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**ECONOMICS OF EXPORT ORIENTED
HORTICULTURAL CROPS OF
MAHARASHTRA**

DEEPAK SHAH

P00217

**AGRO-ECONOMIC RESEARCH CENTRE
GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
(DEEMED TO BE A University
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PREFACE

India's structure of agricultural production and exports underwent tremendous changes over the past decade and a half. During this period, while India lost its stranglehold and pre-eminent position in some of the traditional agricultural exports, she gained newer grounds in some of the non-traditional commodities, especially the export of horticultural ones. The dawn of liberalisation era in more recent times was also marked with increase in international trade in horticultural commodities. Trade liberalisation also saw India's horticultural exports to grow even in the face of wide international price fluctuations and burgeoning domestic demand for these commodities.

There is no iota of doubt that India has great potential in its agricultural sector and that the production of many of the agricultural commodities of this country has grown many folds over time. There is also no denying the fact that the adoption of several policy measures by the Government in more recent times have boosted the country's agricultural production. However, certain agricultural commodities of India such as horticultural ones could gain a real thrust only in more recent times. The reason for this could be considered due mainly to a significant shift in consumption pattern in favour of fruits and vegetables and as a result of other associated factors like changes in export-import policies, especially in the post-liberalisation period, and exchange rate adjustment.

As for fruits and vegetable production, Maharashtra is considered as an important state since it leads the country in the production of grapes, banana, oranges and onions. The diverse agro-climatic conditions of the state is conducive to the cultivation of vast array of horticultural crops round the year. However, under such a veritable scenario, the relevant questions that may merit consideration are what prospects do the state of Maharashtra hold in the exports of these high value crops and what is the economics involved in the cultivation of various export-amenable horticultural crops, particularly fruits and vegetables, grown in the state of Maharashtra. The subject matter of this study mainly revolves round these crucial aspects. Besides, the study seeks to evaluate the pattern of income and employment generation in the cultivation and marketing of fruits and vegetables, particularly grapes and onions. An investigation into changes in production pattern, prices and exports of these high value crops over time are the other foci of attention of this study. Infact, the present study entitled

“Economics of Export Oriented Horticultural Crops of Maharashtra” was undertaken at the initiative of the Ministry of Agriculture, Government of India.

At the initial stages of this study I had fruitful discussions with Shri A.K.Pawar, District Agricultural Officer; Shri S.M.Pillai, Branch Manager, NAFED; Shri Arun B. Thete, NAFED; Shri Lallan Singh, Joint Director, National Horticultural Research and Development Foundation (NHRDF) and also with the Deputy Director, District Horticultural Development Board, Nasik. I am thankful to all of them and their colleagues for their cooperation and facilities extended in the conduct of the present study.

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Gokhale Institute of
Politics and Economics
(Deemed to be a University)
Pune 411 004

Deepak Shah

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CHAPTER I

INTRODUCTION

1.1 Importance of Horticulture in National Economy

The land-use pattern in Indian agriculture has traditionally promoted cereal-based cropping systems. However, diversification to more productive and remunerative crops has become the new milestone to be achieved in Indian agriculture. A shift in favour of horticultural development as a more viable and attractive alternative is a part of such diversification drive and strategy (Kaul, 1993). Many policy makers, trade analysts and development specialists today realise the potential that horticulture has in generating employment and earning foreign exchange for the country. It is also realised that improvement in income levels would result in a shift in the pattern of use of land and other resources in favour of horticultural crops since income elasticity of demand for fruits and vegetables is higher than other food crops. According to Islam (1990), horticultural products have a high income elasticity of demand. As income goes up, demand rises rapidly. The recent spurt in demand for these high value commodities is due mainly to this income buoyancy.

Despite their inherent production and export advantages, horticultural crops received little attention from various development experts and policy pundits in the past and, as a result, this remained a neglected sector for long. Hardly any attention was paid to country's horticultural development until the fourth five year plan. It is substantiated by the fact that the budgetary support for horticultural development in the fourth plan was a meagre Rs. 5.0 lakh. However, in view of the several positive features in favour of horticultural crops, a breakthrough was achieved in horticultural development in the seventh plan when the allocation for this activity rose dramatically to Rs. 24 crores from its level of 7.6 crores in the fifth plan. Nevertheless, development of horticulture became a major thrust area only in the eighth five year plan when the total plan allocation for horticultural development was stepped upto Rs.1000 crore that accounted for an increase of a whopping 4000 per cent over the seventh plan (Uppal, 1995). The Eight plan, therefore, can be considered as a milestone in the growth of horticulture in the country.

On the export front, it might be worth a mention here that despite India's immense potential and ability to produce a wide variety of fruits, flowers, vegetables and a host of other agro-based products round the year which owes mainly to its rich and diverse agro-climatic conditions, only a meagre fraction of the horticultural products, both in quantity and value terms, are traded internationally today.¹ 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) owing to poor post-harvest handling, transportation and storage practices and facilities. Factors such as these plus lack of adequate processing infrastructure conditioned to produce products of international standards could be hampering India's net horticultural exports.²

As per the estimates reported in Economic Survey of India (1993-94), the share of fruits and vegetables in value terms in total agricultural and allied produce exports varied between 2.11 and 3.87 per cent during the period 1960-61 to 1992-93. These figures are clearly symptomatic of the fact that horticultural exports received very little attention in terms of promoting their share in total agricultural exports notwithstanding their immense potential. This is also despite the fact that the growth in horticultural production of late has been much faster in India than in Asia and the world as a whole. As a result of faster growth in fruits and vegetable production in India compared to Asia and world as a whole, India's share in the world is estimated to have grown at the rate of 2.26 per cent a year for fruit production and 1.09 per cent a year for vegetable production during the period between 1979 and 1993 (Table 1.1). These facts give a reflection of the great potential that India has in its horticultural sector.

-
1. Lack of infrastructural facilities which results in heavy post-harvest losses, coupled with low productivity and high prices of raw material, makes our exports uncompetitive in the international market. The constraints of air-cargo space and high air-freight rates compared to other countries also act as impediments to exports.
 2. The Group on Perishable Agriculture Commodities, headed by Dr. M.S.Swaminathan, had estimated that the actual post-harvest losses were as high as 25 to 30 per cent in value terms of the produce. The Group estimated the post-harvest losses to be as high as Rs.3000 to Rs.4000 crores annually.

With a view to determine the future export potential of India in horticultural products, the Agricultural and Processed Food Products Export Development Authority (APEDA) commissioned a study in 1991 to estimate the value of potential exports by 1996-97. The study took into account the level of estimated exports of various horticultural products in 1991-92 and provided estimates for 1996-97 based on various factors such as the constraints faced by the exporters, the complexion of world trade and the market demand and India's competitiveness vis-à-vis other suppliers. The estimated potential value of exports for 1996-97 revealed figures of Rs. 365 crores for fresh fruits, Rs. 415 crores for fresh vegetables, Rs. 100 crores for floriculture productions, Rs. 15 crores for tissue culture items and Rs. 345 crores for processed fruits and vegetables (Table 1.2). Though a number of other studies and recommendations also indicated similar figures, the implementation machinery was not geared enough towards materialising these potential targets (Patnaik, 1995).

Table 1.1 : Growth and Instability in Fruits and Vegetable Production in India, Asia and World (1979-1993)

	CGR (%)	t-statistics	R ² (%)	II (%) (Coppock Index)
INDIA				
- Fruits	4.40*	14.48	94.16	6.16
- Vegetables	3.57*	17.25	95.81	3.25
ASIA				
- Fruits	4.19*	30.32	98.61	3.18
- Vegetables	3.31*	34.09	98.89	1.93
WORLD				
- Fruits	2.09*	15.92	95.12	3.04
- Vegetables	2.45*	28.60	98.44	1.62
Indis'a Share in				
(a) Asia				
- Fruits	0.21	0.92	6.08	3.97
- Vegetables	0.24	1.33	12.05	2.07
(b) World				
- Fruits	2.26*	7.50	81.22	6.01
- Vegetables	1.09*	4.64	62.09	2.88

Notes : a) CGR = Compound Growth Rate; II = Coppock Index of Instability

* = Significant at 1 percent level of Probability

b) Computations are based on various issues of Food and Agricultural Organisation of the United Nations (FAO) "Production Yearbook", FAO.

A recent study conducted by National Council of Applied Economic Research (NCAER) identified banana, grape, sapota and lychee among fresh fruits, onions and tomato among vegetables, and mushroom among processed vegetables as having high degree of export competitiveness. The same study further identified mango, potato and

tomato paste as moderately competitive. The export competitiveness of agricultural commodities in this study was assessed through computation of Nominal Protection Coefficient (NPC) with NPC being determined as the ratio of domestic price to the border price³ (Gulati and others, 1994). Thus, while, banana, grape, sapota, lychee, onion, tomato and mushroom among horticultural commodities were seen to be highly competitive, mango, potato and tomato paste (processed vegetables) were found to be only moderately competitive. And, apple, mango pulp and apple juice (processed fruits) were not seen to be export competitive at the point of study (reckoned as 'at present').

Table 1.2 : Export Potential of Horticultural Produce

(Quantity in MT; Value in Rs. Crores)

Products	Estimated Exports (1991-92)		Potential Exports (1996-97)	
	Quantity	Value	Quantity	Value
Fresh Fruits	45000	59	187000	365
Fresh Vegetables	375000	206	530000	415
Spices	97000	338	163000	611
Floriculture	-	12	-	100
Tissue Culture	-	-	-	15
Processed Fruits and Vegetables	45000	107	130000	345
Total	562000	722	1010000	1851

Source : Patnaik, Gopal (1995), Exports of Fruit and Vegetable Products, in Globalization and Agricultural Marketing, Harish Nayyar and P.Ramaswamy (ed.), National Institute of Agricultural Marketing, Jaipur

As per the estimates provided by Singhal (1995), horticultural crops had about 12 million hectares of land under its cultivation during the year 1993-94, and the production of fruits and vegetables during this year was estimated at about 100 million tonnes. Of this, fruits accounted for about 35 million tonnes and the rest 65 million tonnes owed it to the vegetables. An appraisal of the past performance of this country reveals that during 1991-92, India occupied the second position in the world in fruit as well as vegetable 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

3. If the NPC was less than unity, the particular commodity in question was considered as having comparative advantage in export, i.e., the commodity under consideration was export competitive. Accordingly, the following classification was made : NPC <0.75, Highly Competitive; NPC 0.75 – 1.00, Moderately competitive and NPC >1.00, not competitive (at present).

Yearbook, 1993, India had overtaken Brazil in total fruit production relegating the latter to the second position. These figures and facts clearly underscore the pre-eminent position that India enjoys in the world in fruits and vegetable production. However, India still has a lot of catching up to do to compete in the world market. In order to boost country's horticultural production base and, thereby, exports, various states of the country are required to launch real concerted efforts towards the development of horticulture sector and, thereby, increasing their contribution to the national production.

1.2 Horticultural Development in Maharashtra :

In terms of fruits and vegetable production, Maharashtra is considered to be the most important state of the country. During the last 10 years period, there has been significant increase in the area and production of horticultural crops in the state. The area under horticultural crops in Maharashtra grew from 3.76 lakh hectares during 1981-82 to 6.40 lakh hectares in 1991-92 registering a nearly two fold increase in the area. It is to be noted that this state leads the country in the production of grapes, bananas, oranges and onions. Apart from these horticultural crops, wide range of other fruits and vegetables are also grown in the state. While grapes are cultivated in Jalgaon, Pune, Nasik and Satara districts, bananas' predominate in Jalgaon and Vasai; Chikoos' in Dahanu and Gholvad; Cashews' in Konkan; oranges in Nagpur and Amravati; Mangoes in Ratnagiri, and onions in Lasalgaon, Niphad, Nagpur, Dhule, etc. About 3.08 lakh hectares of land in 29,937 villages of Maharashtra has been brought under fruit Plantation since the launch of Horticulture Development Scheme in 1990.

Though Kerala and Tamil Nadu have a larger area under banana, the production is seen to be the highest in Maharashtra. This is corroborated by the fact that the productivity of banana is higher in Maharashtra than in Kerala. The Jalgaon district of Maharashtra alone accounts for a lion's share of the all-India banana production. The 'Jain group' of Jalgaon is planning a banana revolution in India. According to the Jain group, in the case of tissue cultured elite varieties of banana, a farmer can grow 3 crops in 24 months at a total cost of Rs1,50,000 and earn revenue to the tune of Rs. 6,00,000.

As regards grape, it is already established as an important commercial crop in Maharashtra. Although the cultivation is mainly concentrated in the three districts of Nasik, Sangli and Solapur, a large number of farmers in the neighbouring districts like

Pune, Ahmednagar and Satara are switching over to grape cultivation. In fact, grape cultivation is chiefly confined to Deccan Plateau in Western Maharashtra because of the congenial agro-climatic conditions prevailing in this region. About 600 hectares are added to grape acreage in Maharashtra every year. Nasik district of Maharashtra is the largest producer of grapes in the country. It accounts for a production of about 1,80,000 tonnes of grape per annum. The yield of grape in Nasik has risen from 12 tonnes per hectare a few years ago to 22 tonnes per hectare. Even harvesting of grapes is done twice as against once in most of the other countries.

Among various citrus fruits produced in this country, oranges occupy the first place. However, India ranks seventh in terms of total global citrus fruits' production. In terms of area and production, Maharashtra tops the list of states producing oranges in this country. During 1992-93, this state accounted for nearly 45 percent of area and 30 percent of the country's total output of oranges. However, in terms of yield, the state compares rather poorly with many other provinces of the country.

Another important horticultural crop grown in Maharashtra is onion. Most of the onion produced in India comes from this state. This state accounts for 20 per cent of the area and 25 per cent of the total output of onions in India. Nasik not only produces grapes, this district also accounts for the bulk of the onion production in the state. In fact, Nasik accounts for the largest share in the production of onions in India. Lasalgaon near Nasik is the biggest onion mandi in the whole of Asia. Onion is also grown in Pimpalgaon, Manmad, Yeola, Saikheda, Chandwad and Satana – all located around Nasik. All these places have marketing centres set up by NAFED. The onion produced in Nasik district is transported and distributed throughout the country. Nasik onion is not only consumed in the farthest corners of India, it is also exported to many countries. Bulk of the onions' exported from India originate from Nasik. These observations clearly underscore the great potential that the state of Maharashtra has in the cultivation of various horticultural crops, particularly fruits and vegetables.

1.3 The Issues :

The crucial questions that could strike one are 'what prospects do the state of Maharashtra has in the exports of various high value fruit and vegetable crops? And, what are the constraints involved in their trade? With the passage of time, what structural

changes have taken place vis-a-vis area, production, productivity and marketing encompassing various fruits and vegetables that are grown in the state? What is the economics involved in the cultivation of various fruits and vegetables? What is the extent of labour Utilization and employment generation in the cultivation of these crops? What are various marketing channels used by various horticulture crop growers? What price do they receive from various marketing agencies? What is the share of a producer in export earnings? These are several questions which might loom large on the horizon when one discusses the development of horticulture sector in the state of Maharashtra.

Since research reports on the economics of growing horticultural crops are scanty and very little data are available on their production, marketing and exports, an attempt has been made in the present investigation to comprehensively analyse the economics of various export-amenable horticultural crops, particularly fruits and vegetables, grown in the state of Maharashtra

1.4 Objectives of the Study :

The specific objectives of the study were as follows:

- (i) to identify the major horticultural crops in the state of Maharashtra and to evaluate their growth trends aside from instabilities in their area of cultivation, quantum of production and export,
- (ii) to estimate the economic of selected crops,
- (iii) to assess the impact of horticultural crops on income and employment levels,
- (iv) to estimate the price spread and producer's share in consumer rupee in domestic markets,
- (v) to study the producer's share in export earnings, and
- (vi) to study the prospects of export of horticultural crops and problems thereof.

1.5 Chapter Outline :

The study is divided into eight chapters. First chapter gives the introduction to the study, its importance in the national economy and its development in the state of Maharashtra. The second chapter is devoted to the methodology adopted for this study in terms of selection of the study area, sampling technique used for the selection of farmers, data requirements and reference year, analytical tools used for secondary as well as primary data analysis. The third chapter deals with trend analysis in terms of

growth and instability in area, production and productivity of various horticultural crops grown in different districts of Maharashtra. This chapter also seeks to examine the relative effect of various basic economic components (area, yield and their interaction) on the production of horticultural crops with a view to assess the factors that might be responsible for the rise or fall involved in their production levels in the state over time. The fourth chapter places an onus on studying the socio-economic profile of sample producers with respect to their land resources, cropping pattern, irrigation facilities, livestock resources, farm implements and machinery, etc. The economics of selected horticultural crops (grapes and onions) is dealt with in the fifth chapter. The marketing pattern of the selected crops such as marketing channels adopted by the farmers for the disposal of produce, prices received at various level, transportation cost, marketing margins, price spread, etc. are the main foci of attention of the sixth chapter. The seventh chapter deals with the impact that selected horticultural crops have on the income and employment levels of sample farmers. The problems and prospects of horticultural crops in the context of new economic policy are dealt with in the eight chapter.

CHAPTER II

METHODOLOGY

2.1 The Study Area :

Due to time and labour constraints, it was decided to conduct and confine the investigation to only one district of Maharashtra . Further, as the aim of this study was to evaluate the economics of export driven horticultural crops, particularly onions and grapes, in the state of Maharashtra, it was decided to select the district on the basis of certain rationale. Therefore, the selection of the district was based on various parameters such as area, production and productivity of grapes and onions, irrigation potential, cropping intensity, literacy rate, etc., in each district of the state. Appropriate weights were assigned to each of the above-mentioned variables in order to arrive at and calculate standard score and after adding up all the scores, total score was calculated for each district. Thus, a scale was developed for ranking all the 30 districts of the state. The districts were ranked in accordance of their respective total scores. The district scoring high on this scale was finally selected for this study. Nasik district of Maharashtra showed the highest score on the basis of parameters taken into consideration. And, therefore, it was finally selected for this investigation.

2.2 Selection of Talukas :

The procedure for the selection of Talukas in the selected district was similar to that of selection of district in the state. However, the parameters considered in the selection of talukas were a little different and encompassed variables such as area under grapes and onions, cropping intensity, area under other fruits and vegetables and literacy rate in each taluka of the district. Total scores were calculated after assigning appropriate weights to the above variables and finally Niphad taluka was selected from Nasik district, both for the study of onions and grapes. Since the biggest onion mandi of Asia is also located in Lasalgaon of Niphad taluka, it possesses a unique position in Nasik district. As a matter of fact, Lasalgaon market center alone accounts for about 45 percent of the total market arrival of onions in this district. The other important market centres of onion in Nasik district are Pimpalgaon, Saikheda and Manmad.

2.3 Selection of Villages, Onion Producers and Grape Orchardists:

Stratified random sampling procedure was adopted for the selection of villages, onion producers and grape orchardists. A list of major grape and onion producing villages alongwith number of producers and area under each crop in each village of Niphad taluka was obtained from the Zilla Parishad (ZP) of Nasik district. Based on area under grapes and onions, all the villages were arranged in descending order. The villages showing higher area under grapes and onions formed the basis for the selection of sample villages. Accordingly, five villages were selected for the study of onion producers and another five villages for the study of grape orchardists. A list of onion and grape producing households/orchardists alongwith area under the crop for each household/orchardists was obtained from the respective village level Panchayat Samity of each of the selected onion and grape producing villages. The onion producing households were then categorised as marginal (less than one hectare), small (1-2 hectares), medium (2-4 hectares) and large (above 4 hectares) based on land holding size of the households using cumulative frequency square root technique. It was decided to select a sample of 50 households from these five onion producing villages. The households to be selected from each village were distributed to the four categories, namely, marginal, small, medium and large, in proportion to the number of households in each category, subject to the condition that minimum 10 households are included in each category. Similar procedure was adopted for the selection of grape orchardists in each selected grape producing villages. Nevertheless, since number of orchardists in marginal category were very less, the condition of minimum 10 orchardists in this category could not hold good. The distribution of selected households/orchardists in each of the selected villages is brought out in Table 2.1. Thus, the number of onion producing households selected were 12 in marginal category, 13 in small category, 13 in medium category and 12 in large category. On the other hand, the number of grape producing orchardists selected were 4 in marginal category, 16 in small category, 14 in medium category and the remaining 16 in large category. In all, the study covered 50 onion producing households and 50 grape orchardists.

2.4 Data Collection :

Primary data from the sample onion producers and grape orchardists under study were collected on the well structured pre-tested schedule by personal interview method. An

indepth information on family particulars, land use pattern, sources of irrigation, cropping pattern, production and utilization of various food, vegetables and fruit crops, labour utilization pattern for various farm operations for different crops, quantity of seed, fertilizer, pesticides, etc. use, production and marketing cost for different operations, initial cost of investment for grape orchards, operational costs involved during different stages of

Table 2.1 : Distribution of Sample Onion and Grape Producing Households/Orchardists

Village	Marginal	Small	Medium	Large	Total
ONION PRODUCERS					
Shriramnagar	4	1	5	1	11
Karanjgaon	5	2	1	-	8
Devgaon	-	2	1	4	7
Khadak Malegaon	2	3	5	6	16
Ranwad	1	5	1	1	8
TOTAL	12	13	13	12	50
GRAPE ORCHARDISTS					
Sakore	1	3	7	2	13
Palkhed	-	5	4	2	11
Kasbe Sukene	1	4	1	4	10
Vanasgaon	-	2	1	2	5
Ugaon	2	2	1	6	11
TOTAL	4	16	14	16	50

production of grapes, marketing channels adopted for sale of produce, marketing margins, price spread, pre or post-harvest contracts for grape orchards, inventory of farm implements, machinery, building and livestock, etc. were collected from each of the selected sample households/orchardists.

In addition to the collection of above information, secondary data related to district-wise area, production, productivity of various horticultural crops, their prices, exports, etc. were also collected from various secondary sources in order to bring the matter into proper perspective.

2.5 Reference Year :

Primary data from the sample households/orchardists were collected for the reference year 1995-96.

2.6 Analytical Framework :

The data collected during the period of enquiry were scrutinised, coded, tabulated and compiled systematically. Commensurate with the objectives of the study, tabular and

functional analysis were performed as the empirical tools in the present investigation. These tools of economic analysis are presented and discussed in the sections that follows :

2.6.1 Different Cost Concepts Used

For a farmer, cost A assumes greater significance as it includes considerable portion of his recurring expenditure on inputs. The cost B which includes all the component of cost A as well as rental value of owned land and interest on owned fixed capital indirectly affects his total expenses. Nonetheless, the significance of cost C is great when the producer is interested in knowing his overall maintenance expenses at a given level of production. The cost C also includes the quantum of family labour absorption in various operations of crop production. An estimation of these components of costs is necessary in the light of judging the profitability and economic viability of an enterprise. The details of these cost concepts are given as follows :

Cost A_1 = Cost of inputs such as seed (both farm produced and purchased), manure (owned and purchased), fertilizers, insecticides and pesticides + value of hired labour + value of hired as well as owned bullock labour + hired machinery charges + value of owned machine labour + depreciation on implements and farm buildings + irrigation charges + land revenue, cases and other taxes + interest on working capital + miscellaneous expenses.

Cost A_2 = Cost A_1 + rent paid for leased – in land

Cost B = Cost A_2 + rental value of owned land (net of land revenue) and interest on owned fixed capital excluding land.

Cost C = Cost B + imputed value of family labour.

Although the above mentioned expenses have a definite bearing on the cost economics of the producer, these cost components, however, do not reveal the true picture of the producer's net returns over cost as these expenses do not include various marketing expenses which are normally incurred by the producer farmer. Therefore, apart from the cost of cultivation, various marketing expenses have also been estimated. The marketing cost includes various expenses such as cost of picking/plucking (in case of orchards), assembling, grading, packing (including packing material), local transportation, loading/unloading, freight for transport, octroi, state tax, commission and fee and certain other marketing expenses. The estimation of cost of cultivation coupled with the estimation of marketing expenses incurred by the producer/orchardists has helped us to compute the overall expenses of the producer at a particular level of production of a crop.

In the case of onion, not only cost of cultivation but marketing expenses have also been estimated for both Kharif and Rabi seasons. As for the grapes, the estimation of various expenses is attempted in respect of different stages of production.

2.6.2 Estimation of Growth Rates and Instability :

To the time series data obtained from various secondary sources, exponential trend equation of the following form was fitted:

$$Y = e^{a+bt}$$

$$\text{Log } Y = a + b^*t$$

Where, Y = Area/Production/Productivity/Share; t = Year (time)

The compound growth rates (r) = $(e^b - 1) \times 100$ were tested for their significance by the student 't' statistics.

With a view to understand growth performance of various parameters better and in order to capture year to year fluctuation in the same over the given period of time, index of instabilities as suggested by Cuddy Ville and Coppock were also incorporated in the analysis, which appeared to have taken care of the trend component in the time series data. The formula for Cuddy Ville instability index (II) is as follows :

$$II = c.v.\sqrt{1 - R^2}$$

Where c.v. is the coefficient of variation and $(1-R^2)$ is the unexplained portion of the variation in the trend equation.

According to Coppock, the annual instability index equals the anti-log of the square root of the logarithmic variance. The series is given in algebraic form as follows:

$$V \log = \frac{1}{N-1} \cdot \Sigma[\log X_{t+1} \cdot \log X_t - \frac{1}{N-1} \cdot \Sigma(\log X_{t+1} - \log X_t)]^2$$

OR

$$V \log = \frac{[\log \frac{X_{t+1}}{X_t} - m]^2}{N-1}$$

Where, N = number of years; X = Area/Production/Productivity/Share

m = mean value of the logarithmic first difference.

2.6.3 Decomposition of Production Increase/Value of Production :

Decomposition of production increase in the current period (period 1) over the base period (period 0) was done using the method outlined by Vidya Sagar (1977, 1980) in order to measure the relative importance of area, yield and their interaction on the changes in production.

Decomposition of production increase can be given as

$$Q^1 - Q^0 = A^1 Y^1 - A^0 Y^0 \quad - (1)$$

$$= (A^1 - A^0) Y^0 + (Y^1 - Y^0) A^1 \quad - (2)$$

The right hand side of the identify (2) can be further decomposed as

$$Q^1 - Q^0 = (A^1 - A^0) Y^0 + (Y^1 - Y^0) A^0 + (A^1 - A^0) (Y^1 - Y^0)$$

$$\Delta Q = \Delta A Y^0 + \Delta Y A^0 + \Delta A \Delta Y$$

Change in production = Area effect + Yield effect + Interaction effect

Here, (Q^1, Q^0) , (A^1, A^0) and (Y^1, Y^0) represent current period and base period of production, area and yield, respectively. Three year average has been taken on each end. The decomposition of production increase for various horticultural crops was estimated for the period 1981/82 – 1983/84 to 1991/92 – 1993/94.

The effects of yield, area, prices and their interactions on the rise in value of onion production in different districts of Maharashtra are also estimated separately for the above mentioned period. These effects are estimated as follows :

$$\Delta X = P_0 A_0 \Delta Y + P_0 Y_0 \Delta A + Y_0 A_0 \Delta P + (P_0 \Delta A \Delta Y + A_0 \Delta P \Delta Y + Y_0 \Delta P \Delta A + \Delta A \Delta Y \Delta P)$$

Total change in value of Production = Yield effect + Area effect + Price effect
+ Interaction effect (Area and Yield effect +
Price and Yield effect + Price and area effect
+ area, Yield and price effect)

Definition of Parameters Used :

2.7.1 Classification of Grape Orchards :

It is well nigh essential to know the age of fruit tree/plant/orchards since cost of production and returns are heavily dependent on the stage of production. Grape orchards in the study area were seen to be in different stages of production. While some orchardists

were seen to have both bearing and non-bearing orchards scattered over in different plots, the others had either non-bearing or bearing orchards but in different stages of production in different plots. It is to be noted here that the productivity of fruit tree declines as it grows older. At the same time, it is worth mentioning here that once the infrastructure is raised, the orchard remains non-bearing upto certain age and thereafter starts giving fruits. The productivity of bearing tree increases during the initial years upto a certain level when it reaches maximum and after remaining at that level for a few years (depending upon the nature and kind of fruit tree) it starts showing a declining trend. Thus, a fruit tree passes through three different phases of production, i.e., an increasing phase, a constant phase and a declining phase. As for grape orchards, its economic life in Nasik district was seem to hover around 20-25 years. It is to be noted that the economic life of the plant also depends on its variety. Based on magnitude of production, the following four classifications are made for grape orchards.

<u>Age Group</u>	<u>Production Stages</u>
1- 2 years	Non-bearing stage
3-10 years	Increasing production stage
11-14 years	Constant production stage
Above 15 years	Declining production stage

As a matter of fact, the cost and return vary from orchard to orchard depending upon the age of trees/plants in the orchard. After making initial investment in raising the basic infrastructure for the grape orchard, an orchardist has to make investment for two years for the up-bringing of the fruit trees/plants with no returns from them. This is termed as non-bearing stage of production. Generally, it is seen that during the non-bearing stage the orchardists grow inter-crops so that they get some income during this period. Nonetheless, in case of grapes, the sample orchardists in Nasik district were not seen to grow inter-crops during non-bearing stage. The reason for this could be traced in the fact that the period of non-bearing stage is very less in case of grape and that growth of inter-crops may affect the growth of young grape plants. In the third year the grape plants start giving fruits and the productivity of the same increases till it reaches the tenth year of production. The maximum productivity remains constant for 3-4 years and thereafter a fall

in productivity catches up till it reaches the lowest level. Majority of the sample orchardists in Nasik district were seen to have orchards in the increasing production stage.

2.7.2 Pre-harvest Contractor :

Pre-harvest contract of grape orchards was seen to be a common phenomenon in Nasik district. A pre-harvest contractor is defined as one who buys the standing crop from the grower at his own risk and cost on certain terms and conditions, i.e., he undertakes the contract before the harvest of the crop and incurs expenditure on various operations such as picking/plucking, grading, packing and other marketing functions.

2.7.3 Marketing Margins or Price Spread :

Marketing margin is defined as the difference between the price paid by the consumer and the price received by the producer for an equivalent quantity of farm produce. This difference is termed as farm-retail spread or price spread. The total margin includes the cost involved in moving the produce from the point of production to the point of consumption and the profits of the various market functionaries involved in moving the produce from the producer to the consumer.

2.7.4 Establishment Cost /Initial Cost of Plantation :

This includes all the costs incurred by the orchardists in raising the basic infrastructure for the orchard. The various components of costs included in the initial investment were cost of preparation of land, digging and filling of pits, cost of fertilizer application, plant support, urea application, installation of drip unit for irrigation, fixation of bamboo, cost of iron angles, GI wire, cement, welding, etc. It is to be noted here that due to high profitability in grape gardens, about 30-40 per cent of the sample orchardists preferred to grow only grapes on their farms rather than growing other field crops also with less profit. And, therefore, in these cases certain major cost components of initial investment such as cost of installation of drip unit of irrigation, cost of iron angles and GI wire, etc., were included in the fixed cost. Depreciation and rate of interest on these fixed assets were computed which were included in the orchardist's expenditure on fixed capital.

2.7.5 Labour Cost :

Human as well as bullock and machine labour were seen to be extensively used in the cultivation of various field crops and in grape gardens on the sample farms. Human labour (both family and hired), in particular, was seen to be used in various cultivation operations

such as ploughing, sowing, manuring, fertilizing, irrigation, interculture, pruning, plant protection measures, watch and ward, harvesting and various other marketing operations such as picking/plucking, assembling, grading, packing, loading and unloading. Labour cost was computed using existing wage rates/hiring charges for various operations.

2.8 Assumptions :

Some assumptions were made while estimating establishment/maintenance cost, etc. and these are as follows:

- (i) The interest on working capital was computed at the rate of 12% per annum.
- (ii) Depreciation on purchased asset was worked out by subtracting the scrap value of the asset from the purchased price and dividing it by the life expectancy of the asset concerned. Annual depreciation on farm implements, machinery and store houses, etc., was calculated by straight line method with the assumption that it was charged at the rate of 2% per annum for 'Pucca' sheds and 5% per annum for 'Kuccha' sheds of store houses.
- (iii) The interest on fixed capital was worked out at the rate of 12% per annum.
- (iv) Rental value of owned land was charged at the rate of 10% of the present value of land.
- (v) In the non-bearing stage the interest on accumulated establishment cost in each year have been charged at the rate of 12% per annum.
- (vi) Both implicit and explicit costs were computed through compounding and discounting of initial investment at 12% annual rate of interest to arrive at prorated establishment cost.

CHAPTER III

STRUCTURAL CHANGES IN HORTICULTURAL CROP PRODUCTION IN MAHARASHTRA

This chapter ventures to probe the structural changes in the production pattern of various horticultural crops in the state of Maharashtra and indeed India. The objective of this exercise is to evaluate the underlying growth trends and instability 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. It also deals with component analysis with a view to measure the relative importance of area, yield and the effects of interaction between area and yield as they impact total production pattern changes.

3.1 Changing Horticultural Production Scenario :

The horticultural scenario of India in general and that of Maharashtra in particular stand vastly transformed owing to sustained thrust on planned development. Not only is this thrust seen in the significant expansion of the horticulture production base, profitability and economic viability-wise, it has also turned horticulture into a potentially more vibrant industry. It is 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 early nineties, that is, in the face of a more liberal market environment. Between the early eighties and early nineties period, while oranges and cashewnuts produced 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 early nineties over its early eighties production figures. In contrast, banana and onions produced in the state showed only moderate overall increases in their production levels during this period. Most of the production increase for these two commodities 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 the post late eighties' period. The overall expansion in production levels for grape, oranges and cashewnuts was found to be much higher in Maharashtra compared to the country as a whole. As for India,

a fall in cashewnut production was noticed during the late eighties but, thereafter, it recorded perceptible production increases. Contrary to this, the production of oranges in the country was found to slow down in the second half of the overall period.

Although Maharashtra accounted for bulk of the nation's total output of banana, grapes, oranges and onions, the scenario obtaining over the past decade or so was not seen

Table 3.1 : Changing Structure of Horticultural Production in Maharashtra and India
(1981/82 – 1993/94)

(Quantity in '000' MT)

Crop	Triennium Average			% Change		
	Period			2 Over	3 Over	3 Over
	1	2	3	1	2	1
Maharashtra						
Banana	1252	1390	1915	11.02	37.77	52.96
Grapes	37	112	384	202.70	242.86	937.84
Oranges	86	165	201	91.86	21.82	133.72
Cashewnuts	7	10	15	42.86	50.00	114.29
Onions	812	670	961	-17.49	43.43	18.35
India						
Banana	4483	5505	7610	22.80	38.24	69.75
Grapes	227	328	699	44.49	113.11	207.93
Oranges	1106	1473	1930	33.18	31.03	74.50
Cashewnuts	195	150	265	-23.08	76.67	35.90
Onions	2591	2923	3725	12.81	27.44	43.77
Share (%)						
Banana	27.93	25.25	25.16	-9.60	-0.36	-9.92
Grapes	16.30	34.15	54.94	109.51	60.88	237.06
Oranges	7.78	11.20	10.41	43.96	-7.05	33.80
Cashewnuts	3.59	6.67	5.66	85.79	-15.14	57.66
Onions	31.34	22.92	25.80	-26.87	12.57	-17.68

Note : 1) Period 1= 1981/82 – 1983/84;
Period 2 = 1986/87 – 1988/89;
Period 3 = 1991/92 – 1993/94.

to be very encouraging in terms of the state's share in India's total production of banana and onions. Infact, Maharashtra's share in total banana production of the country was noticed to come down from 28 per cent during the early eighties to about 25 per cent by the early nineties. Despite this, Maharashtra could still emerge as the leading state in banana production enjoying the lion's share. The other major banana producing states of India were Tamil Nadu, Gujarat, Andhra Pradesh and Assam (Table 3.2). A steep decline in Maharashtra's share in India's total onion production was noticed during the late eighties with the production growths registered in the subsequent period being a saving grace. In contrast to this dismal scenario, the share of grape production of Maharashtra in India's total grape production increased dramatically from a low of 16 per cent during the early eighties to a recorded high of 55 per cent during the early nineties. It is worth a

mention here that at present all the grapes produced in the country come from four major states, namely: Maharashtra, Karnataka, Punjab and Tamil Nadu (Table 3.2). As for oranges and cashewnuts, a sharp increase was noticed in share of Maharashtra in the country's total production of these fruits between the early – and the late eighties and a marginal decline, thereafter.

Table 3.2 : Share of Different States in Horticultural Production of India (1991-92)
(in per cent)

Crop	Share in production
Banana	Andhra Pradesh (6.94); Assam (6.65); Goa (4.49); Gujarat (12.84); Karnataka (1.57); Kerala (3.80); Madhya Pradesh (9.04); Maharashtra (26.27); Orissa (3.53); Tamil Nadu (20.05); West Bengal (2.27); Others (2.10)
Grapes	Andhra Pradesh (0.97); Haryana (3.23); Karnataka (22.94); Maharashtra (55.25); Punjab (9.69); Tamil Nadu (7.59); Others (0.33)
Citrus	Arunachal Pradesh (1.1); Assam (9.01); Haryana (8.20); Madhya Pradesh (7.53); Maharashtra (13.88); Manipur (0.99); Meghalaya (2.53); Mizoram (0.99); Punjab (14.13); Rajasthan (7.77); Sikkim (1.05); Tamil Nadu (10.05); Tripura (2.28); West Bengal (7.46); Others (13.02)
Cashewnut	Andhra Pradesh (13.07); Gujarat (4.57); Karnataka (8.82); Kerala (46.73); Maharashtra (10.46); Orissa (10.46); Tamil Nadu (4.25); West Bengal (1.31); Others (0.33)
Onions	Arunachal Pradesh (4.14); Assam (0.27); Bihar (10.07); Gujarat (10.32); Haryana (1.51); Karnataka (19.48); Madhya Pradesh (4.09); Maharashtra (35.18); Punjab (1.13); Rajasthan (0.42); Tamil Nadu (5.60); Uttar Pradesh (6.85); Others (0.94)

Note : Shares have been computed on the basis of statewide production data obtained from (i) Singhal, Vikas (1995). Handbook of Indian Agriculture, Vikas Publishing House Pvt. Ltd., New Delhi and (ii) Agricultural Situation in India, Vol XLVIII (5), August 1993.

3.2 Trends in Horticultural Production Growth :

The share of various fruits and vegetables produced in the state of Maharashtra in India has tended to fluctuate widely over time. An examination of Table 3.3 revealed a much faster rate of growth in production in Maharashtra than in India for various fruits like grapes, oranges and cashewnuts. During the period between 1981/82 and 1993/94, while grape production of Maharashtra grew at an annual compound growth rate of 25 per cent, the same figure for the country stood at a mere 11 per cent. Similarly, the production growth of oranges was estimated at about 12 per cent per annum in Maharashtra as against an annual growth rate of only 6 per cent for India. Cashewnut production of Maharashtra also grew appreciably over time, though the production growth in cashewnut for India was very slow. In contrast to very high rate of growth in production for various fruits like

grapes, oranges and cashewnuts, the production growth of other commodities like bananas and onions in Maharashtra was rather dismal and as per estimates, these were much below the national average growth rates. Consequently, the share of Maharashtra in nation's total production of these commodities was estimated to have declined at the rate of 1.2 per cent a year for banana and 1.5 per cent a year for onions during the 1981/82 – 1993/94 period. The good showing of Maharashtra in the production of grapes, oranges and cashewnuts also saw its share in the country's total output of these commodities to grow at an annual growth rate of nearly 12 per cent for grapes, 5 per cent for oranges and 6 per cent for cashewnuts.

