
**EVALUATION OF SOFT LOAN SCHEMES FOR THE DEVELOPMENT
OF POST HARVEST INFRASTRUCTURE FOR HORTICULTURAL
CROPS IN MAHARASHTRA**

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PREFACE

India is blessed with diverse agro-climatic conditions and so has the ability to produce a wide variety of fruits, flowers, vegetables, and a host of other horticulture based products round the year. Although there is great potential for India to substantially increase the current share of the horticultural sector in its total agricultural exports, only a meagre quantity of horticultural products are exported. A substantial quantity of the country's horticultural produce is lost due to lack of adequate post-harvest infrastructure facilities. Concerted efforts are being made by various organizations including the National Horticulture Board (NHB), to adopt such policy measures that not only help in creation of appropriate and adequate post-harvest infrastructure (PHI) and related facilities but also provide sound footing for boosting country's horticultural exports. As a part of these efforts NHB has initiated soft loan schemes (SLSs) in 1993-94. The major thrust of these schemes is not only to curb the post-harvest losses but also to attract the private investment in the horticulture industry. However, after a span of five years from the initiation of the schemes it was realized that a number of projects assisted under the schemes entered into a depressed position. It was, therefore, felt necessary to evaluate the NHB's soft loan schemes. These schemes were implemented in almost all the major horticultural crops growing states of the country.

The state of Maharashtra received the maximum assistance under the scheme. Although there are many beneficiaries of NHB soft loan schemes in different sectors, this evaluation study covers only two such organizations in the cooperative sector in the state. The selection of these cooperative organisations helped in evaluating the impact of soft loan schemes on cropping pattern, employment and income of the farmers. This study is undertaken at the initiative of the Ministry of Agriculture, Government of India.

In order to improve the efficacy of the Soft Loan Schemes, the study has suggested various measures which mainly revolve around simplification of loan procedure adopted by the NHB, timely disbursement of the loan, financing of the entire comprehensive project rather than for certain specific components, subsidization of

electricity tariffs for the processing units, provision of funds for setting up of Research and Development (R&D) units for the marketing of produce, provision of foreign market intelligence service for the exports of horticultural crops, etc. In general, it is concluded that creation of PHI facilities during the given period of time has not only helped the farmers to increase their family income but these facilities have also helped in creation of additional employment opportunities in the study area.

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CHAPTER I

INTRODUCTION

1.1 Background

The era of liberalization ushered in since July 1991 has given a boost to agricultural exports, in general and to horticulture, in particular. The activities aimed at increasing the export of horticultural produce, with particular reference to gearing up the production of export quality produce, are indeed quite essential to the development of horticultural industry in India. The country is yet to fully realise its potential in horticultural exports and the rapidly changing world trade scenario demands that this potential be tapped to the best possible extent.

India is blessed with diverse agro-climatic conditions and so has the ability to produce a wide variety of fruits, flowers, vegetables and a host of other agro based products. The physiographic, climatic and edaphic diversity of the country makes it possible to grow horticultural crops round the year. As per the estimates reported in Indian Horticulture Database (1998), India had 11.34 million hectares of land under its horticultural crops during the year 1995-96, and the production of fruits and vegetables during this year was estimated at about 113 million tonnes. Of this, fruits accounted for about 41 million tonnes and the rest 72 million tonnes are contributed by the vegetables. An appraisal of the past performance of this sector reveals that during 1991-92, India occupied the second position in the world in fruits as well as vegetables production. During this year, while Brazil occupied first position in fruit production. China was the largest producer of vegetables. However, as per the estimates of FAO Production Yearbook, 1998, India had overtaken Brazil in total fruit production relegating the latter to the third position. Infact, during 1998, while China occupied the first position in world fruits and vegetable production, the position of India was second in the same. These figures and facts clearly underscore the pre- eminent position that India enjoys in the world in fruits and vegetables production. Due to its rich and varied agro-ecological and geographical resource base, India definitely have greater prospects of accelerating the horticultural production in the country in tune with international market that is emerging in the face of current globalisation and liberalization scenario.

Although India has significant share in the world production of various fruits and vegetables, only a meager quantity of horticultural products are exported today. A substantial quantity of the country's horticultural produce is lost due to poor post-harvest processing, handling and storage operations. It is estimated that nearly 30 to 35 per cent of the total horticultural production, particularly of fruits and vegetables, is lost annually in post-harvest losses (Singhal 1995) and this could be hampering India's net horticultural exports. Rising domestic demand for these high value commodities could also be working as a deterrent for exports and might be responsible for India's poor share in the total global horticultural exports.

In terms of fruits and vegetables production, Maharashtra is considered to be the most important state since it leads the country in the production of grapes, bananas, oranges and onions. Apart from these horticultural crops, wide range of other fruits, vegetables and flowers are also grown in the state. However, one of the recent studies has shown a declining trend in the yield growth of some of the horticultural crops grown in the state, especially in the case of onion and banana (Shah, 1998). This has undoubtedly affected the output growth of these valued horticultural crops in the state. There could be several reasons for this situation. Important among them could be the lack of proper attention given to the cultivation of these valued crops, lack of application of scientific and improved production techniques, and poor post-harvest infrastructure relating to processing, packaging and cold storage chains.

1.2 National Horticulture Board (NHB) : Soft Loan Schemes

Infact, many studies in the past have indicated the poor post-harvest infrastructure to be the major cause for the deteriorating health of horticulture industry in the country. Therefore, efforts are being made by various organisations not only to develop adequate post-harvest infrastructure and related facilities but also to provide sound footing for boosting country's horticultural exports. One such major organisation which is doing sustained efforts towards development of infrastructural facilities for the horticultural crops is the National Horticulture Board (NHB). The National Horticulture Board was established by the Government of India in 1984. The Board has gathered rich experience in terms of handling of a variety of programmes that not only include strengthening of

production base but also development of post-harvest infrastructure, including domestic and export trade of horticultural produce. One of the major efforts of NHB is the initiation of the soft loan schemes (SLS) which came into being in 1993-94. The two schemes are “Post-harvest management of horticultural crops” and “Development of marketing of horticultural produce through participation in soft loan”. The main thrust of these schemes is to create modern post-harvest infrastructure (PHI) that can reduce losses, improve quality, facilitate trade and ultimately give a better share to the producer in the rupee spent by the consumer.

These schemes are being implemented by NHB since 1993-94 and they entail for the provision of soft loan assistance to the beneficiaries of co-operative societies / private and public limited companies / farmer’s associations and public sector organisations, etc. The main objective of these schemes is to introduce new technology aside from strengthening infrastructure facilities with backward linkages among producers, processors and marketers. Under these schemes, soft loan assistance with a maximum limit of Rs. 1.00 crore (40 per cent of total loan as appraised by financial institution) is provided at the rate of 4 per cent service charges per annum with one year moratorium period to set up projects related to marketing, processing and also export oriented units and purchase of plants and machinery for the same. During 1997-98, an amount to the tune of Rs 157.97 million was released as soft loan to 22 organisations in the country. Further, during the financial year 1997-98, the NHB had released an amount to the tune of Rs. 35.71 million for various states for the establishment of 19 cold storages, six pre-cooling units, two specialised transport vehicles and eight grading / packing centres. The NHB had also released an amount of the order of Rs. 3.02 million in the form of subsidy to be provided for the supply of 43,776 plastic crates, especially for the states of Himachal Pradesh, Haryana, Maharashtra, Punjab and Rajasthan for the systematic handling of fruits and vegetables.

Although NHB provides soft loan with a maximum limit of Rs. 1.00 crore, there is also a ceiling for various components covered under these schemes. The various components covered under soft loan schemes with their respective ceiling of NHB loan are provided in Table 1.1. It is to be noted that NHB assistance is limited to 50 per cent of the actual cost or limit prescribed for each component, whichever is less. As for the NHB

soft loan, Maharashtra is the only state in the country, which has received maximum assistance under these schemes. There are as many as 15 beneficiaries of NHB soft loan in the state that include co-operative societies as well as private / public limited companies. These beneficiaries put together have received a soft loan component to the tune of Rs. 368.39 lakhs during the period between 1993-94 and 1996-97, which accounts for about 52 per cent of the total soft loan disbursed by NHB to various beneficiaries (26 beneficiaries) in the country during this period. Apart from these beneficiaries, the NHB has also sanctioned soft loan to various floriculture units in the country. During the given period of time, the NHB has financed 16 floriculture units in the country with Maharashtra accounting for eight such units. These floriculture units put together received a soft loan component to the tune of Rs. 1346.76 lakhs during the given period of time. Out of this, the state of Maharashtra alone accounted for a soft loan in the order of Rs. 737.26 lakhs.

Table 1.1 : Components Covered and Ceiling Prescribed under NHB Soft Loan Schemes

Sr. No	Components	Fifty per cent of actual cost or maximum limit of NHB loan (in lakh rupees)
1.	Mechanised grading packing centre	6.10
2.	Pre-cooling unit	5.00
3.	Cold storage	35.00
4.	Refrigerated truck / van	5.00
5.	Specialised transport vehicle	1.70
6.	a. Retail outlets (ordinary)	0.18
	b. Retail outlets (air-conditioned)	0.75
7.	Auction platform	0.50
8.	Ripening curing chamber	5.00
9.	Marketing kits, quality testing equipments, etc.	To be decided on case to case basis
10.	Improved packaging such as plastic crates	Subsidy to be decided on case to case basis

Note : * - In case of plastic crates, NHB assistance would be provided in the form of subsidy upto 50 per cent of the actual cost or Rs. 70 per crate whichever is less.

Although there are many beneficiaries of NHB soft loan schemes in the state, we have covered only two such organisations in this evaluation study. The details of NHB soft loan component released to these two organisations are provided in Table 1.2.

Table 1.2 : Project Financed under Various Schemes

Sector	Organisation	Project Financed (in lakh rupees)				
		Term Loan from Bank of India*	Soft Loan from NHB@	Member Share Capital	Loan from Food Processing Department	Total Loan
Co-operative Sector	1. Abhinav Grape Growers' Co-operative Society Ltd.	114.75 (49.07)	41.00 (17.53)	18.12 (7.75)	60.00 (25.65)	233.87
	2. Vighnagar Grape Growers' Co-operative Society Ltd.	32.64 (39.88)	41.00 (50.10)	8.20 (10.02)	-	81.84

Note : 1) * - Term loan sanctioned by Bank of India for civil and mechanical work

@ - Soft-loan sanctioned by NHB for one pre-cooling unit, one cold storage and one pack – house.

2) Figures in parentheses are percentages to the total project cost.

1.3 Objectives of the study

The study has been carried out with the following specific objectives:

- (i) To study the growth of post-harvest infrastructure (PHI) for fresh fruits, vegetables and flowers during the period between 1993-94 and 1996-97 in the state of Maharashtra.
- (ii) To analyze the NHB soft loan scheme with reference to adequacy of loan, infrastructural development, its use and constraints, etc.,
- (iii) To study the use of created PHI facilities by the farmers and its impact on their cropping pattern, employment and income, and
- (iv) To suggest policy measures for the improvement of the Soft Loan Schemes which would help in providing an effective base for the development of various horticultural crops and farmers in the state.

1.4 Need and Scope of the Study

Gifted as India is with diverse agro-climatic regions conducive to cultivation of a vast array of horticultural crops and products, the country can surely produce a wide variety of export-worthy fruits, flowers and vegetables and this strength surely needs to be further exploited. However, mention may be made here that a higher production performance of these valued crops can be achieved only by providing a complete package of necessary post-harvest infrastructural facilities. Post-harvest infrastructural facilities such as cooling, grading, packing, transportation, warehousing, etc. involve enormous efforts and huge capital investments which the NHB alone can not provide. As per the estimates reported by Kaul (1997), expenditure to the tune of Rs. 3000 per tonne will be needed to handle or create post-harvest infrastructural facilities for fruits and vegetables. This means that a total investment to the tune of about Rs. 30,000 crores will be incurred just to handle 30 per cent of the total fruits and vegetables production which is at present over 100 million tonnes, leaving aside floriculture and other sectors.

In the above context the NHB is trying to find ways and means to offset and minimize initial post-harvest losses and also slow down the chain reaction that trigger spoilage of horticulture crops. One of the measures adopted by the NHB is to develop the industry in a phased manner by providing assistance under soft loan schemes. The schemes were implemented by the NHB during 1993-94. However, after a span of five years of the implementation of the schemes, it was realised that a sizeable number of projects assisted under the schemes entered into a depressed position. Proper remedial measures are needed if this industry is to be saved from such a gloomy situation. In this context the imperative need of the hour is to critically evaluate the NHB soft loan schemes implemented during the period between 1993-94 and 1996-97.

Thus, in the light of these facts, the present study is designed not only to assess the NHB soft loan schemes but also to evaluate the impact of these schemes on the development of post-harvest infrastructure of horticultural crops. An evaluation of these schemes at this stage is likely to help in promoting further investment opportunities in this sector in such a planned and appropriate manner that might bring a positive change in an otherwise dismal scenario of this sector.

1.5 Organisation of the study Report

This report is organised in XI chapters. After this introductory chapter, the methodology adopted for this study is elaborated in chapter II. Chapter III is devoted to find out the status of fruit crops in the state of Maharashtra. The growth in post-harvest infrastructure facilities is analysed in chapter IV. Chapter V deals with the socio-economic profile of the selected sampled farmers. Genesis of the selected Grape Grower's Societies and, their progress in terms of membership pattern, share capital, profit profile, initial investments towards development of infrastructural facilities, labour employment, etc., and also the constraints faced by them in receiving loans are evaluated in Chapter VI. Performance of the selected horticultural units in terms of domestic and export trade of the produce, export cost, and the processing and marketing related constraints faced by them are assessed in Chapter VII. Chapter VIII is designed to evaluate the impact of NHB soft loan schemes on the resource position of the sampled farmers, especially in terms of change in land utilization pattern, cropping pattern, livestock resources, varietal selection of the crops, etc. It also deals with the impact of NHB soft loan schemes on income and employment levels of the sampled farmers. Chapter IX brings out the problems and prospects of post-harvest infrastructure development in Maharashtra. Chapter X places an onerous task on analysing the production, utilization and sale pattern of various fruits, vegetable and flower crops grown by the sampled farmers, types of marketing channels adopted by the farmers, post-harvest losses of produce, etc. The report is concluded in chapter XI with a synthesis of the research findings and a discussion of their implications for development of post-harvest infrastructure in Maharashtra.

CHAPTER – II

METHODOLOGY

2.1 Selection of District, PHI Units and Villages:

The study has been conducted in Pune district of Maharashtra state. Pune district was selected purposely for two reasons. Firstly, Pune district has large area under horticultural crops and it is also a home to several horticultural product processing and export units in Maharashtra state. Secondly, Pune district has also received highest amount of assistance from National Horticultural Board (NHB) under the soft loan schemes for the development of Post Harvest Infrastructure (PHI) for horticultural crops.

Among the various units where the Post Harvest Infrastructure facilities were developed with the help of National Horticultural Board soft loan schemes, the two units selected for this study were : (a) Abhinav Grape Growers Co-operative Society Ltd., Agar, District Pune, and (b) Vighnagar Grape Growers Co-operative Society Ltd., Narayangaon, District Pune. These two societies were established on July 19, 1990.

These co-operative societies received the produce from a number of farmers for post-harvest processing and or marketing. Both the selected co-operative societies deal in marketing of farmer's horticultural produce not only in domestic but also in foreign markets. The cluster of villages surrounding these units which form the 'catchment area' of these units were selected for this study.

2.2 Selection of Sampled Farmers:

A list of member farmers of these co-operative societies along with their landholding size was obtained from the office of the respective societies. Similarly, a list of non-member farmers who have supplied produce to the respective co-operative societies for processing/marketing was also obtained. Member and non-member farmers were then grouped into three landholding categories – small farmers (less than 2.00 ha of

land), medium farmers (2.01 to 4.00 ha of land) and large farmers (more than 4.00 ha of land).

Thirty farmers who were the members of the Abhinav Grape Growers Co-operative Society and another 30 farmers who were the members of the Vighnagar Grape Growers Co-operative Society were randomly selected from different farm size groups. Thus, 10 member farmers each representing small, medium and large landholding categories were selected from each society. Similarly, another 30 non-member farmers from each society representing the small (10), medium (10), and large (10) landholding categories were also randomly selected. Therefore, the final sample farmers selected for this study were 120 respondents that included 60 member farmers and 60 non-member farmers equally distributed in different landholding categories as well as in the two selected co-operative societies.

2.3 Data Collection and Reference Period:

The primary data were collected from the member and non-member sample farmers from both the societies through personal interviews. This data was collected through a specially designed and pre-tested questionnaire that covered the information on household resource base, land use pattern, cropping pattern, varietal selection of crops, various components of production and marketing costs, production, utilisation and sale pattern of crops, channels of marketing of horticultural crops, post harvest losses during various operations, employment and income and constraints faced by the farmers in processing/marketing of their horticultural produce. Discussions were held and information was also collected from various officials of the selected co-operative societies, including the chairman and secretary of the respective co-operative societies.

Primary data from the sampled member and non-member farmers were mainly collected for the reference year 1997-98. However, in order to evaluate the impact of National Horticultural Board soft loan scheme on cropping pattern, employment and income levels of the farmers, data on relevant parameters were also collected from the reference year 1992-93. Further, with a view to evaluate varietal shift in cropping

pattern, data on area under different varieties of fruit, vegetable and flower crops were collected separately for the entire study period between 1992 and 1998.

The data regarding the selected Post Harvest Infrastructure units were also collected through a specially designed schedule that covered various aspects such as history of development of Post Harvest Infrastructure unit, growth in membership, share capital, profit profile, business turnover, investments on various infrastructural facilities, soft loan from the National Horticultural Board, level of employment in various activities, cost of processing of produce, quantum and value of exports, prices received from various marketing centres, productivity of selected crops grown at the study villages, post-harvest losses of these crops, actual storage capacity available at the selected societies, capacity utilisation and information on the constraints and suggestions to improve processing and marketing. Besides this, necessary data related to Maharashtra on area, production and productivity of horticultural crops, exports of horticultural products, growth in cold storage and other post-harvest infrastructure facilities were also collected from various sources.

CHAPTER - III

STATUS OF FRUITS, VEGETABLE AND FLOWER CROPS IN MAHARASHTRA

This chapter attempts to probe the structural changes in production pattern of various horticultural crops in the state of Maharashtra and India. The objective of this exercise is to evaluate the underlying trends in the share of Maharashtra in India's total horticultural production, apart from examining the growth and instability in area, production and productivity of principal horticultural crops in the state. This chapter also deals with the evaluation of export trade of India in various horticultural products, particularly in more recent times.

3.1 Changing Horticultural Production Scenario:

The sustained thrust on planned development has vastly transformed the horticultural scenario of India in general and that of Maharashtra in particular. Not only this thrust has seen a significant expansion of the horticulture production base, profitability and economic viability-wise also, it has turned horticulture into a potentially more vibrant industry.

It could be readily seen from Table 3.1 that various fruits and vegetables produced in the state of Maharashtra and India as a whole got real boost only between the late eighties and the mid- nineties, that is, in the face of more liberal market environment. During the period between early eighties and the mid-nineties, while oranges and cashewnuts production in Maharashtra recorded more than two folds overall increase in their production levels, grape production of the state had fabulous growth so much so that it registered a nearly ten folds increase in its production in the mid-nineties over its early eighties production figures. In contrast, banana and onion produced in the state showed only moderate overall increases in their production levels during this period. Most of the production increase for these two horticultural crops was noticed in the second half of the overall period considered. In fact, onion production in Maharashtra had declined between the early – and the late eighties only to surge ahead fairly sharply in post late eighties

Table 3.1 : Changing Structure of Horticultural Production in Maharashtra and India (1980/1981 - 1994/95)

Crop	Average Production in '000' MT			Per cent Change		
	Period			2 Over	3 Over	1 Over
	1	2	3	1	2	3
MAHARASHTRA						
Banana	1268	1390	2083	9.62	49.86	64.27
Grapes	37	106	414	186.49	290.57	1018.92
Oranges	86	165	331	91.86	100.61	284.88
Mosambi	NA	89	153	-	71.91	-
Cashewnuts	10	22	27	120.00	22.73	170.00
Potato	60	54	66	-10.00	22.22	10.00
Sweet Potato	84	79	79	-5.95	0.00	-5.95
Onions	740	670	1083	-9.46	61.64	46.35
INDIA						
Banana	4385	5874	9219	33.96	56.95	110.24
Grapes	227	328	699	44.49	113.11	207.93
Oranges	1106	1473	1930	33.18	31.03	74.50
Mosambi	NA	NA	864	-	-	-
Cashewnuts	201	260	349	29.35	34.23	73.63
Potato	9845	13881	16675	40.99	20.13	69.38
Sweet Potato	1595	1340	1188	-15.99	-11.34	-25.52
Onions	2526	2860	3844	13.22	34.41	52.18
Share of Maharashtra in India (%)						
Banana	28.92	23.66	22.59	-18.19	-4.52	-21.89
Grapes	16.30	32.32	59.23	98.28	83.26	263.37
Oranges	7.78	11.20	17.15	43.96	53.13	120.44
Mosambi	-	-	17.71	-	-	-
Cashewnuts	4.98	8.46	7.74	69.88	-8.51	55.42
Potato	0.61	0.39	0.40	-36.07	2.56	-34.43
Sweet Potato	5.27	5.90	6.65	11.95	12.71	26.19
Onions	29.30	23.43	28.17	-20.03	20.23	-3.86

Note: Period 1 = 1980/81 – 1982/83 ; Period 2 = 1986/87 – 1988/89;
Period 3 = 1992/93 - 1994/95.

Sources: 1) Districtwise Agricultural Statistical Information of Maharashtra Part-II, (1995-96 and 1996-97), Commission rate of Agriculture, Pune.
2) Agriculture, Centre for Monitoring Indian Economy (CMIE), August 1997.

period. Similarly, potato and sweet potato production of Maharashtra had declined during the period between early - and the late only to pick up in the subsequent period. As for mosambi production in Maharashtra, it had increased by nearly two folds during the given period of time. Further, the overall expansion in production levels for grapes, oranges and cashewnuts was found to be much higher in Maharashtra as compared to the country as a whole. However, a fall in potato as well as sweet potato production was noticed in Maharashtra during the late eighties but, thereafter, potato production, in particular, recorded perceptible production increases. As for India, sweet potato production was found to decline continuously all through the period between early eighties and the mid-nineties. Despite the fact that oranges and potato production in India increased considerably during the given period of time, a considerable slowing down in the production increases of these two crops was also noticed during the period between late eighties and the mid-nineties.

Although Maharashtra accounted for bulk of the nation's total output of banana, grapes, oranges and onions, the scenario obtaining over the past decade and a half was not seen to be very encouraging in terms of the state's share in India's total production of banana and onions. In fact, Maharashtra's share in total banana production of the country was noticed to come down from 29 per cent during the early eighties to about 23 per cent by the mid-nineties. Despite this, Maharashtra could still maintain its position as one of the leading states in banana production in the country. During 1995-96, Tamil Nadu accounted for the lion's share (28 per cent) in total banana production in the country (Table 3.2). The other major banana producing states of India were Karnataka, Gujarat, Andhra Pradesh, Madhya Pradesh, and Assam. It is to be noted here that during 1991-92 the state of Maharashtra ranked first in the country, accounting for more than 26 per cent of the nation's total banana production (Shah, 1998)

As regards onions, a considerable fall in onion production of Maharashtra was noticed between early - and the late eighties period. As a result of this, the share of Maharashtra in India's total onion production declined during the given period of time. In contrast, the share of grape production of Maharashtra in India's total grape production increased dramatically from the low of 16 per cent during the early eighties to a record high of 59 per cent by the mid-nineties. It is worth a mention here that at present all the

Table 3.2 : Share of Different States in Horticultural Production of India (1995-96)

Crop	Per cent share in Production
Banana [@]	Andhra Pradesh (7.90); Assam (4.35); Bihar (3.99);Gujarat (8.18); Karnataka (12.76); Kerala (2.68); Madhya Pradesh (4.47); Maharashtra (22.27); Orissa (1.93); Tamil Nadu (28.20); West Bengal(1.54); Others (1.73)
Grapes [@]	Andhra Pradesh (7.67); Haryana (2.98); Karnataka (26.84); Maharashtra (45.57); Punjab (10.45); Tamil Nadu (5.14); Madhya Pradesh (0.50); U.P.Hills (0.50); Others(0.35)
Oranges [@]	Arunachal Pradesh (1.08); Assam (6.01); Karnataka (2.32); Madhya Pradesh (12.22); Maharashtra (61.36); Rajasthan (3.31); Tamil Nadu (7.45); Tripura(1.99); U.P.Hills (0.56); Sikkim (0.73); Mizoram (2.39); Himachal Pradesh (0.32); Others (0.26)
Mosambi [@]	Andhra Pradesh (59.23); Karnataka (21.84);Madhya Pradesh (0.46); Maharashtra (10.27);Rajasthan (0.68); Punjab (7.42); Others (0.10)
Cashewnuts ^{@@}	Andhra Pradesh (17.16); Karnataka (9.00); Kerala (33.51); Maharashtra (16.73); Orissa (10.29); Others (13.31)
Potato [@]	Andhra Pradesh (0.06); Arunachal Pradesh (0.18); Assam (2.68); Bihar(8.00);Gujarat(2.45);Haryana(1.12); Himachal Pradesh (0.62); Karnataka (1.81); Madhya Pradesh (2.75); Maharashtra (0.40); Meghalaya (1.11); Orissa (0.46); Punjab (4.22); Tamil Nadu (0.44); Tripura (0.41); Uttar Pradesh (39.62); West Bengal (33.21); Others (0.46)
Sweet Potato ^{@@}	Andhra Pradesh (1.60);Assam (2.65);Bihar (15.14);Karnataka (3.18); Kerala(1.49);Madhya Pradesh (3.36);Maharashtra(6.60); Orissa (32.36) ; Uttar Pradesh (25.35); Tamil Nadu (1.31); Others (6.96)
Onion [@]	Andhra Pradesh(9.16);Assam(0.40);Bihar(3.37);Gujarat(10.88); Haryana (2.61); Karnataka (10.79); Madhya Pradesh(5.77); Maharashtra(27.46); Orissa(9.31); Punjab (0.79); Rajasthan(3.96); Tamil Nadu (5.67); Uttar Pradesh(9.71); Others (0.12)

Note: Shares are based on the following data resources:

@ - Indian Horticulture Database (1998), National Horticulture Board, Ministry of Agriculture, Government of India.

@@ - Agriculture, Centre for Monitoring Indian Economy (CMIE), August 1997.

Table 3.3: Share of Different States in Acreage and Production of Horticultural Crops of India (1995-96)

(in per cent)

States	Fruits		Vegetables		Flowers	
	Area	Production	Area	Production	Area	Production
1. Andhra Pradesh	11.63 I	13.18 II	3.18	3.41	26.87	19.79
2. Arunachal Pradesh	0.82	0.16	0.32	0.11	-	-
3. Assam	3.01	2.92	4.67	3.47	0.54	0.02
4. Bihar	8.51 IV	14.56 I	16.06 II	17.16 II	0.13	0.51(0.06)
5. Goa	0.34	0.23	0.14	0.09	-	-
6. Gujarat	4.47	4.98	3.15	2.92	-	-
7. Haryana	0.59	0.35	1.76	1.98	1.78	6.35(11.92)
8. Himachal Pradesh	5.82	0.75	0.73	0.79	0.04	0.03
9. Jammu & Kashmir	3.86	1.90	0.62	0.49	-	-
10. Karnataka	8.22	11.39	5.49	7.97 IV	23.39	33.68
11. Kerala	5.83	4.40	4.57	3.90	-	-
12. Madhya Pradesh	1.84	2.75	3.56	3.29	1.63	3.93
13. Maharashtra	9.26 II	11.56 IV	4.05	4.13	6.91	6.85
14. Manipur	0.68	0.27	0.09	0.05	0.10	Neg.
15. Meghalaya	0.74	0.58	0.42	0.30	-	-
16. Mizoram	0.45	0.17	0.23	0.11	-	-
17. Nagaland	0.14	0.17	0.15	0.12	-	-
18. Orissa	5.58	2.99	16.44 I	12.16 III	0.14	0.16 (0.10)
19. Punjab	2.51	1.83	1.97	2.48	0.73	1.08
20. Rajasthan	0.59	0.57	1.42	0.50	2.42	0.57
21. Sikkim	0.27	0.03	0.16	0.07	-	-
22. Tamil Nadu	5.53	11.61 III	3.28	6.14	17.33	21.26
23. Tripura	0.96	0.97	0.60	0.50	-	-
24. U.P.Hills	5.48	1.21	1.65	1.10	0.21	0.06
25. U.P.Plains	9.24 III	7.25	14.55 III	18.27 I	0.20	0.05 (2.98)
26. West Bangal	3.44	3.09	9.56	7.53	15.27	2.46 (84.94)
27. Others (UT's)	0.19	0.13	1.18	0.96	2.31	3.23 (0.00)
Total [Area in Ha; Production in MT]	3357283	41507011	5335447	71594564	81923	333759 (5368)

Note: Figures in parenthesis under flower production are number of flowers in lack nos.

Source: Shares are based on data obtained from 'Indian Horticulture Database',

National Horticulture Board, Ministry of Agriculture, Government of India,
Gurgaon, 1998.

grapes produced in the country come from four major states, namely, Maharashtra, Karnataka, Punjab and Andhra Pradesh (Table 3.2). As for oranges and sweet potato, a sharp increase was noticed in share of Maharashtra in the country's total production of these fruits and vegetables between the early eighties and the mid-nineties. However, the share of Maharashtra in cashewnut production of India had declined marginally between the late eighties and the mid-nineties after showing a steep rise in the same between early - and the late eighties.

In fact, in terms of fruits, vegetable and flower production, Maharashtra is considered to be the most important state of the country. This is evident from the fact that during 1995-96, this state ranked second in the country in terms of acreage under fruit crops and fourth in production of these fruit crops (Table 3.3). The major fruits producing states in the country were seen to be Bihar, Andhra Pradesh, Tamil Nadu, Maharashtra, Karnataka and Uttar Pradesh (plains). On the other hand, major vegetable growing states in the country were seen to be Uttar Pradesh (plains), Bihar, Orissa, Karnataka, West Bengal, Tamil Nadu, and Maharashtra. The share of Maharashtra in acreage as well as in production of vegetables was found to be above 4 per cent in the country during 1995-96.

As regards flowers, very few states in the country were noticed to cultivate flowers for commercial purposes. The major flower growing states in the country were found to be Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra and West Bengal (Table 3.3). During 1995-96, Maharashtra occupied 5th position in the country in terms of flower production.

In fact, the diverse agro-climatic condition of Maharashtra is conducive to the cultivation of vast array of horticultural crops like grapes, banana, oranges, onion, etc. round the year. However, apart from these horticultural crops, wide range of other fruits, vegetables and flower crops are also being grown in the state. Information regarding area, production and productivity of various fruits, vegetables and flower crops in the state of Maharashtra during 1994-95 is given in Table 3.4.

It could be seen from Table 3.4 that among various fruit crops grown in Maharashtra citrus fruit accounted for the bulk of the total area (25 per cent) under fruit crops, followed by mango (16 per cent), banana (15 per cent), cashewnuts (8 per cent),

Table 3.4 : Area, Production and Productivity of Fruit, Vegetable and Flower Crops in Maharashtra : (1994-95)

Crops	Area		Production		Productivity (MT/Ha)
	Area (Hectares)	Percentage to total	Production (MT)	Percentage to total	
FRUITS					
Banana	62706	15.12	3072665	58.93	49.00
Citrus	105059	25.32	782624	15.01	7.45
Mango	64936	15.65	361829	6.94	5.57
Guava	8036	1.94	79557	1.53	9.90
Grapes	28064	6.77	350437	6.72	12.49
Papaya	1140	0.28	16090	0.31	14.11
Sapota	4914	1.19	30781	0.59	6.26
Litchi	25	Neg.	25	Neg.	1.00
Cashewnut	34529	8.32	29127	0.56	0.84
Coconut	13121	3.16	85422	1.64	6.51
Pomegranate	10773	2.60	107090	2.05	9.94
Ber	9636	2.32	76030	1.46	7.89
Others	71908	17.33	222212	4.26	3.09
Total	414847		5213889		12.57
VEGETABLES					
Potato	11363	5.14	122053	4.35	10.74
Onion	82997	37.58	1200264	42.73	14.46
Cabbage	9933	4.50	214351	7.63	21.56
Cauliflower	6426	2.91	126490	4.50	19.68
Tomato	29326	13.28	446791	15.91	15.24
Okra	5329	2.41	41015	1.46	7.70
Peas	352	0.16	1260	0.04	3.58
Brinjal	20153	9.13	311500	11.09	15.46
Sweet Potato	2095	0.95	31425	1.12	15.00
Carrot	1440	0.65	21600	0.77	15.00
Radish	1278	0.58	17828	0.63	13.95
Methi	3737	1.69	37370	1.33	10.00
Others	46418	21.02	237075	8.44	5.11
Total	220847		2809022		12.72
FLOWERS					
Rose	778	23.18	5464	34.06	7.02
Gladiolus	15	0.45	276	1.72	18.40
Marigold	992	29.56	4567	28.47	4.60
Jasmine	366	10.91	1256	7.83	3.43
Chrysanthemum	439	13.08	1794	11.18	4.09
Carnation	8	0.24	150	0.94	18.75
Others	758	22.58	2534	15.80	3.34
Total	3356		16041		4.78

Source: NHB Production Year Book , 1997, National Horticulture Board, Ministry of Agricultural, Government of India.

grapes (7 per cent), coconut (3 per cent), pomegranate (3 per cent) and ber (2 per cent). The area under other fruit crops like sapota, litchi, papaya and guava were seen to be very marginal. Among various vegetables, onion was the main crop, which accounted for nearly 38 per cent of the total acreage under vegetables in the state. Other important vegetables grown in the state were brinjal, tomato, potato, cabbage, cauliflower and okra. The shares of these crops in total acreage under vegetables were found to be 9 per cent, 13 per cent, 5 per cent, 5 per cent, 3 per cent and 2 per cent, respectively. As regards flowers, acreage under marigold was found to be the highest (30 per cent), followed by rose (23 per cent), chrysanthemum (13 per cent) and jasminum (11 per cent).

Although banana occupied only 15 per cent of the total acreage under various fruit crops, the share of this crop in total fruit production in the state was seen to be as high as 59 per cent. Contrary to this, citrus fruits occupied 25 per cent of the total acreage under various fruit crops, but their share in total fruit production of the state was hardly 15 per cent. However, grapes, papaya and pomegranate have shown by and large equal share in state's total acreage as well as production of various fruit crops. As for vegetables, while acreage under onion accounted for 38 per cent of the total acreage under vegetables, its share in state's total vegetable production was as high as 43 per cent. Similarly, various other vegetables like cabbage, cauliflower, tomato and brinjal have shown much higher contribution to the state's total vegetable production as compared to their share in state's total acreage under vegetable production. Rose, marigold and chrysanthemum are by far the most important flower crops grown in the state of Maharashtra. Although these three flower crops occupied about two-thirds of the total acreage under flower crops, it could be noted that nearly 75 per cent of the total flower production in the state was contributed by these flower crops.

The foregoing results clearly underscore the fact that the state of Maharashtra enjoys a pre-eminent position in fruits, vegetables and flowers production in the country. It not only grows export-oriented fruits and vegetables like banana, oranges, grapes, mangoes and onions but also a host of many other horticultural commodities. However, some of the fruits and vegetables grown in the state have shown disquieting trends. The declining trends in Maharashtra's share in nation's total production of banana and onion are cases in point in this respect. Thus, in order to delineate the reasons for increase or

decrease in the shares of Maharashtra in India for various horticultural crops, we have gone into more details in the next part of this chapter and have examined structural changes and rates of growth along with instability in area, production and productivity of not only the crops listed in Table 3.1 but also one more crop namely, arecanut. This crop, of late, has shown considerable expansion in its production levels in the state of Maharashtra.

3.2 Structural Changes and Growth and Instability in Area, Production and Productivity of Horticultural crops in Maharashtra:

Structural changes and growth trends in area, production and productivity together with instability in rates of growth for various horticultural crops of Maharashtra over the period between 1982/83 and 1996/97 are provided in Table 3.5.

As evident from Table 3.5, majority of the selected horticultural crops grown in Maharashtra showed perceptible rise in their production levels over the period between 1982/83 and 1996/97, despite slow expansion of acreage under the crops. Most of the increase in acreage as well as in production levels was noticed after the period late eighties. The increase in acreage under grapes was found to be more than seven folds during the period between early eighties and the mid-nineties. During the same period, oranges and cashewnuts showed 2-3 folds rise in their acreages. The overall increase in acreage under banana and onion was found to be around 70 per cent during the given period of time. However, in case of arecanut and sweet potato, a considerable decline in acreage was noticed. This overall decline in acreage under these two crops was noticed due mainly to sharp decline in the same during the period between early - and the late eighties as thereafter the acreage under these crops either remained constant or increased marginally. The overall increase in acreage under potato production was also found to be very marginal.

