

ANALYSIS OF ROSE CUT FLOWER SUPPLY CHAIN

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Abstract

The study was undertaken with the overall objective to analyze the supply chain for rose cut flower in Krishnagiri district. The study was undertaken to examine the current practices in supply chain of Rose cut flower, to conduct value chain analysis for Rose cut flower, to identify the major constraints in supply chain of Rose and to suggest suitable strategies for efficient supply chain management of Rose. The study was conducted in Ooty, Coonoor and Kotagiri Panchayat union in Krishnagiri district as it occupied the major area in the production of hi-tech cut flower like rose. A sample of 30 farmers, 25 intermediaries was selected from the study area by simple random sampling method. Data were collected from sample farmers by personal interview with the aid of a pretested interview schedule and published sources. There were four supply chains existing for marketing of rose cut flower. More than eighty five per cent of rose moved from Krishnagiri to Bangalore through channel I, II, III and IV. Large farmers used channel II alone for sending their produce to Bangalore. Marginal and small farmers to sell their produce predominantly used I, III and IV. The producers expressed that the high cost of imported planting material was the most important problem followed by pest and disease attack. The intermediaries expressed lack of quality as the most important problem followed by lack of consistency in supply. The other problems were high handling cost, poor storage facility and high transport cost.

Key Words : Supply chain, Value addition, Marketing efficiency

In Tamil Nadu, Krishnagiri district has the major share of hi-tech cut flower production, due to its comparative advantage for hi-tech cut flower production. Hence, Nilgiri district has been declared as the “Agri-Export Zone for Flowers” by the Government and supported by APEDA. The comparative advantage emanates from suitable quality of arable land and climate, very good connectivity by road to surrounding major cities like Bangalore, Coimbatore and Chennai which have good connectivity by airways to major destinations across the globe. The flowers produced from these districts are of world standards, fetching premium price in the domestic and international markets.

Major cut flower crops successfully grown in Krishnagiri are carnation, Rose, Alstroemeria, Limonium, Chrysanthemum, Gerbera, Anthurium, Gladiolus, Bird of Paradise, Statice, etc. Out of these cut flower crops, Carnation and Roses are cultivated in large hectareage in Krishnagiri because, these flowers produced from this region are best in the country and can be compared with the best grown in any part of the world has been valued for its wide array of colours of flowers, excellent keeping quality and ability to re-hydrate after continuous transportation.

Hi-tech flower production

In Krishnagiri district Rose is cultivated in poly green house. The size of the poly green house varied with the size of holding, because of higher capital investment. Marginal farmers constructed poly green house of 1600 sq.m whereas small and large farmers constructed 3200 sq.m and 6400 sq.m poly green house, respectively. Subsidies were given by various agencies such as State Department of Horticulture (poly house, drip irrigation, shade net etc.), National Horticulture Board (planting material, cold store etc.), Hill Area Development Programme (for poly house, planting material etc.), Agriculture and Processed Food Products Export Development Authority (for air freight and shade net subsidy for export) etc., for establishment of poly green house. Materials for poly green house were available with local suppliers and it was erected by local labourers. With the aid of mist chamber and blowers, microclimate in the poly green house was maintained. Fertigation and irrigation was done through drip irrigation system. The capital required for erecting poly green house for marginal farm was estimated to be Rs. 16.06 lakhs whereas for small and large farms it was Rs. 18.60 and 24.06 lakhs, respectively. Rose bulbs were imported from Holland (stored at -1.5°C in dark) and bulb was being grown for cut flowers once in its life time.

Supply chain (SC)

Large contingents of management experts have expressed their understanding of supply chain and supply chain management. Christopher and Martin (1993) stated that supply chain represented an intricate network of suppliers, distributors and customers who shared carefully managed information about demand, decisions and performance, and who recognized that success for one part of the supply chain meant success for all. Beamon (1999) defined that supply chain as an integrated process where raw materials were transformed into final products and delivered to customers. Hicks (1999) stated that supply chain as a systematic effort to provide integrated management to meet customer needs and expectations from the suppliers of raw materials through manufacturing to end customers. A supply chain typically consists of inbound distribution or logistics, firm operations, outbound distribution or logistics, marketing and channel value chain. These activities are supported by purchasing or procurement, research and development, human resource management and infrastructure. On comparing views of the experts, it could be summarized that the supply chain represents a sequence of operations from production until and processes along the chain, under the delivery of the final product to the consumer. It includes input suppliers, producers, processors, packers and movers, wholesalers, traders, retailers, and export/import distributors.