Table 3.3 : Growth and Instability in Horticultural Production in Maharashtra and India (1981/82 – 1993/94)

Crops	CGR(%)	t-Statistics	R ² (%)	II(%)
Maharashtra				
Banana	4.42***	4.51	64.93	14.04
Grapes	25.28***	14.79	95.22	17.13
Oranges	11.57**	2.55	37.19	45.69
Cashewnuts	7.02***	5.20	71.10	15.50
Onions	1.81	1.40	15.10	17.40
India				
Banana	5.71***	7.40	83.28	9.36
Grapes	11.45***	9.34	88.81	15.51
Oranges	6.01***	9.63	89.40	7.22
Cashewnuts	1.02	0.45	1.81	32.57
Onions	3.37***	6.19	77.72	3.20
Share (%)				
Banana	-1.22	0.96	7.66	16.57
Grapes	12.41***	7.31	82.92	17.32
Oranges	5.26	1.27	12.79	40.63
Cashewnuts	5.93**	2.46	35.41	29.70
Onions	-1.51	1.46	16.30	13.73

Notes : 1) CGR = Annual Compound Growth Rate
II = Instability Index (Cuddy Ville)

2) ***, ** represent significance of growth rates at 1 and 5 per cent level of probability, respectively.

As for the instability in production growth rates, oranges showed the highest yearly fluctuation in output growth in Maharashtra. The fluctuations in output growth for other commodities produced in Maharashtra like bananas, grapes, cashewnuts and onions were seem to waver in the range of 14 to 17 per cent. By and large, Maharashtra showed much higher instability in production growth than the nation as a whole.

In order to delineate the reasons for increase or decrease in the share of Maharashtra in India for various horticultural crops, we have gone into more details and have examined

structural changes and rates of growth alongwith instability in area, production and productivity of not only these selected crops but also two more fruit crops namely, mosambi and arecanut. These two crops, of late, have shown considerable expansion in their production levels in the state of Maharashtra.

3.3.1 Structural Changes in Area, Production and Productivity of Horticultural Crops in Maharashtra :

As is evident from Table 3.4, all the selected horticultural crops grown in Maharashtra showed perceptible rise in their production levels over the period between 1981/82 and 1993/94 despite slow expansion of acreage under the crops. During the given period of time, there was 30 to 70 per cent overall increase in acreage for banana, oranges and onion production. Most of this increase in acreage was noticed after the mid-eighties period. In the case of grapes, the overall acreage expansion was more than five folds during the 1981/82 – 1993/94 period. On the other hand, though a considerable increase in acreage under cashewnut and arecanut was noticed between the mid-eighties and the early nineties, it could not stem the overall decline in acreage for these two commodities between 1981/82 and 1993/94 due mainly to sharp decline in acreage witnessed for cashewnut and arecanut between the early - and the mid-eighties period. The overall acreage loss was, thus, about 15 per cent for both cashewnut and arecanut between 1981/82 and 1993/94 in the state of Maharashtra. In the case of onions, even though the area fell by 5 per cent between the early-and the mid-eighties, it did not seem to offset the overall increase of 27 per cent in area under this crop due mainly to about 33 per cent rise in its acreage observed between the mid-eighties and the early-nineties.

The production of onion also fell between the early-and the mid-eighties but picked up in the subsequent period. Nonetheless, the order of overall increase in production of onions was much lower compared to its overall acreage expansion indicating Maharashtra's decline in productivity of onions. Interestingly, all the selected crops showed much higher overall increase in their production levels than overall increase in their acreage during the 1981/82 – 1993/94 period with onion being the only aberration in this scenario. And, consequently, the productivity of all the selected crops, save onion, was also found to increase perceptibly with cashewnuts registering the highest increase in its productivity level, followed by grapes, arecanut, oranges and banana in that order. Thus,

rise in horticulture crop production in the state of Maharashtra could be mainly attributed to rise in productivity rather than acreage under the crops.

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

Table 3.4 : Structural Changes in Area, Production and Productivity of Horticultural Crops in Maharashtra

Crop	Triennium Average Period			% Change		
	1	2	3	2 Over 1	3 Over 2	3 Over 1
AREA						
Banana	259	271	359	4.63	32.47	38.61
Grapes	2913	6453	16639	121.52	157.85	471.20
Oranges	22343	29047	38388	30.00	32.16	71.81
Mosombi	-	2090	6766	-	223.73	-
Cashewnut	17133	13343	14600	-22.12	9.42	-14.78
Arecanut	2254	1867	1900	-17.17	1.77	-15.71
Onion	586	557	743	-4.95	33.39	26.79
PRODUCTION						
Banana	1253	1390	1915	10.93	37.77	52.83
Grapes	372	1121	3709	201.34	230.87	897.04
Oranges	857	1652	2012	92.77	21.79	134.77
Mosombi	-	172	727	-	322.67	-
Cashewnut	7150	9695	14590	35.59	50.49	104.06
Arecanut	2061	2139	3007	3.78	40.58	45.90
Onion	8122	6704	9606	-17.46	43.29	18.27
PRODUCTIVITY						
Banana	48.38	51.29	53.34	6.01	5.36	11.70
Grapes	12.77	17.37	22.29	36.02	28.32	74.55
Oranges	18.83	22.19	23.65	17.84	6.58	25.60
Mosombi	-	27.55	32.78	-	18.98	-
Cashewnut	417.32	726.60	999.32	74.11	37.53	139.46
Arecanut	77.47	83.50	133.23	7.78	59.56	71.98
Onion	13.86	12.04	12.93	-13.13	7.39	-6.71

Notes : 1) Area : Banana and Onions ('00' Hectares); Grapes, Oranges, Mosombi, Cashewnut and Arecanut (in Hectares)

2) Production : Banana ('000' MT); Grapes, Oranges, Mosombi, Arecanut and Onions ('00' MT); Cashewnut (in MT)

3) Productivity : Banana, Grapes, Onions (Tons/Hectare); Oranges, Mosombi, Arecanut (in kgs./bearing tree); Cashewnuts (kgs./Hectare)

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 1981/82 – 1993/94. Further, to understand growth performance of these parameters better and in order to capture year to year fluctuation in the same over

the given period of time, an index of instability as suggested by Cuddy Ville and Coppock 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.

3.3.2 Growth Trends and Instability in Area, Production and Productivity of Horticultural crops in Maharashtra :

Growth trends in area, production and productivity together with instability in rates of growth for various horticultural crops of Maharashtra are provided in Table 3.5. The observance of the trend obtaining over the past decade or so 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. As a matter of fact, acreage under cashewnut and arecanut went down during the overall period in Maharashtra¹. However, suitable technological measures saw the crop yield for these commodities to expand significantly notwithstanding the acreage loss.

The analysis also revealed large production growth rate differences across different crops. Between 1981/82 and 1993/94, 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. Among the various horticultural crops, yield growth was highest for mosambi followed by cashewnuts, oranges, grapes, arecanut and banana.² The productivity of onion, however,

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1. Acreage under arecanut cultivation in Maharashtra had declined from a figure of 2120 hectare during 1981/82 to 1900 hectares by 1993/94 exhibiting, thereby, a 10 per cent loss of area over the 13 year period. Similarly, acreage under cashewnut cultivation also declined from 17100 hectares to 14600 hectares resulting in 15 per cent loss of area during the same period. As against this, the acreage for other crops grown in the state increased overall with the increase being 91 per cent for banana, 468 per cent for grapes, 293 per cent for oranges, 589 per cent for mosambi (especially between 1985/86 and 1993/94) and 65 per cent for onions.
 2. Productivity of mosambi grew in the state from 3.65 tons/ha during 1985/86 to 11.78 tons/ha in 1993/94. The other horticultural crops that showed their productivity levels to increase between 1981/82 and 1993/94 were banana (increase in yield from 48.29 tons/ha to 53.93 tons/ha), grapes (from 13.5 tons/ha to 24.3 tons/ha), oranges (from 4.31 tons/ha to 7.98 tons/ha), cashewnut (from 409 kgs./ha to 1004.9 kgs/ha), arecanut (from 114.58 tons/ha to 187.26 tons/ha).

declined marginally over time. This was despite the fact that the acreage under onion had increased significantly. A decline in productivity inspite of reasonable acreage growth contributed to onion 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. 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 growths were much higher for various citrus fruits compared to other horticultural crops of Maharashtra

As brought out earlier, fluctuations in rates of growth were computed using two different methods as suggested by Cuddy Ville and Coppock. Both the methods showed basically the same trend, that is, higher instability in output growth than instabilities in area and productivity growth. However, Coppock instability index showed a higher level of fluctuations in the rates of growth in area, production and productivity compared to instabilities explained by Cuddy Ville index. This held true of all the selected crops.

Notably, the foregoing analysis presents us with two differing scenarios. Thus, 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 perceptible decline was observed in the productivity of onions in the state. These trends pre-empted more detailed analysis of the onion and grape production in the state of Maharashtra. In the subsequent sections, therefore, efforts have been spared to evaluate the changes that took place over the past 13 years in the area, production and productivity of onions and, in particular, grapes in different districts of Maharashtra with the analysis extending to discerning growth and instability in the rates of growth of these parameters for the two crops.

3.4.1 Structural Changes in Onion and Grape Production In Maharashtra – A Districtwise Analysis :

The state of Maharashtra witnessed some major changes in its onion cultivation over the past decade or so. Most of the districts of the state saw their onion production to decline during the mid-eighties only to pick up thereafter. The reason for this unseemly

trend could be attributed to loss of onion acreage for majority of the districts between the early – and the mid-eighties. After the mid-eighties period, not only the acreage under onion cultivation increased perceptibly but its output also rose sharply in all the districts of the state with Jalgaon district being the sole aberration in this overall scenario; the Jalgaon

Table 3.5 : Growth and Instability in Area, Production and Productivity of Horticultural Crops in Maharashtra

Crop	CGR(%)	t-Statistics	R ² (%)	Instability Index (%)	
				Cuddy Ville	Coppock
AREA					
Banana	3.08***	3.17	47.80	14.28	14.71
Grapes	18.78***	14.27	94.88	13.91	19.99
Oranges	5.14***	9.98	90.05	6.59	8.00
Mosambi@	28.42***	8.13	90.41	19.24	221.36
Cashewnut	-1.43	1.74	21.51	10.31	11.76
Arecanut	-1.30*	1.89	24.54	8.68	12.44
Onion	2.57**	2.49	36.14	15.94	16.16
PRODUCTION					
Banana	4.42***	4.51	64.93	14.04	15.28
Grapes	25.28***	14.79	95.22	17.13	31.40
Oranges	11.57**	2.55	37.19	45.69	147.24
Mosambi@	44.32***	9.34	92.56	19.91	38.00
Cashewnut	7.02***	5.20	71.10	15.50	27.58
Arecanut	3.72***	3.72	55.73	12.91	14.39
Onion	1.81	1.40	15.10	17.40	15.58
PRODUCTIVITY					
Banana	1.27***	4.90	68.60	3.17	2.82
Grapes	5.18***	4.63	66.08	14.09	22.60
Oranges	5.29	1.43	15.64	35.59	126.92
Mosambi@	7.45**	2.88	54.18	15.02	18.58
Cashewnut	8.56***	7.54	83.78	12.49	22.23
Arecanut	4.77***	3.88	57.73	16.92	18.49
Onion	-0.74	1.08	9.58	8.49	11.28

Notes :1) CGR = Annual Compound Growth Rate

2) ***, ** represent significance of growth rates at 1 and 5 per cent level of probability, respectively.

3) @ Growth and Instability are estimated for the period 1985/86 to 1993/94 due to non-availability of data for the preceeding years.

district showed its onion output and area under the crop to decline even after the mid-eighties (Table 3.6(a)). Nonetheless, the increase in onion output was seen to be more sharp than acreage expansion in all the districts with the exception of certain districts like Satara, Buldhana and Amravati where acreage expansion under onion cultivation was more sharp than the increase in output observed between the mid-eighties and the early nineties.

Although onion production increased considerably between the mid-eighties and the early nineties in districts like Dhule, Solapur, Osmanabad, Buldhana and Amravati, it

could not reverse the overall declining trend in onion for these districts as sharp falls in production were recorded between the early- and the mid-eighties. However, as the cumulative contribution of these districts to total onion production of Maharashtra remained less than 20 per cent all through the period of study, this could not adversely impact onion production in Maharashtra. It might be worth mentioning here that Nasik and Pune districts put together accounted for the lion's share in total onion production of the state. The share of these two districts to the onion pool of Maharashtra was seen to be more than 50 per cent in terms of production and just about 50 per cent in acreage terms and this remained fairly constant all through the overall period. Another important district that showed tremendous increase in its onion production and the area under this crop was Ahmednagar. Over the past decade or so, while the area under onion cultivation in Ahmednagar rose by more than 3 times, output growth of onion in this district was nearly 5 times. However, it is disquieting to note that except Ahmednagar, the overall productivity of onion in all the other districts fell over time. The overall decline in productivity of onion in all the districts of Maharashtra was due mainly to sharp productivity declines observed especially between the early – and the mid-eighties, since after the mid-eighties majority of the districts showed their onion productivity to increase considerably. Thus, two differing scenarios were discernible over the past decade or so. While the first half of the overall period was marked with sharp decline in area, production and productivity of onion, the second half of this period saw considerable rise in the same indices. Nasik district had a unique position in this overall scenario. Though the onion productivity marginally declined in this district since the early 1980s, the bulk (33 per cent) of the onions produced in the state of Maharashtra was still contributed by Nasik. Notwithstanding this fall in productivity, the acreage under onion for the district was found to have increased by 10 per cent over the last 13 years. And, this forebode well about the great potential of Nasik district as far as onion cultivation in the state of Maharashtra was concerned.

As for grapes, the structure of cultivation in Maharashtra was noticed to have undergone some dynamic changes during the overall period. Both area and production of grapes were found to have increased many folds in all the grape growing districts of this state during this period (Table 3.6(b)). In this scenario, the output expansion was much faster than the acreage expansion. This was mainly due to perceptible rise in productivity

of this high value crop over time. And, with the exception of districts like Nasik and Solapur which showed slowing down of production and area increases between the mid-eighties and the early nineties, all other districts of Maharashtra showed much faster rate of

Table 3.6(a): Changing Structure in Area, Production and Yield of Onions in Maharashtra: (1981/82 to 1993/94)

District/State	Triennium Average			Percent Change		
	Period			2 Over	3 Over	3 Over
	1	2	3	1	2	1
	AREA ('00'Hectares)					
Nasik	191	188	212	-1.57	12.77	10.99
Dhule	45	37	45	-17.78	21.62	0.00
Jalgaon	25	25	22	0.00	-12.00	-12.00
Ahmednagar	22	21	73	-4.55	247.62	231.82
Pune	111	99	139	-10.81	40.40	25.23
Solapur	43	40	42	-6.98	5.00	-2.33
Satara	31	30	64	-3.23	113.33	106.45
Aurangabad	10	9	15	-10.00	66.67	50.00
Osmanabad	9	11	12	22.22	9.09	33.33
Buldhana	16	14	27	-12.50	92.86	68.75
Amravati	14	10	16	-28.57	60.00	14.29
Maharashtra State	586	557	743	-4.95	33.39	26.79
	PRODUCTION ('00'MT')					
Nasik	2697	2463	2950	-8.68	19.77	9.38
Dhule	496	360	451	-27.42	25.28	-9.07
Jalgaon	316	279	256	-11.71	-8.24	-18.99
Ahmednagar	259	240	1197	-7.34	398.75	362.16
Pune	1843	1378	2049	-25.23	48.69	11.18
Solapur	573	377	512	-34.21	35.81	-10.65
Satara	341	387	784	13.49	102.58	129.91
Aurangabad	109	73	143	33.03	95.89	31.19
Osmanabad	113	93	105	-17.70	12.90	-7.08
Buldhana	218	153	191	-29.82	24.84	-12.39
Amravati	198	139	173	-29.80	24.46	-12.63
Maharashtra State	8122	6704	9606	-17.46	43.29	18.27
	YIELD (Tons/Ha)					
Nasik	14.12	13.10	13.92	-7.22	6.26	-1.42
Dhule	11.02	9.73	10.02	-11.71	2.98	-9.07
Jalgaon	12.64	11.16	11.64	-11.71	4.30	-7.91
Ahmednagar	11.77	11.43	16.40	-2.89	43.48	39.34
Pune	16.60	13.92	14.74	-16.14	5.89	-11.20
Solapur	13.33	9.43	12.19	-29.26	29.27	-8.55
Satara	11.00	12.90	12.25	17.27	-5.04	11.36
Aurangabad	10.90	8.11	9.53	-25.60	17.51	-12.57
Osmanabad	12.56	8.45	8.75	-32.72	3.55	-30.33
Buldhana	13.63	10.93	7.07	-19.81	-35.32	-48.13
Amravati	14.14	13.90	10.81	-1.70	-22.23	-23.55
Maharashtra State	13.86	12.04	12.93	-13.13	7.39	-6.71

Note: 1) Period 1 = 1981/82 - 1983/84;
 Period 2 = 1986/87 - 1988/89;
 Period 3 = 1991/92 - 1993/94.

output as well as acreage growth for this high value crop during the second half of the overall period as compared to the first half. However, the productivity increases, in general, were observed to have suffered a beating in the second compared to first half.

In terms of area and production of grapes, Nasik district ranked first in the state. More than 50 per cent of the area under grape cultivation in the state was accounted for by Nasik. Not only this, it also contributed more than 50 per cent of the grapes produced in

Table 3.6(b): Changing Structure in Area, Production and Yield of Grapes in Maharashtra: (1981/82 to 1993/94)

District/State	Triennium Average Period			Percent Change		
	1	2	3	2 Over 1	3 Over 2	3 Over 1
	AREA (Hectares)					
Nasik	1460	3785	8545	159.25	125.76	485.27
Ahmednagar	113	153	899	35.40	487.58	695.58
Pune	281	263	906	-6.41	244.49	222.42
Solapur	233	792	1910	239.91	141.16	719.74
Satara	28	28	220	0.00	685.71	685.71
Sangli	650	1172	2690	80.31	129.52	313.85
Osmanabad	149	194	584	30.20	201.03	291.95
Maharashtra State	2913	6453	16639	121.52	157.85	471.20
	PRODUCTION ('00MT)					
Nasik	187	638	1852	241.18	190.28	890.37
Ahmednagar	16	27	165	68.75	511.11	931.25
Pune	40	60	196	50.00	266.67	390.00
Solapur	21	148	416	604.76	181.08	1880.95
Satara	4	6	56	50.00	833.33	1300.00
Sangli	89	194	725	117.98	273.71	714.61
Osmanabad	13	33	88	153.85	166.67	576.92
Maharashtra State	372	1121	3709	201.34	230.87	897.04
	YIELD (Tons/Ha)					
Nasik	12.81	16.86	21.67	31.62	28.53	69.16
Ahmednagar	14.16	17.65	18.35	24.65	3.97	29.59
Pune	14.23	22.81	21.63	60.30	-5.17	52.00
Solapur	9.01	18.69	21.78	107.44	16.53	141.73
Satara	14.29	21.43	25.45	49.97	18.76	78.10
Sangli	13.69	16.55	26.95	20.89	62.84	96.86
Osmanabad	8.72	17.01	15.07	95.07	-11.41	72.82
Maharashtra State	12.77	17.37	22.29	36.02	28.32	74.55

Note : 1) Period 1 = 1981/82 - 1983/84;
 Period 2 = 1986/87 - 1988/89;
 Period 3 = 1991/92 - 1993/94

Maharashtra during the past 13 years. Sangli, Solapur, Pune and Ahmednagar were identified as the other important grape growing districts of Maharashtra. Solapur district, in particular, showed a remarkable increase of about 20 times in its grape production between the early eighties and the early nineties when the acreage under this crop grew by 8 times. Compared to Solapur, Nasik and Ahmednagar districts exhibited about 10 folds increase in production and 6-10 times increase in area under grapes during the same period

(Table 3.6(b)). As for the productivity expansions in grapes during the overall period, Solapur district recorded the highest and by far the most impressive productivity increases followed by Sangli, Satara, Osmanabad, Nasik and Pune in that order. In absolute terms, however, the productivity of grapes during the early nineties was seen to be much higher in Sangli district (27 tons/ha) compared to other districts like Satara (25 tons/ha), Pune, Solapur and Nasik (22 tons/ha), Ahmednagar (18 tons/ha) and Osmanabad (15 tons/ha).

Thus, the unfolding scenario since the early 1980s showed the area and the production of grapes to grow rapidly in all the districts of Maharashtra. Not only did the acreage under grapes and the production quantum increase significantly in all the districts but the productivity of this high value crop was also seen to increase sharply in the state of Maharashtra in general. 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 this state. And, consequent to these concerted efforts, the output of grapes was also found to have increased many folds for the state of Maharashtra.

3.4.2 Growth and Instability in Onion and Grape Production in Maharashtra – Districtwise Analysis :

Although Nasik district accounted for bulk of the onions produced in Maharashtra, in terms of rate of growth in area, production and productivity of onions, it was seen to lag far behind many other districts of the state (Table 3.7(a)). The area under onion cultivation and the production of onions for this district grew very slowly during the period between 1981/82 and 1993/94. In fact, the average annual rate of growth in area and production of onions in Nasik district was estimated to be half that recorded for the state as a whole during the overall period. Not only this, the productivity of onions in this district was also estimated to have declined over time, though the rate of decline in productivity of onions in this district was not as sharp as for other districts like Solapur, Osmanabad and Buldhana. As a matter of fact, except Ahmednagar, all the districts of the state showed their productivity of onions to decline between 1981/82 and 1993/94 with Buldhana district showing maximum decline in this respect. In case of Jalgaon and Solapur, even the area and the output of onion were seen to decline with the annual decline over the overall period being 0.62 per cent in area and 0.88 per cent in production for the district of Jalgaon and,

output as well as acreage growth for this high value crop during the second half of the overall period as compared to the first half. However, the productivity increases, in general, were observed to have suffered a beating in the second compared to first half.

In terms of area and production of grapes, Nasik district ranked first in the state. More than 50 per cent of the area under grape cultivation in the state was accounted for by Nasik. Not only this, it also contributed more than 50 per cent of the grapes produced in

Table 3.6(b): Changing Structure in Area, Production and Yield of Grapes in Maharashtra: (1981/82 to 1993/94)

District/State	Triennium Average Period			Percent Change		
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	AREA (Hectares)					
Nasik	1460	3785	8545	159.25	125.76	485.27
Ahmednagar	113	153	899	35.40	487.58	695.58
Pune	281	263	906	-6.41	244.49	222.42
Solapur	233	792	1910	239.91	141.16	719.74
Satara	28	28	220	0.00	685.71	685.71
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Satara	4	6	56	50.00	833.33	1300.00
Sangli	89	194	725	117.98	273.71	714.61
Osmanabad	13	33	88	153.85	166.67	576.92
Maharashtra State	372	1121	3709	201.34	230.87	897.04
	YIELD (Tons/Ha)					
Nasik	12.81	16.86	21.67	31.62	28.53	69.16
Ahmednagar	14.16	17.65	18.35	24.65	3.97	29.59
Pune	14.23	22.81	21.63	60.30	-5.17	52.00
Solapur	9.01	18.69	21.78	107.44	16.53	141.73
Satara	14.29	21.43	25.45	49.97	18.76	78.10
Sangli	13.69	16.55	26.95	20.89	62.84	96.86
Osmanabad	8.72	17.01	15.07	95.07	-11.41	72.82
Maharashtra State	12.77	17.37	22.29	36.02	28.32	74.55

Note : 1) Period 1 = 1981/82 – 1983/84;
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Maharashtra during the past 13 years. Sangli, Solapur, Pune and Ahmednagar were identified as the other important grape growing districts of Maharashtra. Solapur district, in particular, showed a remarkable increase of about 20 times in its grape production between the early eighties and the early nineties when the acreage under this crop grew by 8 times. Compared to Solapur, Nasik and Ahmednagar districts exhibited about 10 folds increase in production and 6-10 times increase in area under grapes during the same period

(Table 3.6(b)). As for the productivity expansions in grapes during the overall period, Solapur district recorded the highest and by far the most impressive productivity increases followed by Sangli, Satara, Osmanabad, Nasik and Pune in that order. In absolute terms, however, the productivity of grapes during the early nineties was seen to be much higher in Sangli district (27 tons/ha) compared to other districts like Satara (25 tons/ha), Pune, Solapur and Nasik (22 tons/ha), Ahmednagar (18 tons/ha) and Osmanabad (15 tons/ha).

Thus, the unfolding scenario since the early 1980s showed the area and the production of grapes to grow rapidly in all the districts of Maharashtra. Not only did the acreage under grapes and the production quantum increase significantly in all the districts but the productivity of this high value crop was also seen to increase sharply in the state of Maharashtra in general. 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 this state. And, consequent to these concerted efforts, the output of grapes was also found to have increased many folds for the state of Maharashtra.

3.4.2 Growth and Instability in Onion and Grape Production in Maharashtra – Districtwise Analysis :

Although Nasik district accounted for bulk of the onions produced in Maharashtra, in terms of rate of growth in area, production and productivity of onions, it was seen to lag far behind many other districts of the state (Table 3.7(a)). The area under onion cultivation and the production of onions for this district grew very slowly during the period between 1981/82 and 1993/94. In fact, the average annual rate of growth in area and production of onions in Nasik district was estimated to be half that recorded for the state as a whole during the overall period. Not only this, the productivity of onions in this district was also estimated to have declined over time, though the rate of decline in productivity of onions in this district was not as sharp as for other districts like Solapur, Osmanabad and Buldhana. As a matter of fact, except Ahmednagar, all the districts of the state showed their productivity of onions to decline between 1981/82 and 1993/94 with Buldhana district showing maximum decline in this respect. In case of Jalgaon and Solapur, even the area and the output of onion were seen to decline with the annual decline over the overall period being 0.62 per cent in area and 0.88 per cent in production for the district of Jalgaon and,

0.39 per cent in area and 2.56 per cent in production for Solapur district. Contrary to this dismal scenario, Ahmednagar and Satara districts showed their area under onion cultivation and the production of onions to grow tremendously over time. Not only did Ahmednagar district show dynamic growth in area, production and productivity of onions over the past 13 years but it also showed considerable rise in its share in the state's total area under onions so much so that this share had increased from 3.75 per cent during the early eighties to 9.83 per cent by the early nineties (Table 3.6(a)). Similarly, the contribution of Ahmednagar district to the state's total output of onions increased from 3.19 per cent during the early eighties to 12.46 per cent in the early nineties.

As regards instability in rates of growth of onions, both Cuddy Ville and Coppock indices showed yearly fluctuation in area and production growth to be lowest for the district of Nasik compared to other districts in the state (Table 3.7(a)). On the other hand, Solapur district was observed to show very high degree of instability and negative rates of growth in area as well as production of onions. The feature of Satara district was high rates of growth in area and production of onions associated with moderate instability. The districts of Aurangabad and Osmanabad showed moderate rates of growth in area and production of onions to be associated with high instability. And, Ahmednagar district had high instability associated with its otherwise high rates of growth of area and production of onions. Thus, growth in area and production of onions in various districts of Maharashtra were observed to have been associated with wide yearly fluctuations. In general, the trend rates of growth in area, production and productivity of onions in different districts of Maharashtra were not so encouraging and showed unsatisfactory performance, particularly on the productivity front.

In contrast to the dismal trend rate of growth witnessed in case of onions, the production as well as area and productivity growths of grapes in various districts of Maharashtra were not only highly significant but quite substantial and encouraging too. Between 1981/82 and 1993/94 period, most of the districts producing grapes showed 15-30 per cent annual growth rate in their production and area under the crop with Satara district showing the highest growth both in area and production and Pune district recording the lowest growth in the same (Table 3.7(b)). During the same period, the productivity of grapes rose at an annual rate of 4 to 8 per cent in different districts of Maharashtra with

Ahmednagar district recording the lowest and Sangli district the highest rate of productivity growth. The growth in output was seen to be much faster than growth in area under grapes. This held true of all the grape growing districts.

Table 3.7(a) : Growth and Instability in Area, Production and Yield of Onion in Maharashtra : 1981/82 to 1993/94)

District/State	CGR(%)	t-Statistics	R ² (%)	Instability Index (%)	
				Cuddy Ville	Coppock
AREA					
Nasik	1.33*	1.92	25.02	8.93	14.39
Dhule	0.95	0.74	4.80	15.89	16.50
Jalgaon	-0.62	0.35	1.10	20.12	44.67
Ahmednagar	11.20***	3.75	56.08	55.99	43.59
Pune	2.17	1.45	16.12	20.76	21.93
Solapur	-0.39	0.20	0.35	22.97	50.41
Satara	6.73**	2.91	43.56	38.10	28.99
Aurangabad	2.63	0.92	7.11	47.07	35.65
Osmanabad	4.80	1.72	21.24	29.12	49.56
Buldhana	5.11**	2.42	34.71	34.16	29.12
Amravati	3.17	1.28	13.05	27.58	29.87
Maharashtra State	2.57**	2.49	36.14	15.94	16.16
PRODUCTION					
Nasik	0.67	0.54	2.62	16.51	24.35
Dhule	0.36	0.22	0.45	20.16	21.32
Jalgaon	-0.88	0.49	2.15	20.11	38.76
Ahmednagar	13.48***	3.22	48.53	83.94	67.90
Pune	1.33	0.76	5.02	21.62	28.06
Solapur	-2.56	1.05	9.05	27.94	61.87
Satara	6.54***	3.41	51.41	33.65	32.01
Aurangabad	1.68	0.52	2.41	43.80	62.86
Osmanabad	2.61	0.90	6.93	40.45	62.84
Buldhana	-0.76	0.27	0.68	43.70	47.60
Amravati	-4.14	0.97	7.88	95.38	64.48
Maharashtra State	1.81	1.40	15.10	16.03	15.58
YIELD					
Nasik	-0.65	0.54	2.54	15.53	24.60
Dhule	-0.58	0.66	3.82	10.80	18.70
Jalgaon	-0.28	0.23	0.49	13.51	21.69
Ahmednagar	2.06	1.10	9.98	23.24	39.62
Pune	-0.82	0.91	6.95	11.19	14.74
Solapur	-2.19	1.37	14.53	19.59	29.65
Satara	1.16	1.51	17.08	9.50	17.11
Aurangabad	-0.92	0.41	1.49	25.88	58.45
Osmanabad	-2.07**	2.22	30.94	12.21	15.88
Buldhana	-9.28**	2.86	42.60	26.66	103.35
Amravati	-1.25	0.59	3.11	22.17	52.84
Maharashtra	-0.74	1.08	9.58	8.49	11.28

Notes : 1) CGR = Annual Compound Growth Rate; R² = Coefficient of Determination

2) Area in '00' Hectares; Production in '00' tons and Yield in tons/ha.

3) ***, ** and * represent significance at 1, 5 and 10 per cent level of probability, respectively.

Table 3.7 (b) : Growth and Instability in Area, Production and Yield of Grapes in Maharashtra: (1981/82 to 1993/94)

District/State	CGR(%)	t-Statistics	R ² (%)	Instability Index (%)	
				Cuddy Ville	Coppock
AREA					
Nasik	18.86***	12.71	93.63	15.20	21.68
Ahmednagar	25.34***	6.70	80.31	37.89	62.33
Pune	13.28***	5.23	71.34	31.13	33.27
Solapur	22.00***	9.07	88.20	21.35	40.20
Satara	26.97***	3.62	54.40	63.49	113.63
Sangli	15.13***	11.46	92.26	14.52	20.87
Osmanabad	15.92***	7.64	84.15	24.15	20.27
Maharashtra State	18.78***	14.27	94.88	13.91	19.99
PRODUCTION					
Nasik	23.89***	13.22	94.08	18.33	36.88
Ahmednagar	28.60***	7.59	83.95	36.35	67.27
Pune	12.65***	8.19	85.91	25.67	37.08
Solapur	31.68***	6.96	81.15	32.53	106.67
Satara	32.07***	3.86	57.47	67.08	167.36
Sangli	24.55***	8.95	87.92	28.07	39.79
Osmanabad	21.55***	7.08	81.99	29.92	65.14
Maharashtra State	24.97***	15.33	95.53	16.31	31.40
YIELD					
Nasik	4.47***	3.24	48.89	17.52	26.65
Ahmednagar	2.57*	1.77	22.24	17.69	31.22
Pune	3.84***	2.73	40.32	17.16	25.14
Solapur	7.92***	3.22	48.54	27.05	67.20
Satara	3.35	1.51	17.23	25.30	50.64
Sangli	8.14***	3.70	55.51	25.07	34.44
Osmanabad	4.85*	1.98	26.31	24.33	63.87
Maharashtra State	5.18***	4.63	66.08	14.09	22.60

Notes : 1) CGR = Annual Compound Growth Rate; R² = Coefficient of Determination

2) Area in Hectares; Production in '00' tons and Yield in tons/ha.

3) ***, ** and * represent significance at 1, 5 and 10 per cent level of probability, respectively.

Despite significant contribution of Nasik district to the state's total area and production of grapes, the annual growth in area and production of this high value fruit crop in this district was found to be much lower than many other districts of the state. During 1981/82 and 1993/94 period, the area under grapes in Nasik district grew at the rate of 19 per cent a year which was much lower compared to the annual growth rate in area of some of the other districts like Ahmednagar (25 per cent), Solapur (22 per cent) and Satara (27 per cent) but much higher than Pune (13 per cent), Sangli (15 per cent) and Osmanabad (16 per cent) districts. Similarly, the output growth of grapes in Nasik district was observed to be lower than Ahmednagar, Solapur, Satara and Sangli districts but, at the same time, higher than in Pune and Osmanabad districts. As for productivity, the annual growth in

productivity of grapes in Nasik district was much below its state's average all through the overall period.

As regards fluctuations in rates of growth, Coppock index showed higher instability in rates of growth compared to Cuddy Ville index. In general, output instability was higher than area instability. The districts which showed higher rates of growth in area, production and productivity of grapes also showed higher instability in the same (Table 3.7(b)). Nasik and Sangli districts, in general, showed lower instabilities in area, production and productivity of grapes compared to other districts. Among various districts, output as well as area growth under grapes in Satara district was found to be highly unstable.

Thus, while the acreage expansion was accompanied by fall in productivity in case of onions during the cited period leading to slower growth of onion production in Maharashtra, grape production in the state showed steady increase as a result of sharp rise in its area and productivity in different districts of the state.

3.5 Decomposition of Production Increase for Onions and Grapes :

The effects of yield, area and their interaction on the increase/decrease of total production of onions and grapes in different districts of Maharashtra are summarised in Table 3.8.

An examination of Table 3.8 revealed that, in general, the rise in onion production in Maharashtra was due mainly to acreage expansion rather than yield and interaction between area and yield. Infact, yield and the interaction between area and yield impacted production rise in onions negatively or, that these had a negative effect on the production increases in onions. However, in districts like Dhule, Ahmednagar and Satara, yield expansion played a significant role towards rise in output. In districts like Jalgaon and Solapur, it was the decline in acreage and fall in productivity that decelerated the output of onion over time. Further, the fall in output of onions in Buldana and Amravati districts was due mainly to yield effect and the interaction between yield and area effects since these two districts showed considerable expansion in acreage under onion crop.

Table 3.8 : Contribution of Area, Productivity and Their Interaction Towards Increasing Production of Horticultural Crops in Maharashtra

(Per cent)

Crops/District	Area	Effects Yield	Interaction
ONIONS			
Nasik	117.20	-15.10	-2.10
Dhule	0.00	100.00	0.00
Jalgaon	63.20	41.67	-4.87
Ahmednagar	63.99	10.86	25.15
Pune	225.63	-100.22	-25.41
Solapur	21.85	80.36	2.21
Satara	81.94	8.75	9.31
Aurangabad	160.29	-40.29	-20.00
Osmanabad	-471.00	428.63	142.37
Buldhana	-556.00	388.74	267.26
Amravati	-113.12	184.80	28.32
Maharashtra State	146.53	-36.74	-9.79
GRAPES			
Nasik	54.84	7.82	37.34
Ahmednagar	74.70	3.18	22.12
Pune	57.01	13.33	29.66
Solapur	38.25	7.53	54.22
Satara	52.76	6.01	41.23
Sangli	43.91	13.55	42.54
Osmanabad	50.58	12.62	36.80
Maharashtra State	50.50	8.67	40.83
BANANA			
Thane	-44.45	173.30	-28.85
Dhule	90.79	2.88	6.33
Jalgaon	66.47	31.17	2.36
Pune	78.88	4.22	16.90
Aurangabad	50.77	30.77	18.46
Jalna	66.67	16.67	16.66
Parbhani	87.22	5.86	6.92
Nanded	83.62	3.51	12.87
Osmanabad	-	-	-
Amravati	79.41	8.24	12.35
Buldhana	75.79	15.13	9.08
Wardha	88.89	5.56	5.55
Yavatmal	70.59	7.35	22.06
Akola	74.07	4.32	21.61
Maharashtra State	73.08	19.41	7.51
CASHEWNUTS			
Ratnagiri	-21.37	135.94	-14.57
Sindhudurg	-16.50	144.03	-27.53
Raigad	0.00	100.00	0.00
Kolhapur	76.19	11.90	11.91
Nasik	-	-	-
Maharashtra State	-14.21	134.02	-19.80
ORANGES			
Nagpur	36.71	44.99	18.30
Amravati	94.32	3.22	2.46
Wardha	9.88	60.52	29.60
Akola@	87.36	2.81	9.83
Yavatmal@	118.05	-3.75	-14.30
Maharashtra State	53.34	27.08	19.58
MOSAMBI@			
Aurangabad	37.41	30.29	32.30
Jalgaon	56.26	35.41	8.33
Pune	-70.76	246.62	-75.86
Ahmednagar	72.30	4.40	23.30
Jalna	99.84	0.01	0.15
Maharashtra State	69.34	9.51	21.15
ARECANUT			
Raigad	-1498.62	2525.77	-927.15
Ratnagiri	-2.72	104.66	-1.94
Sindhudurg	-12.80	123.40	-10.60
Maharashtra State	-34.22	159.21	-24.99

Note : @ Effects are computed for the period 3 over 2.

Despite the fact that most of the districts showed positive effect on yield towards

rise in output of onion, the overall effect of yield turned out to be negative. This was chiefly because of the negative effect of yield on the rise in output of onion in case of districts like Nasik and Pune which accounted for and contributed the bulk of the onions produced in Maharashtra.

As regards grapes, the area and the interactions effects outweighed yield effect. The output increase in the case of grapes was seen to be due to acreage expansion and interaction between area and yield as the effect of yield towards rise in production appeared to have been very low. In general, the effects of area and the interaction between area and yield on the output growth of grapes were found to be about 50 and 40 per cent and the remaining 10 per cent owed it to the yield effect.

Thus, decline in the share of Maharashtra in the nation's total output of onion could be traced in the slower output growth of this crop in the state. Even significant acreage expansion under the crop could not stem this decline in Maharashtra's share. The yield effect had a very low impact on the output growth of grapes and, in fact, it was negative for onions. Slower output growth of onions in the state of Maharashtra could be considered alarming in view of its export competitiveness and domestic consumption requirements.

CHAPTER IV

SOCIO-ECONOMIC PROFILE OF SAMPLE PRODUCERS/ORCHARDISTS

This chapter deals with the socio-economic profile of sample onion producers and grape orchardists since the socio-economic characteristics of producers 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 onion producers and grape orchardists. The information relating to family size and composition, education, land use pattern, cropping pattern, sources of irrigation, farm implements and machinery and livestock resources has been analysed and discussed for various categories of sample households/orchardists. The knowledge of the background of the sample producers/orchardists is essential 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 technical skills and resource position of the growers.

