ISSN: 2395-1664 (ONLINE)
DOI: 10.21917/ijms.2021.0217

INVESTIGATION OF SUPPLY CHAIN MANAGEMENT IN AGRICULTURE FOR MANGO CROP

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Abstract

In this paper, we provide the data of supply chain management of agriculture product namely mango fruit. The study shows how well the product is undergoing supply chain management from field to user via various chains. The study presents how well the supply chain management makes an effective delivery of product with series of chains in supply chain management. The study also takes into concern the activities that coordinates with the enterprises to deliver the product to customer by meeting various demands like quality, quantity and cost. The study takes into concern the deepest interactions of all the levels of supply chain in delivering the product to the end user.

Keywords:

Supply Chain Management, Agriculture Product, Mango Fruit

1. INTRODUCTION

When it comes to supply chains, the acquisition of raw materials, the production of finished goods, and delivery to end customers are the primary concerns for supply chain member firms [1]. Information-driven, integrated supply chains are allowing companies to cut inventory and expenses, enhance product value, extend resources, speed time to market and retain consumers [2].

The true test of a successful supply chain is how well all the operations in the chain work together to deliver value to customers while also boosting the profitability of each link in the chain [3]. To put it another way, supply chain management refers to the entire process of delivering value to the end user or customer [4].

India agricultural supply chains, however, face numerous difficulties due to the country fundamental concerns. A variety of agricultural supply systems in the country are influenced by a variety of sartorial concerns, like the dominance of small/marginal farmers, fragmented supply chains, and the absence of scale economies [5].

In the early stages of processing-based supply chain management (SCM) success, decreased inventory and faster response times to customer requests for products and services led to improved interactions between warehouses, transportation, and other departments inside firms [6].

When various functional groups inside organisations joined forces to combine manufacturing, procurement, transportation, distribution, and marketing in order to compete in the marketplace efficiently, supply chain management was born [7]. Telecommunications and other technological advancements made it easier for information to flow across functional areas between companies at this stage, making it easier for companies to collaborate [8].

1.1 AGRICULTURE SUPPLY CHAIN COMPONENTS

In agriculture, supply chain management (SCM) refers to coordinating the activities of enterprises that produce and deliver products from the farm level to customers in a way that meets consumer needs in terms of quantity, quality, and price [9]. Management of both horizontal and vertical alliances, as well as the interactions and processes between companies, is typically a part of this.

Economic systems, such as agricultural supply chains, spread the rewards and hazards of participating in them. To ensure that manufacturing and delivery commitments are met on time, supply chains have developed internal processes and chain-wide incentives [10]. As a result of the information exchange and mutual scheduling, as well as assurances about product quality and promises of volume, they are linked and interrelated.

Value is added to agricultural goods through process linkages, which necessitate the coordination of the activities of each participant in a continuous improvement process. The actions done or not performed at other links in the chain have a considerable impact on the costs incurred at one link [8]. Key control operations, including forecasting, buying, scheduling, production and processing programming, sales promotion, and new market and product introductions, all necessitate extensive pre-planning and coordination.

1.2 COORDINATED SCM IN INDIA

There are many changes taking place within the agro supply chains in India as a result of globalisation and other internal shifts, such as a growth in disposable income and an increased preference for more high-value food items like fruits and vegetables in people food baskets. Legal reforms have been implemented by government agencies in response to the country agriculture economy new difficulties, lowering various entry obstacles to boost coordination of supply chains and traceability.

The APMR Act, India most important agricultural marketing law, has been updated to include measures to encourage contract farming, direct selling, and the establishment of private markets (hitherto banned). It is hoped that these initiatives will help small businesses gain economies of scale by establishing direct links between farmers and processors, exporters, retailers, etc. As a result, the policy will enable the development of integrated supply chains for a wide range of agricultural products [11].

1.3 CHANNELS OF MARKETING

It is good to look at the current market channels for specific commodities while researching supply chain management challenges in the agriculture sector. Fruit and vegetable marketing

in India varies greatly by commodity and state, but the overall process is extremely time-consuming and fragmented.

A lot of fruit and vegetable output goes through wholesale markets, although farmers may sell directly to traders at the farm gate or at village markets, or to processors, co-ops, and others depending on the state and commodity.

