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Executive Summary

Impact Study of the National Horticulture Mission (NHM) Scheme in Kerala

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Executive Summary

Introduction

Agriculture continues to be crucial for the growth of the Indian economy. This was proved in 2009 when the rural economy supported the industry and service sectors in India thereby insulating them from the global economic downturn. It acquires greater importance in our policy of inclusive growth. Though its contribution to GDP has come down to 17 per cent, it still employs about 56 per cent of the population. With less than 3 per cent of world's arable area and less than 4 per cent water available for irrigation, it produces enough food for 17 per cent of the world's population.

However, in the year 2006, the country was heading towards a possible food shortage. The year 2007 witnessed a global food crisis exacerbated by a financial crisis. There were times when there was no food available in the global market even if one had enough money. This was a wake-up call for the Indian policymakers. They decided to increase government's investment in agriculture substantially from the previous levels.

Agriculture and allied activities have been given adequate thrust and horticulture is one of the key thrust areas as it makes a substantial contribution to the share of agriculture in GDP. Horticulture in India includes fruits, vegetables, spices, medicinal and aromatic plants, flowers, mushroom and a variety of plantation crops such as coconut, areca nut, cashew and cocoa which have been contributing significantly to the share of agriculture in GDP.

In order to have a planned development of horticultural crops, the National Horticultural Mission (NHM) was launched on July 8, 2004. The scheme has been implemented in 18 States with effect from 2005-06. Since the programme entered in the fourth year had it was proposed to carry out crop based impact evaluation study in different States in order to analyse the impact of the flagship programme vis-à-vis objectives of the NHM scheme especially for the major focused crops in terms of area expansion, increase in production and productivity.

The objectives of the National Horticulture Mission are as follows:

- Doubling horticultural production; that is to achieve a production of 300 million tonnes by 2011-12.

- Establishing convergence and synergy among various on-going and planned programmes in the field of horticultural development.
- Promoting development and dissemination of technologies by blending traditional wisdom and frontier knowledge.

The National Horticulture Mission (NHM) focuses on horticultural research, development, post-harvest management, processing and marketing.

The programme under horticultural development aims at increasing the production and productivity of all horticultural crops through adoption of improved technologies in crop production. Under this programme, special emphasis is given for regionally differentiated crops, which are most suitable for the state/region. This programme is implemented by the horticultural departments of the State governments, which also include cooperative organizations, self-help groups, NGOs and commodity organizations for achieving the targeted production and productivity of identified crops. Risk management in the form of crop insurance has also been included.

Post–harvest management would include creating suitable infrastructure for efficient post-harvest management and marketing of horticultural produce (handling, transport, storage and marketing) besides taking up market promotional activities such as dissemination of market information to the farmers, processors, traders, and consumers. Special thrust has been provided to promote export of horticultural produce through establishment of AEZs, for which there is a potential global market.

The Mission also focuses on promoting processing of horticultural produce and value addition by providing incentives for setting up horticultural processing industries and food parks in potential areas and to encourage linkages between the markets for the horticultural produce and processing industry. This activity is supported by the Ministry of Food Processing Industry (MFPI) and implemented through agencies under the administrative control of MFPI and other organizations and the concerned departments of the State governments. These programmes would be credit-linked through NABARD/IDBI/State Financial Corporations. The estimated requirements of funds for the Mission during the X Plan was Rs.65,000 million. Research was given Rs 4,700 million, horticultural development Rs 3,200 million, post-harvest management and marketing Rs. 18,600 million, processing and value addition Rs 8,700 million and the

National Horticulture Mission headquarters Rs 1,000 million. The funds were allocated for the years 2004-07 of the Tenth Five Year Plan.

Guiding Principles under NHM: The Mission has adopted an end-to-end approach covering production, post-harvest management, processing and marketing to:

- Assure appropriate returns to growers/producers;
- Promote Research and Development (R and D) of technologies for production, post-harvest management and processing in potential belts/ clusters;
- Enhance acreage, coverage and productivity in potential belts/clusters.
- Adopt a coordinated approach and promote partnership, convergence and synergy among R&D, processing and marketing agencies in public as well as private sectors, at all levels;
- Promote, where appropriate, National Dairy Development Board model of cooperatives to ensure support and adequate returns to farmers; and
- Facilitate capacity- building and human resource development

The State and sub-State level structures have been evolved, keeping in view the need for getting adequate returns for the produce of the farmers and eliminating middlemen to the extent possible.

