farmers face is due to pest attacks which reduces the quality of the crop, followed by facilities like water and storage.

Cooperative Model: 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 83% of the farmers are classified as small and marginal with the size of land holding of less than 2 acres. The famers are unable to voice their opinion in decision making and therefore do not participate effectively towards the success of the cooperative movement.

The farm community in Udupi district mainly comprises of small and marginal farmers. More over most of these farmers are not the owners of the land. They work in the fields of land owners for daily wages. The major threat for horticulture crops is the invasion of pests and insects. Fruit shoot borer, an insect pest is the most common threat to the crops, especially Brinjal, the chief crop grown in Udupi district in terms of Production. Farmers have limited knowledge about the type and frequency of fertilizer spray. The responsibility of training of farmers is undertaken by Zonal Agriculture Research Station, Kisan Vikas Kendra, Department of Agriculture, and Government of India. The Kisan Vikas Kendra has developed a new technology using silver coated material reflection, which restricts the entry of pests. Indifferent rain fall is another challenge faced by the farmers.

Farmers Speak:

"We are closely working with the Kisan Vikas Kendra, Zonal Agriculture Research station to re-define production". – **Mr. Lakshmana, Member, Mattu Brinjal Growers Association**

"The primary reason for the formation of the growers association is control of prices" – Mr. **Yashwanth, farmer, Mattu village**

Experts Speak:

"Farmers are ready to produce any quantity. Fetching a good price is important"- **Dr. Hanumathappa, Principal – In charge, Zonal Agriculture Research Station, Udupi District.**

"Fruits and vegetables grown in India find excellent markets abroad. Production is important, but creating markets are more important". **Dr. Dhananjay, Marketing expert, Zonal Agriculture Research Station.**

"Can't stop intermediaries as they are a link to the supply chain and facilitate increased sale. The most profitable preposition is to find means to increase consumption". **Dr. Dhananjay, Marketing expert, Zonal Agriculture Research Station.**

"Small plants are sown in the backyards of household kitchens and once they grow to a reasonable extent, they are planted back in the fields. This is a method adopted to avoid pest attacks".

Dr. Jayalakshimi Hegde, Pest attack and disease controller, Kisan Vikas Kendra, Zonal Agriculture Research Station, Udupi District.

Source: Focused Group Discussion of farmers and experts. July 14, 2014.

Cronbach Alpha for Reliability analysis:

Nine variables are used as indicators to study the scope for the application of marketing strategy. Each of these variables were measured using interval scale. The responses of 126 farmers were collected and Cronbach alpha co-efficient was computed to test internal consistency.

Reliability Statistics	
Cronbach's Alpha	N of Items
.767	9

Item Statistics			
	Mean	Std. Deviation	N
Access to Markets	2.00	.639	50
Area of sale	1.04	.198	50
Agents	1.48	1.111	50
Pest Attack	1.30	1.249	50
Market price	2.52	1.776	50
Support	2.02	2.005	50
Lack of Distribution facility	2.18	1.769	50
Lack of facilities	1.74	1.562	50
Lack of awareness in Technology	1.94	1.743	50

In general, reliabilities less than 0.60 is considered to be poor, those in the 0.70 range, acceptable, and those over 0.80, good. Thus, the internal consistency reliability of the measures used in this study can be considered to be acceptable for the scope for marketing measure as the internal consistency is 0.767.

Table 7: **Relationship between Size of Land Holding and Access to markets**

Access to markets as a construct is operationalized as very easy, somewhat difficult and very difficult to find markets to sell the vegetables. The responses of the sample group has been tabulated to perform a chi-square test.

Size of land holding	Access to Markets			Sample value of Chi-square	Accepted/Rejected Status
	Easy	Somewhat Difficult	Very Difficult		
Small	22	58	24		Rejected
Large	10	6	6	7.25	

Null hypothesis H_0: Size of land holding and access to markets are not related is tested. The resulting data is presented in table 6 above. The critical value of chi-square at 5% level of significance with 2 degrees of freedom is given by 5.991. The sample value of chi-square of 7.25 falls in the rejection region as the sample chi-square value is higher than the critical value. Therefore, null hypothesis is rejected and one can conclude that size of land holding of farmers and access to markets are related. This study also reveals that small farmers should pool their produce through an association and target markets. Such pooling will provide better control over prices through economies of scale. Specific to Udupi District, this cooperative model can be thought of for the Brinjal crop as it the single largest crop grown in the District.

Table 8: Affiliation status of sample group of farmers

Status	No of farmers	Percentage (%)
Individual	88	70
Group (Association)	34	27
Did not answer	4	3

Conclusion: Possible interventions are targeted to promote the interests of farmers. National Bank of Agriculture and Rural Development (NABARD) set up by the Government of India is promoting the incubation of Farmers Producers Organization (FPO). The main aim of setting up of FPO's in Udupi District is to involve farmers as a group in the procurement activity and thereby reduce procurement costs. A reduction in procurement costs would result in better prices for farmers cost. Such an intervention is also intended to link producer organizations to markets and increase farm income. Although the farmers in Udupi District are aware of the benefits a cooperative movement can bring to the Supply Chain, they are reluctant to participate, as any attempt made in this direction have not brought desired results. Farmer's interviewed say that finding markets is a difficult preposition. Besides this, activities which are part of the supply chain like transport, distribution and infrastructure facilities are adding to the farmer's woes. Marketing strategies can be implemented under two folds. First, creation of place and time utilities from the point of the dealers and organized retail for the creation of new markets. This theory is explained by the traditional concept of marketing. Second, understand markets by studying the tastes and preferences of the consumer. Thus marketing strategies for increasing the sale of vegetables is a matter of creating utilities by the seller and targeting these utilities for the buyer by creating appropriate market segments.

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