4.1 Family Size and Composition of Sample Producers/Orchardists :

Running a crop enterprise on traditional lines is a labour intensive operation where the composition and size of the family of a producer are important considerations. The viability of a crop enterprise at village level often depends on such important factors. Information on the average size of producer family(ies) and their sex-wise and age-wise break-up is presented in Table 4.1. The average size of a family consisted of 6 persons in the case of onion producers and nearly 8 persons in the case of grape orchardists. The family size of large category was seen to be more compared to other categories, both in the case of onion producers and grape orchardists. A positive association was seen between land holding size and number of members in the family, that is, the number of members in the family increased from marginal to small, small to medium and medium to large category. This held true for both onion producers and grape orchardists. Due to joint family system, grape orchardists, in particular, had larger family size. On a facile view, the number of members in the family increased with the increase in the age group, the number of those above 15 years of age group being predominantly more. The number of male members was significantly higher than females in all the categories of households for both

onion producers and grape orchardists, except in the case of marginal grape orchardists where number of females were seen to be equal to number of male members. The average number of females was significantly higher for grape orchardists than for onion producers.

Table 4.1 : Family Composition According to Sex, Age and Category of Sample Producers

Category of Producer	No. of Producers	Male				Female				Overall average family size	Sex ratio
		Less than 5 yrs	5-15 yrs.	More than 15 yrs.	Total	Less than 5 yrs	5-15 yrs.	More than 15 yrs.	Total		
ONION GROWERS											
Marginal	12	0.42	0.42	1.92	2.76	0.17	0.67	1.33	2.17	4.93	786
Small	13	0.08	0.54	2.46	3.08	0.15	0.46	2.00	2.61	5.69	847
Medium	13	0.23	0.92	2.38	3.53	-	0.62	2.00	2.62	6.15	742
Large	12	0.42	0.92	3.17	4.51	-	0.67	2.42	3.09	7.60	685
Overall	50	0.28	0.70	2.48	3.46	0.08	0.60	1.94	2.62	6.08	757
GRAPE GROWERS											
Marginal	4	-	1.00	2.00	3.00	0.25	1.25	1.50	3.00	6.00	1000
Small	16	0.31	0.75	2.75	3.81	0.25	1.00	2.31	3.56	7.37	934
Medium	14	0.43	1.50	2.43	4.36	0.14	0.50	2.36	3.00	7.36	688
Large	16	0.38	1.12	3.19	4.69	0.63	0.56	2.63	3.82	8.51	814
Overall	50	0.34	1.10	2.74	4.18	0.34	0.72	2.36	3.42	7.60	818

The number of members in more than 15 years age category, both among males and females, was higher in all the categories of producers/orchardists. This substantiate the foregoing that a higher workforce was available in the case of sample producers/orchardists. The availability of a higher workforce was more in case of grape orchardists compared to onion producers.

4.2 Education Status of Sample Producers/Orchardists :

The standard of education has a definite bearing on a farmer's response to improved technology and extension services. A responsive and enlightened farmer only acts to improve technology and market performance because of his higher motivation that helps him to take effective managerial decisions to contribute more to the market, to diversify his farm business and thereby, to earn more. Such motivated responsive farmers are very much needed to run any professional enterprise that warrant quality managerial inputs. In a village set up, the decision maker of a family is usually either its head or any other elderly economically active person of this family. All decisions regarding primary and secondary occupations that should be practiced by a family are taken by such a person. However, the

level of education of other members of the family could be equally important in the decision making process if they have motivation towards gaining knowledge about modern techniques of production. Since such decision makers have important roles in determining the health of a crop enterprise, it was thought prudent and desirable to ascertain the education level of such members in case of a producer family.

In order to ascertain the extent of education of the members of a family, an index of literacy was computed for various categories of onion producers and grape orchardists and the same is presented in Table 4.2. The overall literacy index was seen to be slightly higher for onion producers compared to grape orchardists. In case of onion producers, the literacy index was seen to increase with the increase in size of land holding, that is, it increased from marginal to small, small to medium and medium to large category. However, such a trend could not be visualised in case of grape orchardists as medium category showed much higher literacy index compared to large as well as small and marginal categories. About 60 per cent of the male members above six years of age in case of both onion producers and grape orchardists, in general, were seen to acquire above middle level of education. In case of male members of onion producers, this proportion was seen to be the highest for small category (72 per cent) followed by large category (70 per cent), medium category (60 per cent) and marginal category (39 per cent). On the other hand, in case of grape orchardists, the proportion of male members in the family acquiring education more than middle level was seen to be the highest for small category (66 per cent) followed by large and medium categories (57 per cent) and marginal category (35 per cent) in that order. In general, the literacy of female members in the family was seen to be much lower than literacy of male members in the family in case of both onion producers and grape orchardists. On an average, the proportion of female members in the family acquiring education higher than middle level was 10 per cent for marginal category, 34 per cent for small category, 43 per cent for medium category and 57 per cent for large category in case of onion producers and, 42 per cent for small category, 46 per cent for medium category and 38 per cent for large category in case of grape orchardists. All the members of sample onion producers and grape orchardists were found to be literate, though the level of member's literacy varied

Index of Sample Onion and Grape Growers

Male								Female							
Can read & write	Primary	Middle	High-School	Intermediate	Graduate & above	Total	Illiterate	Can read only	Can read & write	Primary	Middle	High-School	Intermediate	Graduate & above	
ONION GROWERS															
03	0.24	0.73	0.73	0.91	0.18	-	2.82	-	0.08	0.23	0.92	0.46	0.19	-	
03	0.20	0.60	0.30	1.63	0.45	0.88	4.09	-	0.09	0.24	0.62	0.12	0.15	0.18	
07	0.30	0.59	0.43	0.87	0.65	0.61	3.52	-	0.06	0.24	0.62	0.47	0.88	0.18	
-	0.15	0.67	0.30	0.93	0.89	0.78	3.72	-	0.08	0.27	0.65	0.11	1.49	-	
03	0.22	0.64	0.42	1.07	0.59	0.60	3.57	-	0.08	0.24	0.69	0.27	0.73	0.09	
GRAPE GROWERS															
-	0.33	0.50	1.00	0.42	-	0.58	2.83	-	0.08	0.33	0.50	-	-	-	
02	0.13	0.64	0.52	1.23	0.59	0.69	3.82	-	0.07	0.35	0.68	0.28	0.44	0.32	
10	0.23	0.44	0.52	1.23	0.39	0.11	3.02	-	0.05	0.24	0.64	0.67	0.95	0.43	
09	0.37	0.40	0.53	0.67	0.56	0.65	3.27	-	0.08	0.23	0.39	0.59	0.49	0.30	
07	0.26	0.49	0.56	0.98	0.49	0.50	3.35	-	0.07	0.28	0.56	0.47	0.44	0.31	

Index (L) was calculated as under

$$L = \sum_{i=1}^n (i \cdot f_i) / N$$

N = total no. of family members above six years

f_i = literacy score of an individual member of the household

score allotted to different levels of education is as follows:

0 (illiterate); can read only (1); can read and write (2); Primary (3); Middle (4); High-School (5); Intermediate (6); Graduate and above (7) (1963).

from household to household and orchardists to orchardists. On the whole, medium and large categories of producers/orchardists attained higher education level and appeared to be better equipped to take effective managerial decisions than producers in marginal and small categories.

4.3 Land Use Pattern of Sample Producers/Orchardists :

Land is the main resource base of the farmer in the production process. The economic and social progress of the farmers largely depends on the size of their operational holdings. Keeping in view the significance of land resources, it was thought essential to show the land use pattern of sample producers/orchardists in the study area. The land use pattern of sample onion producers is presented in Table 4.3(a) and that of grape orchardists in Table 4.3(b).

In case of sample onion producers, the average size of operational holding stood at 1.92 acres (0.78 ha) for marginal category, 3.74 acres (1.51 ha) for small category, 6.69 acres (2.71 ha) for medium category and 15.32 acres (6.20ha) for large category (Table 4.3(a)). On an average, 0.15 acre of land was seen to be acquired on lease by small category of onion producers. On the other hand, large category of onion producers were seen to lease out an average of 0.25 acre of land. The average net cultivated area stood at 1.91 acres for marginal category, 3.72 acres for small category, 6.69 acres for medium category and 14.65 acres for large category. In general, of the gross cropped area, about 59 per cent area was seen to be under kharif crops, 32 per cent under rabi crops and 9 per cent under perennial crops. As for various categories of onion producers, 46 per cent of the gross cropped area was under kharif crops, 37 per cent under rabi crops and 17 per cent under perennial crops in case of marginal category, 58 per cent under kharif crops, 34 per cent under rabi crops and 8 per cent under perennial crops in the case of small category, 57 per cent under kharif crops, 39 per cent under rabi crops and 4 per cent under perennial crops in the case of medium category and 63 per cent under kharif crops, 26 per cent under rabi crops and 11 per cent under perennial crops in the case of large category. The intensity of cropping was worked out at 147 per cent in case of marginal category of onion producers, 151 per cent for small category, 148 per cent for medium category and 126 per cent for large category with an average of 139 per cent for the average category of onion producers.

As for sample grape orchardists, the average size of operational holding was seen to be 1.98 acres (0.80 ha) in case of marginal category, 3.70 acres (1.50 ha) for small category, 7.56 acres (3.06 ha) for medium category, and 16.85 acres (6.82 ha) for large category giving an overall average size of land holding per orchardist at 8.86 acres (3.59 ha)

Table 4.3(a) : Land Use Pattern of Sample Onion Producers

(in Acres/Households)

Particulars	Marginal			Small		
	IR	UIR	Total	IR	UIR	Total
A. Particulars of land Holding						
(i) Owned Land	1.81 (0.18)	0.11 (0.14)	1.92 (0.16)	2.70 (0.43)	0.89 (0.10)	3.59 (0.37)
(ii) Leased in	-	-	-	0.15	-	0.15
(iii) Leased out	-	-	-	-	-	-
(iv) Operational Holding [(i)+(ii)-(iii)]	1.81 (0.18)	0.11 (0.14)	1.92 (0.16)	2.85 (0.39)	0.89 (0.10)	3.74 (0.27)
(v) Uncultivated	0.01	-	0.01	0.02	-	0.02
(vii) Barren	-	-	-	-	-	-
(viii) Misc. Tree Crops and Groves	-	-	-	-	-	-
B. Net area cultivated	1.80 (0.18)	0.11 (0.14)	1.91 (0.16)	2.83 (0.39)	0.89 (0.10)	3.72 (0.27)
C. i) Area under kharif crop	1.17	0.11	1.28	2.44	0.80	3.24
ii) Area under Rabi crop	1.05	-	1.05	1.88	-	1.88
iii) Area under Perennial crop	0.47	-	0.47	0.49	-	0.49
Grossed Cropped Area	2.70 (0.29)	0.11 (0.14)	2.81 (0.29)	4.81 (0.80)	0.80 (0.03)	5.61 (0.62)
Area under Orchards	-	-	-	0.23	-	0.23
Area under Vegetables	0.83	-	0.83	1.48	-	1.48
Cropping Indensity (%)	150	100	147	170	90	151

Table 4.3(a) : (contd.)

Particulars	Medium			Large		
	IR	UIR	Total	IR	UIR	Total
A. Particulars of land Holding						
(i) Owned Land	6.14 (0.56)	0.55 (0.29)	6.69 (0.38)	11.14 (1.71)	4.43 (1.06)	15.57 (1.42)
(ii) Leased in	-	-	-	-	-	-
(iii) Leased out	-	-	-	0.25	-	0.25
(iv) Operational Holding [(i)+(ii)-(iii)]	6.14 (0.56)	0.55 (0.29)	6.69 (0.38)	10.89 (1.69)	4.43 (1.06)	15.32 (1.39)
(v) Uncultivated	-	-	-	-	0.42	0.42
(vii) Barren	-	-	-	-	0.25	0.25
(viii) Misc. Tree Crops and Groves	-	-	-	-	-	-
B. Net area cultivated	6.14 (0.56)	0.55 (0.29)	6.69 (0.38)	10.89 (1.69)	3.76 (1.24)	14.65 (1.55)
C. i) Area under kharif crop	5.08	0.55	5.63	8.64	3.10	11.74
ii) Area under Rabi crop	3.86	-	3.86	4.55	0.25	4.80
iii) Area under Perennial crop	0.40	-	0.40	1.97	-	1.97
Grossed Cropped Area	9.34 (1.01)	0.55 (0.29)	9.88 (0.84)	15.16 (2.88)	3.35 (1.34)	18.51 (2.31)
Area under Orchards	0.38	-	0.38	1.37	-	1.37
Area under Vegetables	2.48	-	2.48	4.08	-	4.08
Cropping Indensity (%)	152	100	148	139	89	126

Table 4.3(a) : (Contd.)

Particulars	Overall		Total
	IR	UIR	
A. Particulars of land Holding			
(i) Owned Land	5.41 (0.68)	1.47 (0.48)	6.88 (0.82)
(ii) Leased in	0.04	-	0.04
(iii) Leased out	0.06	-	0.06
(iv) Operational Holding	5.39	1.47	6.86
[(i)+(ii)-(iii)]	(0.66)	(0.48)	(0.80)
(v) Uncultivated	0.01	0.10	0.11
(vi) Barren	-	0.18	0.16
(viii) Misc. Tree Crops and Groves	-	-	-
B. Net area cultivated			
	5.38 (0.66)	1.21 (0.51)	6.58 (0.76)
C. i) Area under kharif crop			
ii) Area under Rabi crop	4.31	1.12	5.43
iii) Area under Perennial crop	2.84	0.06	2.90
	0.82	-	0.82
Grossed Cropped Area			
	7.97 (1.00)	1.18 (0.52)	9.15 (1.03)
Area under Orchards	0.49	-	0.49
Area under Vegetables	2.21	-	2.21
Cropping Intensity (%)	148	88	139

Note : Figures in parentheses are standard errors.

IR = Irrigated ; UIR = Unirrigated.

(Table 4.3(b)). Marginal category of grape orchardists were seen to lease in an average of 0.75 acre of land. The other categories of grape orchardists neither leased-in nor leased-out their land. The net area cultivated stood at 1.95 acres in case of marginal category, 3.67 acres for small category , 7.45 acres for medium category and 16.37 acres for large category. The area under kharif crops in case of grape orchardists varied from 0.75 acre on marginal farms to 7.50 acres on large farms. In case of rabi crops, it varied from 0.75 acre on marginal farms to 3.73 acres on large farms. The area under perennial crops was seen to be much higher compared to area under kharif and rabi crops. This held true for all the categories of sample farms. The acreage under perennial crops varied from 1.20 on small farms to 8.00 on large farms. Of the gross cropped area, the proportions of area under kharif, rabi and perennial crops were seen to be 28 percent, 28 per cent and 44 per cent, respectively, in case of marginal category of farms, 27 per cent, 17 per cent and 56 per cent, respectively, on small farms, 37 per cent, 25 per cent and 38 per cent, respectively, on medium farms, and 39 per cent, 19 per cent and 42 per cent, respectively, on large farms. The Intensity of cropping was seen to be lower on the farms of grape

Table 4.3(b) : Land Use Pattern of Sample Grape Growers

(in acres/orchardists)

Particulars	Marginal			Small		
	IR	UIR	Total	IR	UIR	Total
A. Particulars of land	Holding					
(i) Owned Land	1.23 (0.39)	-	1.23 (0.39)	3.41 (0.28)	0.29 (0.27)	3.70 (0.22)
(ii) Leased in	0.75	-	0.75	-	-	-
(iii) Leased out	-	-	-	-	-	-
(iv) Operational Holding [(i)+(ii)-(iii)]	1.98 (0.50)	-	1.98 (0.50)	3.41 (0.28)	0.29 (0.27)	3.70 (0.22)
(v) Uncultivated	-	-	-	0.01	0.01	0.02
(vi) Barren	0.03	-	0.03	-	-	-
(vii) Misc. Tree Crops and Groves	-	-	-	-	0.01	0.01
B. Net area cultivated	1.95 (0.51)	-	1.95 (0.51)	3.40 (0.28)	0.27 (0.25)	3.67 (0.23)
C. i) Area under kharif crop	0.75	-	0.75	0.86	0.29	1.15
ii) Area under Rabi crop	0.75	-	0.75	0.71	0.02	0.73
iii) Area under Perennial crop	1.20	-	1.20	2.43	-	2.43
Grossed Cropped Area	2.70 (1.23)	-	2.70 (1.23)	4.00 (0.36)	0.31 (0.19)	4.31 (0.34)
Area under Orchards	1.20	-	1.20	2.10	-	2.10
Area under Vegetables	-	-	-	0.20	-	0.20
Cropping Intensity (%)	138	-	138	118	115	117

Table 4.3(b) : (contd.)

Particulars	Medium			Large		
	IR	UIR	Total	IR	UIR	Total
A. Particulars of land	Holding					
(i) Owned Land	6.97 (0.64)	0.59 (0.41)	7.56 (0.47)	14.58 (1.70)	2.27 (0.58)	16.85 (1.63)
(ii) Leased in	-	-	-	-	-	-
(iii) Leased out	-	-	-	-	-	-
(iv) Operational Holding [(i)+(ii)+(iii)]	6.97 (0.64)	0.59 (0.41)	7.56 (0.47)	14.58 (1.70)	2.27 (0.58)	16.85 (1.63)
(v) Uncultivated	0.01	0.02	0.03	0.01	0.01	0.02
(vi) Barren	-	0.01	0.01	0.07	0.31	0.38
(vii) Misc. Tree Crops and Groves	-	0.07	0.07	-	0.08	0.08
B. Net area cultivated	6.96 (0.64)	0.49 (0.46)	7.45 (0.44)	14.50 (1.66)	1.87 (0.55)	16.37 (1.51)
C. i) Area under kharif crop	3.07	0.44	3.51	5.41	2.09	7.50
ii) Area under Rabi crop	2.23	0.16	2.39	3.73	-	3.73
iii) Area under Perennial crop	3.63	-	3.63	8.00	-	8.00
Grossed Cropped Area	8.93 (0.93)	0.60 (0.84)	9.53 (0.66)	17.14 (2.01)	2.09 (0.44)	19.23 (1.80)
Area under Orchards	3.56	-	3.56	6.01	-	6.01
Area under Vegetables	0.43	-	0.43	1.40	-	1.40
Cropping Intensity (%)	128	122	128	118	112	117

Table 4.3(b) : (Contd.)

Particulars	Overall		Total
	IR	UIR	
A. Particulars of land Holding			
(i) Owned Land	7.81 (0.91)	0.99 (0.31)	8.80 (0.99)
(ii) Leased in	0.06	-	0.06
(iii) Leased out	-	-	-
(iv) Operational Holding [(i)+(ii)-(iii)]	7.87 (0.90)	0.99 (0.31)	8.86 (0.98)
(v) Uncultivated	0.01	0.01	0.02
(vii) Barren	0.03	0.10	0.13
(viii) Misc. Tree Crops and Groves	-	0.05	0.05
B. Net area cultivated	7.83 (0.89)	0.83 (0.30)	8.66 (0.94)
C. i) Area under kharif crop	2.93	0.88	3.81
ii) Area under Rabi crop	2.10	0.05	2.15
iii) Area under Perennial crop	4.45	-	4.45
Grossed Cropped Area	9.48 (1.06)	0.93 (0.34)	10.41 (1.10)
Area under Orchards	3.69	-	3.69
Area under Vegetables	0.63	-	0.63
Cropping Intensity (%)	121	112	120

Note : Figures in parentheses are standard errors.

IR = Irrigated ; UIR = Unirrigated

orchardists compared to that of onion producers. In this case, the intensity of cropping was worked out at 138 per cent on marginal category of farms, 117 per cent on small farms, 128 per cent on medium farms and 117 per cent on large farms with an average of 120 per cent in general.

Notably, while average size of land holding was significantly higher in case of grape orchardists compared to onion producers, in terms of intensity of cropping the reverse was true and onion producers showed much higher intensity of cropping on their farms than it was noticed on the farms of grape orchardists.

4.4 Cropping Pattern of Sample Producers/Orchardists :

An analysis into area allocation under different crops, particularly under irrigated and unirrigated/rainfed conditions, provides us an indication of the significance of the crops grown under the existing agro-climatic conditions and also farmer's preference for the crop under such conditions. In general, the cropping pattern of irrigated area differs from the cropping pattern of unirrigated area. While on one hand high value commercial crops are usually grown under irrigated conditions, low density subsistence crops, on the other hand,

are grown under rainfed conditions. The cropping pattern of sample onion producers is brought out in Table 4.4(a) and that of grape orchardists in Table 4.4(b).

In case of sample onion producers, the crops other than onion that dominated the cropping pattern of these producers were seen to be hybrid jowar, bajra, groundnut and soyabean in kharif season and wheat and hybrid gram in rabi season. Grapes, sugarcane and lucerne were seen to be grown as perennial crops by these sample onion producers. On an average, of the total cropped area in kharif season, the proportions of area under hybrid jowar, bajra, groundnut, soyabean and onion were seen to be 23 per cent, 44 per cent, 8 per cent, 6 per cent and 18 per cent, respectively. And, the remaining 1 per cent of the total cropped area in kharif season was seen to be accounted for by other crops like tomato, kadwal, udid and moong. In rabi season, 43 per cent of the total cropped area was under wheat, 8 per cent under hybrid gram, 46 per cent under onion and the remaining 3 per cent under jowar and kadwal. As for perennial crops, grapes and sugarcane accounted for 57 per cent and 39 per cent, respectively, of the total cropped area. As a matter of fact, hybrid jowar, bajra, groundnut and soyabean in kharif season and wheat in rabi season were the only crops, other than onion, that were seen to be grown by all the categories of onion producers. Interestingly, in kharif season, all the categories of onion producers showed a very high allocation of area under bajra compared to allocation of area under other field crops. Among various categories of producers, the proportion of area under bajra to total cropped area in kharif season was seen to be 40 per cent for marginal category, 65 per cent for small category, 43 per cent for medium category and 38 per cent for large category. Contrary to this, the proportion of area under onion to total cropped area was seen to be 16 per cent for marginal category, 15 per cent for small category, 15 per cent for medium category and 22 per cent for large category in kharif season and, 59 per cent for marginal category, 58 per cent for small category, 46 per cent for medium category and 39 per cent for large category in rabi season (Tables 4.3(a) and 4.4(a)). Thus, it was only in the case of rabi season that onion crop dominated in the cropping pattern of onion producers, particularly in the case of marginal, small and medium category. In the case of large category, the most dominating crop in rabi season turned out to be wheat rather than onion.

Table 4.4(a) : Cropping Pattern of Sample Onion Producers (1995-96)
(in acres/households)

Crop	Marginal			Small			Medium		
	IR	UIR	Total	IR	UIR	Total	IR	UIR	Total
Kharif									
H.Jowar	0.19	-	0.19	0.23	-	0.23	1.71	0.23	1.94
Bajra	0.43	0.11	0.51	1.33	0.77	2.10	2.13	0.28	2.41
Groundnut	0.18	-	0.18	0.40	0.03	0.43	0.38	-	0.38
Soyabean	0.14	-	0.14	-	-	-	0.02	-	0.02
Onion	0.21	-	0.21	0.48	-	0.48	0.82	-	0.82
Tomato	-	-	-	-	-	-	0.02	-	0.02
Kadwal	-	-	-	-	-	-	-	-	-
Udid	0.02	-	0.02	-	-	-	-	0.02	0.02
Moong	-	-	-	-	-	-	-	0.02	0.02
Rabi									
Wheat	0.41	-	0.41	0.79	-	0.79	1.72	-	1.72
H.Gram	0.02	-	0.02	-	-	-	0.34	-	0.34
Onion	0.62	-	0.62	1.09	-	1.09	1.77	-	1.77
Jowar	-	-	-	-	-	-	-	-	-
Kadwal	-	-	-	-	-	-	0.03	-	0.03
Perennial									
Grape	-	-	-	0.23	-	0.23	0.40	-	0.40
Sugarcane	0.46	-	0.46	0.24	-	0.24	-	-	-
Lucerne	0.01	-	0.01	0.02	-	0.02	-	-	-

Table 4.4(a) : (contd.)

Crop	Large			Overall		
	IR	UIR	Total	IR	UIR	Total
Kharif						
H.Jowar	1.86	0.84	2.70	1.00	0.26	1.26
Bajra	2.50	2.00	4.50	1.60	0.78	2.38
Groundnut	0.52	0.18	0.70	0.37	0.05	0.42
Soyabean	1.02	0.08	1.10	0.28	0.02	0.30
Onion	2.54	-	2.54	1.00	-	1.00
Tomato	0.18	-	0.18	0.05	-	0.05
Kadwal	0.02	-	0.02	0.01	-	0.01
Udid	-	-	-	0.01	-	0.01
Moong	-	-	-	0.01	-	0.01
Rabi						
Wheat	2.07	-	2.07	1.25	-	1.25
H.Gram	0.63	-	0.63	0.24	-	0.24
Onion	1.85	-	1.85	1.34	-	1.34
Jowar	-	0.25	0.25	-	0.06	0.06
Kadwal	-	-	-	0.01	-	0.01
Perennial						
Grape	1.27	-	1.27	0.47	-	0.47
Sugarcane	0.60	-	0.60	0.32	-	0.32
Lucerne	0.10	-	0.10	0.03	-	0.03

Table 4.4(b) : Cropping Pattern of Sample Grape Growers (1995-1996)

Crop	(in acres/orchardists)								
	Marginal			Small			Medium		
	IR	UIR	Total	IR	UIR	Total	IR	UIR	Total
Kharif									
H.Jowar	-	-	-	0.21	0.08	0.29	1.57	0.07	1.64
Bajra	-	-	-	0.39	0.09	0.48	0.67	0.30	0.97
Groundnut	0.75	-	0.75	0.06	0.12	0.18	0.57	0.07	0.64
Soyabean	-	-	-	-	-	-	-	-	-
Onion	-	-	-	0.13	-	0.13	0.01	-	0.01
Tomato	-	-	-	0.06	-	0.06	0.21	-	0.21
Kadwal	-	-	-	0.01	-	0.01	-	-	-
Tur	-	-	-	-	-	-	-	-	-
Kulith	-	-	-	-	-	-	-	-	-
Flower	-	-	-	-	-	-	-	-	-
Cabbage	-	-	-	-	-	-	-	-	-
Brinjal	-	-	-	-	-	-	0.01	-	0.01
Maize	-	-	-	-	-	-	-	-	-
Tag	-	-	-	-	-	-	-	-	-
Rabi									
Wheat	0.75	-	0.75	0.64	0.02	0.66	1.93	0.14	2.07
H.Gram	-	-	-	0.06	-	0.06	0.01	0.02	0.03
Onion	-	-	-	0.01	-	0.01	0.14	-	0.14
Jowar	-	-	-	-	-	-	0.14	-	0.14
Kadwal	-	-	-	-	-	-	0.01	-	0.01
Perennial									
Grape	1.20	-	1.20	2.09	-	2.09	3.53	-	3.53
Sugarcane	-	-	-	0.34	-	0.34	-	-	-
Lucerne	-	-	-	-	-	-	0.10	-	0.10
Pomogranate	-	-	-	-	-	-	-	-	-

Table 4.4(b) : (contd.)

Crop	Large			Overall		
	IR	UIR	Total	IR	UIR	Total
Kharif						
H.Jowar	1.40	0.38	1.78	0.95	0.17	1.12
Bajra	1.10	1.51	2.61	0.66	0.60	1.26
Groundnut	0.64	-	0.64	0.44	0.06	0.50
Soyabean	0.25	-	0.25	0.08	-	0.08
Onion	0.60	-	0.60	0.24	-	0.24
Tomato	0.58	-	0.58	0.26	-	0.26
Kadwal	0.09	-	0.09	0.03	-	0.03
Tur	-	0.06	0.06	-	0.02	0.02
Kulith	-	0.14	0.14	-	0.04	0.04
Flower	0.06	-	0.06	0.02	-	0.02
Cabbage	0.06	-	0.06	0.02	-	0.02
Brinjal	-	-	-	Neg.	-	Neg.
Maize	0.44	-	0.44	0.14	-	0.14
Tag	0.19	-	0.19	0.06	-	0.06
Rabi						
Wheat	3.54	-	3.54	1.94	0.05	1.99
H.Gram	0.13	-	0.13	0.06	Neg.	0.06
Onion	0.06	-	0.06	0.06	-	0.06
Jowar	-	-	-	0.04	-	0.04
Kadwal	-	-	-	Neg.	-	Neg.
Perennial						
Grape	5.58	-	5.58	3.54	-	3.54
Sugarcane	1.94	-	1.94	0.73	-	0.73
Lucerne	0.04	-	0.04	0.04	-	0.04
Pomogranate	0.44	-	0.44	0.14	-	0.14

The cropping pattern of grape orchardists was seen to be slightly different from onion producers. In the case of grape orchardists, certain other field crops like cabbage, brinjal, flower, maize, tur etc., were also seen to be appearing in the list of crops grown in kharif season. All the categories of sample grape orchardists were seen to grow hybrid jowar, bajra, groundnut, onion and tomato in kharif season and wheat, hybrid gram and onion in rabi season with marginal category being the only aberration in this scenario (Table 4.4(b)). In the case of marginal category, groundnut was the only crop grown in kharif season and wheat in rabi season. In kharif season, among various categories of grape growers, bajra was the most dominating crop in the case of small and large category and hybrid jowar in the case of medium category. As for rabi season, wheat crop predominated the cropping pattern of all the categories of grape orchardists. As for perennial crop, only grape was seen to be grown by marginal category of farmers. Small category of farmers were seen to grow both grapes and sugarcane as perennial crops, though proportion of area under grapes was seen to be as high as 86 per cent compared to only 14 per cent area under sugarcane. In the case of medium category, 3 per cent of the total cropped area under perennial crops was seen to be under lucerne and the remaining 97 per cent under grape orchards. As regards large category, sugarcane was seen to be the other important crop grown as perennial crop, apart from grapes. In general, in case of perennial crops, 80 per cent of the total cropped area was seen to be under grape orchards, 16 per cent under sugarcane, 1 per cent under lucerne and the remaining 3 per cent under pomogranate.

4.5 Sources of Irrigation :

Groundwater based irrigation is seen to have dominated over the surface water based irrigation in the study area. The proportion of area under various sources of irrigation to net irrigated area in the case of sample onion producers and grape orchardists is brought out in Table 4.5

It could be noticed from Table 4.5 that in general 90 per cent of the net irrigated area of sample onion producers was under well irrigation, about 5 per cent under canal irrigation and the remaining 5 per cent under other sources of irrigation. The dominance of well irrigation was seen in case of all the categories of sample onion producers. The proportion of well irrigated area to net irrigated area was seen to be the highest for marginal category (94 per cent) followed by large category (91 per cent), medium category

(89 per cent) and small category (84 per cent) . The proportion of canal irrigated area to net irrigated area was seen to be almost the same in case of small and large category of onion producers.

In the case of grape orchardists, 80 per cent of the net irrigated area was seen to be covered under well irrigation and the remaining 20 per cent under canal and other sources of irrigation. It is to be noted here that other sources of irrigation mainly included drip irrigation in case of grape orchardists. Interestingly, the proportion of area under well irrigation to net irrigated area declined with the increase in land holding size of sample orchardists. In dismal contrast to this, proportion of area under canal irrigation to net irrigated area increased with the size of land holding. Marginal category of grape orchardists were seen to follow only well irrigation, whereas other categories of orchardists followed canal, well and other sources of irrigation.

Thus, groundwater irrigation predominated over the surface water irrigation in the case of both sample onion producers and grape orchardists. Nonetheless, the extent of use of groundwater irrigation differed considerably among various categories of sample onion producers and grape orchardists.

Table 4.5 : Proportion of Area Under Various Sources of Irrigation for Sample Onion producers and Grape Orchardists

	Marginal	Small	Medium	Large	Overall
ONION PRODUCERS					
1. Net Irrigated Area (Acres/household)	1.80	2.83	6.14	10.89	5.38
2. Percent Irrigated Area					
Canal	5.56	8.13	-	8.45	5.58
Well	94.44	84.10	89.25	90.63	89.78
Others	-	7.77	10.75	0.92	4.64
GRAPE ORCHARDISTS					
1. Net Irrigated Area (Acres/orchardist)	1.95	3.40	6.96	14.50	7.83
2. Percent Irrigated Area					
Canal	-	4.12	4.31	17.86	12.26
Well	100.00	88.53	86.21	73.52	80.46
Others	-	7.35	9.48	8.62	8.05

4.6 Farm Implements and Machinery :

The information regarding different types of major and minor implements possessed by various categories of sample onion producers and grape orchardists is provided in Table 4.6. In the group of major implements, various items included were Tractor, Leveller, Disc Harrow, Cultivator, Trolley, Sprayer-power hand, Electric Motor,

Diesel Engine, Pumpset, Wheat Thresher, Iron Plough and Wooden Plough. On the other hand, the items included in the group of minor implements were Kudali, Spade, Gainti, Axe, Sickles and Pruning Scissors.

In the case of onion producers, in general each household was seen to possess at least one iron plough and electric motor among major implements and 1-2 numbers of kudali, spade, Gainti, Axe, Seickles and Pruning Scissors among minor implements. Large category of onion producers possessed almost all the items of major and minor implements listed in Table 4.6. On the other hand, marginal category of onion producers possessed the least number of major implements. In general, the number of items under major and minor implements increased with the increase in land holding size of the sample onion producers.

As for the grape orchardists, tractor, trolley, sprayer-power-hand, electric motor and iron plough were the items under major implements that were seen to be possessed by each orchardists in general. Among minor implements, each orchardist was seen to possess 1-4 number of Kudali, Spade, Gainti, Axe, Sickles and Pruning Scissors. Large category of grape orchardist owned all the items listed under major and minor implements. On the other hand, the number of items listed under major and minor implements were the least in the case of marginal category compared to other categories of grape orchardists. As noticed in the case of onion producers, the number of items under major and minor implements increased with the increase in land holding size of sample grape orchardists. In general, the number of items listed under major and minor implements were more in the case of grape orchardists compared to onion producers.

4.7 Livestock Resources :

The number of animals of different species and breeds on the household indicates the economic status of the owner. The different types of animals maintained by sample households/orchardists were classified into various categories such as crossbred cow, local cow, murrh buffalo, local buffalo, bullocks, he-buffalo, young stock, etc. Table 4.7 gives the average number of animal stock in each breed category per household for both onion producers and grape orchardists.

Table 4.6 : Farm Implements and Machinery of Sample Onion Producers and Grape Orchardists

Item	(No./Household)				
	Marginal	ONION PRODUCERS			Overall
		Small	Medium	Large	
1. Major Implements					
a) Tractor	0.08	0.08	0.62	0.92	0.42
b) Leveller	0.08	-	-	0.33	0.08
c) Disc Harrow	0.08	-	-	0.08	0.04
d) Cultivator	0.08	-	0.08	0.50	0.16
e) Trolley	0.08	0.08	0.23	0.67	0.26
f) Sprayer-power-hand	0.08	0.08	0.15	0.42	0.18
g) Electric Motor	1.00	1.00	1.62	2.16	1.44
h) Diesel Engine	-	-	-	0.17	0.04
i) Pumpset	0.08	-	-	-	0.02
j) Wheat Thresher	-	-	-	0.09	0.02
k) Iron Plough	0.92	0.92	1.08	1.17	1.02
l) Wooden Plough	0.58	0.54	0.69	0.67	0.62
2. Minor Implements					
a) Kudali	1.33	2.38	2.00	2.50	2.06
b) Spade	1.50	2.38	1.77	2.67	2.08
c) Gainti	1.08	1.31	1.38	1.25	1.26
d) Axe	0.92	0.69	0.77	1.17	0.88
e) Sickles	1.42	1.08	1.15	2.08	1.42
f) Pruning Scissors	-	0.31	0.92	1.67	0.72
g) Scatier	-	-	-	-	-

Table 4.6 : (Contd.)

Item	GRAPE PRODUCERS				
	Marginal	Small	Medium	Large	Overall
1. Major Implements					
a) Tractor	0.25	0.44	0.57	1.00	0.64
b) Leveller	0.25	0.50	0.29	0.25	0.34
c) Disc Harrow	0.25	0.50	0.14	0.25	0.30
d) Cultivator	0.25	0.31	0.36	0.75	0.46
e) Trolley	0.25	0.38	0.79	1.06	0.70
f) Sprayer-power-hand	0.50	0.69	0.79	0.75	0.72
g) Electric Motor	1.25	1.06	1.00	1.50	1.20
h) Diesel Engine	0.25	0.13	0.43	0.25	0.26
i) Pumpset	-	-	-	0.19	0.06
j) Wheat Thresher	-	-	-	0.19	0.06
k) Iron Plough	0.50	0.81	0.93	1.19	0.94
l) Wooden Plough	0.25	0.50	0.57	0.38	0.46
2. Minor Implements					
a) Kudali	2.50	2.31	2.14	2.69	2.40
b) Spade	1.75	1.88	1.93	2.38	2.04
c) Gainti	0.50	0.94	1.00	1.25	1.02
d) Axe	0.50	0.88	1.14	1.31	1.06
e) Sickles	1.00	1.38	1.57	3.00	1.92
f) Pruning Scissors	4.00	2.75	3.93	4.06	3.60
g) Scatier	0.50	0.25	-	-	0.12

Table 4.7 : Livestock Resources of Sample Onion Producers and Grape Orchardists
(No./ Household)

Type of Livestock	ONION PRODUCERS				Overall
	Marginal	Small	Medium	Large	
1. Cows					
a) Crossbred	0.67	1.00	1.77	0.58	1.02
- in milk	0.42	0.62	0.85	0.25	0.54
- dry	0.25	0.38	0.92	0.33	0.48
b) Indigeneous	1.08	1.08	-	0.92	0.76
- in milk	0.50	0.54	-	0.42	0.36
- dry	0.58	0.54	-	0.50	0.40
2. Buffaloes					
a) Murrah	0.67	0.67	1.62	1.54	1.11
- in milk	0.25	0.31	0.77	0.92	0.56
- dry	0.42	0.31	0.85	0.62	0.55
b) Local	-	0.54	-	0.50	0.26
- in milk	-	0.23	-	0.25	0.12
- dry	-	0.31	-	0.25	0.14
3. Bullock	0.83	0.46	0.62	0.67	0.64
4. He-Buffaloes	0.50	0.38	0.77	0.42	0.52
5. Young Stock	1.08	1.15	1.23	1.00	1.12
6. Sheep/Goat	0.33	-	-	-	0.08
Total Livestock	5.16	5.23	6.01	5.63	5.51
Standard Animal Units@ (SAU)	4.48	4.95	5.96	5.57	5.27

Table 4.7 : (Contd.)

Type of Livestock	GRAPE ORCHARDISTS				Overall
	Marginal	Small	Medium	Large	
1. Cows					
a) Crossbred	0.75	0.69	-	1.19	0.66
- in milk	0.50	0.31	-	0.56	0.32
- dry	0.25	0.38	-	0.63	0.34
b) Indigeneous	-	0.44	-	0.38	0.26
- in milk	-	0.19	-	0.19	0.12
- dry	-	0.25	-	0.19	0.14
2. Buffaloes					
a) Murrah	-	0.88	1.65	0.70	0.97
- in milk	-	0.38	0.79	0.32	0.45
- dry	-	0.50	0.86	0.38	0.52
b) Local	1.00	-	0.86	-	0.32
- in milk	0.50	-	0.36	-	0.14
- dry	0.50	-	0.50	-	0.18
3. Bullock	0.75	0.63	0.57	0.62	0.62
4. He-Buffaloes	0.50	0.63	0.57	0.69	0.62
5. Young Stock	1.00	1.06	0.71	1.06	0.96
6. Sheep/Goat	-	-	-	-	-
Total Livestock	4.00	4.33	4.36	4.64	4.41
Standard Animal Units@ (SAU)	3.85	4.03	4.46	4.37	4.24

Note : @ For details see : Kumbhare, S.L., K.N.S.Sharma and R.K.Patel (1983).
"Standardization of Bovine Units", Indian Journal of Animal Sciences,
Vol. 53, pp.547.