Supply chain management (SCM)

According to Kotler (2004) supply chain management started earlier than physical distribution with attempts to procure the right inputs (raw materials, components, and capital equipment) and convert them efficiently into finished products; and dispatch them to the final destinations. According to Chase *et al.* (2005) supply chain management is a total system approach to manage the entire flow of information, materials, and services from raw-material suppliers through factories and warehouses to the end customer. Fantazy *et al.* (2010) defined supply chain management (SCM) as an integrated approach beginning with planning and control of materials, logistics, services, and information stream from suppliers to manufacturers or service providers to the end client and it also represents a most important change in business management practices. An efficient supply chain management system provides an incentive to

farmers to produce more and convey changing needs of the consumers to enable farmers to take up production planning based on market forces.

Perishable nature of cut flowers and lack of cold storage facilities create a problem of marketing. The supply of most cut flowers is seasonal and their production is concentrated in few areas. The cut flower supply chain is still characterized by inefficiencies, diseconomies of scale, lack of investments and inadequate infrastructure, resulting in high cost and poor yields. Transporting the produce over long distances that often separates producing areas from consuming one, cause a large proportion of spoilage, sometimes as large as thirty per cent. Efficient marketing system needs vertical and horizontal integration of production, post-harvest management, storage, processing and distribution to make an integrated supply chain.

There is a growing demand for cut flowers and efficient SCM will ensure abundant benefits for all stakeholders in the system. Hence, a study was undertaken to identify and analyze the supply chain for Rose in Krishnagiri district.

Methodology

There are about 150 hi-tech flowers producers spread over four Panchayat unions in Krishnagiri district. Among the four Panchayat unions, based on the maximum area under cut flower production, three Panchayat unions viz., Kotagiri, Ooty and Coonoor were selected. Ten farmers were selected from each of the selected by simple random sampling method from each of the selected Panchayat unions. Thus, the total sample size of farmers was 30 representing 20 per cent of the hi-tech flower producers in Krishnagiri district. The members involved in supply chain of cut flower such as local traders, commission agent and wholesaler were identified and in each category, five members were selected by simple random selection method. Thus, the total sample included 30 farmers and 20 members in the supply chain. A survey was conducted during 2012 and data were collected from selected farmers and other players in the supply chain with the aid of an interview schedule.

Supply chain for rose

Survey revealed that there were four supply chains for Rose cut flower produced in Krishnagiri district for domestic market.

Supply chain I

In supply chain I, the farmers sold the produce through commission agents to wholesaler cum processor cum retailer (WPR), who in turn sold it to consumers at Bangalore. Expenses like packaging, loading/unloading and transportation etc. were borne by the producers and buyers at their end.

Supply chain II

In supply chain II, the farmers sold the produce directly to wholesaler cum processor cum retailer (WPR). In supply chain II, the farmers got maximum producer's share in consumer's rupee mainly because of less number of intermediaries and economies of scale in the supply chain. Supply chain II provided more net price to producer and high quality produce to consumer due to minimum manual handling.

Supply chain III

In supply chain III, the farmers sold the produce through auction centre to wholesaler. The auction centre charged Rs.1.00 per stem as its service charge. Generally collusion of trading agents was observed in the auction centre and they attempted to purchase at less price from the farmers. Expenses like packaging, loading/unloading and transportation etc. at their segment was borne by the buyers and producers. There was no physical value addition in this stage. Wholesaler sold the produce to retailer cum processor (RP).

Supply chain IV

In supply chain IV, the farmers sold the produce to local traders who in turn sold it to wholesaler cum processor cum retailer. The local traders charged Rs.1.50 per stem as their service charge. Expenses like packaging, loading/unloading and transportation etc., were borne by the buyers and producers, at their end. There was no physical value addition in this stage. Wholesaler cum processor cum retailer sold the produce to consumer. The major difference between commission agent and local trader was that the local trader transacted only small quantity.