Kerala – An overview

Kerala is situated in the south west region of India and it covers a mere 1.3 per cent of the country's total land area, lying between the Lakshadweep sea and the forested Western Ghats that define its border with Tamil Nadu in the east and south, Karnataka to the north and north east and Arabian sea to the west. The land area of Kerala is about 38,863 sq km, with a total population of 31,838,619. It is about 3 per cent of the country’s population. Kerala is the twelfth largest state by population and is divided into 14 districts.

Nearly half of the state’s population has agriculture as its primary source of livelihood. Major food grains produced in the state are rice and tapioca apart from pulse crops that are produced in smaller pockets of the state.

Kerala has the natural endowments conducive for a wide variety of horticultural crops. The opportunity for raising a variety of fruits and vegetables by taking advantage

of the varying climate and other favourable features remain largely untapped. Kerala has a rich diversity of horticulture crops.

Horticulture sector has been a promising sector in the state with good production of an array of cash crops. Kerala is a major producer of cash crops such as coconut, rubber, pepper, cardamom, ginger, banana, cocoa, cashew, arecanut, coffee and tea.

Kerala is a land of spices considering the large variety of spices grown in the state. India is the single largest source of spices in the world. Kerala, accounts for 96 per cent of the total production in the country.

Major Highlights of the State

- ✓ Ranked 2nd in India in investment climate index (World Bank study 2009)
- ✓ Operational costs and rentals much lower in comparison with other Indian states
- ✓ Power and water tariff among the lowest in the country
- ✓ Human Development Index at par with the developed countries
- ✓ Three international airports (Thiruvananthapuram, Kochi and Kozhikode) and an international seaport at Kochi
- ✓ Highest density of science and technology personnel in India. Lowest employee attrition rate in the country – less than 5 per cent
- ✓ Man-days lost in labour strike – one of the lowest in India
- ✓ Major Industries: Agriculture, IT Products, Software, Tourism, Textile, Marine, Food Processing, Bio Technology, Textiles, Herbal Products, Petrochemicals and Spices and Spice Extracts

State Horticulture Mission – Kerala - Introduction

The State Horticulture Mission (SHM) was launched in October 2005 for implementation of the National Horticulture Mission programme introduced by Government of India (GOI) during 2005-06. The schemes of the SHM envisaged overall development of the horticulture sector including areas of production, post-harvest management, processing and marketing of horticultural produce. Initially, the programme was implemented in 10 districts but it was subsequently extended to four more districts (Kollam, Kottayam, Pathanamthitta and Thiruvananthapuram).

Organisational Set up

The SHM, registered under the Travancore-Cochin Literary, Scientific and Charitable Societies Registration Act 1955, started functioning from October 2005. The control, administration and management of the affairs of the SHM are vested in a Governing Body with the Minister for Agriculture as the Chairman and the Agriculture Production Commissioner as the Vice Chairman. A State Level Executive Committee (SLEC), constituted under the Chairmanship of the Agriculture Production Commissioner is responsible for project formulation and monitoring. The SHM is headed by a Director while the District Missions are headed by Deputy Directors of Agriculture (Horticulture). The programmes are mainly implemented by the State Agriculture Department through Krishi Bhavans. The Kerala Agriculture University (KAU), the Kerala State Horticultural Product Development Corporation Limited (Horticorp), the Vegetable and Fruit Promotion Council, Keralam (VFPCK), are also involved in the implementation of the SHM schemes.

Highlights

The State Horticulture Mission was launched in 2005-06 to give new momentum to the development of horticulture, generate employment and enhance farm income. Out of the various interventions under the State Horticulture Mission, organic cultivation practised in Wayanad district showed significant improvement. Rural marketing facilities and infrastructure for seed production established by the Vegetable and Fruit Promotion Council, Kerala enabled farmers to sell their products directly to the customers and achieve substantial progress in production of vegetable seeds.