The sample onion producers were seen to maintain 4-6 animals in standard animal units. Medium category of onion producers maintained the maximum number of animals followed by large, small and marginal category. In general, of the total number of

livestock possessed by each sample onion producer, milch cows accounted for 32 per cent, milch buffaloes 25 per cent, bullocks 12 per cent, he-buffaloes 9 per cent and young stock 20 per cent.

The sample grape orchardists possessed less number of animals compared to sample onion producers. On an average, the grape orchardists possessed around 4 animals in standard animal unit. The total number of livestock possessed by grape orchardists was seen to increase with the increase in land holding size of orchardists. However, in standard animal units, medium category of orchardists possessed the maximum number of animals followed by large, small and marginal category. In general, of the total number of livestock possessed by each sample orchardist, milch cows accounted for 21 per cent, milch buffaloes 29 per cent, bullock 14 per cent, he-buffaloes another 14 per cent, and the remaining 22 per cent owed it to young stock.

Thus, the foregoing analysis presented us with wide differences in resource position of various categories of onion producers and grape orchardists. While grape orchardists possessed more number of major and minor implements and turned out to be more strong in terms of land resources, onion producers, on the other hand, were seen to possess more livestock resources. Further, despite no significant difference in soil type and agro-climatic conditions, the cropping pattern of different categories of sample onion producers and grape orchardists differed significantly. Nevertheless, strict comparison of resources of onion producers and grape orchardists is not feasible as the establishment of grape orchards require much higher investment compared to investment on field crops like onion.

Chapter V

Economics of Onion and Grape Production

Having discussed and evaluated in brief the underlying growth trends and instabilities in various parameters encompassing principal horticultural crops grown in the state of Maharashtra in chapter III and the socio-economic characteristics of onion producers and grape orchardists in chapter IV, let us now examine the cost structure and return in raising the selected horticultural crops in this state. An attempt, therefore, has been made in this chapter to estimate various components of cost, both operational and marketing, and also returns with a view to assess the magnitude of income generation for various categories of onion producers and grape orchardists.

5.1 Cost of Onion Production

It has been widely argued that in the typical rural setting, maximization of net return is the ultimate goal of the producer which largely depends on the cost structure to be followed by such enterprising household. However, maximization of profit requires a balance between the increase in the production and various components of costs. In fact, it is the structure of cost and returns that is most crucial not only for the producers but also for the consumers and policy makers since these two key elements provide an effective linkage between the producers and consumers for rational fixation of prices of the produce. It is, therefore, essential to evaluate various components of costs involved in raising onion crop in the state of Maharashtra.

As a matter of fact, the state of Maharashtra is also called the onion basket of India. In this State, the bulk of the onions produced comes from Nasik district alone. Generally, the market arrival of onion is classified into three categories based on variety and period of arrival. During the period from September to December, kharif onion arrives in the market. The variety of onion arrived during this period is called 'pole' (red onion). The second variety (late kharif crop) of onions arrived in the market in the month of January and is termed as 'Rangda'. The third variety (rabi crop) of onion arrives in the market during the period from February to April. This arrival of onion is called 'Unhal'. However, in broad terms, the onion crop is grown in this state only during two seasons namely, kharif and rabi. The economics of onion production, both in kharif and rabi seasons, is evaluated in

this study

5.1.1 Operational and Marketing Cost of Onion in Kharif Season

Most of the farmers are generally seen to be unorganized who have neither the knowledge nor the appreciation of the concept of production costs which might help them to assess the viability of any crop production activity undertaken by them. These producers are totally unaware of the quantitative aspects of the operations or the dimensions of production economics. However, an enlightened farmer may like to know whether he is getting the type of returns from the crop activity as can best be expected. Generally, such a farmer wants his investment on any crop activity to be a worthwhile exercise and, hence, is more concerned about the kinds of return that such investment may fetch him. As the cost of production varies under different conditions, a close analysis and scrutiny of some of the influencing factors becomes an imperative need. The estimates of various items of costs, both operational and marketing, in the production of onion crop, particularly in kharif season, are delineated in Tables 5.1(a), 5.1(b), 5.1(c), 5.1(d) and 5.1(e), separately for each category of onion producers.

A break-up of per acre expenditure on various items of costs in the case of marginal category of onion producers is presented in Table 5.1(a). The per acre gross operational cost of onion production, which included cultivation as well as marketing expenses, was worked out at Rs 8138 for marginal category of onion producers. Of the gross cost of production, the major expenditure was seen to be on human labour absorption in various cultivation and marketing operations. Labour cost alone accounted for 44 per cent of the gross operational cost of onion production. However, hired labour expenditure was seen to be much higher than imputed family labour expenditure. Of the gross cost of production, about 22 per cent expenditure was seen to be on material inputs such as seed, manure, fertilizer and plant protection measures, 17 per cent on family labour, 27 per cent on hired labour, 4 per cent on bullock labour, both owned and hired, 5 per cent on machinery such as tractor hiring charges, and the remaining 24 per cent expenditure was incurred in meeting various marketing expenses such as freight for transport, commission and fee, etc. The magnitude of human labour absorption was seen to be quite high in case of certain operations such as sowing, interculture, irrigation, harvesting and grading of the

produce. Regarding proportions of expenditure on various operations to gross operational cost of production, it was noticed that about 7 per cent expenditure was incurred on ploughing, 12 per cent on sowing, 11 per cent on manuring, 7 per cent each on fertilizing and interculture operations, 3 per cent on mulching, 5 per cent on irrigation, 6 per cent on plant protection measures, 8 per cent on harvesting operations, 5 per cent on grading of the produce, nearly 2 per cent each on packing and loading/unloading operations, 14 per cent on freight for transport and commission and fees, 7 per cent as irrigation charges and the remaining 3 per cent on various other marketing operations. Thus, wide differences were seen in terms of expenditure on various items of cost.

The per acre gross operational cost of onion production turned out to be much lower in case of small category of onion producers compared to marginal category of producers and stood at only Rs. 7259 (Table 5.1(b)). The imputed family labour expenditure also turned out to be lower in the case of small category compared to marginal category. In the case of small category too, human labour cost accounted for the maximum share in gross operational cost of onion production, followed by expenditure on material inputs. The share of tractor hiring charges in gross operational cost of onion production was seen to be the least. Of the gross operational cost of onion production, the small category of onion producers were seen to incur 43 per cent expenditure on human labour alone, 27 per cent on different types of inputs, 15 per cent on marketing operations, 6 per cent on bullock labour, 5 per cent in the form of irrigation charges and 4 per cent as tractor hiring charges. It is noteworthy to mention here that small category of onion producers incurred about 76 per cent expenditure of the gross operational cost of onion production on various cultivation operations and the remaining 24 per cent on various marketing functions (Table 5.1(b)). As regards various cultivation operations, the proportion of expenditure to gross operational cost of onion production was seen to be maximum in the case of certain operations such as sowing, manuring and fertilizing (about 13 per cent each), followed by ploughing, interculture and harvesting (about 7 per cent each), irrigation (5 per cent), plant protection measures (4 per cent) and mulching (2 per cent). Thus among various cultivation operations, the major expenditure was seen to be incurred on sowing, manuring, fertilizing and harvesting operations.

The per acre gross operational cost of onion production in the case of medium category of onion producers was estimated at Rs. 8256 which turned out to be not only substantially higher than small category but also slightly higher than marginal category (Table 5.1(c)). In this case, human labour cost accounted for about 38 per cent of the gross operational cost of onion production. The expenditure on material inputs was seen to be about 24 per cent of the gross operational cost of onion production. Marketing cost, particularly in respect of freight for transport, commission and fees and other expenses, acquired the third place in terms of its share in gross operational cost. In general, it was seen that various cultivational operations put together accounted for 70 per cent expenditure of the gross operational cost and the remaining 30 per cent expenditure was incurred in respect of meeting various marketing operations. As for various cultivation operations, the expenditure on fertilizing was seen to be the highest, followed by expenditure on sowing, manuring and harvesting. On the other hand, the freight for transport and commission and fees alone accounted for the bulk of marketing expenses incurred by the medium category of onion producers.

As for the large category of onion producers, the per acre gross operational cost of onion production was estimated at Rs. 7324 which turned out to be slightly higher than the per acre gross operational cost of small category but much lower than the per acre gross operational cost of both marginal and medium category (Table 5.1(d)). Like other categories of onion producers, large category also showed their maximum expenditure on human labour employment in various cultivation and marketing operations. In the case of large category, of the gross cost of onion production, about 27 per cent expenditure was

Table 5.1(a) : Operational and Marketing Cost of Onion in Kharif Season for Marginal Category

(In Rupees/Acre)

	Human Labour Cost				Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost		
	Family		Hired								
	M	F	M	F							
Plooughing	24.00	-	24.00	108.00	80.00	388.00	-	600.00	(7.37)		
Sowing	44.00	60.00	104.00	204.00	80.00	-	480.00	1013.00	(12.45)		
Manuring	48.00	20.00	68.00	72.00	200.00	12.00	500.00	892.00	(10.96)		
Fertilizing	64.00	60.00	124.00	16.00	-	-	447.20	599.20	(7.36)		
Interculture	-	190.00	190.00	-	-	-	-	540.00	(6.64)		
Mulching	36.00	50.00	86.00	48.00	-	-	-	214.00	(2.63)		
Irrigation	159.20	-	159.20	262.40	-	-	-	421.60	(5.18)		
PP	32.00	-	32.00	32.00	-	-	402.40	466.40	(5.73)		
Measures	-	-	-	-	-	-	-	-	-		
Harvesting	192.00	170.00	362.00	204.00	-	-	-	691.20	(8.49)		
Grading	80.00	96.00	176.00	80.00	-	-	-	416.00	(5.11)		
Packing	40.00	-	40.00	60.00	-	-	-	132.00	(1.62)		
Loading / Unloading	20.00	-	20.00	140.00	-	-	-	160.00	(1.97)		
Freight for Transport	-	-	-	-	-	-	-	544.00	(6.69)		
Commission and Fee	-	-	-	-	-	-	-	593.20	(7.29)		
Irrigation	-	-	-	-	-	-	-	604.00	(7.42)		
Charges	-	-	-	-	-	-	-	251.60	(3.09)		
Other Cost	739.20	646.00	1385.20	1226.40	944.20	2170.60	360.00	400.00	1829.60	1992.80	8138.20
Total Cost			(17.02)		(26.67)	(4.42)	(4.92)	(22.48)	(24.49)		

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

Table 5.1(b) : Operational and Marketing Cost of Onion in Kharif Season for small Category

(in Rupees/Acre)

Operations	Human Labour Cost				Bulllock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost
	Family		Hired						
	M	F	M	F					
Ploughing	43.84	-	43.84	82.19	82.19	262.33	-	470.55	(6.48)
Sowing	65.75	23.29	89.04	49.32	68.49	-	-	900.68	(12.41)
Manuring	36.99	44.52	81.51	41.10	191.78	20.55	-	945.22	(13.02)
Fertilizing	24.66	30.82	55.48	24.66	58.22	-	684.93	932.88	(12.85)
Interculture	-	91.78	91.78	-	471.23	-	-	563.01	(7.76)
Mulching	32.88	23.97	56.85	73.97	23.97	-	-	154.79	(2.13)
Irrigation	131.51	-	131.51	208.22	208.22	-	-	339.73	(4.68)
PP	21.92	-	21.92	21.92	21.92	-	-	290.14	(4.00)
Measures	-	-	-	-	-	-	-	-	-
Harvesting	139.73	-	139.73	193.15	207.53	-	-	540.41	(7.44)
Grading	54.79	121.92	176.71	82.19	131.51	-	-	390.41	(5.38)
Packing	27.40	10.96	38.36	89.04	10.96	-	-	138.36	(1.91)
Loading / Unloading	20.55	-	20.55	116.44	-	-	-	136.99	(1.89)
Freight for Transport	-	-	-	-	-	-	-	448.08	(6.17)
Commission and Fee	-	-	-	-	-	-	-	479.86	(6.61)
Irrigation	-	-	-	-	-	-	-	368.49	(5.08)
Charges	-	-	-	-	-	-	-	158.90	(2.19)
Other Cost	-	-	-	-	-	-	-	1455.33	(20.05)
Total Cost	600.02	347.26	947.28	982.20	1203.42	282.88	1935.34	7258.50	
			(13.05)			(3.90)	(26.66)		

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

Table 5.1(c) : Operational and Marketing Cost of Onion in Kharif Season for Medium Category

(in Rupees/Acre)

Operations	Human Labour Cost				Bullhook Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost		
	Family		Hired								
	M	F	T	M							F
Ploughing	41.91	7.35	49.26	41.91	11.03	52.94	117.65	274.26	-	494.11	(5.98)
Sowing	50.74	37.87	88.61	59.56	218.01	277.57	102.94	-	402.94	872.06	(10.56)
Manning	18.38	32.35	50.73	74.71	25.00	99.71	161.76	16.54	482.35	811.09	(9.82)
Fertilizing	46.32	18.38	64.70	26.47	42.28	68.75	66.18	-	908.82	1108.45	(13.43)
Interculture	-	118.75	118.75	-	516.91	516.91	-	-	-	635.66	(7.70)
Mulching	14.71	26.47	41.18	11.03	69.85	80.88	-	-	-	122.06	(1.48)
Irrigation	123.53	4.41	127.94	208.82	-	208.82	-	-	-	336.76	(4.08)
PP	14.34	-	14.34	21.32	-	21.32	-	-	21.31	248.97	(3.02)
Measures											
Harvesting	72.79	70.96	143.75	114.71	425.74	540.45	-	-	-	684.20	(8.29)
Grading	129.41	57.35	186.76	66.18	117.65	183.83	-	-	-	370.59	(4.49)
Packing	22.06	2.94	25.00	88.82	14.71	103.53	-	-	-	128.53	(1.55)
Loading / Unloading	-	-	-	132.85	-	132.85	-	-	-	132.85	(1.61)
Freight for Transport	-	-	-	-	-	-	-	-	-	770.00	(9.33)
Commission and Fee	-	-	-	-	-	-	-	-	-	746.62	(9.04)
Irrigation Charges	-	-	-	-	-	-	-	-	-	421.47	(5.10)
Other Cost	-	-	-	-	-	-	-	-	-	373.01	(4.52)
Total Cost	534.19	376.83	911.02	846.38	1441.18	2287.56	448.53	290.80	2007.42	2311.10	(28.00)
			(11.03)			(27.71)	(5.43)	(3.52)	(24.31)		

Note : Figures in parenthesis are percentages to the total cost

Table 5.1(d) : Operational and Marketing Cost of Onion in Kharif Season for Large Category Operations (in Rupees/Acre)

	Human Labour Cost				Bullhook Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost			
	Family		Hired									
	M	F	M	F								
Ploughing	15.74	8.20	23.94	40.82	21.31	62.13	59.02	289.34	-	434.43	(5.93)	
Sowing	42.30	6.56	48.86	39.34	196.33	235.67	59.02	-	341.31	-	684.86	(9.35)
Manuring	10.49	29.18	39.67	19.67	26.56	46.23	62.30	29.51	310.66	-	488.37	(6.67)
Fertilizing	24.10	26.56	50.66	32.72	37.38	70.10	42.62	-	1133.34	-	1296.72	(17.70)
Interculture	2.95	72.95	75.90	27.54	509.84	537.38	-	-	-	-	613.28	(8.37)
Mulching	12.30	14.75	27.05	30.33	18.36	48.69	-	-	-	-	75.74	(1.03)
Irrigation	89.51	-	89.51	174.43	-	174.43	-	-	205.84	-	263.94	(3.60)
PP	11.80	-	11.80	7.87	-	7.87	-	3.28	-	-	228.79	(3.12)
Measures	-	-	-	-	-	-	-	-	-	-	-	-
Harvesting	58.52	118.85	177.37	70.00	362.13	432.13	-	-	-	-	609.50	(8.32)
Grading	98.36	91.80	190.16	52.46	55.74	108.20	-	-	-	-	298.36	(4.08)
Packing	27.05	27.05	54.10	42.62	23.61	66.23	-	-	-	-	120.33	(1.65)
Loading / Unloading	-	-	-	137.52	-	137.52	-	-	-	-	137.52	(1.88)
Freight for Transport	-	-	-	-	-	-	-	-	-	-	669.84	(9.15)
Commission	-	-	-	-	-	-	-	-	-	-	639.80	(8.74)
and Fee	-	-	-	-	-	-	-	-	-	-	639.80	(8.74)
Irrigation	-	-	-	-	-	-	-	-	-	-	469.70	(6.41)
Charges	-	-	-	-	-	-	-	-	-	-	469.70	(6.41)
Other Cost	-	-	-	-	-	-	-	-	-	-	293.11	(4.00)
Total Cost	393.12	395.90	789.02 (10.77)	637.32	1251.26	1926.58 (26.30)	222.96 (3.04)	322.13 (4.40)	1991.15 (27.19)	2072.45 (28.30)	7324.29	

Note : Figures in parentheses are percentages to total cost

Table 5.1(e) - Overall Operational and Marketing Cost of Onion in Kharif Season

(in Rupees/Acre)

Operations	Human Labour Cost						Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost	
	Family		Hired		M	T						
	M	F	M	F								
Ploughing	26.53	6.49	33.02	49.81	12.99	62.80	77.92	286.46	-	-	460.20	(6.14)
Sowing	47.68	19.20	66.88	53.43	208.83	262.26	72.36	-	375.05	-	776.55	(10.36)
Manning	17.81	31.63	49.44	23.75	27.83	51.58	111.32	24.21	348.61	-	585.16	(7.81)
Fertilizing	31.63	26.62	58.25	29.28	40.26	69.54	55.66	-	1034.60	-	1218.05	(16.25)
Interculture	1.67	92.49	94.16	15.58	498.98	514.56	-	-	-	-	608.72	(8.12)
Mulching	16.79	20.59	37.38	32.19	34.97	67.16	-	-	-	-	104.54	(1.39)
Irrigation	107.01	1.11	108.12	154.66	-	154.66	-	-	-	-	262.78	(3.51)
pp	14.75	-	14.75	10.58	-	10.58	-	1.86	222.32	-	249.51	(3.33)
Measures												
Harvesting	79.31	92.02	171.33	104.17	317.31	421.48	-	-	-	-	592.81	(7.91)
Grading	99.44	87.38	186.82	61.23	86.46	147.69	-	-	-	-	334.51	(4.46)
Packing	26.44	12.51	38.95	61.37	20.04	81.41	-	-	-	-	120.36	(1.60)
Loading / Unloading	3.71	-	3.71	133.60	-	133.60	-	-	-	-	137.31	(1.83)
Freight for Transport	-	-	-	-	-	-	-	-	-	-	659.24	(8.80)
Commission and Fee	-	-	-	-	-	-	-	-	-	-	642.93	(8.58)
Irrigation Charges	-	-	-	-	-	-	-	-	-	-	449.66	(6.00)
Other Cost	-	-	-	-	-	-	-	-	-	-	293.17	(3.91)
Total Cost	472.77	390.04	862.81	729.65	1247.67	1977.32	317.26	312.53	1980.58	2045.00	7495.50	
			(11.51)			(26.38)	(4.23)	(4.17)	(26.43)	(27.28)		

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

seen to be on various kinds of inputs, 11 per cent on family labour, 26 per cent on hired labour, 3 per cent on bullock labour, 4 per cent on machinery such as tractor hiring charges, about 6 per cent on irrigation and the remaining 23 per cent on various marketing functions. The large category of onion producers were seen to spend a substantial amount of money on various types of fertilizers. This is evident from the fact that about 15 per cent expenditure of the gross operational cost of onion production was on fertilizer alone. In fact, the amount spent on fertilizer together with labour charges for fertilizer application accounted for 17.7 per cent of the gross operational cost of onion production. As for other cultivation operations, ploughing, sowing, manuring, fertilizing, interculture and harvesting were the operations that fetched the large category of onion producers an expenditure in the range of 6 to 9 per cent of the gross operational cost of onion production. On the other hand, in the case of marketing operations, 4 per cent expenditure of the gross operational cost of production was seen to be on grading, nearly 2 per cent each on packing and loading/unloading, 9 per cent each on freight for transport and commission and fees and 4 per cent on other marketing operations.

An interesting feature that emerged out from the close scrutiny of results presented in tables 5.1(a), 5.1(b), 5.1(c) and 5.1(d) was that the proportion of expenditure on family labour to gross operational cost of onion production declined steadily with the increase in land holding size of the onion producers; the decline in the proportion being from 17 per cent in the case of marginal category to 11 per cent for large category. On the other hand, the proportion of expenditure on hired labour to gross cost of onion production remained by and large constant and hovered at around 27 per cent for various categories of onion producers with medium category being the only aberration in this scenario which showed 30 per cent expenditure of the gross operational cost on hired labour. The expenditure on material inputs, particularly in the case of fertilizers, also increased with the increase in size of land holding, both in absolute terms and in terms of their share in gross operational cost of production. The cultivation expenses accounted for about 75 per cent of the gross operational cost of onion production in the case of marginal and small category and about 70 per cent in the case of medium and large categories. Thus, the proportion of cultivation expenses to gross operational cost of production also declined with the land holding size of

the producers. In other words, the proportion of marketing expenses to gross operational cost of production increased with the increase in the size of land holding of the sample producers.

In general the per acre gross operational cost of onion production in kharif season was estimated at Rs. 7495, of which imputed value of family labour accounted for 12 per cent, hired labour expenditure accounted for 26 per cent, expenditure on various types of inputs accounted for 26 per cent, bullock labour expenditure accounted for 4 per cent, machine labour another 4 per cent, irrigation charges accounted for 6 per cent and the remaining 21 per cent owed it to expenditure on various marketing functions (Table 5.1(e)). Further, an average category of onion producer was seen to spend about 6 per cent of the gross operational cost of onion production on ploughing operation, 10 per cent on sowing, 8 per cent on manuring, 16 per cent on fertilizing, 8 per cent on interculture operations, 1 per cent on mulching, 10 per cent on irrigation and maintenance, 3 per cent on plant protection measures and 8 per cent on harvesting operations with a total of 70 per cent on all cultivation operations; the remaining 30 per cent expenditure of the gross operational cost of onion production was seen to be incurred on various marketing functions which also included family as well as hired labour expenses in various marketing operations.

5.1.2 Operational and Marketing Cost of Onion in Rabi Season

The sample onion producers, in general, were seen to make more investment on various cultivation and marketing operations in rabi season compared to kharif season. The estimates of various items of costs, both cultivation and marketing, in the production of onion crop, particularly in rabi season, are brought out separately for each category of onion producers in Tables 5.2(a), 5.2(b), 5.2(c), 5.2(d) and 5.2(e).

In the case of marginal category of onion producers, the per acre gross operational cost of onion production in rabi season was estimated at Rs 9087 (Table 5.2(a)). In rabi season too, the human labour expenditure turned out to be very high and stood at about 40 per cent of the gross operational cost of production. The next major expenditure was seen to be on various kinds of inputs which accounted for about 28 per cent of the gross operational cost of production. The expenditure on various marketing operations turned out to be the third major component of cost which accounted for about 17 per cent of the gross

operational cost of onion production in rabi season. The remaining 15 per cent expenditure of the gross operational cost of production owed it to bullock labour cost (6 per cent), tractor hiring charges (4 per cent) and irrigation charges (5 per cent). As for various cultivation operations, the major expenditure was seen to be on fertilizing operation (about 15 per cent of the gross operational cost of production) followed by sowing (14 per cent), interculture operation (9 per cent), manuring and irrigation and maintenance (about 8 per cent each), ploughing and harvesting (about 7 per cent each), plant protection measures (4 per cent) and mulching (about 3 per cent). Thus, about 75 per cent expenditure of the gross operational cost of production was on various cultivation operations and the remaining 25 per cent was on various marketing functions in the case of marginal category of onion producers. The per acre gross operational cost of onion production was seen to be much higher in rabi season compared to kharif season. An increase in expenditure to the tune of nearly 12 per cent was seen in rabi season over that of kharif season in the case of marginal category of onion producers.

In rabi season, the per acre gross operational cost of onion production was worked out at Rs 7888 for small category of producers which turned out to be much lower than the per acre gross operational cost estimated for marginal category (Table 5.2(b)). In fact, about 13 per cent drop in per acre gross operational cost was seen in the case of small category over that of marginal category. In the case of small category too, family and hired labour cost together accounted for about 39 per cent of the gross operational cost of production. The expenditure on various kinds of inputs such as seed, manure, fertilizer and plant protection measures was seen to be very high in this case and stood at 32 per cent of the gross cost of onion production. The share of marketing expenditure in gross operational cost of onion production was seen to be about 15 per cent. The bullock labour cost as proportion of gross operational cost was estimated at 5 per cent in the case of small category of producers. The tractor hiring charges and irrigation charges together accounted for the remaining 9 per cent of the gross operational cost of onion production. It is to be noted here that among various cultivation operations, the expenditure on fertilizing operation was so high that it alone accounted for about 20 per cent of the gross operational cost of production. The next major expenditure was seen to be on sowing operation which

accounted for 15 per cent of the gross operational cost of production. The expenditure on other cultivation operations was seen to be in the range of 3 to 8 per cent of the gross operational cost of production. The small category of onion producer's total expenditure (per acre gross operational cost) increased by 9 per cent in rabi season over that of its expenditure in kharif season.

A break-up of per acre expenditure on various items of cost, both cultivation and marketing, in the case of medium category of onion producers is brought out in Table 5.2(c). In this case, the per acre gross operational cost of onion production was estimated at Rs. 8523 which turned out to be lower than the per acre gross operational cost of marginal category but much higher than that of small category. In the case of medium category, the maximum expenditure was seen to be incurred on material inputs, followed by expenditure on human labour employment in various operations and expenditure on various marketing functions. The input cost alone accounted for more than 35 per cent of the gross operational cost of production. The input cost turned out to be very high mainly because of very high expenditure on fertilizer. The expenditure on fertilizer in this case was so high that it alone accounted for 21 per cent of the gross operational cost of production. However, if labour cost in fertilizer application is also taken into account then fertilizing operation is seen to account for about 24 per cent of the gross operational cost of production. Human labour cost, both family and hired, in this case accounted for about 34 per cent of the gross operational cost of production. Some of the cultivation operations were seen to be too labour intensive such as sowing, irrigation, interculture and harvesting operations. These operations together accounted for the maximum share in total human labour cost. Even some of the marketing operations such as grading, packing and loading/unloading were seen to be too labour intensive. Among various marketing operations, the magnitude of human labour absorption was seen to be quite high in the case of grading operation. In the case of medium category of onion producers, an increase in total expenditure (gross operational cost of production) to the tune of 3 per cent was seen in rabi season over that of in kharif season.

The large category of onion producers showed the highest per acre gross operational cost of onion production compared to other categories. In this case, the per acre

gross operational cost of onion production in rabi season was estimated at Rs 9249 which was 17 per cent higher than the expenditure of small category and 9 per cent higher than the expenditure of medium category (Table 5.2(d)). As a matter of fact, large category's total expenditure on rabi crop was seen to increase by 26 per cent over that of its total expenditure on kharif crop. In the case of large category of onion producers, the expenditure on various cultivation operations turned out to be about 70 per cent of the gross operational cost of production. The remaining 30 per cent expenditure of the gross operational cost of production was seen to be on various marketing functions. Among various cultivation operations, about 20 per cent expenditure of the gross operational cost of production was seen to be on fertilizing operation alone. Sowing was the other important operation among various cultivation operations which accounted for about 13 per cent of the gross operational cost of production. The expenditure on other cultivation operations as proportion of gross operational cost of production was seen to be in the range of 2 to 6 per cent. Input cost, in general, accounted for 29 per cent of the gross operational cost of production in the case of large category of producers. The share of human labour cost in gross operational cost of onion production was seen to be 34 per cent. Vary high labour cost was seen to be involved in the case of certain cultivation and marketing operations such as sowing, fertilizing, interculture, irrigation, harvesting and grading of the produce. Of the total human labour cost, the maximum labour cost was seen to be involved in interculture operation (19 per cent), followed by harvesting (17 per cent), sowing (16 per cent), irrigating (11 per cent), grading (10 per cent) and fertilizing (5 per cent).

A noteworthy feature that emerged through examination of results presented in Tables 5.2(a), 5.2(b), 5.2(c) and 5.2(d) was the continuous decline in family labour cost (as proportion of per acre gross operational cost of production) with the increase in land holding size of producers; the decline in proportion of family labour cost was seen to be from 15 per cent in the case of marginal category to the low of 9 per cent in the case of large category. The proportion of hired labour cost in gross operational cost of production was seen to be around 25 per cent in the case of marginal, medium and large category and 28 per cent in the case of small category. The per acre gross operational cost of onion

production turned out to be the highest in the case of large category followed by marginal, medium and small category in that order. Although the per acre gross operational cost of onion production was the highest in the case of large category, in terms of expenditure on various kinds of material inputs it was seen to be much higher for medium category compared to large and other categories of onion producers. The expenditure on material inputs was the least in the case of marginal category compared to other categories. Further, it is interesting to note that while per acre expenditure on fertilizer increased from Rs. 1032 in the case of marginal category to as high as Rs. 1808 in the case of medium category, a decline in expenditure on manure, on the other hand, was also seen with the increase in land holding size of producers; the per acre expenditure on manure declined from Rs. 397 in the case of marginal category to Rs. 205 in the case of large category. Thus, the decline in expenditure on manure with the increase in land holding size of producers was more than compensated by increase in expenditure on various kinds of fertilizers. Another interesting feature was the increase in marketing expenditure with the increase in land holding size of producers. The marketing expenditure increased from 17 per cent of the gross operational cost of production in the case of marginal category to 24 per cent in the case of large category. In other words, there was a decline in cultivation expenses (as proportion of per acre gross operational cost of production) with the increase in size of land holding of the sample onion producers in rabi season. The general or average trend showed an investment

Operations	Table 5.2(a) : Operational and Marketing Cost of Onion in Rabi Season for Marginal Category										(in Rupees/Acre)	
	Human Labour Cost					Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost		
	Family		Hired									
	M	F	T	M	F	T						
Ploughing	55.00	-	55.00	75.00	9.38	84.38	156.25	375.00	-	670.63	(7.38)	
Sowing	48.44	51.56	100.00	98.44	300.47	398.91	46.88	-	756.72	1302.51	(14.33)	
Manuring	23.44	50.78	74.22	46.88	46.88	93.76	203.13	-	396.88	767.99	(8.45)	
Fertilizing	60.00	70.31	130.31	40.00	42.19	82.19	109.38	-	1031.72	1353.60	(14.90)	
Interculture	9.38	239.84	249.22	-	531.41	531.41	-	-	-	780.63	(8.59)	
Mulching	68.75	65.63	134.38	90.63	21.88	112.51	-	-	-	246.89	(2.72)	
Irrigation	262.50	-	262.50	32.81	-	32.81	-	-	-	295.31	(3.25)	
pp	32.81	-	32.81	14.06	-	14.06	-	-	328.13	375.00	(4.13)	
Measures												
Harvesting	135.94	21.09	157.03	107.81	354.69	462.50	-	-	-	619.53	(6.82)	
Grading	54.69	64.06	118.75	109.38	137.50	246.88	-	-	-	365.63	(4.02)	
Packing	31.25	12.50	43.75	113.28	-	113.28	-	-	-	157.03	(1.73)	
Loading /	18.75	-	18.75	164.06	-	164.06	-	-	-	182.81	(2.01)	
Unloading	-	-	-	-	-	-	-	-	-	661.88	(7.28)	
Freight for	-	-	-	-	-	-	-	-	-	679.69	(7.48)	
Transport	-	-	-	-	-	-	-	-	-	679.69	(7.48)	
Commission	-	-	-	-	-	-	-	-	-	456.25	(5.02)	
and Fee	-	-	-	-	-	-	-	-	-	456.25	(5.02)	
Irrigation	-	-	-	-	-	-	-	-	-	172.03	(1.89)	
Charges	-	-	-	-	-	-	-	-	-	172.03	(1.89)	
Other Cost	-	-	-	-	-	-	-	-	-	1969.85	(21.68)	
Total Cost	800.95	575.77	1376.72 (15.15)	892.35	1444.40	2336.75 (25.71)	515.64 (5.67)	375.00 (4.13)	2513.45 (27.66)	9087.41		

Note : Figures in parentheses are percentages to total cost.

Table 5.2(b) : Operational and Marketing Cost of Onion in Rabi Season for Small Category

(in Rupees/Acre)

Operations	Human Labour Cost				Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost
	Family		Hired						
	M	F	M	F					
Ploughing	31.55	-	31.55	-	96.13	323.94	-	592.47	(7.51)
Sowing	9.15	78.52	87.67	80.28	140.85	-	-	1145.07	(14.52)
Manning	30.63	24.65	55.28	66.90	49.30	22.54	698.59	145.07	(14.52)
Fertilizing	48.45	29.58	78.03	50.70	126.76	-	280.28	558.10	(7.08)
Interculture	-	132.39	132.39	421.48	77.46	-	1309.79	1549.78	(19.65)
Mulching	36.62	29.58	66.20	102.32	-	-	-	553.87	(7.02)
Irrigation	137.11	-	137.11	-	144.57	-	-	210.77	(2.67)
PP	19.01	-	19.01	-	152.82	-	-	289.93	(3.67)
Measures	-	-	-	-	4.23	-	241.55	264.79	(3.35)
Harvesting	44.37	54.93	99.30	78.17	349.30	-	-	526.77	(6.68)
Grading	35.21	52.11	87.32	96.83	427.47	-	-	319.36	(4.05)
Packing	14.08	22.54	36.62	52.82	232.04	-	-	133.10	(1.69)
Loading / Unloading	3.52	-	3.52	170.08	96.48	-	-	173.60	(2.20)
Freight for Transport	-	-	-	-	170.08	-	-	-	-
Commission and Fee	-	-	-	-	-	-	-	513.17	(6.51)
Irrigation	-	-	-	-	-	-	-	420.99	(5.34)
Charges	-	-	-	-	-	-	-	349.30	(4.43)
Other Cost	-	-	-	-	-	-	-	286.62	(3.63)
Total Cost	409.70	424.30	834.00	813.75	1398.80	2212.55	394.37	1570.08	(19.91)
			(10.57)			(28.05)	(5.00)		

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

(in Rupees/Acre)

Table 5.2(c) : Operational and Marketing Cost of Onion in Rabi Season for Medium Category

Operations	Human Labour Cost						Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost
	Family			Hired							
	M	F	T	M	F	T					
Ploughing	35.20	-	35.20	60.40	-	60.40	85.00	300.00	-	-	480.60 (5.64)
Sowing	19.00	103.15	122.15	63.00	225.00	288.00	60.00	-	700.00	-	1170.15 (13.73)
Manuring	16.50	21.90	38.40	15.00	52.50	67.50	65.00	20.00	248.75	-	439.65 (5.16)
Fertilizing	22.80	14.25	37.05	22.80	74.25	97.05	95.00	-	1807.80	-	2036.90 (23.90)
Interculture	-	91.25	91.25	-	434.40	434.40	-	-	-	-	525.65 (6.17)
Mulching	35.00	54.25	89.25	19.50	82.25	101.75	-	-	-	-	191.00 (2.24)
Irrigation	65.20	-	65.20	170.60	-	170.60	-	-	-	-	235.80 (2.76)
PP	9.00	-	9.00	12.00	-	12.00	-	64.00	250.70	-	335.70 (3.93)
Measures	-	-	-	-	-	-	-	-	-	-	-
Harvesting	84.75	81.25	166.00	79.50	312.50	392.00	-	-	-	-	558.00 (6.55)
Grading	25.00	25.00	50.00	65.00	207.00	272.00	-	-	-	-	322.00 (3.78)
Packing	10.00	2.00	12.00	81.25	52.00	133.25	-	-	-	-	145.25 (1.70)
Loading / Unloading	-	-	-	168.75	-	168.75	-	-	-	-	168.75 (1.98)
Freight for Transport	-	-	-	-	-	-	-	-	-	709.20	709.20 (8.32)
Commission and Fee	-	-	-	-	-	-	-	-	-	561.50	561.50 (6.59)
Irrigation Charges	-	-	-	-	-	-	-	-	-	462.50	462.50 (5.43)
Other Cost	-	-	-	-	-	-	-	-	-	180.75	180.75 (2.12)
Total Cost	322.45	393.05	715.50 (8.39)	757.80	1439.90	2197.70 (25.78)	305.00 (3.58)	384.00 (4.51)	3007.25 (35.28)	1913.95 (22.46)	8523.40

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

Table 5.2(d) : Operational and Marketing Cost of Onion in Rabi Season for Large Category

(in Rupees/Acre)

Operations	Human Labour Cost				Bullhook Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost		
	Family		Hired								
	M	F	M	F							
Ploughing	38.20	16.22	54.42	61.98	29.73	91.71	211.71	203.60	-	561.44	(6.07)
Sowing	8.11	93.60	101.71	40.54	351.04	391.58	72.07	90.09	-	1219.41	(13.18)
Manuring	6.76	1.13	7.89	31.08	37.16	68.24	90.09	-	-	370.95	(4.01)
Fertilizing	23.06	12.16	35.22	40.36	91.89	132.25	49.55	-	1631.26	1848.28	(19.98)
Interculture	-	107.21	107.21	-	481.31	481.31	-	-	-	588.52	(6.36)
Mulching	40.54	45.72	86.26	3.60	83.56	87.16	-	-	-	173.42	(1.88)
Irrigation	206.53	-	206.53	140.32	-	140.32	-	-	216.17	346.85	(3.75)
PP	8.78	-	8.78	12.16	-	12.16	-	-	-	237.11	(2.57)
Measures	-	-	-	-	-	-	-	-	-	-	-
Harvesting	58.11	86.08	144.19	98.65	295.50	394.15	-	-	-	538.34	(5.82)
Grading	27.03	21.62	48.65	71.51	181.08	252.59	-	-	-	301.24	(3.26)
Packing	2.16	1.44	3.60	55.18	54.05	109.23	-	-	-	112.83	(1.22)
Loading / Unloading	-	-	-	159.91	-	159.91	-	-	-	159.91	(1.73)
Freight for Transport	-	-	-	-	-	-	-	-	-	957.21	(10.35)
Commission and Fee	-	-	-	-	-	-	-	-	-	930.54	(10.06)
Irrigation	-	-	-	-	-	-	-	-	-	542.12	(5.86)
Charges	-	-	-	-	-	-	-	-	-	-	-
Other Cost	-	-	-	-	-	-	-	-	-	360.59	(3.90)
Total Cost	419.28	385.18	804.46	715.29	1605.32	2320.61	423.42	203.60	2706.21	2790.46	9248.76
			(8.70)			(25.09)	(4.58)	(2.20)	(29.26)	(30.17)	

Note : Figures in parentheses are percentages to total cost.