The higher increase in production, despite slow expansion in acreage under the crops, was due mainly to increase in productivity levels. This is especially true in case of banana, grapes, oranges, and cashewnuts. On the other hand, arecanut production increased by nearly two folds during the period between early eighties and the mid-

Table 3.5: Structural Changes and Growth and Instability in area, Production and Productivity of Horticultural Crops in Maharashtra

Crop	Triennium Average			Per cent Change			(1981-1995)	
	Period			2 Over	3 Over	3 Over	CGR (%)	CII (%)
	1	2	3	1	2	1		
AREA								
Banana	249	275	413	10.44	50.18	65.86	3.08***	14.71
Grapes	3558	11405	25637	220.54	124.79	620.55	18.78***	19.99
Oranges	23637	29941	62152	26.67	107.58	162.94	5.14***	8.00
Mosambi @	-	3234	9278	-	186.89	-	28.42***	221.36
Cashewnuts	11567	13800	23782	19.30	72.33	105.60	6.59	11.76
Arecanut	2187	1900	1900	-13.12	0.00	-13.12	-1.30	12.44
Potato	11.67	12.20	13.90	4.54	13.93	19.11	1.58	3.67
Sweet Potato	6.00	5.17	5.30	-13.83	2.51	-11.67	-0.38	9.33
Onion	551	615	939	11.62	52.68	70.42	2.57	16.16
PRODUCTION								
Banana	1193	1500	2344	25.73	56.27	96.48	4.42***	15.28
Grapes	522	2010	6392	285.06	218.01	1124.52	25.28***	31.40
Oranges	857	2109	8121	146.09	285.06	847.61	11.57***	147.24
Mosambi @	-	330	1001	-	203.33	-	44.32***	38.00
Cashewnuts	6542	11790	23055	80.22	95.55	252.42	7.02***	27.58
Arecanut	1976	2436	4046	23.28	66.09	104.76	3.72***	14.39
Potato	59.33	54.73	61.9	-7.75	13.10	4.33	0.97	2.18
Sweet Potato	78.00	74.00	74.40	-5.13	0.54	-4.62	-0.05	4.01
Onion	7969	7719	11719	-3.14	51.82	47.06	1.81	15.58
PRODUCTIVITY								
Banana	47.91	54.55	56.76	13.86	4.05	18.47	1.27***	2.82
Grapes	14.67	17.62	24.93	20.11	41.49	69.94	5.18***	22.60
Oranges	18.83	26.89	47.26	42.80	75.75	150.98	5.29	126.92
Mosambi @	-	34.15	39.24	-	14.90	-	7.45**	18.58
Cashewnuts	565.57	854.35	969.43	51.06	13.47	71.41	8.56***	22.22
Arecanut	80.40	91.07	174.50	13.27	91.61	117.04	4.77***	18.49
Potato	5084	4486	4453	-11.76	-0.74	-12.41	-0.54	1.97
Sweet Potato	13000	14313	14038	10.10	-1.92	7.98	-0.53	2.09
Onion	14.46	12.55	12.48	-13.21	-0.56	-13.69	-0.74	11.28

Note: 1) Period 1 = 1982/83 – 1984/85 ; Period 2 = 1988/89 – 1990/91; Period 3 = 1994/95 – 1996/97;

2) @ - Growth and Instability are estimated for the period 1985/86 to 1996/97 due to non-availability of data for the preceding years.

3) Area: Potato and Sweet Potato ('000' hectares); Banana and Onions ('00' hectares) Grapes, Orange, Mosambi, Cashewnut, and Arecanut, (in Hectare); Production: Banana, Potato and sweet Potato ('000' MT); Grapes, Oranges, Mosambi, Arecanut and Onion ('00' MT); Cashewnut (in MT); Productivity: Banana, Grapes and onions (Tons/Hectares); Orange, Mosambi and Arcanut (in kgs/bearing tree); Cashewnut, Potato and Sweet potato (in kg/ha).

4) Due to non-availability of data for the preceding year, Growth and Instability are computed for the period 1985/86 to 1996/97) CGR = Annual Compound Growth Rate ; CII = Coppock Instability Index ; *, ** and *** denote significance of CGR at 1,5 and 10 per cent level of probability.

nineties despite about 13 per cent acreage loss for this crop during the same period. This was again due to an overall increase in productivity level of this crop during the given period of time. Further, during the same period, the overall decline in output of sweet potato was much lower as compared to overall decline in acreage under this crop. This was also a reflection to the increase in productivity level of sweet potato during the given period of time. However, the productivity levels of potato and onions have declined since the increase in output of these two crops was much lower as compared to increase in acreage under these crops during the same period. The decline in productivity of potato and onion was found to be more sharp during the period between early - and late eighties as compared to the period between late eighties and the mid-nineties.

Evidently, various horticultural crops grown in the state of Maharashtra showed significant overall increase in their production as well as productivity levels even in the face of considerable variation in acreage under these high value crops witnessed during the given period. These fluctuations, however, could not explain the exact nature of secular trend that various horticultural crops had followed over time. In order to recapitulate and discern the exact secular trend in the time series data, compound growth rates were worked out with respect to area, production and productivity of the selected horticultural crops encompassing the period 1982/83 – 1996/97. Further, to understand growth performance of these parameters better and in order to capture year to year fluctuations in the same over the given period of time, an index of instability, as suggested by Coppock (1962), was also incorporated in the analysis in order to account for the trend component in the time series data.

Unless growth trends and fluctuations thereof are assessed and evaluated, it is difficult to arrive at any concrete conclusion about the extent of rise or fall in various parameters in question.

The observance of the trend obtaining over the past decade and a half revealed that compared to yield, production growth was faster for all the selected horticultural crops save for cashewnuts and arecanuts which showed higher yield than production growth (Table 3.5). As a matter of fact, acreage under arecanut went down during the overall period in Maharashtra. On the other hand, the growth in acreage under cashewnut was lower as compared to growth in output of this crop during the period between

1982/83 and 1996/97. And, as a result the growth in productivity was found to be higher than growth in output of this crop.

The analysis also revealed large production growth rate differences across different crops. Between 1982/83 and 1996/97, grape output grew at the rate of 25 per cent per annum, which was more than twice the output growth of oranges but half that of Mosambi. Both area as well as yield per hectare contributed to this higher rate of growth in output of grapes. Among the various horticultural crops, yield growth was highest for cashewnuts followed by mosambi, oranges, grapes, arecanut and banana. The productivities of onion, potato and sweet potato, however, declined marginally over time. This was despite the fact that acreages under onion and potato, in particular, increased significantly during the given period of time. A decline in productivity inspite of reasonable acreage growth contributed to onion and potato registering slower production growth rates in the state of Maharashtra.

In general, output instability was observed to be much higher than area and yield instabilities across various selected crops (Table 3.5). This held true for all the selected fruits and vegetables. Among various fruits and vegetables, output as well as yield growth of oranges was most unstable. However, area-wise, mosambi showed higher instability in its acreage than other fruits and vegetables. Thus, fluctuations in output growth as well as those in area and yield growth were much higher for various citrus fruits as compared to other horticultural crops in Maharashtra.

Notably, the foregoing analysis presents us with two differing scenarios. Thus, over the course of time, while grape production in Maharashtra grew significantly as result of perceptible rise in productivity and acreage under the crop, a perceptible decline was also noticed in the productivity of onion, potato and sweet potato in the state. Undoubtedly, adoption of various technological measures such as increasing use of drip irrigation, use of improved varieties of seeds, etc. contributed no less in giving a real boost to the productivity of grapes in the state. And, consequent to these concerted efforts, the output of grapes was also found to have increased many folds for the state of Maharashtra. On the other hand, various vegetable crops like onion, potato and sweet potato appeared to have been given less attention by various policy makers towards increase in their productivity levels. Suitable technological measures are, therefore,

required to be initiated not only to increase the productivity but also to increase the acreages, under these vegetable crops. In fact, slower output growth of onion and decline in its productivity in the state of Maharashtra could be considered alarming in view of its export competitiveness and domestic consumption requirements.

3.3 Horticultural Exports of India:

Due to lack of data, horticultural exports of the state of Maharashtra could not be evaluated. However, an attempt is made in this section to provide an insight into the structural changes in export trade of India in these valued commodities over the period between early eighties and the mid-nineties.

In fact, it has indeed been only in the last few years that Indian horticultural exports got a real boost because of more liberal market environment. In 1994-95 budget proposals, the Finance Ministry also gave due recognition to the potential of horticultural sector, particularly on the export front. Nonetheless, fluctuations encompassing horticultural production have many a times diluted and undermined our efforts, commitments and credibility to bolster India's horticultural exports. How highly India's horticultural exports have fluctuated over the past decade and a half can be clearly seen by visualising the trends obtainable from Tables 3.6 and 3.7.

Although potato exports of India fell by 74 per cent in quantity term and 77 per cent in value term during the period between early - and the late eighties, a sharp increase in the export trade of the same was noticed after the late eighties period so much so that there was about 3 folds overall increase in potato exports from India during the period between early eighties and the mid-nineties (Tables 3.6 and 3.7). In quantity terms, tomato exports of India increased by nearly two folds during the period between late eighties and the mid-nineties. However, in value terms, the export trade of India in tomato was found to be sharply declining during this period. This was mainly due to decline in international prices of tomato during the given period of time.

The banana export of India was found to decline steadily all through the period between early eighties and the mid-nineties; the decline being more sharp in value terms as compared to quantity term. Further, the decline in quantum of banana export from

India was sharper after the late eighties period as compared to the period between early - and the late eighties. In dismal contrast to continuous decline in banana exports of India, the onion export of the country has followed a reverse trend and has shown an overall export expansion of 110 per cent in quantity terms of trade and about 80 per cent in value terms of trade between the early eighties and the mid-nineties. Although oranges export of India also increased perceptibly during the given period of time, most of the increase in oranges exports from India was noticed after the late eighties period, especially in quantity terms. On the other hand, a declining trend was also seen to be caught up with lemon exports from India between early - and the late eighties and for other citrus fruits between late eighties and the mid-nineties. However, lemon exports from India expanded sharply after the late eighties period so much so that there was about 5 folds increase in export trade of India for this citrus fruit during the period between early eighties and the mid-nineties. Other fruits like grapes, apple and coconut also showed perceptible increase in their export trade from India after the late eighties period, both in quantity and value terms. However, pears and pineapple export trade of India was found to decline after the late eighties period. These observations clearly underscore the highly fluctuating nature of horticultural exports of India over the past decade and a half.

In general, the export trade of India in fruits and vegetables has grown by about 120 per cent in value terms over the period between early eighties and the mid-nineties. Most of the increase in export trade of India in fruits and vegetables was found after the late eighties period, that is, in the face of more liberal market environment (Table 3.7). In this sequel, vegetable export of India grew more sharply as compared to fruit export. Among various fruits, nuts (edible, fresh and dried) exports constituted the major share. The bulk of the nuts exports from India were found to be contributed by cashewnuts. The cashewnuts exports of India was found to expand by more than two folds during the period between early eighties and the mid-nineties. It is to be noted that the share of fruits and vegetable in total agricultural product exports of India remained by and large constant and hovered at around 12 per cent during the period between early eighties and the mid-nineties, though a marginal increase in the same was also noticed during the late eighties period.

Table 3.6 : Structural Changes in Horticultural Exports of India (Quantity Terms)

(in '000' MT)

Commodity	Triennium Average			Per cent Change		
	Period			2 Over	3 Over	3 Over
	1	2	3	1	2	1
Potatoes	12.00	3.17	33.67	-73.58	962.15	180.58
Tomato Fresh	-	0.36	0.68	-	88.89	-
Onion	153.33	204.78	320.05	33.56	56.29	108.73
Oranges+ Tang+ Clem	8.50	8.63	21.65	1.53	150.87	154.71
Lemons & Limes	0.16	0.04	0.78	-75.00	1850.00	387.50
Other Citrus Fruits	-	0.30	0.12	-	-60.00	-
Bananas	1.70	1.42	0.78	-16.47	-45.07	-54.12
Apples	-	4.95	11.90	-	140.40	-
Grapes	-	4.91	18.04	-	267.41	-
Raisins	Neg	Neg	0.13	-	-	-
Coconuts	-	0.02	0.09	-	350.00	-
Coconut Desicated	-	Neg	0.23	-	-	-
Pears	-	0.50	0.10	-	-80.00	-
Pineapple Fresh	-	0.31	0.12	-	-61.29	-
Pineapple Canned	-	-	0.03	-	-	-

Note : Period 1 = 1981-1983; Period 2 = 1988-1990 ; Period 3 = 1995-97

Source: FAO Trade Yearbook ; 1984, 1990 and 1997.

Table 3.7 : Structural Changes in Horticultural Exports of India (Value Terms)

(in million US \$)

Commodity	Triennium Average			Per cent Change		
	Period			2 Over	3 Over	3 Over
	1	2	3	1	2	1
Potatoes	1.73	0.40	5.59	-76.88	1297.50	223.12
Tomato Fresh	-	0.14	0.12	-	-14.29	-
Onion	32.00	42.44	57.33	32.63	35.08	79.16
Oranges + Tang + Clem	1.55	2.50	4.65	61.29	86.00	200.00
Lemons and Limes	0.06	0.02	0.32	-66.67	1500.00	433.33
Other Citrus Fruits	-	0.08	0.03	-	-62.50	-
Bananas	0.84	0.16	0.30	-80.95	87.50	-64.29
Apples	-	2.31	3.54	-	53.25	-
Grapes	-	4.67	13.13	-	181.16	-
Raisins	-	Neg.	0.16	-	-	-
Coconuts	-	Neg.	0.05	-	-	-
Coconut Desiccated	-	Neg.	0.28	-	-	-
Pears	-	0.04	0.01	-	-75.00	-
Pineapples Fresh	-	0.14	0.04	-	-71.43	-
Pineapple Canned	-	-	0.04	-	-	-
Total Fruits and Vegetables	292.25 (11.54)	373.39 (13.99)	642.56 (11.69)	27.76	72.09	119.87
Vegetables (Fresh, Simplified, Preserved)	49.74	72.00	151.16	44.75	109.94	203.90
Fruits (Nuts, Fresh, Dried)	194.14	262.14	437.87	35.03	67.04	125.54
-Nuts (Edible, Fresh, Dried)	175.02	225.96	394.56	29.11	74.61	125.44
-Cashewnuts (Fresh, Dried)	145.94	215.46	368.30	47.64	70.94	152.36
Total Agril. Product Exports	2532.13	2668.29	5495.63	5.38	105.96	117.04
Floriculture Total	2.85	2.61	9.87	-8.42	278.16	246.32
Live Plants, Bulbs, etc.	0.68	1.10	1.97	61.76	79.09	189.71
Cut Flowers and Foliage	2.04	0.98	5.04	-51.96	414.29	147.06
Cut Flowers	0.13	0.53	2.86	307.69	439.62	2100.00

Note : 1) Period 1 = 1981-1983 ; Period 2 = 1988-1990 ; Period 3 = 1995-1997

2) For Floriculture Products : Period 1 = 1981-83 ; Period 2 = 1986-1988 ; Period 3 = 1991-1993

3) Figures in Parentheses are share of fruits and vegetables in total agricultural exports (per cent)

Sources : 1) FAO Trade Yearbook ; 1984, 1990 and 1997

2) International Statistics Yearbook (Volume I for Total Fruits and Vegetable Products, and volume II for Floriculture Products)

Among various horticultural products, floricultural exports of India, in particular, increased tremendously over time, especially after the late eighties period. The bulk of the floriculture product exports from India were seen to be contributed by cut flower and foliage, followed by the exports of live plants, bulbs, etc. In fact, cut flower and foliage export of India had declined during the period between early - and the late eighties, but, thereafter, a sharp increase in the same was noticed so much so that the export trade of this valued product increased by about two and a half times during the period between early eighties and the mid-nineties. It is to be noted that while the total value of India's floricultural exports was little less than about US \$ 3 million during early - and the late eighties, its exports rose to as high as nearly US \$ 10 million in the mid-nineties and, thus, India has recorded a whopping 250 per cent rise in its exports of floricultural products during the past decade and a half in value terms.

Thus, India's horticultural exports have grown in the face of considerable fluctuations in international prices and inspite of rise in domestic consumption requirements for these high value crops within the country. Further, the rising trend in horticultural exports of India over time also brings us closer to the fact that India has been making serious attempts to tap her potentiality in horticultural products exports. The Government of India has made concerted efforts to increase the horticultural products exports by allocating more funds in Eighth Five-Year Plan for horticultural development. Since in India, the state of Maharashtra holds great potential to increase the production of horticultural commodities because of diverse agro-climatic conditions of the state, which enables it to produce fruits, flowers and vegetables, this strength needs to be exploited further. This strength, coupled with conducive policy will surely help it to emerge as one of the major exporter of quality produce in the country, especially in the export trade of grapes, oranges, banana and onion, where it holds still the lion's share in country's total production.

CHAPTER- IV

GROWTH PROFILE OF POST-HARVEST INFRASTRUCTURE FOR HORTICULTURAL CROPS IN MAHARASHTRA

4.1 Programmes of National Horticulture Board (NHB):

In order to develop horticulture industry in India, improvement in the marketing mechanism of fruits, vegetables and flowers is the basic requirement. Although it is widely believed that the marketing of fruits and vegetables is a complex process due to their perishability, fragility, seasonality and bulkiness, it is expected that measures and programme initiatives such as adoption of improved pre - and post-harvest technology and water and pest control practices under the Eighth Five Year Plan will not only increase the productivity of individual crops and their quality, they are also expected to substantially minimize the post-harvest losses, increase the total crop area cover and generate adequate quality surplus for their conversion into value added food products. It is estimated that nearly 30 to 35 per cent of the total horticultural products, particularly of fruits and vegetables, is lost annually in post-harvest handling (Singhal, 1995). In order to curb these losses and with a view to strengthen infrastructural facilities for horticultural crops, the NHB has undertaken various programmes that can be grouped as under:

- Soft loan schemes for exploitation of commercial horticulture, post-harvest management and marketing, etc.
- Schemes to provide support services, like market information, transfer of technology, etc.
- Schemes to create awareness as regards improvement in the state of horticulture through innovative ideas, concepts, etc.

However, in broader terms, various aspects covered by the NHB to improve the horticulture production base in the country included such programmes as encompassing integrated projects on management of post-harvest infrastructure of horticulture crops,

development of marketing of horticultural produce through participation in soft loan schemes, projects related to introduction of new technology and concepts in horticulture, techno-economic feasibility studies/survey on various aspects of horticulture, transfer of technology through training and visits (T and V) of horticulture growers, market information service for horticulture crops, etc.

4.2 Development of PHI:

In order to propel Indian economy to a higher rate of growth, the Ministry of Commerce has rightly placed more emphasis on increasing India's agricultural exports through increased fruits and vegetable exports in general and floricultural exports in particular (Anonymous, 1994). Nonetheless, it is to be noted that horticulture industry in the country received very little attention from various policy makers until the Fourth Five Year Plan. It is only during the sixth, seventh, eighth and also in the ninth plan that the importance of this sector was recognised. Thus, in view of its importance and the crucial role being played by it in the overall agricultural development of the country, the total plan allocation for this sector in the Ninth Five Year Plan was placed at Rs. 1,100 crore. During the Ninth Five Year Plan, greater emphasis was placed towards completion of those programmes that were initiated during the Eighth Five Year Plan such as on-going programmes for the development of fruits, coconut, vegetables, cashewnuts, spices and plantation crops, and also new schemes related to the development of medicinal and aromatic plants, mushroom, floriculture, root and tuber crops and beekeeping, etc. Some of the other schemes of Eighth Five Year Plan, especially related to use of plastic and infrastructure development for post-harvest handling and marketing, were also included in the Ninth Five-Year plan.

During the financial year 1997-98, the NHB had released an amount to the tune of Rs. 35,714 thousand for the establishment of 19 cold storages, six pre-cooling units, two specialized transport vehicles and eighth grading/packing centres. The Board had also released an amount of Rs. 30,20,634 in the form of subsidy for the supply of 43,776 plastic crates for the states of Himachal Pradesh, Haryana, Maharashtra, Punjab and

Rajasthan for the systematic handling of fruits and vegetables (Ministry of Agriculture, 1999).

It is to be noted that the National Cooperative Development Corporation (NCDC) also provides financial assistance for infrastructure development and marketing support to fruits and vegetable cooperatives so as to ensure better returns to the growers for (i) purchase of transport vehicles, (ii) construction of godown, grading and packing sheds and retail outlets, (iii) strengthening of share capital base and margin money for raising working capital, and (iv) establishment of pre-cooling units for export of horticulture produce. During 1997-98, the NCDC had sanctioned a total financial assistance to the tune of Rs. 298.78 lakhs to fruits and vegetables cooperatives in different states. The assistance released during the same period, however, was of the order of Rs. 203.128 lakhs. The details regarding financial assistance sanctioned and released for fruits and vegetable cooperatives during 1997-98 is given in Table 4.1. Besides, the state-wise information regarding cumulative financial assistance sanctioned by NCDC for fruits and vegetable marketing activities is provided in Table 4.2.

It could be readily discerned from Table 4.1 that the amount of financial assistance released by NCDC for various activities was much lower than the amount of financial assistance sanctioned by NCDC during 1997-98. Out of 25 societies financed by NCDC, 15 societies were sanctioned an amount to the tune of Rs. 46.57 lakhs under the centrally sponsored scheme. On the other hand, the remaining 10 societies were sanctioned an amount of the order of Rs. 252.21 lakhs under the NCDC sponsored scheme. The maximum amount was found to be sanctioned for the purpose of purchase of transport vehicles under the centrally sponsored scheme and for the fruits and vegetable marketing projects under the NCDC sponsored scheme. As for the financial assistance released by the NCDC, out of 40 societies financed by NCDC, 11 societies received an amount to the tune of Rs. 21.428 lakhs under the centrally sponsored scheme and the remaining 29 societies received an amount of the order of Rs. 181.70 lakhs under the NCDC sponsored scheme. Most of the amount under the centrally sponsored scheme was released for the purpose of fruits and vegetable marketing projects and for the purchase of transport vehicles. Under the NCDC sponsored schemes, while grape export

projects received the maximum amount, the amount of money released for post-harvest management was the least.

Further, a close examination of Table 4.2 revealed considerable differences in respect of number of projects assisted by the NCDC and the amount of financial assistance sanctioned by the corporation across various states in the country. As on March 1998, the NCDC had assisted 386 projects in the country with total sanctioned amount to the tune of Rs. 4065.603 lakhs. Maharashtra was seen to be the only state in the country which received maximum assistance from the NCDC. Out of 386 projects assisted by the NCDC the state of Maharashtra alone accounted for as high as 167 projects with the total amount of sanction to the tune of Rs. 2490.01 lakhs. Out of 167 projects assisted by the NCDC in the state of Maharashtra, 54 projects were assisted under the NCDC-NHB scheme, 32 under the grape export project, one under the mango export project, one under the margin money and the remaining 79 under the share capital development scheme. The other major states covered under the assistance by the NCDC were Himachal Pradesh, Andhra Pradesh, Nagaland, Tamil Nadu, Rajasthan and Manipur.

4.3 Growth in Cold Storage Facilities:

Cold storage not only helps in extending shelf life and the period of marketing of fruits and vegetables but also avoid glut in the market, besides reducing transport bottlenecks during peak period of production. Cold storages also provides producers the required safety net by helping them to avoid distress sale which in turn help them to get better prices during the post-harvest period. From the consumer point of view also these facilities are essential since consumers are assured of constant supply of quality produce at reasonable market prices. It is, therefore, essential to create sufficient cold storage capacity to manage the existing and projected production of horticultural produce. As per the Annual Report of NCDC, 1997-98, as on March 1998, there were 3253 cold storages in the country with the capacity of 87.34 lakh tonnes. Of this, 250 cold storages with the capacity of 7.7 lakh tonnes were under the folds of co-operative sector. It is to be noted here that about 89 per cent of the capacity generated in cold storages is being utilized for

Table 4.1 : Financial Assistance Sanctioned and Released by the NCDC to Fruits and Vegetable Co-operatives During 1997-98

(Rs. in Lakhs)

Sr. No.	Scheme/Purpose	1997-98	
		No. of Societies	Amount Sanctioned
I. Financial Assistance Sanctioned			
<i>A. Centrally Sponsored Scheme</i>			
1.	Margin money/strengthening of share capital base	07	4.50
2.	Construction of Godown	01	1.6625
3.	Purchase of Transport Vehicles	06	22.8075
4.	Fruits and Vegetable Marketing Project	01	17.60
Total		15	46.57
<i>B. Corporation (NCDC) Sponsored Scheme</i>			
1.	Margin money/strengthening of share capital base	04	8.40
2.	Fruits and Vegetable Marketing Project	06	243.81
Total		10	252.21
Total (A+B)		25	298.78
II. Financial Assistance Released			
<i>A. Centrally Sponsored Scheme</i>			
1.	Margin money/strengthening of share capital base	07	4.50
2.	Retail Outlet	01	0.142
3.	Fruits and Vegetable Marketing Project	01	8.55
4.	Purchase of Transport Vehicles	02	8.236
Total		11	21.428
<i>B. Corporation (NCDC) Sponsored Scheme</i>			
1.	Margin money/strengthening of share capital base	11	44.75
2.	Post-harvest Management	05	18.548
3.	Grape Export Projects	13	118.402
Total		29	181.70
Total (A+B)		40	203.128

Source: NCDC Annual Report (1997-1998)

**Table 4.2 : State-wise Cumulative Financial Assistance Sanctioned by the NCDC
For Fruits and Vegetable Marketing Societies (As on 31-3-98)
(Rs. in Lakhs)**

Sr.No.	State	No. of Projects Assisted	Amount Sanctioned	Purpose
1.	Assam	1	15.590	Share Capital
2.	Andhra Pradesh	1	63.945	Marketing Project
3.	Gujarat	7	34.07	4 Share Capital 3 Margin Money
4.	Himachal Pradesh	56	480.182	45 Share Capital 2 Godown 7 Transport 2 Marketing Project
5.	Haryana	3	1.75	Share Capital
6.	Kerala	9	16.00	8 Share Capital 1 Transport Vehicle
7.	Karnataka	7	631.81	Marketing Projects
8.	Maharashtra	167	2490.01	54 NCDC-NHB Scheme 32 Grape Export Project 1 Mango Export Project 1 Margin Money 79 Share Capital
9.	Madhya Pradesh	1	1.000	Share Capital
10.	Manipur	30	37.98	11 Storage Godown 19 Share Capital
11.	Mizoram	3	7.64	1 Storage Godown 1 Marketing project 1 Transport Vehicle
12.	Nagaland	49	93.181	1 Marketing project 28 Share Capital 12 Vehicles 6 Godown 1 Retail Outlet
13.	Rajasthan	10	42.565	8 Share Capital 2 F&V Marketing Project
14.	Tamil Nadu	15	67.410	11 Share Capital 2 Storage Godown 2 Transport
15.	Uttar Pradesh	8	23.500	Share Capital
16.	West Bengal	15	22.050	14 Share Capital, 1 NCDC-NHB
17.	Others	4	36.920	3 Storage Sheds, 1 Marketing Project
Total		386	4065.603	

the storage of potatoes and the balance is used for keeping other vegetables, fruits, fish, meat and dairy products. As regards the cooperative sector, the entire cold storage capacity has been created with the technical assistance from NCDC and is being primarily utilized by small and marginal farmers. The state-wise information relating to growth in numerical strength as well as capacity of cold storages in the cooperative sector over the period between 1986-1987 and 1995-96 is provided in Table 4.3.

It is to be noted from Table 4.3 that there are only few states in the country that have shown consistently a steady growth in the numerical strength of cold storages. While states like Andhra Pradesh, Bihar, Tamil Nadu and to some extent West Bengal have shown a steady increase in the numerical strength of their cold storages, there are also other states like Madhya Pradesh, Nagaland, Tripura and Uttar Pradesh which have neither shown any increase nor decrease in the number of cold storages constructed by cooperative sector. A considerable decline in the numerical strength of cold storages has also been noticed in the states like Karnataka, Orissa and Punjab. Interestingly, until 1993-94 the state of Maharashtra did not have any cold storage facility under the folds of cooperative sector. The necessity to establish cold storage in this state was realized only during 1994-95 when 42 cold storages came into being in this state under the folds of cooperative sector. This is despite the fact that Maharashtra accounted for the bulk of nation's total production of many of the horticultural products and commodities. In fact, Andhra Pradesh also had only one cold storage until 1991-92 and it was only during 1992-93 that additional 43 cold storages were constructed in this state under the folds of cooperative sector.

As for the country as a whole, the number of cold storages under the folds of cooperative sector increased steadily from 165 during 1986-87 to as high as 485 by 1994-95 with a sharp decline in the same thereafter. In fact, because of recurrent losses many of the sick cold storages were closed down in the country during 1995-96. Efforts are now on to revive the sick cold storages in the country. In this sequel, it is to be noted that a comprehensive programme for the enhancement of capacity of cold storages from the existing 11 million tonnes (estimated) to 12.3 million tonnes in the next three years has been prepared by the Ministry of Agriculture with a view to stabilise the marketing of perishable vegetables in general and fruits in particular and also to enable the farmers to

Table 4.3 : State-wise Growth of Cold Storages in the Country (Co-operative Sector) during 1986-87 to 1995-96

(Capacity in Tonnes)

States	1986-87		1987-88		1988-89		1989-90		1990-91		1991-92		1992-93		1993-94		1994-95		1995-96	
	No	Capacity	No	Capacity	No	Capacity	No	Capacity	No	Capacity	No	Capacity	No	Capacity	No	Capacity	No	Capacity	No	Capacity
Andhra Pradesh	1	1000	1	1000	1	1000	1	1000	-	-	1	1000	44	6710	47	6610	47	6710	-	-
Bihar	4	16000	5	20000	5	16200	5	16200	28	86200	32	95700	32	95700	32	95700	32	95700	32	95700
Haryana	2	4200	3	4204	4	10200	4	12200	4	12200	4	12200	1	1200	1	1200	-	-	-	-
Himachal Pradesh	-	-	-	-	1	1600	1	1600	-	-	-	-	-	-	-	-	-	-	-	-
Karnataka	3	2800	2	1800	2	1800	1	1000	1	800	4	1900	2	1100	1	1000	1	1000	2	2140
Madhya Pradesh	11	29500	11	29500	11	29500	11	29500	14	51500	19	51500	14	48850	14	47500	14	47500	14	47500
Maharashtra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42	4300	30	4250
Nagaland	2	1012	1	1000	1	1000	1	1000	1	1000	1	1000	1	1000	1	1000	1	1000	1	1006
Orissa	24	25250	24	25250	24	25250	22	21820	22	24600	21	24600	21	24600	17	25000	17	24600	17	24600
Punjab	16	17000	21	19795	12	28995	12	30212	12	41313	12	41313	6	23230	5	5039	5	5039	-	-
Tamil Nadu	2	2000	2	2000	1	1250	-	-	1	1250	-	-	-	-	188	33790	188	33790	1	1250
Tripura	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000	1	2000
Uttar Pradesh	75	195	84	253	91	261600	91	262000	91	258000	91	262000	91	268760	91	268760	91	268760	86	242410
West Bengal	24	92	32	87	32	87	32	87	33	119100	39	164100	33	119100	46	182940	46	182940	46	182940
Total	165	101049	187	106889	186	380482	182	378619	208	597963	225	657313	246	592150	444	670639	485	673339	230	603796

Source: Important Items of Data, Credit and Non-Credit Co-operative Societies, Annual Reports (1986-87 to 1995-96), National Bank for Agriculture and Rural Development (NABARD), Mumbai.

get remunerative prices for their produce by utilizing storage facilities (Ministry of Agriculture, 1998-99). One of the major objectives of this programme is to revive the sick cold storages in the country that have the estimated capacity to the tune of about 8 million tonnes. Other features of this programme mainly encompass creation of 4.5 lakh tonnes of onion storages in the country in the next three years and encouragement to entrepreneurs to set up new cold storages. In order to encourage entrepreneurs to set up cold storages, the Ministry has proposed to provide commercial loans to them at subsidized interest rates with the element of capital investment subsidy to the tune of 25 per cent. In addition to this, some other measures are also proposed to be undertaken in the programme such as adoption of latest technologies in cold storage technique, pilot projects on onion storages and creation of low energy consuming cool stores for potatoes. These measures will not only minimize the post-harvest losses but they are also likely to make prevention more efficient as well as cost effective.

It is to be noted that during 1997-98 for Orissa and West Bengal alone Rs. 1630.498 lakhs were sanctioned by the NCDC for the establishment and modernization of cold storage facilities. During this year, a cold storage unit in the name of Krishak Kalyan Samabay Himghar Samity Ltd. was commissioned and put into use in Burdwan district of West Bengal. As for modernization, some of the established cold storages of Hoogly district of West Bengal got modernized refrigeration system. These cold storage units were Burdwan Central Cooperative Agricultural Produce and Marketing Society Ltd., Raja Ram Mohan Roy Samabay Himghar Ltd. and Tarakeshwar Pursurah Cooperative Cold Storage. In Orissa also, the funds released by the NCDC were used towards establishment as well as modernization of refrigerated system of cold storages.

4.3.1 Soft Loan for Cooperative Cold Storages:

Of late, cooperative cold stores are seen to be financially non-viable chiefly because of substantial increase in the cost of civil works, plant machinery and equipment, apart from rise in the operating cost, especially that of electricity and power. In the light of these facts, the National Horticulture Board (NHB) in league with NCDC has worked out sub project details to establish cooperative cold stores by providing some element of

soft loan since these stores are primarily utilised for the storage of post-harvest agricultural produce by farmers. In fact, this proposal was put forward by the NCDC. Working on this proposal, during 1998-99 the NHB had granted a total loan of Rs. 315 lakhs to NCDC for the establishment of cooperative cold stores in various states of the country. These cooperative cold stores under soft loan scheme are specifically proposed to be set up by some privately run firms like Kulti SKUS Ltd., Kana-II CAMS Ltd., Kana-II CADP FSCS Ltd., Toofanganj Samabay Himghar Samiti Ltd., Boinchi CADP Barella Sech 'O' SKUS Ltd., Falakata Cooperative Cold Storages, Himalayan Cooperative Cold Storages, Nimapara MCS & MS Ltd., and Maa Harsidhi Phal Evam Sag Sabzi Utpadak Sanstha Ltd (Ministry of Agriculture, 1998-99).

4.4 Financial Assistance For Horticultural Development in Maharashtra Under Various Schemes

The NCDC has been according high priority for the development of horticulture industry in the cooperative sector in various states of the country. It is not only directly assisting cooperatives for marketing of fruits and vegetables under its various schemes but also extending indirect support in collaboration with the National Horticultural Board (NHB), especially for the post-harvest management as well as marketing and retailing of fruits and vegetables and other horticulture crops. In the state of Maharashtra, the assistance for the development of horticulture sector came not only from NCDC but also from various central sector schemes. However, it is to be noted that while the assistance for the development of horticulture sector under central sector scheme is confined to the provision of subsidy only, the NCDC extends direct loan facilities for various development activities of this valued sector in this state. A detailed information regarding financial assistance provided by the NCDC under its various schemes and also under the central sector schemes for the development of horticulture sector in Maharashtra over the period from 1993-94 to 1997-98 is given in Table 4.4.

During 1993-94, the Ministry of Food Processing had provided financial assistance in the form of subsidy for the post-harvest processing of fruits and vegetables in Maharashtra to the tune of Rs. 26.95 lakhs. This element of subsidy for the processing

of fruits and vegetables in Maharashtra was seen to have increased to Rs. 34.54 lakhs during 1995-96. However, a decline in the element of subsidy provided by the Ministry of Food Processing was noticed in the subsequent years and during 1997-98 only an amount to the tune of Rs. 5.50 lakhs was sanctioned for the processing activities of Fruits and vegetables in the state of Maharashtra. In fact, the Ministry of Food Processing not only provides subsidy for the processing activities but also for the marketing of fruits and vegetables. An amount of the order of Rs. 16 lakhs was sanctioned by the Ministry of Food Processing for the Marketing of fruits and vegetables in Maharashtra during 1996-97 which was increased to Rs. 50 lakhs during 1997-98. During 1995-96, the Ministry of Food Processing had also sanctioned an amount in the form of subsidy to the tune of Rs. 24 lakhs for the construction of cold storages, especially for fruits and vegetables. As regards the element of subsidy for the construction of godown for potato and onion, it was found to be of the order of Rs. 25 lakhs during 1997-98.

As pointed out earlier, the NCDC has been extending all possible assistance for the development of horticulture sector in Maharashtra. The amount of assistance provided by the NCDC in collaboration with NHB for the development market infrastructure for fruits and vegetables was found to be as high as Rs. 373.57 lakhs during 1993-94. However, in the subsequent years this amount of loan assistance was found to decline and during 1997-98 only a loan amount to the tune of Rs. 13.05 lakhs was sanctioned by the NCDC in league with NHB for the post-harvest infrastructure development activities in the state of Maharashtra. On the other hand, the NCDC had extended a direct loan facility of the order of Rs. 223.47 lakhs for 1995-96, Rs. 341.05 lakhs for 1996-97 and Rs. 68.41 lakhs for 1997-98, especially for the marketing activities of fruits and vegetables. Further, it is to be noted that while the approved VIIIth plan outlay for the marketing of fruits and vegetables was Rs. 200 lakhs, the actual expenditure for this purpose turned out to be Rs. 197 lakhs for 1990-91 and 1991-92 alone and of the order of Rs. 97.65 lakhs for the year 1992-93. The NCDC had also kept loan provision for the development of Mahamango/Mahagrapes. The actual expenditure for this purpose was found to be as high as Rs. 416 lakhs during 1992-93. As regards construction of cold storages, the VIIIth plan outlay for this purpose was found to be very meagre.