Primacy of horticulture crops in Kerala

Horticulture has always been the thrust area of Kerala's agricultural scenario. Kerala's predominance of commercial horticulture is of national importance in terms of valuable foreign exchange earned through exports and foreign exchange saved through import substitution. The state has virtual monopoly in pepper production (81 per cent), rubber (92 per cent), cardamom (74 per cent), coconut (44 per cent), besides coffee (22 per cent), cashew (15 per cent) and tea (8 per cent). Kerala contributing 88 per cent

of export earnings from pepper, 72 percent from cardamom, 54 per cent from cashew kernels, 56 per cent form ginger and 21 per cent from turmeric. Out of a total cropped area of about 30 lakh hectares, as high as 89.59 per cent of the area has been occupied by horticultural crops. The important horticultural crops of the state include pepper, coconut, cashew, ginger, turmeric, arecanut, cocoa, cardamom, tapioca, sweet potato and other tubers, fruits covering banana and plantains, mango, jack, pineapple and papaya besides vegetables such as cowpea, pumpkin, snake-gourd, bitter-gourd, cucumber, bhendi, amaranthus, brinjal, tomato, chillies, floriculture etc.

Production and Productivity of Horticulture crops

Productivity of horticulture crops in Kerala is trailing behind the National averages except in the case of pepper and cashew. The scope for improvement lies more on productivity improvements than area expansion in a land-hungry State like Kerala. Accordingly, the Department of Agriculture, Kerala in its ongoing programmes has given priority for productivity enhancement. By NHM support, the growth rate in horticulture moved up from 6 percent to 10 percent at the terminal year of the Eleventh Five Year Plan (2011-2012). Accordingly, the horticultural crop production had been projected to go up from 60.47 lakhs tonnes in 2003 to 109.45 MT in 2012, almost accomplishing the goal of doubling of production by 2012.

When compared to exports of horticultural crops at the All India level, good potential exists for Kerala in the years ahead, as exports of these products were much below one per cent of global exports.

Main Objectives of the Study

The study aims to understand the impact of the NHM scheme in Kerala.

The main objectives of the study are:

- To assess the impact in terms of increase in area, production and productivity of identified horticultural crops covered under NHM, keeping 2004-2005 as the base year in the State in general and for the identified crops/districts in particular.

- To assess the extent to which the scheme has helped in creating employment opportunities and enhancement of income of the farmers and

- To suggest measures for improving the implementation strategy of NHM in Kerala.

Data and Methodology

The study area under evaluation consists of 2 districts of the State of Kerala, namely, Wayanad and Ernakulam which are located in north-eastern and central parts of the State. Totally 4 villages in the 2 districts were covered for the study. Main thrust was given to Pineapple for Ernakulam district, and pepper for Wayanad district

The sources of data were both primary and secondary. As regards the primary data, a survey of 98 farmers from the two selected districts, by using the household schedule for studying the impact of the National Horticulture Mission in Kerala, was made and the data so collected were analyzed and interpreted.

The secondary sources were obtained only through the library and documentary sources apart from the online sources. It is regretful to report that no support was received from the State Horticulture Mission, Government of Kerala with regard to the secondary data. The secondary data provided by the State Horticulture Mission, Government of Kerala were the data that are completely irrelevant to the required inputs of current study. Had, there been proper responses to the numerous requests from this office to the State Horticulture Mission, Kerala, State's relevant departments/agencies, for providing relevant data a precise analysis could have been ensured. However, the report has been prepared with best efforts having been put for analysis with the available data.

Major Findings of the Study

Area, Production and Productivity of Horticultural Crops in Kerala

The area of horticultural crops in Kerala was discussed in detail. It must be noted at the outset that the analysis has been severely constrained by extremely poor and scattered availability of data on horticultural production in the state. The total geographical area of the State accounted for 3886287 ha. Of this, cultivable area which was 2132483 ha during TE 2004-05 declined to 2088955 ha during TE 2008-09. Though there was a general decline in the total cultivable area during 2008-09, the area

under horticultural crops on the other hand registered a higher decreasing trend from 917527 ha during TE 2004-05 to 723484 ha during TE 2008-2009.

The study reveals that NHM made a favourable impact on the growth of horticultural crops in Kerala.

A considerable increase could be noticed in area of selected horticultural crops, pepper and pineapple from the period TE 1980-81 to TE 2008-2009 in Kerala. All the two selected crops pepper and pineapple registered a substantial growth in terms of area during the period under study.

Household Characteristics, Cropping Pattern and Production Structure

Characteristics of operational holdings, nature of tenancy, sources of irrigation, sources and purpose of credit, cropping pattern, production cost and returns were analysed.