Operations	Table 5.2(e) : Overall Operational and Marketing Cost of Onion in Rabi Season										(in Rupees/Acre)
	Human Labour Cost					Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total Cost	
	Family										
	M	F	T	M	F						
Ploughing	37.45	5.73	43.18	70.53	11.47	82.00	149.68	278.98	-	553.84	(6.37)
Sowing	15.92	88.95	104.87	62.58	278.20	340.78	60.51	-	689.22	1195.38	(13.75)
Manuring	16.96	18.12	35.08	21.98	49.76	71.74	101.91	11.47	255.41	475.61	(5.47)
Fertilizing	32.48	22.69	55.17	33.25	71.89	105.14	76.43	-	1553.69	1790.43	(20.59)
Interculture	0.96	121.34	122.30	-	457.95	457.95	-	-	-	580.25	(6.67)
Mulching	40.76	46.82	87.58	26.27	81.10	107.37	-	-	-	194.95	(2.24)
Irrigation	151.68	-	151.68	141.83	-	141.83	-	-	-	293.51	(3.38)
pp	13.61	-	13.61	10.51	-	10.51	-	20.38	244.32	288.82	(3.32)
Measures											
Harvesting	71.42	70.88	142.30	88.85	319.11	407.96	-	-	-	550.26	(6.33)
Grading	31.05	33.92	64.97	79.02	174.52	253.54	-	-	-	318.51	(3.67)
Packing	10.32	7.52	17.84	68.87	45.54	114.41	-	-	-	132.25	(1.52)
Loading / Unloading	2.71	-	2.71	165.45	-	165.45	-	-	-	168.16	(1.94)
Freight for Transport	-	-	-	-	-	-	-	-	-	747.72	(8.60)
Commission and Fee	-	-	-	-	-	-	-	-	-	672.23	(7.73)
Irrigation Charges	-	-	-	-	-	-	-	-	-	464.41	(5.34)
Other Cost	-	-	-	-	-	-	-	-	-	267.37	(3.08)
Total Cost	425.32	415.97	841.29	769.14	1489.54	2258.68	388.53	310.83	2742.64	2151.73	8693.70
			(9.68)			(25.98)	(4.47)	(3.57)	(31.55)	(24.75)	

Note : Figures in parentheses are percentages to total cost.

to the tune of 34-41 per cent of the gross operational cost of production on human labour employment alone, 28-35 per cent on various kinds of inputs, 17-24 per cent on various marketing functions and activities and the remaining on bullock labour and machine labour employment.

Based on estimates of various components of costs in the case of different categories of producers, an average picture was drawn and the same is presented in Table 5.2(e). In rabi season, the per acre gross operational cost of onion production in the case of average category of producer was estimated at Rs. 8694. On breaking this per acre gross operational cost of production into various components of cost, it was seen that about 10 per cent expenditure of the same was made on family labour, 26 per cent on hired labour, 32 per cent on various material inputs, 4 per cent on bullock labour, another 4 per cent on machine labour (tractor), 5 per cent in the form of irrigation charges and the remaining 19 per cent on various marketing functions and activities. As for various cultivation operations, the maximum expenditure was seen to be incurred on fertilizing operation (to the tune of 21 per cent of the gross operational cost of production) followed by sowing (14 per cent), irrigation and maintenance (9 per cent), interculture (7 per cent), ploughing and harvesting (6 per cent each), manuring (5 per cent), mulching and plant protection measures (about 3 per cent each) with a total of 74 per cent expenditure of the gross operational cost of production on various cultivation operations. The remaining 26 per cent expenditure of the gross operational cost of production turned out to be on various marketing functions and activities.

Although the foregoing sections presented us with a great deal of idea about the extent of expenditure involved in various cultivation and marketing operations, these estimates of costs, however, failed to provide us with complete structure of cost as they did not include producer's investment on fixed assets and certain other components of costs such as land revenue, rental value of land, etc. Therefore, an attempt was made to bring forth all the components of production cost, fixed as well as variable cost, together with marketing cost and returns with a view to evaluate the magnitude of income generation for various categories of onion producers. These cost and return estimates, both for kharif and rabi season, are delineated in the following section.

5.2 Economics of Onion Production in kharif and Rabi Season

The cost structure is broadly classified into two components namely, production cost and marketing cost. While working on the production economics of onion, the gross production cost was divided into various components such as labour cost, material input cost, land revenue, interest on working capital, rental value of owned land, depreciation and interest on fixed capital and other miscellaneous expenses. A comparative economics of onion production for different categories of producer was worked out separately with respect to kharif and rabi season and the estimates have been shown in Table 5.3.

It could be readily discerned from Table 5.3 that the per acre total cost of onion production was much higher in rabi season compared to kharif season. This held true for all the categories of onion producers. The per acre total cost of onion production was estimated at Rs. 12667 for marginal category, Rs. 11850 for small category, Rs. 12532 for medium category and Rs. 11313 for large category in the case of Kharif season. As for rabi season, the estimated per acre total cost of onion production turned out to be Rs. 13674 for marginal category, Rs. 12551 for small category, Rs. 12827 for medium category and Rs. 13352 for large category. It is to be noted here that the per acre total cost of production was the highest in the case of marginal category compared to other categories, both in kharif and rabi season. In general, the per acre total cost of onion production for an average category of farmer was estimated at Rs. 11678 in the case of kharif season and Rs. 12949 in respect of rabi season.

In kharif season, the production cost as proportion of total cost varied from 80 per cent in the case of medium category to 85 per cent in the case of small category. On the other hand, the marketing cost as proportion of total cost varied from 15 per cent in the case of small category to 20 per cent in the case of medium category. It is interesting to note that during the kharif season the per acre production cost declined with the increase in the size of land holding, though the difference in per acre production cost of small and medium category was not seen to be very high. During kharif season, a fall to the tune of 10 per cent was seen in per acre production cost for large category over that of marginal category. As for marketing cost, no such trend was seen because of wide differences in per acre marketing cost for various categories of producers. The per acre marketing cost turned

out to be the highest in the case of medium category and lowest for small category in the case of kharif season. Another interesting feature that emerged through examination of results presented in Table 5.3 was the steady decline in labour cost as proportion of total cost with the rise in land holding size of onion producers, though the decline in this proportion was not very sharp. In dismal contrast to this, during the kharif season the material input cost as proportion of total cost increased with the rise in land holding size of the producer; the increase in this proportion was from 14 per cent in the case of marginal category to nearly 18 per cent in the case of large category. Among various material inputs, the expenditure on fertilizer was seen to increase sharply from marginal to small, small to medium and medium to large category. The large category of producers were seen to invest nearly two and a half times more on fertilizer compared to marginal category.

As for rabi season, the production cost as proportion of total cost varied from 79 per cent in the case of large category to 85 per cent in the case of medium category. In fact, this proportion was seen to be almost the same in the case of marginal and medium category, though in absolute terms the per acre production cost was much higher in the case of marginal category compared to medium category. During the same season, a continuous increase in marketing cost as proportion of total cost was seen. The marketing cost as proportion of total cost increased from 15 per cent in the case of small category to 21 per cent in the case of large category. The per acre production cost of large category was seen to decline by 8 per cent over that of marginal category. In rabi season too, a persistently declining trend was noticed in respect of labour cost as proportion of total cost with the increase in size of land holding. As for expenditure on various material inputs as proportion of total cost, it was noticed that this proportion was the highest in the case of medium category (23 per cent) followed by large and small category (about 20 per cent)

(in Rupees/Acre)

Table 5.3 : Production and Marketing Costs and Net Returns for Onion Production in Kharif and Rabi Season

Cost Components	Kharif Season			Rabi Season			Overall
	Marginal	Small	Medium	Small	Medium	Large	
A: Production Cost							
1. Labour Cost							
a) Human Labour	2847.80	2467.14	2566.61	2159.39	2247.95	2277.20	2481.05
b) Bullock Labour	360.00	452.05	448.53	222.96	317.26	305.80	388.53
c) Machine	400.00	282.88	290.80	322.13	312.53	384.00	310.83
Total	3607.80	3202.07	3305.94	2704.48	2877.74	2966.20	3180.41
2. Material Input	(28.48)	(27.02)	(26.38)	(23.91)	(24.64)	(23.12)	(24.51)
a) Seed	480.00	428.08	402.94	341.31	375.05	700.00	689.22
b) Manure	500.00	576.03	482.35	310.60	348.61	248.75	555.41
c) Fertilizer	447.20	684.93	908.82	1133.34	1034.60	1807.80	1531.69
d) Insecticides and Pesticides	402.40	246.30	213.31	205.84	222.32	250.70	244.32
Total	1829.60	1935.34	2007.82	1991.15	1980.58	3007.25	2742.64
	(14.44)	(16.33)	(16.02)	(17.60)	(16.96)	(23.44)	(21.18)
	7.00	7.00	7.00	7.00	7.00	7.00	7.00
	405.18	351.06	440.72	392.12	397.96	462.64	471.14
3. Land Revenue	376.75	362.19	360.18	310.51	334.80	360.18	334.80
4. Interest on Working Capital	2844.00	3008.00	2609.00	2539.00	2644.00	2609.00	2644.00
5. Depreciation							
6. Rental Value of Owned Land	895.92	862.87	849.08	740.40	798.38	859.08	798.38
7. Interest on Fixed Capital	604.00	368.49	421.47	469.70	449.66	462.50	464.41
8. Other Cost	10570.25	10097.02	10010.81	9154.36	9490.12	10739.68	10642.78
Sub-total	(83.45)	(85.21)	(79.88)	(80.92)	(81.27)	(83.73)	(82.19)
B: Marketing Cost							
1. Labour Cost (Grading/Packing etc)	708.00	665.76	631.97	556.21	592.18	636.00	618.92
2. Other Cost (Freight for Transport/Commission and Fee etc.)	1388.80	1086.84	1889.63	1602.75	1595.34	1451.45	1687.32
Sub-total	2096.80	1752.60	2521.60	2158.96	2187.52	2087.45	2306.24
Total Cost (A+B)	(16.55)	(14.79)	(20.12)	(19.08)	(18.73)	(16.27)	(17.81)
Gross Return	12667.05	11849.62	12532.41	11313.32	13673.72	12827.13	12949.02
Net Return	16828.70	17332.06	17613.00	16272.00	16776.54	18562.32	19235.01
	4161.65	5482.44	5080.59	4958.68	5098.90	5735.19	6285.99

and marginal category (about 18 per cent). In rabi season, the expenditure of medium category on various kinds of fertilizers was seen to increase by 75 per cent over that of marginal category.

As for returns, it was seen that during the kharif season the per acre gross return was the highest in the case of medium category followed by small , marginal and large category (Table 5.3). Nonetheless, the per acre net return was much higher in the case of small category compared to other category of onion producers. The higher per acre net return witnessed in the case of small category during the kharif season was due mainly to lower per acre total cost of production. In the case of kharif season, the per acre gross return was estimated at Rs. 16829 for marginal category, Rs. 17,332 for small category, Rs. 17613 for medium category and Rs. 16272 for large category. During the same season, the per acre net return was estimated at Rs. 4162 for marginal category, Rs. 5482 for small category, Rs. 5081 for medium category and Rs. 4959 for large category. Thus, the per acre net return was seen to be 32 per cent higher in the case of small category over that of marginal category. In general, the per acre net return was seen to be Rs. 5098 for an average category of onion producer in kharif season.

In rabi season, the per acre gross return was seen to be much higher in the case of large category compared to other category of onion producers. As a matter of fact, the per acre gross returns for marginal, small and medium categories were by and large the same in rabi season and were seen to hover at around Rs. 18,500. So far as per acre net return was concerned, it was seen to waver widely among different categories of producers. This was mainly due to wide differences in per acre total cost of production among various categories of onion producers. In the case of rabi season, the per acre gross return was estimated at Rs. 18574 for marginal category, Rs. 18589 for small category, Rs. 18562 for medium category and Rs. 20442 for the large category. On the other hand, the per acre net return was estimated at Rs. 4901 for marginal category, Rs. 6038 for small category, Rs. 5735 for medium category and Rs. 7090 for large category. It is amply clear that the per acre net return of onion production was substantially high in the case of large category compared to other category of producers. The per acre net return was seen to be 45 per cent higher in the case of large category over that of marginal category. In general, the per acre

net return was seen to be Rs. 6285 for an average category of onion producer in rabi season which turned out to be 23 per cent higher than the per acre net return for the average category of producer in kharif season. In this sequel, the input-output ratio was seen to be higher in rabi season (1:1:49) compared to kharif season (1:1.44).

5.3 Production and Utilization of Onion in Kharif and Rabi Season

Onion, like other fruits and vegetables, is perishable to a considerable extent and as such requires its quick disposal. Either no or very little literature is available in India about the production and utilization pattern of onion in kharif and rabi season. An attempt was made in the present investigation to ascertain the production, spoilage, consumption and sale of onion by different categories of households during different seasons, that is, in kharif and rabi season. The results of this analysis are presented in Table 5.4.

In kharif season, the average per household production of onion in the case of marginal category was estimated at 159.17 quintals, out of which 12.05 per cent was spoilage, 1.13 per cent was consumed at home, 1.46 per cent was given to labour as kind payment and the remaining 85.36 per cent was sold in the market. The total per household onion production in the case of small category during the same season was estimated at 329.05 quintals, out of which 85.70 per cent was sold in the market and the remaining proportion of production owed it to various uses such as home consumption, payment to labour as kind and spoilage. As regards medium category, the per household onion production was estimated at 572.00 quintals, of which 12.44 per cent was spoilage, 0.44 per cent was home consumption, 1.79 per cent was payment to labour as kind and 84.29 per cent was marketed surplus. So far as large category is concerned, the percentage sale of production was seen to be 85.80 per cent, spoilage as 11.65 per cent, home consumption as 0.21 per cent, payment to labour as kind as 2.34 per cent. Thus, it is to be noted that the percentage sale of production was of the same order for different categories of onion producers and hovered at around 85 per cent in kharif season. The total per household production of onion for an average category of producer during this season was estimated at 584.19 quintals, of which 502.92 quintals was sold representing market surplus to the tune of 85.36 per cent. Although the percentage sale of production remained constant for various categories of producers, a steady decline in home consumption as proportion of

production was seen with the increase in land holding size of producers. Nonetheless, in absolute terms the quantity used for home consumption was seen to be much higher for large category compared to marginal and other categories (Table 5.4).

The per household onion production was seen to be much higher in rabi season compared to kharif season. This held true for all the categories of producers. In rabi season, the per household production was estimated at 169.02 quintals for marginal category, 339.14 quintals for small category, 611.73 quintals for medium category and 1456.63 quintals for large category with an overall average of 631.58 quintals per household. The per household quantity marketed was estimated at 143.40 quintals for marginal category, 288.85 quintals for small category, 521.86 quintals for medium category and 1242.36 quintals for large category with an overall average of 538.13 quintals per household. Thus, in rabi season too, the marketed surplus turned out to be about 95 per cent of the production for various categories of producers. During the rabi season, a negative relationship was seen between percentage spoilage of production and size of land holding. The same negative relationship was also seen between percentage home consumption of production and size of land holding. This means that these proportions declined with the rise in land holding size of producers. Contrary to this, the quantity of onion used as kind payment to labour increased with the increase in land holding size of producers not only in absolute terms but also in terms of percentage of production.

Evidently, though per household production and marketed surplus of onion differed perceptibly in absolute terms for various categories of producers, in terms of percentage sale of production it remained by and large constant and wavered at around 95 per cent for different categories of producers in both kharif and rabi season. However, seasonal fluctuations were observed in the production and marketing of onion for all the categories

Category	Kharif and Rabi Season			(Quantity in Quintals/Household)	
	Total Production	Spillage (Post harvest Loss)	Home Consumption	Given as Kind to Labour	Marketed
KHARIF SEASON					
Marginal	159.17	19.18 (12.05)	1.80 (1.13)	2.32 (1.46)	135.87 (85.36)
Small	329.05	38.99 (11.85)	2.17 (0.66)	5.89 (1.79)	282.00 (85.70)
Medium	572.00	71.16 (12.44)	2.52 (0.44)	16.19 (2.83)	482.13 (84.29)
Large	1298.37	151.26 (11.65)	2.73 (0.21)	30.38 (2.34)	1114.00 (85.80)
Overall	584.19	65.37 (11.19)	2.31 (0.40)	13.59 (2.33)	502.92 (85.36)
RABI SEASON					
Marginal	169.02	21.26 (12.58)	1.81 (1.07)	2.55 (1.51)	143.40 (84.84)
Small	339.14	41.00 (12.09)	2.71 (0.80)	6.58 (1.94)	288.85 (85.17)
Medium	611.73	73.47 (12.01)	3.61 (0.59)	12.79 (2.09)	521.86 (85.31)
Large	1456.63	171.30 (11.76)	3.64 (0.25)	39.33 (2.70)	1242.36 (85.29)
Overall	631.58	75.41 (11.94)	2.95 (0.47)	15.09 (2.39)	538.13 (85.20)
					27581.61
					55554.00
					98510.67
					213888.00
					98924.35
					30257.40
					59214.25
					105937.58
					267107.40
					112253.94

Note : Figures in parentheses are percentages to the total production

of producers as the production and marketed surplus figures were seen to be higher in rabi compared to kharif season.

The foregoing analysis and discussion is a pointer to the fact that there has been considerable amount of profit involved in the cultivation of onion crop. However, the post-harvest losses of the same reduces the farmer's profit to that extent. Although in this study the spoilage of onion as proportion of production is estimated at around 12 per cent only; the extent of loss during transportation and storage could be much higher compared to what it has been noticed at the producer's end. It is to be noted that because of high water content (87 per cent), the onion cannot be stored for a longer period. In fact, onions require cold storage conditions of 0°C with a R. H. of 64 per cent. Losses in cold storage are reported to be 10 to 18 per cent which occur mainly due to diriage. Generally, the producer farmer has to shoulder all these losses which in turn reduces his profit to a considerable extent. In the case of grapes the losses could be much higher than what it has been noticed in the case of onion due mainly to attack of various kinds of diseases, unforeseen calamities like hail storm and also on account of breaking of berry from the bunches. Despite all these negative aspects, the profitability in grape cultivation has been reported to be very high. Because of high element of profit involved in grape cultivation and its export, the farmers are seen to indulge in land market, that is, more and more people are buying land particularly from tribals, to expand cultivation of grapes. Thus, in view of several positive feature in favour of grape cultivation, it becomes essential to evaluate the cost structure and returns in the cultivation of this high value fruit crop on the sample farm.

5.4 Initial Cost of Plantation of Grapes

Because of high initial investment on the infrastructure coupled with a fair amount of risk involved in its cultivation owing to prevalence of various kinds of diseases and other unforeseen calamities such as hail storm, the cultivation of grape is seen to be limited to a particular class of farmers. In other words its cultivation is restricted to those kinds of enlightened farmers who not only have resources and are economically sound but who also possess knowledge about the market forces that determine profitability and economic viability of the enterprise undertaken by them. The per acre initial establishment cost is

Table 5.5 : Initial Investment on Grape Orchards by Sample Orchardists
Acre)

(Rupees/

	Marginal	Small	Medium	Large	Overall
Increasing Stage (3-10 years)					
1. Labour Cost [@] a) Family	582.11	443.22	492.17	299.73	384.12
b) Hired	1316.08	1445.06	1599.04	1675.22	1600.80
Total	1898.19	1888.28	2091.21	1974.95	1984.92
2. Tractor Hiring Charges	172.15	315.00	328.66	392.16	355.70
3. Material Input Cost					
a) FYM / Compost	193.22	207.28	223.66	152.16	182.71
b) Superphosphate and others	566.87	704.62	819.01	1113.66	942.53
c) Seeding / Sapling	680.01	822.08	993.52	893.67	875.40
d) Urea Application	152.12	267.31	277.52	301.67	285.53
e) Bamboo	1000.08	1225.78	1466.15	1333.03	1338.22
f) Irrigation and maintenance	997.33	1082.04	1285.11	1315.11	1252.60
g) PP Measures	913.11	822.03	1001.77	1133.89	1030.61
h) Iron Angles	2813.09	2616.55	3015.67	3145.45	2995.08
i) GI Wire	711.71	681.69	875.75	771.11	777.86
j) Cement	108.13	242.87	315.22	400.01	339.99
k) Sand, Rubbles, Transplantation etc.	688.69	576.41	892.17	1118.08	938.75
Total	8824.36	9248.66	11165.55	11677.84	10959.28
G Total (1+2+3)	10894.70	11451.94	13585.42	14044.95	13299.90
Constant Stage (11-14 years)					
1. Labour Cost [@] a) Family	-	275.22	244.11	132.77	187.99
b) Hired	-	801.34	665.69	822.11	760.33
Total	-	1076.56	909.80	954.88	948.32
2. Tractor Hiring Charges	-	218.63	177.11	153.39	168.23
3. Material Input Cost					
a) FYM / Compost	-	121.67	112.33	79.65	95.88
b) Superphosphate and others	-	444.68	521.17	598.68	555.41
c) Seeding / Sapling	-	522.00	417.19	533.09	487.69
d) Urea Application	-	93.69	106.66	185.49	147.19
e) Bamboo	-	776.43	692.13	613.99	658.25
f) Irrigation and maintenance	-	615.15	778.61	711.31	728.63
g) PP Measures	-	311.01	329.27	668.22	506.84
h) Iron Angles	-	1516.15	1706.25	1692.61	1682.29
i) GI Wire	-	441.11	452.97	569.18	513.36
j) Cement	-	153.00	133.21	199.22	208.17
k) Sand, Rubbles, Transplantation etc.	-	142.66	262.87	322.93	284.03
Total	-	5137.55	5512.66	6174.37	5867.74
G Total (1+2+3)	-	6432.74	6599.57	7282.64	6984.29
Decreasing Stage (Above 15 years)					
1. Labour Cost [@] a) Family	154.04	117.74	114.06	69.91	96.04
b) Hired	368.69	391.69	413.01	438.41	416.81
Total	522.72	509.43	527.07	508.32	512.85
2. Tractor Hiring Charges	84.41	105.00	109.55	120.72	111.79
3. Material Input Cost					
a) FYM / Compost	74.41	89.09	72.56	60.72	70.49
b) Superphosphate and others	128.96	164.87	171.00	277.22	220.30
c) Seeding / Sapling	156.67	194.03	211.17	217.89	205.30
d) Urea Application	70.71	99.10	72.51	101.56	93.55
e) Bamboo	333.36	408.59	358.72	404.34	391.95
f) Irrigation and maintenance	322.44	360.68	278.37	288.37	307.08
g) PP Measures	324.37	329.01	273.92	367.96	340.28
h) Iron Angles	837.70	772.18	605.00	748.48	740.91
i) GI Wire	227.24	277.23	231.92	267.04	260.18
j) Cement	41.04	90.95	105.07	133.34	110.10
k) Sand, Rubbles, Transplantation etc.	169.56	192.14	217.39	172.69	183.73
Total	2686.46	2977.87	2597.63	3039.61	2923.37
G Total (1+2+3)	3293.59	3592.30	3234.25	3668.65	3548.01

Note : @ - Labour cost include labour used for ploughing, harrowing, digging, and filling of pits, fertilizer application, plantation of sapling, rooted cuttings, Urea application, fixing of bamboo, spraying for interculture operations, irrigation and maintenance, cutting iron angles, welding and fixing, plant protection measures, etc.

reported to be very high in grape cultivation. As per the estimates reported by

Neelakantiah (1995), a farmer has to make an investment in the range of 0.80 lakh to 1.0

lakh in order to raise the infrastructure for grape orchards on one acre farm. However, this initial establishment cost appeared to be quite high since it was reported to be estimated for those types of farmers who were mainly commercial grower (mainly exporters) of grapes. These types of farmers preferred to have a permanent structure which fetched them reasonably a very high cost. On our sample farms, the infrastructure for grape gardens was seen to be of different types. While some growers of grapes exclusively had a permanent structure made of iron rods and angles, the others were seen to have a wooden structure made of bamboos. The initial investment for these two categories of farmers varied significantly. In majority of the cases the whole structure was seen to be made of bamboos. However, the farmers possessing this type of structure were seen to make a good amount of investment on repair work in each year. Further, the initial investment of sample farmers also varied significantly because of differences in year of establishment of grape orchards. While in some cases the grape orchard was established about 15-20 years back, in other cases it was seen to be established just 5-6 years back. Owing to differences in the year of establishment and the nature of the structure of grape orchard, a significant difference in expenditure was seen for various categories of growers of grapes.

The initial establishment costs were estimated for various categories of producers and the estimates are brought out in Table 5.5. On the average, per acre establishment costs of grape gardens were estimated at Rs. 13,300 for the orchards which were in increasing production state (3-10 years), Rs. 6984 for the orchards which were in constant production stage (11-14 years) and Rs. 3548 for the decreasing production stage orchards (15-25 years). It is to be noted that the initial investment was made 3-10 years back for the increasing production stage orchards, 11-14 years back for the constant production stage orchards and 15-25 years back for decreasing production stage orchards. The large orchardists were seen to invest more on the infrastructure compared to other categories of orchardists. In fact, an increase in establishment cost was noticed with the increase in land holding size of orchardists. In the case of increasing production stage orchards, the per acre establishment cost varied from Rs. 10,895 in the case of marginal category to Rs. 14,045 for large category of orchardists. As for the constant production stage orchards, the per acre establishment cost varied from Rs. 6433 in the case of small category to Rs. 7283 in

the case of large category. The per acre establishment cost in the case of decreasing production stage orchards varied from Rs. 3294 for marginal category of orchardists to Rs. 3669 for the large category of orchardists. However, at current prices, the establishment cost will turn out to be very high compared to the estimated figures reported for various categories of orchards. In order to bring forth true picture of cost during the production years for different stages of orchards, prorated establishment cost is estimated which included both implicit and explicit costs and the same is recaptured during the production years in order to bring the matter into proper perspective.

5.5 Maintenance Cost of Grape Orchards

A noteworthy feature of a 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. The maintenance cost estimates for non-bearing and bearing orchards for different categories of orchardists are delineated in the following sections.

5.5.1 Maintenance Cost of Non-bearing Orchards

The estimates of various components of maintenance cost for non-bearing orchards among different categories of orchardists are brought out separately in Tables 5.6(a), 5.6(b), 5.6(c), 5.6(d) and 5.6(e). The per acre maintenance cost for non-bearing orchards was estimated at Rs. 12833 for marginal category of orchardist, Rs. 14064 for small category of orchardist, Rs 15,246 for medium category of orchardist and Rs. 15, 171 for large category of orchardist with an overall average per acre maintenance cost at Rs. 15,057 for the average category of orchardist. These estimates clearly showed a positive association between the per acre gross maintenance cost and the land holding size of orchardists. The per acre expenditure of medium category was seen to increase by 19 per cent over that of marginal category in the maintenance of non-bearing orchards. Among various components of costs, the rental value of owned land showed the maximum share in total maintenance cost of non-bearing orchards, followed by expenditure on various types

of inputs, labour cost, interest on fixed capital, interest on working capital and depreciation on fixed assets, in that order. The labour cost as proportion of total maintenance cost turned out to be constant among various categories of orchardists and this proportion was seen to hover at around 15 per cent. Similarly, the expenditure on material inputs as proportion of total maintenance cost also turned out to be constant for different categories of orchardists and this proportion was seen to waver at around 25 per cent . However, an increase in expenditure on insecticides and pesticides and also on fertilizer was seen with the increase in land holding size of orchardists not only in absolute terms but also in terms of their share in total maintenance cost of non-bearing orchards. Among various material inputs, the expenditure on insecticides and pesticides was seen to be the maximum. This held true for all the categories of orchardists.

In general, of the total maintenance cost of non-bearing orchards, labour cost accounted for 14 pr cent, material input cost accounted for 24 per cent, rental value of owned land accounted for 41 per cent and the remaining 21 per cent owed it to other expenses such as land revenue, interest on working capital, depreciation on fixed assets, interest on fixed capital and gap filling cost (Table 5.6(e)).

5.5.2 Maintenance Cost and Returns for Increasing Production Stage Orchards (3-10 years)

The gross maintenance cost of bearing grape orchards was broadly classified into two major components such as production cost and marketing cost. While production cost, in particular, included fixed and variable costs, the marketing cost encompassed various other components of costs such as labour cost involved in various marketing functions, packing material cost, freight for transport, octroi, State tax, commission and fee and various other marketing expenses. The estimates of various components of costs, both production and marketing, for different categories of orchardists are provided separately in Tables 5.6(a), 5.6(b), 5.6(c), 5.6(d) and 5.6(e). The estimates of gross returns for various categories of orchardists are also introduced in these tables with a view to evaluate the magnitude of income generation for various categories of orchardists. In fact, Table 5.6 (e) provides us an average picture of costs and returns irrespective of category of orchardists. In other words, Table 5.6(e) provides the cost structure and return for the

average category of orchardists, that is, the general scenario.

In the case of increasing production stage orchards, the per acre gross maintenance cost of grape production was estimated at Rs. 52,202 for marginal category, Rs. 58,379 for small category, Rs. 66,293 for medium category and Rs. 62,454 for large category of orchardists. These estimates clearly revealed a much higher gross maintenance cost for the medium category compared to other categories of orchardists. In fact, an increase in maintenance expenditure to the tune of 27 per cent was noticed in the case of medium category over that of marginal category. As for share of production cost in gross maintenance cost, an increase in this share was seen from marginal to small and small to medium category. However, in the case of large category, this proportion was seen to be in line with the proportion noticed for marginal category, though in absolute terms production cost of large category was much higher than marginal category. On the other hand, a decline in marketing cost as proportion of gross maintenance cost was noticed with the increase in land holding size of orchardists with large category being the only aberration in this scenario which showed the share of marketing cost in gross maintenance cost to be of the similar order as noticed in the case of marginal category, though in absolute terms the marketing cost was much higher in the case of large category compared to marginal category.

As for various components of production cost, it was noticed that the prorated establishment cost alone accounted for one-third of the gross maintenance cost of grape production. As a matter of fact, the per acre prorated establishment cost as proportion of gross maintenance cost increased with the rise in size of land holding of the grape orchardists. Contrary to this, the share of material input cost in gross maintenance cost declined with the increase in land holding size of grape orchardists, though the decline in this share was not very sharp. Nonetheless, in absolute terms, medium category of orchardists were seen to invest more on various kinds of inputs compared to large, small and marginal category. Interestingly, all the sample orchardists invested 6-7 per cent of the gross maintenance cost on labour employment in various production operations. However, in absolute terms, the labour cost was again seen to increase from marginal to small and small to medium category. Among various inputs, maximum expenditure was seen to be

incurred on irrigation and maintenance in the case of marginal, medium and large category and on farm yard Manure (FYM) in the case of small category.

Regarding marketing cost, about 10 per cent expenditure of the gross maintenance cost was seen to be incurred on packing material alone. This held true for all the categories of orchardists. Among various categories of orchardists, the freight for transport was the second important item of marketing cost which accounted for 6-7 per cent of the gross maintenance cost of production. A considerable proportion of expenditure of gross maintenance cost was also seen to be incurred on labour employment in various marketing functions such as plucking, grading, packing, loading/unloading, local transport, etc. Among these marketing operations, maximum labour was seen to be employed on plucking/picking operation, followed by loading/unloading, assembling, packing, grading and local transport in that order (Appendix 1(a) to 1(d)). This trend was seen in the case of majority of the orchardists. In general, among various categories of orchardists, labour cost involved in various marketing functions accounted for 5-6 per cent of the gross maintenance cost of production.

It is interesting to note an increase in per acre gross return with the increase in land holding size of orchardists. The higher gross return on relatively bigger size farms was noticed mainly because of higher productivity of grape on these farms which in turn could be attributed to farmer's preference in the cultivation of superior/exportable varieties of grapes on their farms. The per acre gross returns were estimated at Rs. 79,103 on marginal farms, Rs. 93,133 on small farms, Rs. 95,133 on medium farms and Rs. 95,826 on large farms. As for net returns, it was seen to be the highest in the case of small category of forms (Rs. 34,753) followed by large farms (Rs. 33,372), medium farms (Rs. 28,840) and

Table 5.6(a) : Maintenance Cost and Returns from Grape Among Marginal Orchardists of Maharashtra (Rs./Acre)

Items	Age in Years				All Bearing Age
	0-2	3-10	11-14	15 and above	
A. Production Cost					
1. Labour Cost					
a) Human Labour	1441.23	3032.70	-	2700.24	2875.22
b) Bullock Labour	137.51	308.00	-	224.60	268.49
c) Machine	292.67	133.60	-	92.00	113.89
Total	1871.41	3474.30 (6.66)	-	3016.84 (5.42)	3257.60 (6.05)
2. Material Input					
a) FYM / Compost	601.33	1755.60	-	1528.20	1647.88
b) Fertilizer	891.21	1230.78	-	991.53	1117.45
c) Irrigation	877.44	2160.00	-	1920.00	2046.32
d) Insecticides Pesticides	902.32	1179.53	-	831.09	1014.48
Total	3272.30	6325.91 (12.12)	-	5270.82 (9.47)	5826.13 (10.82)
3. Land Revenue	7.00	7.00	-	7.00	7.00
4. Interest on Working Capital	567.73	998.07	-	862.02	933.63
5. Depreciation	509.25	611.58	-	651.29	630.39
6. Rental Value of Owned Land	5321.00	5118.00	-	5869.00	5473.74
7. Interest on Fixed Capital	1105.75	1322.41	-	1466.36	1390.60
8. Prorated establishment Cost	-	16601.28 (31.80)	-	21109.82 (37.94)	18736.90 (34.81)
Others@	178.29	-	-	-	-
Sub Total	12832.73	34458.55 (66.01)	-	38253.15 (68.76)	36255.99 (67.36)
B. Marketing Cost					
1. Labour Cost (Plucking, Grading, Packing, etc.)	-	3208.60 (6.15)	-	2910.27 (5.23)	3067.29 (5.70)
2. Packing Material Cost	-	5055.00 (9.68)	-	4750.46 (8.54)	4910.74 (9.12)
3. Freight	-	3577.70	-	3821.26	3693.07
4. Octroi	-	1096.35	-	1101.10	1098.60
5. State Tax	-	1685.00	-	1573.00	1631.95
6. Commission and Fee	-	2461.20	-	2516.80	2487.54
7. Others	-	659.35	-	707.85	682.32
Sub-Total	-	17743.20 (33.99)	-	17380.74 (31.24)	17571.51 (32.64)
Total Cost (A+B)	12832.73	52201.75	-	55633.89	53827.50
Gross Return	-	79102.80	-	74524.24	76934.01
Net Return	-	26901.05	-	18890.35	23106.51

Note : @ - Gap filling cost for Non-bearing orchards (0-2 years)
Figures in parentheses are percentages to the total cost

Table 5.6(b) : Maintenance Cost and Returns from Grape Among Small Orchardists of Maharashtra (Rs./Acre)

Items	Age in Years				
	0-2	3-10	11-14	15 and above	All Bearing Age
A. Production Cost					
1. Labour Cost					
a) Human Labour	1729.11	3492.33	3592.13	2993.05	3425.18
b) Bullock Labour	144.71	225.00	353.40	195.00	229.41
c) Machine	211.97	254.00	213.60	240.80	249.26
Total	2085.79	3971.33 (6.80)	4159.13 (6.28)	3428.85 (5.54)	3903.85 (6.57)
2. Material Input					
a) FYM/ Compost	688.53	2291.70	2568.30	2006.55	2268.50
b) Fertilizer	921.46	1145.28	1380.89	1133.57	1159.79
c) Irrigation	901.08	2000.00	2160.00	1920.00	1999.17
d) Insecticides, Pesticides	1101.35	1418.84	1493.86	1372.34	1417.12
Total	3612.42	6855.82 (11.74)	7603.05 (11.49)	6432.46 (10.40)	6844.58 (11.52)
3. Land Revenue	7.00	7.00	7.00	7.00	7.00
4. Interest on Working Capital	597.43	1184.97	1316.05	1053.48	1174.51
5. Depreciation	553.51	705.55	691.89	621.21	692.10
6. Rental Value of Owned Land	5811.00	6322.00	6018.00	6119.00	6270.93
7. Interest on Fixed Capital	1205.67	1467.28	1722.39	1821.01	1537.32
8. Prorated establishment Cost	-	19110.90 (32.74)	22515.83 (34.01)	24718.84 (39.97)	20177.25 (33.95)
Others [@]	191.21	-	-	-	-
Sub Total	14064.03	39624.85 (67.87)	44033.34 (66.52)	44201.85 (71.48)	40607.54 (68.33)
B. Marketing Cost					
1. Labour Cost (Plucking, Grading, Packing, etc.)	-	3388.82 (5.80)	4278.29 (6.46)	3295.77 (5.33)	3436.37 (5.78)
2. Packing Material Cost	-	5877.90	6738.42 (10.18)	5502.75 (8.90)	5881.62 (9.90)
3. Freight	-	3307.50	4068.48	3018.75	3317.17
4. Octroi	-	1247.40	1483.30	1224.75	1260.31
5. State Tax	-	1890.00	2119.00	1725.00	1881.00
6. Commission and Fee	-	2475.90	2797.08	2328.75	2476.23
7. Others	-	567.00	678.08	542.00	570.95
Sub-Total	-	18754.52 (32.13)	22162.65 (33.48)	17637.77 (28.52)	18823.65 (31.67)
Total Cost (A+B)	-	58379.37	66195.99	61839.62	59431.19
Gross Return	-	93132.80	103098.88	85952.00	92755.38
Net Return	-	34753.43	36902.89	24112.38	33324.19

Note : @ - Gap filling cost for Non-bearing orchards (0-2 years)

Figures in parentheses are percentages to the total cost

Table 5.6(c) : Maintenance Cost and Returns from Grape Among Medium Orchardists of Maharashtra (Rs./Acre)

Items	Age in Years				
	0-2	3-10	11-14	15 and above	All Bearing Age
A. Production Cost					
1. Labour Cost					
a) Human Labour	1691.67	3611.48	3646.78	3045.99	3578.76
b) Bullock Labour	110.28	85.60	75.00	74.20	82.42
c) Machine	246.99	586.40	420.00	495.20	542.73
Total	2048.94	4283.48 (6.46)	4141.78 (6.03)	3615.39 (5.90)	4203.91 (6.32)
2. Material Input					
a) FYM / Compost	717.23	2118.30	2208.30	1835.10	2118.04
b) Fertilizer	939.71	1720.40	1579.21	1478.43	1671.53
c) Irrigation	879.12	2320.00	2240.00	2000.00	2279.18
d) Insecticides Pesticides	1204.25	1488.13	1228.44	1028.71	1397.22
Total	3740.31	7646.83 (11.53)	7255.95 (10.56)	6342.24 (10.36)	7465.97 (11.23)
3. Land Revenue	7.00	7.00	7.00	7.00	7.00
4. Interest on Working Capital	654.41	1291.76	1165.59	1014.33	1243.70
5. Depreciation	649.45	778.21	811.81	699.78	780.07
6. Rental Value of Owned Land	6378.00	6138.00	6448.00	6399.00	6225.89
7. Interest on Fixed Capital	1604.60	1921.39	2005.75	2139.25	1955.85
8. Prorated establishment Cost	-	23073.74 (34.81)	24017.82 (34.95)	21479.83 (35.07)	23169.91 (34.86)
Others [@]	163.28	-	-	-	-
Sub Total	15245.99	45140.41	45853.70 (66.72)	41696.82 (68.08)	45052.30 (67.78)
B. Marketing Cost					
1. Labour Cost (Plucking, Grading, Packing, etc.)	-	3486.02 (5.26)	3954.28 (5.75)	3035.16 (4.96)	3558.11 (5.35)
2. Packing Material Cost	-	6816.00 (10.28)	6916.80 (10.06)	5689.02 (9.29)	6757.57 (10.17)
3. Freight	-	4112.00	4532.16	4293.60	4218.97
4. Octroi	-	1528.00	1823.52	1610.10	1599.82
5. State Tax	-	1920.00	2096.00	1789.00	1950.00
6. Commission and Fee	-	2618.40	2834.40	2504.60	2658.41
7. Others	-	672.00	713.60	626.15	677.99
Sub-Total	-	21152.42 (31.91)	22870.76 (33.28)	19547.63 (31.92)	21420.87 (32.22)
Total Cost (A+B)	-	66292.83	68724.46	61244.45	66473.17
Gross Return	-	95132.80	102848.64	89389.76	96441.71
Net Return	-	28839.97	34124.18	28145.31	29968.54