Table 4.4 : Financial Assistance for the Development of Horticulture Sector in Maharashtra

Scheme and Year	Financial Assistance in Lakh Rupees
A. Central Sector Scheme	
(i) Subsidy for Post-harvest Processing of F & V (Fruits and vegetables)	
- 1993-94	26.95
- 1995-96	34.54
- 1996-97	14.71
- 1997-98	5.50
(ii) Subsidy for F & V Marketing (Ministry of Food Processing)	
- 1996-97	16.00
- 1997-98	50.00
(iii) Subsidy for F & V Cold Storage (Ministry of Food Processing)	
- 1995-96	24.00
(iv) Subsidy for Construction of Godown for Potato and Onion (Under VIIIth Plan Outlay)	
- 1997-98	25.00
B. NCDC Sponsored Scheme	
(i) Loans Through National Horticulture Board for F& V	
- 1993-94	373.57
- 1995-96	47.51
- 1996-97	22.29
- 1997-98	13.05
(ii) Loans for F& V Marketing	
- 1995-96	223.47
- 1996-97	341.05
- 1997-98	68.40
(iii) Financial Assistance to Co-operative Marketing Societies for F & V	
a) Actual Expnd. for 1990-91/1991-92	197.00
b) Approved VIII th Plan Outlay	200.00
c) Actual Expnd. for 1992-93	97.65
d) Outlay for 1993-94	120.00
(iv) Loans to Mahamango/Mahagrape (Actual Export for 1992-93)	416.00
(v) Financial Assistance to Agricultural Produce Marketing Committee for Cold Storage (approved VIIIth Plan Outlay)	5.00

Sources: 1) Annual Report of NCDC, 1993-94, 1995-96, 1996-97 and 1997-98
2) Cooperative Movement at a Glance in Maharashtra, Office of the Commissioner For Co-operation and Registrar of Co-operative Societies, Maharashtra State, Pune.

It is to be noted here that during 1994-95 the NCDC had sanctioned financial assistance for the establishment of 32 pre-cooling and cold storage units in Maharashtra State. This assistance was provided with a view to help the cooperatives not only to increase the storage capacity of cold storage units but also to enhance the shelf life of fruits and vegetables kept in these cold storage units. However, mention may be made here that most of these cooperative cold storage units were established for the purpose of increasing the shelf life of grapes and these facilities have undoubtedly increased the exports of this high value fruit crop from the state of Maharashtra. During 1995-96, the Mahagrapes exported 367 tonnes of grapes, 53 tonnes of pomegranate and 2 tonnes of mangoes valued at Rs. 1204.78 lakhs. In Sindhudurg district of Maharashtra the Mahamango was sanctioned an assistance to the tune of Rs. 110.70 lakhs during 1993-94, especially for setting up of an export unit for Alphonso mango. The establishment of this unit had increased the handling capacity of Mahamango by 1000 tonnes. In fact, both Mahagrapes and Mahamango are partnership cooperative units of grape growers and mango growers societies. The NCDC had earlier assisted grape grower's societies in Maharashtra for the establishment of pre-cooling and cold storage units.

Thus, various programme initiatives undertaken by the NCDC have certainly given a fresh fillip not only to the expansion of the horticultural production base of Maharashtra but also to the exports of these high value products from this state. The goals set forth by the NCDC for the growth and development of horticulture sector in the state of Maharashtra are truly worth emulating and a heartening feature indeed.

CHAPTER- V

SOCIO – ECONOMIC PROFILE OF THE SAMPLED FARMERS

This chapter deals with the socio-economic profile of the sampled farmers since the socio-economic characteristics have a profound influence on the decision making process and profitability of crop enterprise. An attempt has been made in this chapter to compare and contrast the resource endowments of different categories of farmers in both member and non-member groups. The information relating to family size and composition, education, land holding particulars, cropping pattern and livestock resources has been analysed and discussed for various categories of sampled farmers in each group. It is essential to know the background of the sampled farmers since the viability of any enterprise heavily depends on the favourable attitudinal changes towards adoption of superior technical inputs or technique of production which, in turn, depends on personal skills and resource position of the farmers.

5.1 Family Size and Education of the Sampled Households:

The composition, size of the family, and age and education of the farmer acquire greater significance under present day farming. In a village set up, the decision maker of a family is usually either its head or any other elderly economically active person of the family. An attempt, therefore, has been made in this section to provide an insight into not only the size and composition of the family but also the age and level of education of the head of the household of the family. This information for different categories of farmers in both member and non-member groups is provided in Table 5.1

The sampled farmers falling in the member group were found to have less number of members in their family as compared to farmers falling in the non-member group. In general, there were 7 persons in the family of member group of farmers and 8 in the case of non-member group of farmers. The large category of farmers in the member group and medium category in non-member group were found to have more number of members in their families as compared to other categories of farmers. Further, the level of education was found to be higher for member group as compared to non-member group of farmers.

Among various categories of farmers, the large category in the member group and medium category in non-member group attained higher level of education as compared to other categories of farmers. However, by and large, there was no significant difference in the level of education for various categories of farmers in both member and non-member groups. The age of head of the household was also found to be higher for the member group of farmers as compared to non-member group of farmers. In general, the large category of farmers in member group and medium category in non-member group were found to be better equipped to take effective managerial decisions since their level of education was higher as compared to other categories of farmers.

**Table 5.1 : Family Size and Education of the Sampled Households in Maharashtra :
1997-98**

Particulars	Members				Non-Member			
	S	M	L	All	S	M	L	All
1. Average age of Head of the Household (years)	43.60	46.55	45.15	45.10	39.00	42.70	44.15	41.9
2. Average Family Size (Number)	6.45	6.80	8.20	7.15	6.05	9.40	9.35	8.2
(i) Average number of adult males	2.10	2.45	3.25	2.60	2.25	3.15	2.85	2.7
(ii) Average number of adult females	2.00	2.25	2.85	2.37	2.15	2.70	3.25	2.7
(iii) Average number of children	2.35	2.10	2.10	2.18	1.65	3.55	3.25	2.8
3. Education of Head of Family (Number of schooling years)	11.20	10.55	11.35	11.03	9.40	10.40	8.70	9.5

Note : S = Small ; M = Medium ; L = Large ; All = All farmers.

5.2 Land Holding Particulars of the Sampled Farmers:

Land is the main resource base of the farmer in the agricultural production. The economic and social progress of a farmer largely depends on the size of his owned and operational holding. Keeping in view the significance of land, it was thought essential to show the land holding particulars of the sampled farmers in the study area. The land holding particulars of both member and non-member group of farmers for the year 1997-98 are provided in Table 5.2.

In case of member group of farmers, the average size of operational holding stood at 1.73 hectare for small category, 2.88 hectares for medium category, and 6.34 hectares for the large category with an average of 3.65 hectares of operational holding for all the farmers. As for the non-member group of farmers, the average size of operational holding is 1.15 hectares for small category, 2.51 hectares for medium category, and 4.86 hectares for the large category with an overall average of 2.84 hectares of operational holding for all the farmers. It is to be noted that except in the case of large farmers in non-member group, the operational holding of different categories of sampled farmers did not differ much from their owned holdings. The difference between owned land and operational holding in the case of large farmer in non-member group was mainly observed because of their considerable proportion of fallow and barren land which accounted for about 8 per cent of their owned holdings. In general, irrigated land accounted for 84 per cent of the total operational holding in the case of member group of farmers and 83 per cent for the non-member group of farmers.

Table 5.2 : Land Holding Particulars of Sampled Farmers in Maharashtra: 1997-98

Farm Size Category	(Area in Hectares)			
	Members		Non-Members	
	Owned Land	Operational Holding	Owned Land	Operational Holding
Small - IR	1.57	1.57	1.11	1.11
- UIR	0.16	0.16	0.04	0.04
Total	1.73	1.73	1.15	1.15
Medium - IR	2.54	2.53	2.31	2.32
- UIR	0.35	0.35	0.19	0.19
Total	2.89	2.88	2.50	2.51
Large - IR	5.11	5.11	3.85	3.65
- UIR	1.23	1.23	1.42	1.21
Total	6.34	6.34	5.27	4.86
All - IR	3.07	3.07	2.42	2.36
- UIR	0.58	0.58	0.55	0.48
Total	3.65	3.65	2.97	2.84

Note : IR = Irrigated Area ; UIR = Unirrigated Area

5.3 Area under Major Crops during different Seasons:

The information regarding area under major groups of crops grown during different seasons by different categories of sampled farmers for both member and non-member groups during the year 1997-98 is given in Table 5.3.

It is to be noted that kharif season crops accounted for the major share in gross cropped area of both member and non-member sampled farmers. The next important crops grown by the sampled farmers were perennial crops, followed by rabi and summer season crops. This held especially true in case of medium and large categories of sampled farmers in both member and non-member groups. However, in the case of small category in both member and non-member groups, perennial crops accounted for the major share in gross cropped area, followed by kharif, rabi and summer season crops.

In kharif season, food and other crops mainly dominated the cropping pattern of majority of the member and non-member sample farmers. In general, while 74 per cent of the total cropped area under kharif season was covered under food and other crops in case of member group of farmers, the share of these crops in total cropped area under kharif season for the non-member group of farmers was found to be 71 per cent. Large farmers from non-member group and medium as well as large farmers in member group showed higher proportion of area under food and other crops as compared to other categories of farmers. Further, in general, vegetable crops accounted for about 25 per cent of the total cropped area under kharif season in case of member group of farmers and 29 per cent for the non-member group of farmers. Among various categories of farmers, the proportionate area under vegetables to total cropped area under kharif season was found to be the highest for small category (31 per cent) in the case of member group and medium category (36 per cent) for non-member group. The average category of farmers in the member group showed only one per cent of their total kharif cropped area under flower crops. The highest and the lowest proportionate area under flower crops was found in case of small and large category of farmers, respectively.

In rabi season too, food and other crops dominated the cropping pattern of the sampled farmers. In general, the share of food and other crops in total cropped area under

Table 5.3 : Area Under Major Crops for the Sampled Farmers in Maharashtra : 1997-98

(Area in Hectares/Household)

Season and crops	Member				Non- Member			
	Small	Medium	Large	All	Small	Medium	Large	All
Kharif								
- Food & Other Crops	0.50 (66.67)	1.05 (75.54)	2.22 (74.75)	1.25 (73.53)	0.28 (65.12)	0.86 (64.18)	2.28 (75.00)	1.15 (70.99)
- Vegetables	0.23 (30.67)	0.33 (23.74)	0.73 (24.58)	0.43 (25.29)	0.15 (34.88)	0.48 (35.82)	0.76 (25.00)	0.47 (29.01)
- Flower	0.02 (2.66)	0.01 (0.72)	0.02 (0.67)	0.02 (1.18)	-	-	-	-
Total	0.75 (30.24)	1.39 (33.02)	2.97 (33.75)	1.70 (32.88)	0.43 (25.00)	1.34 (36.91)	3.04 (39.74)	1.62 (37.24)
Rabi								
- Food & Other Crops	0.52 (74.29)	0.81 (69.83)	2.11 (83.07)	1.14 (78.08)	0.37 (80.43)	0.72 (66.06)	2.21 (82.77)	1.10 (78.57)
- Vegetables	0.16 (22.86)	0.32 (27.59)	0.35 (13.78)	0.28 (19.18)	0.09 (19.57)	0.29 (26.60)	0.39 (14.61)	0.25 (17.86)
- Flower	0.02 (2.85)	0.03 (2.58)	0.08 (3.15)	0.04 (2.74)	-	0.08 (7.34)	0.07 (2.62)	0.05 (3.57)
Total	0.70 (28.23)	1.16 (27.55)	2.54 (28.86)	1.46 (28.24)	0.46 (26.74)	1.09 (30.03)	2.67 (34.90)	1.40 (32.18)
Summer Crops	0.12 (4.84)	0.28 (6.65)	0.67 (7.61)	0.37 (7.16)	0.14 (8.14)	0.15 (4.13)	0.44 (5.75)	0.25 (5.75)
Perennial Crops	0.91 (36.69)	1.38 (32.78)	2.62 (29.78)	1.64 (31.72)	0.69 (40.12)	1.05 (28.93)	1.50 (19.61)	1.08 (24.83)
Gross Cropped Area	2.48	4.21	8.80	5.17	1.72	3.63	7.65	4.35

Note: 1) Figures in parentheses under different group of crops are percentages to the total area under Kharif/ Rabi Season.

2) Figures in parentheses under total area under kharif,Rabi,Summer and perennial crops are percentages to the gross cropped area.

rabi season was found to be around 78 per cent for both member and non-member group of farmers. Large category of farmers were found to sow higher proportionate area under food and other crops as compared to other categories of farmers. This held true for both member and non-member group of farmers. Further in general, vegetable crops were seen to account for about 19 per cent of the total cropped area in case of member farmers and 18 per cent for the non-member farmers. Among various categories, the highest proportionate area under vegetable crops was found in the case of medium category of farmers. This held true for both member and non-member groups of farmers. The share of flower crops in total cropped area under rabi season was found to be nearly 3 per cent in the case of member group and 4 per cent for the non-member group of farmers. Among various categories, large category in the case of member group and medium category in non-member group showed higher proportionate area under flower crops as compared to other categories of farmers.

In general, about 7 per cent of the gross cropped area of members and 6 per cent of non-members was seen to be covered under summer crops. Large category among member farmers and small category among non-member farmers showed higher proportionate area under summer crops as compared to other categories of farmers.

Perennial crops, in general, accounted for 32 per cent of the gross cropped area in the case of member farmers and 25 per cent of the non-member farmers. The highest proportionate area under perennial crops was found in the case of small category of farmers. This held true for both member and non-member group of farmers.

5.4 Livestock Resources Owned by the Sampled farmers

The number of animals of different species and breeds possessed by the households indicate the economic status of the owner. The different types of animals maintained by sampled farmers were classified into various categories such as bullocks, milch cows and milch buffaloes. Table 5.4 provides information on average number of animals in each category possessed by both member and non-member category of households during the year 1997-98.

It is to be noted that the total number of animals maintained by sampled member farmers were slightly lower as compared to the number of animals maintained by sampled non-member farmers. In fact, the number of animals maintained increased with the increase in size of land holding of the sampled farmers. This is true for both member and non-member groups of farmers.

In general, in the case of member farmers, milch buffaloes accounted for the largest share (38 per cent) in total number of animals maintained by the sampled farmers, followed by bullocks (33 per cent) and milch cows (29 per cent). On the other hand, in the case of non-member farmers, milch cows accounted for the highest share (38 per cent) in total number of animals maintained by the sampled farmers, followed by milch buffaloes (35 per cent) and bullocks (28 per cent). Among various categories of member farmers, while large category of farmers possessed more number of milch buffaloes, the number of bullocks and milch cows were the highest with the medium category of farmers. As for the non-member farmers, large category of farmers not only possessed more number of milch buffaloes but also bullock and milch cows as compared to other categories of sampled farmers.

Table 5.4: Number of Livestock Owned by Sampled Farmers In Maharashtra: 1997-98

Type of Livestock	Small	Medium	Large	All
Members				
Bullocks	1.15 (37.10)	1.20 (38.10)	1.00 (26.32)	1.12 (33.33)
Milch Cows	0.80 (25.81)	1.05 (33.33)	1.05 (27.63)	0.97 (28.87)
Milch Buffaloes	1.15 (37.09)	0.90 (28.57)	1.75 (46.05)	1.27 (37.80)
Total	3.10	3.15	3.80	3.36
Non-members				
Bullocks	0.65 (26.00)	0.65 (23.21)	1.80 (30.51)	1.03 (27.61)
Milch Cows	1.05 (42.00)	1.50 (53.57)	1.65 (27.97)	1.40 (37.54)
Milch Buffaloes	0.80 (32.00)	0.65 (23.22)	2.45 (41.52)	1.30 (34.85)
Total	2.50	2.80	5.90	3.73

Note: Figures in parentheses are percentages to the total

Thus, the foregoing analysis showed wide differences in resource position of various categories of member and non-member farmers. While member farmers were found to be more strong in terms of land resources, the non-member farmers possessed more livestock resources. The family size of members was found to be smaller as compared to non-member farmers. However, member farmers, in general, were seen to be more educated than non-member farmers. The member and non-member farmers also differed in terms of their cropping pattern.

CHAPTER- VI

EVALUATION OF NHB SOFT LOAN SCHEME

In Maharashtra, there are several beneficiaries of NHB soft loan, which include both cooperative societies and private/public limited companies. However, in this chapter an attempt is made to evaluate the performance of only two such organisations. These are: (a) Abhinav Grape Grower's Cooperative Society Ltd., and (b) Vignahar Grape Grower's Cooperative Society Ltd. Both the societies are situated in Junnar taluka of Pune district and they mainly deal with the marketing of farmers' produce not only in domestic but also in export market. This chapter, therefore, revolves around a comparative study on the performance of these two-selected grape grower's societies financed by the NHB under the soft loan scheme. The main foci of attention is on their progress since inception, changes in their membership pattern, share capital, profit profile, business turnover, investments on various infrastructural facilities, level of employment in various activities, cost of processing of produce, etc. It also deals with various constraints confronted by these societies, particularly in terms of sanctioning of loan, repayment of loan amount, procurement of farmer's produce, and also processing and marketing related problems.

6.1 Genesis of the Selected Grape Grower's Societies:

6.1.1 Abhinav Grape Grower's Cooperative Society (AGGCS) Limited:

Abhinav Grape Grower's Cooperative Society (AGGCS) was established on 19th July, 1990 at Agar village in Junnar taluka of Pune district. However, its processing unit came into being in March, 1995. It is basically a grape export unit controlled by its member farmers. The main cause for the establishment of this society at Agar is the location of the village, which is not only well connected to various marketing centres but also has easy accessibility to road and transportation. Another reason for the establishment of AGGCS in this village could be traced in the marketing related problems faced by various farmers before the establishment of this society. Despite the

fact that this village had considerable area (296 acres of land) under grape cultivation, there was no systematic marketing infrastructure available to the producers. Therefore, farmers were selling their produce through private traders. The system was grossly inefficient due to considerable exploitation of the farmers by the traders. Hence, the idea of setting up of this society came into existence.

The project was financed by various financial institutions, including soft loans from NHB. The major financial assistance to the tune of Rs. 114.75 lakhs was received by AGGCS from Bank of India situated at Narayangaon, especially for the civil and mechanical work (Table 6.1). However, for the establishment of pre-cooling unit, cold storage and pack-house, the major financial assistance was given to AGGCS by NHB in the form of a soft loan to the tune of Rs. 41 lakhs. The amount was paid by the NHB in two installments. The first installment of Rs. 25 lakhs was given in February, 1997 and the second installment of Rs. 16 lakhs was given in October, 1997. The AGGCS had also received financial assistance of the order of Rs. 60 lakhs from the Food Processing Department, especially to construct its processing unit.

It deserves mention here that there are as many as five varieties of grapes that are cultivated in Agar village. Among various varieties, Sharad seedless variety of grapes account for the highest share (50.68 per cent) in total area under grape cultivation in this village, followed by Tas Ganesh (23.65 per cent), Sonika seedless (20.27 per cent), Flame seedless (4.05 per cent) and Thompson seedless (1.35 per cent) variety of grapes in that order (Table 6.1). Although there are five varieties of grapes grown in this village, only two varieties such as Tas Ganesh and Thompson seedless are traded by the AGGCS in the international market and the remaining three varieties are traded by the farmers in the domestic market. It is to be noted that AGGCS does not have any technical collaboration with any other firm / organisation to process or market its produce. During 1997-98, the total turnover of the AGGCS was estimated at Rs.106.68 lakhs.

6.1.2 Vignahar Grape Grower's Cooperative Society (VGGCS) Limited:

Vignahar Grape Grower's Cooperative Society (VGGCS) was registered on 19th July, 1990 vide registration No. PNA / JNR (m) 371 / 90-91 at Narayangaon village in Junnar taluka of Pune district as an agricultural marketing society. Its processing unit was

established during 1997-98, though the trial of this processing unit was taken during 1995-96. The main objective of establishing this society was to undertake post-harvest management and marketing of farmer members' as well as non-members' horticultural produce, especially grapes that dominate the cropping pattern of most of the farmers of this village. In order to meet this objective, it has developed the required infrastructure such as pre-cooling unit, cold storage, grading and pack-house, especially to cater to the export marketing requirements of fruits. The establishment of this society was felt when the farmers of Narayangaon faced problems to market their produce in the export market, especially after the opening up of the national economy to the international market during the early nineties.

It is to be noted that Narayangaon is one of the well known villages for grape cultivation in Maharashtra. This valued crop is being cultivated in this village for the last 35 years. However, large scale commercial cultivation of this crop is being practiced only for the last 10 years, i.e., in the face of more liberal market environment. Narayangaon has an additional advantage of its being on the Pune-Nasik highway, besides its easy accessibility to transport facilities. Added to this, there are two commercial banks such as Bank of Maharashtra and Bank of India, apart from a cooperative bank located in this village. Further, this village has about 165 acres of land under grape cultivation. There are as many as four grape varieties that are seen to be cultivated in this village. Among various varieties, Thompson seedless variety of grapes account for the highest share (42.42 per cent), followed by black seedless grapes (24.24 per cent) Sonika seedless (23.03 per cent), and flame seedless (10.30 per cent) variety of grapes in that order (Table 6.1). Generally, while Thompson seedless variety of grapes is being traded in the export market, other varieties of grapes find their place in the domestic market.

Before the establishment of VGGCS, grapes were sold by the farmers through private traders and the average realization used to be around 10 to 15 rupees per kg. However, exports of this valued crop was felt necessary when many trade barriers were removed by the Government during the early nineties. But, lack of infrastructural facilities available in the village always posed great problems to the farmers to export this valued crop. It was practically impossible for the individual farmer to have all the infrastructural facilities such as pre-cooling units, cold storages, pack-house, transport

Table 6.1 : History of the Selected Grape Grower's Societies in Maharashtra

Particulars	Abhinav Grape Grower's Co-operative Society	Vignahar Grape Grower's Co-operative Society
1. Year of establishment of society	19-07-1990	19-07-1990
2. Name of the village	Agar	Narayangaon
3. Area under grape varieties in the village (in Acres)		
- Thompson seedless	4	70
- Tas Ganesh	70	-
- Sonaka seedless	60	38
- Sharad seedless	150	-
- Flame seedless	12	17
- Black seedless	-	40
Total	296	165
4. Year of establishment of processing unit	March 1995	1997-1998 (Trial 1995-96)
5. Technical collaboration with the other firm	-	California Humifresh (I) Pvt. Ltd., Mumbai
6. Project Financing (in lakh Rs.)		
i. Term loan from financial institutions	114.75	32.64
ii. Soft loan from NHB	41.00	41.00
iii. Contribution by members		
a. Share capital	18.12	8.20
b. Interest fee deposit	-	-
c. Food Processing Dept.	60.00	-
Total	233.87	81.84
7. Turnover of the society during 1997-98 (in lakh)	106.68	90.69

vehicles, etc. Thus, the necessity of setting up of a co-operative society was felt and this paved the way for the establishment of VGGCS.

The project was financed by various financial institutions (Table 6.1). The total cost of the project was estimated at Rs. 81.84 lakhs. The major financial assistance to the tune of Rs. 41 lakhs was received by VGGCS from NHB in the form of soft loan that accounted for about 50 per cent of the total project cost of VGGCS. It is to be noted that the optimum ceiling of financial assistance fixed by NHB is also 50 per cent of the total project cost. This assistance was provided by NHB mainly to create infrastructure facilities such as pre-cooling units, cold storages and pack-houses. The amount was paid by NHB in two instalments. The first installment of Rs. 25 lakhs was sanctioned by NHB in February, 1997, and the second installment of Rs. 16 lakhs was disbursed to VGGCS in October, 1997. However, for civil and mechanical work, the major finance of the order of Rs. 32.64 lakhs was sanctioned to VGGCS by Bank of India located in Narayangaon. The VGGCS had also generated the fund of Rs. 8.2 lakhs in the form of share capital from its members. It deserves mention here that VGGCS has developed technical collaboration with California Humifresh (I). Pvt. Ltd. Generally, this firm supplies plant and machinery to VGGCS. The cost of technical assistance is normally included in the plant and machinery supplied by this firm to VGGCS. During 1997-98, the total turnover of the VGGCS was estimated at Rs. 90.69 lakhs.

6.2 Progress of the Selected Grape Grower's Societies:

Progress of the selected grape grower's societies over the period from 1991-92 to 1997-98 in terms of membership, authorized capital, paid-up share capital, State Government share Capital, and profit profile is given in Table 6.2.

During the given period of time, both the selected societies showed considerable increase not only in paid-up share capital but also in their profit profile. However, authorized share capital and state Government's contribution to share capital were seen to remain constant at Rs. 20 lakhs and Rs. 5 lakhs, respectively, for both the selected societies all through the period from 1991-92 to 1997-98. As regards membership, while AGGCS showed gradual increase in the numerical strength of its members from 129 during 1991-92 to 142 in 1997-98, such was not the case for VGGCS and it had shown a

Table 6.2 : Progress of the Selected Grape Grower's Societies in Maharashtra

Particulars	1991- 92	1992- 93	1993- 94	1994- 95	1995- 96	1996- 97	1997- 98
Abhinav Grape Grower's Co-operative Society							
1.Membership of the society (number)	129	129	129	129	142	142	142
2. Authorized Capital (Rs in lakh)	20.00	20.00	20.00	20.00	20.00	20.00	20.00
3. Paid-up Share Capital (Rs in lakh)	3.59	3.63	3.66	11.85	17.37	17.75	18.12
4.State Govt. Share Capital(Rs in lakh)	5.00	5.00	5.00	5.00	5.00	5.00	5.00
5. Profit Earned (Rs in lakh)	-	-	-	0.31	0.53	0.84	0.68
Vignahar Grape Grower's Co-operative Society							
1.Membership of the society (number)	152	152	152	70	70	70	70
2. Authorized Capital (Rs in lakh)	20.00	20.00	20.00	20.00	20.00	20.00	20.00
3. Paid-up Share Capital (Rs in lakh)	2.51	3.71	3.77	9.78	9.91	9.91	9.91
4.State Govt. Share Capital (Rs in lakh)	5.00	5.00	5.00	5.00	5.00	5.00	5.00
5. Profit Earned (Rs in lakh)	0.59	0.97	1.66	0.69	0.90	0.77	0.64

sharp decline in its membership from 152 during 1991-92 to as low as 70 in 1997-98. However, it is to be noted that the decline in membership of VGGCS has not affected its business since it is now dependent not only on members but also on non-members.

6.3 Initial Investments Towards Development of Infrastructural Facilities:

Details regarding investments made by the selected societies on various infrastructural facilities like buildings, various utilities, air handler, refrigeration equipment, packing lines, etc. are provided in Table 6.3.

The total initial investment of AGGCS towards creation of various infrastructural facilities was found to be Rs. 142.42 lakhs. Out of this, Rs. 0.47 lakhs was spent on the purchase of land and its development, Rs. 50.34 lakhs on construction of buildings,

Table 6.3 : Details of Investments made by the Societies on various Facilities (during 1994/95)

Particulars	Investment (Rs in lakh)			
	Abhinav Grape Grower's Co-operative Society		Vignahar Grape Grower's Co-operative Society	
1. Land and land development	0.47	(0.33)	Received in Gift	
2. Buildings	50.34	(35.35)	25.96	(31.72)
3. Utilities				
a. H.T. Station	2.47	(1.73)	-	-
b. Generator Set	5.4	(6.04)	8.60	(10.51)
c. Domestic electrification	9.31	(6.54)	-	-
4. Pre-cooling, cold storage and others				
a. Air handlers	21.81	(15.31)	18.53	(22.64)
b. Refrigeration equipment	-	-	-	-
c. Packing lines	49.42	(34.70)	25.47	(31.12)
5. Customs duty on imported machinery and material including transport cost from port to site, etc.	-	-	3.28	(4.01)
6. Margin money for working capital		23.00		-
Total cost of the project (excluding margin money for working capital)		142.42		81.84

Note : Figures in parentheses are percentages to the total project cost

Rs. 2.47 lakhs on H.T. station, Rs. 8.60 lakhs on the purchase of generator set, Rs. 9.31 lakhs on domestic electrification, Rs. 21.81 lakhs on air handlers and Rs. 49.42 lakhs on packing lines. Thus, construction of buildings and packing lines accounted for the maximum share in total investment made by the society towards creation of infrastructural facilities. The next major investment was found to be on air handlers, followed by investment on the purchase of generator set and on domestic electrification. However, in the case of VGGCS, there was no initial investment on the purchase of land and its development as it was gifted by the present Chairman of the society. Therefore, total initial investment of VGGCS excludes expenditure incurred on the purchase and development of land. The total initial investment of VGGCS towards creation of various

infrastructural facilities was estimated at Rs. 81.84 lakhs. Out of this, Rs. 25.96 lakhs was spent on construction of buildings, Rs. 8.60 lakhs on purchase of generator set, Rs. 18.53 lakhs on air handlers, and Rs. 25.47 lakhs on packing lines. Thus, major items of investment were construction of buildings and packing lines. The other major investments of VGGCS were found to be on air handlers and on purchase of generator set. The VGGCS was also found to import some of the machinery and materials. The import duty on the same is included in the initial investment made by the VGGCS towards development of infrastructural facilities. This expenditure was found to account for about 4 per cent of the total initial investment of VGGCS towards development of infrastructural facilities.

6.4 Labour Employment at the Selected Societies

Processing, marketing and distribution of horticultural products have immense potential in employment generation. While male labour find their place in marketing and distribution activities, female labour is preferred in grading, packing and other processing activities. Information regarding extent of human labour employment, both permanent and seasonal, at the selected societies is provided in Table 6.4.

The extent of labour employment was found to be by and large same at both the selected societies. However, wage rates of labour differed in both societies. In general, female labour absorption was found to be higher as compared to male labour. The reasons for higher absorption of female labour as compared to male labour are not far to seek from. In fact, most of the processing activities are labour intensive in nature. The processing units, therefore, employ more female labour since it is not only cheap but also available in abundance. This held true in the case of both the selected societies. However, during peak season the dependence on female labour was found to be more in the case of VGGCS as compared to AGGCS. The male-female labour employment ratios during peak season were found to be 1:1.20 for AGGCS and 1:2.67 for VGGCS. Since female wage rates were lower at Narayangaon as compared to Agar village, VGGCS had employed more female labour as compared to AGGCS.

Table 6.4 : Level of Employment at the Selected Grape Grower's Societies

Particulars	Position at establishment		Present Position		Monthly Wage (Rs)	Daily Wage (Rs)
	Male	Female	Male	Female		
Abhinav Grape Grower's Society						
1. Permanent -Tech.	2	-	2	-	1800	-
-Non tech	5	-	5	-	1500	-
2. Seasonal - Peak	40	50	50	60	-	45
- Slack	-	-	-	-	-	-
3. Daily Wage Labourers	-	-	-	-	-	30
Vignahar Grape Grower's Society						
1. Permanent -Tech.	2	-	2	-	2500	-
-Non - tech	4	-	4	-	2000	-
2. Seasonal - Peak	30	80	30	80	-	35
- Slack	-	-	-	-	-	-
3. Daily Wage Labourers	-	-	-	-	-	25

6.5 Processing Cost of Grapes at the Selected Societies

While working on the estimation of processing cost, the total cost of processing was broadly classified into three components of cost such as cost of labour used for grading, packing, pre-cooling, loading, unloading, etc., cost of packing material –boxes, plastic sheets, pouches, tissue papers, air bubble sheets, grape guards, pallets, angle boards, strap and clips, and wastage, and cost of pre-cooling and cold storage expenses. Operation-wise estimates of processing cost of grapes at the selected society level plants for the year 1997-98 are given in Table 6.5.

The AGGCS was seen to process about 24,000 boxes, each containing 5 kgs of grapes. The per unit (box) cost of processing of grapes was estimated at Rs. 58.82. In the processing of grapes, various types of materials used for packing put together accounted

for the maximum share (85.55 per cent) in the total processing cost. Expenses on labour used during various processing activities such as grading, packing, pre-cooling, etc. turned out to be the next important cost, accounting for 10.20 per cent share in total processing cost. Pre-cooling expense accounted for only 4.25 per cent share in total processing cost. Among various packing materials, the major expenses were seen to be on packing boxes, followed by expenses on pouches, grape guards, air bubble sheets, angle boards, etc. The total per unit (box) packing material cost was estimated at Rs. 50.32. Out of this, Rs. 25.00 was spent on packing box alone, Rs 1.40 on plastic sheets, Rs. 5.80 on pouches, Re. 0.81 on tissue papers, Rs. 2.80 on air bubble sheets, Rs. 4.35 on grape guards, Rs. 2.25 on pallets, Rs. 2.75 on angle boards and Re. 0.50 on strap and clips. Wastage of packing material also accounted for considerable share (7.92 per cent) in total processing cost.

Because of difference in material used, the processing cost of grapes was found to be higher at VGGCS plant as compared to AGGCS plant. During 1997-98, VGGCS had processed 45,601 boxes, each containing 5.8 kgs of grapes. The per unit (box) processing cost of grapes at VGGCS plant was estimated at Rs. 63.02. In the cost of processing of grapes, the maximum share was seen to be accounted for by the packing material (86.91 per cent). Labour expenses turned out to be the next important item of cost in the processing of grapes, accounting for 8.73 per cent share in total processing cost. Pre-cooling expenses accounted for only 4.36 per cent share in total processing cost of grapes. In the case of VGGCS, the total per unit (box) packing material cost was estimated at Rs. 54.77. Out of this, Rs. 26.00 was spent on packing box alone, Rs.1.30 on plastic sheets, Rs.6.84 on pouches, Rs. 0.85 on tissue papers, Rs. 2.80 on air bubble sheets, Rs. 6.25 on grape guards, Rs. 2.25 on pallets, Rs. 3.00 on angle boards and Rs. 0.50 on strap and clips. In this case, wastage of packing material accounted for 7.90 per cent share in total processing cost.

It is to be noted that in the processing of grapes, pre-cooling is by far the most important activity. Pre-cooling is the removal of field heat from freshly harvested products. Within a specific time after harvest, the field heat is need to be removed from the fruit through pre-cooling. Pre-cooling not only prevents spoilage of fruit but also helps in maintaining pre-harvest qualities of the produce such as freshness, flavour,

**Table 6.5 : Operation – wise Processing Cost of Grapes at the Society Level Plant :
1997-98**

Operation	Abhinav Grape Grower's Society			Vignahar Grape Grower's Society		
	No. of Boxes	Per Unit Cost (Rs)	Total Cost (Rs)	No. of Boxes	Per Unit Cost (Rs)	Total Cost (Rs)
1. Labour for grading, packing, pre-cooling, cold storage, loading, unloading, etc.	24000	6.00	144000	45601	5.50	250806
2. Packing Material	24000	50.32	1207680	45601	54.77	2497567
a. Boxes	24000	25.00	600000	45601	26.00	1185626
b. Plastic sheets	24000	1.40	33600	45601	1.30	59281
c. Pouches	24000	5.80	139200	45601	6.84	311911
d. Tissue papers	24000	0.81	19440	45601	0.85	38761
e. Air bubble sheets	24000	2.80	67200	45601	2.80	127683
f. Grape guards	24000	4.35	104400	45601	6.25	285006
g. Pallets	24000	2.25	54000	45601	2.25	102602
h. Angle boards	24000	2.75	66000	45601	3.00	136803
i. Strap and clips	24000	0.50	12000	45601	0.50	22801
j. Wastage	24000	4.66	111840	45601	4.98	227093
3. Pre – cooling and cold storage	24000	2.50	60000	45601	2.75	125403
Total	24000	58.82	1411680	45601	63.02	2873776

Note: Each box contained 5 kgs of grapes in the case of AGGCS and 5.8 kgs of grapes for VGGCS.

firmness and appearance. In fact, the fruit cannot be kept directly in the cold storage if the field heat from the fruit is not removed. Thus, pre-cooling is one of the most important processing activities of grapes.