2. COORDINATED SUPPLY CHAINS

In the last few years, India has seen a rise in fruit and vegetable supply chains that cater to both the domestic and export markets. Large supermarkets, supermarkets, and other organised retailers in metropolitan areas have mostly driven this movement on the home front. Quality and safety regulations in several export markets have sparked the development of specific export chains.

With the help of a well-structured supply chain, clear requirements on what and how much to create, the time of delivery, quality and safety criteria, and price may be established. When it comes to business partnerships, information exchange is common, along with aid with technology and finances. Modern food markets, especially those dealing with fresh and processed perishables, benefit from supply networks that are coordinated. [13] These chains can be used for process control, which is better than merely controlling at one end of a supply chain.

Supply chain management systems and infrastructure with an emphasis on quality and safety are being developed by a number of Indian firms. Fresh produce retailers that buy directly from farmers or grower groups through various formal and informal contractual arrangements are becoming more prevalent. Rural areas have constructed collection-cum-grading facilities with all produce flowing through a single distribution facility equipped with contemporary infrastructure, such as cold storage, ripening rooms, and controlled environmental chambers. Agronomic and post-harvest techniques are regulated, and growers are typically given inputs and technical assistance.

Due to legislative developments in India, such as the Model APMC Act, contract farming for fruits and vegetables is already widespread and is expected to grow further. Contract farming was previously illegal in most states, and there was no legal structure for enforcing contracting agreements. The APMC Model Act includes a new chapter on "contract farming" that provides for the registration of contract purchasers, the recording of contract farming agreements, and time-bound dispute resolution methods for contract farming agreements. Contract farming agreements are exempt from market fees, and farmer land is insured in the event of a dispute to protect against the loss of land in the event of a lawsuit. Now, contract purchasers can lawfully acquire goods from farmer markets or through individual purchase contracts. Farm food can also be sold directly to contract purchasers from farmer fields without passing through notified markets as part of the regulation.

More terminal markets based on contemporary infrastructure are being established. Multiple options for farmers to sell products, such as computerised auctions and direct sales to exporters, processors, and retail chain networks under one roof, would be offered by MTMs to link farm supply with purchasers. Additional storage facilities would be provided to allow participants the option of trading at a later date. As part of the one-stop solution, it is expected to include logistical support, including transportation and cool chain support; warehousing; packaging and palletizing facilities; and support for farmers in the form of extension assistance and advice.

Agricultural supply chains for perishables are depicted in the model through the use of MTMs. To preserve product quality in their supply chain, chain participants are unable to control and command each other in the current system of fragmented and ill-functioning agro-supply chains. An integrated command, high-quality produce from farmers organised into groups, and access to the market through contemporary terminal market complexes will prove to be beneficial.

Where there are economies of scale in production or marketing, the need for collective action (CA) in the agri-supply chain develops. To this end, farmer cooperatives play an important role in improving traceability. The expense of establishing traceability for businesses and farmers in these chains is reduced when concerted action is taken. Individuals in supply chains have various comparative advantages; therefore, collective action makes sense. Because of this, a group of producers that have a competitive advantage in production could profit from working with marketing experts.

Shorter and more direct supply chains with traceability are likely to become increasingly widespread as a result of increased private investment in the food retail sector and changes in contract and marketing rules. India food retail sector modernization will have a direct impact on the occurrence and spread of coordinated supply chains. Compared to other emerging countries, the pace of development in the food retail industry has been modest so far.

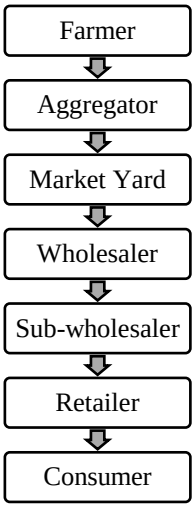

Fig.1. Changing SCM with Organized Retailing

The procurement policies of supermarkets for fruits, vegetables, dairy, and meat have a significant impact on supply chain organization as in Fig.1.

Consumer demand and competition in the fresh produce supply chain in Asian countries are driving the rapid evolution of procurement systems in this sector, which are adapting quickly to meet the needs of consumers.

Several players are now assisting various retail chains in meeting their sourcing needs, in addition to retailers who are located in rural areas sourcing farm products. In order to take advantage of economies of scale and expand across the country, the new partnerships would be beneficial to the organisation.

