A STUDY OF SUPPLY CHAIN OF MANGO

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I. INTRODUCTION

In India, Mango is an important commercial crop. Indian mango are famous for their taste. Mango is a juicy stone fruit belonging to the genus Mangifera. The mango is native to South and Southeast Asia, from where it has been distributed worldwide and has become one of the most cultivated fruits in the tropics. The center of diversity of the Mangifera genus is in India(wikipedia)

Mangoes are produced in over 90 countries worldwide. Asia accounts for approximately 77% of global mango production, and the Americas and Africa account for approximately 13% and 10%, respectively (FAOSTAT 2007). Global production of the mango has doubled in thirty years to around 37 million tonnes (Mt) in 2010. On the Asian continent, India, where the mango is considered the king of fruits is the largest mango producing country. But the current supply chain of mango followed in India consists of numerous intermediaries starting from farm to fork. There are farmers, distributors, wholesalers, retailers etc., and then the produce reaches to the consumer. For regular domestic consumption, the mangoes from the field are sold in a regulated market authorized by government i.e. APMC market under the Agricultural Produce Markets Act (1939). The selling prices of mango is decided by open auction in the presence of an authorized APMC official. The commissions agents/distributors sell these produce to either wholesaler, retailers whoever buys from them and then it is further sold to the consumers. There are farmers who directly sell their produce to consumers and some farmers sell their produce to retailers without selling through APMC and going through middlemen. This has been observed that the mango supply chain is very complexly linked with numerous intermediaries. There are lots of wastage throughout the supply chain due to poor infrastructure linkage among the stakeholders. There is a big gap between price received by the famers and price paid by the consumers. There is a need of analyzing various supply chain channels followed so that the efficient out of those supply chains can be found out and proper step can be implemented to bring positive changes in the supply chain so that both the farmers and the consumers are benefited. Further, it is necessary to find out the important barriers for implementation of organized supply chain for mangoes so that those barriers could be eliminated to get a transparent, efficient organized supply chain where minimum wastage of mangoes could be there. The researchers have analyzed that due to the perishability and the seasonality character of fruits, mango growers want to avoid its marketing and the related risk of price and income variation (Padhi P. and Padhy A., 2014). Although the production of vegetables in India is one of the highest but it lacks an efficient supply chain due to which wastage is more (Kalidas, ***Sivakumar et al., 2011***). There is a significant role of Organized Retailers in Rationalizing Fruits and Vegetables Supply Chain in India (Veena A. and Venkatesha HR; ***Rajkumar P and Jacob F, 2010***). Majorly producers usually avoid the marketing of fruit by themselves as they do not want to be involved in the complication of the marketing system (Sarada Gopalkrishnan). Through this paper an effort has been made to identify the constraints perceived by various stakeholders in implementation of organized supply chain for Mango. Also an effort has been made to justify the need of improved Supply Chain in Mango.

II. RESEARCH METHODOLOGY & MAJOR FINDINGS

The data collection for the study was done through Primary data sources. Responses were taken from different parts of Delhi NCR region. The interviews were conducted at various places in Azadpur Mandi, Narela market in Delhi NCR region. A sample of 25 farmers, 25 distributors, 25 wholesaler and 25 retailers were selected through Random Sampling and included for the present study. Following observations were noted:

Table: 1 –Supply Chain Costs (source: primary data)

Sr.no	Market chain price in Rupees		Per ton (Rs.)
1	Price paid to farmer		10,000
2	Market cost borne by farmer		-
3	Price paid by pre-harvest contractor		10,000
4	Cost borne by pre-harvest contractor		
	Harvesting	2500	
	Loading	500	
	Transportation	3000	
	Wastage	300	
	Total	**6300**	
5	Profit of the pre-harvest contractor		8700
6	Net price paid by the wholesaler		25000
7	Cost borne by the wholesaler of the distribution market		
	Wastage	300	
	Loading & market fees	500	
	Total	**800**	
8	Profit of the wholesaler of distribution market		4200
9	Net price paid by the wholesaler of the consumer market		30000
10	Cost borne by the wholesaler of the consumer market		
	Wastage cost	200	
	Loading & travel cost	800	
	Total	**1000**	
11	Profit of the wholesaler of the consumer market		3000
12	Net cost paid by the retailer		35000
13	Cost borne by the retailer		
	Travelling	800	
	Wastage	50	
	others	500	
	Total	**1350**	
14	Profit of retailer		13,650
15	Net price paid by the consumer		50,000

The supply chain for mango can be studied and detailed as below. The margin for an ownership level is calculated using the values of the buying cost, selling cost, cost of value addition on the date of observation and the loss at that level.