Analysis and Discussion

The findings of the present study have been presented in the following sub heads :

Value addition in supply chain of rose cut flower

Rose passed through different intermediaries in the supply chain. In some stages value addition took place while in some cases it was mere change of ownership after assembling large volumes. The farmer is the first leg of the chain and his value addition is the production of the crop. He, thus, bears product risks in terms of the crop loss, possible wastage prior to sale and financial risks in terms of price of the crop. Details of value addition by the marginal, small and large farmers are given in Table 1.

Sr. No.	Particulars/item	SC I		SC II		SC III		SC IV	
		Amount (Rs.)	Percentage to total share	Amount (Rs.)	Percentage to total share	Amount (Rs.)	Percentage to total share	Amount (Rs.)	Percentage to total share
1.	Producer								
(a)	Gross price received	28.00	100.00	30.50	100.00	29.50	100.00	28.00	100.00
i	Packing	0.75	2.67	0.20	0.65	0.40	1.35	0.75	2.67
ii	Loading/unloading	0.40	1.43	0.30	0.98	0.40	1.35	0.40	1.43
iii	Transport cost	0.60	2.14	0.40	1.31	0.50	1.69	0.60	2.14
iv	Commission charge	1.50	5.35	—	—	—	—	—	—
v	Processing charge	—	—	1.00	3.28	1.00	3.39	1.50	5.36
vi	Sorting/grading	0.10	0.35	0.10	0.32	0.20	0.67	0.10	0.36
vii	Spoilage loss	0.10	0.35	0.10	0.32	0.10	0.33	0.10	0.36
(b)	Marketing cost	3.45	12.32	2.10	6.88	2.60	8.81	3.45	12.32
(c)	Net price received	24.55	87.68	28.40	93.11	26.80	90.84	24.55	87.67

There was marginal difference in the price for farmers selling through different supply chain. Net price received by the farmers was maximum in channel II, primarily because the number of intermediaries was least. Farmers marketing expenditure was maximum (Rs. 3.45) in supply chain I and IV, largely due to higher packing and commission charges. In supply chain I and IV the farmer himself made a small pack which was more costly, while in channel II the farmers packed stems in large boxes while selling directly to wholesaler. The list of operations at WPR and the cost incurred is given in Table 2.

The wholesaler's profitability depends on two variables— quality and quantity. The wastage level at the wholesaler's doorstep was fairly high and had to be factored into his price. However, market compulsions put a cap on this factoring and hence wholesalers depend on finding means of reducing wastage. The wholesaler's net margin across products and across markets was approximately 5-6 per cent.

The retailer was the last leg in the chain that supplied the produce to the consumer. He generally sold on a mark-up basis and had to bear a small amount of product risk. The list of operations at RP and the cost incurred is given in Table 3.

Marketing efficiency

Marketing efficiency of marketing in the supply chain was done based on Acharya approach. Efficiency was relatively high for the supply chain II (Table 4). In supply chain II number of intermediaries was less, hence WPR could directly place demand order to farmer and farmers supplied the same (demand based supply). Large farmers used this channel only (who produced better quality flowers than marginal and small farmers). Hence, supply chain II was found to be the most efficient.

Sr. No.	Particulars/stem	Amount (Rs.)	Percentage to sale price
(a)	Purchase price	30.50	90.37
i	Transport cost	0.50	1.48
ii	Grading/ sorting	0.10	0.29
iii	Spoilage loss	0.20	0.59
iv	Marketing cost	0.80	2.37
v	Profit margin	2.45	7.26
vi	Marketing margin	3.25	7.68
(b)	Sale price	33.75	100.00