The total number of sample respondents for the study was 98 comprising 13 marginal, 30 small, 53 medium and 2 large farmers. The average household size was 2.77 persons. The average number of earners was found to be 1.38. As regards the sex of sample respondents, it was 51.8 per cent male and 48.2 per cent female. About 66 per cent of the members of the sample households belonged to the productive age group of 16-60 years. As regards education, about 83 per cent of the sample respondents had education ranging from primary to graduation level. About 17 per cent of the sample respondents were illiterates. As far as community of the sample respondents was concerned, BC was found to be the dominant community claiming more than 50 per cent whereas SC community constituted just 3 per cent only. Farming was found to be the main occupation for about 86 per cent of the working members of the sample households.

As regards operational holdings, average net operated area and net sown area of the sample households accounted for 11.78 acres and again 11.78 acres respectively. The average gross cropped area worked out to 16.66 acres and cropping intensity was 141 per cent. The leased-in area was found to be 3.75 acres on an average and fixed rent in cash was the nature of tenancy prevailing among the sample households.

Tank, Canal and well were the sources of irrigation for the sample households and among them wells were found to the major source, irrigating 65.09 per cent of the land of the sample households. A little more than one tenth of the net operated area depended upon tanks and rain.

The average amount of loan borrowed from different sources accounted for Rs.71612 per household. About 97 per cent of the loan taken from all sources was for agricultural purposes. With regard to asset holding, it accounted for Rs.166054 per household and Rs.14096 per acre of NSA on an average.

The sample respondents raised paddy, areca nut, cardamom, coconut and ginger during kharif season and paddy, banana, tapico and cashew during rabi season. As regards horticultural crops, pepper, pineapple, other fruits, vegetables, plantation crops, spices & condiments and medicinal crops were cultivated by the sample respondents. The total area under kharif crop accounted for 3.81 acres per household whereas it was 3.89 acres per household for rabi crop. In case of horticultural crops, the total area worked out to 8.96 acres per household. The area under pepper on an average accounted for 2.03 acres per household. The average area under pineapple worked out to 1.81 acre per household. The study reveals that a little more than 81 per cent of the area per household was irrigated during kharif season and 77.78 per cent of the area per household was irrigated during the rabi season. In the case of horticultural crops, about 93 per cent of the area was irrigated per household.

The total value of output on an average was Rs.764177 per household. The total cost of production worked out to Rs.290958 per household while the realized net returns on an average of Rs.473219 per household. The total income including non-farm income earned by the sample respondents was of Rs.526711 per household. The total value of output per acre of net sown area and per acre of gross cropped area worked out to Rs.64871 and Rs.45869 respectively. The total cost of production calculated in terms of per acre of net sown area and per acre of gross cropped area accounted for Rs.24699 and Rs.17464 respectively. In the case of net returns from agriculture, the average per acre net returns of net sown area and per acre net returns of gross cropped area were Rs.40171 and Rs.28405 respectively.

Kerala is gradually turning to organically grown pepper, turmeric, coffee, tea, pineapple and other horticultural produce to help marginal farmers earn more money through the highly priced chemical fertilizer-free produce. Initiated in 2005-06 with Rs.750 million funding from National Horticulture Mission, the Kerala State Horticulture Mission used around 75 per cent funds in developing and rejuvenating horticulture and cash crops in some areas like Wayanad. And such schemes are being implemented through the horticulture mission that is receiving funds from both the central and state governments.

Production Structure and Resource Use under Horticulture Crops

Cost of cultivation, output and net returns of selected crops pepper and pineapple and use of human labour in the cultivation of these crops were studied.

The average area of pepper planted by the sample farmers was three acres per household. The total cost of cultivation of pepper including variable cost and fixed cost on an average was Rs.60903 per acre, whereas the average revenue earned by a farmer was Rs.165000 per acre. The average output produced by a sample farmer was calculated to be 13.75 quintals of pepper per acre. The average area of pineapple cultivated by the sample farmers was 5.35 acres per household.

The total cost of cultivation of pineapple was put at Rs.21015 per acre. Against this cost, the total net returns generated by the sample farmers on an average were Rs.64233 per acre.

A comparison of net returns obtained from horticultural crops and non-horticultural crops was made in this chapter. The study reveals that the average net returns generated by a sample household from kharif crop was to the tune of Rs.20980 per acre whereas the average net returns obtained from rabi crop were put at Rs.39586 per acre. But at the same time, the average net returns generated from horticultural crops were much higher compared to kharif and rabi crops. The average net returns from horticultural crops stood at Rs.7768 per acre. Of the two selected horticultural crops the average net returns obtained from pepper were found to be high at Rs.13995 per acre followed by pineapple (Rs.11975).