6.6 Constraints Faced By the Selected Societies in Receiving Loans

The chairmen and secretaries of the selected societies had cited by and large similar constraints faced by them while receiving loans from NHB and other financial institutions. According to them the excess time required for completing the complex formalities had not only delayed the disbursement of loan amount but also caused considerable inconvenience to the societies, particularly in terms of purchase of certain equipments and machinery. In fact, the procedures followed by the NHB towards sanctioning of soft loans for PHI related activities were not only time consuming but also were quite cumbersome. It is to be noted new that in order to get soft loans for the development of PHI related facilities both the selected societies had approached the NHB in March 1995. However, the actual loan amount was sanctioned to these societies only during 1997. The first instalment of Rs. 25 lakhs was sanctioned to these societies in March 1997 and the second instalment of Rs. 16 lakhs was paid to them in October 1997. Thus, it took more than two years to get the loan money sanctioned from NHB. This has delayed the project which in turn considerably increased the project cost. Thus, the need of the hour for the NHB is to have quick and more effective loan processing and disbursing machinery. There is also an urgent need to simplify the loan disbursement procedures. The early clearance of loan applications will certainly help in making the soft loan scheme more effective. It deserves mention here that the Chairmen of the selected societies had given certain suggestions. One of the major suggestions was in favour of receiving finance for the entire and comprehensive project rather than for certain specific components. However, how best this suggestion can be taken care of by the NHB will depend on its future strategies and policies related to financing of PHI related facilities for the horticultural crops.

CHAPTER- VII

PERFORMANCE OF HORTICULTURAL EXPORT UNITS IN MAHARASHTRA

Through the 1994-95 budget proposals, the Finance Ministry recognised the export potential of the horticultural commodities and products. In fact, the horticultural exports of India got a real boost only during the last few years in the face of more liberal market environment. This chapter, therefore, brings into focus the trade performance of the selected societies, both on domestic and export fronts. In general, it revolves around various aspects of marketing of grapes such as estimates of various components of marketing costs, especially on export front, quantum and value of exports, destination of exports, prices received from various marketing centers, etc. It also deals with certain other aspects such as productivity of crops at the selected villages, post-harvest losses, actual storage capacity available at the selected societies, capacity utilization, etc. Besides, this chapter deals with the constraints faced by the selected societies in processing and marketing of produce.

7.1 Changes in Performance Indicators of the Selected Societies:

Table 7.1 provides an insight into the changes in various performance indicators of the selected societies over the period from 1994-95 to 1997-98, especially in respect of their actual and utilized cold storage capacity, quantum of exports, export prices and costs, as also the productivity and post-harvest losses of grapes grown on the farms of member farmers.

It is to be noted that both the selected societies have their own pre-cooling as well as cold storage plants. The pre-cooling capacity of both the selected society level plants is noticed to be 6 tons in 6 hour. As for the cold storage capacity, it is found to be 24 containers in the case of AGGCS and 30 containers for VGGCS. It deserves mention here that grapes are shipped in reefer containers of 40 feet size. Each such container contains about 3000 cartons (boxes) of grapes. The capacity of a carton is found to be 5 kgs of

grapes in case of AGGCS and 5.8 kgs of grapes for VGGCS. Thus, the capacity of a container works out to 15 tons of grapes in case of AGGCS and 17.4 tons of grapes for VGGCS. As for the capacity of cold storage, it works out to 360 tons (24× 15) in case of AGGCS and 522 tons (30 × 17.4) for VGGCS. During the period from 1994-95 to 1997-98, the utilized capacity was found to be much lower than the actual capacity of cold storage available with the societies. During the given period of time, the utilized cold storage capacity varied from 40 to 75 per cent in the case of AGGCS and from 40 to 70 per cent for VGGCS.

Table 7.1 : Performance of the Selected Grape Grower's Societies in Maharashtra

Particulars	1994-95	1995-96	1996-97	1997-98
Abhinav Grape Grower's Co-operative Society				
1. Actual Storage Capacity (in no. of containers)	24.00	24.00	24.00	24.00
2. Capacity Utilized (%)	40.00	75.00	75.00	40.00
3. Productivity (in MT/hect.)	22.00	24.00	24.00	24.00
4. Post-harvest Loss (%)	13.00	10.00	12.00	12.00
5. Exports (in MT)	120.00	285.00	289.00	120.00
6. Export Cost (in Rs/Box)	140.00	140.00	150.00	150.00
7. Export Price Received (in Rs/kg) -From U. K	37.50	28.07	28.72	44.17
Vignahar Grape Grower's Co-operative Society				
1. Actual Storage Capacity (in no. of containers)	30.00	30.00	30.00	30.00
2. Capacity Utilized (%)	40.00	65.00	70.00	70.00
3. Productivity (in MT/hect.)	25.00	27.00	25.00	22.00
4. Post-harvest Loss (%)	11.00	11.00	11.00	11.00
5. Exports (in MT)	106.22	287.24	243.08	264.49
6. Export Cost (in Rs/Box)	130.00	140.00	150.00	155.00
7. Export Price Received (in Rs/kg)				
- From U.K.	34.82	30.94	28.16	35.50
- From Netherland	30.76	29.08	26.18	32.17
- Average	33.02	29.58	27.53	34.59

The productivity as well as post-harvest losses of grapes on the farms of member farmers are also shown in Table 7.1. During the period from 1994-95 to 1997-98, the productivity of grapes on the farms of member farmers was found to vary from 20 to 25

MT/hectare. The post-harvest losses during this period accounted for 10-13 per cent of the total production of grapes.

As for the export trade of grapes, both the selected societies have shown considerable progress during the given period of time. In case of AGGCS, the export trade of this valued crop was found to expand from 120 tons during 1994-95 to as high as 289 tons in 1996-97. Similarly, VGGCS has also shown an increase in its export trade of grapes from 106 tons during 1994-95 to 264 tons in 1997-98. The estimates of export costs and export prices are also provided in Table 7.1. However, the detailed analysis with respect to trade performance of the selected societies as well as the costs incurred by them in the export trade of this valued crop is delineated in the subsequent sections.

7.2 Export Trade of the Selected Societies:

The estimates related to quantum as well as value of grape exports of the selected societies to various destinations over the period from 1994-95 to 1997-98 are provided in Table 7.2.

During the given period of time, England was found to be the only country where grapes were exported from AGGCS. Although during 1994-95 the AGGCS had exported only 120 tons of grapes valued at Rs. 45 lakhs, its export trade of this valued commodity expanded sharply in the subsequent years so much so that during 1996-97 its export trade of grapes had gone up to 289 tons valued at Rs. 83 lakhs. However, a sharp decline in grape exports from AGGCS was found during 1997-98 when it could export only 120 tons of grapes valued at Rs. 53 lakhs. The main reason for this decline in export trade could be poor procurement of grapes by the AGGCS during this year.

Unlike AGGCS, the VGGCS had exported grapes to both UK and Netherlands. During 1994-95, the total quantum of grape exported from VGGCS was estimated at 106.22 tons, which was valued at Rs. 35.07 lakhs. Out of this, 59.04 tons were exported to UK and 47.18 tons to Netherlands. The grape exports of VGGCS expanded sharply from 1995-96 and onwards. During 1997-98, the total exports of grapes from VGGCS was estimated at 264.49 tons, which was valued at Rs. 91.50 lakhs. Out of this, 192.48 tons were traded to UK and 72.01 tons to Netherlands. It is to be noted that the export

Table 7.2 : Export Trade of Grapes by the Selected Grape Grower's Society

Exports	1994-95	1995-96	1996-97	1997-98
Abhinav Grape Grower's Co-operative Society				
1. Country	UK	UK	UK	UK
- Quantity (MT)	120.00	285.00	289.00	120.00
Total Value (Rs in lakh)	45.00	80.00	83.00	53.00
Value (Rs./Kg)	37.5	28.07	28.72	44.17
2. Country	-	-	-	-
- Quantity (MT)	-	-	-	-
Total Value (Rs in lakh)	-	-	-	-
Vignahar Grape Grower's Co-operative Society				
1. Country	U.K.	U.K.	U.K.	U.K.
- Quantity (MT)	59.04	77.39	165.16	192.48
Total Value (Rs in lakh)	20.56	23.94	46.51	68.33
Value (Rs./Kg)	34.82	30.93	28.16	35.50
2. Country	Netherland	Netherland	Netherland	Netherland
- Quantity (MT)	47.18	209.85	77.92	72.01
-Total Value (Rs in lakh)	14.51	61.02	20.40	23.17
Value (Rs./Kg)	30.75	29.08	26.18	32.18

prices of grapes were more favourable in UK as compared to Netherlands. And, this could be the reason why VGGCS had exported more grapes to UK as compared to Netherlands.

7.3 Domestic Trade of the Selected Societies:

While AGGCS was trading grapes only in international markets, the grapes procured by VGGCS found their place both in export and domestic markets. Domestic trade estimates of grapes, both in quantity and value terms, for the VGGCS are provided in Table 7.3.

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Table 7.3: Domestic Trade of Grapes by the Selected Grape Grower's Society

Domestic Trade	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
Abhinav Grape Grower's Co-operative Society						
1. Place	-	-	-	-	-	-
- Quantity (MT)	-	-	-	-	-	-
Total value(Rs in lakh)	-	-	-	-	-	-
2. Place	-	-	-	-	-	-
- Quantity (MT)	-	-	-	-	-	-
Total value(Rs in lakh)	-	-	-	-	-	-
Vignahar Grape Grower's Co-operative Society						
1. Place	-	Ludhiana	Ludhiana	Delhi	Delhi	Delhi
- Quantity (MT)	-	35.00	37.00	41.00	45.00	50.00
Total value(Rs in lakh)	-	4.50	4.81	5.33	6.30	7.00
Value (Rs./Kg)		12.86	13.00	13.00	14.00	14.00
2. Place	-	Mumbai	Mumbai	Mumbai	Mumbai	Mumbai
- Quantity (MT)	-	30.00	32.00	36.00	40.00	48.00
Total value(Rs in lakh)	-	3.60	3.84	4.68	6.00	7.20
Value (Rs./Kg)		12.00	12.00	13.00	15.00	15.00

It could be seen from Table 7.3 that initially VGGCS was trading grapes only in Ludhiana and Mumbai markets. During 1993-94, the VGGCS had traded 35 tons of grapes in Ludhiana market and 30 tons in Mumbai market. The total value of this trade was estimated at Rs. 8.10 lakhs. During 1994-95 also VGGCS had continued its trade with Ludhiana and Mumbai markets. Its total trade of grapes in these two markets during 1994-95 was estimated at 69 tons. However, from 1995-96 and onwards VGGCS was found to switch its trade from Ludhiana to Delhi market as the prices of grapes in Delhi markets were more favourable as compared to Ludhiana market. During 1997-98, VGGCS had traded 50 tons of grapes in Delhi market and 48 tons in Mumbai market. The total value of this trade was estimated at Rs. 14.20 lakhs. The trend over the last 5 years also show more favourable prices of grapes at Ludhiana and Delhi markets as compared to prices of grapes at Mumbai market.

7.4 Export Costs of Grapes:

The total export cost of grapes was broadly classified into three components such as (i) inland expenses which included inland transport expenses, clearing and forwarding expenses, customs duty, terminal handling charges, etc., (ii) freight for transport from Indian port to the port of the importing country, and (iii) expenses at destination which included custom clearing charges, port cost per container, duty per unit, transportation charges from port to agent's depot, agents depot handling charges including cold storage charges, delivery charges from depot to super markets, super market preparation expenses, etc. The export cost estimates of grapes for the selected societies with respect to the year 1997-98 are provided in Table 7.4.

In the case of AGGCS, the per box export cost of grapes was estimated at Rs 150.05 (Rs. 30.01/Kg). Expenses at destination accounted for the maximum share (50.09 per cent) in total export cost of grapes. The other major item of export cost was the freight for transport, accounting for 40.67 per cent share in total export cost. Inland expenses accounted for only 9.24 per cent share in total export cost of grapes.

As for VGGCS, the per box export cost of grapes was estimated at Rs 154.05 (Rs. 26.56/Kg). Expenses at destination again accounted for the highest share (46.83 per cent) in total export cost of grapes. The next important item of export cost was freight for transport, accounting for 43.82 per cent share in total export cost of grapes. Inland expenses accounted for only 9.35 per cent share in total export cost of grapes.

Thus, it could be readily discerned from Table 7.4 that expenses at destination accounted for the maximum share in total export cost of grapes. The next important item of export cost was the freight for transport from the Indian port to the port of the importing country. Inland expenses accounted for the least share in total export cost of grapes. In general, although VGGCS had shown higher inland expenses and freight for transport as well as total export cost of grapes, the expenses incurred at destination tended to be higher for AGGCS as compared to VGGCS.

Table 7.4: Cost of Grape Exports Incurred by the Selected Grape Grower's Societies : 1997-98

(in Rs/Box)

Particulars	Abhinav Grape Grower's Society	Vignahar Grape Grower's Society
A. Inland expenses		
1. Inland transport etc.	5.63	5.76
2. Clearing and forwarding	0.97	1.03
3. Customs duty	2.10	2.21
4. Terminal handling charges	4.67	4.93
5. Other charges	0.50	0.50
Total	13.87 (9.24)	14.43 (9.35)
B. Freight		
* JNPT to Thomas Port	61.02 (40.67)	-
Mumbai to U.K.	-	67.62 (43.82)
Mumbai to Rotterdam	-	67.62
C. Expenses at destination		
1. Duty per unit	34.08	29.43
2. Custom clearing charges		
3. Port cost per container		
4. Transport from port to agent's depot	2.18	2.00
5. Agent's depot handling and cold storage	11.97	13.70
6. Delivery charges from depot to super market	20.03	19.22
7. Super market preparation expenses	2.45	2.76
8. Other expenses	4.45	5.17
Total	75.16 (50.09)	72.28 (46.83)
Grand Total (A+B+C)	150.05	154.33

7.5 Processing and Marketing Related Constraints Faced by the Selected Societies:

The major constraints faced by the selected societies were found to be related to marketing of grapes rather than their processing. As regards processing of grapes, lack of availability of skilled labour for grading and packing of produce, voltage fluctuation, lack of availability of water, especially during summer/peak season were seen to be the major constraints faced by the selected societies. Further, electricity supply at low voltage and frequent cuts in electricity during the season were also seen to be some other processing related constraints faced by the selected societies. It deserves mention here that regular supply of electricity and its normal voltage are by far the most essential requirements for running both pre-cooling and cold storage plants. Fluctuation in electricity supply, therefore, might hamper the continuous processing of grapes. As for the electricity use, another constraint was seen to be related to its tariff. It is to be noted that both pre-cooling and cold storage plants were receiving normal electricity tariffs. Such Tariffs are normally applicable to the firms operating in urban or semi urban areas. However, Chairmen of both the selected societies were of the view that agricultural tariffs should be applied to their pre-cooling and cold storage plants rather than the normal electricity tariffs as charged for firms operating in urban areas by the Electricity Board

As regards marketing, it deserves mention here that a firm operates in different kind of environment when trading is done both in export and domestic market. The demand as well as prices of produce also differ significantly in these two markets which, in turn, depend on national and international market conditions / forces. Thus, marketing of produce beyond national boundaries pose special problems. There is always greater risk involved in the transportation of perishable products like grapes. For the perishable products, final acceptability by the importing country is, therefore, most essential.

It is to be noted that most of the fruits and vegetables are exported on consignment basis. These consignments are not sold at the port of shipment but they remain as stocks abroad on the supplier's account. The stocks are cleared whenever market demand for them arises. When shipment takes place, the pre-shipment credit is carried over to the special post - shipment credit account, which is adjusted when the

goods are sold abroad and the sales proceeds received. The overseas stocks may be sold on cash or on credit basis. Here, post-shipment credit is the credit which the banks extend to the exporter during the period from the point of shipment abroad to final receipt of sales proceeds by the exporter.

As for the marketing of grapes, various constraints and suggestions were cited by the Chairman and Secretary and members of the selected societies. According to them, air freight for the transportation of grapes are subsidised by APEDA. However, such subsidies are not available for the grapes being transported through ships. The selected societies, therefore, wanted the sea freight also to be subsidised. Added to this, they also wanted various organisations to come forward to subsidise inland transportation of grapes, apart from providing insurance cover to their produce. The selected societies were also seen to be in favour of receiving funds for setting up of Research and Development (R & D) units for the marketing of grapes.

According to the Chairmen of the selected societies, the exports of grapes require huge working capital which the societies alone can not arrange. The State Government, therefore, should come forward and recommend to National Cooperative Development Corporation (NCDC) to participate in the working capital requirements of the grape grower's societies. However, according to them, the recommendation should be need based and free from any condition of minimum dividend. Further, they also wanted the State Government to come forward to help them in providing market intelligence service for the export of grapes and other fruits and vegetables round the year. Reimbursement of extension service cost from Maharashtra State Agricultural Marketing Board (MSAMB) was another suggestion put forward by one of the Chairmen of the selected societies.

CHAPTER- VIII

IMPACT OF SOFT LOAN SCHEME ON CROPPING PATTERN, EMPLOYMENT AND INCOME OF SAMPLE FARMERS

The NHB soft loan scheme was implemented with a view to strengthen not only the existing infrastructural facilities for horticultural crops but also to create modern post-harvest infrastructure for these valued crops that can reduce post-harvest losses, improve quality of produce and ultimately create an efficient marketing system which, in turn, provide better share to the producer in consumer's rupee. The overall objective of the NHB soft loan scheme is to increase horticultural production base by providing both backward and forward linkages to the member farmers. The beneficiary units are, therefore, expected to comply with the objectives of NHB soft loan scheme. This chapter is designed to evaluate the impact of this scheme on the development of post-harvest infrastructure. It is expected that creation of post-harvest infrastructural facilities such as pre-cooling units, cold storages, transportation, etc. will not only provide efficient marketing system to the farmers but also help them in making necessary changes in their resource position, especially with respect to land utilisation pattern, cropping pattern, livestock resources, varietal selection of the crop, etc. The present chapter, therefore, has been designed to bring out the changes, if any, over the study period in such variables on the sample holdings in the state.

8.1 Changes in Land-Utilisation Pattern:

Land utilisation pattern of the sampled farmers during 1992-93 and 1997-98 is provided in Table 8.1. A comparative evaluation of these two tables do not reveal any significant change in the average size of owned and operational holding during the period between 1992-93 and 1997-98, both for member and non-member farmers with the sole exception of small category of non-member farmers, where the average size of operational holding has declined from 1.19 hectares during 1992-93 to 1.15 hectares in 1997-98. The net cultivated area for various categories of member and non-member

Table 8.1 : Landholding and Land Use Pattern of Sampled Households in Maharashtra (Area in Hectares)

Particulars	Small		Medium		Large		Overall	
	1992-93	1997-98	1992-93	1997-98	1992-93	1997-98	1992-93	1997-98
MEMBERS								
A. Landholding, - Owned land	1.73	1.73	2.89	2.89	6.34	6.34	3.65	3.65
- Operational Holding	1.73	1.73	2.88	2.88	6.34	6.34	3.65	3.65
B. Land Use - 1. Fallow land	0.01	0.01	0.01	0.01	0.02	-	0.01	0.01
2. Barren / Waste land	0.01	0.01	0.03	0.03	0.21	0.19	0.09	0.08
3. Land Under Misc Tree, etc.	0.01	0.01	0.06	0.06	0.31	0.31	0.13	0.13
4. Net Cultivated Area	1.70	1.70	2.78	2.78	5.81	5.84	3.42	3.43
5. Area under Kharif	0.86	0.75	1.50	1.39	3.48	2.97	1.95	1.70
6. Area under Rabi	0.74	0.70	1.10	1.16	2.54	2.54	1.45	1.46
7. Area under Summer	0.12	0.12	0.22	0.28	0.30	0.67	0.21	0.36
8. Area under Perinial	0.84	0.91	1.21	1.38	2.31	2.62	1.45	1.64
- of which under fruits	0.80	0.87	1.06	1.25	1.84	2.30	1.23	1.47
9. Area under Vegetables (K+R+S)	0.37	0.32	0.88	0.86	1.93	1.81	1.06	1.00
10. Area under flower (K+R+S)	0.07	0.12	0.12	0.15	0.12	0.20	0.10	0.16
11. Gross Cropped Area (5+6+7+8)	2.55	2.48	4.03	4.21	8.63	8.80	5.06	5.16
12. Cropping Intensity (%)	150.00	145.88	144.96	151.44	148.54	150.68	147.95	150.44
NON-MEMBERS								
A. Landholding - Owned land	1.19	1.15	2.40	2.50	5.27	5.27	2.95	2.97
- Operational Holding	1.19	1.15	2.52	2.51	4.87	4.86	2.86	2.84
B. Land Use - 1. Fallow land	0.02	0.02	0.01	0.01	0.11	0.11	0.05	0.05
2. Barren / Waste land	-	-	0.02	0.02	0.13	0.13	0.05	0.05
3. Land Under Misc Tree, etc.	0.01	0.01	0.09	0.09	0.07	0.07	0.06	0.06
4. Net Cultivated Area	1.16	1.12	2.40	2.39	4.56	4.55	2.70	2.68
5. Area under Kharif	0.61	0.43	1.45	1.34	3.25	3.04	1.77	1.61
6. Area under Rabi	0.54	0.46	1.11	1.09	2.54	2.67	1.39	1.40
7. Area under Summer	0.11	0.14	0.10	0.15	0.17	0.44	0.13	0.24
8. Area under Perinial	0.54	0.69	0.95	1.05	1.31	1.50	0.93	1.08
- of which under fruits	0.47	0.55	0.72	0.74	1.03	1.13	0.74	0.81
9. Area under Vegetables	0.35	0.27	0.95	0.66	1.19	1.39	0.83	0.77
10. Area under flower	0.02	0.02	0.16	0.12	0.18	0.18	0.12	0.11
11. Gross Cropped Area	1.80	1.72	3.61	3.63	7.27	7.65	4.22	4.33
12. Cropping Intensity (%)	155.17	153.57	150.42	151.88	159.43	168.13	156.30	161.57

Note : K = Kharif ; R = Rabi ; S = Summer

farmers is also seen to have remained by and large same during the given period of time. However, significant differences are noticed in the utilisation pattern of land, especially in the case of land being cultivated during different seasons.

A critical comparative analysis drawn from Table 8.1 clearly show a sharp decline in acreage under kharif and rabi seasons during the period between 1992-93 and 1997-98. However, this decline in acreage under kharif and rabi seasons is more than compensated by an increase in acreage under perennial as well as fruit crops. For instance, in the case of small category of member farmers, the area under kharif and rabi seasons has declined from 0.86 hectare and 0.74 hectare during 1992-93 to 0.75 hectare and 0.70 hectare in 1997-98. On the other hand, area under perennial crops for this category of farmer has increased from 0.84 hectare during 1992-93 to 0.91 hectare in 1997-98. In fact, this kind of trend is seen to have caught up with all the categories of member and non-member farmers.

In general, for the average category of member farmers the area under kharif season has declined from 1.95 hectares in 1992-93 to 1.70 hectares in 1997-98. On the other hand the area under perennial crops for the average category of member farmers has increased from 1.45 hectares in 1992-93 to 1.64 hectares in 1997-98. The average category of member farmer is also seen to have shown an increase in area under summer crops from 0.21 hectare in 1992-93 to 0.36 hectare in 1997-98. As regards non-member farmers, the area under kharif season for the average category of farmers is seen to have declined from 1.77 hectares in 1992-93 to 1.61 hectares in 1997-98. On the other hand, the area under perennial crops for this category of non-member farmer is seen to have increased from 0.93 hectare in 1992-93 to 1.08 hectares in 1997-98. Like member farmers, the average category of non-member farmers also showed an increase in area under summer crops from 0.13 hectare in 1992-93 to 0.24 hectare in 1997-98.

Among various perennial crops, major area is found to be covered under fruit crops. During the period between 1992-93 and 1997-98, the area under fruit crops is found to have increased from 0.80 hectare to 0.87 hectare in the case of small category of member farmer, 1.06 hectare to 1.25 hectare for medium category of member farmer, 1.84 hectare to 2.30 hectare for large category of member farmer, 0.47 hectare to 0.55 hectare for small category of non-member farmer, 0.72 hectare to 0.74 hectare for

medium category of non-member farmer, and from 1.03 hectare to 1.13 hectare for the large category of non-member farmer. During the period from 1992-93 to 1997-98, a considerable decline is also seen in area under vegetable crops. This type of trend is seen to hold good for all the categories of member and non-member sampled farmers. Another interesting feature is the increase in area under flower crops during the period between 1992-93 and 1997-98, especially in the case of member farmers.

Thus, the foregoing analysis clearly reveal a shift in cropping pattern of the sampled farmers in favour of perennial, fruits and flower crops since the area under these crops during the given period of time has increased in the face of decline in area under other field crops. Further, there has also been an increase in area under summer crops. This held true for both member and non-member categories of farmers. Consequent upon these shifts in area, the cropping intensity on the sampled farms is also seen to have increased during the given period of time. In general, the cropping intensity is found to have increased from 147.95 per cent in 1992-93 to 150.44 per cent in 1997-98 on the farms of member farmers and from 156.30 per cent in 1992-93 to 161.57 per cent in 1997-98 on the farms of non-member farmers. Further, since the difference between net cultivated area and gross cropped area was higher in the case of non-member farmer as compared to member farmer, the intensity of cropping turned out to be higher on the farms of former category of farmers as compared to the intensity of cropping on the farms of later category of farmers.

8.2 Changes in Livestock and Machinery Owned:

Information regarding different types of animals maintained by the sampled member and non-member farmers along with details regarding major machinery possessed by them during the period between 1992-93 and 1997-98 are provided in Table 8.2.

In fact, various types of machinery owned by the farmers and their livestock holding indicates the economic status of the owner. As regards livestock resources, only adult animal stock maintained by the farmers are evaluated in this section. The adult animal stocks maintained by the sampled farmers included bullocks, milch cows and

Table 8.2 : Livestock and Machinery Owned by Sampled Farmers in Maharashtra

(Number / Households ; Value in Rupees / Households)

Particulars	1992-93								1997-98							
	Small		Medium		Large		Overall		Small		Medium		Large		Overall	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
MEMBERS																
A. Livestock : Bullocks	1.30	6275	1.45	7150	1.10	5750	1.28	6392	1.15	7800	1.20	8800	1.00	7600	1.12	8067
Milch cows	0.60	3650	0.65	2900	0.80	5050	0.68	3867	0.80	7450	1.05	9250	1.05	9650	0.97	8783
Milch Buffaloes	0.30	1800	0.45	2800	0.80	4450	0.52	3017	1.15	12225	0.90	6800	1.75	11650	1.27	10225
Total	2.20	11725	2.55	12850	2.70	15250	2.48	13276	3.10	27475	3.15	24850	3.80	28900	3.36	27075
B. Major Machinery																
Bullock Carts	0.45	2225	0.50	2450	0.50	2325	0.48	2333	0.50	3000	0.45	2850	0.40	2300	0.45	2717
Electric Pump Sets	1.30	8950	1.50	11350	2.00	15800	1.60	12033	1.40	13625	1.65	18125	2.20	26000	1.75	19250
Oil Pump Sets	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Drip Irrigation Sets		14200		16950		39200		23450		28200		35050		78250		47167
Jeeps / Tractors	0.15	20750	0.20	32650	0.50	76500	0.28	43300	0.25	58400	0.55	170250	0.85	229250	0.55	152633
Sprayers / Dusters	0.60	1280	0.95	3370	1.20	8545	0.92	4398	1.15	9025	1.45	17665	1.80	13950	1.47	13547
Threshers	-	-	-	-	-	-	-	-	0.10	1340	-	-	-	-	0.03	447
Others	-	-	0.05	1900	-	-	0.02	633	-	-	0.15	8450	0.10	4100	0.08	4183
Total	2.50	47405	3.20	68670	4.20	142370	3.30	86147	3.40	113590	4.25	252390	5.35	353850	4.33	239944
NON-MEMBERS																
A. Livestock : Bullocks	0.55	2800	0.80	4440	1.70	8750	1.02	5330	0.65	4200	0.65	5700	1.80	13400	1.03	7767
Milch cows	0.50	3550	0.95	6200	0.85	5525	0.77	5092	1.05	8850	1.50	12800	1.65	13275	1.40	11642
Milch Buffaloes	0.15	700	0.10	600	0.90	6000	0.38	2433	0.80	5550	0.65	4400	2.45	18695	1.30	9548
Total	1.20	7050	1.85	11240	3.45	20275	2.17	12855	2.50	18600	2.80	22900	5.90	45370	3.73	28957
B. Major Machinery																
Bullock Carts	0.15	700	0.25	1300	0.65	3100	0.35	1700	0.25	1850	0.35	2400	0.70	4400	0.43	2883
Electric Pump Sets	0.85	8150	1.20	10050	1.40	10200	1.15	9467	1.15	16300	1.50	20050	1.75	16675	1.47	17675
Oil Pump Sets	0.05	300	-	-	-	-	0.02	100	0.05	300	-	-	0.10	1000	0.05	433
Drip Irrigation Sets	0.05	8725		10850		14400		11325	0.05	19175		23200		32050	0.02	24808
Jeeps / Tractors	0.05	8000	0.05	7000	0.20	28000	0.10	14333	0.05	10000	0.25	51500	0.40	109750	0.23	57083
Sprayers / Dusters	0.60	2200	0.60	1470	0.75	2810	0.65	2160	1.10	4315	0.90	9205	1.35	7130	1.12	6883
Threshers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-	-	-	-	-	0.05	2000	0.02	667
Total	1.75	28075	2.10	30670	3.00	58510	2.27	39085	2.65	51940	3.00	106355	4.35	173005	3.34	110432

milch buffaloes. On the other hand, in the group of major machinery and implements, various items included were bullock carts, electric pump sets, drip irrigation sets, jeep/tractors, sprayers/dusters, threshers, etc.

It is to be noted that the livestock resource position of the sampled farmers was better during 1997-98 as compared to the year 1992-93 as they possessed more number of bullocks and milch bovines during the later year as compared to the former year. In general, the number of animals possessed by the sampled member and non-member farmers increased from 2-3 during 1992-93 to 3-4 by 1997-98. During the period between 1992-93 and 1997-98, the increase in milch bovine population was higher than increase in bullock population. This held true for both member and non-member categories of farmers. Further, in case of member farmers, milch buffaloes accounted for the largest share in total animal stocks maintained by the sampled farmers. In this sequel, the least share in total herd strength was seen to be accounted for by milch cows. Contrary to this, in the case of non-member farmers, milch cows accounted for the highest share in total animal stocks maintained by the sampled farmers. The least share in total animal stock of the non-member farmer was seen to be accounted for by buffaloes. This held true during both 1992-93 and 1997-98.

As for machinery, it was noticed that, in general, each sampled member farmers possessed at least one sprayer/ duster and 1-2 electric pumpsets during both 1992-93 and 1997-98. During the given period of time, drip irrigation set turned out to be another major machinery that was possessed by almost all the categories of sampled farmers. However, the value of drip irrigation set was found to be higher during 1997-98 as compared to the year 1992-93. Similarly, all the sampled member farmers were also seen to possess bullock carts and jeep/tractors. The values of these major items of machinery were found to be higher during 1997-98 as compared to the year 1992-93. In fact, large category of member farmers possessed almost all the items of major implements listed in Table 8.3. On the other hand, small category of member farmers possessed the least number of major implements. In general, the number of items under major implements increased with the increase in land holding size of the sampled member farmers.

During the given period of time, except oil pump sets all the machinery items listed in Table 8.3 were also seen to be possessed by the non-member farmers. In general,

each sampled non-member farmer was seen to possess at least one sprayer/duster and 1-2 electric pump set during both 1992-93 and 1997-98. During the given period of time, drip irrigation set and bullock cart turned out to be the other items that were owned by all the sampled non-member farmer. However, the values of these major items were higher during 1997-98 as compared to the year 1992-93. Further, while large category of non-member farmers owned almost all the items listed under major machinery, least of these items were possessed by the small category of non-member farmers. In general, major machinery items owned by the non-member sampled farmers increased with the increase in size of land holding.

Thus, the sampled member and non-member farmers were found to possess more machinery and livestock resources during 1997-98 as compared to the year 1992-93. However, among various sampled farmers, the resource position in terms of possession of various machinery items as well as animal stocks was found to be better for member farmers as compared to non-member farmers. Further, an increasing trend was noticed in terms of possession of machinery and livestock resources with the increase in land holding size of both member and non-member farmers. This held true during both 1992-93 and 1997-98. This gives a clear indication of better resource position of large category of farmers as compared to other categories of farmers.

8.3 Changes in the Cropping Pattern:

An analysis into area allocation under different crops provides us an indication of the significance of the crops grown under the existing agro-climatic conditions and also farmer's preference for the crops under such conditions. Generally, under the existing agro-climatic condition, complete change in cropping pattern over time is not expected. However, a shift in area allocation could be expected if available market infrastructural facilities improve with the course of time. Undoubtedly, because of creation of pre-cooling units, cold storage plants, etc the availability of infrastructural facilities in the study area has improved considerably over time. It is, therefore, expected that these changes in infrastructural facilities have also led to changes in the cropping pattern/ area allocation of the sampled farmers. An attempt has been made in this section to capture

such changes in the cropping pattern of the sampled farmers during the given period of time. The pattern of cropping of the sampled farmers during the given period of time is evaluated separately for each of the three seasons such as kharif, rabi and summer. An attempt has also been made to provide an insight into the changes in area allocation under perennial crops during the given period of time. The changes in cropping pattern of the sampled farmers during each season are delineated separately in the subsequent sections.

8.3.1 Cropping Pattern of Selected Farmers During Kharif Season

The crops grown by the sampled farmers during kharif season were classified into three groups such as food and fodder crops, vegetable crops and flower crops. Table 8.3 provides an insight into the changes in the distribution of area under each crop grown during kharif season by different categories of sampled member and non-member farmers during the period between 1992-93 and 1997-98.

In the case of sampled member farmers, the crops that dominated the cropping pattern of these farmers during both 1992-93 and 1997-98 were food and fodder crops, followed by vegetable and flower crops. Among various food and fodder crops, bajra and groundnut were found to be grown by almost all the categories of sampled farmers during both the selected points of time. These two crops were seen to acquire considerable share not only in total acreage under food and fodder crops but also in net cultivated area under kharif season during the study period. During the given period of time while the acreage under groundnut remained by and large constant, a decline in acreage under bajra was found from 1992-93 to 1997-98 with the decline in acreage being more sharp in the case of small category of member farmers as compared to other categories of member farmers. Jute was found to be another crop that accounted for considerable share in total acreage under food and fodder crops. However, this crop was found to be grown only by large category of member farmers. The acreage under jute was found to increase marginally from 1992-93 to 1997-98. The sampled member farmers were also found to grow some other food and fodder crops like jowar, tur, rice, lucerne, etc. However, the acreage under these crops remained by and large constant during the given period of time. As for the

Table 8.3 : Cropping Pattern of the Sampled Households in Maharashtra : Kharif Season

(Area in Hectares / Household)

Crops	MEMBERS								NON-MEMBERS							
	Area Under Crops (1992-93)				Area Under Crops (1997-98)				Area Under Crops (1992-93)				Area Under Crops (1997-98)			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall	Small	Medium	Large	Overall	Small	Medium	Large	Overall
Crops:																
Bajra	0.20	0.42	1.01	0.54	0.10	0.38	0.85	0.44	0.21	0.17	1.08	0.49	0.18	0.14	0.96	0.43
Groundnut	0.35	0.53	0.87	0.58	0.30	0.57	0.86	0.58	0.16	0.49	0.97	0.54	0.09	0.58	0.88	0.52
Jowar	-	0.04	-	0.01	-	0.04	-	0.01	-	-	-	-	-	-	-	-
Tur	-	0.01	-	Neg.	-	0.01	-	Neg.	-	0.03	-	0.01	-	0.02	-	0.01
Kidney beans	0.01	0.03	0.14	0.06	0.02	0.01	0.10	0.04	-	0.03	0.19	0.07	-	0.02	0.14	0.05
Rice	-	-	0.02	0.01	-	-	0.02	0.01	-	-	0.04	0.01	-	-	0.04	0.01
Hulga/Kulthi	0.01	-	-	Neg.	-	-	-	-	-	0.02	-	0.01	-	0.02	-	0.01
Jute	-	-	0.30	0.10	-	-	0.36	0.12	-	-	-	-	-	-	-	-
Fodder	-	0.01	0.03	0.01	-	0.01	0.03	0.01	0.01	0.04	0.11	0.05	0.01	0.02	0.15	0.06
Lucerne	0.02	-	-	0.01	0.02	-	-	0.01	-	0.01	0.01	0.01	-	0.01	0.01	0.01
Maize/Jowar(fodder)	0.03	-	-	0.01	0.06	0.03	-	0.03	-	0.03	0.14	0.06	-	0.05	0.10	0.05
Total	0.62	1.04	2.37	1.33	0.50	1.05	2.22	1.25	0.38	0.82	2.54	1.25	0.28	0.86	2.28	1.15
Vegetables																
Brinjal	0.02	0.06	0.21	0.10	0.03	0.04	0.12	0.06	-	0.09	0.11	0.07	0.01	0.06	0.07	0.05
Tomato	0.10	0.17	0.39	0.22	0.07	0.15	0.17	0.13	0.18	0.29	0.31	0.26	0.09	0.20	0.28	0.19
Onion	0.05	0.06	0.02	0.04	0.05	0.02	0.09	0.06	0.03	0.05	0.12	0.07	0.01	0.01	0.02	0.01
Cauliflower	0.06	0.04	0.14	0.08	0.04	0.06	0.21	0.10	-	0.07	0.02	0.03	-	0.13	0.22	0.12
Cabbage	-	0.01	-	Neg.	-	-	-	-	-	-	0.04	0.01	-	-	-	-
Chilly	-	-	0.02	0.01	-	-	-	-	-	0.02	-	0.01	-	-	0.02	0.01
Lady's finger	-	0.03	0.06	0.03	0.03	0.04	-	0.02	-	0.03	0.05	0.03	0.02	0.02	0.08	0.04
Potato	-	-	0.08	0.03	-	-	0.12	0.04	-	-	-	-	-	-	0.02	0.01
Bhopala	-	0.03	0.10	0.04	0.01	0.02	-	0.01	-	-	-	-	0.02	0.05	-	0.02
Ghevada	0.01	-	-	Neg.	-	-	-	-	-	0.02	-	0.01	-	-	-	-
Wallowed	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	Neg.
Farce	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.01
Cucumber	-	-	0.01	Neg.	-	-	0.02	0.01	-	-	-	-	-	-	0.03	0.01
Behall	-	-	0.02	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.24	0.40	1.05	0.56	0.23	0.33	0.73	0.43	0.21	0.57	0.65	0.49	0.15	0.48	0.76	0.47
Flower:																
Chrysanthemum	-	0.03	-	0.01	-	-	-	-	-	0.02	-	0.01	-	-	-	-
Marigold	-	0.03	0.02	0.02	-	0.01	0.02	0.01	-	0.04	0.06	0.03	-	-	-	-
Aster	-	-	0.04	0.01	0.02	-	-	0.01	0.02	-	-	0.01	-	-	-	-
Total	-	0.06	0.06	0.04	0.02	0.01	0.02	0.02	0.02	0.06	0.06	0.05	-	-	-	-
G.Total	0.86	1.50	3.48	1.93	0.75	1.39	2.97	1.70	0.61	1.45	3.25	1.79	0.43	1.34	3.04	1.62

vegetable crops, the crops that dominated the cropping pattern of all the categories of sampled member farmers during both 1992-93 and 1997-98 were brinjal, tomato, onion and cauliflower. These four crops put together had acquired maximum share in total acreage under vegetable crops. During the given period of time, the other less important vegetable crops grown by most of the sampled farmers were ladyfinger and potato. Flower crops like chrysanthemum, marigold and aster had very little share in total net cultivated area under kharif season.

