SUPPLY CHAIN MANAGEMENT ISSUES KASHMIRI APPLE

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1.1. Introduction:

The Apple (Botanical Name of Apple is malus domestica) is one of the principal fruits, grown in temperate region of the world. It has colourful appearance, crispy flesh, pleasant flavour and sweet taste that attract the consumers and fetch good price. Apple is mostly grown due to its high economic value and mostly grown in drained rich sandy loamy soil (Fiala, 1994). Major part of the production is consumed fresh and smaller part of the production is processed for juices, jellies and other jam items. Mostly the Indian apples are grown in three regions Jammu & Kashmir, Himachal Pradesh and Uttarakhand where they are cultivated at an altitude of 4000 to 11000 feet. Jammu & Kashmir and Himachal Pradesh have roughly equal production area for apple, but J&K has the higher average yield (output), which accounts to 67 percent of total apple production in India. (Anonymous, 2003). Jammu and Kashmir is the major apple producing state which produces about 1.33 million tons per year and is exported to Middle East, Gulf and East Asian countries through state marketing intermediaries (Javid & Banerjee, 2003). Its cultivation is done in all the districts of Kashmir valley and major share to the apple production comes from Baramulla, Shopian, and Pulwama. In the state GDP (J&K) agricultural share is 19.35 percent in the year 2011--12, whereas share of apple industry to SGDP was 8 percent in 2013--14 (Anonymous, 2013; Arjun, 2013)).

1.2. **Medicinal Properties:**

In India under the medicinal value category, the apple is widely used as a stimulant for heart and acts as purgative. It also prevents constipation, reduces incidence of dental caries, helps to control obesity and supplies extra energy for heavy exercise (Mitra & Rathore, 2004). The old saying "an apple a day keeps the doctor away" has been reconfirmed as the pulp of apple fruit has been found to be the second richest source of photochemical like quercetin, catechin, phloridzin and chlorogenic acid, all of which are very strong antioxidants and reduces the risk of some cancers, cardiovascular diseases, asthma and diabetes (Block, et al, 1992). Apple consumption has been inversely linked with asthma and has a been positively associated with general pulmonary health (Woods et al, 2003). Not only may apples help decrease the risk of heart disease, cancer, and asthma, but is also associated with a lower risk for diabetes (Knekt P et al, 2002). This helps to remove harmful wastes from the bloodstream and can lower the diabetic's insulin requirements. Apple and pear intake has been associated with weight loss in middle aged overweight women in Brazil (De Oliviera et al, 2003; Boyer & Liu, 2004).

1.3. Critical Issues In The Supply Chain Apple Industry In Kashmir::

Supply Chain Management (SCM) is basically an extension model of systems model where in input, process and output stages are discussed. In value chain analysis, the service providers and manufacturers that work together in order to move goods from the stage of raw material to completely finished goods to the end user (consumer) (Peter Singe, 2010). **1.4.1.Input issues:**

a) Lack of Diversity: The area covered under delicious variety in Kashmir valley is 45 percent (Ghosh, 2001).The practice of monoculture in the apple orchards leads to spreading of various diseases to the plants. Since all plants in a monoculture are

genetically similar, if a disease strikes to which they have no resistance, it can destroy entire populations of plants. Studies have shown that adding diversity in planting of different varieties of trees in the same field to be effective in combating diseases (Zhu & Youyong, 2000). A variety of different cultivars are often planted in orchards to increase the resistance against diseases. It has been found that the highly disease resistant apple variety i.e. Maharaji apple hardly visible now in the orchards. Less diversified apple trees are prone to many diseases and attacks by variety of rodents. The farmers are not aware about this problem and they do not have any idea about diversity and the importance of pollination in the orchards.

b) Lack of Pollinators: Pollination management is an important element of apple production and before planting it is important to arrange for pollinizers (varieties of apple which provide viable, compatible and plentiful pollen). During the bloom season, commercial apple growers usually provide pollinators to carry the pollen. Honeybee hives are commonly used in the United States, and other European countries. The most common pollinator for apple trees is of the genus 'Apis' of honeybees (McGregor & Samuel, 1976). Inadequate pollination not only reduces apple yield, but also increases premature fruit drop which leads to poor quality. The main solution to this problem is to place single trees of a selected pollinizer cultivar, or crab apple trees, as they serve as universal pollinizers within the rows. Well pollinated apples have best quality and will have seven to ten seeds (Hartman & Howlett, 1954).

c) **Lack of Proper and optimised spray of Pesticides**: Fruit growers ignore the value of authorized and approved pesticides. Moreover, overdose and inefficient spray of pesticides affect the quality and quantity of apple. Application timing of chemicals can influence its efficacy (Jones, Bound, & Miller, 1998). Kashmir valley is dominated by marginal holders, about 70 percent having orchard holding up to 2 hectors, with an average size of land holdings of 0.53 hector (Anonymous, 2006). Apple scab diseases, outbreak of premature leaf fall and infestation of red spider mite, have declined the quantity as well as quality of the fruit. It is now recognized that virus and virus like disorders mainly contribute in reducing the yield in apple to 4 to 6 tons/hector in India and 40 to 60 tons /hector in developed countries (Bhardwaj et al, 1992).