2.1 Supply Chain of Mango during Peak Season (March-April):

In India, Mango is harvested mostly during the months of March and April. A part of the produce is then directly sold in the markets. The most common supply chain for mango during peak season (March-April) can be represented by the chain map in Fig.1

Following points describe in detail the chain maps during peak season

- Before selling the produce at the market, farmer invests in grading, packaging and transportation of the produce to the market.
- In peak season, the farmers sell their produce to local agents on predetermined price as per the contract or agreement done before the season arrival or harvesting or Farmer itself take their produce to the shop of the commission agent in the market area who facilitates the sale of his produce by means of an open-outcry auction
- In off season, the produce from the farmers is acquired by an aggregator who takes the produce to the cold storage. The aggregator takes advantage of the higher prices in the off season. Which leads to the higher price market for consumer and lesser profits for the farmers.
- The produce from the APMC markets in the peak season is acquired by the wholesalers who transport the produce from the market yard to their premises and sell the produce to the retailers.

III. BOTTLENECKS IDENTIFIED IN MANGO SUPPLY CHAIN

Mango Supply Chain is having various inbuilt constraints and bottlenecks throughout. There is uneven Price Spread throughout the chain. A big difference can be noted between the margin share which farmer is receiving and the amount which Consumer is paying. At each stage or channel, price escalation overshadows the extent of value addition. There are various apparent and non-apparent problems at the each level of Supply Chain, which actually impacts the Supply Chain. Few of the problems in this context may be discussed as follows:

a) Access to Quality Inputs at affordable prices: Firstly, there is shortage of good quality inputs and even if they are available the prices are not affordable for farmers most of the times. Farmers are using below average inputs, which therefore impacts the output.
b) Low Adoption rate of Advanced Farming Technologies: The level of adoption of modern technology was observed to be very low. There can be various obvious reasons for the same. One out of them is small size of land holdings. In most cases farmers relied on mass media (TV/Radio/Newspaper) or other farmers for accessing information ***(World Bank, 2007).***
c) Ineffective Agricultural Produce Marketing Commissions (APMC 's): Presently the status of APMCs in India is not an efficient one. They lack adequate infrastructure facilities and transparent Pricing Methods. Collusion between traders or agents, as is found several times, negatively impacts a farmers profit or share in selling their produce.
d) Low Extent of Processing: Very less quantity of Mango crop actually is being utilized for processing purposes. Unawareness, Small landholdings, below average quality produce actually become hindrances for growth of processing in this sector.
e) Inadequate Logistic Support: Infrastructure support in terms of Warehousing,Transporation, Grading-Sorting, cold storages etc. lacks hugely in India. Huge gaps in requirements and availability of Efficient Logistical Support, hampers the sector.
f) There is very poor Risk Management Techniques adoption in Mango Supply Chain.

IV. RECOMMENDATIONS

The margin analysis for mango supply chain for peak season points towards widespread exploitation of the farmers in the current state of the supply chain. The supply chain is dominated by numerous intermediaries who do not add significant value along the chain but add a lot to the final price. The situation is further aggravated by a very little bargaining power of the farmers who in absence of a transparent pricing process are unable to receive a fair price for their produce. This is supported by the margin analysis presented in the study. For an effective overhaul of the supply chain towards a more efficient system, several measures have been recommended in the study.

4.1 Promotion of Expansion of Organized Retail

In many developing countries where the share of organized retail is much higher it has been observed that the efficiency of the supply chain has improved greatly. The supply chain of mango is unorganized due to which there is great efficiency reduction in both aspects quality and quantity. The biggest concern of the policymakers in enforcing such legislation has been the impact of organized retail on the unorganized sector. However it has been established through research that unorganized retail has maintained employment levels in presence of organized retail perhaps as a result of competitive response ***(Indian Council for Research on International Economic Relations, 2008).*** With increase in the organized mango supply chain there will be need of manpower to function this organized sector which will result in the generation of many jobs.(a) Direct procurement of farmers will lead to increased returns to farmers on account of bypassing of numerous intermediaries in the supply chain. As in most of the cases the intermediaries earn more profits with very less or no value addition; direct procurement will result in increase in efficiency of supply chain. (b)The organized retail outlets will work directly with farmers to improve yields by enabling them to obtain quality input supplies, modern farm technology and timely credit at reasonable interest rates.(c) They will invest heavily on logistics such as cold storage, warehousing, transport and distribution either directly or through third party logistics. (d) These outlets will create employment for both skilled and unskilled workers.(e) A higher share of organized retail will boost the tax receipts of the government. (f) Organized retail will help to have good traceability of mango processed food products.

4.2 Promotion of Associations of Farmers and Small Retail Outlets

Organizing farmers into larger producer groups can benefit the entire value chain. These groups will then better be placed in terms of collective pre and post-harvest management, reduced transaction costs and higher bargaining power. The government can also encourage small retailers to come together to form cooperatives which can then undertake direct procurement from farmers.

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