Note : @ - Gap filling cost for Non-bearing orchards (0-2 years)

Figures in parentheses are percentages to the total cost

Table 5.6(d) : Maintenance Cost and Returns from Grape Among Large Orchardists of Maharashtra (Rs./Acre)

Items	Age in Years				
	0-2	3-10	11-14	15 and above	All Bearing Age
A. Production Cost					
1. Labour Cost					
a) Human Labour	1701.88	3168.20	3469.61	3205.45	3219.57
b) Bullock Labour	141.91	82.40	75.80	77.80	70.25
c) Machine	282.47	542.40	649.60	461.16	549.06
Total	2126.26	3793.00 (6.07)	4195.01 (6.08)	3744.41 (5.74)	3838.88 (6.02)
2. Material Input					
a) FYM / Compost	666.03	1986.60	2061.15	1921.65	1990.19
b) Fertilizer	1001.98	1579.25	1724.62	1552.82	1598.57
c) Irrigation	791.23	2160.00	2000.00	2080.00	2125.33
d) Insecticides Pesticides	1171.17	1162.74	1097.73	1055.64	1139.49
Total	3630.41	6888.59 (11.03)	6883.50 (9.98)	6610.11 (10.14)	6853.58 (10.74)
3. Land Revenue	7.00	7.00	7.00	7.00	7.00
4. Interest on Working Capital	660.80	1114.11	1134.46	1076.24	1112.62
5. Depreciation	696.65	813.11	870.81	719.23	810.53
6. Rental Value of Owned Land	6119.00	5828.00	6158.00	6445.00	5955.06
7. Interest on Fixed Capital	1719.42	2089.11	2149.28	2201.77	2112.30
8. Prorated establishment Cost Others [@]	- 211.07	21002.78 (33.63)	23867.11 (34.60)	24654.78 (37.81)	21896.26 (34.32)
Sub Total	15170.61	41535.70 (66.51)	45265.17 (65.62)	45458.54 (69.71)	42586.23 (66.75)
B. Marketing Cost					
1. Labour Cost (Plucking, Grading, Packing, etc.)	-	3405.62 (5.45)	3984.77 (5.78)	3221.73 (4.94)	3472.93 (5.44)
2. Packing Material Cost	-	6311.20 (10.11)	6646.44 (9.63)	5705.70 (8.75)	6288.63 (9.36)
3. Freight	-	4051.20	5015.24	4149.60	4212.95
4. Octroi	-	1681.60	2055.80	1659.84	1737.02
5. State Tax	-	1960.00	2164.00	1729.00	1963.00
6. Commission and Fee	-	2646.00	2921.40	2507.05	2671.68
7. Others	-	862.40	930.52	778.05	862.61
Sub-Total	-	20918.02 (33.49)	23718.17 (34.38)	19750.97 (30.29)	21209.02 (33.25)
Total Cost (A+B)	-	62453.72	68983.34	65209.51	63795.25
Gross Return	-	95825.60	104671.04	85809.44	95967.80
Net Return	-	33371.88	35687.70	20599.93	32172.55

Note : @ - Gap filling cost for Non-bearing orchards (0-2 years)

Figures in parentheses are percentages to the total cost

Table 5.6(e) : Overall Maintenance Cost and Returns from Grape Orchards of Maharashtra
(Rs./Acre)

Items	Age in Years				
	0-2	3-10	11-14	15 and above	All Bearing Age
A. Production Cost					
1. Labour Cost					
a) Human Labour	1701.16	3346.69	3548.31	3082.12	3344.74
b) Bullock Labour	128.93	117.37	99.95	119.00	114.92
c) Machine	258.21	485.42	523.19	378.73	478.00
Total	2088.30	3949.48 (6.33)	4171.45 (6.18)	3579.85 (5.69)	3937.66 (6.23)
2. Material Input					
a) FYM / Compost	690.60	2079.98	2162.23	1889.83	2069.04
b) Fertilizer	965.09	1517.52	1638.61	1388.61	1520.05
c) Irrigation	842.79	2167.11	2106.08	2014.78	2139.02
d) Insecticides Pesticides	1175.92	1299.73	1182.73	1103.59	1257.71
Total	3674.40	7064.34 (11.32)	7089.65 (10.50)	6396.81 (10.17)	6985.85 (11.05)
3. Land Revenue	7.00	7.00	7.00	7.00	7.00
4. Interest on Working Capital	649.75	1172.09	1162.39	1040.54	1154.38
5. Depreciation	657.86	777.88	832.43	686.71	774.93
6. Rental Value of Owned Land	6187.66	5997.62	6256.81	6305.47	6075.07
7. Interest on Fixed Capital	1603.24	1901.45	2056.66	2031.33	1941.11
8. Prorated establishment Cost	-	21050.95 (33.74)	22656.04 (33.57)	23839.82 (37.91)	21639.49 (34.23)
Others [@]	188.29	-	-	-	-
Sub Total	15056.50	41920.81 (67.20)	44232.43 (65.54)	43887.53 (69.79)	42515.49 (67.25)
B. Marketing Cost					
1. Labour Cost (Plucking, Grading, Packing, etc.)	-	3418.91 (5.48)	3998.95 (5.93)	3180.17 (5.06)	3477.76 (5.50)
2. Packing Material Cost	-	6325.40 (10.14)	6758.16 (10.01)	5562.29 (8.85)	6297.11 (9.96)
3. Freight	-	3901.60	4746.68	3875.12	4026.99
4. Octroi	-	1540.39	1916.34	1495.93	1592.14
5. State Tax	-	1930.01	2133.97	1721.93	1935.38
6. Commission and Fee	-	2599.80	2877.10	2465.96	2625.50
7. Others	-	748.07	825.14	692.90	752.99
Sub-Total	-	20464.18 (32.80)	23256.34 (34.46)	18994.30 (30.21)	20707.87 (32.75)
Total Cost (A+B)	-	62384.99	67488.77	62881.83	63223.36
Gross Return	-	94773.52	103834.07	85283.60	94981.84
Net Return	-	32388.53	36345.30	22401.77	31758.48

Note : @ - Gap filling cost for Non-bearing orchards (0-2 years)

Figures in parentheses are percentages to the total cost

marginal farms (Rs. 26,901). Thus, an increase in net return of the order of 29 per cent was seen for the small category of farms over that of marginal category of farms.

In general, the per acre gross maintenance cost was estimated at Rs. 62,385, out of which 67 per cent was production cost and the remaining 33 per cent was marketing cost (Table 5.6(e)). On the other hand, the per acre gross return was estimated at Rs 94,774 for the average category of orchardists. Thus, in the case of increasing production stage orchard, a net annual income to the tune of Rs. 32,389 was seen to be obtained by an average category of orchardist from one acre grape orchard.

5.5.3 Maintenance Cost and Returns for Constant Production Stage Orchards (11-14 years)

Because of smaller sample size for marginal category, no orchardist in this category was found to have his orchard in the constant production stage. The orchards of marginal category were seen to be either in the increasing production stage or in the declining production stage. The estimates of various components of costs as well as returns in the case of constant production stage orchards are also brought out in Tables 5.6(b), 5.6(c), 5.6(d) and 5.6(e), separately for each category of orchardist under this stage of production.

In the case of constant production stage orchards, the per acre annual gross maintenance cost was estimated at Rs. 66,196 for small category, Rs. 68724 for medium category and Rs. 68983 for the large category. This observation clearly brings us closer to the fact that constant production stage orchards fetched the orchardists a much higher investment on various production and marketing operations compared to their investment on increasing production stage orchards. Further, it is to be noted that in the case of constant production stage orchards the per acre gross maintenance cost increased from small to medium and medium to large category showing, thereby, an increase in per acre gross maintenance cost with the increase in land holding size of orchardists. During this stage of production, the production cost was found to be to the tune of about 66-67 per cent of the gross maintenance cost and the remaining 33-34 per cent of this gross maintenance cost was seen to be the marketing cost. This held true for all the categories of orchardists. However, it is to be noted that in absolute terms the production cost was much higher in the case of medium category, whereas marketing cost was higher in the case of large category compared to other categories of orchardists.

Among various items of production cost, prorated establishment cost alone

accounted for 34 per cent of the gross maintenance cost in the case of small category and 35 per cent in the case of medium and large categories. The share of labour cost in the gross maintenance cost was seen to be to the tune of about 6 per cent for various categories of orchardists. An interesting feature that emerged through examination of Tables 5.6 (b), 5.6(c), and 5.6(d) was the decline in the expenditure on material inputs with the rise in the size of land holding of the orchardists. This decline was seen not only in absolute terms but also in terms of its share in gross maintenance cost of production.

In the case of marketing cost, a negative relationship was noticed between the share of packing material cost in gross maintenance cost and the land holding size of orchardists, though in absolute terms the expenditure on packing material was found to be much higher in the case of medium category compared to small and large categories. The expenditure on labour employment in various marketing functions turned out to be of the same order for various categories of orchardists and this expenditure stood at around 6 per cent of the gross maintenance cost of production. An increase in expenditure was observed with the increase in land holding size of orchardists in the case of various marketing charges such as freight for transport, octroi, commission and fee, etc.

The per acre gross return for various categories of orchardists turned out to be much higher in the case of constant production stage orchardists compared to increasing production stage orchards. The per acre gross return was estimated at Rs 103,099 for small category of orchardists, Rs 102,849 for medium category of orchardists and Rs 104,671 for large category of orchardists. Thus, one acre grape orchard yielded much higher net annual income in the case of small category compared to other category of orchardists, though the gross annual return from one acre grape orchard was relatively higher in the case of large category compared to medium and small categories.

On an average, the per acre annual gross maintenance cost was estimated at Rs. 67,489, out of which 66 per cent was production cost and the remaining 34 per cent was marketing cost (Table 5.6 (e)). The shares of prorated establishment cost, labour cost (both in production and marketing operations) and material input cost in the gross maintenance cost of grape production, particularly in the case of constant production stage orchards, were found to be of the order of 34 per cent, 12 per cent and 11 per cent, respectively. In

this particular case, the per acre gross return was estimated at Rs. 103,834. Thus, in the case of constant production stage, one acre grape orchard yielded a net annual income of the order Rs. 36,345 for the average category of orchardist.

5.5.4 Maintenance Cost and Returns for Decreasing Production Stage Orchards (15-25 years)

In the case of decreasing production stage orchards, the estimated figures for per acre annual gross maintenance cost varied from Rs. 55,634 in the case of marginal category to Rs. 65,210 for large category showing, thereby, an increase in gross annual expenditure to the tune of 17 per cent in the case of large category over that of marginal category (Table 5.6 (a) and 5.6 (d)). In the case of small and medium category of orchardists, the estimated figures for per acre annual gross maintenance cost turned out to be of the order of Rs. 61840 and Rs. 61244, respectively, showing, thereby, a very little difference in maintenance expenditure for these two categories of orchardists (Table 5.6 (b) and 5.6 (c)). The share of production cost in gross maintenance cost was seen to be very high in the case of decreasing production stage orchards which was mainly due to very high share of prorated establishment cost in the gross maintenance cost of production. The share of production cost in gross maintenance cost varied from 68 per cent in the case of medium category to more than 71 per cent in the case of small category. On the other hand, the share of marketing cost in gross maintenance cost varied from 29 per cent in the case of small category to 32 per cent in the case of medium category.

As for various components of production cost, prorated establishment cost alone accounted for about 35-40 per cent of the gross maintenance cost in the case of different categories of orchardists. A sharp increase in expenditure on material input was seen with the increase in land holding size of orchardists, the increase in expenditure on material inputs being to the tune of 25 per cent in the case of large category over that of marginal category. Nonetheless, the share of material input cost in gross cost of production remained by and large constant among different categories of orchardists and this share was found to hover at around 10 per cent. The expenditure on labour employment in various production operations also increased steadily with the increase in land holding size of grape orchardists. However, in terms of share of labour cost in gross maintenance cost, no

significant difference was seen among various categories of orchardists. Another interesting feature was the increase in human labour cost with the increase in the land holding size of orchardists. In dismal contrast to this, a decline in bullock labour cost was seen with the rise in land holding size of orchardists. A break-up of human and bullock labour cost is given in Appendix 3(a) to 3(d) which clearly shows a much higher absorption of human labour in various production operations such as interculture, spraying of insecticides and pesticides, pruning and watch and ward.

A steady increase in expenditure on labour employment in various marketing functions was also seen with the increase in land holding size of orchardists. However, it is to be noted that the share of labour cost in gross maintenance cost remained more or less constant and hovered at around 5 per cent across various categories of orchardists. In general the expenditure on all the components of marketing cost increased from marginal to small, small to medium and medium to large category.

As for returns, the per acre gross annual return was estimated at Rs. 74,524 in the case of marginal category, Rs. 85,952 for small category, Rs. 89,390 for medium category and Rs. 85,809 for large category. The gross return estimates clearly showed a much higher return in the case of medium category compared to other categories of orchardists. The gross return of medium category was seen to increase by 20 per cent over that of marginal category. As regards net return, it was estimated at Rs. 18,890 in the case of marginal category of orchardists, Rs. 24,112 for small category, Rs. 18,145 for medium category and Rs. 20,600 for large category of orchardists. Thus, the difference in net return was seen to be much higher than difference in gross returns among various categories of orchardists. In the case of decreasing production stage orchards, the medium category of orchardists received 49 per cent higher net annual income from one acre grape orchard compared to their counterpart in marginal category.

A few points need to be emphasized in the light of the changes that took place in the structure of cost and returns over different stages of production across various categories of orchardists. First, the per acre annual gross maintenance cost of grape orchardists increased sharply from increasing to constant production stage and declined thereafter (Table 5.6 (e)). The per acre gross and net annual returns for the average

category of orchardist also found to follow a trend similar to that of per acre gross maintenance cost, that is, an increase in gross and net annual returns from the increasing to constant production stage and a sharp decline in the same during the declining production stage. Second, the prorated establishment cost of the orchardist increased in every successive stage of production even though the per acre production cost declined from constant to declining production stage after showing an increase in the same from increasing to constant production stage. Third, the share of labour cost and material input cost in gross maintenance cost of production declined from increasing to constant and constant to decreasing production stage, though in absolute terms the expenditure on labour employment and on various material inputs increased from increasing to constant production stage. A similar trend was noticed in the case of expenditure of the orchardist on packing material. The share of packing material cost in gross maintenance cost of production declined with every successive stage of production despite the fact that in absolute terms the expenditure of the orchardist rose sharply on packing material from increasing to constant production stage, though thereafter a steep decline in the same was also seen. Fourth, in the case of medium category of orchardists, the per acre expenditure on material input declined sharply from increasing to constant and constant to decreasing production stage, both in absolute terms and in terms of its share in per acre gross maintenance cost. Fifth, during each stage of production, in general the expenditure on various items of cost, both production and marketing, increased with the increase in land holding size of orchardists, that is, big orchardists invested more on various items of cost compared to small orchardists. Sixth, small category of orchardists obtained higher net annual returns from one acre of grape orchard compared to other categories of orchardists, and this held particularly true in the case of increasing and constant production stage orchards. In the case of decreasing production stage orchards, the per acre net annual income turned out to be higher for medium category compared to other categories of orchardists.

5.5.5 Maintenance Cost and Returns for All- Bearing Age Orchards

Based on estimates of various components of costs, both production and marketing, and also returns during different stages of production, an overall average scenario of cost

and return estimates was drawn for various categories of orchardists and this has been termed as scenario of estimates for all-bearing age of production and the same estimates are brought out in Tables 5.6(a), 5.6(b), 5.6(c), 5.6(d) and 5.6(e).

In the case of all-bearing age, the per acre annual gross maintenance cost was estimated at Rs. 53,828 for marginal category, Rs. 59,431 for small category, Rs. 66,473 for medium category and Rs. 63,795 for large category of orchardists. Thus, an increase in total expenditure of the order of 23 per cent was seen in the case of medium category over that of marginal category in the maintenance of one acre grape orchard. On breaking this gross maintenance cost of production into various components of cost, it was noticed that among various categories of orchardists about 67 per cent of the expenditure of the gross maintenance cost was incurred on various production related operations and the remaining 33 per cent of the same was incurred on various marketing related functions. Among various components of production cost, the prorated establishment cost alone accounted for about 34-35 per cent of the gross maintenance cost of production. The share of material input cost in gross maintenance cost of production was seen to be about 10-11 per cent. This held true for all the categories of orchardists. Similarly, among various categories of orchardists, the share of labour cost in gross maintenance cost was found to be of the order of 6 per cent. As for marketing cost, about 10 per cent of the gross maintenance cost was seen to be incurred on packing material alone, whereas the share of labour cost for various marketing functions in gross cost of production was found to be to the tune of 5-6 per cent for various categories of orchardists. An increase in expenditure on various items of costs, both production and marketing, was seen with the increase in land holding size of orchardists, that is, the per acre expenditure on various items increased from marginal to small and small to medium category.

As for returns, the per acre gross annual return from grape orchard was estimated at Rs. 76,934 for marginal category, Rs. 92,755 for small category, Rs. 96,442 for medium category and Rs. 95,968 for large category. On the other hand, the per acre net annual income from grape orchard was estimated at Rs. 23,107 for marginal category, Rs. 33,324 for small category, Rs. 29,969 for medium category and Rs. 32,173 for the large category. Thus the net annual income from one acre grape orchard was found to be the highest in the

case of small category and the lowest for marginal category. Infact, the annual income of small category derived from one acre grape orchard increased by 44 per cent over that of marginal category.

5.6 Production and Utilization Pattern of Grape

In this section an attempt was made to estimate production, spoilage, consumption and sale of grapes for different categories of orchardists. A general scenario of production and utilization of grapes among different categories of orchardists irrespective of stage of production is brought out in Table 5.7.

The average per orchardist production of grapes was estimated at 71.52 quintals for marginal category, 154.52 quintals for small category, 245.12 quintals for medium category and 427.71 quintals for large category with an overall average production of 270.47 quintals for the average category of orchardists. In general, of the total production of grapes per orchardists, 11.77 per cent was spoilage (post harvest loss), 1.03 per cent was used up in home consumption, 2.12 per cent was given to labour as kind payment and the remaining 84.51 per cent was sold in the market. An important feature that was seen to emerge through examination of Table 5.7 was the declining share of spoilage in total production of grapes with the increase in land holding size of orchardists. Similarly, the payment made in kind to labourers and the share of home consumption as proportion of total production also declined with the rise in land holding size of the orchardists. Nonetheless, it is to be noted that in absolute terms the quantity used for home consumption as well as for payment to labour kind and also quantity spoilt during harvesting and during post harvest operations were much higher in the case of large category compared to other categories of orchardists. On the other end of the spectrum, the per cent sale of production increased with the increase in land holding size of orchardists. The marketed surplus as proportion of production varied from 81 per cent in the case of marginal category to 86 per cent in the case of large category.

Table 5.7 : Production and Utilization of Grapes Among Various Categories of Orchardists

Category	Total Production	(Quantity in Quintals/Orchardists)			Value(Rs.)
		Spoilage (Post-Harvest Loss)	Home Consumption	Marketed	
Marginal	71.52	10.08 (14.10)	1.44 (2.09)	57.83 (80.77)	59102.26
Small	154.52	19.92 (12.89)	2.22 (1.44)	128.35 (83.06)	139644.80
Medium	245.12	29.14 (11.89)	2.93 (1.20)	207.88 (84.80)	227836.48
Large	427.71	47.82 (11.18)	3.59 (0.84)	367.45 (85.91)	398315.80
Overall	270.47	31.83 (11.77)	2.79 (1.03)	230.11 (85.08)	250043.14

Although the spoilage of grapes as proportion of production was estimated about per cent, the actual quantity of spoilage could be much higher than what it has been noticed at the farm level. It is well nigh difficult to estimate spoilage of grapes during different post-harvest operations such as transportation, storage, etc.. Thus, the actual scenario of spoilage of grapes could be little removed from what it has been noticed in the present study. However, it is worth mentioning here that the breaking up of berry from the bunches has not been considered under spoilage since the grape producers were seen to dry up these broken berries in the sunlight for fifteen days in order to convert them into raisin and latter on sell the same in the market at reasonably good price. At the same time, it is to be noted that the spoilage of grapes during post-harvest handling reduces farmer's profit to a considerable extent.

CHAPTER VI MARKETING OF GRAPES AND ONIONS

For the development of horticulture industry in India, improvement in the marketing mechanism of fruits and vegetables is a must. 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 plan will not only increase the productivity of individual horticultural crops and their quality, these are also likely to substantially minimise the post-harvest losses, increase the total crop area cover and generate adequate quality surplus for their conversion into value-added food products. As a matter of fact, an efficient marketing system implies improving the whole gamut of marketing functions such as harvesting, grading, processing, packing, pricing, development of channels and production. Most of the marketing functions require huge capital investment which could be minimised under modern techniques of marketing. Generally, a producer farmer has to bear most of the expenses incurred during various marketing functions. It is generally seen that at the farm level the price of the produce is much lower than the prevailing market price. This is owing to the fact that various marketing operations involve significant margins in the form of cost of performing the marketing functions and the profit of various market functionaries in each marketing function. As a result of this, the consumer's price turns out to be much higher than producer's price. The fact that both production and marketing costs influence producer's price, it becomes essential to evaluate the estimates of various marketing costs involved during different marketing functions. This chapter, therefore, revolves round various aspects of marketing such as estimates of various components of marketing costs, producer's share in consumer rupee, trends in domestic and export prices over time, etc. Apart from these aspects, certain other crucial aspects such as marketing channels adopted by the farmers for the disposal of produce, prices received at various levels, price spread, pre-or post harvest contract of orchards, etc. are also delineated in this chapter.

6.1 Pre-Harvest Contract of Grape Orchards :

The practice of pre-harvest contract of orchard was seen to be very common in the study area. Usually the orchards are sold to the contractors before the harvest. The orchards are given to the contractors for varying periods on certain terms and conditions. The contractor performs various functions such as harvesting, assembling, grading, packing, transportation, etc. The practice of pre-harvest contract is adopted by the orchardists with a view to obtain pre-harvest finance and to save himself from the botheration of looking after the crop, and also to avoid various other risks associated with the marketing of the crop. However, this type of practice definitely reduces the actual profit of the orchardists and, at the same time, discourages him from producing the crop on large scale. It is to be noted here that the practice of pre-harvest contract is more common among marginal orchardists or those who have small size of orchards. The big orchardists, on the other hand, prefer to perform various marketing functions themselves.

In the present investigation, out of 50 sample orchardists, as many as 21 orchardists were seen to have given their orchards on contract due to various reasons (Table 6.1) . In the case of marginal category, 75 per cent of the sample orchardists preferred to give their orchards on contract, whereas this proportion in the case of small, medium and large category stood at 31 per cent, 29 per cent and 56 per cent, respectively. It is to be noted here that in the case of large category, only a small portion of the orchard was given on contract and that on the remaining portion various marketing functions were performed by these categories of orchardists themselves.

As many as five reasons were cited by the sample orchardists for giving their orchards on contract. The most important reasons in this respect were : to avoid labour problem in marketing operations, to avoid market problems and to avoid risk and uncertainties associated with harvesting, price of the produce and other marketing functions. The other less important reasons were : to look after other domestic work and preoccupation of the orchardists in other farm operations. The response in respect of second reason was seen to be cent per cent in the case of marginal category, 80per cent in

the case of small category, 75 per cent in the case of medium category and 78 per cent in the case of large category. As for the third reason, the response was seen to be cent per cent

Table 6.1 : Reasons for Giving Grape Orchards to Pre-Harvest Contractor

Particulars	Marginal	Small	Medium	Large	Overall
I. Total No. of Orchardists	4	16	14	16	50
II. No. of Orchards given on contract	3	5	4	9	21
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
III. Reasons for giving orchards on Contract (in percentage)					
a. Labour problems	33.33	40.00	25.00	44.44	38.10
b. to avoid market problems	100.00	80.00	75.00	77.78	80.95
c. to avoid risk & uncertainty	66.67	100.00	100.00	88.89	90.47
d. to look after other domestic work	33.33	-	-	-	4.67
e. busy in other farms operations	-	-	-	11.11	4.67
IV. Details of Orchards Given on Contract :					
1. Area under grapes (acres/orchardists)	1.58	1.30	2.25	4.22	2.77
2. No. of plants (per acre)	163	153	156	177	165
3. Value of Contract (per acre)	67,589	75,133	82,004	79,826	78,710
4. Mode of payment (in percentage)					
a) One-fourths payment at the time of finalising contract	-	20.00	-	33.33	19.04
b) Cash payment only	66.67	-	-	1.11	14.29
c) three-fourths payment at the time of finalising contract	33.33	20.00	-	-	9.52
d) payment after weighment of produce (grapes)	-	20.00	50.00	-	14.29
e) part payment at the time of contract and remaining afterwards	-	-	50.00	11.11	14.29
f) ¼ at the time of contract and remaining in instalments	-	20.00	-	22.22	14.29
g) 50% payment on the spot and balance after one month	-	20.00	-	22.22	14.29
V. Tenure of Contract for One year	3	5	4	9	21
VI. Month of Finalising Contract (%)					
a) April	33.33	40.00	50.00	44.44	42.85
b) May	66.67	60.00	50.00	55.56	57.14
VII. Terms of Contract (in percentage)					
a) Expenditure to be incurred by the farmer upto local transport	66.67	20.00	-	55.56	38.10
b) Based on quality of Orchards (variety, etc.)	33.33	40.00	50.00	22.22	33.33
c) No terms and Conditions	-	40.00	50.00	22.22	28.57
VIII. Terms Regarding payment (in percentage)- by contractor					
a) total payment within a month	33.33	-	-	33.33	19.04
b) after one month	66.67	20.00	-	22.22	23.80
c) after 15 days	-	20.00	25.00	22.22	19.04
d) in the month of May	-	20.00	-	-	4.76
e) after weighment of produce	-	40.00	25.00	-	14.28
f) 25% payment before picking and balance after harvesting	-	-	50.00	22.22	19.04
IX. Terms of picking (in percentage)					
a) picking by grower (owner)	100.00	100.00	100.00	100.00	100.00
X. Terms of plant protection (in percentage)					
a) expenditure to be incurred by grower	100.00	100.00	100.00	100.00	100.00

in the case of small and medium categories, 67 per cent in the case of marginal category and 89 per cent is the case of large category.

At the time of survey, the sample orchardists were requested to elucidate details about the mode of payment for the orchards given on contract. In general, about 19 per cent of the total sample orchardists were seen to be in favour of receiving one-fourth payment of the total value of contract at the time of finalising the same. About 14 per cent of the total sample orchardists were seen to be in favour of receiving only cash payment

from the contractor. On the other hand, about 10 per cent of orchardists were seen to be in favour of receiving three-fourth payment of the total value of contract at the time of finalising the same. The preference for other mode of payments cited by the orchardists were : payment to be received after weighment of the produce , part payment at the time of contract and remaining afterwards , one-fourth payment at the time of contract and remaining in instalments and 50 per cent payment on the spot and balance after one month. The response of the orchardists in favour of each of these four different mode of payments was about 14 per cent. In general, the contract was seen to be finalised in the month of April or May.

Certain terms and conditions were seen to be laid down by the contractor while finalising the contract. In general, the contract of the orchard was taken on the basis of quality of the orchard, that is, the variety of grapes grown in the orchard was considered as the main criterion for finalising the value of contract. At the same time, a condition was laid down by the contractor that the expenditure on local transport will be incurred by the owner of the orchard. On the other hand, about 29 per cent of the contractors were not seen to have laid down any terms and conditions while finalising the contract of the orchard.

Although owners of the orchards were seen to cite their own preferences for various mode of payments and their responses in these respects have already been discussed, the contractors, on the other hand, were seen to lay down their own terms and conditions regarding payment for the contract. The most prominent terms and conditions laid down by contractors regarding payment were : (a) total payment within a month of finalising the contract, (b) payment after one month of finalising the contract, (c) payment after 15 days, (d) payment in the month of May, (e) payment to be given after weighment of the produce and (f) one-fourth payment of the value of contract before picking and the balance after harvesting. In general, the responses of the contractors in favour of these different mode of payments were to the tune of 19 per cent, 24 per cent, 19 per cent, 5 per cent, 14 per cent and 19 per cent, respectively. In response to questions on terms regarding picking and plant protection measures, all the contractors maintained that the expenditure on such operations should be incurred by the owner of the orchard.

6.2 Marketing Channels for Grapes and Onions :

There could be numerous channels through which the produce might move from the producer to the consumer. In the case of fruits and vegetables, 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 functions of retail sellers. Some of the large producers are also seen to sell their produce directly to the processing firms. In the case of grapes and onions, the most prominent marketing channels that have been visualised are as follows:

A – Marketing Channels for Grapes

I- For Domestic Consumers :

- (i) Producer - Retailer – Domestic Consumer
- (ii) Producer - Wholesaler – Retailer – Domestic Consumer
- (iii) Producer - Private Trader - Wholesaler – Retailer – Domestic Consumer
- (iv) Producer - Coop. Society - Wholesaler – Retailer – Domestic Consumer

II- For Foreign Consumers :

- (i) Producer - Import Agent – Foreign Consumer
- (ii) Producer - Wholesaler – Exporter – Import Agent - Foreign Consumer
- (iii) Producer - Coop. Society – Import Agent - Foreign Consumer
- (iv) Producer - Coop. Society - Exporter – Import Agent - Foreign Consumer

B – Marketing Channels for Onions

I- For Domestic Consumers :

- (i) Producer - Wholesaler - Retailer – Domestic Consumer
- (ii) Producer - Private Trader - Wholesaler – Retailer – Domestic Consumer
- (iii) Producer - NAFED - Retailer – Domestic Consumer

II- For Foreign Consumers :

- (i) Producer - NAFED - Foreign Consumer
- (ii) Producer - Wholesaler - Foreign Consumer
- (iii) Producer - Wholesaler - Exporter – Foreign Consumer

6.3 Cost of Marketing of Grapes :

The sample grape orchardists in the study area were seen to market their produce either through forwarding agents in wholesale market or through commission agents or directly to the wholesaler. The computation of marketing cost was done separately for each of these three different methods of sale through which the produce was sold by the orchardists. Further, it is worth mentioning here that this computation of marketing cost was done for each category of orchardists, particularly for a box containing 4 kg. of grapes. While working on the estimation of marketing cost, the total cost of marketing was broadly classified into three components of costs such as cost of preparation of fruits – cost of picking/plucking, assembling, grading, packing and packing material, cost of transportation – local transportation cost and expenditure on loading/unloading, and marketing charges – freight for transport, octroi, state tax, commission and fee and other expenses. The estimates of various components of marketing costs are brought out in Table 6.2.

In the case of grapes marketed through forwarding agent in wholesale market, the per box (4 kgs.) total marketing cost was estimated at Rs.12.05 for marginal category, Rs. 10.76 for small category, Rs. 12.79 for medium category and Rs. 12.58 for the large category with an overall average of Rs. 12.35 for the average category of orchardist. Thus, the total marketing cost was seen to be the lowest in the case of small category and it turned out to be the highest in the case of medium category. Of the total cost of marketing, the cost of preparation of fruits alone accounted for about 39 per cent in the case of marginal category, 45 per cent for small category, 40 per cent for medium category and 39 per cent for large category with an overall average of 40 per cent in general. The share of local transportation cost in the total cost of marketing was seen to be of the same order among different categories of orchardists and it was seen to hover at around 6 per cent. The share of various marketing charges put together in total marketing cost also did not vary much among various categories of orchardists with small category being the only aberration in this scenario. In the case of small category, marketing changes, taxes, etc. accounted for 49 per cent of the total marketing cost, whereas in the case of marginal, medium and large categories this share was found to be about 55 per cent. In general, of the total cost of preparation of fruits, packing material alone accounted for about 69 per

Table 6.2 : Cost of Marketing of Grapes by Sample Orchardists According to Different Marketing Channels

(Rs./Box of 4 kg.)

Particulars	Marginal	Small	Medium	Large	Overall
I- Through forwarding Agent					
In Wholesale Market					
A. Cost of Picking, Assembling, Grading etc.					
a) Picking/Plucking	0.43	0.55	0.59	0.63	0.61
b) Assembling	0.49	0.34	0.47	0.30	0.34
c) Grading	0.32	0.24	0.37	0.33	0.32
d) Packing	0.47	0.38	0.23	0.24	0.26
e) Packing Material	3.02	3.34	3.40	3.42	3.40
Total	4.73 (39.25)	4.85 (45.07)	5.06 (39.56)	4.92 (39.11)	4.93 (39.92)
B. Transportation					
a) Local Transport	0.40	0.37	0.41	0.41	0.39
b) Loading/Unloading	0.32	0.23	0.37	0.31	0.30
Total	0.72 (5.98)	0.60 (5.58)	0.78 (6.10)	0.72 (5.72)	0.69 (5.59)
C. Marketing Charges, Taxes, etc.					
a) Freight	2.62	1.99	2.75	2.83	2.69
b) Octroi	0.79	0.61	0.92	0.95	0.89
c) State Tax	1.00	1.00	1.00	1.00	1.00
d) Commission and fee	1.70	1.39	1.87	1.73	1.70
e) Miscellaneous	0.49	0.32	0.41	0.43	0.45
Total	6.60 (54.77)	5.31 (49.35)	6.95 (54.34)	6.94 (55.17)	6.73 (54.49)
Total Marketing Cost (A+B+C)	12.05	10.76	12.79	12.58	12.35
Cost Per Kg.	3.01	2.69	3.20	3.15	3.09
II- Through Commission Agent					
A. Cost of Picking, Assembling, Grading etc.					
a) Picking/Plucking	-	0.50	0.42	0.56	0.48
b) Assembling	-	0.30	0.25	0.25	0.27
c) Grading	-	0.26	0.20	0.21	0.23
d) Packing	-	0.21	0.28	0.20	0.23
e) Packing Material	-	3.00	3.21	3.22	3.09
Total	-	4.27 (44.30)	4.27 (42.03)	4.44 (41.65)	4.30 (42.70)
B. Transportation					
a) Local Transport	-	0.24	0.29	0.50	0.32
b) Loading/Unloading	-	0.30	0.20	0.24	0.25
Total	-	0.54 (5.60)	0.49 (4.82)	0.74 (6.94)	0.57 (5.66)
C. Marketing Charges, Taxes, etc.					
a) Freight	-	1.59	1.95	1.89	1.79
b) Octroi	-	0.74	0.87	1.00	0.85
c) State Tax	-	1.00	1.00	1.00	1.00
d) Commission and fee	-	1.20	1.30	1.14	1.23
e) Miscellaneous	-	0.30	0.28	0.45	0.33
Total	-	4.83 (50.10)	5.40 (53.15)	5.48 (51.41)	5.20 (51.64)
Total Marketing Cost (A+B+C)	-	9.64	10.16	10.66	10.07
Cost Per Kg.	-	2.41	2.54	2.67	2.52

Table 6.2 : (Contd.)

Particulars	Marginal	Small	Medium	Large	Overall
III Directly to Wholesaler (Self Forwarding Agent)					
A. Cost of Picking, Assembling, Grading etc.					
a) Picking/Plucking	0.48	0.52	0.39	0.38	0.40
b) Assembling	0.19	0.18	0.17	0.18	0.18
c) Grading	0.24	0.20	0.31	0.22	0.24
d) Packing	0.22	0.39	0.19	0.23	0.24
e) Packing Material	3.01	3.09	3.12	3.15	3.13
Total	4.14 (87.90)	4.38 (88.31)	4.18 (90.67)	4.16 (86.49)	4.19 (87.66)
B. Transportation					
a) Local Transport	0.29	0.31	0.19	0.34	0.30
b) Loading/Unloading	0.28	0.27	0.24	0.31	0.29
Total	0.57 (12.10)	0.58 (11.69)	0.43 (9.33)	0.65 (13.51)	0.59 (12.34)
Total Marketing Cost (A+B)	4.71	4.96	4.61	4.81	4.78
Cost Per Kg.	1.18	1.24	1.15	1.20	1.20

Note : Figures in parentheses are percentages to the total marketing cost.

cent. As a matter of fact, among various items of marketing costs, the major expenditure of the orchardist was seen to be incurred on packing material, freight for transport, octroi, state tax and on commission and fee.

As for marketing of grapes through commission agent, the total estimated per box marketing cost was seen to be Rs. 9.64 for small category, Rs.10.16 for medium category and Rs. 10.66 for the large category with an overall average of Rs. 2.52 for the average category of orchardists. The marginal category of orchardists were not seen to market their produce through commission agent. The total marketing cost in the case of produce sold through commission agent was found to be lower compared the cost of marketing in the case of produce sold through forwarding agent in wholesale market. This held true among all the categories of orchardists. In this case, the cost of preparation of fruit as proportion of total marketing cost was found to be 44 per cent in the case of small category, 42 per cent for medium category and nearly 42 per cent in the case of large category showing, thereby, a decline in this proportion with the increase in land holding size of orchardists. The share of local transportation cost was again found to be 5-6 per cent in the total cost of marketing among various categories of orchardists. The share of various marketing charges put together in total marketing cost varied from 50 per cent in the case of small category to 53 per cent in the case of medium category. The per kg.

marketing cost was found to increase from small to medium and medium to large category. In general, the per kg. marketing cost was estimated at Rs. 2.52.

In the case of produce sold by the orchardists directly to the wholesaler, the per box marketing cost was estimated at Rs. 4.71 for marginal category, Rs.4.96 for small category, Rs. 4.61 for medium category and Rs. 4.81 for the large category with an overall average of Rs. 4.78 for the average category of orchardists. In this case, among various components of marketing cost, the cost of preparation of fruit alone accounted for 86-91 per cent of the total cost of marketing for different categories of orchardists. The remaining 9-14 per cent of the total marketing cost was seen to be the expenditure on local transport. Of the total cost of marketing, the bulk of the expenditure was seen to be on packing material which varied from 62 per cent in the case of small category to 68 per cent for medium category. However, in absolute terms, the expenditure on packing material increased with the increase in land holding size of orchardists.

Thus, the per box total marketing cost was estimated to be the highest in the case of produce sold through forwarding agent in wholesale market compared to produce sold through other marketing channels. The least per box marketing cost was seen in the case of produce sold by the orchardists directly to the wholesaler.

6.4 Cost of Marketing of Onions :

All the sample producers were seen to market their produce through the forwarding agent in the wholesale market. This type of practice was seen both in kharif and rabi season. Although onion was seen to be sold in the market in gunny bags containing 50 kg. of the produce, the estimation of marketing cost was done on per quintal basis. In this case, the total cost of marketing was broadly classified into two major components such as cost of preparation of the produce – cost of grading, packing, loading/unloading, etc. and various market charges – freight for transport, commission and fee, taxes (if any), etc. The estimates of various components of marketing costs in the case of onion are brought out in Table 6.3, separately for kharif and rabi season.