Climate, soil and water requirements, and plant density are the most important factors which need to be considered before cultivating apple trees in a given place (Abu Goukh et al, 1983). In addition, the practice of pruning in summer is negligible in the valley. Pruning in summer improves light penetration, enables fruit colour and promotes flower bud formation (Utermark, 1977; Robinson, 1994). In establishing an orchard there should be optimum spacing to accommodate maximum number of trees per unit area, but the branches should not interlock (Kumar, 1997). Poor inputs (water, seeds, fertilizers, agricultural tools) have significantly lowered the production of apple fruits. The size of fruit, its attractiveness, flavour, and pleasing texture all depends upon good quality of raw materials and inputs (Looney, 1993). Inputs available to the growers here are primitive compared to those found in developed countries (Kumar et al, 2004).

1.4.2. Processing stage issues:

At the peak season of harvesting, the scarcity of apple boxes put producers at a huge risk because of perishable nature of ripe fruits. The delay in the fruit harvesting leads to over maturing of the fruits. Apples harvested at more mature stage have shorter shelf life (Meredith et al., 1989) and did not ship well because of reduced shelf life (Murray et al., 1998). In Kashmir valley there is still traditional, informal and non-registered sorting and grading system prevailing. Adequate light distribution is an important factor influencing apple yield and aspects of fruit quality such as size and

colour (Wagenmakers & Callesen, 1995). In China sunlight reflectors are used. In Australia it has become common practice to cover apple orchards with hail netting to protect fruit from damage with hail storms (Proctor & Lougheed, 1976). Enclosing apple fruit in protective bags during development has been practiced in Japan for many years (Ibid). In Kashmir there are no such technologies available for the farmers. Moreover; many marginal apple growers are having the problem of improper labelling and non-registered trademarks.

1.4.3. Output stage issues:

There is an acute shortage of affordable cold storages at the farm level and refrigerated storages at the markets and ports. In Kashmir there are couple of cold storage facilities available and is costly for a marginal farmer. In addition fruit diameter, weight, volume, firmness, elements of sodium and potassium, quality and colour surface is significantly affected by different cold storage temperatures (Khorshidi et al, 2010). Moreover, extended storage of apple fruit may cause enzymatic browning accompanied by unpleasant colours and flavours and a loss of nutrients (Goupy et al, 1995).

There is no proper quality control mechanism in the valley which would have maintained the quality of apples being exported outside. Retailers and wholesalers consider that there are four main quality problems with apples_ immaturity, over ripeness, poor grading, marks and blemishes. In the Kashmir the shipment of fruit to the wholesale market by unrefrigerated trucks, growers have the option either to sell at prevailing price or paying for storage in the hope of getting higher price in future. Moreover, truck transport is costly as there is no train connectivity from Kashmir to Jammu.

In the valley, marketing is mainly controlled following unfair practices at different wholesale fruit markets (mandies) of the country, which is universally objectionable (Javid, 2004). The dominance of middlemen ship, especially commission agents in the current supply chain of apple fruit has negatively affected the income of growers. Neither farmers cannot control nor has government taken any step to regulate the whole marketing system of apple fruit. Price risk is faced by growers and contractors, since there is no guarantee of minimum supporting prices and increasing trend in the market price of the fruit. In the valley it has been seen that there is collusion among middlemen and apple merchants to control prices, hence exploitation of marginal producers is a common practice. Moreover, due to non-regulated market producers face various malpractices such as deduction of undue charges, quoting of lower price than actual, high commissions by the intermediaries. Consequently, the growers are not able to frame a feasible marketing strategy.

1.5. Conclusion and suggestions:

Supply chain management may be a powerful tool in linking marginal farmers to the markets for sustainable income generation. Proper cold storage facilities should be provided at ease to growers in order to reduce the carriage costs. There is poor technical awareness among fruit growers regarding modern technological interventions adopted at the international level. Horticulture department of the valley should provide the knowledge and technical training to the farmers. There is need to brand Kashmiri apple at the national and international level so that the originality of fruit is traced from Kashmir region. Moreover, the market rate of apple fruit fluctuates, and it should be supported by Minimum Supporting Price (MSP) fixed per kg or per box on year to year basis by the government so that the marginal apple producers are sure of the minimal value in case of market downfall. As apple industry is one of the major foreign exchange earners of the state, it should be uplifted on the

lines of SEZs. At the micro level, pruning methods, degree and timing should be done with the help of experts and proper training needs to be provided by the horticulture department of the state at the Tehsil and Block level. As fruit growers in the valley are not aware about pollination and its benefits for the overall orchard health and management, they need to consider strongly beehive pollination, as it acts as a resistant against harsh weather conditions and deadly diseases by cross pollinating highly disease resistant variety (e.g. Maharaji) and highly disease susceptible apple (e.g. Delicious) variety.

1.6. REFERENCES

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