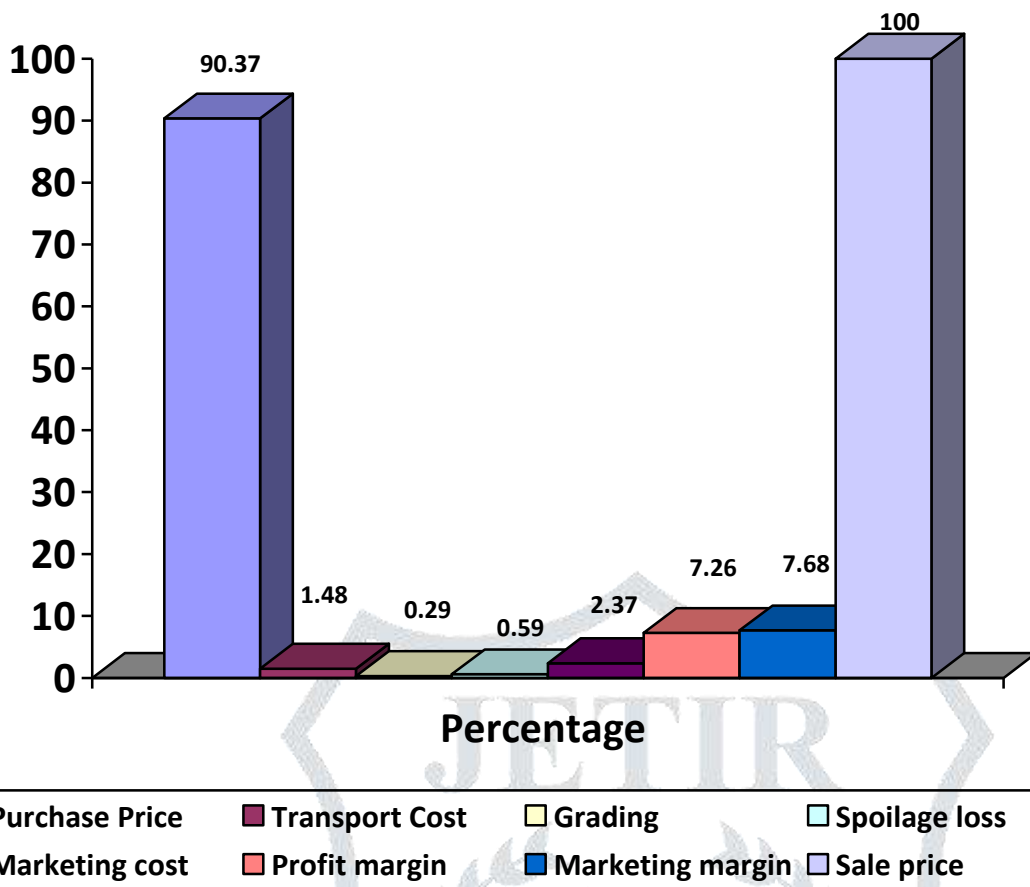


Table 3 :Value addition at retailer cum processor of lillium

Sr. No.	Particulars/stem	Amount (Rs.)	Percentage to sale price
(a)	Purchase price	32.00	85.33
i	Sorting/grading	1.00	2.67
ii	Transport cost	0.60	1.60
iii	Spoilage loss	1.00	2.67
iv	Marketing cost	2.60	6.93
v	Profit margin	2.90	7.73
vi	Marketing margin	5.50	14.67
(b)	Sale price	37.50	100.00

Sr. No.	Market channel	Net price received by the farmer	Marketing cost + Marketing margin	Marketing efficiency
1.	Supply Chain I	24.55	10.20	2.41
2.	Supply Chain II	28.40	6.15	4.61
3.	Supply Chain III	26.80	14.00	1.91
4.	Supply Chain IV	24.55	10.75	2.28

Efficient supply chain

The data collected and the observations made during the survey were used to analyze the traditional cut flower marketing practices followed five years ago and the present marketing system with respect to various attributes of the supply chain. This analysis led to the identification of efforts required for developing a modern scientific supply chain (Table 5).

The players in the market were disaggregated, acted more on self interest in the absence of any credible marketing information, resulting in more wastage in the system and less benefits to the farmers. Over the years the practices had improved and there was more market information flow because of developments in information and communication technology, access to better quality inputs and cut flower production technology and marketing logistics. This has reduced the wastage to some extent, increased the market reach and returns to farmers. However, gaps still exist in the present marketing systems which have to be rectified by designing, developing and successfully operating a modern supply chain system.

Leadership must emerge from the constituents of the supply chain for building and maintaining the supply chain. The leadership may emerge from the farmers (as a group), wholesaler-cum-processor, organized retailer and exporter.

Some of the institutional arrangements such as contract farming, co-operative society, group marketing and relationship with some corporate are suggested to farmers to facilitate direct sales to consumers / export markets. Dedicated networks of farmers and intermediaries in the market could be developed with the State Agriculture University and Development Departments playing a catalytic role.