As regards sampled non-member farmers, the crops that dominated the cropping pattern of these farmers during both 1992-93 and 1997-98 were bajra and groundnut among various food crops and brinjal, tomato, onion and cauliflower among various vegetable crops. All these food and vegetable crops were found to be grown by almost all the categories of sampled non-member farmers. These crops were found to acquire considerable share in total net cultivate area of the sampled non-member farmers during kharif season. Lady's finger was found to be another crop grown by all the selected sampled non-member farmers during both the selected points of time. However, acreage under this crop was found to be very low. Further, some of the vegetable crops like cucumber and potato were seen to be introduced in the cropping pattern of the sampled farmers only during the year 1997-98. Interestingly, none of the sampled non-member farmers cultivated flower crops during the year 1997-98.

Thus, during the given period of time a declining trend was seen to be caught up with the acreage under different crops grown by the sampled farmers during kharif season with the decline in acreage being relatively more sharp for food and fodder crops as compared to vegetable and flower crops. This held especially true in case of member farmers as compared to non-member farmers. Further, the distribution of area under different crops clearly show farmer's preference for food and fodder crops as compared to vegetable and flower crops during kharif season.

8.3.2 Cropping Pattern of Selected Farmers During Rabi Season

In rabi season too various crops grown by the sampled farmers were classified into three groups such as food and fodder crops, vegetable crops and flower crops.

Information regarding acreage under various crops grown by the sampled member and non-member farmers during the period between 1992-93 and 1997-98 are provided in Table 8.4.

Among various crops grown by the sampled farmers during rabi season, food and fodder crops accounted for the major share in net cultivated area. During 1992-93, the share of food and fodder crops in net cultivated area was found to be 80 per cent for both member and non-member sampled farmers. However, this share of food and fodder crops in net cultivated area was found to decline marginally to 78 per cent by the year 1997-98. In general, vegetable crops accounted for 16 to 17 per cent share in net cultivated area during 1992-93 and 18 to 19 per cent during 1997-98. The share of flower crops in net cultivated area was found to be as low as 3 to 4 per cent during both 1992-93 and 1997-98.

During rabi season, the crops that dominated the cropping pattern of both member and non-member farmers were jowar, wheat and tur among various food and fodder crops and tomato, onion and cauliflower among various vegetable crops. All these food and vegetable crops were found to be cultivated by almost all the categories of member and non-member farmers. However, a decline in acreage under these crops was found from 1992-93 and 1997-98, especially in the case of wheat and tur cultivated by sampled member farmers. Interestingly, both member and non-member farmers showed an increase in acreage under various vegetable crops grown by them during the period between 1992-93 and 1997-98. Among various sampled farmers, large category of farmers were seen to cultivate almost all the crops listed in Table 8.4. This held especially true in case of large category of member farmers. Further, most of the flower crops were seen to be cultivated by medium and large category of member and non-member farmers. In general, the acreage under flower crops remained by and large constant for various categories of member and non-member farmers during the period between 1992-93 and 1997-98.

Thus, an evaluation into changes in the distribution of area under each crop grown by various categories of sampled member and non-member farmers during rabi season clearly indicated a decline in acreage under most of the food and fodder crops in the face of increase in acreage under various vegetable crops during the period between 1992-93

Table 8.4 : Cropping Pattern of the Sampled Households in Maharashtra : Rabi Season

(Area in Hectares / Household)

Crops	MEMBERS								NON-MEMBERS							
	Area Under Crops (1992-93)				Area Under Crops (1997-98)				Area Under Crops (1992-93)				Area Under Crops (1997-98)			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall	Small	Medium	Large	Overall	Small	Medium	Large	Overall
Crops:																
Jowar	0.12	0.16	0.57	0.28	0.12	0.16	0.66	0.31	0.04	0.08	0.93	0.35	0.01	0.08	0.96	0.35
Wheat	0.43	0.61	1.38	0.81	0.38	0.57	1.36	0.77	0.35	0.52	0.97	0.61	0.31	0.52	0.98	0.60
Tur	0.02	0.03	0.09	0.15	0.02	0.07	0.09	0.06	0.08	0.12	0.20	0.13	0.05	0.12	0.27	0.15
Maize Jowar(fodder)	0.01	0.01	-	0.01	-	0.01	-	Neg.	-	0.02	-	0.01	-	-	-	-
Total	0.58	0.81	2.04	1.25	0.52	0.81	2.11	1.14	0.47	0.74	2.10	1.10	0.37	0.72	2.21	1.10
Vegetables																
Brinjal	0.01	0.02	0.02	0.02	-	-	-	-	0.01	-	-	Neg.	0.01	-	-	Neg.
Tomato	0.05	0.13	0.13	0.10	0.07	0.15	0.04	0.09	0.03	0.09	0.14	0.09	0.03	0.09	0.06	0.06
Onion	0.02	0.02	0.16	0.07	0.07	0.07	0.10	0.08	0.03	0.15	0.10	0.09	0.03	0.15	0.21	0.13
Cauliflower	-	0.06	0.02	0.03	0.02	0.07	0.07	0.05	-	0.04	0.06	0.03	-	0.04	0.04	0.03
Cabbage	-	-	0.02	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Lady's finger	0.02	0.02	0.04	0.03	-	0.01	0.04	0.02	-	-	0.04	0.01	-	-	-	-
Potato	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	Neg.
Pumpkin	-	-	0.05	0.01	-	0.02	0.10	0.04	-	0.01	-	Neg.	0.02	-	0.08	0.03
Ghevada	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	0.10	0.25	0.44	0.27	0.16	0.32	0.35	0.28	0.07	0.29	0.34	0.22	0.09	0.29	0.39	0.25
Flowers:																
Chrysanthemum	0.02	0.04	0.02	0.03	-	0.02	-	0.01	-	0.04	0.02	0.02	-	0.04	0.02	0.02
Marigold	0.04	-	0.04	0.01	0.02	0.01	0.008	0.03	-	0.02	0.08	0.03	-	0.02	0.05	0.02
Aster	-	-	-	-	-	-	-	-	-	0.02	-	0.01	-	0.02	-	0.01
Total	0.06	0.04	0.06	0.04	0.02	0.03	0.08	0.04	-	0.08	0.10	0.06	-	0.08	0.07	0.05
G.Total	0.74	1.10	2.54	1.56	0.70	1.16	2.54	1.46	0.54	1.11	2.54	1.38	0.46	1.09	2.67	1.40

and 1997-98. This held especially true in the case of sampled member farmers (Table 8.4). Contrary to this, during the kharif season the acreage under both food and vegetable crops was found to decline from 1992-93 to 1997-98 (Table 8.3). This declining trend in acreage under various food and fodder and vegetable crops during kharif season was seen to be caught up with both member and non-member farmers. However, the point that merits attention is that the net cultivated area on the sampled farms of both member and non-member farmers was much higher during kharif season as compared to rabi season.

8.3.3 Cropping Pattern of the Selected Farmers During Summer Season

An attempt is made in this section to provide an insight into the changes in the distribution of area under various crops grown during summer season by various categories of sampled member and non-member farmers during the period between 1992-93 and 1997-98. Information regarding changes in acreage under various crops grown during summer season during the given period of time are brought out in Table 8.5.

During summer season, very few crops were seen to be cultivated by both member and non-member sampled farmers. The net cultivated area on the sampled farms during summer season was also found to be very low. However, during the given period of time, an increase in net cultivated area under summer crops was observed ; the increase being to the tune of 76 per cent on the farms of member farmers and 79 per cent on the farms of non-member farmers.

Among various summer crops, tomato was found to be the major crop grown by both sampled member and non-member farmers. The acreage under tomato on the sampled farms of members was found to increase considerably during the period between 1992-93 and 1997-98. As regards non-member farmers, the acreage under tomato remained by and large constant on their farms during the given period of time. In fact, this vegetable crop was seen to be cultivated by almost all the categories of sampled member and non-member farmers. Another crop that dominated the cropping pattern of member farmers was maize and jowar for fodder. The area under maize and jowar on the sampled farms was found to increase sharply during the given period of time. The vegetable crops grown during summer season on the sampled farms were brinjal, onion,

Table 8.5 : Cropping Pattern of the Sampled Households in Maharashtra: For Summer and Perinial Crops

(Area in Hectares / Household)

Crops	MEMBERS								NON-MEMBERS							
	Area Under Crops (1992-93)				Area Under Crops (1997-98)				Area Under Crops (1992-93)				Area Under Crops (1997-98)			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall	Small	Medium	Large	Overall	Small	Medium	Large	Overall
Summer Crops:																
Maize/Jowar (Fodder)	0.04	0.08	-	0.04	0.04	0.11	0.05	0.07	-	-	-	-	0.02	-	0.05	0.02
Brinjal	-	-	0.06	0.02	-	-	-	-	0.01	-	-	Neg.	0.02	-	-	0.01
Tomato	0.04	0.10	0.24	0.13	0.03	0.10	0.40	0.18	0.04	0.07	0.14	0.08	0.04	0.04	0.17	0.08
Onion	-	-	-	-	-	-	0.06	0.02	-	-	-	-	-	-	-	-
Cauliflower	0.03	0.01	-	0.01	-	-	0.04	0.01	0.04	0.01	-	0.02	-	-	0.04	0.01
Cabbage	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	0.01
Pumpkin	-	-	-	-	-	-	-	-	0.01	-	-	Neg.	0.01	0.01	-	0.01
Cucumber	-	-	-	-	-	-	0.02	0.01	0.01	-	0.01	0.01	0.01	-	0.04	0.02
Chrysanthemum	0.01	0.02	-	0.01	0.05	0.01	0.08	0.05	-	0.02	0.02	0.01	0.02	0.05	0.08	0.05
Marigold	-	0.01	-	Neg.	-	0.06	0.02	0.03	-	-	-	-	-	0.05	0.06	0.04
Total	0.12	0.22	0.30	0.21	0.12	0.28	0.67	0.37	0.11	0.10	0.17	0.12	0.14	0.15	0.44	0.25
Perinial Crops																
Grape	0.78	1.04	1.84	1.22	0.80	1.10	1.99	1.30	0.47	0.72	0.98	0.73	0.55	0.70	1.02	0.76
Banana	0.02	0.02	-	0.01	0.07	0.15	0.16	0.13	-	-	0.01	Neg.	-	0.04	0.07	0.04
Guava	-	-	-	-	-	-	0.02	0.01	-	-	-	-	-	-	-	-
Custard Apple	-	-	-	-	-	-	0.01	Neg.	-	-	-	-	-	-	-	-
Sapota	-	-	-	-	-	-	0.06	0.02	-	-	0.04	0.01	-	-	0.04	0.01
Mango	-	-	-	-	-	-	0.06	0.02	-	-	-	-	-	-	-	-
Sugarcane	0.04	0.15	0.47	0.22	0.04	0.13	0.32	0.16	0.07	0.23	0.28	0.19	0.14	0.31	0.37	0.27
Total	0.84	1.21	2.31	1.45	0.91	1.38	2.62	1.64	0.54	0.95	1.31	0.93	0.69	1.05	1.50	1.08

cauliflower, cabbage and cucumber. However, the acreages under these vegetable crops grown during summer season were found to be very low. Interestingly, during the given period of time, both sampled member and non-member farmers were found to increase acreages under flower crops. In fact, flower crops like chrynanthemum and marigold put together accounted for 22 per cent share in the net cultivated area under summer crops for the member farmers and as high as 36 per cent share for the non-member farmers. In general, unlike kharif and rabi crops, an increase in acreage under various summer crops was noticed on the sampled farms during the given period of time.

8.3.4 Cropping Pattern of the Selected Farmers for Perennial Crops

Table 8.5 provides an insight into the changes in the distribution of area under various perennial crops grown on the sampled farms of member and non-member sampled farmers during the period between 1992-93 and 1997-98.

An evaluation of Table 8.6 revealed considerable differences in acreages under various perennial crops grown on the sampled farms during the period between 1992-93 and 1997-98. Among various perennial crops, grape was found to be the most important crop grown on the sampled farms as it not only occupied maximum share in the net cultivated area under perennial crops but it was also found to be cultivated by all the categories of member and non-member sampled farmers. In general, although the share of this fruit crop in net cultivated area under perennial crops declined from 84 per cent during 1992-93 to 79 per cent in 1997-98 on the sampled farms of member farmers and from 78 per cent during 1992-93 to 70 per cent in 1997-98 on the sampled farms of non-member farmers, by and large in absolute terms an increase in acreage under grapes was noticed during the given period of time, both on the sampled farms of members and non-members. The next important perennial crop grown on the sampled farms was noticed to be sugarcane. However, it is to be noted that in general during the given period of time the acreage under sugarcane had declined on the sampled farms of member farmers in the face of sharp increase in the same on the sampled farms of non-member farmers. Another important perennial crop cultivated on the sampled farms was noticed to be banana. During the given period of time, a sharp increase in acreage under banana was noticed on

the sampled farms of member farmers. Thus, during the period between 1992-93 and 1997-98, the decline in acreage under sugarcane on the sampled farms of member farmers was more than compensated by an increase in acreage under banana crop. In other words, a shift in cropping pattern was seen to have taken place on the sampled farms of member farmers, especially in favour of cultivation of banana crop. Some other less important perennial crops like guava, custard apple, sapota and mango were also seen to be cultivated on the sampled farms of only large category of member and non-member farmers. However, the acreages under these fruit crops were found to be very low. In general, during the given period of time, an increase in net cultivated area under perennial crops was noticed on the sampled farms of both member and non-member farmers.

Undoubtedly, the passage of time was seen to be marked with considerable changes in the distribution of area under various crops grown during kharif, rabi and summer seasons. In fact, majority of the kharif crops grown on the sampled farms of member and non-member farmers showed a decline in their acreage during the period between 1992-93 and 1997-98. Some of the rabi crops, especially food and fodder crops grown on the sampled farms of member farmers also showed a declining trend in their acreages during the given period of time. However, flower crops grown during rabi as well as summer seasons, in general, showed an increase in their acreages during the same period. In fact, during summer season, even food and vegetable crops showed an increase in their acreages, both on the sampled farms of member and non-member farmers. Major change in the cropping pattern of the sampled farmers was seen to be in the case of perennial crops. Perennial crops like grapes and banana in the case of member farmers and also sugarcane in the case of non-member farmers showed remarkable increases in their acreages during the given period of time. This clearly indicate a shift in cropping pattern on the sampled farms, especially in favour of certain perennial crops like grape, banana and sugarcane and also some of the vegetable and flower crops grown during rabi and summer seasons. Thus, during the given period of time, changes in infrastructural facilities such as creation of pre-cooling units, cold storages, etc. have certainly affected the cropping pattern of the sampled farmers as they are seen to be more positively

inclined towards cultivation of various fruits, vegetable and flower crops as compared to various food and fodder crops.

8.4 Changes in Acreages Under Various Fruit Crop Varieties:

During the period between 1990 and 1998 many new varieties of fruits, especially in the case of grapes, were introduced on the sampled farms of both member and non-member farmers. This section, therefore brings out a detailed analysis in respect of changes in acreages under grape varieties and other fruit crops grown on the sampled farms of both member and non-member farmers and such changes during the given period of time are brought out in Table 8.6.

In case of sampled member farmers, as many as five grape varieties were seen to be cultivated on their farms. These grape varieties were Tas Ganesh, Sharad, Thompson, Flame and Sonika. Large category of member farmers were seen to cultivate all the five grape varieties during the period between 1990 and 1998. A steady increase in acreages under these grape varieties was noticed during the given period of time. The cropping pattern of medium category of member farmers was found to be in favour of cultivation of only four varieties of grapes such as Tas Ganesh, Sharad, Flame and Sonika. The medium category of member farmers were seen to have cultivated all these four varieties of grapes ever since 1990 with the sole exception of Sonika which was introduced in their cropping pattern only during 1993. During the given period of time, small category of member farmers were also found to cultivate Tas Ganesh, Sharad, Thompson, and Sonika varieties of grapes. However, Sonika was introduced in their cropping pattern only during 1992.

Some other fruit crops like banana, sapota, guava, custard apple and mango were also found to be cultivated on the sampled farms of member farmers. Medium category of sampled member farmers were seen to cultivate banana ever since 1990. However, the point that merits attention is that the acreage under this crop increased rapidly only during the more recent times. In the case of large category of farmers, many of the fruit crops other than grapes were introduced in their cropping pattern only during 1997.

**Table 8.6 : Acreage Under Various Fruit Crops/Varieties Introduced During the Period From 1990 to 1998 on the Sampled Farms in Maharashtra
(Area in Hectare / Households)**

Fruit Crop/ Varieties	MEMBERS									NON-MEMBERS								
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1990	1991	1992	1993	1994	1995	1996	1997	1998
Small																		
Tas Ganesh	0.28	0.45	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.14	0.18	0.18	0.18	0.20	0.20	0.20	0.20	0.20
Sharad	0.09	0.13	0.23	0.23	0.23	0.23	0.23	0.29	0.29	0.04	0.09	0.09	0.11	0.15	0.23	0.23	0.23	0.23
Thomson	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-
Flame	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonika	-	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.08	0.08	0.08	0.08	0.12	0.12	0.12	0.12
Banana	-	-	-	-	-	-	-	0.07	0.07	-	-	-	-	-	-	-	-	-
Sapota	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.02	0.02	0.02	0.02
Medium																		
Tas Ganesh	0.35	0.52	0.52	0.52	0.52	0.53	0.53	0.59	0.59	0.18	0.24	0.26	0.29	0.30	0.30	0.30	0.30	0.30
Sharad	0.08	0.12	0.13	0.17	0.17	0.29	0.29	0.29	0.29	0.12	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Thomson	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flame	0.10	0.10	0.10	0.10	0.10	0.13	0.13	0.13	0.13	-	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Sonika	-	-	-	0.09	0.09	0.09	0.09	0.09	0.09	0.05	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Banana	0.02	0.02	0.02	0.02	0.06	0.04	0.04	0.15	0.15	-	-	-	-	-	-	-	0.04	0.04
Sapota	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large																		
Tas Ganesh	0.98	1.06	1.06	1.09	1.09	1.09	1.09	1.09	1.09	0.27	0.33	0.37	0.37	0.37	0.49	0.49	0.49	0.49
Sharad	0.17	0.23	0.34	0.34	0.34	0.34	0.34	0.40	0.40	0.44	0.48	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Thomson	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	-	-	-	-	-	-	-	-	-
Flame	0.06	0.06	0.06	0.06	0.08	0.08	0.08	0.08	0.08	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Sonika	0.10	0.14	0.14	0.16	0.24	0.24	0.24	0.24	0.24	-	0.01	0.01	0.01	0.04	0.04	0.07	0.07	0.07
Banana	-	-	-	-	-	-	-	0.16	0.16	0.01	0.01	0.01	0.04	0.04	0.07	0.07	0.07	0.07
Sapota	-	-	-	-	-	-	-	0.06	0.06	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Guava	-	-	-	-	-	-	-	0.02	0.02	-	-	-	-	-	-	-	-	-
Custard Apple	-	-	-	-	-	-	-	0.01	0.01	-	-	-	-	-	-	-	-	-
Mango	-	-	-	-	-	-	-	0.06	0.06	-	-	-	-	-	-	-	-	-
Overall																		
Tas Ganesh	0.54	0.68	0.69	0.70	0.70	0.70	0.70	0.72	0.72	0.20	0.25	0.27	0.28	0.29	0.33	0.33	0.33	0.33
Sharad	0.11	0.16	0.23	0.25	0.25	0.29	0.29	0.33	0.33	0.20	0.25	0.26	0.27	0.28	0.31	0.31	0.31	0.33
Thomson	0.06	0.06	0.12	0.06	0.06	0.06	0.06	0.06	0.06	-	-	-	-	-	-	-	-	-
Flame	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Sonika	0.03	0.05	0.05	0.09	0.11	0.11	0.11	0.11	0.11	0.03	0.09	0.09	0.10	0.10	0.13	0.13	0.13	0.13
Banana	0.01	0.01	0.01	0.01	0.02	0.01	0.07	0.13	0.13	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Sapota	-	-	-	-	-	-	-	0.03	0.03	-	-	-	-	-	-	-	-	-
Guava	-	-	-	-	-	-	-	0.01	0.01	-	-	-	-	-	-	-	-	-
Custard Apple	-	-	-	-	-	-	-	Neg.	Neg.	-	-	-	-	-	-	-	-	-
Mango	-	-	-	-	-	-	-	0.02	0.02	-	-	-	-	-	-	-	-	-

As regards non-member farmers, only four varieties of grapes such as Tas Ganesh, Sharad, Flame and Sonika were found to be cultivated on their sampled farms. Among these four varieties, Tas Ganesh, Sharad, and Sonika were found to be common varieties grown by all the categories of sampled non-member farmers. Flame variety of grapes was seen to be cultivated on the sampled farms of only medium category of non-member farmers. As for the other fruit crops, banana and sapota were found to be cultivated on the sampled farms of large category of non-member farmers.

In general, the period between 1990 and 1998 was found to be marked with continuous increases in acreage under various fruit crops grown on the sampled farms of both member and non-member farmers. Some of the grape varieties like Tas Ganesh and Sharad were found to show sharp increases in their acreages during the given period of time. To some extent Sonika variety of grapes also showed considerable increases in its acreage during the given period of time. However, among various grape varieties, Tas Ganesh was found to be the most important variety as it was not only cultivated by all the categories of member and non-member farmers but it also occupied considerable area under its cultivation. Sharad was found to be another variety of grape which occupied reasonable area under its cultivation. Among other fruit crops, banana was the only crop that showed sharp increases in its acreages, especially on the sampled farms of medium category of farmers. As a matter of fact, the reason for increases in acreages under various fruit crops and also introduction/adoption of certain specific varieties of grapes during the given period of time could be traced in the changes in market demand for these crops. It deserves mention here that the export market is more favourable for Tas Ganesh and Sharad varieties of grapes as compared to other varieties of grapes.

8.5 Maintenance Cost of Fruits (Grapes) on the Sampled Farms:

A noteworthy feature of grape orchard is that it comes in the bearing stage only in the third year of establishment and that in the first two years the orchardists have to make a fair amount of investment towards the upbringing of plants/trees of the non-bearing orchard. The bearing orchard, on the other hand, passes through different stages of production such as increasing, constant and decreasing phase. The maintenance cost also

differs significantly among these different categories of bearing orchards. However, in this study an attempt is made to provide an insight into the annual acreage maintenance cost of grape orchards for different categories of orchardists. The annual acreage maintenance cost estimates for the all-bearing age orchards for different categories of member and non-member orchardists are delineated in Table 8.7.

In the case of member farmers, the per hectare annual gross maintenance cost for the all-bearing age orchard was estimated at Rs 156,277 for small category, Rs 171,494 for medium category, and Rs 174,210 for the large category with an annual hectareage maintenance cost of Rs 167,329 for the average category of orchardists. Thus, an increase in annual maintenance cost of grape orchards was noticed with the increase in land holding size of the sampled member orchardists. As regards non-member farmers, the per hectare annual gross maintenance cost for the all-bearing age orchard was estimated at Rs 152,080 for small category, Rs 157,496 for medium category, and Rs 150,387 for the large category with an annual average maintenance cost of Rs 153,321 for the average category of orchardists. Thus, medium category of non-member farmers incurred maximum expenditure to maintain one-acre grape orchard as compared to other categories of non-member farmers.

On breaking the gross maintenance cost of production into various components of cost, it was noticed that in general insecticides/pesticides applications accounted for about 30 per cent of the gross maintenance cost on the sampled farms of both member and non-member orchardists. The share of manure/fertilizer applications in gross maintenance cost was also found to be nearly 30 per cent for the average category of member and non-member orchardists. Human labour was found to be another important component of cost, accounting for about 26 per cent share in gross maintenance cost on the sampled farms of both member and non-member farmers/orchardists. The share of other components of cost such as micronutrients application, irrigation, human labour employment and bullock and machinery labour use put together was found to be about 15 per cent of the gross maintenance cost on the sampled farms of both member and non-member farmers/orchardists. Further, not much of a variation was noticed as regards share of various items of cost in gross maintenance cost for various categories of both member and non-member farmers/orchardists. In general, an increase in total expenditure

Table 8.7 : Average Maintenance Cost of Fruits on the Sampled Farms in Maharashtra: (1997-98)

(in Rupees / Hectare / Household)

Cost Component	MEMBERS				NON-MEMBERS			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
1. Mannures / Fertilizers	45016 (28.81)	49771 (29.02)	48536 (27.86)	47775 (28.55)	43472 (28.59)	42855 (27.21)	40879 (27.18)	42402 (27.66)
2. Insecticides / Pesticides	45139 (28.88)	50388 (29.38)	50759 (29.14)	48763 (29.14)	45201 (29.72)	48783 (30.98)	44090 (29.32)	46024 (30.02)
3. Micronutrients / Plant Harmons	10127 (6.48)	9757 (5.69)	10559 (6.06)	10147 (6.07)	8336 (5.48)	8275 (5.25)	9201 (6.12)	8603 (5.61)
4. Irrigation	4817 (3.08)	6052 (3.53)	7287 (4.18)	6052 (3.62)	5187 (3.41)	5372 (3.41)	5866 (3.90)	5476 (3.57)
5. Human Labour	41928 (26.83)	43102 (25.14)	44089 (25.31)	43040 (25.72)	39026 (25.66)	40755 (25.88)	38038 (25.29)	39273 (25.61)
6. Bullock and Machinery Cost	7904 (5.06)	10930 (6.37)	11486 (6.59)	10107 (6.04)	9603 (6.31)	10189 (6.47)	11053 (7.35)	10283 (6.71)
7. Land Revenue and Other Cess	1346 (0.86)	1494 (0.87)	1494 (0.86)	1445 (0.86)	1255 (0.82)	1267 (0.80)	1260 (0.84)	1260 (0.82)
Total	156277	171494	174210	167329	152080	157496	150387	153321

Note: Figures in parentheses are percentages to the total cost

of the order of 9 per cent was seen in the case of member orchardists over that of non-member orchardists in the maintenance of one hectare grape orchard.

8.6 Human Labour Employment On Grape Orchards:

Cultivation, processing, marketing and distribution of horticultural products have immense potential in employment generation. Generally, in the case of horticultural crops various cultivation related operations generate higher employment opportunities as compared to other operations. However, in this study, an attempt is made to evaluate the extent of human labour absorption on grape orchards, especially during various post-

harvest operations such as picking/plucking, assembling, grading, packing, local transportation and loading/unloading of produce. Thus, the data on human labour employment during different post-harvest operations, especially for grape crops, were analysed for different categories of member and non-member sampled farmers and the results are summarized in Table 8.8.

As scan of Table 8.8 revealed that the extent of human labour absorption during various post-harvest operations during the given year was equivalent to about 57 man days per hectare on the sampled grape orchards of member farmers and about 44 man days per hectare on the sampled grape orchards of non-member farmers. An increase in human labour employment was noticed with the increase in farm size of the sampled farmers. This held true for both member and non-member farmers. In general, the extent of human labour absorption during various post-harvest operations varied from 50 man days per hectare to 64 man days per hectare on the sampled farms of member farmers and from 40 man days per hectare to 46 man days per hectare on the sampled farms of non-member farmers. Among various post-harvest operations, maximum labour was seen to be employed in picking/plucking operations, followed by assembling, grading, packing, local transportation and loading/unloading operations. This held true on the sampled farms of both member and non-member farmers.

In general, picking/plucking operation accounted for about 36 per cent share in total human labour employment during post-harvest operations, both on the sampled farms of member and non-member farmers. Other operations like assembling, grading and packing accounted for 17 to 20 per cent share in total human labour employment during post-harvest operations. In this sequel, the least share was seen to be accounted for by various other post-harvest operations such as local transportation and loading/unloading of produce. Further, in general, of the total human labour employment during post-harvest operations, family labour component accounted for about 17 per cent share on the sampled farms of member farmers and 28 per cent share on the sampled farms of non-member farmers. Thus, the contribution of hired labour to total human labour absorption during various post-harvest operations was 83 per cent on the sampled farms of member farmers and 72 per cent on the sampled farms of non-member farmers. Interestingly, a decline in ratio of family to hired labour was seen with the increase in

Table 8.8 : Human Labour Employment on Grape Orchards During Post Harvest Operations

(Man days per Hectare)

	Small			Medium			Large			Overall		
	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total
MEMBERS												
Picking/ Plucking	4.74	15.93	20.67	5.00	15.77	20.77	2.87	18.10	20.97	4.20 (43.34)	16.60 (34.80)	20.80 (36.24)
Assembling	1.94	7.39	9.33	2.31	9.68	11.99	1.70	10.75	12.45	1.98 (20.43)	9.27 (19.43)	11.25 (19.60)
Grading	1.28	6.92	8.20	2.13	7.99	10.12	1.07	11.92	12.99	1.49 (15.38)	8.94 (18.74)	10.43 (18.17)
Packing	1.24	7.33	8.57	2.23	8.91	11.14	1.48	11.34	12.82	1.65 (17.03)	9.19 (19.27)	10.84 (18.89)
Local Transport	0.34	1.30	1.64	0.30	2.23	2.53	0.23	2.64	2.87	0.29 (2.99)	2.06 (4.32)	2.35 (4.10)
Loading / Unloading	0.14	1.26	1.40	0.10	1.68	1.78	-	1.98	1.98	0.08 (0.83)	1.64 (3.44)	1.72 (3.00)
Total	9.68 (19.43)	40.13 (80.57)	49.81	12.07 (20.69)	46.26 (79.31)	58.33	7.35 (11.47)	56.73 (88.53)	64.08	9.69 (16.88)	47.70 (83.12)	57.39
NON – MEMBERS												
Picking/ Plucking	5.81	12.19	18.00	4.35	10.20	14.55	5.12	10.51	15.63	5.09 (41.96)	10.97 (34.76)	16.06 (36.76)
Assembling	2.31	4.90	7.21	2.77	7.63	10.40	2.17	6.84	9.01	2.42 (19.95)	6.46 (20.47)	8.88 (20.32)
Grading	1.76	3.87	5.63	2.53	6.07	8.60	2.81	6.40	9.21	2.37 (19.54)	5.45 (17.27)	7.82 (17.90)
Packing	1.60	4.91	6.51	2.29	5.65	7.94	1.70	6.80	8.50	1.86 (15.33)	5.79 (18.35)	7.65 (17.51)
Local Transport	0.26	1.21	1.47	0.16	1.57	1.73	0.14	1.62	1.76	0.19 (1.57)	1.47 (4.65)	1.66 (3.80)
Loading / Unloading	0.36	1.18	1.54	0.24	1.38	1.62	-	1.71	1.71	0.20 (1.65)	1.42 (4.50)	1.62 (3.71)

Note : Figures in Parenthesis are percentages to the Total Human Labour Employment

size of the farm with medium category of member farm being the only aberration in this scenario as in this case the ratio of family to hired labour was found to be marginally higher than small farm and perceptibly higher than large farm of the member farmers. Generally, family labour absorption was higher on all categories of sampled farms of non-member farmers as compared to member farmers. Among various post-harvest operations, maximum family labour was seen to be engaged in picking/plucking operation, followed by assembling, grading, packing, local transportation and loading/unloading operations. In general, total increment in human labour absorption during post-harvest operations was found to be to the tune of 14 man days per hectare on the sampled grape orchards of member farmers over that of sampled grape orchards of non-member farmers.

8.7 Source-wise Annual Income of the Sampled Farmers:

The magnitude of income generation by an enterprise reflects its economic soundness and viability. Besides, income is the ultimate indicator through which impact of any development programme can be assessed. The sampled farmers in this investigation were seen to derive income from various sources that not only included income from various crop and livestock activities but also from other activities like regular job, etc. An attempt, therefore, is made in this section to evaluate the magnitude of income derived by the sampled member and non-member farmers from various sources, especially during the period between 1992-93 and 1997-98, and the estimates of the same are provided in Table 8.9.

During 1992-93, the total annual income of the sampled member farmers derived from various sources was estimated at Rs 99,905 for small category, Rs 1,62,830 for medium category, and Rs 3,21,200 for the large category of farmers with an overall average of Rs 1,94,645 for the average category of member farmers. During the same year, the total income of the non-member farmers derived from various sources was estimated at Rs 51,625 for small category, Rs 82,625 for medium category and Rs 1,19,450 for the large category of farmers with an overall average of Rs 83,733 for the average category of non-member farmers. With the passage of time, a substantial increase

Table 8.9 : Source-wise Annual Income of the Sampled Farmers in Maharashtra

(Amount in Rupees / Households)

Source	1992-93								1997-98							
	Small		Medium		Large		Overall		Small		Medium		Large		Overall	
	Income	Share (%)	Income	Share (%)	Income	Share (%)	Income	Share (%)	Income	Share (%)	Income	Share (%)	Income	Share (%)	Income	Share (%)
MEMBERS																
1.Crop	4075	4.08	8200	5.03	17000	5.29	9758	5.01	5750	4.27	12250	5.45	24650	5.69	14217	5.38
2. Fruits, Vegetables & Flowers	90350	90.44	147550	90.62	282000	87.80	173300	89.03	116850	86.87	195500	87.01	372250	85.94	228200	86.40
3.Livestock	1780	1.78	1800	1.11	6550	2.04	3377	1.74	3210	2.39	2550	1.13	5750	1.33	3837	1.45
4.Regular Job	3700	3.70	5280	3.24	15650	4.87	8210	4.22	8700	6.47	14400	6.41	30500	7.04	17867	6.77
5. Others	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	99905	100.00	162830	100.00	321200	100.00	194645	100.00	134510	100.00	224700	100.00	433150	100.00	264121	100.00
NON-MEMBERS																
1.Crop	7150	13.85	13175	15.94	18700	15.66	13008	15.53	9850	12.01	19450	16.50	27700	15.99	19000	15.49
2. Fruits, Vegetables & Flowers	40100	77.68	62250	75.34	81750	68.44	61367	73.29	60150	73.35	80500	68.31	114400	66.03	85017	69.29
3.Livestock	1875	3.63	3600	4.36	10600	8.87	5358	6.40	3750	4.57	6350	5.39	20650	11.92	10250	8.35
4.Regular Job	-	-	3600	4.36	8400	7.03	4000	4.78	3250	3.97	11550	9.80	10500	6.06	8433	6.87
5. Others	2500	4.84	-	-	-	-	-	-	5000	6.10	-	-	-	-	-	-
Total	51625	100.00	82625	100.00	119450	100.00	83733	100.00	82000	100.00	117850	100.00	173250	100.00	122700	100.00

in annual income was noticed for all the categories of sampled member and non-member farmers. This could be seen from the fact that during 1997-98 the total annual income of the sampled member farmers derived from various sources stood at Rs 1,34,510 for small category, Rs 2,24,700 for medium category and Rs 4,33,150 for the large category of farmer with an overall average of Rs 2,64,121 for the average category of member farmers. During 1997-98, the total annual income of the non-member sampled farmers derived from various sources was estimated at Rs 82,000 for small category, Rs 1,17,850 for medium category and Rs 1,73,250 for the large category of farmer with an overall average of Rs 1,22,700 for the average category of non-member farmers. Thus, during the period between 1992-93 and 1997-98, the increase in annual income derived from various sources was found to be to the tune of 36 per cent for the average category of member farmers and of the order of 47 per cent for the average category of non-member farmers. Among various categories, the increase in annual income during the given period of time was found to be the highest for medium category among member farmers and for small category among non-member farmers.