Human labourer is employed in different activities of agriculture. The study shows that human labour used for all the kharif crops by the sample households on an average worked out to 23.65 man-days per acre and it was little higher at 30.31 man-days per acre in case of rabi crop. When compared to kharif and rabi crops, the human labour used in horticultural cultivation was found to be normal which worked out to 22.25 days on an average for all horticultural crops. The study reveals that human labour required for all recurring activities in horticulture on an average worked out to 18.37 man days per acre whereas for fixed activities the figure was found to be 13.66 man-days per acre.

As regards the marketing channels, the selected horticultural crops pepper and pineapple produced by the sample households were sold through wholesale markets and intermediaries at farm gate. In the case of pepper, only 12 per cent of the produce was marketed through intermediaries at farm gate. Similarly, only 11 per cent of the pineapple produced was also sold through the same channel. That shows in general 90 percent of that pepper and pineapple produce were sold directly by the farmer households in the sample.

Impact of NHM on the Expansion of Horticultural Crops

While analyzing the impact of NHM on area, the study found that, there was no change in the area under pepper crop cultivated by the sample respondents and it remained the same during the period from 2004-2005 to 2009-10. The average area under pepper crop per household worked out to 0.61 acre.

In the case of pineapple crop, area expansion could be witnessed over the period. The average area under pineapple crop was 1.21 acres during 2004-05 which marginally rose to 2.69 acres during 2008-09 and further increased to 2.92 acres during 2009-10. Impact of NHM on yield was visible as the average yield of pineapple obtained by the sample respondents marginally increased from 31.6 quintals per acre in 2004-05 to 33.4 quintals per acre in 2008-09 and further rose to 32.3 quintals per acre during 2009-10. In the case of pepper, the yield decreased from 1.26 quintals per acre in 2004-05 to 0.90 quintals per acre in 2008-09 and increased marginally to 1.00 quintals during 2009-10.

The average area for which certified inputs were procured under rejuvenation and protection through NHM resource provision accounted for 1.81 acres and 1.80 acres per household respectively in case of pepper and pineapple crops during 2008-09. It is found from the study that rejuvenation support was given to nearly 10 per cent and 9 per cent of the sample respondents growing pepper and pineapple respectively under NHM. Area under pepper and pineapple expanded due to rejuvenation under NHM. The average area expanded under pepper and pineapple accounted for 0.41 acre and 0.36 acre respectively.

Majority of the sample respondents availed the promotional activities such as availability of good quality planting materials like nursery, rejuvenation with improved cultivators, integrated nutrient management or integrated pest management and so on.

As regards subsidy, it was provided for planting materials, fertilizers, pesticides, other inputs drip/sprinkler irrigation, in respect of all the selected crops pepper and pineapple. In the case of pepper, all the 49 sample respondents received subsidy for fertilizer, pesticides, other inputs and vermi compost, while all the 49 sample households growing pineapple availed subsidy for planting material, fertilizer, pesticides, other inputs and vermi compost.

The average amount of subsidy under NHM for pepper crop ranges from Rs.762 to Rs.11,127 per household. In the case of pineapple, the average subsidy amount provided for fertilizer, pesticide, other inputs and vermi compost, was Rs.1051 per household respectively. Training was imparted to the farmers under NHM. As regards frequency of training, it was 1.87 times per household per year through all sources. The average number of days of training provided through all sources was 2.75 per household per year.

As regards perception of sample households about NHM, over 74 per cent of them reported that the scheme helped them by providing seedlings/nursery. According to 60 per cent of the sample respondents, subsidy provision was a great benefit, in the policy towards NHM. About 83 per cent of the sample respondents expressed the that NHM increased employment opportunities for the farmers and agricultural labourers by increasing area under horticultural crops.

Out of various suggestions put forth by the sample households, providing single phase electricity connection so as to enable them to improve their horticultural operations was considered important by 68 per cent of the sample respondents. Nearly 72 per cent of the sample respondents suggested that there was need for providing subsidy for fencing their horticultural crops.

Regional Agricultural Research Station, Ambalavayal

A Regional Agricultural Research Station functions at Ambalavayal as a part of Kerala Agricultural University. The station mainly concentrates on the research on spices, tropical and subtropical fruits, vegetables, especially cool season vegetables and hill paddy. A Krishi Vigan Kendra, with the objective of dissemination of latest technologies to the farmers, is also attached to this station. Recently, a plant Biotechnology Centre started functioning here for the large-scale production of tissue culture plants of high value crops.