Suggestions to overcome problems in existing supply chain: Standardized grading system based on the market needs has to be followed across the supply chain. Uniform packing size based on the transport facility must be designed. Packing and labeling should also be done to facilitate traceability. Small cold storage facilities must be created in marginal and small farm holdings. Cold chains should also be created to reduce loss in transit and maintain the freshness of the flowers. Access to market information was incomplete and inadequate. Government must take necessary steps to collect and disseminate market information so that the farmers and others could be benefited.

Sr. No.	Attributes	Traditional (past)	Present marketing	Modern supply chain (future)
1.	Sourcing emphasis	Short term and multiple sourcing	Relationship with vendor and purchase from two to three sources	Long term relationship with vendor and single sourcing
2.	Information sharing	No information sharing	Less information sharing and planning for volumes	Greater information sharing and planning for meeting, market needs and market development
3.	Management and technical assistance	No	Less	High and need based
4.	Cost reduction	No	Yes (less commission and less spoilage) and left to individual efforts.	Yes (reduction of intermediaries) and marketing information flow for all supply chain partners
5.	Spoilage	20 % at wholesaler level, 15 % at retailer level and 20% at exporter level	Only 10-15% at each level	Less than 2% across the supply chain
6.	Order receiving	Irregular and large batch size	Medium batch size and frequent deliveries	Market oriented batch size and frequent deliveries
7.	Information technology	No	Less and IT enabled	IT enabled and Easy access by all supply chain partners
8.	Value added activities	No	Grading, quality checking and packaging based on size, colour and freshness	Standardized uniform market oriented grading practices
9.	Transparency	No	Less transparency in demand, availability, price, consumer preference	High transparency in market information for all supply chain partners
10.	Customer price	Very high	Medium	Low
11.	Net price received by producer	Very low	Medium	High
12.	Time to reach consumer	Maximum 2-3 days	Maximum 1-2 days	Within one day

References

- Balthazar, M. and Wins, S. (2008) 'GSK biological distribution & cold chain, documents for small business and professionals', available at <http://www.docstoc.com/docs/46335713/GSKBiologicals-Distribution-Cold-Chain> (accessed on 6 April 2011).
- Belleza, E. (2009) 'Dubai Flower Centre set to launch market', Gulf News, (online) available at <http://gulfnews.com/business/general/dubai-flower-centre-set-to-launch-market.htm> (accessed on 30 March 2011).
- Bishara, R. (2006a) 'Cold chain management – an essential component of the global pharmaceutical supply chain', *American Pharmaceutical Review*, Vol. 9, No. 1, pp.105–109.
- Bishara, R. (2006b) 'The application of electronic records and data analysis for good cold chain management practices', *The Journal of Pharmaceutical & Biopharmaceutical Contract Services*, Vol. 7, No. 3, pp.5–6.
- Bossi, D. (2010) 'A history of floriculture', *Articlecell.com*, available at <http://www.articlecell.com/Article/A-history-of-floriculture/401773> (accessed on 30 March 2010).
- Cool Times (2009) 'Spotlight on: waiting for flowers', *Cool Times Spring 2009, 9th Issue*, available at <http://coolchain.org/> (accessed on 4 April 2011). Epiq (2010) 'Supply chain: global supply chain management', *Epiq Advanced Supply Management Review*, available at http://www.epiqtech.com/supply_chain-global-Management.htm (accessed on 30 March 2010).
- Floralife (2004) 'How important is the cold chain?', *Floralife Inc. Research Update*, available at http://www.floralife.com/industry_professionals/pdfs/Research/Cold%20Chain%20Research%20Update%20Feb%202004.pdf (accessed on 3 April 2011).
- Ganeshan, R. and Harrison, T. (1995) 'An introduction to supply chain management', available at http://lcm.csa.iisc.ernet.in/scm/supply_chain_intro.html (accessed on 10 April 2011).
- Global Logistics Media (2010) 'Promoting best practice in pharmaceutical cold chain management across the Middle East and North Africa', available at <http://globallogisticsmedia.com/articles/view/promoting-best-practice-in-pharmaceutical-coldchain-management-across-the-middle-east-and-north-afr> (accessed on 16 April 2011).
- GSK (2011) 'GlaxoSmithKline – do more, feel better, live longer', available at <http://www.gsk.com/index.htm> (accessed on 16 April 2011).
- Cold chain logistics in the floral industry 413 Hulst, J. (2004) 'Cool chain management for cut flowers', *Flower Tech.*, available at <http://coolchain.org/> (accessed on 4 April 2011).
- Hulst, J. (2004) 'Cool chain management for cut flowers', *Flower Tech.*, available at <http://coolchain.org/> (accessed on 4 April 2011).
- Laschkewisch, B. and Smith, R. (2000) *Growing Cut Flowers for Markets*, North Dakota State University – Agricultural and University Extension, H-1200, Fargo, ND.
- Lee, H.J. and Ho, T.H. (2003) 'Co-integration tests on transaction prices for cut flower', *Journal of the Agricultural Association of China*, Vol. 4, No. 6, pp.489–501 (in Chinese).