In the case of both sampled member and non-member farmers, the major source of annual income was found to be the cultivation of various fruit, vegetable and flower crops. This held true during both 1992-93 and 1997-98. The sampled member farmers, in general, were seen to derive as high as 89 per cent of their total income from the cultivation of various horticultural crops during 1992-93 and of the order of 86 per cent during 1997-98. On the other hand, in general, sampled non-member farmers were found to derive about 73 per cent of their total annual income from the cultivation of various horticultural crops during 1992-93 and of the order of 69 per cent during 1997-98. Cultivation of various field crops was found to be another source of major income, especially in the case of non-member farmers. In the case of member farmers, income derived from livestock activity was found to be the least as its share in total annual income of sampled member farmers stood at less than 2 per cent during both 1992-93 and 1997-98. Regular job of some of the family members also contributed to the total income of the sampled farmers. However, its contribution to the total family income was found to hover at around 5 per cent during 1992-93 and 7 per cent during 1997-98, for both member and non-member farmers. The proportion of income derived from regular job

was found to be higher for large category of farmers as compared to other categories of farmers, during both 1992-93 and 1997-98. This held true for both member and non-member farmers.

In general, it was noticed that sampled member farmers derived 132 per cent additional income over sampled non-member farmers during 1992-93 and 115 per cent during 1997-98. Needless to mention that the major portion of this additional income derived by the sampled member farmers was from various horticultural activities. Due to the benefit of PHI created/developed in the area, the member farmers were obtaining a substantially large proportion of their total income from the cultivation of various fruits, vegetable and flower crops as compared to non-member farmers. Thus, it may finally be concluded that the creation of PHI facilities during the given period of time has not only helped the member farmers to increase their family income but these facilities have also helped in creation of additional employment opportunities in the area.

CHAPTER- IX

PROBLEMS AND PROSPECTS OF POST –HARVEST INFRASTRUCTURE

The Government of India had established the NHB with a view to develop horticulture industry in the country and also to improve post-harvest management and marketing facilities for horticultural produce. In order to develop post-harvest infrastructure, the NHB has adopted multifarious strategy which not only include promotion of cooperatives but also private sector corporate units. These institutions receive both technical knowhow and financial assistance from the NHB. The NHB is also seen to be coordinating with other Government departments like NCDC, especially for the modernization of markets, road network, seaports, airports, etc. Of late, the main agenda of the NHB is to create a sound post-harvest infrastructure that not only reduce post-harvest losses of the horticultural produce but also provide a fair share to the producer in the ultimate rupee spent by the consumer. There are many states which have received financial assistance from the NHB and Maharashtra is one among them. In the state of Maharashtra, the NHB has provided financial assistance to both cooperatives and private corporate units like floriculture units. While cooperatives have received financial assistance for the creation of pre-cooling and cold storage units, such assistance to private corporate units turns out to be for the development of green houses.

Although the NHB has created various infrastructural facilities, it is still not known as to how far the farmers are satisfied with such post-harvest infrastructural facilities. Other issues that merit attention are the adequacy, quality and timely availability of such facilities. An attempt, therefore, has been made in this chapter to assess the perception of the farmer regarding various post-harvest infrastructural facilities and the constraints perceived by them in availing such facilities through co-operatives. In this sequel, the problems perceived by the sampled farmers, both members and non-members, are tested on the following lines: (a) cold storage related problems, (b) transportation related problems, (c) marketing related problems, (d) picking/plucking, grading and packing related problems, and (e) stacking material related problems.

9.1 Cold Storage Related Problems:

At the time of survey both sampled member and non-member farmers were asked to indicate the problems faced by them regarding pre-cooling / cold storage facilities available in the area. Majority of the sampled member farmers did not indicate any problem relating to pre-cooling / cold storage facilities and they were found to be quite satisfied with such facilities (Table 9.1). However, since non-member farmers did not have any access to pre-cooling/ cold storage facilities provided by the co-operatives, their concern was more for such facilities. In fact, as high as 85 per cent of the total non-member sampled respondents aired their view regarding the non-availability of pre-cooling facilities. The remaining 15 per cent of the total non-member sampled respondents showed resentment for the non-availability of cold storage facilities. These non-member sampled farmers also wanted such facilities to be extended to them by the co-operatives. Interestingly, one isolated case among small category of member farmers and one among medium category of member farmers also showed concern for inadequate / non-availability of such facilities. However, their concern might not be considered serious as they had at least access to such facilities extended by the cooperatives.

Table 9.1: Problems Faced by the Sampled Farmers Regarding Pre-cooling / Cold Storage Facilities in Maharashtra: 1997-98

Particulars	Members (per cent)				Non-Members (per cent)			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
a. No pre-cooling facility	-	5.00	-	1.67	80.00	85.00	90.00	85.00
b. Inadequate pre-cooling facility	-	-	-	-	-	-	-	-
c. No cold storage facility	-	-	-	-	20.00	15.00	10.00	15.00
d. Inadequate cold storage facility	5.00	-	-	1.67	-	-	-	-
e. No problem	95.00	95.00	100.00	96.66	-	-	-	-

9.2 Transportation Related Problem:

Opinions of the sampled respondent regarding transportation related problems were also sought and their responses in this respect are brought out in Table 9.2.

Although majority of the sampled member as well as non-member farmers did not show any concern about the approach roads to their villages, in some quarters it was also held that such approach roads were neither all seasoned nor metalled and, therefore, caused great inconvenience for the transportation of produce. The non-member farmers were found to be more concerned about this problem as compared to member farmers.

Table 9.2 : Problems faced by the Sampled Farmers Regarding Transportation of Horticultural Crops in Maharashtra : 1997-98

Particulars	Members (per cent)				Non-Members (per cent)			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
I. Approach Road to Village								
a. No all season road	20.00	15.00	20.00	18.33	25.00	35.00	20.00	26.67
b. Road not metalled	20.00	25.00	15.00	20.00	20.00	30.00	30.00	26.67
c. No problem	60.00	60.00	65.00	61.67	55.00	35.00	50.00	46.66
II. Transportation								
1. No approach road to farm	5.00	-	-	1.67	-	-	-	-
b. Lack of all weather roads	-	-	-	-	-	-	-	-
c. Lack of vehicles	-	-	-	-	-	-	-	-
d. Lack of refrigerated vehicles	-	-	-	-	-	-	-	-
e. High transport charges	30.00	55.00	45.00	43.33	90.00	80.00	85.00	85.00
f. No problem	65.00	45.00	55.00	55.00	10.00	20.00	15.00	15.00

Among various transportation related problems, high transportation costs involved in the marketing of horticultural produce was cited as the major problem confronted by most of the sampled farmers. This held especially true in the case of non-member sampled farmers. About 43 per cent of the sampled member farmers and as high

as 85 per cent of the sampled non-member farmers showed their concern for this problem. The resentment for this problem was more among medium category of sampled member farmers and small category of sampled non-member farmers. Further, lack of approach road to farm was also cited as one of the other transportation related problems, especially by the small category of sampled member farmers. However, in general, it was noticed that about 55 per cent of the sampled member farmers and 15 per cent of the sampled non-member farmers were not so forthcoming about their views and chose to reserve their comments on the problems related to the transportation of their produce. Therefore, it was presumed that these sampled farmers as such did not face any problem in this respect.

9.3 Marketing Related Problems:

The sampled respondents, whose impressions had been sought on the post-harvest infrastructure facilities, were further probed to find out if they had any problem related to marketing of produce. Though many problems were indicated, the respondents were asked to elucidate only the most prominent among them. In general, sampled respondents came forward with two sets of problems relating to marketing of produce. While majority of the problems turned out to be associated with selling of the produce, a few problems were also found to be related to market information, especially in terms of demand and price of the produce. The views of sampled respondents expressed with respect to the constraints faced by them in the marketing of produce have been enlisted in Table 9.3.

Lack of information regarding demand and price of the produce in various market centres was cited as one of the major market information related problems. About 27 per cent of the sampled member farmers and as high as 85 per cent of the sampled non-member farmers expressed their view for this problem. The resentment for this problem was more among small and large category of sampled non-member farmers and to some extent among medium category of sampled member farmers. These sampled farmers wanted some extension agencies to come forward and help them in seeking information about the demand and price of the produce not only in domestic but also in export markets.

response in terms of various problems faced by them during these operations is given in Table 9.4.

During picking/plucking operations, the shortage of skilled labour was found to be the major problem confronted by majority of the sampled farmers. About 42 per cent of the sampled member farmers and 62 per cent of the sampled non-member farmers expressed their view for this problem. Some of the sampled respondents were also concerned for the higher prevailing wage rates of labour in the area. Medium category of non-member farmers were more concerned for these problems.

Table 9.4 : Problems Faced by Sampled Farmers Regarding Picking / Plucking, Grading and Packing of Horticultural Crops in Maharashtra : 1997-98

Particulars	Members (per cent)				Non-Members (per cent)			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
I. Picking / Plucking								
a. Shortage of skilled labour	45.00	50.00	30.00	41.67	65.00	70.00	50.00	61.67
b. Wages are high	20.00	15.00	15.00	16.67	15.00	30.00	30.00	25.00
c. No problem	35.00	35.00	55.00	41.66	20.00	-	20.00	13.33
II. Grading / Packing								
a. No grading / packing Centre with equipment	-	-	-	-	-	5.00	-	1.67
b. Shortage of skilled labour	50.00	65.00	45.00	53.33	55.00	70.00	60.00	61.67
c. Higher wages	10.00	20.00	15.00	15.00	20.00	10.00	15.00	15.00
d. No problem	40.00	15.00	40.00	31.67	25.00	15.00	25.00	21.66
III. Packing Material								
a. Shortage of packing material	-	-	-	-	10.00	15.00	15.00	13.33
b. Higher prices	55.00	70.00	45.00	56.67	65.00	60.00	65.00	63.33
c. Not available on credit	-	-	-	-	5.00	-	-	1.67
d. Lack of improved packing material	-	-	-	-	-	-	-	-
e. No Problem	45.00	30.00	55.00	43.33	20.00	25.00	20.00	21.67

Table 9.3 : Problems faced by the Sampled Farmers Regarding Marketing of Horticultural Crops in Maharashtra : 1997-98

Particulars	Members (per cent)				Non-Members (per cent)			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
I. Market Information								
a. Inadequate information	5.00	-	-	1.67	-	-	-	-
b. Information available for limited markets	20.00	35.00	25.00	26.67	95.00	65.00	95.00	85.00
c. No problem	75.00	65.00	75.00	71.66	5.00	35.00	5.00	15.00
II. Selling Problems								
a. Deduct more charges	35.00	50.00	15.00	33.33	20.00	20.00	45.00	28.33
b. Part payment	-	-	-	-	-	-	-	-
c. Delay in payment	10.00	15.00	10.00	11.67	60.00	65.00	35.00	53.33
d. Do not take consent while selling	-	-	-	-	-	-	-	-
e. Quote lower prices than actual prevailing in market	-	-	-	-	10.00	-	5.00	5.00
f. No problem	55.00	35.00	75.00	55.00	10.00	15.00	15.00	13.34

On the other end of the spectrum, deduction of more charges by various market functionaries and delayed payments for the produce were found to be the major selling related problems. These kind of problems were faced by majority of the non-member sampled farmers. The concern for these problems was more among small and medium category of sampled non-member farmers. Quoting less than the actual price was another problem confronted by some of the non-member sampled farmers. However, mention may be made here that majority of the sampled member farmers neither had any problem relating to market information nor with the sale of their produce.

9.4 Picking / Plucking, Grading and Packing Related Problems:

Impressions of the sampled respondents were also sought on the picking / plucking, grading and packing related problems. The information on sampled member's

Availability of skilled labour posed great problem even during grading / packing operations. The concern for this problem was more among small and medium category of sampled member and non-member farmers. About 15 per cent of the total sampled member and non-member respondents also expressed their concern for prevailing high wage rates of labour in the area. Thus, during both picking/plucking and grading / packing operations the sampled farmers experienced similar kind of problems.

In response to a question on the problem associated with packing material, about 57 per cent of the sampled member respondents and 63 per cent of the sampled non-member respondents maintained that such packing materials were available at very high prices. Availability of such packing material was found to be another problem confronted by non-member sampled farmers. Majority of the sampled farmers wanted some Government agencies to come forward to subsidize such packing materials. Nonetheless, mention may be made here that some of the sampled member and non-member farmers chose to reserve their comments on packing material and the problems associated with it.

9.5 Stacking Material Related Problems:

When the sampled respondents were asked to indicate their perception regarding stacking material related problems, as many as four different kinds of problems were cited by the sampled farmers with respect to the availability of such material. The responses of the sampled farmers in this respect are enlisted in Table 9.5.

Although majority of the sampled farmers did not face any stacking material related problems, a significant section among non-member farmers believed that such stacking materials were available not only at far away places but there was also a problem of availability of quality material. Inadequate supply of such stacking material was another problem confronted by non-member sampled farmers. A significant section of sampled member and non-member farmers also maintained that there was a problem of availability of labour for fixing such stacking material in their farms.

Table 9.5 : Problems Faced by the Sampled Farmers Regarding Stacking Material

Particulars	Members (per cent)				Non-Members (per cent)			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
a. Lack of desired quality material	-	10.00	-	3.33	-	10.00	-	3.33
b. Inadequate supply	-	5.00	-	1.67	5.00	10.00	10.00	8.34
c. Availability at far away places	-	10.00	5.00	5.00	30.00	20.00	35.00	28.33
d. Non availability of labour	15.00	5.00	15.00	11.67	10.00	15.00	10.00	11.67
e. No problem	85.00	70.00	80.00	78.33	55.00	45.00	45.00	48.33

In conclusion, two differing points of view emerged about the availability of post-harvest infrastructural facilities in the study area. While sampled member farmers were quite satisfied with the kind of post-harvest infrastructural facilities available in the area, the non-member farmers faced some major problems in this respect. Lack of availability of pre-cooling and cold storage facilities, high transportation charges for the marketing of produce, delayed payment for the produce, lack of availability of market information for the prices and demand for the produce, lack of availability of skilled labour for various post-harvest operations and higher price of packing material were among the major problems faced by non-member sampled farmers. The resentment for these problems was more among small and medium category of sampled non-member farmers as compared to large category of sampled non-member farmers.

CHAPTER- X

MARKETING PATTERN OF HORTICULTURAL CROPS IN MAHARASHTRA

There are several studies conducted in various parts of the country on the marketing pattern of fruits, vegetable and flower crops. Most of these studies suggest that the traders associated with the marketing pattern of these high value crops share high margin quite in excess of the proportion of services rendered by them (Swarup et al; 1985; Singh, 1990; AERC, 1977; Srivastava , 1994). It has been argued that most of the small growers even today resort to the same traditional way in disposing off their produce, despite the presence of organized structure of marketing in the form of cooperatives (Prasad, 1996). On the other hand, it is also conceded that fruits and vegetables marketed through cooperative societies also suffer from similar deficiencies as experienced in the traditional way of marketing (Rajagopal, 1992, 1995; Singh, 1995; Thakur, 1995; Jha, 1995 and Wadkar and Talathi, 1996). It is widely believed that the marketing of fruits and vegetables is a complex process due to their perishability, fragility, seasonality, and bulkiness. However, it is expected that measures and programme initiatives such as adoption of improved pre- and post-harvest technology and water and pest control practices will not only increase the productivity of individual horticultural crops and their quality but they are also likely to substantially minimize the post-harvest losses, increase the total crop area cover and generate sufficient surplus of these high value crops.

Since PHI facilities created in the area are expected to provide immense opportunities to the farmers to divert their produce to various domestic and export markets, it is hoped that the producers will not only get a fair share in the consumer rupee but they will also be able to reduce post-harvest losses of the produce because of the presence of modern and scientific method of marketing. This chapter, therefore, places an onerous task on evaluating the pattern of marketing of various horticultural crops grown by both members and non-members of marketing cooperatives. The main foci of attention of this chapter are on analyzing the production, utilization and sale pattern of various fruits, vegetable and flower crops grown by the sampled farmers, types of

marketing channels adopted by the farmers for the disposal of produce, post-harvest losses of the produce during various operations, etc.

10.1 Production, Utilization and Sale Pattern of Horticultural Crops:

An attempt is made here to provide an insight into the production, utilization and sale pattern of various horticultural crops grown on the sampled farms of various categories of member and non-member farmers, especially during the reference year 1997-98. This exercise is done not only for various vegetable crops grown during kharif, rabi and summer season but also for various perennial crops such as grapes and banana grown on the sampled farms. The changes in terms of production, utilization and sale pattern of various horticultural crops grown by various categories of farmers are brought out separately for each season and such changes are delineated separately in the subsequent sections.

10.1.1 Production, Utilization and Sale of Horticultural Crops During Kharif

Season

Most of the horticultural crops are generally perishable in nature and, therefore, require quick disposal. This is especially true in the case of vegetable crops. An attempt is made in this section to ascertain the production, spoilage, consumption and sale pattern of various horticultural crops grown on the farms of member and non-member farmers, especially during kharif season. The production, utilization and sale estimates of various horticultural crops for various categories of farmers for the reference year 1997-98 are provided in Table 10.1.

During kharif season, various vegetable crops were seen to be by far the major horticultural crops grown on the farms of both member and non-member farmers. The area under these vegetable crops differed significantly among various categories of sampled farmers, especially in the case of certain vegetables like tomato, brinjal and cauliflower. In general, the area under most of the vegetable crops were found to be higher on the farms of member farmers as compared to non-member farmers. Among various vegetable crops, tomato, onion, brinjal and cauliflower were seen to be grown on all the categories of sampled farms. It is to be noted that the area under most of the

Table 10.1 : Production, Utilization and Sale of Various Horticultural Crops During Kharif Season

Particulars	Member				Non-Member			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
Tomato								
- Area (Ha / Household)	0.06	0.21	0.32	0.20	0.07	0.14	0.30	0.17
- Production (Qtls / Ha)	386.97	373.65	376.68	376.68	300.14	303.46	357.33	334.96
- Spoilage (%)	3.83	3.44	3.28	3.39	3.99	4.65	4.06	4.20
- Home Consumption (%)	1.92	2.01	1.89	1.93	2.24	3.14	1.94	2.27
-Sale (%)	94.25	94.55	94.83	94.68	93.77	92.21	94.00	93.53
Onion								
- Area (Ha / Household)	0.05	0.02	0.06	0.04	0.01	0.01	0.02	0.03
- Production (Qtls / Ha)	196.48	202.54	216.13	207.25	185.25	197.60	185.25	187.01
- Spoilage (%)	9.14	8.54	7.14	8.01	9.33	9.38	8.67	8.87
- Home Consumption (%)	8.00	7.32	8.93	8.38	10.67	10.00	7.33	8.21
-Sale (%)	82.86	84.14	83.93	83.61	80.00	80.62	84.00	82.92
Brinjal								
- Area (Ha / Household)	0.02	0.05	0.12	0.06	0.01	0.05	0.06	0.04
- Production (Qtls / Ha)	177.84	209.95	227.24	217.74	200.07	209.41	239.59	225.53
- Spoilage (%)	8.33	7.49	6.16	6.66	10.49	7.69	7.56	7.71
- Home Consumption (%)	9.72	8.02	6.16	6.64	9.88	6.67	5.50	6.09
-Sale (%)	81.95	84.49	87.68	86.70	79.63	85.64	86.94	86.20
Pumpkin								
- Area (Ha / Household)	0.01	0.02	-	0.01	0.02	0.05	0.04	0.04
- Production (Qtls / Ha)	333.45	345.80	-	343.74	227.24	258.23	321.10	276.45
- Spoilage (%)	4.44	3.57	-	3.71	6.52	6.09	6.15	6.19
- Home Consumption (%)	4.44	2.86	-	3.11	4.35	3.48	3.85	3.78
-Sale (%)	91.12	93.57	-	93.18	89.13	90.43	90.00	90.03
Lady's Finger								
- Area (Ha / Household)	0.03	0.04	-	0.02	0.02	0.02	0.08	0.04
- Production (Qtls / Ha)	329.33	333.45	-	331.91	271.70	247.00	302.58	288.17
- Spoilage (%)	5.63	5.56	-	5.58	5.45	6.00	4.90	5.14
- Home Consumption (%)	3.75	2.96	-	3.26	3.64	4.00	3.27	3.43
-Sale (%)	90.62	91.48	-	91.16	90.91	90.00	91.83	91.43
Cauliflower								
- Area (Ha / Household)	0.04	0.06	0.25	0.12	-	0.13	0.22	0.12
- Production (Qtls / Ha)	382.85	444.60	413.02	415.02	-	416.31	371.62	387.73
- Spoilage (%)	3.87	3.70	2.99	3.22	-	4.59	4.47	4.52
- Home Consumption (%)	2.58	2.59	2.50	2.53	-	4.02	3.99	4.00
-Sale (%)	93.55	93.71	94.51	94.25	-	91.39	91.54	91.48
Potato*								
- Area (Ha / Household)	-	-	0.12	0.04	-	-	0.02	0.01
- Production (Qtls / Ha)	-	-	316.98	316.98	-	-	296.40	296.40
- Spoilage (%)	-	-	2.86	2.86	-	-	2.50	2.50
- Home Consumption (%)	-	-	2.08	2.08	-	-	2.50	2.50
-Sale (%)	-	-	95.06	95.06	-	-	95.00	95.00
Cucumber								
- Area (Ha / Household)	-	-	0.02	0.01	-	-	0.02	0.01
- Production (Qtls / Ha)	-	-	148.20	148.20	-	-	197.60	197.60
- Spoilage (%)	-	-	3.33	3.33	-	-	6.25	6.25
- Home Consumption (%)	-	-	5.00	5.00	-	-	6.25	6.25
-Sale (%)	-	-	91.67	91.67	-	-	87.50	87.50
Flower								
- Area (Ha / Household)	0.06	-	-	0.02	-	-	-	-
- Production (Qtls / Ha)	107.03	-	-	107.03	-	-	-	-
- Spoilage (%)	9.23	-	-	9.23	-	-	-	-
- Home Consumption (%)	-	-	-	-	-	-	-	-
-Sale (%)	90.77	-	-	90.77	-	-	-	-

Note : * In the case of potato, about 8-10 per cent of the total production is kept by the farmer for seed. However, such figures were not available

vegetable crops increased with the increase in land holding size of the sampled farmers. This held true on the sampled farms of both member and non-member farmers. The small category of member farmers were also seen to be growing some of the flower crops on their farms such as marigold and aster.

The productivity of various vegetable crops also differed significantly among various categories of respondent farmers. In general, the productivities of most of the vegetable crops were found to be higher on the farms of member farmers as compared to non-member farmers with brinjal and cucumber being the only aberration in this scenario. The productivity of brinjal was found to be higher on the farms of all the categories of non-member farmers as compared to member farmers. In general, the productivity of various vegetable crops increased with the increase in land holding size of the farmer. However, in the case of tomato, the productivity was found to be higher on the farms of small category of member farmers as compared to medium and large category of member farmers. On an average, for the average category of member farmers the estimated productivities on their farms were found to be of the order of 376.68 quintals/hectare for tomato, 207.25 quintals/hectare for onion, 217.74 quintals/hectare for brinjal, 343.74 quintals/hectare for pumpkin 331.91 quintals/hectare for lady's finger, 415.02 quintals/hectare for cauliflower, 316.98 quintals/hectare for potato and 148.20 quintals/hectare for cucumber (Table 10.1). On the other hand, in the case of non-member farmers, the estimated productivities on their farms were found to be to the tune of 334.96 quintals/hectare for tomato, 187.01 quintals/hectare for onion, 225.53 quintals/hectare for brinjal, 276.45 quintals/hectare for pumpkin, 288.17 quintals/hectare for lady's finger, 387.73 quintals/hectare for cauliflower, 296.40 quintals/hectare for potato and 197.60 quintals/hectare for cucumber. These estimates clearly show higher productivities of various vegetable crops on the sampled farms of member farmers as compared to non-member farmers.

Various vegetable crops grown by the selected farmers showed considerable variations in terms of spoilage during various operations. The extent of spoilage was found to be the highest for onion crop and lowest for potato. This held true for both the member and non-member farmers. In the case of onion, the extent of spoilage was as high as 8 per cent of the total production on the farms of member farmers and 9 per cent

of the total production on the farms of non-member farmers. Brinjal was found to be another vegetable crop that showed considerable spoilage during various operations. The estimated spoilage in the case of brinjal was found to be about 7 per cent of total production on the sampled farms of member farmers and 8 per cent of the total production on the sampled farms of non-member farmers (Table 10.1). The extent of spoilage in the case of other vegetable crops like tomato, pumpkin, cauliflower, potato and cucumber were estimated at 3-4 per cent of the total production. This held true on the farms of both member and non-member farmers. In the case of lady's finger, the spoilage was estimated at 6 per cent of the total production on the sampled farms of member farmers and 5 per cent of total production on the sampled farms of non-member farmers. Interestingly, the magnitude of spoilage for various vegetable crops were higher on the sampled farms of non-member farmers as compared to member farmers. Various flower crops also showed very high proportion of spoilage. In the case of flower crops, the proportion of spoilage to the total production was estimated at 9.23 per cent for the average category of sampled member farmers.

A considerable difference was also noticed in terms of annual consumption of various vegetable crops grown on the sampled farms. In general, for the average category of farmer the annual consumption of vegetables was estimated at about 2 per cent of total production for tomato, 8 per cent for onion, 7 per cent for brinjal, 3 per cent for pumpkin, lady's finger, cauliflower, and potato, and 5 per cent for cucumber (Table 10.1). These consumption figure estimates held true for both member and non-member farmers. However, it is to be noted that the proportions of home consumption to total production of various vegetable crops were marginally higher for the non-member farmers as compared to member farmers. Interestingly, the proportion of home consumption to total production of various vegetable crops in a year declined with the increase in land holding size of the farmer. However, mention may be made here that in absolute terms the annual home consumption estimates of various vegetable crops on per farm basis were much higher for larger categories of farmers as compared to other categories of farmers.

The proportion of sale to total production did not vary much among various categories of farmers, especially in the case of tomato, onion, lady's finger and cauliflower. In the case of tomato, about 94 per cent of the total production was sold in

the market. This held true for both member and non-member farmers. Because of very high proportion of spoilage and home consumption, the proportion of sale to total production for onion crop was estimated at 83-84 per cent for both member and non-member farmers. Similarly, in the case of brinjal, the estimated sale was about 86 per cent of the total production. In the case of other vegetable crops like pumpkin, lady's finger, cauliflower, potato and cucumber, the proportion of sale to total production varied from 90 to 95 per cent for both member and non-member farmers. In general, the estimated figures for various vegetable crops in terms of proportion of sale to total production were higher for the member farmers as compared to non-member farmers. Further, during kharif season the proportion of sale to total production of various vegetable crops increased with the increase in land holding size of the farmers. This held true for both sampled member and non-member farmers.

10.1.2 Production, Utilization and Sale of Horticultural Crops During Rabi Season

During rabi season, the sampled farmers were seen to cultivate five vegetable and two flower crops on their farms. These crops were onion, cauliflower, tomato, ladyfinger, pumpkin, marigold and aster. An attempt is made in this section to provide an insight into the extent of production, spoilage, consumption and sale of these horticultural crops for various categories of sampled member and non-member farmers and the estimates of the same are provided in Table 10.2.

Among various vegetable crops grown during rabi season, tomato was seen to be the only crop cultivated by all the categories of member and non-member farmers. The area under this vegetable crop was found to be marginally higher on the farms of member farmers as compared to non-member farmers. As regards productivity of tomato, it was found to be substantially higher on the farms of member farmers as compared to non-member farmers. An increase in productivity of tomato was found with the increase in land holding size of member and non-member farmers. Despite differences in productivity of tomato among various categories of members and non-members, the proportion of spoilage as well as home consumption to total production remained by and large same on these two categories of farms. As a result of this, the proportion of sale to

total production of tomato also remained by and large same on these two categories of farms. In general, 95-96 per cent of the total production of tomato was sold in the market by various categories of sampled member and non-member farmers.

Onion was found to be another horticultural crop cultivated by most of the selected farmers during rabi season. In general, the area under onion crop was higher on the sampled farms of non-member farmers as compared to member farmers. However, the productivity of onion was found to be higher on the farms of member farmers as compared to non-member farmers. For the average category of farmer, the productivity of onion was estimated at 192.92 quintals/hectare on the farms of member farmers and 181.79 quintals/hectare on the farms of non-member farmers. As regards spoilage and home consumption of this valued crop, no significant differences were noticed among various categories of sampled member and non-member farmers. Therefore, the proportion of sale to total production of onion also did not differ much among various categories of member and non-member farmers. The proportion of sale to total production of onion was found to be about 91 per cent on the farms of both member and non-member farmers.

Like onion, cauliflower was found to be cultivated by almost all the categories of sampled member and non-member farmers. The acreages as well as productivity of this crop were found to be higher on the farms of member farmers as compared to non-member farmers. Interestingly, the magnitude of spoilage of cauliflower was higher on the farms of member farmers as compared to non-member farmers. However, the proportion of sale to total production of cauliflower remained by and large same among various categories of selected farmers. Both sampled member and non-member farmers sold about 95 per cent of the total production of cauliflower in the market.

Lady's finger was found to be cultivated only by the large category of sampled member farmers. The productivity of lady's finger for the large category of member farmers was estimated at 370.50 quintals/ hectare. Out of the total production, about 7 per cent was seen to be spoiled during various operations and 3 per cent was consumed at home. Thus, only 90 per cent of the total production of lady's finger was found to be sold in the market.

Table 10.2 : Production, Utilization and Sale of Various Crops During Rabi Season

Particulars	Member				Non-Member			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
Onion								
- Area (Ha / Household)	0.06	0.06	0.09	0.07	-	0.08	0.20	0.10
- Production (Qtls / Ha)	176.56	209.38	192.86	192.92	-	167.50	187.50	181.79
- Spoilage (%)	4.96	4.78	4.08	4.55	-	5.37	4.53	4.75
- Home Consumption (%)	3.89	4.48	4.32	4.74	-	5.37	4.27	4.56
-Sale (%)	91.15	90.74	91.60	90.71	-	89.26	91.20	90.69
Cauliflower								
- Area (Ha / Household)	0.02	0.06	0.07	0.05	-	0.02	0.04	0.02
- Production (Qtls / Ha)	296.40	308.75	333.45	318.01	-	247.00	284.05	271.70
- Spoilage (%)	2.50	4.27	2.31	3.13	-	3.00	2.61	2.73
- Home Consumption (%)	1.67	2.40	1.39	1.83	-	2.00	1.74	1.82
-Sale (%)	95.83	93.33	96.30	95.04	-	95.00	95.65	95.45
Tomato								
- Area (Ha / Household)	0.06	0.04	0.04	0.05	0.01	0.02	0.06	0.03
- Production (Qtls / Ha)	411.67	449.09	432.25	428.82	308.75	308.75	329.33	322.78
- Spoilage (%)	2.00	3.25	1.71	2.32	3.33	4.23	3.25	3.60
- Home Consumption (%)	1.00	1.75	1.14	1.28	2.22	1.53	1.75	1.73
-Sale (%)	97.00	95.00	97.15	96.40	94.45	94.24	95.00	94.67
Lady's Finger								
- Area (Ha / Household)	-	-	0.04	0.01	-	-	-	-
- Production (Qtls / Ha)	-	-	370.50	370.50	-	-	-	-
- Spoilage (%)	-	-	6.67	6.67	-	-	-	-
- Home Consumption (%)	-	-	3.33	3.33	-	-	-	-
-Sale (%)	-	-	90.00	90.00	-	-	-	-
Pumpkin								
- Area (Ha / Household)	-	0.02	0.10	0.04	0.02	0.02	0.08	0.04
- Production (Qtls / Ha)	-	321.10	345.80	341.68	259.35	271.70	302.58	290.23
- Spoilage (%)	-	3.08	2.57	2.65	4.76	5.45	4.90	4.97
- Home Consumption (%)	-	4.62	3.00	3.25	5.71	5.45	3.27	3.97
-Sale (%)	-	92.30	94.43	94.10	89.53	89.10	91.83	91.06
Flowers (Marigold + Aster)								
- Area (Ha / Household)	0.02	0.04	0.10	0.05	-	0.02	0.04	0.02
- Production (Qtls / Ha)	123.50	135.85	153.14	145.11	-	98.80	98.80	98.80
- Spoilage (%)	12.00	13.64	9.68	10.85	-	12.50	12.50	12.50
- Home Consumption (%)	-	-	-	-	-	-	-	-
-Sale (%)	88.00	86.36	90.32	89.15	-	87.50	87.50	87.50

Among other vegetable crops, pumpkin was found to be cultivated by all the categories of sampled non-member farmers and only by medium and large categories of sampled member farmers. The estimated productivities of pumpkin were relatively higher on the sampled farms of member farmers as compared to non-member farmers. As regards spoilage of this vegetable crop, it was found to be about 3 per cent of the total production on the sampled farms of member farmers and 5 per cent of the total production on the sampled farms of non-member farmers. The proportion of consumption to total production of pumpkin was found to be slightly higher on the sampled farms of non-member farmers as compared to member farmers. In general, about 94 per cent of the total production of pumpkin was sold in the market by sampled member farmers and 91 per cent by sampled non-member farmers.

As pointed out earlier, marigold and aster were the only flower crops cultivated by most of the sampled member and non-member farmers. The acreages under these flower crops were higher on the farms of member farmers as compared to non-member farmers. The productivities of these flower crops were also found to be higher on the farms of member farmers as compared to non-member farmers. The proportion of spoilage to total production of these flower crops was estimated at about 11 per cent on the farms of member farmers and 13 per cent on the farms of non-member farmers. As a result of this, only 89 per cent of the total production of flower crops was sold in the market by sampled member farmers and about 87 per cent by the sampled non-member farmers.

Thus, various horticultural crops grown on the sampled farms during rabi season showed considerable differences in terms of their area coverage, productivities, spoilage, home consumption and quantity marketed. The differences in productivities of these horticultural crops among various categories of farmers were more sharp as compared to differences in extent of spoilage, home consumption and quantity marketed.

10.1.3 Production, Utilization and Sale of Horticultural Crops During Summer

Season

This section provides an insight into the extent of production, spoilage, consumption and sale of various horticultural crops grown during summer season by

various categories of sampled member and non-member farmers. The result of this exercise are provided in Table 10.3.

Among various horticultural crops grown during summer season, tomato was found to be the only crop that acquired considerable area under its cultivation, especially on the farms of large farmers. Added to this, it was seen to be cultivated by all the categories of member and non-member farmers. In fact, the acreage under this crop was found to increase with the increase in land holding size of the farmers. The productivity of tomato was found to be higher on the farms of member farmers as compared to non-member farmers. Out of the total production of tomato, about 3 per cent of the crop was found to be spoilt during various operations on the farms of member farmers and nearly 5 per cent of the same on the sampled farms of non-member farmers. As regards proportion of home consumption to total production of this crop, it was found to be marginally higher on the farms of non-member farmers as compared to member farmers. In general, about 94 per cent of the total production of tomato was sold in the market by sampled member farmers and 93 per cent of the same by sampled non-member farmers.

During summer season, bottle gourd was found to be cultivated by only small and medium category of sampled member and non-member farmers. In general, the productivity of this vegetable crop was found to be higher on the farms of member farmers as compared to non-member farmers. However, the extent of spoilage as well as home consumption of this crop were found to be higher for non-member farmers as compared to member farmers. In general, the proportion of sale to total production of bottle gourd was estimated at 93 per cent for the sampled member farmers and 90 per cent for sampled non-member farmers.

Cauliflower was found to be cultivated by medium and large category of member farmers and small and large category of non-member farmers. In general, member farmers showed higher productivity of cauliflower on their farms as compared to non-member farmers. Out of the total production of cauliflower, about 96 per cent of the crop was found to be sold in the market by member farmers and 93 per cent by non-member farmers.