In kharif season, the per quintal cost of marketing of onion varied from Rs. 19.92 in the case of small category to Rs. 29.49 in the case of medium category. As for marginal

Table 6.3 : Cost of Marketing of Onions by Sample producers in Kharif and Rabi Season
(Through forwarding Agent in Wholesale Market)

Particulars	Marginal	Small	Medium	Large	Overall
KHARIF SEASON					
A. Grading, Packing, Loading etc.					
a) Grading	3.07	3.10	2.97	2.50	2.73
b) Pakcing	1.39	1.49	1.42	1.22	1.31
c) Loading/Unloading	1.75	1.51	1.37	1.40	1.42
d) Others (Including Assembling)	2.33	1.72	1.63	1.44	1.57
Total	8.54 (33.77)	7.57 (38.00)	7.39 (25.06)	6.56 (25.76)	7.03 (27.30)
B.Freight, Commission and Other Charges					
a) freight	8.00	5.23	9.53	8.66	8.38
b) Commission and fee	5.92	4.08	7.85	7.13	6.84
c) Others (Including taxes, if any)	2.83	3.04	4.72	3.12	3.50
Total	16.75 (66.23)	12.35 (62.00)	22.10 (74.94)	18.91 (74.24)	18.72 (72.70)
Total Marketing Cost (A+B)	25.29	19.92	29.49	25.47	25.75
Cost Per kg.	0.25	0.20	0.29	0.25	0.26
RABI SEASON					
A. Grading, Packing, Loading etc.					
a) Grading	3.28	2.94	3.14	2.72	2.96
b) Pakcing	1.71	1.59	1.51	1.27	1.46
c) Loading/Unloading	1.49	1.35	1.32	1.21	1.31
d) Others (Including Assembling)	1.53	1.02	0.99	0.84	1.00
Total	8.01 (31.79)	6.90 (33.89)	6.96 (30.49)	6.04 (20.34)	6.73 (26.98)
B.Freight, Commission and Other Charges					
a) freight	7.71	5.57	6.77	9.64	7.61
b) Commission and fee	5.67	4.51	4.67	7.93	5.89
c) Others (Including taxes, if any)	3.81	3.38	4.43	6.08	4.71
Total	17.19 (68.21)	13.46 (66.11)	15.87 (69.51)	23.65 (79.66)	18.21 (73.02)
Total Marketing Cost (A+B)	25.20	20.36	22.83	29.69	24.95
Cost Per kg.	0.25	0.20	0.23	0.30	0.25

and large category of producers, no significant difference in total cost of marketing of onion was seen and in these two cases the estimated figures for the same turned out to be around Rs. 25 per quintal. The bulk of the expenditure of the total marketing cost was seen to be incurred on transportation, commission and fee and on other marketing charges. In general, the share of various marketing charges put together in total cost of marketing

was found to be 73 per cent. The remaining 27 per cent of the total marketing cost was seen to be incurred on the preparation of produce for the market. An interesting feature that emerged through examination of Table 6.3 was the steady decline in expenditure on preparation of produce with the increase in land holding size of producers. The expenditure on preparation of produce declined from Rs.8.54 per quintal in the case of marginal category to Rs. 6.56 per quintal in the case of large category. Nonetheless, as for various market charges, the expenditure on the same was found to be the highest in the case of medium category (Rs.22.10) followed by large (Rs. 18.91) marginal (Rs. 16.75) and small category (Rs.12.35).

In the case of marginal and small category of producers, the per quintal total marketing cost was seen to be the same in rabi season as noticed in kharif season (Table 6.3). However, in the case of medium category, a decline in expenditure to the tune of 23 per cent was seen in rabi season over that of its expenditure in kharif season. Contrary to this, the total marketing expenditure of large category increased by 17 per cent in rabi season over that of its expenditure in kharif season. In general, the total cost of marketing was found to be slightly lower in rabi season compared to kharif season. In rabi season too, the expenditure on preparation of fruit accounted for 27 per cent of the total cost of marketing and the remaining 73 per cent of the same owed it to various marketing charges.

6.5 Producer's Share in Consumer Rupee in Domestic Market :

The estimates of producer's share in consumer rupee together with a spectrum of produce prices at various levels for various categories of grape orchardists are brought out in Table 6.4. Similar figures for various categories of onion producers are brought out in Table 6.5. The estimation of producer's share in consumer rupee was done taking into account the consumer market prices of grapes and onions prevailing in Gultekdi Market Yard of Pune during 1996-97 marketing season.

The producer's share in consumer rupee turned out to be very high in case of all the categories of grape orchardists. This share was seen to vary from 55.71 per cent in the case of marginal category to 60.46 per cent for medium category with an overall average share of 59.49 per cent for the average category of orchardists (Table 6.4). A

scale effect was seen between prices at various levels and the category of orchardists, that is, the prices tended to increase from marginal to small and small to medium category, though in the case of large category the prices at various levels were slightly lower compared to medium category.

Although the share of producer's price in consumer rupee stood reasonably at very high level in case of all the categories of grape orchardists, such was not the case in case of onion producers. In general, for the average category of onion producers, the

Table 6.4 : Producer's Share in Consumer's Rupee in Grapes produced on Sample Farms
(Rs./Box of 4 kg.)

Particulars	Marginal	Small	Medium	Large	Overall
I. Price Levels					
a) Farm gate price	36.88	39.52	43.82	42.16	41.86
b) Wholesale price	50.10	51.28	55.72	54.06	53.78
c) Retailers price	57.16	57.82	63.24	62.32	61.45
d) Consumer's price	66.20	69.18	72.48	70.08	70.38
II Producer's share in consumers rupee(%)	55.71	56.78	60.46	60.16	59.49

Table 6.5 : Producer's Share in Consumer Rupee in Onions Produced on Sample Farms
(Rs./Box of 4 kg.)

Particulars	Marginal	Small	Medium	Large	Overall
KHARIF SEASON					
I. Price Levels					
a) Farm gate price	203.00	197.00	206.00	192.00	197.00
b) Wholesale price	337.00	318.00	346.00	309.00	321.00
c) Retailers price	418.00	402.00	425.00	395.00	405.00
d) Consumer's price	467.00	445.00	478.00	440.00	452.00
II Producer's share in consumers rupee(%)	43.47	44.27	43.10	43.64	43.58
RABI SEASON					
I. Price Levels					
a) Farm gate price	211.00	205.00	203.00	215.00	209
b) Wholesale price	315.00	306.00	302.00	320.00	311
c) Retailers price	392.00	373.00	353.00	399.00	378
d) Consumer's price	455.00	440.00	426.00	462.00	445
II Producer's share in consumers rupee(%)	46.37	46.59	47.65	46.54	46.97

producer's share in consumer rupee was estimated at 44 per cent in the case of rabi season and at 47 per cent for kharif season. Across various categories of producers, this share was seen to be the highest in case of small category (44.27 per cent) during kharif season and for medium category (47.65 per cent) in rabi season. The lowest share was estimated for medium category (43.10 per cent) in case of kharif season and for marginal category

(46.37 per cent) in case of rabi season. However, it is to be noted that among various categories of producers there was no significant difference in producer's share in consumer rupee. This held true both in kharif and rabi season. At the same time, it is worth mentioning that the prices prevailing at various levels different significantly across various categories of producers. The medium category of producers during kharif season and large category of producers in rabi season were seen to realise much higher price at various levels compared to other categories of producers. On the other hand, the prices realised at various levels by small category during kharif season and medium category during rabi season turned out to be the least compared to other categories of producers.

The higher producer's share in consumer rupee in the case of grapes could be considered as a pointer to the lower availability of profit margins for various market intermediaries during different marketing functions. On the other hand, the reverse could be considered true in case of onion since in this case the share was seen to fall in the range of 43 per cent to 48 per cent across various categories of producers during kharif and rabi season.

Although the price estimates at various levels do provide us an insight into the magnitude of marketing margins prevailing at various levels, these estimates, however, do not reveal the extent of fluctuation in prices over time, particularly in respect of wholesale prices. In chapter III, an attempt was made to trace the reasons for the slow growth in output of onion in the state of Maharashtra. Earlier the reason for this unseemly trend was attributed to time-scale fall in productivity of this crop in most of the districts of the state. However, the decline in productivity might not be the only cause responsible for poor production growth of this high value crop. Highly fluctuating nature of onion prices might have also played a major role in the slow output growth of onion in the state of Maharashtra. An attempt, therefore, was made in the subsequent sections to evaluate the trend in onion prices over the past fifteen years and assess the changes that impacted the aggregate output values of onions during the period from 1981/82 – 1983/894 to 1991/92 – 1993/94 in the state of Maharashtra.

6.6 Price Behaviour of Onions in Maharashtra :

Large scale fluctuations in the wholesale prices of onions could be observed in the state of Maharashtra over the past decade and a half. Though, in general, the prices of onions were found to increase over time, time-scale deceleration in the same could also be observed during some phase or the other over the overall period (Table 6.6). Thus, onion prices were seen to decline between the years 1981/82 and 1982/83 only to pick up in the following year. However, these prices again took a beating between 1983/84 and 1984/85, increased sharply thereafter only to get caught in the morose of steadily declining prices between the period 1987/88 to 1989/90 (Table 6.6 and figure 1). Although wholesale prices of onions increased by about two folds between 1989/90 and 1990/91, the subsequent two years saw these prices to plummet over once again. The period between 1992/93 and 1995/96 yet again was market with the trend of rise and fall in the wholesale prices of onions (Table 6.6 and figure 1). Nonetheless, it should be noted that during the period between 1984/85 and 1995/96, the wholesale prices of onions in the state of Maharashtra increased by nearly three and a half times notwithstanding deceleration in these prices observed during some of the phases of this overall period.

Although monthly wholesale prices of onions over the past 15 years are also shown in Table 6.6, these were not of much help^p in revealing the general price trend as considerable amount of fluctuation in these prices could be observed during different years. Because of wide fluctuations, no concrete conclusion could be drawn as regards the degree of instability in monthly wholesale prices during different years. In order to understand the underlying instabilities in wholesale prices of onions better, the monthly data for the period 1981/82 to 1995/96 were used to compute 12 monthly moving totals. These moving totals became the basis for computing specific seasonal relatives and, thereby, seasonal indices. The typical seasonal indices of wholesale prices of onions so obtained, in turn, formed the basis for delineating trend in monthly prices of onions during the past 15 years. These indices, thus, computed are presented in Table 6.7.

FIGURE 1 : TREND IN WHOLESALE PRICES OF ONIONS IN MAHARASHTRA

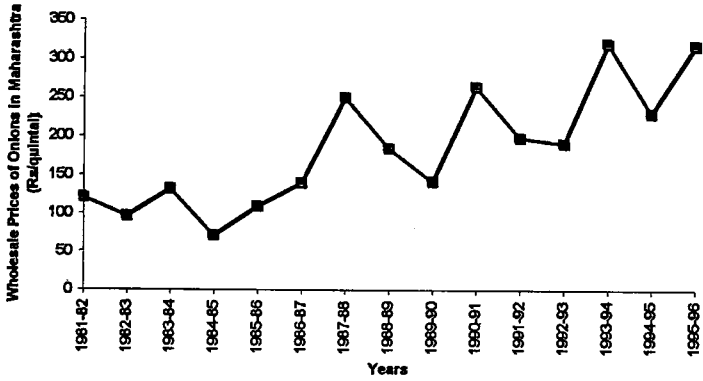
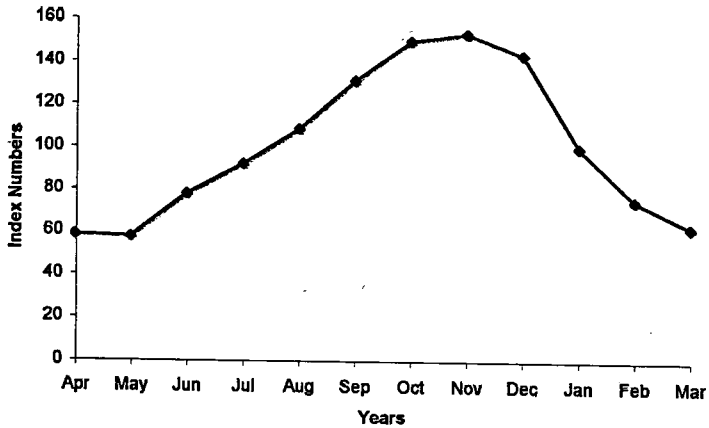


FIGURE 2 : SEASONAL INDEX OF WHOLESALE PRICES OF ONIONS IN MAHARASHTRA 1981-82 TO 1995-96



The wholesale price figures of onions obtaining in Maharashtra over the last 15 years and shown in Table 6.7 clearly exhibited the fact that while these prices peaked in the month of November, they touched their lowest in the month of May. June through November marked the period when the wholesale prices of onions were found to be in the midst of a rising trend. In general, the wholesale prices of onions for the state peaked during the month of September, October, November and December and February, March, April, May and June marked the lean months in this respect (Table 6.7 and figure 2). A noticeable trend emerging out from this analysis was the steep and steady decline in wholesale prices of onions during the period between November and February and a sharp increase in the same during the period between May and October.

The foregoing analysis was a pointer to the fact that not only the wholesale prices of onions tended to fluctuate widely during different years over the past fifteen years, but, within the same year also, there was considerable variation in its wholesale prices during different months. It might be worth mentioning here that the post-harvest fluctuation in prices of onions was the major problem faced by the onion growers. Perishable nature of this high value crop meant that it could not be safely stored under normal ambient conditions for long. In fact, factors such as the variety of onions, the time of arrival of the produce in the assembly market, domestic consumption requirements and export demand were the major determinants governing the wholesale prices of onions. Delay in the arrival of kharif crop owing to unfavourable weather conditions was also found to impact the wholesale prices of onions to a considerable extent .

Having discussed the price trend of onions over the past one and a half decades in the state of Maharashtra, let us now examine the effects of yield, area and prices of onions and their interactions on the change in the total value of onion production in different districts of this state.

Table 6.6 : Trends in Wholesale Prices of Onions in Maharashtra (1981/82 – 1995/96)
(in Rs/quintal)

Year	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Annual Average	Change (%)
1981-82	42	43	64	83	110	124	239	250	218	108	75	83	120	-
1982-83	44	43	77	100	111	111	117	133	144	104	87	67	95	-20.83
1983-84	74	79	95	143	150	220	204	225	160	91	75	59	131	+37.89
1984-85	47	48	52	62	70	56	75	67	136	79	77	70	70	-46.56
1985-86	72	72	74	74	77	128	153	197	143	133	105	70	108	+54.29
1986-87	68	62	91	107	117	194	222	253	176	149	103	110	138	+27.78
1987-88	102	150	244	289	388	388	398	280	175	191	210	158	248	+79.71
1988-89	142	123	155	173	158	155	233	357	288	166	139	112	183	-26.21
1989-90	98	73	97	116	120	149	223	278	252	100	75	99	140	-23.50
1990-91	90	100	160	170	200	325	370	300	500	517	210	193	261	+86.43
1991-92	165	134	198	220	367	387	318	252	108	82	59	56	196	-24.90
1992-93	106	130	183	192	183	178	173	177	219	232	315	176	189	-3.57
1993-94	165	165	191	185	235	444	488	488	500	525	265	140	316	+67.20
1994-95	137	100	156	198	287	383	445	250	331	193	122	122	227	-28.16
1995-96	140	158	271	334	505	450	552	552	300	209	157	143	314	+38.33

- Notes : 1) Monthly figures are computed from the week-end prices given for different market centres in Agricultural situation in India
 2) Prices correspond to various market centres of Maharashtra such as Bombay, Nasik and Lasalgaon
 3) Prices correspond to various varieties of onions such as Pole, Nasik I – Rangada and Hot

Table 6.7 : Computation of Typical Seasonal Index for Wholesale Prices of Onions in Maharashtra Over the Past Fifteen Years : (1981/82 – 1995/96)

Rank	Specific Seasonal Relative As A Percentage												Total
	Apr.	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	
1	83.06	93.72	130.52	127.08	172.13	192.34	199.17	208.19	183.88	187.60	158.49	87.05	
2	76.22	75.52	105.46	123.99	162.36	167.19	188.99	200.94	181.53	171.69	99.74	83.02	
3	71.68	67.35	87.55	108.12	162.15	162.23	164.73	197.92	180.73	121.14	94.52	77.88	
4	69.85	63.13	81.35	107.15	118.21	157.88	159.67	183.40	174.75	117.84	93.06	68.89	
5	60.97	62.91	81.18	104.90	116.03	143.60	159.62	176.18	166.71	103.49	85.90	67.96	
6	60.52	61.32	78.11	92.58	113.28	142.65	159.57	175.49	163.02	100.36	84.54	65.61	
7	56.01	61.21	73.41	89.42	108.93	139.88	156.77	156.98	142.46	98.59	81.28	59.88	
8	55.34	53.81	73.24	89.08	101.57	126.70	155.04	147.06	134.99	88.62	73.78	59.70	
9	52.01	52.25	72.77	79.95	83.07	118.34	141.67	134.57	132.77	88.60	66.52	59.18	
10	50.34	48.41	71.25	77.77	83.48	116.23	139.95	132.34	128.39	80.73	61.16	57.51	
11	48.35	46.14	69.05	75.63	87.04	106.02	128.32	112.02	114.13	76.18	55.07	53.29	
12	45.98	46.14	66.56	75.40	80.71	96.91	121.77	111.56	111.26	75.49	48.49	45.44	
13	45.10	40.36	63.23	71.44	73.21	83.63	105.70	91.78	71.39	67.08	45.12	43.22	
14	37.77	33.76	55.03	59.51	71.96	80.62	90.52	90.75	56.95	43.66	32.96	34.44	
M.T.	692.37	680.55	923.16	1095.43	1290.04	1560.86	1781.80	1820.24	1701.73	1189.81	889.28	741.58	
M.M.	57.70	56.71	76.93	91.29	107.50	130.07	148.48	151.69	141.81	99.15	74.11	61.80	1197.24
S.I.	57.83	56.84	77.11	91.50	107.75	130.37	148.82	152.04	142.14	99.38	74.28	61.95	1200.00

Correction Factor : 1200.00/1197.24 = 1.0023053

Note : Seasonal relatives have been computed from monthly wholesale prices, which in turn were calculated from average weekend wholesale prices prevailing in Nasik and Bombay Markets for various varieties of onions during different years.
 M.T. = Modified Total, M.M. = Modified Mean, S.I. = Seasonal Index

Source of Basic Data: Agricultural Situation in India, Vol.s 37 to 51.

6.7 Measurement of the Effects of Area, Yield and Prices Towards Increase in Value of Onion Output

Effects of yield, area, prices and their interactions on the rise in value of production of onions in different districts of Maharashtra during the period from 1981/82

- 1983/84 to 1991/92 – 1993/94 are summarised in Table 6.8. The total increase in value of onion production in the state of Maharashtra over the given period was of the order of about 1314 million rupees. Most of this increase was found to be due to price effect with area effect impacting this scenario only to some extent. The effect of yield on the rise in value of this high value crop was negative. Even the effects of interactions between area and yield, price and yield and among area, yield and prices were negative. However, the overall interaction effect was observed to be positive and quite substantial too due mainly to effect of interaction between price and area. Most of the districts in Maharashtra followed this trend with Ahmednagar and Satara districts being the only notable exceptions. In case of Ahmednagar and Satara districts, the overall interaction effect outweighed the individual effects of yield, area and price. In these two districts, though the effect of yield towards rise in value of onion output was positive, its magnitude remained very low. In fact, Ahmednagar district stood out as the second most important district of Maharashtra, next only to Nasik district, in terms of its contribution towards rise in value of onion production in this state. The total increase in value of onion production in Ahmednagar district during the given period of time was to the tune of 250 million rupees; of which nearly 5 per cent owed it to the yield effect, 28 per cent to area effect, 12 per cent to price effect and the remaining 55 per cent owed it to various interaction effect. Satara district showed 3 per cent rise in value of onion production due to yield effect, 29 per cent rise due to area effect, 28 per cent due to price effect and the remaining 40 per cent due to various interaction effects. It might be of interest to note here that in case of Jalgaon and Solapur districts, even the effect of area towards rise in value of onion production was negative, apart from negative effects of yield and interactions between price and yield and price and area. It was mainly rise in price of onions that had a bearing on the rise in value of onion production in these two districts over time as all the other factors were found to impact the rise in the value of onion production negatively. Even in Nasik district, about 85 per cent rise in value of onion production during the given period was due to rise in prices of onions. Pune district also followed a trend similar to that of Nasik district in terms of factors affecting change in

Table 6.8 : Effects of Area, Yield and Price in The Change of Value of Onion Production During the Period (1981/82 – 1983/84 to 1991/92 –1993/94)
(in Lakh Rupees)

District	Total Change	Yield Effect	Area Effect	Price Effect	Interactions				
					Area and Yield Effect	Price and Yield Effect	Price and Area Effect	Area, Yield and Price Effect	Total Interaction
Nasik	3801	-44 (-1.16)	341 (8.97)	3209 (84.42)	-5 (-0.13)	-46 (-1.20)	353 (9.28)	-7 (-0.18)	295 (7.77)
Dhule	485	-52 (-10.67)	-	590 (121.69)	-	-53 (-11.02)	-	-	-53 (-11.02)
Jalgaon	236	-29 (-12.20)	-44 (-18.51)	377 (159.58)	3 (1.46)	-30 (-12.63)	-45 (-19.22)	4 (1.52)	-68 (-28.87)
Ahmednagar	2503	117 (4.68)	690 (27.58)	308 (12.31)	272 (10.85)	121 (4.84)	714 (28.54)	281 (11.20)	1388 (55.43)
Pune	2675	-238 (-8.88)	535 (19.98)	2193 (81.96)	-60 (-2.24)	-246 (-9.18)	553 (20.67)	-62 (-2.31)	185 (6.94)
Solapur	539	-56 (-10.46)	-15 (-2.84)	682 (126.52)	1 (0.24)	-58 (-10.82)	-16 (-2.89)	1 (0.25)	-72 (-13.22)
Satara	1442	45 (3.09)	417 (28.94)	406 (28.13)	47 (3.29)	46 (3.20)	432 (29.95)	49 (3.40)	574 (39.84)
Aurangabad	209	-16 (-7.53)	63 (29.95)	130 (61.98)	-8 (-3.76)	-17 (-7.79)	65 (30.99)	-8 (-3.84)	32 (15.60)
Osmanabad	116	-40 (-34.07)	43 (37.44)	135 (116.21)	-13 (-11.36)	-41 (-35.25)	45 (38.74)	-13 (-11.71)	-22 (-19.58)
Buldhana	196	-120 (-61.51)	172 (87.86)	259 (132.24)	-83 (-42.29)	-125 (-63.65)	178 (90.92)	-85 (-43.57)	-115 (-58.59)
Amravati	177	-54 (-30.27)	33 (18.36)	236 (133.00)	-8 (-4.32)	-56 (-31.32)	34 (19.00)	-8 (-4.45)	-38 (-21.09)
Maharashtra State	13138	-626 (-4.77)	2503 (19.05)	9664 (73.56)	-168 (-1.28)	-649 (-4.94)	2589 (19.71)	-175 (-1.33)	1597 (12.16)

Figures in parentheses are percentages of the respective effects to total change during the period

value of onion production. The general trend of Maharashtra in respect of effects of various factors towards increase in value of onion production was also more akin to Nasik and Pune districts as compared to other districts.

Thus, price effect emerged out to be the most powerful factor towards the change in value of production of onion in the state of Maharashtra. The other powerful factor impacting the value was seen to be the area effect followed by interaction effect between price and area. Nonetheless, in case of Ahmednagar and Satara districts, the positive effect of area outweighed the positive effects of price as well as yield. Thus, considerable variation could be observed in the relative contribution of various factors in the total change in value of onion production in Maharashtra.

6.8 Onion and Grape Exports from India and Trend in Export Prices:

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 environments. Nonetheless, fluctuations encompassing horticultural production have

many a times diluted and undermined our efforts, commitments and credibility to bolster India's horticultural exports. Among various horticultural crops, grapes and onion exports from India, in particular, fluctuated widely over time. How highly India's grape and onion exports have fluctuated over the past decade and a half can be clearly seen by visualising the trends obtainable from Table 6.9.

While on one hand grape exports from India increased by leaps and bounds during the period between 1979 and 1993, the increase in onion exports from India during this period was very slow and infact during some phases of this overall period the export of this high value crop from India was seen to decline, both in quantity and value terms (Table 6.9). Nonetheless, in general, the onion export of the country has shown an encouraging increasing trend and it was found that the overall expansion in onion export of India between 1979 and 1993 was of the order of about 163 per cent in quantity and about 215 per cent in value terms of trade. Most of the export expansion for onion was noticed between the early – and the mid-eighties and, thereafter, it has considerably slowed down. In contrast to a slow growth in onion export from India, a sharp increase in grape export from India was noticed, particularly after the mid-eighties, so much so that during the period between 1985 and 1993 the grape exports from India increased by 525 per cent in quantity terms and 370 per cent in value terms.

Another interesting feature that emerges from taking a close look at Table 6.9 concerns very wide fluctuations observed in the unit value of export over time, particularly in the case of onion. It may be mentioned here that fluctuation in unit value of exports is a clear enough reflection of the fact that agricultural commodities are invariably subject to considerable amount of price instabilities in the international market over time. Thus, the point that needs to be appreciated is that India's grape and onion exports have forged ahead even in the face of wide international price fluctuation and high burgeoning domestic demand for these high value commodities. This also perhaps underscores the fact that India have not spared any efforts at boosting country's exports of these two commodities.

If we look into export prices of grapes and onions enlisted in Table 6.9, we notice that these prices have fluctuated widely over the past decade or so. While on the one hand

the export prices in dollar terms are seen to have declined for both the commodities, a substantial growth in export prices in rupee terms is only too evident. The reason for export prices showing substantial growth in rupee terms in the face of steep decline in dollar terms can be traced in the devaluation of rupee over time. The money value of Indian currency has depreciated considerably compared to dollar with the passage of time. As a result of this, the exchange rate of rupee per dollar has gone up sharply in due course of time. And, this consequently has resulted in rise in export prices of grapes and onions in rupee terms.

As a matter of fact, the evaluation of overall export trade of India in various horticultural commodities over the given period of time is only one end of the problem, the other end being the identification of countries who are regular importers of these high value commodities from India. Thus, as a prelude to have better understanding of the export trade of India in grapes and onions, we have gone into more details and have identified the countries who are the major importers of Indian grapes and onions. The market shares of different countries in the export trade of onion and grape from india during three different points of time are brought out in Table 6.10.

Table 6.9 : Onion and Grape Exports from India and Trend in Export Prices : (1979-1993)
(Quantity: in MT; Value: in '000' \$)

Year	ONION EXPORT				GRAPE EXPORT			
	Quantity	Value	Export Price		Quantity	Value	Export Price	
			US \$ Per Tonne	Rs. Per Quintal			US \$ Per Tonne	Rs. Per Quintal
1979	95,000	14,275	150.26	118.83	278	267	960.43	759.51
1980	181,000	36,000	198.90	157.29	280	270	964.29	762.56
1981	200,000	44,600	220.00	197.30	280	270	964.29	864.78
1982	172,000	27,500	159.88	154.54	-	-	-	-
1983	140,000	21,000	150.00	155.10	-	-	-	-
1984	140,000	24,000	171.43	203.81	-	-	-	-
1985	258,000	33,500	129.84	158.86	1,600	1,600	1000.00	1223.50
1986	210,000	32,000	152.38	194.71	2,000	2,000	1000.00	1277.80
1987	210,000	38,000	180.95	234.62	2,000	2,100	1050.00	1361.43
1988	214,336	44,324	207.12	299.95	4,738	4,419	932.67	1350.69
1989	200,000	40,000	200.00	332.98	5,000	4,600	920.00	1531.71
1990	200,000	43,000	215.00	385.77	5,000	5,000	1000.00	1794.30
1991	311,350	61,399	197.42	483.17	11,143	7,624	684.20	1674.51
1992	272,180	45,443	167.07	483.83	10,770	8,229	764.07	2212.75
1993	250,000	45,000	180.00	564.66	10,000	7,500	750.00	2353.75

- Notes : 1) The data pertaining to quantity and value of onion exports from India are compiled from various issues of Food and Agricultural Organisation of the United Nations (FAO), "Trade Yearbook", FAO.
2) The export prices of onions and grapes in rupees per quintal are arrived at using exchange rate conversions.

Table 6.10 : Market Share of Different Countries in the Export of Onion (Fresh or Chilled) and Grape (Fresh) from India

Countries	(per cent)					
	1983-84		1988-89		1993-94	
	Qty.	Value	Qty.	Value	Qty.	Value
ONION						
Baharain	1.17	0.94	1.08	0.89	1.26	1.23
Bangladesh	0.03	0.04	20.14	21.33	22.96	19.56
Kuwait	4.11	3.06	3.27	2.75	1.13	0.97
Malaysia	24.30	27.37	18.53	19.22	15.44	18.06
Mauritius	1.08	0.91	-	-	1.57	1.69
Pakistan	4.72	6.49	-	-	-	-
Saudi Arabia	3.36	2.67	2.09	1.64	6.37	5.95
Singapore	8.16	9.21	17.41	18.25	10.10	14.69
Sri Lanka	6.72	7.54	14.70	17.26	10.55	12.91
UAE	40.41	35.95	21.15	16.94	29.53	23.70
USSR	3.17	3.44	-	-	-	-
Others	2.77	2.38	1.63	1.72	1.09	1.24
GRAPE						
Baharain	0.15	0.23	3.33	2.94	3.31	3.28
Bangladesh	40.45	17.37	18.87	12.09	16.06	7.97
Hong Kong	0.05	0.06	Neg.	Neg.	0.53	0.49
Kuwait	6.53	10.07	4.23	4.69	1.80	2.16
Netherland	-	-	-	-	1.16	1.68
Oman	0.58	1.49	0.91	0.88	0.23	0.21
Qatar	0.30	0.72	2.62	2.58	0.37	0.26
Saudi Arabia	8.09	12.36	20.95	23.17	15.69	14.63
Sri Lanka	-	-	-	-	0.40	0.40
UAE	43.68	57.58	48.60	53.02	42.37	43.90
UK	-	-	0.20	0.24	16.91	23.27
Others	0.17	0.12	0.29	0.39	1.17	1.75

Note : The market share of different countries are computed on the basis of figures reported in Monthly Statistics of Foreign Trade, Vol. 1, (Various years), DGCIS, Calcutta.

During 1983-84, the major importers of Indian onion were the countries like UAE, Malaysia, Singapore, Sri Lanka, Pakistan and Kuwait who put together accounted for about 88 per cent of India's exports in terms of quantity and 90 per cent in terms of value. However, during 1988-89, Bangladesh was seen to emerge as the major importer of Indian onion. The other major importers of Indian onion during this period were UAE, Sri Lanka, Singapore and Malaysia. The market share of these countries put together in total onion export from India was seen to be to the tune of 92 per cent in quantity terms and 93 per cent in value terms. It is to be noted that during 1993-94, Saudi Arabia also emerged as one of the important importers of Indian onion, though its market share in export trade of India was not very high compared to other major countries. In fact, during 1993-94, UAE, Bangladesh and Malaysia were the major importers of Indian onion, who along with Sri Lanka, Singapore and Saudi Arabia accounted for 95 per cent of the India's export of onions, both in quantity and value terms. It is noteworthy to mention that during the period between 1983-84 and 1993/94 the share of Kuwait in India's exports of onion

declined from 4 per cent to 1 per cent in quantity terms and from 3 per cent to less than 1 per cent in value terms due mainly to Gulf war.

Since the early 1980s, the major importers of Indian grapes were found to be only four countries such as Bangladesh, UAE, Saudi Arabia and Kuwait. During 1983-84, the market share of these four countries put together in India's total export of grapes was found to be about 99 per cent in quantity terms and 97 per cent in value terms. However, during the period between 1983-84, the market share of Bangladesh in total grape export from India declined drastically, both in quantity and value terms. Similarly, the market share of Kuwait in total grape export from India also declined, though the decline in market share was not as sharp as noticed in the case of Bangladesh. Contrary to this, during the same period, a significant increase in market share was seen in the case of Saudi Arabia, Baharain and Qatar. As for the period between 1988-89 and 1993-94, both Saudi Arabi and Bangladesh showed a decline in their share in total grape exports from India, both in quantity and value terms. It is noteworthy to mention that during 1993/94, UK emerged as the major importer of Indian grapes, next only to UAE . During this period, the market share of countries like UAE, UK, Saudi Arabia and Bangladesh put together was found to be 91 per cent in quantity terms and 90 per cent in Value terms in India's total exports of grapes.

These facts clearly underscore the pre-eminent position that Indian grapes and onions enjoy in the world market. India can definitely have a cutting edge over many of the current player nations in the international horticultural front if our current efforts at boosting our international horticultural trade continue with unflapping zeal.

Chapter VII

Income and Employment Generation Through Horticultural Crops

The magnitude of income and employment 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. In India, horticultural development has contributed in no small measure towards substantial increase in production and there cannot be two opinions about it. This is substantiated by the fact that increase in productivity of various horticultural crops through various development programmes initiated in this country has brought in its wake financial viability in raising these high value crops for various enterprising producers. However, at this juncture, the relevant question that could strike one is whether various horticultural development programmes in the state of Maharashtra have been successful in exercising their influence on various producers in respect of increase in income and employment generation. If yes, to what extent. Another crucial aspect that merits debate and discussion is the determination of magnitude of profit involved in raising these horticultural crops vis-a-vis other field crops, besides evaluation into the pattern of human labour absorption in various operations in the cultivation of these valued crops. This chapter, therefore, places an onerous task on analyzing these crucial aspects of the selected horticultural crops grown in this state.

7.1 Evaluation of Cost and Return Structure

Horticultural farming is capital-cum-labour intensive enterprise. If a good beginning is made through modern techniques of production, it yields good returns. The cultivation of horticultural crops fits well in diversified farming programme. With horticulture becoming an organized activity owing to greater demand for these valued crops in the world market and with horticulture being looked upon as a tool of economic development, the producer may now like to know whether he is getting the type of returns from these valued crops as can best expected.

Among various horticultural crops grown in the state of Maharashtra, the cultivation of onion and grape is considered by far the most lucrative and worthwhile proposition as they not only yield high margin of profit to the producers despite high cost

of production but also lead to sufficient employment generation. An analysis into cost structure and returns in the case of these two horticultural crops is of practical interest in the decision making process of the farmers. It points out the direction to bring down the cost of production and, thus, ensuring good margin of returns to the producer. An enterprising farmer can increase his income by two alternative ways, i.e. (i) by increasing production, and (ii) by reducing the cost of production. The second alternative can be achieved through judicious use of various factors of production. Comparison of cost of production with gross returns gives us an indication of the profitability of the enterprise. Thus, as a prelude to have better understanding of the profitability of various horticultural crop production, it was thought prudent to examine the cost and return structure not only for the selected horticultural crops but also for other field crops grown on the farms of sample onion and grape producers. This exercise was done to gauge into the extent of profit generated through horticultural crops vis-a-vis other field crops and, thus, providing an insight into the economic viability of the enterprise undertaken by the sample producers. Various concepts of costs such as cost A₁, A₂, B and C have been used to assess the structure of various components of costs. The profitability analysis is carried out for both onion producers and grape growers and the discussion of the results is brought out in the following sections.

7.1.1 Profitability Analysis for Onion Producers

As a matter of fact, among various cost concepts, it is the cost A that appears to be the most crucial for the farmer since it not only includes the expenditure of the farmer on various cultivation operations and inputs but it also includes the interest on working capital. The cost B indirectly influences the total expenses of the farmers since it includes not only all the components of cost A but also the rental value of owned land and interest on owned fixed capital. The cost C which includes all the components of Cost A and B as well as the imputed value of family labour assumes greater significance when the farmer is interested in assessing his overall maintenance expenses at the given level of production. The per acre estimates of various concepts of costs coupled with returns over these costs in respect of onion crop grown in kharif and rabi season by various categories of producers are brought out in Table 7.1.

A close examination of Table 7.1 reveals that the per acre total cost (cost C) of onion production was much higher in rabi season compared to kharif season for all the categories of onion producers. In general, the total expenditure of onion producers' was seen to increase by 12 per cent in rabi season compared to kharif season. A negative association was seen between the cost of production of onion and the land holding size of onion producers. This was evident from the fact that the total cost (cost C) of onion production declined from marginal to small, small to medium and medium to large category. This type of trend was discerned both in kharif and rabi season. Nevertheless, the total recurring expenditure (cost A) was found to be the highest for medium category in both the seasons. The least per acre recurring expenditure (cost A) was seen in the case of large category in kharif season and for small category in rabi season. Similarly, no discernible trend was seen in terms of cost B as per acre cost B was estimated to be much higher for small category compared to other categories of onion producers. This held true both in kharif and rabi season. As for various categories of onion producers, the per acre total cost of onion production was estimated at Rs 10,570 for marginal category, Rs 10,548 for small category, Rs 10,011 for medium category and Rs 9,154 for the large category with an overall average of Rs 9,649 for the average category of producers in the case of kharif season. Similar figures for rabi season were estimated at Rs 11,455 for marginal category, Rs 11,155 for small category, Rs 10,740 for medium category and Rs 10,530 for the large category with an overall average of Rs 10,801 for the average category of producers.

