Short communication

Supply chain management in horticultural nursery business

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Abstract

The importance of horticulture sector in our economy is increasing over the years. This has necessitated the need for quality seeds and planting materials which in turn has increased the importance of horticultural nursery business. This study analyses the supply chain managementof horticultural nurseries and constraints in nursery business in Thrissur district, which is considered as the hub of nursery business in Kerala. The random sample survey conducted among the nursery owners showed that nearly 3/4th of the nurseries were unregistered. Supply chain mapping identified two major categories of supply chains i.e., supply chain of plants produced in the nursery and supply chain involving plants purchased from other nurseries. Supply Chain Performance Index (SCPI) of plants produced in the nursery was 0.86 and that of plants purchased from other nurseries was 0.80. The BC ratio of large scale nurseries was 1.92, followed by medium scale nurseries 1.65 and small scale nurseries 1.56. The major constraints in nursery business as reported by the nursery owners in the study area were market rivalry, non-availability of raw materials and cost of raw materials.

Keywords: Benefit-cost ratio, Horticultural nurseries, Supply chain management, Supply chain performance index

Over the years, horticulture has emerged as one of the potential agricultural enterprise in accelerating the growth of economy. Its role in the country's nutritional security, poverty alleviation and employment generation programmes is becoming increasingly important.Success of any horticultural production programme mainly depends upon the quality of seeds and planting materials supplied for the production. Unavailability of adequate quantity of quality seeds and planting materials has been reported as one of the most important problems affecting the development of the horticulture sector in the country (GOI, 2007). Lack of sufficient horticulture nurseries which conform to model nursery standards in terms of infrastructure, quality of seed and planting materials and adoption of nursery management practices is a bottle neck in horticulture industry (NHB, 2012).

Although plant nurseries play a crucial role in the development horticulture sector, and employment generation they have received less attention from the part of government in case of monitoring and evaluation of their activities and management. Detailed information about plant nursery management and business will be an asset for the researchers and policy makers for making required improvements in plant nursery business management. It would also be helpful to the prospective entrepreneurs to make investments in plant nursery business. Hence this study was formulated with the objective of understanding the supply chain management including the constraints in horticultural nursery business.

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Thrissur district, which is considered as the hub of horticultural nursery business in Kerala, was purposively selected as the location for the study. Proximity to Kerala Agricultural University is regarded as one of the reason for the concentration of nursery business in and around this area. For the final study 40 nurseries were randomly selected which included both private and government nurseries. Primary data were collected using sample surveys with the aid of structured interview schedule. Secondary data were collected from Krishibhavan, Principal Agricultural Office and other relevant sources. A post stratification of sample was done on the basis of operational area as, Category 1 (C-1) - area less than 50 cents, Category 2 (C-2) - 50 cents to 2 acres and Category 3 (C-3) - area more than 2 acres. Descriptive statistics and frequencies were used to analyse the data collected. The performance of supply chain was measured using the supply chain performance model proposed by Aramyan et al., 2006 with suitable modifications. The Supply Chain Performance Index (SCPI) was developed incorporating three dimensions of the supply chain i.e., efficiency, flexibility and quality.

$$SCPI = \frac{\sum_{i=1}^{n} x_i}{\text{maximun} \sum x_i}$$

x_i is the score obtained for each of the dimensions

During pilot survey, the major constraints in plant nursery business in the study area were identified through the interactions with the respondents and also through local enquiries. The respondents were asked to rate the constraints according to their importance as perceived by them. The ratings adopted were as follows: 1= not important, 2= less important, 3= important and 4= very important. Mean rank for each of the constraints were estimated and the constraint with highest mean rank was identified as the most important constraint affecting the nursery business in the study area.

Most of the sampled nurseries (72.50%) are unregistered nurseries. The category wise analysis showed that none of the nurseries under the category C-1are registered. 33.33 per cent of the nurseries under C-2 and 44.44 per cent nurseries under C-3 are registered nurseries. Majority of the nurseries (55%) operating in own land of the nursery owner. 37.50 per cent of the nurseries operating in leased in land and 7.50 per cent of the nurseries operating in both own land and leased in land. In 70 per cent of the nurseries the major method of sale is whole sale and57.5 per cent of the nurseries having major sales share through regular customers (Table 1).On average nurseries in the category C-1 generated 605.80 person-days per year and C-2 generated 1040.00 person-days per year. In nurseries under the category C-3 the average employment generated per year was estimated to be 5373.33 person-days per year.

Table 1. General information on nursery business

Particulars		Frequency			
		C-1	C-2	C-3	Total
Registration	Registered	0(0.00)	7 (33.33)	4 (44.44)	11 (22.50)
	Not registered	10 (100)	14 (66.66)	5 (55.55)	29 (72.50)
Ownership	Own land	7 (70)	6(28.57)	9(100)	22(55)
	Leased in land	2(20)	13(61.90)	0(0.00)	15(37.50)
	Own + leased in land	1(10)	2(9.50)	0(0.00)	3(7.50)
Method of sale	Retail	5(50)	5(23.80)	2(22.22)	12(30)
	Whole sale	5(50)	16(76.19)	7(77.77)	28(70)
Customer profile	Regular	5(50)	11(52.30)	7(77.77	23(57.5)
	Irregular	5(50)	10(47.61)	2(22.22	17(42.5)

(Figures in the parenthesis indicate per cent to total)

Supply chain "refers to all those activities associated with the transformation and flow of goods and services, including their attendant information flows, from the sources of raw materials to end users" (Ballou, 2004).The basic functions of supply chain are collection, production, wholesale, retail and consumption. Supply chains in the nursery business in the study area were identified through focus group discussions and interactions with respondents. The identified supply chains were:

Chain 1: Sample nursery - Customers
Chain 2: Farmers/ Households - Agent - Sample nursery – Customers

This chain is prevalent if the mother plant source is not available in the nursery itself. An agent will be there, for collecting and distributing planting materials from mother plant sources from farmers and households. So, the nursery will purchase tubers, seeds etc. from farmers and households for which an agent will act as the middlemen between farmers/households and the sample nursery.