3. CHALLENGES OF SCM IN CASE OF PROCESSING UNITS

- **Power Supply**: Fruit and vegetable processing is largely seasonal, with processing taking place during the peak arrival season. Fruit and vegetable processing plants typically run for 120–150 days a year on average. Because the bulk of the processing is done during peak arrival season and the processors require fossil fuels to provide power, a lack of power during this peak processing season results in a high cost of processing. The perishability of fruits and vegetables compared to other agricultural products like rice and oil seeds makes the problem even more problematic.
- **Minimum Demand Charges**: In the fruit and vegetable processing business, which is very seasonal, the demand for electricity does not remain constant throughout the year. There are numerous reports of processing units having to pay minimum demand costs based on the connected load, which results in an additional cost to processed products during a field survey.
- **Labour Laws**: Due to the seasonal nature of this sector, units must operate in all three shifts while raw materials are readily accessible. Compliance with labour standards pertaining to the number of hours worked by female employees and the number of days off they are entitled to each week is proving difficult for processors.
- **Quality Testing**: Large cities like Hyderabad, Bangalore, and Chennai have the majority of quality assurance labs recognised by clients, while the processing plants are based in rural areas. As a result, samples are transferred to far-off cities for more complex examinations like pesticide residue tests, which incur more costs and take longer to complete.
- **Incubation Centre**: No common facility centre is designed to assist new entrepreneurs in setting up processing units, lowering the initial costs of installation and allowing new enterprises to focus their energies on developing a new product or a new market.The state does not have any incubation centres to assist businesses in creating new goods or finding innovative solutions to problems that already exist.

4. CONCEPTUAL MODEL

Based on the results of the identification and analysis of actors participating in the mango supply chain, a number of key players or stakeholders were identified. This group of people has a variety of goals and interests in mind. Conflict can arise as a result of competing interests and goals. On one hand, the government aims to increase mango production to raise state revenue, but environmental NGOs are continuing their efforts to thwart these efforts. Even more problematic, there is a lack of synergy between NGO efforts to collect data for farmers as well as government efforts to support their growth and development. Aside from financial institution encouraging farmers to take out loans, it is difficult for farmers to get access to cash because of the existence of collateral loan requirements.

An important difficulty in Indonesia mango industry was identified in the supply chain mapping results: traders, primarily collectors and major traders, exerted a significant effect across the mango distribution chain. Farmers receive low profit sharing because traders control the product price in the conventional value chain, whereas cooperatives take on the distribution role in the fermented value chain. By comparing the certified value chain to the fermented one, producers have an advantage in the product market price negotiations. As a result of these findings, a conceptual model for a long-term mango supply chain has been established, with the goal of generating sustainable production for the owner.

A measurement or indication of the supply chain attainment of sustainability is needed to monitor sustainability along the supply chain. The identification of indicators for measuring economic, environmental, and social aspects yields a number of indicators mostly connected to environmental issues for use in sustainability measurement. Climate Change Potential (GWP) was available throughout the mango supply chain. It was determined that a new productivity metric in the transportation chain was needed, and that indicator was found to be the tonnage per day of chocolate that can be delivered effectively by vehicles. This review paper did not find a social sustainability indicator for mango. Agricultural bulk logistics studies in Germany [14] used variables other than mango to assess social sustainability. Although the criteria included factors such as health and safety and the effect of the industry, this measurement did not include indicators. Environmental factors dominated the mango sector, whereas social indicators were few. Conceptual models are built from data gleaned via multi-actor analysis, mango supply chain mapping, and indication identification.

With the goal of providing a clearer image of the complexities involved in managing Indonesia mango supply chains, we devised a conceptual model to represent the sustainability of the industry. According to the conceptual model, the government goals are to increase mango harvest yield, reduce environmental effects, and raise farmer income. Economic, environmental, and social sustainability can only be achieved when the many stakeholders work together. Incentives, help, and the issuing of regulations are some of the ways the government, as the public owner, fosters goal achievement. Farmers, grinder processors, and manufacturers are intended to be able to achieve a unified aim, which is production sustainability, as a result of these interventions.

5. CONCLUSION

The depth of service integration depends on the level of trust and information exchange across the supply chain participants. Big businesses, in their efforts to integrate various activities vertically and horizontally, often wind up devouring the smaller ones. As a result, the system and process must be strengthened so that necessary synergies can emerge to benefit all parties. The government should play its role as a facilitator to the fullest in order to support the development of professional agri-supply management of different agricultural products.

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