Table 10.3 : Production, Utilization and Sale of Various Crops During Summer Season

Particulars	Member				Non-Member			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
Bottle Gourd								
- Area (Ha / Household)	0.02	0.06	-	0.03	0.01	0.01	-	0.01
- Production (Qtls / Ha)	432.25	370.50	-	385.94	345.80	395.20	-	370.50
- Spoilage (%)	4.00	4.89	-	4.64	7.14	5.00	-	6.00
- Home Consumption (%)	1.71	2.00	-	1.92	4.28	3.75	-	4.00
-Sale (%)	94.29	93.11	-	93.44	88.58	91.25	-	90.00
Tomato								
- Area (Ha / Household)	0.01	0.14	0.41	0.19	0.05	0.04	0.17	0.09
- Production (Qtls / Ha)	345.80	338.74	350.74	347.60	247.00	364.33	337.08	323.95
- Spoilage (%)	4.29	3.65	3.17	3.31	4.00	5.08	4.48	4.52
- Home Consumption (%)	4.29	3.13	2.82	2.92	3.60	4.41	2.76	3.17
-Sale (%)	91.42	93.22	94.01	93.77	92.40	90.51	92.76	92.31
Cauliflower								
- Area (Ha / Household)	-	0.01	0.04	0.02	0.02	-	0.04	0.02
- Production (Qtls / Ha)	-	281.58	284.05	283.56	234.65	-	290.23	271.70
- Spoilage (%)	-	3.51	2.17	2.44	4.21	-	2.98	3.33
- Home Consumption (%)	-	3.51	1.30	1.74	4.21	-	3.40	3.64
-Sale (%)	-	92.98	96.53	95.82	91.58	-	93.62	93.03
Onion								
- Area (Ha / Household)	-	-	0.06	0.02	-	-	-	-
- Production (Qtls / Ha)	-	-	222.30	222.30	-	-	-	-
- Spoilage (%)	-	-	4.07	4.07	-	-	-	-
- Home Consumption (%)	-	-	3.33	3.33	-	-	-	-
-Sale (%)	-	-	92.60	92.60	-	-	-	-
Cucumber								
- Area (Ha / Household)	-	-	0.02	0.01	-	-	0.04	0.01
- Production (Qtls / Ha)	-	-	123.50	123.50	-	-	160.55	160.55
- Spoilage (%)	-	-	4.00	4.00	-	-	3.08	3.08
- Home Consumption (%)	-	-	4.00	4.00	-	-	3.85	3.85
-Sale (%)	-	-	92.00	92.00	-	-	93.07	93.07
Flowers (Chrysanthemum + Marigold)								
- Area (Ha / Household)	0.06	0.09	0.10	0.08	0.02	0.11	0.10	0.08
- Production (Qtls / Ha)	149.85	105.27	108.68	117.63	86.45	99.75	82.99	91.08
- Spoilage (%)	9.34	8.38	8.18	8.61	11.43	10.48	10.71	10.65
- Home Consumption (%)	-	-	-	-	-	-	-	-
-Sale (%)	90.66	91.62	91.82	91.39	88.57	89.52	89.29	89.35

During summer season, onion was found to be cultivated only by large category of sampled member farmers. The productivity of onion during summer season was estimated at 222.30 quintals/hectare. Out of the total production of onion, about 4 per cent was found to be spoilt during various operations and 3 per cent was consumed at home. The remaining 93 per cent of the crop was sold in the market as marketed surplus.

Cucumber was found to be cultivated by large category of both member and non-member farmers. The productivity of cucumber was estimated at 123.50 quintals/hectare on the farms of member farmers and 160.55 quintals/hectare on the farms of non-member farmers. In fact, as against member farmers, the non-member farmers showed not only higher productivity but also higher proportion of sale to total production of cucumber.

The most important feature of summer season was the cultivation of flower crops. The flower crops were found to be cultivated not only by all the categories of member and non-member farmers but they also acquired considerable area under their cultivation. In fact, the area under flower crops increased with the increase in land holding size of the sampled farmers. As regards productivity of flower crops, no such trend was discernible. The productivity of flower crops was found to be the highest for small category of member farmers and medium category of non-member farmers. However, in general, member farmers showed higher productivity of flower crops on their farms as compared to non-member farmers. Because of very high proportion of spoilage, only 91 per cent of the total production of flower crops was sold in the market by sampled member farmers and this proportion was found to be of the order of 89 per cent for sampled non-member farmers.

Thus, tomato and flower crops were found to be the only major horticultural crops cultivated during summer season by all the categories of sampled member and non-member farmers. Other horticultural crops like bottle gourd, cauliflower, onion and cucumber were found to be cultivated by some specific categories of sampled member and non-member farmers. In general, during summer season, sampled member farmers showed not only higher acreages under the crop but also higher productivity as well quantum of sale of various horticultural crops as compared to sampled non-member farmers.

10.1.4 Production, Utilization, and Sale of Perennial Crops

Among various perennial crops, grapes and banana were found to be the only major horticultural crops cultivated by both sampled member and non-member farmers. The sampled farmers were found to cultivate as many as five varieties of grapes on their farms. These grape varieties were Tas Ganesh, Sharad seedless, Thompson seedless, Flame and Sonika. Table 10.4 provides an insight into the estimates relating to acreage under various perennial crops grown on various categories of farms, production, spoilage, consumption and sale of the produce by various categories of farmers, both members and non-members.

Among various grape varieties, Tas Ganesh was found to be the only variety that not only acquired considerable area under its cultivation but it was also found to be cultivated by all the categories of sampled member and non-member farmers. However, the acreage under this variety of grapes was found to be significantly higher on the farms of member farmers as compared to non-member farmers. Not only this, the member farmers also showed higher productivity of this variety of grapes on their farms as compared to non-member farmers. In general, the productivity of Tas Ganesh variety of grapes was estimated at 190.69 quintals/hectare on the farms of member farmers and 175.29 quintals/hectare on the farms of non-member farmers. The magnitudes of spoilage as well as home consumption of this crop were found to be higher on the farms of non-member farmers as compared to member farmers. Because of higher proportion of spoilage and home consumption non-member farmers could sell only 87 per cent of the total production of this crop in the market, whereas this proportion for member farmers was found to be as high as 91 per cent.

Sharad seedless was another variety of grapes cultivated by all the categories of sampled member and non-member farmers. However, the acreage under this variety of grapes was found to be much lower as compared to acreage under Tas Ganesh variety of grapes. This held true for all the categories of farmers. The productivity of Sharad

Table 10.4 : Production, Utilization and Sale of Fruits on the Selected Farms

Crops / Varieties	Member				Non-Member			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
Grapes								
(a) Tas Ganesh								
- Area (Ha / Household)	0.68	0.65	1.13	0.82	0.24	0.28	0.85	0.46
- Production (Qtls / Ha)	192.03	195.95	186.88	190.69	161.57	184.81	178.23	175.29
- Spoilage (%)	5.73	4.66	5.49	5.34	6.44	6.82	8.09	7.35
- Home Consumption (%)	4.95	4.16	3.50	4.09	4.25	6.64	5.90	5.77
- Sale (%)	89.32	91.18	91.01	90.57	89.31	86.54	86.01	86.88
(b) Sharad Seedless								
- Area (Ha / Household)	0.10	0.19	0.35	0.21	0.15	0.21	0.16	0.17
- Production (Qtls / Ha)	214.89	218.81	200.78	208.33	185.25	169.51	184.30	178.51
- Spoilage (%)	7.82	5.77	6.12	6.29	4.81	6.00	6.24	5.94
- Home Consumption (%)	4.83	3.07	2.52	3.07	4.44	3.57	3.71	3.81
- Sale (%)	87.35	91.16	91.36	90.64	90.75	90.43	90.05	90.25
(b) Thompson Seedless								
- Area (Ha / Household)	0.01	-	0.18	0.06	-	-	-	-
- Production (Qtls / Ha)	197.60	-	198.97	198.94	-	-	-	-
- Spoilage (%)	6.25	-	4.83	4.86	-	-	-	-
- Home Consumption (%)	5.00	-	2.07	2.13	-	-	-	-
- Sale (%)	88.75	-	93.10	93.01	-	-	-	-
(d) Flame								
- Area (Ha / Household)	-	0.13	0.08	0.07	-	0.04	-	0.01
- Production (Qtls / Ha)	-	167.32	179.08	171.93	-	160.55	-	160.55
- Spoilage (%)	-	4.76	5.17	4.93	-	7.69	-	7.69
- Home Consumption (%)	-	2.38	3.45	2.82	-	-	-	-
- Sale (%)	-	92.86	91.38	92.25	-	92.31	-	92.31
(e) Sonika								
- Area (Ha / Household)	0.01	0.13	0.25	0.13	0.16	0.17	0.01	0.12
- Production (Qtls / Ha)	172.90	174.47	183.14	180.13	164.67	173.20	160.55	168.86
- Spoilage (%)	7.14	7.42	5.48	6.13	5.92	6.43	7.69	6.21
- Home Consumption (%)	7.14	6.97	3.07	4.38	4.26	5.22	7.69	4.79
- Sale (%)	85.72	85.61	91.45	89.49	89.82	88.35	84.62	89.00
Banana								
- Area (Ha / Household)	0.06	0.17	0.16	0.13	-	0.03	0.06	0.03
- Production (Qtls / Ha)	553.76	563.28	602.06	577.83	-	503.50	636.80	598.29
- Spoilage (%)	4.32	3.48	3.59	3.65	-	4.53	2.42	2.94
- Home Consumption (%)	6.19	3.21	3.23	3.68	-	3.02	2.42	2.57
- Sale (%)	89.49	93.31	93.18	92.67	-	92.45	95.16	94.49

seedless variety of grapes was found to range from 200 to 218 quintals/hectare on the farms of member farmers and from 170 to 185 quintals/hectare on the farms of non-member farmers. Out of the total production, about 6 per cent of the crop was found to be spoilt during various operations on the sampled farms of both member and non-member farmers. As regards home consumption of this crop, no significant differences were noticed among various categories of sampled member and non-member farmers. In general, 3-4 per cent of the total production of Sharad seedless variety of grapes was consumed at home. The quantity marketed was found to be about 90 per cent of the total production in the case of both member and non-member farmers.

Sonika variety of grapes was also found to be cultivated by all the categories of member and non-member farmers. However, the acreage under this crop was found to be not only lower than Tas Ganesh variety of grapes but also Sharad seedless variety of grapes. In general, the productivity of this variety of grapes was estimated at 180.13 quintals/hectare on the farms of member farmers and 168.86 quintals/hectare on the farms of non-member farmers. As regards spoilage, about 6 per cent of the total production of the crop was found to be lost during various operations on the farms of both members and non-members. The proportion of home consumption to total production of this crop was found to be of the order of 4-5 per cent on the farms of both member and non-member farmers. Despite differences in productivity of the crop, both member and non-member farmers sold 89 per cent of the total production of the crop in the market.

Although Thompson seedless variety of grape was found to be cultivated by both small and large categories of member farmers, the acreage under this variety of grapes was found to be negligible on the farms of small category of farmers. The productivity of this variety of grapes was estimated at around 199 quintals/hectare. Out of the total production of this crop, about 5 per cent was spoilt during various operations and 2 per cent was consumed at home. The remaining 93 per cent of the total production of this crop was sold in the market.

Flame variety of grape was mainly cultivated by medium and large category of member farmers and only by medium category of non-member farmers. The productivity of Flame was estimated at 171.93 quintals/hectare on the farms of member farmers and

160.55 quintals/hectare on the farms of non-member farmers. The proportion of sale to total production of this crop was found to be by and large same on the farms of both member and non-member farmers and it was estimated at around 92 per cent.

Apart from various varieties of grapes, both member and non-member farmers were also found to cultivate banana on their farms. The acreage under banana was found to be higher on the farms of member farmers as compared to non-member farmers. However, interestingly the productivity of banana, in general, turned out to be higher on the farms of non-member farmers as compared to member farmers. The reason for this being that the productivity of banana was substantially high on the farms of large category of non-member farmers. In the case of banana, the proportion of spoilage to total production was estimated at around 3-4 per cent on the sampled farms of both member and non-member farmers. The proportion of home consumption was also found to be 3-4 per cent of the total production of banana on the farms of both member and non-member farmers. Both sampled member and non-member farmers were found to sell 93-94 per cent of the total production of banana in the market.

An overall analysis of the estimates of various parameters relating to acreage, production, spoilage, consumption and sale of various horticultural crops cultivated by various categories of member and non-member farmers during kharif, rabi and summer seasons brought us closer to various observations, especially in terms of differences in the estimated parameters not only across various categories of farmers but also for different types of horticultural crops cultivated on the sampled farms.

In general, the acreages as well as yields of various vegetable and flower crops cultivated during kharif, rabi and summer seasons were higher on the sampled farms of member farmers as compared to non-member farmers. It is to be noted that some of the vegetable crops like tomato, cauliflower, onion, bottle gourd and cucumber were cultivated during all the three seasons. However, the yields of these crops were different during different seasons. The productivity of tomato was found to be the highest during rabi and lowest during summer season. On the other hand, onion crop showed higher productivity during kharif season as compared to other seasons. Similarly, the productivity of cauliflower was found to be the highest during kharif and lowest during summer season. In contrast to this, the productivity of bottle gourd was much higher

during summer season and it was found to be the lowest during kharif season. This held true on the farms of both member and non-member farmers. Interestingly, the acreage under flower crops was the highest during summer season. However, the productivities of these flower crops were higher during rabi season as compared to other two seasons. Some of the vegetable crops like onion, lady's finger and brinjal and all the selected flower crops showed very high proportion of spoilage to their total production. This held true during all the three seasons. In the case of brinjal, even home consumption was quite high. Consequently, the proportions of sale to total production of these vegetable and flower crops were low as compared to other horticultural crops grown during the given seasons. However, mention may be made here that as against non-member farmers the member farmers not only consistently showed higher productivity of various crops grown on their farms but also higher proportion of sale to total production of crops.

Among other horticultural crops, grapes and banana were seen to be cultivated as perennial crops. As many as five different varieties of grapes were grown on the sampled farms. All these varieties of grapes showed varying productivities. The productivity of Sharad seedless variety of grapes was found to be highest on the sampled farms of both member and non-member farmers. However, Tas Ganesh varieties of grapes showed higher acreage under their cultivation as compared to other varieties of grapes. Interestingly, all the five varieties of grapes showed by and large same proportion of spoilage to their total production which varied from 4 to 6 per cent on the sampled farms of both member and non-member farmers. The proportion of home consumption to total production of these varieties of grapes varied from 2 to 6 per cent on the selected sampled farms. Because of considerable differences in proportion of home consumption to total production, the quantum of sale of these varieties of grapes varied to a considerable extent across various categories of farmers. The proportion of sale to total production of different varieties of grapes varied from 87 per cent to 92 per cent on the selected farms of member and non-member farmers. However, the member farmers showed consistently higher proportion of sale to total production of different varieties of grapes. On the other hand, in the case of banana, non-member farmers showed not only higher productivity but also higher proportion of sale to total production of this crop. However, mention may be made here that acreage under banana was very low on the

farms of non-member farmers as compared to member farmers. Thus, it is not feasible to strictly compare the productivity as well as sale of banana for various categories of member and non-member farmers.

10.2 Marketing of Fruit, Vegetable and Flower Crops:

There are several questions which might loom large on the horizon when one discusses the marketing of horticultural crops, especially because of their perishable nature. A time lag in the disposal of these high value products often result in huge losses because of spoilage and deterioration of the quality of the produce. Sometimes improper selection of marketing channels also result in either losses or relatively lower profit margins to the farmer which is often due to lack of his knowledge about the existing marketing channels. It is therefore necessary to study various marketing related aspects of horticultural crops grown on the sampled farms. This section, therefore, revolves around those aspects of the marketing of horticultural crops such as : (i) Marketing channels for fruits, vegetable and flower crops, (ii) Sale of horticultural produce in domestic and export markets, and (iii) Post-harvest losses of horticultural produce.

10.2.1 Marketing Channels for Fruit, Vegetable and Flower Crops

There could be numerous channels through which the produce might move from the producer to the consumer. The channels might vary from commodity to commodity and also from producer to producer. In some cases, it has been noticed that the producers themselves perform the function of retail sellers. In the case of fruits and vegetables, some of the large producers are also seen to sell their produce directly to the processing firms. In the case of fruits, vegetables and flower crops, the most prominent marketing channels observed in this study are as follows:

A – Marketing Channels for Grapes

- (i) Producer – Retailer – Domestic Consumer

- (ii) Producer – Forwarding/Commission Agents – Wholesaler – Retailer – Domestic Consumer
- (iii) Producer – Private Exporter – Import Agent – Foreign Consumer
- (iv) Producer – Co-operative Society – Import Agent – Foreign Consumer

B – Marketing Channels for Banana

- (i) Producer – Commission Agents – Wholesaler – Retailer – Domestic Consumer

C - Marketing Channels for Vegetables

- (i) Producer – Forwarding/Commission Agents – Wholesaler – Retailer – Domestic Consumer

D - Marketing Channels for Flower Crops

- (i) Producer – Forwarding/Commission Agents –Retailer – Domestic Consumer
- (ii) Producer – Forwarding/Commission Agents – Wholesaler – Retailer – Domestic Consumer
- (iii) Producer – Forwarding/Commission Agents – Private Exporter – Import Agent- Foreign Consumer

In the case of grapes, the sampled producers were found to market their produce either directly to the retailer or through forwarding/commission agents in the wholesale market. These channels were followed only in the case of domestic sale of the produce. In the case of export trade, the sampled producers were marketing their produce either through private exporters or through cooperative society located in the village. Among these marketing channels available to them, the bulk of the produce was noticed to be marketed through the forwarding/commission agents in the wholesale market (Table 10.5). In general, the sampled member farmers sold about 47 per cent of the total marketed surplus of grapes through forwarding/commission agents in the wholesale market and this proportion for non-member farmers stood at 44 per cent. The share of

retailer in total marketed surplus of grapes was found to be about 25 per cent in the case of member farmers and 19 per cent for non-member farmers. It is to be noted that while proportionate sale through forwarding agents increased with the increase in land holding size of farmers, a reverse trend was noticed when the produce was sold through retailer. This kind of trend especially held true in the case of member farmers. In fact, the sampled farmers were following forwarding and retail channels only for the marketing of grapes in the domestic market. However, they were also found to sell this valued crop in the export market. While non-member farmers exported their produce only through private exporters, the member farmers had an additional channels available to them and they were found to export their produce not only through private exporters but also through cooperative society located in the village. And, this could be the reason why quantity marketed through private exporter was only to the tune of 12 per cent of the total marketed surplus of grapes in the case of member farmers and as high as 37 per cent for non-member farmers (Table 10.5). In fact, the member farmers were also selling about 17 per cent of the total marketed surplus of grapes in the export market through cooperative society.

As regards banana, all the sampled farmers were seen to market this valued crop in the wholesale market through commission agents. In general, the total marketed surplus of banana was estimated at 55.72 quintals/household in the case of member farmer and 17.33 quintals/household for non-member farmers. Similarly, vegetable and flower crops were also found to be marketed through the forwarding/commission agents in the wholesale market. On an average, the marketed surplus of various vegetable crops put together was estimated at 365.29 quintals/ household in the case of member farmers and 229.37 quintals/household for non-member farmers. The total marketed surplus of flower crops was estimated at 14.33 quintals/household for member farmers and 8.91 quintals/household for non-member farmers (Table 10.5). Thus, marketed surplus was found to be higher on the sampled farms of member farmers as compared to non-member farmers. This held true not only for various fruit crops but also for vegetable and flower crops.

**Table 10.5 : Marketing Channels Adopted by the Farmers for Fruits, Vegetables
and Flowers : 1997-98**

Marketing Channels	Member				Non-Member			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
(Quintals / Household)								
Fruits								
(i) Grapes								
(a) Retailer	70.10 (42.82)	76.00 (34.89)	47.90 (11.52)	66.97 (24.93)	20.00 (18.17)	24.50 (12.77)	58.10 (23.97)	34.20 (18.85)
(b) Forwarding / Commission Agent	40.60 (24.80)	95.15 (43.68)	239.25 (57.55)	125.00 (46.54)	50.45 (45.82)	85.45 (44.53)	101.50 (41.88)	79.13 (43.61)
(c) Pvt. Exporter	26.50 (16.19)	14.85 (6.81)	54.10 (13.01)	31.82 (11.85)	34.00 (30.88)	81.95 (42.70)	82.75 (34.15)	66.23 (36.50)
(d) Cooperative Society	26.50 (16.19)	31.85 (14.62)	74.50 (17.92)	44.82 (16.68)	5.65 (5.13)	-	-	1.88 (1.04)
Total	163.70	217.85	415.75	268.61	110.10	191.90	242.35	181.44
(ii) Banana								
(a) Commission Agent	33.40 (100.00)	65.75 (100.00)	68.00 (100.00)	55.72 (100.00)	-	12.25 (100.00)	39.75 (100.00)	17.33 (100.00)
Total	33.40	65.75	68.00	55.72	-	12.25	39.75	17.33
Vegetables								
(a) Forwarding / Commission Agent	153.10 (100.00)	315.05 (100.00)	627.70 (100.00)	365.29 (100.00)	61.00 (100.00)	188.35 (100.00)	438.80 (100.00)	229.37 (100.00)
Total	153.10	315.05	627.70	365.29	61.00	188.35	438.80	229.37
Flowers								
(a) Forwarding / Commission Agent	13.40 (100.00)	12.00 (100.00)	17.60 (100.00)	14.33 (100.00)	1.15 (100.00)	11.45 (100.00)	14.15 (100.00)	8.91 (100.00)
Total	13.40	12.00	17.60	14.33	1.15	11.45	14.15	8.91

The foregoing observations clearly indicate that forwarding/commission agents was the only major marketing channel through which most of the fruit, vegetable and flower crops of the sampled farmers was marketed, especially in the domestic market. However, as for exports of the produce, the major channels available to the producers were private exporters and cooperative society located in the village.

10.2.2 Domestic Sale of Fruit, Vegetable and Flower Crops

The sampled farmers were seen to market their horticultural produce in the domestic market either through retailer or through forwarding/commission agents. The domestic sale estimates, both in quantity and value terms, for various varieties of fruits and for all the selected vegetable and flower crops for different categories of member and non-member sampled farmers are brought out in Table 10.6.

In general, the domestic sale of grape was estimated at 189.67 quintals/household in the case of member farmers and 113.34 quintals/household for non-member farmers. The value of this sale was estimated at Rs 3.85 lakhs for member farmers and Rs 2.23 lakhs for non-member farmers. Thus, member farmers not only marketed higher quantity of grapes but also received higher prices for this valued crop. The unit price of Sonika variety of grapes was found to be the highest for member farmers and Flame variety of grapes for non-member farmers. Interestingly, the lowest price was received for Tas Ganesh variety of grapes in the case of member farmers and for Sonika variety of grapes for non-member farmers. Another interesting feature was the wide differences in the price of various varieties of grapes, especially in the case of member farmers. As regards non-member farmers, the prices did not differ much for various varieties of grapes.

The domestic sale of banana for the average category was estimated at 55.72 quintals / household in the case of sampled member farmers and 17.33 quintals/household for sampled non-member farmers. The value of sale of banana was estimated at Rs 0.18 lakhs for member farmers and Rs 0.06 lakhs for non-member farmers. Thus, prices of banana received by non-member farmers were marginally higher as compared to member farmers.

Table 10.6 : Domestic Sale of Fruits, Vegetables and Flowers By the Sampled Farmers in Maharashtra : 1997-98

(Quantity in Quintals / Household ; Value in Rupees)

Crop	MEMBERS								NON-MEMBERS							
	Small		Medium		Large		Overall		Small		Medium		Large		Overall	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
Grape Variety																
Tas Ganesh	91.05	167025	82.05	166860	149.40	287080	107.50	206988	26.95	48160	52.65	98719	79.00	165900	52.87	104260
Sharad S.	19.65	43290	42.40	93575	64.25	128240	42.10	88368	31.25	56313	24.65	48437	79.10	162155	45.00	88968
Thomson	-	-	-	-	11.25	22500	3.75	7500	-	-	-	-	-	-	-	-
Flame	-	-	24.90	66200	14.25	30550	13.05	32250	-	-	5.00	10000	-	-	1.67	3333
Sonika	-	-	21.80	44350	48.00	104800	23.27	49717	12.25	22356	27.65	55715	1.50	2475	13.80	26849
Total	110.70	210315	171.15	370985	287.15	573170	189.67	384823	70.45	126829	109.95	212871	159.60	330530	113.34	223410
Other Fruits																
Banana	33.40	10504	65.75	23325	68.00	21270	55.72	18366	-	-	12.25	3981	39.75	14906	17.33	6296
Sapota	-	-	-	-	-	-	-	-	1.75	1444	-	-	2.25	1969	1.33	1138
Total	33.40	10504	65.75	23325	68.00	21270	55.72	18366	1.75	1444	12.25	3981	42.00	16875	18.66	7434
Vegetables																
Tomato	63.15	21818	141.00	52311	262.65	98625	155.60	57585	34.95	13065	55.00	20110	183.55	66990	91.17	33388
Onion	41.75	19163	42.00	20412	71.25	35768	51.67	25114	7.25	2922	34.50	15353	74.45	36108	38.73	18128
Brinjal	2.95	1351	7.10	3515	54.10	29539	21.38	11468	2.85	1200	12.45	5540	16.10	7808	10.47	4849
Lady's finger	11.75	6392	13.00	7930	14.85	9727	13.20	8016	0.60	300	2.25	1350	23.50	14950	8.78	5533
Pumpkin	3.25	1300	55.95	21261	53.60	21976	37.60	14846	13.95	5685	15.75	4200	23.50	8675	17.73	6187
Cauliflower	30.25	15760	56.00	34664	139.70	80677	75.32	43700	-	-	58.00	29350	96.75	54575	51.58	27975
Potato	-	-	-	-	27.45	15290	9.15	5097	-	-	7.25	3263	7.75	3681	5.00	2315
Cabbage	-	-	-	-	-	-	-	-	1.40	560	-	-	-	-	0.47	187
Cucumber	-	-	-	-	4.10	1640	1.37	547	-	-	-	-	9.55	3677	3.18	1226
Walwad	-	-	-	-	-	-	-	-	-	-	0.90	540	-	-	0.30	180
Ghevda	-	-	-	-	-	-	-	-	-	-	2.25	1800	-	-	0.75	600
Chilly	-	-	-	-	-	-	-	-	-	-	-	-	0.85	1275	0.28	425
Farsi	-	-	-	-	-	-	-	-	-	-	-	-	2.80	2240	0.93	747
Total	153.10	65784	315.05	140093	627.70	293242	365.29	166373	61.00	23732	188.35	81506	438.80	199979	229.37	101740
Flowers																
Chrysanthemum	6.90	5203	7.50	6398	7.75	6316	7.38	5972	1.15	753	6.95	5630	7.75	6123	5.28	4169
Marigold	4.50	5175	2.75	3011	9.85	12313	5.70	6833	-	-	4.50	3200	6.40	6190	3.63	3130
Aster	2.00	2000	1.75	1750	-	-	1.25	1250	-	-	-	-	-	-	-	-
Total	13.40	12378	12.00	11159	17.60	18629	14.33	14055	1.15	753	11.45	8830	14.15	12313	8.91	7299
Grand Total	310.60	298981	563.95	545562	1000.45	906311	625.01	583617	134.35	152758	322.00	307188	654.55	559697	370.28	339883

Note : The channel adopted for domestic sale was either through retailer or through forwarding/commission agents or both

As regards vegetable crops, the total sale of all the vegetables put together was estimated at 365.29 quintals/household for the average category of member farmers and 229.37 quintals/household for the average category of non-member farmers. The value of this sale was estimated at Rs 16.64 lakhs for member farmers and Rs 10.17 lakhs for the non-member farmers. Thus, in general, the average price realization for various categories of vegetables turned out to be Rs 455.45 per quintal in the case of member farmer and Rs 443.56 per quintal for non-member farmers. This clearly indicate that there in hardly any difference in the prices of various categories of vegetables for the sampled member and non-member farmers. Nonetheless, mention may be made here that as against non-member farmers, the prices received by member farmers were consistently higher for certain vegetable crops like brinjal, cauliflower and pumpkin. On the other hand, non-member farmers showed higher prices received by them for some other vegetable crops like lady's finger. The unit price of tomato was found to be by and large same for both sampled member and non-member farmers. To some extent this also held true for onion crop.

The domestic sale of flower crops was estimated at 14.33 quintals/household for the average category of sampled member farmers and 8.9 quintals/household for the average category of sampled non-member farmers. The value of sale of flower crops put together was estimated at Rs 0.14 lakhs for sampled member farmers and Rs 0.07 lakhs for sampled non-member farmers. Thus, sampled member farmers showed much higher unit price of flower crops as compared to non-member farmers, which was estimated at Rs 980.81 per quintal for the average category of member farmers and Rs 819.19 per quintal for the average category of non-member farmers.

In general, out of the total value of sale of various horticultural crops, fruits, vegetables, and flower crops accounted for 69.08 per cent, 28.50 per cent and 2.42 per cent share, respectively, in the case of member farmers and 67.92 per cent, 29.93 per cent and 2.15 per cent share, respectively, as regards non-member farmers. Thus, various fruit crops contributed more than two-thirds to the total value of sale of various horticultural crops. This held true for both member and non-member farmers.

10.2.3 Export Trade of Grapes

Among various horticultural crops, grape was found to be the only fruit crop exported by the sampled farmers through cooperative society located in the village. Export trade estimates of grapes, both in quantity and value terms, for various categories of sampled farmers are provided in Table 10.7.

During 1997-98, the average category of sampled members exported 44.28 quintals of grapes through their cooperative society. The value of this grape exports was estimated at Rs 1.25 lakhs. In general, the export price of grapes was estimated at Rs 28.33/kg. Large category of member farmers diverted maximum quantity of their produce in the export market. In fact, an increase in export trade of grapes was noticed with the increase in land holding size of the farmers. However, the export price of grapes remained by and large same for various categories of farmers. Some of the small category of non-member farmers were also found to sale their produce in the export market through cooperative society.

Table 10.7 : Export Trade of Grapes by the Sampled Farmers In Maharashtra: 1997- 98 (Through Co-operative Society)

Particulars	(Per Household)			
	Small	Medium	Large	Overall
MEMBERS				
Quantity Sold (Qtls)	26.50	31.85	74.50	44.28
Value of Sale (Rs)	76850	90630	208800	125427
Price (in Rs / Kg)	29.00	28.46	28.03	28.33
NON-MEMBERS				
Quantity Sold (Qtls)	5.65	-	-	1.88
Value of Sale (Rs)	14875	-	-	4958
Price (Rs / Kg)	26.33	-	-	26.33

Nonetheless, the magnitude of this sell was found to be very low. Not only this, non-member farmers also received lower export prices for their produce as compared to member farmers. As pointed out earlier, the non-member farmers were mainly exporting

their produce through private exporters and it was only in some isolated cases that the produce of non-member farmers was exported through cooperative society.

10.2.4 Post-harvest Losses of Fruits (Grapes)

There could be several post-harvest operations during which chances of losses of produce are unavoidable. Generally, farmers try to minimize such losses. However, it all depends on the extent of scientific methods they follow to minimize such losses. It also depends on the type of infrastructural facilities available in the area. Post – harvest losses are normally higher for those farmers who adopt traditional methods of marketing. In the case of grapes, the farmers incur losses during several post-harvest operations like picking / plucking, assembling, grading, packing, loading/unloading, transportation, etc. All these operations are pre-requisite for the final disposal of the produce in the market. However, mention may be made here that the magnitude of losses vary from operation to operation. It has been widely believed that the losses during different post-harvest operations indicate the steps to be initiated to curb such losses. Therefore, an attempt is made in this section to estimate losses of the produce during each of the post-harvest operations and such estimates are brought out for both sampled member and non-member farmers in Table 10.8. The post-harvest losses of the produce relate to the reference year 1997-98.

In general, during the reference year 1997-98 the total production of grapes was estimated at 189.63 quintals/hectare on the sampled farms of member farmers and 174.80 quintals/hectare on the sampled farms of non-member farmers. The loss of produce during various post-harvest operations was estimated at 10.90 quintals/hectare on the farms of member farmers and 11.28 quintals/hectare on the farms of non-member farmers. Thus, post-harvest losses constituted 5.72 per cent of the total production of the produce on the farms of member farmers and 6.45 per cent of the total production of the produce on the farms of non-member farmers. The major post-harvest loss of produce was seen during picking/plucking operation, followed by grading, assembling, packing, loading/unloading and transportation operations. Picking/plucking operation accounted for 27 per cent of the total loss of the produce on the farms of member farmers and 26

Table 10.8 : Post - harvest losses of Grapes on the Selected Farms : 1997-98

Particulars	Member				Non-Member			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
(Qtls / Hectare)								
A. Operations								
1. Picking / Plucking	3.46 (29.20)	2.91 (27.38)	2.85 (26.32)	2.97 (27.25)	2.82 (27.35)	2.93 (26.56)	2.97 (24.59)	2.91 (25.80)
2. Assembling	2.40 (20.25)	2.39 (22.48)	1.67 (15.42)	2.01 (18.44)	1.95 (18.91)	2.50 (22.67)	2.35 (19.45)	2.29 (20.30)
3. Grading	2.24 (18.90)	2.09 (19.66)	2.01 (18.56)	2.06 (18.90)	2.95 (28.61)	2.32 (21.03)	2.75 (22.76)	2.65 (23.49)
4. Packing	2.34 (19.75)	1.93 (18.16)	1.78 (16.44)	1.92 (17.61)	1.91 (18.53)	2.07 (18.77)	2.11 (17.47)	2.04 (18.09)
i. Loading / Unloading	1.31 (11.06)	0.86 (8.09)	1.43 (13.20)	1.24 (11.38)	0.27 (2.62)	0.64 (5.80)	1.27 (10.51)	0.83 (7.36)
6. Transportation	-	-	0.08 (0.74)	0.04 (0.37)	-	-	0.29 (2.40)	0.13 (1.15)
7. Other Loss	0.10 (0.84)	0.45 (4.23)	1.01 (9.32)	0.66 (6.05)	0.41 (3.98)	0.57 (5.17)	0.34 (2.82)	0.43 (3.81)
Total Loss	11.85	10.63	10.83	10.90	10.31	11.03	12.08	11.28
B. Total Production	194.72	193.97	189.63	190.40	168.95	176.01	179.02	174.80
C. Losses (% to total production)	6.09	5.48	5.71	5.72	6.10	6.27	6.75	6.45

Figures in parentheses are percentages to total loss

per cent of the total loss of the produce on the farms of non-member farmers.

Grading was found to be another important post-harvest operation accounting for about 19 per cent of the total loss of the produce on the sampled farms of member farmers and as high as 23 per cent of the total loss of the produce on the farms of non-member farmers. Packing operation accounted for about 18 per cent of the total post-harvest losses of the produce on the farms of both member and non-member farmers. Similarly, assembling operation also accounted for 18-20 per cent of the total post-harvest losses of the produce on the farms of both member and non-member farmers. The loss during loading / unloading operation was found to be relatively higher on the farms of member farmers as compared to non-member farmers. In fact, loading / unloading

operation accounted for about 11 per cent of the total post-harvest loss of the produce on the farms of member farmers and 7 per cent on the farms of non-member farmers. The loss during transportation operation turned out to be the least which was estimated at less than 1 per cent of the total post-harvest loss of the produce on the farms of member farmers and a little higher than 1 per cent on the farms of non-member farmers.

Interestingly, non-member farmers showed an increase in post-harvest losses with the increase in their land holding size. This held true not only in quantity terms but also in terms of share of post-harvest losses in total production of the crop. As regards member farmers, no such trends were discernible and in this case medium category of farmers showed relatively lower post-harvest losses as compared to other categories of farmers.

Thus, picking / plucking, assembling, grading and packing are noticed to be the major post-harvest operations accounting for more than 80 per cent of the total loss of the produce. However, mention may be made here that such losses are not as high as compared to the losses reported by some earlier studies for horticultural crops (Singhal, 1995). Hence, it can be concluded from the foregoing discussion that the cold storage and pre-cooling facilities created by the NHB have certainly helped the farmers to reduce the post-harvest losses of the produce. It has been widely believed that delay in marketing of produce due to absence of proper infrastructural facilities like cold storages, pre-cooling units, transportation, etc. increase the post-harvest losses. However, since such infrastructural facilities were already developed by the NHB, the farmers were keen to take advantage of the same to the best possible extent. Added to this, the infrastructural facilities created by the NHB in the area were also seen to be instrumental in increasing the productivities of various horticultural crops grown on the sampled farms, besides increasing the marketed surplus of these high value crops.

CHAPTER- XI

SUMMARY AND IMPLICATIONS

11.1 Introduction:

Horticultural commodity exports have of late become the prima donna of all the agricultural exports in India. Introduction of the process of integration of forward and backward linkages in horticultural production in the aftermath of liberalisation has given a fresh fillip to horticultural exports in this country. Consequently, not only the horticultural exports have improved but it has also resulted in considerable expansion of the horticultural production base. However, India is yet to fully realise its potential in horticultural exports and the rapidly changing world trade scenario demands that this potential be tapped to the best possible extent.

Although India is blessed with diverse agro-climatic conditions and so has the ability to produce a wide variety of fruits, flowers, vegetables and a host of other agro based products round the year, the rising domestic demand coupled with increasing post-harvest losses often hamper the net horticultural exports of the country. It is to be noted that a substantial quantity of the country's horticultural produce is lost at the alter of post-harvest handling, processing and storage conditions. Efforts are now being made by various organisations to curb these losses by creating appropriate and adequate post-harvest infrastructure and related facilities. In order to strengthen infrastructural facilities for horticultural crops, the National Horticulture Board (NHB) has undertaken various developmental programmes. One of the major efforts of NHB is the initiation of soft loan schemes (SLSs). The main thrust of the schemes is to introduce new technology aside from strengthening infrastructural facilities with backward linkages among producers, processors and marketers.