Channel 3: Satellite nurseries – Sample nursery - Customers

This supply chain is observed in the case of large scale nurseries which will identify those farmers with good quality mother plants and assign them with the duty of producing seedlings from the identified mother plants for supply to the nurseries. The nursery owners are also found to assign the production of seedlings to private individuals, after providing all the inputs and mother plants and the seedlings and planting materials thus produced would be bought back by the nursery

Chain 4: Other nurseries (inside and outside Kerala and outside India) - Sample nursery -Customers

Chain 5: Other nurseries (inside and outside Kerala) - Agent – Sample Nursery –Customers

Chain 6: Farmers/Krishibhavan/Government agencies (Collection of planting materials from good quality mother plants) – Sample Nursery - Customers

Public sector nurseries usually maintain their own sources of mother plants for majority of the plants produced in the nursery. For the rest they would collect planting materials or mother plant materials from recognised farmers through Krishibhavan and other government agencies.

Chain 7: Sample Nursery - Government agencies – Farmers (through government schemes)

In this chain government agencies will collect seedlings from public sector nurseries or other registered nurseries for distributing among the farmers through various government schemes.

The performance of supply chain was measured by the model proposed by Aramyan et al., 2006 with suitable modifications. For this two major supply chains identified, i.e., supply chain of plants produced in the nursery and supply chain of plants purchased from other nurseries were selected and a supply chain performance index was estimated on the basis of three dimensions of the supply chain namely, efficiency, flexibility and quality. The supply chain performance index of plants produces in the nursery was estimated to be 0.86 and that of plants purchased in the nurseries was 0.80. So, the supply chain of plants produced in the nurseries was identified to be slightly more efficient than plants purchased in the nursery.

The estimated cost per year of nurseries under the category C-1 was Rs. 1,179,100. The average cost per year of nurseries under the categories C-2 and C-3 was found to be Rs. 2,160,700 and Rs. 8,290,800 respectively. The major share of cost incurred was for the purchase of plants and planting materials followed by labour charge. Mohanan (2015) who studied economics of orchid flower trade in Kerala has similarly reported that cost of

Table 2. Economics of nursery business

Category	Cost (Rs/year)	Returns (Rs/year)	BC ratio
C-1	1,179,100	1,847,000	1.56
C-2	2,160,700	3,574,500	1.65
C-3	8,290,800	16,255,000	1.92

planting material constituted the major share (80%) in Cost A1, followed by hired labour (7%).

Total returns in the case of plant nursery business are constituted of income from the sale of nursery plants. Total returns per year from nursery business are presented in the table. The total returns per year of nurseries under the category C-1 was found to be 18 lakhs per year. In case of C-2 the estimated returns per year was 35 lakhs. A return of 1.62 crores was found in the nurseries comes under the category C-3.

Benefit cost ratio is an important measure which deals with the profitability of the business. BC ratio was found to be well above unity in all the categories of nurseries (Table 2). It indicated that the investment is of worth in all the categories. The estimated BC ratio of category C-1 was 1.56 and C-2 was 1.65. A higher BC ratio was estimated in category C-3 which was 1.92. So we can conclude that nursery business in the study area is a profitable venture. Hegde and Patil (2007) reported that the estimated benefit cost ratio of mango fruit plant nurseries in Karnataka was around 1.9.The studies conducted by Ajayi and Babalola (2007) and Shukla (2010) also reported that the nursery business is a profitable venture with more than one benefit cost ratio (1.5 and 1.44 respectively).

The most important problem affecting the nursery business in the study area is the unhealthy competition among the nurseries. Since the plant nursery business in the district is clustered in the region with more than 500 nurseries, all the nursery owners are facing the challenge of market competition. This problem mostly affects the small and medium sized nurseries than large nurseries. The second most important problem affecting the nursery business in the study area is with regard to availability of raw materials. Cost of raw materials is the next most important problem affecting the nursery business. Labour shortage, land availability, pest and diseases and weather related problems are the other factors which are affecting the performance of nurseries in the study area. The studies conducted by Brumfield and McSweeney (1998), Brumfield (2001) and Guijarro et al., (2001) similarly identified that increasing number of nurseries entering in the market was the most important problem affecting the plant nursery industry.

Horticultural nurseries being the providers of seed material for long term investments in farming, supply of quality planting material is of utmost importance.Hence, measures have to be taken to monitor and evaluate the activities in the nurseries in order to ensure the quality of planting materials produced in the nursery. The nursery business in the study area was identified as a profitable business and they contribute substantially to the income and employment generation in the locality. Lack of proper registration and monitoring mechanism leading to the proliferation of nurseries and unhealthy management were identified as major issues in the horticultural nursery business.

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