- Liemt, G. (2000) *The World Cut Flower Industry: Trends and Prospects*, International Labour Organization (ILO) working, available at [http://www.ilo.org/public /english/dialogue/sector/papers/ctflower/index.htm](http://www.ilo.org/public/english/dialogue/sector/papers/ctflower/index.htm) (accessed on 4 April 2011).
- Lin, T.F. and Liu, C.Y. (2004) 'Challenges of agricultural regional planning in cross-border production-and-trade networks: an empirical study of floriculture industry in Taiwan', *Journal of Building and Planning*, Vol. 11, pp.35–53 (in Chinese).
- Manikas, I. and Terry, L.A. (2009) 'A case study assessment of the operational performance of a multiple fresh produce distribution centre in the UK', *British Food Journal*, Vol. 111, No. 5, pp.421–435.
- Marsden, K. and Garzia, M. (1998) *Argo-Industrial Policy Reviews, Methodological Guidelines*, Food and Agriculture Organization of the United Nation, ISBN: 92-5-104-180-3, p.7.
- Matthee, M., Naude, W. and Viviers, W. (2007) 'Challenges for the floriculture industry in a developing country: a South African perspective', *Development Southern Africa*, Vol. 23, No. 4, pp.23–39.
- Rodrigue, J. and Craig, M. (1998) 'The cold chain', available at [http:// people.hofstra.edu/geotrans/eng/ch5en/appl5en/ch5a5en.html](http://people.hofstra.edu/geotrans/eng/ch5en/appl5en/ch5a5en.html) (accessed on 10 April 2011).
- Rushton, A. and Walker, S. (2007) *International Logistics and Supply Chain Outsourcing: From Local to Global*, pp.5–8, Kogan Page, London.
- Salin, V. and Rodolfo, M. (2002) 'A cold chain network for food exports to developing countries', *International Journal of Physical Distribution and Logistics*, Vol. 33, No. 10, pp.1–16.
- Sengupta, D. (2011) 'Integrated cold chain management in floriculture', *Floriculture Today*, available at <http://www.floriculturetoday.in/integrated-cold-chain-management-in-floriculture.html> (accessed on 12 April 2011).
- Smith, D. (2006) 'Design and management concepts for high care food processing', *British Food Journal*, Vol. 108, No. 1, pp.54–60.
- Steen, M. (2006) 'Flower power at the Dutch flower auctions? Application of an inverse almost ideal demand system', *Proceeding on the International Association of Agricultural Economists Conference*, Gold Coast, Australia.
- Steen, M. and Gjolberg, O. (1999) 'Forecasting prices at the Dutch flower auctions', *Journal of Agricultural Economics*, Vol. 50, No. 2, pp.258–268.
- Tamimi, M., Sundarakani, B. and Vel, P. (2010) 'Study of cold chain logistics implementation strategies: insights from UAE industry', published in the POMS Conference Proceedings, p.42.
- UAE Interact (2009) 'UAE flower industry endures effects of crisis', available at [http://www.uaeinteract.com/docs/ UAE_flower_industry_endures_effects_of_crisis/35132.htm](http://www.uaeinteract.com/docs/UAE_flower_industry_endures_effects_of_crisis/35132.htm) (accessed on 6 April 2011).