In broader terms, during the past decade or so the NHB had undertaken two major soft loan schemes. These schemes were: (i) Integrated Project on Management of Post Harvest Infrastructure of Horticulture crops, and (ii) Development of Marketing of Horticultural Produce through Participation in Soft Loan. The first project was

undertaken by the NHB in 1988-89. Under this project, assistance was provided for the creation of post-harvest infrastructure such as scientific grading facilities in the producing areas, improved packaging and transport facilities with special emphasis on developing cool chain including establishment of pre-cooling units, refrigerated transport vehicle, etc. The soft loan having service charges of four per cent was provided to the cooperative/corporate sector for creation of such post-harvest infrastructure facilities to a maximum extent of one crore per organisation. The second scheme came into being in 1993-94. This scheme entailed for the provision of soft loan assistance to the beneficiaries of co-operative societies/private and public limited companies/farmers' association and public sector organisations, etc. Under this scheme, soft loan assistance with a maximum limit of Rs. 1.00 crore is being provided at four per cent service charges per annum with one year moratorium period to set up projects related to infrastructural facilities. The schemes are still in its implementation phase.

Maharashtra is the only state in the country, which has received maximum assistance under the soft loan scheme. The beneficiaries in Maharashtra have received a soft loan component to the tune of Rs 368.39 lakhs during the period between 1993-94 and 1996-97. The NHB soft loan scheme was implemented with a view to strengthen not only the existing infrastructural facilities for horticultural crops but also to create modern post-harvest infrastructure, reduce losses, improve quality of produce and help create an efficient marketing system. Nonetheless, after a span of five years it has been realised that a sizable number of projects assisted under the soft loan scheme have entered into a depressed position and are on the verge of collapse. This has undoubtedly necessitated to initiate proper remedial measures to save this industry from such a gloomy situation.

The present study is designed not only to assess the NHB soft loan scheme but also to evaluate the impact of this scheme on the development of post-harvest infrastructure for horticulture crops. An evaluation of this scheme at this stage is likely to help in promoting further investment opportunities in this sector in such a planned and appropriate manner that might bring a positive change in an otherwise dismal scenario of this sector.

11.2 Objectives of the study:

The study has been carried out with the following specific objectives:

- (i) to study the growth of post-harvest infrastructure (PHI) for fresh fruits, vegetables and flowers during the period between 1993-94 and 1996-97 in the state of Maharashtra,
- (ii) to analyse the NHB soft loan scheme with reference to adequacy of loan, infrastructural development, its use, and constraints, etc.
- (iii) to study the use of created PHI facilities by the farmers and its impact on their cropping pattern, employment and income generation, and
- (iv) to suggest policy measures which would help in providing an effective base for the development of various horticultural crops in the state.

11.3 Methodology:

11.3.1 Selection of Districts, PHI Units and Villages

Although there are several beneficiaries of NHB soft loan, the present study confined itself to only two such organisations situated in Pune district of Maharashtra. In fact, the selection of district was governed by the presence of the PHI facilities created through the soft loan schemes. The selected units for this investigation were : (a) Abhinav Grape Grower's Cooperative Society (AGGCS), and (b) Vignahar Grape Grower's Cooperative Society (VGGCS). Both the societies deal with marketing of farmers' produce not only in domestic but also in export markets.

11.3.2 Selection of Sampled Farmers

A list of members in each of the selected societies along with their land holding size was obtained from the societies. The members were then categorized as small (< 2 hectares), medium (2.01 – 4 hectares) and large (>4 hectares) based on their land holding size. It was decided to randomly select 10 members from each of the three

selected land holding size categories. Further, it was also decided to select randomly 10 non-member farmers from each of the three selected land holding size categories with the proviso that they fall in the same “catchment area”. Thus, there were 30 members and 30 non-members selected from each of the selected societies. In all, the study covered 120 farmers with 60 members and 60 non-members.

11.4 Data Collection and Reference Year:

Primary data from the members and non-members of grape cooperatives were collected on the well structured pre-tested schedule by personal interview method. An indepth information relating to family resource base, land use and cropping pattern, various components of production and marketing costs, production, utilization, and sale pattern of crops, channels of marketing of crops, post-harvest losses during various operations, etc. were collected from each of the sampled member and non-member farmers.

Secondary data related to various performance indicators of the selected societies were also collected from the official records of the selected societies. Besides, data relating to area, production, productivity and exports of various horticultural crops, growth in cold storage and other PHI facilities, etc. were also collected from other secondary sources not only for the state of Maharashtra but also for the country as a whole.

Primary data from the sampled member and non-member farmers were mainly collected for the reference year, 1997-98. However, in order to evaluate the impact of NHB soft loan scheme on cropping pattern, employment and income levels of the farmers, data on relevant parameters were also collected for the reference year 1992-93.

11.5 Major Findings:

11.5.1 Structural Changes in Horticultural Production and Exports

In terms of horticultural crop production, Maharashtra is considered to be the one of the most important states of the country. The diverse agro-climatic conditions of the state are not only conducive to the cultivation of fruits and vegetables but also

various flower crops. This is also evident from the fact that during 1995-96 this state ranked second in the country in terms of acreage under fruit crops and fourth as regards production of fruit crops. During the same year, the share of Maharashtra in the country's total production of vegetable and flower crops was found to be about 4 per cent. Among various fruit crops grown in the state, citrus fruits were seen to account for the bulk of the total area, followed by mango, banana, cashewnuts, grapes, coconut, pomogranate and ber. The area under other fruit crops like sapota, litchi, papaya and guava were seen to be very marginal. As for vegetables, onion was seen to be the major crop, which accounted for nearly 38 per cent of the total acreage under vegetables in the state. Other important vegetables grown in the state were brinjal, tomato, potato, cabbage, cauliflower and okra. Among various flower crops, acreage under marigold was found to be the highest, followed by rose, chrysanthemum and jasmine.

The scenario obtained over the past decade or so also showed some disquieting trends in terms of Maharashtra's share in the country's total production of various horticultural crops, especially the export oriented ones. The declining trend in societies share in nation's total production of banana and onion are cases in point in this respect. In fact, Maharashtra's share in total banana production of the country was noticed to come down from 29 per cent during the early eighties to about 23 per cent by the mid nineties. A considerable fall in onion production of Maharashtra was also noticed between early – and the late eighties period. As a result of this, the share of Maharashtra in India's total onion production declined during the given period of time.

As for the cultivation of various fruits and vegetables, the study revealed very interesting observations. Over the course of time while grape production in Maharashtra grew significantly as a result of perceptible rise in productivity and acreage under the crop, a sharp decline was also noticed in the productivities of onion, potato and sweet potato in the state. The decline in productivities of onion, potato and sweet potato was noticed mainly because of slower growth in output as compared to growth in acreages under the crops during the period between early eighties and the mid nineties. Further, the decline in productivity of potato and onion was found to be more sharp during the period between early – and the late eighties as compared to the period between late eighties and the mid-nineties.

In this study, horticultural exports of the state of Maharashtra could not be evaluated because of lack of availability of such data. However, an attempt is made in this investigation to evaluate the structural changes in export trade of India in those export oriented horticultural crops that are mainly grown in the state of Maharashtra.

The export trade of India in fruits and vegetables was seen to grow by about 120 per cent in value terms over the period between early eighties and the mid-nineties. Most of the increase in export trade of India in fruits and vegetables was found after the late eighties period, that is, in the face of more liberal market environment. Interestingly, in quantity terms, tomato export of India increased by nearly two folds during the period between late eighties and the mid nineties. However, in value terms, the export trade of India in tomato was found to decline sharply during this period. This was mainly due to decline in international prices of tomato during the given period of time. The banana export of India was also found to decline steadily all through the period between early eighties and the mid-nineties; the decline being more sharp in value terms as compared to quantity terms. In contrast to continuous decline in banana exports of India, the onion exports of the country followed a reverse trend and had shown an overall export expansion of 110 per cent in quantity terms of trade and about 80 per cent in value terms of trade between the early eighties and the mid-nineties. Similarly, some other fruits and vegetables like oranges, lemon, grapes, coconut and potato also showed perceptible increase in their export trade from India, especially after the late eighties period. This held true both in quantity and value terms. These observations clearly underscore highly fluctuating nature of horticultural exports of India over the past decade and a half.

Among various horticultural products, floricultural exports of India, in particular, increased tremendously over time, especially after the late eighties period. The bulk of the floriculture product exports from India was seen to be contributed by cut flower and foliage, followed by the exports of live plants, bulbs, etc. In fact, cut flower and foliage exports of India had declined during the period between early – and the late eighties, but, thereafter, a sharp increase in the same was noticed so much so that export trade of this valued product increased by about two and half times during the period between early eighties and the mid-nineties.

Thus, India's horticultural exports have grown in the face of considerable fluctuations in international prices and inspite of rise in domestic consumption requirements for these high value crops within the country.

11.5.2 Steps Towards Development of PHI Facilities

In order to strengthen infrastructural facilities for horticultural crops, the NHB had undertaken various development programmes. The aspects covered by the NHB included such programmes as encompassing integrated projects on management of post-harvest infrastructure of horticultural crops, development of marketing of horticultural produce through participation in soft loan scheme, projects related to introduction of new technology and concepts in horticulture, techno-economic feasibility studies, market information services for horticultural crops, etc. During the financial year 1997-98, the NHB had released an amount to the tune of Rs 357.14 lakhs for the establishment of 19 cold storages, six pre-cooling units, two specialised transport vehicles and eight grading/packing centers. The Board had also released an amount of Rs 30.21 lakhs in the form of subsidy for the supply of 43,776 number of plastic crates for the states of Himachal Pradesh, Haryana, Maharashtra, Punjab and Rajasthan for the systematic handling of fruits and vegetables.

It deserves mention here that the NCDC had also provided financial assistance for infrastructure development and marketing support to fruits and vegetable cooperatives so as to ensure better returns to growers, especially for (i) purchase of transport vehicles, (ii) construction of godown, grading and packing sheds and retail outlets, (iii) strengthening of share capital base and margin money for raising working capital, and (iv) establishment of pre-cooling units for export of horticulture produce. During 1997-98, the NCDC had sanctioned a total financial assistance to the tune of Rs 298.78 lakhs to fruits and vegetables cooperatives in different states, including Maharashtra. Further, as on March 1998, the NCDC had assisted 386 projects in the country with total sanctioned amount to the tune of Rs 4065.603 lakhs. Maharashtra was the only state in the country, which received maximum assistance from the NCDC. Out of 386 projects assisted by the NCDC, the state of Maharashtra alone accounted for as high as 167 projects with the total

amount of sanction of Rs 2490.01 lakhs. Further, out of 167 projects, 54 projects were assisted under the NCDC-NHB scheme, 32 under the grape export project, 1 under the mango export project, 1 under the margin money and the remaining 79 under the share capital development scheme.

11.5.3 Growth in Cold Storage Facilities

There were only few states in the country that showed consistently a steady growth in cold storages. While states like Andhra Pradesh, Bihar, Tamil Nadu and to some extent West Bengal showed a steady increase in the numerical strength of their cold storages, the states like Madhya Pradesh, Nagaland, Tripura and Uttar Pradesh which had neither shown any increase nor decrease in the number of cold storages constructed by cooperative sector. A considerable decline in the numerical strength of cold storages was also noticed in the case of states like Karnataka, Orissa and Punjab. Interestingly, until 1993-94 the state of Maharashtra did not have any cold storage facility under the folds of cooperative sector. The necessity to establish cold storage in this state was realised only during 1994-95 when 42 cold storages came into being in this state under the fold of cooperative sector. This is despite the fact that Maharashtra accounted for the bulk of the nation's total production of many of the horticultural products and commodities.

11.5.4 Project Financing of the Selected Grape Grower's Societies

The present investigation revolves around the performance evaluation of two grape grower's cooperative societies. These societies were : (a) Abhinav Grape Grower's Cooperative Society (AGGCS) Limited, and (b) Vignahar Grape Grower's Cooperative Society (VGGCS) Limited. These two selected societies came into being on 19th July, 1990 at Agar and Narayangaon villages, respectively, of Pune district. Both the societies have developed the required infrastructure such as pre-cooling unit, cold storage, grading and pack-house, especially to cater to the export-marketing requirements of fruits. However, in order to develop these infrastructural facilities, both the societies received assistance from various financial institutions. In the case of AGGCS, the major financial

assistance of Rs 114.75 lakhs was received from Bank of India, especially for the civil and mechanical work. Nonetheless, for the establishment of pre-cooling units, cold storages and pack-house, the assistance was given to AGGCS by the NHB in the form of soft loan of Rs 41 lakhs. The AGGCS had also received financial assistance of Rs 60 lakhs from Food Processing Department, especially to construct its processing units. As regards VGGCS, the total establishment cost was estimated at Rs 81.84 lakhs. In this case, both NHB and Bank of India were the major funding agencies. The NHB had provided a financial assistance to the tune of Rs 41 lakhs to VGGCS for the establishment of pre-cooling unit, cold storage and pack-house. However, for the civil and mechanical work, VGGCS had received assistance to the tune of Rs 32.64 lakhs from Bank of India. The VGGCS had also generated an amount to the tune of Rs 8.2 lakhs in the form of share capital from its members.

11.5.5 Progress of the Selected Grape Grower's Societies

The selected societies showed considerable increase not only in paid-up share capital but also in their profit profile during the period between 1991-92 and 1997-98. However, authorized share capital and state Government's contribution to share capital remained constant at Rs 20 lakhs and Rs 5 lakhs respectively, for both the societies all through the given period. As regards membership, while AGGCS showed gradual increase in the numerical strength of its members from 129 during 1991-92 to 142 in 1997-98, a declining trend was seen to be caught up with the membership of VGGCS during the same period, which in fact had declined from 152 during 1991-92 to as low as 70 in 1997-98. However, this decline in membership of VGGCS did not affect its business since it was found to be dependent not only on members but also on non-members.

11.5.6 Initial Investment Towards Development of Infrastructural Facilities

The total initial investment of AGGCS towards creation of various infrastructural facilities was found to be Rs 142.42 lakhs. Out of this, Rs 0.47 lakhs was found on the purchase of land and its development, Rs 50.34 lakhs on construction of buildings, Rs

2.47 lakhs on H.T. station, Rs 8.60 lakhs on the purchase of generator set, Rs 9.31 lakhs on domestic electrification, Rs 21.81 lakhs on air handlers and Rs 49.42 lakhs on packing lines. On the other hand, the total initial investment of VGGCS for infrastructural development was estimated at Rs 81.84 lakhs. Out of this, Rs 25.96 lakhs was spent on construction of buildings, Rs 8.60 lakhs on purchase of generator set, Rs 18.53 lakhs on air handlers, and Rs 25.47 lakhs on packing lines. This, construction of buildings, packing lines and purchase of air handlers accounted for the maximum share in total initial investment of both the selected societies towards creation of infrastructural facilities.

11.5.7 Processing Cost of Grapes

During the year 1997-98, the AGGCS had processed about 24,000 boxes, each containing 5 kgs of grapes. The per unit (box) cost of processing of grapes was estimated at Rs 58.82. Various types of materials used for packing put together accounted for the maximum share (85.55 per cent) in the total processing cost. Expenses on labour used during various processing activities such as grading, packing, pre-cooling, etc. turned out to be the next important cost, accounting for 10.20 per cent share in total processing cost. Pre-cooling expenses accounted for only 4.25 per cent share in total processing cost.

Because of differences in material used, the processing cost of grapes was found to be higher at VGGCS plant as compared to AGGCS plant. During 1997-98 VGGCS had processed 45,601 boxes, each containing 5.8 kgs of grapes. The per unit (box) processing cost of grapes at VGGCS plant was estimated at Rs 63.02. In the cost of processing of grapes, the maximum share was seen to be accounted for by the packing material (86.91 per cent), labour expenses turned out to be the next important item of processing cost, accounting for 8.73 per cent share in total processing cost. Pre-cooling expenses accounted for only 4.36 per cent share in total processing cost of grapes.

11.5.8 Constraints in Receiving Loans

The selected societies faced by and large similar constraints as regards receipt of loan from NHB and other financial institutions. The excessive use of formalities, rules

and regulations had not only delayed the disbursement of loan amount but also caused considerable inconvenience to the societies, particularly in terms of timely purchase of certain equipments and machinery. The procedures followed by the NHB towards sanctioning of soft loans for PHI related activities were not only time consuming but also quite cumbersome. This could be evident from the fact that it took more than two years for both the societies to get loan amount sanctioned by the NHB.

11.5.9 Domestic and Export Trade of Grapes

While AGGCS was exporting grapes only in international market, the grapes procured by VGGCS found their place both in export and domestic markets. In the case of domestic trade, initially VGGCS was trading grapes only in Ludhiana and Mumbai markets. However, in due course of time VGGCS was found to switch its trade from Ludhiana to Delhi market as the prices of grapes in Delhi markets were more favourable as compared to Ludhiana market. During 1997-98 VGGCS had traded 50 tons of grapes in Delhi market and 48 tons in Mumbai market. The total value of this trade was estimated at Rs 14.20 lakhs. As regards export trade of grapes, England was found to be the only country where grapes were exported from AGGCS. Nonetheless, VGGCS had exported grapes to both UK and Netherlands. During 1997-98, the total quantum of grape exports was estimated at 120 tons for AGGCS and 264.49 tons for VGGCS. The value of this export trade of grapes was estimated at Rs 53 lakhs for AGGCS and Rs 91.50 lakhs for VGGCS. The export prices of grapes turned out to be more favourable in UK as compared to Netherlands.

11.5.10 Export Cost of Grapes

The per box export cost of grapes was estimated at Rs 150.05 (Rs. 30.01/Kg.) for AGGCS and Rs 154.33 (Rs. 26.56/Kg.) for VGGCS. The expenses at destination accounted for the maximum share in total export cost of grapes. The next important item of export cost was the freight for transport from the Indian port to the port of the importing country. In land expenses accounted for the least share in total export cost of

grapes. In general, while VGGCS had shown higher inland expenses and freight for transport as well as total export cost of grapes, the expenses incurred at destination tended to be higher for AGGCS as compared to VGGCS.

11.5.11 Processing and Marketing Related Constraints

Lack of availability of skilled labour for grading and packing of produce, voltage fluctuation, lack of availability of water, especially during summer/peak season were seen to be the major processing related constraints faced by the selected societies. Further, electricity supply at low voltage and frequent cuts in electricity were also seen to be some other processing related constraints faced by the selected societies. As regards marketing of grapes, the major constraint was seen to be related to its freight. It is to be noted that airfreight for the transportation of grapes are subsidised by APEDA. Nonetheless, such subsidies are not available for the grapes being transported through ship. The selected societies, therefore, wanted the sea freight also to be subsidized. Added to this, they also wanted various organisations to come forward to subsidize inland transportation of grapes, apart from providing insurance cover to their produce.

11.5.12 Family Size and Education of the Sampled Farmers

The sampled farmers in member group were found to have less number of members in their families as compared to their counter part in non-member group. In general, there were 7 persons in the family of member group and 8 persons in the family of non-member group of farmers. Among various categories of farmers, large category in the member group and medium category in non-member group attained higher level of education as compared to other categories of farmers. Thus, these farmers were better equipped to take effective managerial decisions as their level of education was higher as compared to other categories of farmers.

11.5.13 Land Holding Particulars of the Sampled Farmers

The study revealed a much higher average size of operational holding for various categories of member farmers as compared to non-member farmers. In the case of

member group of farmers, the average size of operational holding stood at 1.73 hectares for small category, 2.88 hectares for medium category, and 6.34 hectares for the large category with an overall average of 3.65 hectares of operational holding for the average category of farmers. As for the non-member group of farmers, the average size of operational holding stood at 1.15 hectares for small category, 2.51 hectares for medium category, and 4.86 hectares for the large category with an overall average of 2.84 hectares of operational holding for the average category of farmers. It is to be noted that the operational holding of different categories of sampled farmers did not differ much from their owned holdings. In general, irrigated land accounted for 84 per cent of the total operational holding of member farmers and 83 per cent for non-member farmers.

11.5.14 Livestock Resources Owned by the Sampled Farmers

The herd strength of sampled member farmers was found to be lower as compared to sampled non-member farmers. In the case of member farmers, milch buffaloes accounted for the largest share (38 per cent) in total animal stock maintained by them, followed by bullocks (33 per cent) and milch cows (29 per cent). As regards sampled non-member farmers, milch cows accounted for the highest share (38 per cent) in total animal stocks maintained by them, followed by milch buffaloes (35 per cent) and bullocks (28 per cent). In general, the number of animals maintained increased with the increase in land holding size of farmers.

11.5.15 Changes in Livestock and Machinery Owned

The sampled member and non-member farmers were found to possess more machinery and livestock resources during 1997-98 as compared to the year 1992-93. Nonetheless, among various sampled farmers, the resource position was found to be better for member farmers as compared to non-member farmers. An increasing trend was also noticed in terms of possession of machinery and livestock resources with the increase in land holding size of both member and non-member farmers. This held true during both 1992-93 and 1997-98. This gave a clear indication of better resource position

of large category of farmers as compared to other categories of farmers, during both 1992-93 and 1997-98.

11.5.16 Area Under Major Crops During Different Seasons

Kharif crops accounted for the major share (33 – 37 per cent) in gross cropped area of both member and non-member farmers. The next important season is rabi season accounting for 28-32 per cent share in gross cropped area. Summer season crops accounted for only 6-7 per cent share in gross cropped area. The share of perennial crops in gross cropped area was found to vary from 25 per cent to 32 per cent for the average category of sampled member and non-member farmers. During both kharif and rabi seasons, food and fodder crops dominated the cropping pattern of majority of the sampled member and non-member farmers. The share of these food and fodder crops in total cropped area during kharif and rabi seasons was found to be 70-80 per cent. The remaining 20-30 per cent share in total cropped area during these two seasons was seen to be accounted for by vegetable and flower crops. Among various categories of farmers, small category showed higher proportionate area under perennial crops as compared to area under kharif, rabi and summer crops.

11.5.17 Changes in Land-Utilisation Pattern

The study showed a sharp decline in acreage under kharif and rabi seasons during the period between 1992-93 and 1997-98. However, this decline in acreage under kharif and rabi seasons was more than compensated by an increase in acreage under perennial as well as fruit and flower crops. Thus, a shift in cropping pattern of the sampled farmers was seen to have taken place in favour of perennial, fruit and flower crops. Consequent upon these shifts in area, the cropping intensity on the sampled farms was also found to have increased during the given period of time. The increase in cropping intensity was found to be from 147.95 per cent in 1991-92 to 150.44 in 1997-98 on the farms of member farmers and from 156.30 per cent in 1992-93 to 161.57 per cent in 1997-98 on the farms of non-member farmers. The reason for higher cropping intensity on the

sampled farms of non-member farmers as compared to member farmers was due to differences between net cultivated area and gross cropped area, which turned out to be higher on the farms of non-member farmers as compared to member farmers.

11.5.18 Changes in Cropping Pattern

The study showed considerable changes in the distribution of area under various crops grown during kharif, rabi and summer seasons. In fact, majority of the kharif crops grown on the sampled farms showed a decline in their acreages during the period between 1992-93 and 1997-98. Some of the rabi crops, especially food and fodder crops, also showed a declining trend in their acreages during the given period of time. However, flower crops grown during rabi as well as summer seasons, in general, showed an increase in their acreages during the same period. Perennial crops like grapes and banana in the case of member farmers and also sugarcane in the case of non-member farmers also showed remarkable increases in their acreages during the given period of time. These trends clearly indicated a shift in cropping pattern on the sampled farms, especially in favour of certain perennial crops like grape, banana and sugarcane and also some of the vegetable and flower crops grown during rabi and summer seasons.

11.5.19 Changes in Acreages Under Various Fruit Crops

The study showed a continuous increase in acreages under various fruit crops grown on the sampled farms of both member and non-member farmers during the period between 1990 and 1998. Some of the grape varieties like Tas Ganesh and Sharad were found to show sharp increase in their acreages during the given period of time. To some extent Sonika variety of grapes also showed considerable increases in its acreages. However, among various grape varieties Tas Ganesh was found to be the most important variety as it was not only cultivated by all the categories of member and non-member farmers but it also occupied considerable area under its cultivation. Sharad was found to be another variety of grape which occupied reasonable area under its cultivation. Among other fruit crops, banana was the only crop that showed sharp increases in its acreages. In

fact, the reason for increases in acreages under various fruit crops was due mainly to the increase in market demand for these crops during the given period of time. Nonetheless, it deserves mention here that market demand turned out to be more favourable for Tas Ganesh and Sharad varieties as compared to other varieties of grapes.

11.5.20 Cost of Maintenance of Grape Orchards

The per hectare annual gross maintenance cost for the all-bearing age grape orchard was estimated at Rs 1,67,329 for the average category of member orchardists and Rs 1,53,321 for the average category of non-member orchardists. In general, insecticides/pesticides applications accounted for about 30 per cent share in gross maintenance cost on the sampled farms of both member and non-member orchardists. The share of manure/fertilizer applications in gross maintenance cost was also found to be nearly 30 per cent. Human labour was found to be another important component of cost, accounting for about 26 per cent share in gross maintenance cost. The share of other components of cost such as micronutrients application, irrigation, bullock and machine labour use put together was found to be about 15 per cent of the gross maintenance cost. In general, an increase in total expenditure of the order of 9 per cent was seen in the case of member orchardists over that of non-member orchardists in the maintenance of one acre grape orchard.

11.5.21 Human Labour Employment on Grape Orchards

The study revealed that the extent of human labour absorption during various post-harvest operations during the reference year 1997-98 was equivalent to about 57 man days per hectare on the sampled grape orchards of member farmers and about 44 man days per hectare on the sampled grape orchards of non-member farmers. An increase in human labour employment was noticed with the increase in farm size of the sampled farmers. Among various post harvest operations, maximum labour was seen to be employed in picking/plucking operation, followed by assembling, grading, packing, local transportation and loading/unloading operations. during various post-harvest operations,

family labour component accounted for about 17 per cent share in total human labour employment on the sampled farms of member farmers and 28 per cent share on the sampled farms of non-member farmers. The study also showed a decline in ratio of family to hired labour with the increase in size of the farm.

11.5.22 Source-wise Annual Income of the Sampled Farmers

The total annual income for the average category of sampled member farmers derived from various sources was estimated at Rs 1,94,645 during 1992-93 and at Rs 2,64,121 during 1997-98. As against this, the estimated annual income figures for the average category of non-member farmers were Rs 83,733 during 1992-93 and Rs 1,22,700 during 1997-98. The major source of annual income was found to be the cultivation of various fruits, vegetable and flower crops. The sampled member farmers were seen to derive as high as 89 per cent of their total income from the cultivation of various horticultural crops during 1992-93 and of the order of 86 per cent during 1997-98. On the other hand, sampled non-member farmers derived about 73 per cent of their total annual income from the cultivation of various horticultural crops during 1992-93 and of the order of 69 per cent during 1997-98. Cultivation of various field crops was found to be another source of major income, especially in the case of non-member farmers. Regular job of some of the family members also contributed to the total income of the sampled farmers. Nonetheless, the least share in total annual income of the sampled farmers was seen to be accounted for by the livestock activity.

11.5.23 Production, Utilization and Sale Pattern of Horticultural Crops

The study revealed higher acreages as well as productivities of various vegetable and flower crops on the farms of member farmers as compared to non-member farmers. This held true not only during kharif and rabi seasons but also during summer season. Although some of the vegetable crops like tomato, cauliflower, onion, bottle gourd and cucumber were found to be cultivated during all the three seasons, their productivities differed significantly during these seasons. Some of the vegetable crops like onion, lady's

finger and brinjal, and also all the selected flower crops showed very high proportion of spoilage to their total production. Consequently, the proportions of sale to total production of these vegetable and flower crops were low as compared to other horticultural crops grown during the given seasons. Nonetheless, mention may be made here that as against non-member farmers the member farmers not only consistently showed higher productivity of various crops grown on their farms but also higher proportion of sale to total production of the crops. The productivities as well as proportion of sale to total production of various grape varieties also turned out to be higher on the farms of member farmers as compared to non-member farmers. However, in the case of banana non-member farmers not only showed higher productivity but also higher proportion of sale to total production of this crop.

11.5.24 Marketing of Fruit, Vegetable and Flower Crops

The study showed that retailers and forward commission agents were the only major marketing channels through which most of the fruit, vegetable and flower crops of the sampled farmers were marketed, especially in the domestic market. However, as for the export trade, the major channels available to the sampled producers were private exporters and cooperative society located in the village. In general, marketed surplus of grapes was estimated at 268.61 quintals/household for member farmers and 181.44 quintals/household for non-member farmers. The sampled member farmers sold about 47 per cent of the total marketed surplus of grapes through forwarding/commission agents in the wholesale market and this proportion for non-member farmer stood at 44 per cent. The share of retailer in total marketed surplus of grapes was found to be about 25 per cent in the case of member farmers and 19 per cent for non-member farmers. The quantity marketed through private exporter was found to be only to the tune of 12 per cent of the total marketed surplus of grapes in the case of member farmers and as high as 37 per cent for non-member farmers. Nonetheless, it is to be noted that member farmers were also selling about 17 per cent of the total marketed surplus of grapes in the export market. As regards banana, all the sampled farmers were seen to market this crop in the wholesale market through commission agents. The total marketed surplus of banana was estimated

at 55.72 quintals/household in the case of member farmers and 17.33 quintals/household for non-member farmers. Similarly, vegetable and flower crops were also found to be marketed through the forwarding/commission agents in the wholesale market. The marketed surplus of various vegetable crops put together was estimated at 365.29 quintals/household for member farmers and 229.37 quintals/household for non-member farmers. The total marketed surplus of flower crops was estimated at 14.33 quintals/household for member farmers and 8.91 quintals/household for non-member farmers. Thus, marketed surplus of various fruits, vegetable and flower crops turned out to be higher for member farmers as compared to non-member farmers.

11.5.25 Post-harvest Losses of Grapes

The loss of grapes during various post-harvest operations was estimated at 10.90 quintals/hectare on the sampled farms of member farmers and 11.28 quintals/hectare on the sampled farms of non-member farmers. This constituted 5.72 per cent of the total production of produce on the sampled farms of member farmers and 6.45 per cent of the total production on the sampled farms of non-member farmers. The major post-harvest loss of produce was seen during picking/plucking operation, followed by grading, assembling, packing, loading/unloading and transportation operations. However, mention may be made here that such losses were not as high as compared to the losses reported by some earlier studies for horticultural crops (Singhal, 1995). Hence, it could be concluded that the cold storage and pre-cooling facilities created by the NHB had certainly helped the farmers to reduce the post-harvest losses of the horticultural produce.

11.6 Policy Implications and Conclusions:

1. Undoubtedly, adoption of various technological measures such as increasing use of drip irrigation, use of improved varieties, etc. contributed no less in giving a real boost to the productivity of grapes in the state of Maharashtra. Consequent to these concerted efforts, the output of grapes was also found to have increased many folds for this state. Nonetheless, inspite of the great potential various vegetable crops like

onion, potato and sweet potato appeared to have been given less attention by various policy makers towards increasing in their productivity levels. Suitable technological measures are, therefore required to be initiated not only to increase the productivity but also the acreages under these vegetable crops. In fact, slower output growth of onion and decline in its productivity in the state of Maharashtra could be considered alarming in view of its export competitiveness and domestic consumption requirements.

2. Notably, the number of cold storages in the country under the folds of cooperative sector increased steadily from 165 during 1986-87 to as high as 485 by 1994-95 with a sharp decline in the same thereafter. In fact, because of recurrent losses many of the sick cold storages were closed down in the country during 1995-96. However, efforts are now on to revive the sick cold storages in the country. In this sequel, a comprehensive programme for the enhancement of capacity of cold storages from the existing 11 million tonnes to 12.3 million tonnes in the next three years was prepared by the Ministry of Agriculture during 1998-99 with a view to stabilise the marketing of perishable vegetables in general and fruits in particular and also to enable the farmers to get remunerative prices for their produce by utilising storage facilities. One of the major objectives of this programme is to revive the sick cold storages in the country that have the estimated capacity to the tune of about eight million tonnes. Other features of this programme mainly encompass creation of 4.5 lakh tonnes of onion storages in the country in the next three years and encouraging the entrepreneurs to set up new cold storages. These measures will not only minimise the post harvest losses but they are also likely to make loss prevention more efficient as well as cost effective.
3. It is to be noted that the NHB took more than two years to clear loan applications filed by various organizations. Thus, the need of the hour for the NHB is to have quick and more effective loan disbursing machinery. There is also an urgent need to simplify the loan disbursement procedures. The early clearance of loan application filed by various organizations will certainly help in making the soft loan scheme more effective. Further, one of the suggestions of the Chairmen of the selected societies was in favour of receiving finance for the entire and comprehensive project rather

than for certain specific components. However, how best this suggestion can be taken care of by the NHB will depend on its future strategies and policies related to financing of PHI related facilities for the horticultural crops.

4. In the processing of grapes, pre-cooling is by far the most important activity. The fruits can not be kept directly in the cold storage if pre-cooling is not done or the field heat from the fruits is not removed. During processing of grapes, both pre-cooling and cold storage plants require not only regular supply of electricity but also its normal voltage. Any fluctuation in electricity supply, therefore, might hamper the continuous processing of grapes. Nonetheless, it is to be noted that both the selected societies not only faced the problem of electricity supply at low voltage but also frequent cuts in electricity, especially during summer/peak season. Efforts, therefore, should be made by the electricity department to ensure normal and regular supply of electricity to such processing plants. Further, the electricity tariffs charges for the pre-cooling and cold storage plants were reported to be at par with the tariffs charges for the firms operating in Urban or Semi Urban areas. Therefore, the Chairman of both the selected societies were of the view that agricultural tariffs should be applied to their pre-cooling and cold storage plants rather than normal electricity tariffs as charges for firms operating in Urban area.
5. According to the Chairmen of the selected societies, the exports of grapes require huge working capital which the societies alone can not arrange. The state Government, therefore, should come forward and recommend to National Cooperative Development Corporation (NCDC) to participate in the working capital requirements of the grape grower's societies. However, according to them, the recommendation should be need based and free from any condition of minimum dividend. The selected societies were also seen to be in favour of receiving funds for setting up of Research and Development (R & D) units for the marketing of grapes. Further, they also wanted the State Government to come forward to help them in providing market intelligence service for the exports of grapes and other fruits and vegetables round the year. Reimbursement of extension service cost from the Maharashtra State Agricultural Marketing Board (MSAMB) was another suggestion put forward by one of the Chairmen of the selected societies.

6. The positive feature of creation of infrastructural facilities such as pre-cooling units, cold storages, etc. during the given period of time was the shift in cropping pattern of the sampled farmers in favour of export oriented crops. Because of these facilities generated in the study area, the farmers were seen to be more positively inclined towards cultivation of various fruit, vegetable and flower crops as compared to various food and fodder crops.
7. Evidently, the sampled member farmers derived 132 per cent additional income over sampled non-member farmers during 1992-93 and 115 per cent during 1997-98. Needless to mention that the major portion of this additional income derived by the sampled member farmers was from various horticultural activities. Due to the benefit of PHI created/developed in the area, the member farmers were obtaining a substantially large proportion of their total income from the cultivation of various fruit, vegetable and flower crops as compared to non-member farmers. Thus, it may be concluded that the creation of PHI facilities during the given period of time has not only helped the member farmers to increase their family income but these facilities have also helped in creation of additional employment opportunities in the area.

It has been widely believed that delay in marketing of produce due to absence of adequate infrastructural facilities like cold storages, pre-cooling units, transportation, etc. increase the post-harvest losses. However, since such infrastructural facilities were already developed by the NHB, the farmers were seen to take advantage of the same to the best possible extent. Added to this, the infrastructural facilities created by the NHB in the area were also seen to be instrumental in increasing the productivities of various horticultural crops grown on the sampled farms, besides increasing the marketed surplus of these high value crops. Nevertheless, in conclusion, two differing points of view emerged about the availability of post-harvest infrastructural facilities in the study area. While sampled member farmers were quite satisfied with the kind of post-harvest infrastructural facilities available in the area, the non-member farmers faced some major problems in this respect. Lack of availability of pre-cooling and cold storage facilities, high transportation charges for the marketing of produce, delayed receipt of payment for the produce, lack of availability of market information with respect to prices and demand for the produce, lack of availability of skilled labour for various post-harvest operations

and higher prices of packing material were among the major problems faced by non-member sampled farmers. The resentment for these problems was more among small and medium category of sampled non-member farmers as compared to large category of sampled non-member farmers.

Of late, the Government of India had made concerted efforts to enhance the export of horticultural products by allocating more funds in Eighth Five Year Plan for horticultural development. Since in India the State of Maharashtra holds vast potential to increase the production of horticultural commodities because of diverse agro-climatic conditions of the state which enables it to produce fruits, flower and vegetables, this strength needs to be exploited further. This strength, coupled with conducive policy will surely help it to coverage as one of the major exporter of quality produce in the country, especially in the export trade of grapes, oranges, banana and onion, where it holds still the lions share in country's total production.

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