Spices Board

The Spices Board has a field office at Kalpetta. The main functions of the Spices Board are the formulation and implementation of better production and quality improvement programs, systematic research and development, educating and training growers, processors, packers and exporters, selective registration and licensing. It also acts as a data bank and communication channel for importers and exporters of Indian spices.

The Board helps exporters in establishing contact with overseas buyers of spices. The Board also forwards trade enquiries received from abroad to competent registered Indian exporters and helps the International buyer procure good quality spices from India.

Vazhakulam Agro and Fruit Processing Company

Under the Kerala Horticulture Development Programme, Nadukkara Agro-Processing Company Limited (NAPCL), a modern fruit processing factory, for the commercial processing of pineapple, mango and other fruits was established in the heart of Kerala's Pineapple growing area Nadukkara, Avoly panchayat near

Muvattupuzha. NAPCL was established as a public limited company with 582 farmers holding 70 per cent share and the Government of Kerala 30% share. NAPCL has ISO 9002/HACCP certifications and its own brand of pineapple juice called "JIVE" and can process 70 tonnes of pineapple per day. The company initially produced 200 ml Jive tetra-pack, 256 kg dump bag juice concentrate, besides ginger candy. Today, company markets seven different types of natural cool drinks under Jive brand without using any preservatives. They have become very popular as „ *the drinks of nature'*.

NAPCL organizes training and seminars for farmers for the popularisation of pineapple and promotes MD2 pineapple variety for cultivation to meet the challenges of global competition in the WTO regime. The company has also taken initiative for getting GI indication registered for Vazhakulam Pineapple. NAPCL has recently commissioned an "*integrated pack home for export of fresh pineapple*" with facility for pre-cooling, packing, branding and certificate labelling having a capacity of 700 t/day at a cost of Rs.3.7 crores fully funded by APEDA. It has recorded a growth rate of 500% during the last 5 years.

NAPCL was taken over by state government and functions in the name of Nadukkara Agro Processing Factory (NAPF) for some time. It is being renamed as Vazhakulam Agro and Fruit Processing Company with a proposed share holding of 51% by Government of Kerala, 30% by farmers and 19% by VFPCK, out of 10,000 shares in total.

Pineapple Farmers' Association (PFA)

Farmers face many problems in the cultivation and marketing of pineapple. So a group of farmers decided to form an association of Pineapple farmers in 1990 and registered the Pineapple Farmer's Association, Vazhakulam under the Charitable Societies Act. The main objectives of PFA are to unite and strengthen the pineapple farmers, make awareness about farming, marketing and other related subjects, promote marketing and processing facilities and help farmers to avail financial and technical assistance from government and non-government organizations and banks. The service area of PFA is Kerala State. The PFA is distributing good quality planting materials, fertilizers, pesticides, herbicides, growth regulators etc. at subsidised rates to the

members. Every year the PFA conducts a three day Agriculture Fair at Vazhakulam. This is a festival of Pineapple farmers. The association presents the 'Pineapple Sree' Award to the best Pineapple Farmer. Agricultural University and the Department of Agriculture. PFA strived very much for getting GI indication registered for boosting the export of Vazhakulam pineapple.

Pineapple Research Station (PRS)

The Pineapple Research Station at Vazhakulam was established on 2nd January 1995 to give research and development support to pineapple farmers. Since then, this research centre of the Kerala Agricultural University has been steadily growing and serving as a subvention to the pineapple growers of the state and the country as well. The research centre strives to become the ultimate authority and provider of excellent quality technology, products and services in the pineapple sector through concerted research and development efforts sustained by best human resource and infrastructure development.

The centre had a humble beginning on 2.1.1995 as “Pineapple Research Station & Pest and disease Surveillance Unit” under Kerala Horticulture Development Programme (KHDP). For the construction of the office-cum-laboratory building of the station, 15 cents of land was transferred from the Revenue Department to Kerala Agricultural University on 24.6.1996. It was delinked from KHDP and became a constituent research centre of Kerala Agricultural University under central zone on 1.7.1997. The present building was occupied on 27.6.1998. The centre is located close to the pineapple market at Vazhakulam.

The mandate of the research centre is to give research and development support to the pineapple growers, provide quality technology, products and services to the pineapple sector and undertake basic and applied research in pineapple and other fruit crops of Kerala. The station has taken up research in pineapple on various aspects like intercropping in rubber and coconut, plant spacing and density, organic and chemical fertilizer requirement besides experiments on development of new varieties. Based on continuous surveillance and laboratory studies, the station has identified the presence of PMWA virus in pineapple in Vazhakulam area. Based on all the findings this station

has formulated the Package of Practices Recommendations for the popular variety Mauritius and included in the POP and all the technology developed are being transferred to the pineapple growers extensively. Vazhakulam pineapple has been registered in the Geographical Indication Registry to boost the export of pineapple.

The centre has established good laboratory facilities. The Plant Tissue culture, biochemistry and pathology labs are equipped with Gel documentation, ELISA Reader and washer, PCR, Colourimeter, UV- Transilluminator, Flame photometer, Centrifuge, Microscopes, Electrophoresis, Shakers, ovens, Precision weighing balances, Deep freezer, BOD, Laminar Air Flow, still, etc. It has a leased farm of two hectares at NAPCL. The centre undertakes basic and applied research and development activities in pineapple and other fruit crops of Kerala. The research and development projects are mainly in Participatory Technology Development (PTD) mode and funded by various agencies as KAU, State and central governments, ICAR, SHM, NHM, etc.

The centre has developed scientific technology for the commercial cultivation of Kew and Mauritius varieties of pineapple, including pure cropping, intercropping in rubber and coconut plantations and in reclaimed paddy lands. Technology is developed for organic production. Tissue culture protocols for various varieties of pineapple are available. Performance evaluation of MD2 pineapple is in progress at the centre. Participatory technology process and product development in association with sister institutions, Nadukkara Agro Processing Co.Ltd. and Pineapple Farmers' Association for the stakeholders is a steady and continuing process at the centre. Technology transfer is effectively carried out through personal discussions, field visits, phones, emails, website, posts, radio, TVs, news papers, periodicals, publications, pineapple fests, seminars. trainings, etc. At present pineapple cultivation in Kerala is generating employment of about 60 lakh mandays among farmers, agricultural workers, people involved in loading, unloading, transporting, traders, retailers etc. By doubling the area under pineapple cultivation, an additional 50 lakh man-days per year can be created.

Earnest efforts are also being made to acquire free government land nearby as a permanent farm for raising various fruit plants, conserving germplasm and conducting field research, besides establishing adequate infrastructure for further development and diversification, renaming the station as Tropical Fruit Crops Research Station (TFCRS).

It is also proposed to establish a fruit processing laboratory with FPO registration at the centre for the efficient conversion of leftover fruits to value added products like squash, jam, syrup, etc.

Concerted research and development efforts coupled with excellent human resource and infrastructure development will ensure the way to ultimate success and supremacy in the sector.

Policy Suggestions

The State is ideally suited for exports given the strategic location of airports and sea ports.

Trade and marketing arrangements in place, both spatially and economically, are able to support horticultural crop exports, particularly pineapple. Both pepper and pineapple are a much preferred and demanded products not only locally and regionally but also nationally and internationally. There are indeed varieties of pineapple which are all the time favourites of people in India and abroad that the demand for them is never low. In the recent years, the export of pineapple has been on an increase which should be nurtured and promoted to reach greater heights. It would be appropriate to create policy support facilitating the export of pienapple, in the international arena. Promotional efforts would be in order for making horticultural crops in constant demand and use.

Presence of leading institutions like Kerala Pineapple Mission, Spice Board,Agricultural University and other Research Institutions.

Institutions such as the Kerala Pineapple Mission, Spice Board and other research centres are an advantage to the State as they will be involved in furthering the cause of horticulture and also improve the status of the farmers in the State.

State Government policies facilitate growth of the sector

Continued support of the Government in facilitating the growth of the horticultural sector must be appreciated. New areas of development must be encouraged so as to improve the GDP and the per capita agricultural income.

Awareness on Hi-tech horticulture/quality consciousness among growers

Despite enormous growth in hi-tech in the country and in the State, the lack of awareness of hi-tech horticulture has been an impediment in the growth and development of horticulture. Much needs to be done by way of bringing awareness among the farmers, especially small and marginal farmers. Also important are the efforts at improving the quality of products and spreading quality consciousness among the growers. Newer strategies involving non-governmental organizations may be sought to be developed for this purpose.

The presence of small land holdings hampers adoption of best practices.

This is a greater problem and is difficult to resolve unless consolidation of land holdings takes place in tune with the needs of the sector. Unless consolidation occurs spontaneously in response to the needs of the horticultural sector, adoption of best practices may continue to be hampered.

There is low focus on post-harvest management and facilities like cold storage, pre-cooling and waxing centres and processing units.

This is true as of now, but efforts are underway to improve the situation. But what has been done so far is not adequate for the purpose. Further, efforts on providing facilities like cold storage, pre-cooling and waxing centres at the local level at low, affordable prices and also processing units may be encouraged. Local farmers may be encouraged to set up their own facilities, either individually or in a cooperative spirit with government assistance for doing so in response to the local needs.

Non-availability of work force for agriculture during season

This is indeed an insurmountable problem for a variety of reasons. The most important of them are: (a) the increasing unavailability of local agricultural labour, which is largely being catered to by Mahatma Gandhi National Rural Employment Guarantee Scheme and (b) the increasing bargaining power of the local and specialized labour. The MNREGS has now attracted most of the local agricultural labourers who prefer to work for the program related activities. The labour in the last few years has become increasingly powerful because of the increasing demand for them on the one hand and

the bargaining power on the other. This may escalate into a crisis in the future, unless some drastic attempts are made by the government and labour associations to resolve the crisis.

Strategies for further Improvement of Horticulture

As for Kerala is concerned, the important things to do to improve the prospects and consequences of the National Horticulture Mission are to:

- Organize farmers' groups, cooperatives on the national/state models, self-help groups, producer companies and other associations;
- Provide for collection centres and transportation to local markets; and
- Provide for a network of cold chain storage van all over the country in cooperative/private/public sector.

Development of a new variety in Pepper - Hope for farmers due to improved traits

Researchers at the Spice Board, Kerala have developed and released sixteen improved varieties of black pepper for cultivation Panniyur-1 and Panniyur-3 are hybrids evolved at the Pepper Research Station, Panniyur (Kerala) and have Uthirankotta and Cheriyakaniakadan as their female and male parents respectively.

Need for a sustainable development strategy

In NHM, it has to be seen as to how much of its benefits are percolating to farmers across geographical regions and income levels. It is cautioned that any unplanned major shift towards horticulture should not happen at the cost of wheat and rice cultivation as this would lead to a shortage of food grains. Hence, very careful sustainable development strategies are to be planned so that food shortage will not occur due to the development of horticulture.

Need for strengthening supply chain management

The enormous losses of fruits produced in the country are mainly because of the lack of proper infrastructure for storage and transportation under controlled conditions. Of late, Supply Chain Management (SCM) is gaining importance due to globalization.

Several factors are driving emphasis on supply chain management and the following three are identified as most important, 1. The cost and availability of

information resources between entities in the supply chain allow easy linkages that eliminate time delays in the network. 2. The level of competition in both domestic and international markets requires organizations to be agile and flexible. 3. Customer expectations and requirements are becoming much more stringent so as to satisfy the consumers. The supply chain management system should operate with the two main objectives namely timeliness and quality.

Cold chain development

The focus needs to be on areas of reducing post-harvest losses, building supply chains, and developing linkages of farming to the processing industries. India should augment cold chain facilities and container handing facilities at major ports as also at air cargo complexes for targeting global markets.

Export from the State and suggestion for increased export

a) Information of production estimates is required at a district level and at quarterly level.
b) Price discovery mechanism has to be improved

This should be encouraged at National and State level with adequate support and incentives.

Lack of adequate post-harvest infrastructure

There is a clear need to increase the focus on post-harvest infrastructure, especially pack houses, cold stores, refrigerated vans and market infrastructure. They have to be provided at the project site considering the special nature of exportable fruits.

The marketing channels are not well developed.

This has to be done by the local, regional and national governments on a wider scale throughout the country. Newer, modern marketing practices may be ushered in, with the encouragement and support of the government and even international funding organizations.

Strategies for improving Marketing

It is understood from the study that the farmers must have support in marketing their horticultural products and the strategies for improving marketing could be the following:

- The substantial gap between farmers' share in consumers' prices has to be narrowed;
- A number of marketing practices can be encouraged but with focus on regulated marketing; Farmer –Consolidator – Trader – Commission Agent - Wholesaler – Retailer – Consumer; Markets regulated by marketing committees;
- A model of transparency cold chains and linkage with farmers may well be adopted;
- There is need to provide infrastructure for local markets and help set up NDDB type markets; and
- Different markets in one location may continue to provide competition.