Table 7.1 also shows per acre net return estimates over different cost bases. These net return estimates were obtained by subtracting various costs from gross returns. The estimates of gross returns for various categories of onion producers have already been discussed in chapter V (Table 5.3). It could be readily discerned from Table 7.1 that the total net return over cost C was much higher in rabi season compared to kharif season for all the categories of onion producers. In general, one acre onion farm yielded 18 per cent higher return in rabi season over that of kharif season. An interesting feature that emerged out from the close scrutiny of results presented in Table 7.1 was the increase in net returns over cost with the increase in land holding size of producers. This held particularly true in

Table 7.1 : Cost of Cultivation, Cost of Production and Returns through Onion on the Basis of Different Cost Concept

	Marginal	Small	Medium	Large	Overall
KHARIF SEASON					
1. Cost of Cultivation					
(Rs/Acre)					
Cost A ₁	5681.13	5514.49	5843.47	5330.19	5414.41
Cost A ₂	5681.13	5965.69	5843.47	5330.19	5573.05
Cost B	9421.05	9836.56	9311.55	8609.59	9015.43
Cost C	10570.25	10548.22	10010.81	9154.36	9648.76
2. Cost Of Production					
(Rs/kg)					
Cost A ₁	0.69	0.63	0.68	0.63	0.64
Cost A ₂	0.69	0.68	0.68	0.63	0.65
Cost B	1.14	1.12	1.09	1.02	1.06
Cost C	1.28	1.20	1.17	1.08	1.13
3. Net Returns Over Cost :					
(Rs/Acre)					
Cost A ₁	11147.57	11817.57	11769.53	10941.81	11362.13
Cost A ₂	11147.57	11366.37	11769.53	10941.81	11203.49
Cost B	7407.65	7495.50	8301.45	7662.41	7761.11
Cost C	6258.45	6783.84	7602.19	7117.64	7127.78
RABI SEASON					
1. Cost of Cultivation					
(Rs/Acre)					
Cost A ₁	6519.20	6126.72	6618.10	6498.40	6444.63
Cost A ₂	6519.20	6577.92	6618.10	6498.40	6603.27
Cost B	10259.18	10448.79	10086.18	9777.80	10045.65
Cost C	11454.65	11155.33	10739.68	10530.01	10801.42
2. Cost Of Production					
(Rs/kg)					
Cost A ₁	0.74	0.68	0.72	0.68	0.70
Cost A ₂	0.74	0.73	0.72	0.68	0.72
Cost B	1.17	1.15	1.10	1.03	1.09
Cost C	1.30	1.23	1.17	1.11	1.17
3. Net Returns Over Cost :					
(Rs/Acre)					
Cost A ₁	12055.13	12462.68	11944.22	13943.80	12790.38
Cost A ₂	12055.13	12011.48	11944.22	13943.80	12631.74
Cost B	8315.15	8140.61	8476.14	10664.40	9189.36
Cost C	7119.68	7434.07	7822.64	9912.19	8433.59
Yield (Quintals/Acre)					
a) Kharif	82.90	87.98	85.50	84.75	85.29
b) Rabi	88.03	90.68	91.44	95.08	92.21

Table 7.2 : Cost of Production and Returns from Other Field Crops on the Sample Forms of Onion Producers

	Marginal	Small	Medium	Large	(Rs/Acre)	Overall
BAJRA						
1. Cost : A ₁	1436	1331	1355	1401		1375
A ₂	1436	1331	1355	1401		1375
B	2764	2757	2847	2899		2843
C	2956	2935	3048	3091		3034
2. Yield (q/ha)	5.94	6.23	6.04	6.41		6.24
3. Gross Return						
Main Produce	2833	3065	2978	3147		3060
By Produce	879	931	919	952		933
Total	3712	3996	3897	4099		3993
4. Net Returns Over Cost :						
A ₁	2276	2665	2542	2698		2618
A ₂	2276	2665	2542	2698		2618
B	948	1239	1050	1200		1150
C	756	1061	849	1008		959
JOWAR						
1. Cost : A ₁	1469	1322	1561	1478		1492
A ₂	1469	1322	1561	1478		1492
B	2797	2748	3053	2976		2978
C	2989	3006	3345	3224		3240
2. Yield (q/ha)	7.65	7.14	7.43	7.84		7.64
3. Gross Return						
Main Produce	3534	3263	3507	3771		3635
By Produce	1206	1077	1292	1309		1281
Total	4740	4340	4799	5080		4915
4. Net Returns Over Cost :						
A ₁	3271	3018	3238	3602		3423
A ₂	3271	3018	3238	3602		3423
B	1943	1592	1746	2104		1937
C	1751	1334	1454	1856		1675
WHEAT						
1. Cost : A ₁	2271	2136	1878	1956		1983
A ₂	2271	2136	1978	1956		1983
B	3599	3562	3370	3454		3451
C	3976	3897	3762	3783		3811
2. Yield (q/ha)	8.40	7.57	7.01	7.63		7.44
3. Gross Return						
Main Produce	4696	4216	3933	4341		4188
By Produce	1277	1141	1083	1115		1121
Total	5973	5357	5016	5456		5309
4. Net Returns Over Cost :						
A ₁	3702	3221	3138	3500		3326
A ₂	3702	3221	3138	3500		3326
B	2374	1795	1646	2002		1858
C	1997	1460	1254	1673		1498
GROUND NUT						
1. Cost : A ₁	4115	4364	4582	4283		4369
A ₂	4115	4364	4582	4283		4369
B	5443	5790	6074	5781		5825
C	5923	6227	6586	6185		6272
2. Yield (q/ha)	6.00	6.15	7.33	6.60		6.54
3. Gross Return						
Main Produce	7200	8401	9712	8362		8593
By Produce	2275	2315	2537	2487		2416
Total	9475	10716	12249	10849		11009
4. Net Returns Over Cost :						
A ₁	5360	6352	7667	6566		6640
A ₂	5360	6352	7667	6566		6640
B	4032	4926	6175	5068		5184
C	3552	4489	5663	4664		4737
SOYABEAN						
1. Cost : A ₁	3320	-	-	3597		3557
A ₂	3320	-	-	3597		3557
B	4648	-	-	5095		5031
C	4909	-	-	5362		5297
2. Yield (q/ha)	7.00	-	-	7.00		7.00
3. Gross Return						
Main Produce	7000	-	-	7000		7000
By Produce	1327	-	-	1295		1300
Total	8327	-	-	8295		8300
4. Net Returns Over Cost :						
A ₁	5007	-	-	4698		4743
A ₂	5007	-	-	4698		4743
B	3679	-	-	3200		3269
C	3418	-	-	2933		3003
GRAM						
1. Cost : A ₁	925	-	1138	1152		1072
A ₂	925	-	1138	1152		1072
B	2253	-	2630	2650		2511
C	2405	-	2778	2788		2657
2. Yield (q/ha)	2.00	-	2.00	2.00		2.00
3. Gross Return						
Main Produce	2000	-	2000	2000		2000
By Produce	825	-	918	885		876
Total	2825	-	2918	2885		2876
4. Net Returns Over Cost :						
A ₁	1900	-	1780	1733		1804
A ₂	1900	-	1780	1733		1804
B	572	-	288	235		365
C	420	-	140	97		219

rabi season. In rabi season, the per acre net return over cost C was estimated at Rs 7,120 for marginal category, Rs 7,434 for small category, Rs 7,823 for medium category and at Rs 9,912 for the large category. However, in the case of kharif season the per acre net return over cost C was the highest for medium category (Rs 7,602) followed by large (Rs 7,118), small (Rs 6,784) and marginal category (Rs 6,258). In kharif season, one acre onion farm yielded 21 per cent higher net return over cost C for the medium category of producers over that of marginal category of producers. An increase in net returns to the tune of 39 per cent was seen in the case of large category over that of marginal category in the case of rabi season.

Thus, while the total cost (cost C) of onion production declined with the increase in land holding size of producers - both in kharif and rabi season, a reverse trend was seen in the case of net return over cost C which turned out to be much higher for large and medium category of producers compared to marginal and small category of producers. It is worthwhile to mention here that the difference between cost B and cost C represented family labour income to the farmer. This family labour would have been wasted had the households not practiced this activity. Further, the medium and large category of onion producers appeared to be better off in terms of managerial practices as in these cases not only the total cost of production turned out to be the least but the net return over cost was also found to be the highest compared to other categories of producers. This given enough scope to the marginal and small category of farmers to reduce various costs in order to enhance returns over costs. Unless costs are subjected to reduction, the returns for these two categories of onion producers will continue to be at the lower level.

It is noteworthy to mention here that apart from onion the sample producers were also growing other field crops on their farms. The estimation of different cost bases such as cost A₁, A₂, B and C as well as returns was also done for these field crops grown on the sample farms of onion producers in order gauge into the profitability in growing onion crop vis-a-vis other field crops. These cost and return estimates for the other field crops are brought out in Table 7.2.

Among various field crops grown on the sample farms of onion producers, the highest per acre net return over cost C was found to be in the case of groundnut followed

by soyabean, jowar, wheat, bajra and gram in that order (Table 7.2). As a matter of fact, all the field crops grown on sample farms showed much lower per acre net return over different costs compared to onion crop. In the case of bajra, the per acre net return over cost C varied from Rs 756 in the case of marginal category to Rs 1061 for small category. The similar figures in the case of jowar varied from Rs 1334 in the case of small category to Rs 1856 for the large category. As for the wheat crop, the per acre net return was estimated to be the highest for marginal category (Rs 1997) and the lowest for small category (Rs 1,460). In the case of groundnut, the per acre net return over cost C varied between Rs 3,552 for marginal category and Rs 5,663 for the medium category. The net return over cost C from one acre farm hovered at around Rs 3000 in the case of soyabean. The cultivation of pulse crop like gram was found to be the most unprofitable proposition since total cost (cost C) of production was much higher than gross return from the main produce, though main and by produce together yielded a positive return over cost.

On an average, the per acre net incremental income in growing onion crop was estimated at Rs 3,043 over that of groundnut and at Rs 4,777 over that of soyabean crop. This showed an increase in net return to the tune of 64 per cent in growing onion crop over that of groundnut and an increase in net return of the order of 159 per cent in growing onion crop over that of soyabean crop. In general, the per acre incremental income in growing onion crop over that of bajra, jowar, wheat and gram was estimated at Rs 6,821, Rs 6,105, Rs 6,282 and Rs 7,561, respectively. These estimated figures clearly showed a much higher net return in growing onion crop compared to other field crops.

7.1.2 Profitability Analysis for Grape Growers

The estimates of different concepts of costs together with return over these costs for various categories of grape orchardists in accordance with different stages of production are provided in Table 7.3. A considerable difference between cost A and cost B could be readily discerned from examination of results presented in Table 7.3. This difference was observed mainly because of inclusion of prorated establishment cost in the cost B.

In the case of increasing production stage orchards, the per acre gross maintenance cost (cost C) of grape production was estimated at Rs 38,297 for marginal category, Rs 39,625 for small category, Rs 45,140 for medium category and Rs 41,536 for the large

category with an overall average of Rs 41,992 for the average category of orchardists. On the other hand, the per acre net return over cost C was estimated at Rs 40,806 for marginal category, Rs 53,508 for small category, Rs 49,992 for medium category and Rs 54,890 for the large category with an overall average of Rs 52,781 for the average category of orchardists. Thus, small and large category of orchardists showed almost similar net annual returns from one acre grape orchard.

As for constant production stage orchards, no significant difference in per acre gross maintenance cost (cost C) was seen among various categories of orchardists. However, the net return over cost C was found to be slightly higher for large category compared to small category and significantly higher for large category compared to medium category.

In the case of declining production stage orchards, an increase in recurring expenditure (cost A) was found with the increase in land holding size of orchardists. Nonetheless, such a trend was not seen in the case of cost C as the total cost of maintenance (cost C) was the highest (Rs 45,459) in the case of large category and the least (Rs 41,697) for the medium category. On the other end of the spectrum, the net return over cost C was the highest for medium category and the lowest for marginal category. In general, during this stage of production, the per acre gross maintenance cost (cost C) was estimated at Rs 44,318 and per acre net return over cost C was estimated at Rs 41,413.

Based on estimates of various costs and returns during different stages of production, an overall average scenario of cost and return estimates was drawn for various categories of orchardists and these estimates were termed as estimates for all-bearing age of production. The per acre estimates of costs and returns for all-bearing age of production are also presented in Table 7.3.

In the case of all-bearing age orchards, the per acre gross maintenance cost (cost C) was worked out at Rs 40,361 for marginal category, Rs 40,608 for small category, Rs 45,052 for medium category and Rs 42,597 for large category. The per acre net return over cost C was worked out at Rs 38,742 for marginal category, Rs 52,148 for small category, Rs 51,389 for medium category and Rs 53,371 for the large category of orchardists. Thus, not much of a difference was seen in the case of net return over cost C for small, medium

Table 7.3 : Cost of Cultivation, Cost of Production and Returns through Grape Orchards on the Basis of Different Cost Concept

	Marginal	Small	Medium	Large	Overall
Increasing Production Stage					
(3-10 years)					
1. Cost of Cultivation					
(Rs./Acre)					
Cost A ₁	10375.51	11772.68	12843.66	11843.26	12055.98
Cost A ₂	14214.01	11772.68	12843.66	11843.26	12127.06
Cost B	37255.70	38672.86	43976.79	40763.15	41077.14
Cost C	38297.05	39625.24	45140.41	41535.70	41992.04
2. Cost of Production					
(Rs./Kg)					
Cost A ₁	1.34	1.38	1.48	1.34	1.38
Cost A ₂	1.84	1.38	1.48	1.34	1.39
Cost B	4.81	4.52	5.07	4.61	4.71
Cost C	4.95	4.63	5.20	4.70	4.82
3. Net Returns Over					
Cost :					
(Rs./Acre)					
Cost A ₁	68727.29	81360.12	82289.14	83982.34	82717.55
Cost A ₂	64888.79	81360.12	82289.14	83982.34	82646.47
Cost B	41847.10	54459.94	51156.01	55062.45	53696.39
Cost C	40805.75	53507.56	49992.39	54289.90	52781.48
Constant Production Stage					
(11-14 years)					
1. Cost of Cultivation					
(Rs./Acre)					
Cost A ₁	-	12982.06	12192.62	12191.52	12261.59
Cost A ₂	-	12982.06	12192.62	12191.52	12261.59
Cost B	-	43238.28	44664.19	44365.91	44380.88
Cost C	-	44033.34	45853.70	45265.17	45382.20
2. Cost of Production					
(Rs./Kg)					
Cost A ₁	-	1.37	1.30	1.26	1.29
Cost A ₂	-	1.37	1.30	1.26	1.29
Cost B	-	4.56	4.76	4.59	4.65
Cost C	-	4.65	4.89	4.69	4.76
3. Net Returns Over					
Cost :					
(Rs./Acre)					
Cost A ₁	-	90116.82	90656.02	92479.52	91572.48
Cost A ₂	-	90116.82	90656.02	92479.52	91572.48
Cost B	-	59860.60	58184.45	60305.13	59453.19
Cost C	-	59065.54	56994.94	59405.87	58451.87

Table 7.3 (contd.)

	Marginal	Small	Medium	Large	Overall
Declining Production Stage					
(15 and above)					
1. Cost of Cultivation					
(Rs./Acre)					
Cost A ₁	8703.78	10460.71	10743.28	11310.08	10770.37
Cost A ₂	13105.53	10460.71	10743.28	11310.08	11200.98
Cost B	41550.71	43119.56	40761.36	44611.63	43377.59
Cost C	42654.90	44201.85	41696.82	45458.54	44318.15
2. Cost of Production					
(Rs./Kg)					
Cost A ₁	1.19	1.32	1.32	1.43	1.36
Cost A ₂	1.80	1.32	1.32	1.43	1.42
Cost B	5.70	5.46	5.00	5.64	5.51
Cost C	5.85	5.60	5.11	5.74	5.62
3. Net Returns Over Cost :					
(Rs./Acre)					
Cost A ₁	70399.02	75491.29	78646.48	74499.36	74961.13
Cost A ₂	65997.27	75491.29	78646.48	74499.36	74530.53
Cost B	37552.09	42832.44	48628.40	41197.81	42353.91
Cost C	36447.90	41750.15	47692.94	40350.90	41413.35
All Bearing Age					
1. Cost of Cultivation					
(Rs./Acre)					
Cost A ₁	9583.64	11661.55	12547.63	11831.80	11928.63
Cost A ₂	13688.94	11661.55	12547.63	11831.80	12033.26
Cost B	39290.18	39647.06	43899.28	41795.41	41864.01
Cost C	40361.30	40607.85	45052.30	42596.77	42795.24
2. Cost of Production					
(Rs./Kg)					
Cost A ₁	1.27	1.37	1.42	1.34	1.36
Cost A ₂	1.82	1.37	1.42	1.34	1.38
Cost B	5.23	4.66	5.00	4.73	4.80
Cost C	5.38	4.78	5.12	4.83	4.91
3. Net Returns Over Cost :					
(Rs./Acre)					
Cost A ₁	69519.16	81093.83	83894.07	84601.72	83349.94
Cost A ₂	65413.86	81093.83	83894.07	84601.72	83245.31
Cost B	39812.62	53108.32	52542.42	54172.39	53173.10
Cost C	38741.51	52147.53	51389.41	53371.03	52241.88

Note : Cost B also includes prorated establishment cost

Table 7.4 : Cost of Production and Return from Various Field Crops On the Sample Forms of Grape Producers

	(Rs/Acre)				
	Marginal	Small	Medium	Large	Overall
BAJRA					
1. Cost : A ₁	-	1292	1220	1041	1114
A ₂	-	1292	1220	1041	1114
B	-	2844	2865	2658	2727
C	-	3038	3073	2867	2934
2. Yield (qtls)	-	6.45	5.91	6.08	6.10
3. Gross Return					
Main Produce	-	3006	2715	2864	2856
By Produce	-	913	847	877	876
Total	-	3919	3562	3741	3732
4. Net Returns					
Over Cost :					
A ₁	-	2627	2342	2700	2618
A ₂	-	2627	2342	2700	2618
B	-	1075	697	1083	1005
C	-	881	489	874	798
JOWAR					
1. Cost : A ₁	-	1469	1368	1300	1343
A ₂	-	1469	1368	1300	1343
B	-	3021	3013	2917	2966
C	-	3241	3224	3080	3155
2. Yield (qtls)	-	7.80	7.36	7.59	7.51
3. Gross Return					
Main Produce	-	3487	3172	3332	3277
By Produce	-	1262	1157	1210	1192
Total	-	4749	4329	4542	4469
4. Net Returns					
Over Cost :					
A ₁	-	3280	2961	3242	3126
A ₂	-	3280	2961	3242	3126
B	-	1728	1316	1625	1503
C	-	1508	1105	1462	1314
WHEAT					
1. Cost : A ₁	2157	2251	1898	1887	1940
A ₂	2157	2251	1898	1887	1940
B	3673	3803	3543	3504	3554
C	3889	4012	3734	3684	3742
2. Yield (qtls)	6.33	7.18	7.89	7.75	7.68
3. Gross Return					
Main Produce	3665	4028	4553	4332	4342
By Produce	1088	1221	1340	1279	1284
Total	4753	5249	5893	5611	5626
4. Net Returns					
Over Cost :					
A ₁	2596	2998	3995	3724	3686
A ₂	2596	2998	3995	3724	3686
B	1080	1446	2350	2107	2072
C	864	1237	2159	1927	1884

Table 7.4 (contd.)

	Marginal	Small	Medium	Large	Overall
GROUNDNUT					
1. Cost : A ₁	3588	4290	3992	3634	3823
A ₂	3588	4290	3992	3634	3823
B	5104	5842	5609	5251	5418
C	5616	6306	6057	5614	5844
2. Yield (qtls)	5.67	6.00	7.43	6.40	6.62
3. Gross Return					
Main Produce	7088	7500	8916	8160	8199
By Produce	1895	1922	2060	2018	2004
Total	8983	9422	10976	10178	10203
4. Net Returns					
Over Cost :					
A ₁	5395	5132	6984	6544	6380
A ₂	5395	5132	6984	6544	6380
B	3879	3580	5367	4927	4785
C	3367	3116	4919	4564	4359
TOMATO					
1. Cost : A ₁	-	4291	6221	5700	5669
A ₂	-	4291	6221	5700	5669
B	-	7811	9824	9206	9193
C	-	8387	10464	9669	9694
2. Yield (qtls)	-	83.00	94.67	95.71	94.50
3. Gross Return					
Main Produce	-	16600	18934	19142	18899
By Produce	-	-	-	-	-
Total	-	16600	18934	19142	18899
4. Net Returns					
Over Cost :					
A ₁	-	12309	12713	13442	13230
A ₂	-	12309	12713	13442	13230
B	-	8789	9110	9936	9706
C	-	8213	8470	9473	9205
GRAM					
1. Cost : A ₁	-	1120	1016	1177	1116
A ₂	-	1120	1016	1177	1116
B	-	2672	2633	2794	2718
C	-	2828	2768	2935	2861
2. Yield (qtls)	-	2.40	2.12	2.57	2.40
3. Gross Return					
Main Produce	-	2400	2120	2570	2398
By Produce	-	915	888	931	915
Total	-	3315	3008	3501	3313
4. Net Returns					
Over Cost :					
A ₁	-	2195	1992	2324	2197
A ₂	-	2195	1992	2324	2197
B	-	643	375	707	595
C	-	487	240	566	452

and large category of orchardists. Nevertheless, in the case of marginal category, not only the gross maintenance cost of production (cost C) was the least but the return over cost C was also the lowest for this category of orchardist compared to other category of orchardists. Interestingly, the per kg cost of production (cost C) was the highest for marginal category (Rs 5.38/kg) followed by medium (Rs 5.12/kg), large (Rs 4.83/kg) and small category (Rs 4.78/kg). The higher per kg cost of production in the case of marginal category was seen mainly because of lower productivity of grapes on the farms of this category of orchardists. The highest productivity of grape was noticed on the farms of large category followed by medium, small and marginal category. Thus, an increase in productivity of grapes was noticed with the increase in land holding size of orchardists. And, this could be the reason for higher profit margin for large category of orchardists.

In addition to grapes, the orchardists were also seen to grow various field crops on their farms. In fact, in general, it was only on 43 per cent of the net cultivated area that grape cultivation was done and on the remaining 57 per cent various field crops were grown (Tables 4.3 (b) and 4.4 (b)). The principal field crops that dominated the cropping pattern of grape orchardists were jowar, bajra, groundnut and tomato among kharif crops and wheat and gram among rabi crops. The estimation of costs and returns for these field crops was also done with a view to evaluate the profitability in growing these field crops. The cost and return estimates for these field crops grown on the sample farms of grape orchardists are brought out in Table 7.4.

It could be noticed from table 7.4 that in general the most profitable field crops grown on the sample farms of grape orchardists were tomato and groundnut. The profit margin in tomato cultivation was found to be even higher than what it was noticed in the case of onion cultivation. This could be substantiated by the fact that while one acre onion farm yielded a net income to the tune of Rs 7,128 in kharif season and Rs 8,434 in rabi season, the margin of profit from one acre tomato farm was as high as Rs 9,205 (Tables 7.1 and 7.4). Groundnut was found to be the other major profitable crop grown on the sample farms. The per acre profit margin in groundnut cultivation was found to be of the order of Rs 4,359 in general.

Among various categories of orchardists, a vast difference in per acre net return

was seen from various field crops. In the case of bajra cultivation, the per acre net return over cost C varied from Rs 489 in the case of medium category to Rs 881 for small category. Similarly, in the case of jowar the per acre net return estimates varied from Rs 1,105 for medium category to Rs 1,508 for the small category. The difference in per acre net return between marginal and medium category in the case of wheat cultivation was found to be the highest. In this case, the per acre net return over cost C ranged from Rs 864 in the case of marginal category to Rs 2159 for the medium category. In the case of groundnut cultivation too the difference in per acre net returns was found to be quite high among various categories of producers. The net return from one acre farm in the case of groundnut cultivation varied from Rs 3,367 in the case of marginal category to Rs 4,919 for the medium category. The cultivation of pulse crop such as gram was not found to be a profitable proposition as the profit margin from one acre farm in this case varied from the low of Rs 240 in the case of medium category to only Rs 566 for the large category.

In general, the per acre net incremental income in grape cultivation was found to be to the tune of Rs 43,037 over that of tomato cultivation and Rs 47,883 over that of groundnut cultivation. In the case of other field crops the profit margins from one acre farm were so low that strict comparison of net returns from grape orchard and that from other field crops was not found to be a worthwhile proposition. It could be worthwhile to mention here that though the cultivation of some of the field crops was not found to be a lucrative proposition, these crops were still grown on the sample farms mainly because of the farmer's need to meet his family consumption requirements. This could be further substantiated by the fact that the area coverage under these unprofitable field crops were very low.

Because of high element of profit involved in grape cultivation, more and more farmers are switching over to grape cultivation. In other words, the cropping pattern of farmers is fast changing in favour of grape cultivation in the study area. This could be substantiated by the fact that the annual growth in area under grape cultivation was to the tune of 19 per cent in Nasik district during the period between 1981/82 and 1993/94 (Table 3.7 (b)).

7.2 Human Labour Employment in Horticultural Production

Cultivation, processing, marketing and distribution of horticultural products have immense potential in employment generation. India has a comparative advantage in the production of horticultural products and commodities chiefly because of the labour intensive nature of the mode of horticultural production. And, labour which is available relatively at cheaper rates constitutes an abundant and readily available resource in this country. As a matter of fact, in the cost of horticultural production, human labour is one of the vital components. And, manifest in its utilization is the pivotal role that it plays in a horticultural enterprise to generate employment. To gauge the extent of labour utilization and employment generation in the cultivation of horticultural crops, particularly in the case of onion and grapes, the data on human labour employment during different cultivation and marketing operations were analyzed for different categories of sample onion produces and grape orchardists and the results are summarized in the following sections.

7.2.1 Labour Utilization Pattern for Onion Production

In the case of onion producers, the pattern of utilization of labour by various categories of producers is brought out separately in Tables 7.5 (a) and 7.5(b) for kharif season and in Tables 7.6(a) and 7.6(b) for the rabi season.

An examination of results presented in Tables 7.5(a) and 7.6(a) reveals that the extent of human labour employment on one acre onion farm increased from kharif to rabi season. The human labour employment was, thus, found to be season-dependent. The extent of human labour absorption was equivalent to about 98 man days per acre in kharif season and in the case of rabi season, this figure was 108 man days per acre. A steady decline in human labour absorption on one acre onion farm was seen with the increase in land holding size of onion producers, particularly in kharif season. During the kharif season, the human labour employment on one acre onion farm declined from the high of 123 man equivalent days in the case of marginal category to the low of 93 man equivalent days for the large category. Similarly, during the rabi season, the decline in human labour employment was seen to be from 129 man equivalent days per acre in the case of marginal category to 103 man equivalent days per acre in the case of medium category. The extent of human labour employment was seen to be the same for small and large category during

the rabi season and it stood at 107 man equivalent days per acre of onion farm.

In general, during the kharif season, hired labour accounted for 71 per cent of the total human labour force and the remaining 29 per cent of the same owed it to family labour. In the case of rabi season, the proportion of hired labour was found to be 74 per cent of the total labour force and the family labour during this season accounted for the remaining 26 per cent of the same. As for share of family labour in total human labour absorption, a decline in this proportion was seen with the increase in land holding size of producers. This held particularly true in the case of rabi season. The ratio of family labour to total human labour force declined from 39 per cent in the case of marginal category to 28 per cent in the case of large category during the kharif season and in the case of rabi season, this ratio was seen to decline from 36 per cent in the case of marginal category to 23 per cent for the large category.

Regarding various operations, maximum labour was seen to be employed in interculture operation accounting for 27 per cent of the total human labour force employed during kharif season and 24 per cent of the same in rabi season. Harvesting was found to be the other most important operation next only to interculture operation accounting for an absorption of human labour to the tune of 22 per cent of the total labour force, both in kharif and rabi seasons. The extent of human labour employment during sowing operation was found to be 13 per cent of the total labour force during kharif season and 17 per cent of the same during the rabi season. Thus, sowing, interculture and harvesting were the operations that accounted for more than 60 per cent of the total labour force employed during kharif and rabi season. The labour employment during other operations such as ploughing, manuring, fertilizing, mulching irrigation, grading, packing, etc., varied in the range of 2 to 8 per cent of the total human labour force, both in kharif and rabi seasons.

Upon splitting the labour utilization component into men and women, it was noticed that female labour absorption was much higher than male labour absorptions during various operations such as sowing, manuring, fertilizing, interculture, mulching, harvesting and grading. This held true both in kharif and rabi seasons as well as among family and hired labour (Tables 7.5(b) and 7.6(b)). In the case of marginal, small and medium category, the extent of female labour use in interculture operation was seen to be

Table 7.5 (a) : Human Labour Utilization Pattern for Onion Production in Kharif Season.

Operations	Marginal			Small			Medium			Large			Overall		
	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total
	0.80	3.60	4.40	1.10	2.06	3.16	1.69	1.55	3.24	0.85	2.21	3.06	1.57	2.09	3.66
Ploughing	4.73	12.60	17.33	2.63	9.42	12.05	4.08	10.71	14.79	2.55	9.16	11.71	2.73	9.75	12.48
Sowing	2.40	4.00	6.40	3.01	2.74	5.75	2.35	1.84	4.19	1.43	1.38	2.81	1.92	1.80	3.72
Manuring	3.60	0.80	4.40	2.06	3.15	5.21	2.28	2.57	4.85	1.57	2.18	3.75	1.91	2.35	4.26
Fertilizing	8.48	15.75	20.23	4.55	20.60	25.15	5.63	22.43	28.06	3.89	23.06	26.95	4.63	22.23	26.86
Interculture	3.20	4.80	8.00	2.06	3.43	5.49	1.91	3.16	5.07	1.23	2.13	3.36	1.61	2.69	4.30
Mulching	5.30	8.60	13.90	3.29	5.21	8.50	3.24	1.54	4.78	2.98	5.82	8.80	3.20	4.78	7.98
Irrigation	0.80	0.80	1.60	0.55	0.55	1.10	0.48	0.22	0.70	0.30	0.20	0.50	0.40	0.28	0.68
PP Measures	14.08	13.55	27.63	4.66	16.92	21.58	6.14	18.02	24.16	5.84	14.49	20.33	6.25	15.61	21.86
Harvesting	4.00	5.60	9.60	4.14	4.93	9.07	4.02	4.27	8.29	4.26	2.44	6.70	4.17	3.39	7.56
Grading	0.80	2.00	2.80	0.82	2.06	2.88	0.52	2.14	2.66	1.22	1.44	2.66	0.56	1.73	2.29
Packing	0.40	2.80	3.20	0.41	2.33	2.74	-	2.66	2.66	-	2.75	2.75	0.07	2.67	2.74
Loading/Unloading	48.59	74.90	123.49	29.28	73.40	102.68	32.34	71.11	103.45	26.12	67.26	93.38	29.02	69.37	98.39
Total	(39.35)	(60.65)	(99.99)	(28.52)	(71.48)	(100.00)	(31.26)	(68.74)	(100.00)	(27.97)	(72.03)	(100.00)	(29.49)	(70.51)	(100.00)

Note : Figures in parentheses in direct percentages to total labour employment

Operations	Table 7.5 (b) : Proportion of Female Labour Utilization for Onion Production in Kharif Season (per cent)														
	Marginal			Small			Medium			Large			Overall		
	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total
Ploughing	-	-	-	-	-	-	17.37	9.55	13.63	38.42	38.51	38.48	23.74	24.91	24.51
Sowing	69.31	46.03	52.38	86.92	76.14	58.56	81.46	75.14	44.65	85.69	77.02	44.53	82.30	74.04	
Manuring	33.33	40.00	37.50	50.00	54.77	68.76	67.98	68.42	81.64	64.31	73.14	70.09	59.79	65.11	
Fertilizing	55.56	50.00	54.55	73.90	68.40	32.25	65.71	50.00	56.24	57.13	56.76	49.51	62.46	56.65	
Interculture	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	97.46	96.02	96.23	98.79	97.66	97.85	
Mulching	62.50	66.67	65.00	27.99	34.99	69.22	88.37	81.15	60.02	43.08	49.27	60.67	55.86	57.65	
Irrigation	-	-	-	-	-	4.56	-	3.09	-	-	-	1.17	-	-	
PP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Measures	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Harvesting	54.53	49.82	52.22	60.95	47.53	60.48	78.77	74.13	71.37	86.19	81.94	60.24	78.96	73.60	
Grading	60.00	71.43	66.67	66.67	69.81	35.64	68.96	52.79	53.84	57.06	55.01	52.35	63.82	57.49	
Packing	-	40.00	28.57	13.32	19.04	14.32	17.14	16.60	55.54	40.90	47.60	5.16	28.99	23.18	
Loading/Unloading	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Note : Dash indicate cent per cent Male labour utilization.

Operations	Human Labour Utilization Pattern for Onion Production in Rabi Season												(Days/Acre)		
	Marginal			Small			Medium			Large			Overall		
	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total
Ploughing	1.72	2.34	4.06	0.99	3.20	4.19	1.10	2.01	3.11	1.73	2.93	4.66	1.19	2.64	3.83
Sowing	4.22	16.17	20.39	3.99	12.72	16.71	5.30	11.98	17.28	4.56	16.27	20.83	4.63	14.09	18.72
Manuring	2.81	3.44	6.25	2.01	2.89	4.90	1.43	2.60	4.03	0.27	2.52	2.79	1.29	2.72	4.01
Fertilizing	4.22	2.66	6.88	2.50	2.75	5.25	1.19	3.19	4.38	1.13	4.32	5.45	1.77	3.44	5.21
Interculture	10.78	23.01	33.79	6.17	18.61	24.78	4.53	19.13	23.66	5.16	21.00	26.16	5.76	20.07	25.83
Mulching	3.59	2.89	6.48	1.76	3.98	5.74	2.43	2.84	5.27	2.32	2.48	4.80	2.36	2.97	5.33
Irrigation	7.50	0.94	8.44	3.92	4.37	8.29	1.86	4.88	6.74	2.07	4.01	6.08	2.98	4.05	7.03
PP Measures	1.09	0.47	1.56	0.63	0.14	0.77	0.30	0.40	0.70	0.29	0.41	0.70	0.45	0.35	0.80
Harvesting	6.25	19.53	25.78	4.55	18.33	22.88	6.95	16.90	23.85	6.26	16.86	23.12	6.09	17.48	23.57
Grading	2.70	5.63	8.33	2.01	5.32	7.33	1.13	6.48	7.61	1.09	5.96	7.05	1.47	5.94	7.41
Packing	0.94	2.27	3.21	0.85	2.15	3.00	0.25	2.93	3.18	0.07	2.46	2.53	0.39	2.52	2.91
Loading/Unloading	0.38	3.28	3.66	0.07	3.40	3.47	-	3.38	3.38	-	3.20	3.20	0.05	3.31	3.36
Total	46.20 (35.86)	82.63 (64.14)	128.83	29.45 (27.44)	77.86 (72.56)	107.31	26.47 (25.65)	76.72 (74.35)	103.19	24.95 (23.24)	82.42 (76.76)	107.37	28.43 (26.32)	79.58 (73.68)	108.01

Note : Figures in parentheses indicate percentages to total labour Employment

Table 7.6 (b) : Proportion of Female Labour Utilization for Onion Production in Rabi Season

(per cent)

Operations	Marginal			Small			Medium			Large			Overall		
	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total
Ploughing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sowing	59.26	79.71	75.48	89.75	78.96	81.54	86.08	82.46	83.57	91.77	33.85	32.84	16.05	13.26	85.46
Manuring	72.22	54.55	62.50	49.13	92.68	74.82	61.40	80.77	73.91	16.67	58.92	91.71	86.29	85.19	67.66
Fertilizing	55.56	52.94	54.55	39.45	61.54	51.01	40.00	77.65	67.43	35.96	70.83	63.62	42.70	69.76	60.55
Interculture	97.10	100.00	99.08	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	99.46	100.00	99.88
Mulching	52.17	21.62	38.55	48.01	73.45	65.65	63.92	82.82	74.11	56.30	96.37	76.99	56.76	77.93	68.57
Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PP Measures	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Harvesting	27.50	81.60	68.48	67.51	85.78	82.15	59.35	84.32	77.04	69.03	80.49	77.39	60.91	83.05	77.33
Packing	59.42	61.11	60.56	64.92	63.58	63.95	55.56	79.92	76.32	50.57	75.99	72.06	57.70	73.41	70.30
Loading/Un-	33.33	-	9.76	66.72	50.81	55.30	20.00	44.44	42.52	39.66	55.04	54.60	47.62	45.26	45.58
loading	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note : Dash indicate cent per cent Male Labour Utilization.

cent per cent . The higher absorption of female labour during different operations was noticed chiefly because of the fact that the wage rates prevailing in the study area were much lower for female workers compared to male workers. And, as such, the producers' found cheap labour in female compared to male.

7.2.2 Labour Utilization Pattern for Grape Production

The magnitude of human labour absorption during different operations differed to a considerable extent across various stages of grape production. Therefore, it was thought prudent to bring forth a general scenario of human labour absorption on grape orchards taking into account labour absorption in all the three stages of production. The estimated results of human labour absorption on all-bearing -age grape orchards for various categories of orchardists are brought out in Tables 7.7(a) and 7.7(b).

A scan of Table 7.7(a) reveals that the extent of human labour absorption on one acre grape orchard during the given year was equivalent to about 200 man days. The human labour employment was found to be the highest on medium category of farms (215 man days per acre) and the lowest on marginal category of farms (184 man days per acre). In general, of the total human labour employment, family labour component accounted for 24 per cent and the remaining 76 per cent of the same owed it to hired labour. A decline in ratio of family to hired labour was seen with the increase in size of the farm with medium category of farm being an aberration in this scenario as in this case the ratio was found to be slightly higher than small farm and significantly higher than large farms.

As for various cultivation and marketing operations, the extent of human labour absorption was found to be significantly higher on watch and ward and picking/plucking operations. In each of these two operations, the proportion of labour absorption was 13-14 per cent of the total labour employment . Among various cultivation operations, pruning operation accounted for about 8 per cent of the total human labour employment and in the case of spraying of insecticides and pesticides, this ratio stood at nearly 7 per cent. The labour employment in other cultivation operations such as maintenance of basin, interculture, manuring, fertilizing and irrigation varied in the range of 2 to 4 per cent of the total labour employment. Regarding marketing operations, the share of human labour absorption in assembling, grading, packing and loading/unloading operations was found to

(Days/Acre)

Table 7.7 (e) : Human Labour Utilization Pattern for Grape Production - All Bearing

Operations	Marginal			Small			Medium			Large			Overall Total	
	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total		
Maintenance of Basin	0.78	3.02	3.80	0.47	4.25	4.72	1.16	2.47	3.63	0.82	2.51	3.33	3.69 (1.84)	
Interculture	1.57	8.20	9.77	1.22	7.00	8.22	5.87	3.88	9.75	2.92	5.12	8.04	8.57 (4.26)	
FYM/Compost	1.04	2.82	3.86	1.79	3.67	5.46	2.12	4.98	7.10	2.10	4.40	6.50	6.39 (3.18)	
Fertilizing	1.00	3.03	4.03	1.49	4.18	5.67	1.86	4.75	6.61	1.31	3.71	5.02	5.54 (2.76)	
Irrigation/Watering	3.15	2.30	5.45	2.59	3.19	5.78	2.79	3.98	6.77	1.88	3.27	5.15	5.71 (2.84)	
Pruning/ Training	3.84	9.98	13.82	3.07	13.79	16.86	2.26	15.17	17.43	1.64	14.39	16.03	16.50 (8.21)	
Insecticides/Pesticides	5.02	5.37	10.39	3.58	8.82	12.40	4.25	9.71	13.96	2.41	10.57	12.98	13.06 (6.50)	
Watch and Ward	13.31	16.45	29.76	11.83	18.76	30.59	10.77	16.84	27.61	7.12	17.97	25.09	26.94 (13.41)	
Other Operations	5.65	9.50	15.15	3.64	11.48	15.12	6.03	15.64	21.67	5.40	14.14	19.54	19.13 (9.52)	
Marketing : Picking/ Plucking	3.56	17.94	21.50	5.70	21.69	27.39	4.15	24.13	28.28	2.92	24.18	27.10	27.32 (13.60)	
Assembling	2.35	13.84	16.19	3.06	12.02	15.08	4.68	14.70	19.38	2.63	12.49	15.12	16.25 (8.09)	
Grading	4.60	8.89	13.49	5.34	8.03	13.37	3.27	12.91	16.18	3.81	11.83	15.64	15.29 (7.61)	
Packing	2.61	13.99	16.60	1.07	16.50	17.57	5.14	9.18	14.32	2.64	10.93	13.57	14.62 (7.28)	
Local Transport	3.41	2.39	5.80	2.31	3.72	6.03	1.21	2.65	3.86	1.49	3.96	5.45	5.16 (2.57)	
Loading/ Unloading	0.57	14.07	14.64	0.93	14.48	15.41	2.22	15.90	18.12	2.66	13.97	16.63	16.74 (8.33)	
Total	52.46 (28.47)	131.79 (71.53)	184.25	48.09 (24.08)	151.58 (75.92)	199.67	57.78 (26.92)	156.89 (73.08)	214.67	41.75 (21.39)	153.44 (78.61)	195.19	153.43 (76.37)	200.91

Table 7.7 (b) : Proportion of Female Labour Utilization for Grape Production - All Bearing (per cent)

Operations	(per cent)														
	Marginal			Small			Medium			Large			Overall		
	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total	Family	Hired	Total
Maintenance of Basin	74.46	70.20	71.02	-	43.00	36.91	1.75	38.49	13.62	-	-	-	2.36	20.22	12.55
Interculture	39.96	59.98	54.91	38.86	66.74	58.15	45.37	67.46	60.85	-	-	61.91	47.00	64.25	58.89
FYM/Compost	4.63	11.62	10.05	12.25	38.77	31.42	18.66	20.47	19.94	16.58	21.38	20.30	15.98	24.28	22.11
Fertilizing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Irrigation/	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Watering	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pruning/Training	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Insecticides/	-	0.65	0.37	-	-	-	-	-	-	-	-	-	-	0.02	Neg
Pesticides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Watch and Ward	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Operations	46.96	53.92	51.67	58.96	42.07	45.92	49.10	40.30	42.67	26.65	37.77	34.74	39.32	39.68	39.42
Marketing :	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Picking/Plucking	13.23	42.24	37.73	22.53	52.26	45.86	37.24	55.91	53.14	40.62	60.17	58.05	35.52	57.06	53.88
Assembling	28.01	60.46	55.81	13.73	38.23	33.55	27.82	37.73	35.35	29.50	54.45	50.09	25.96	47.07	43.16
Grading	9.37	34.44	25.97	14.23	59.98	41.39	23.64	44.24	40.05	36.23	65.68	58.38	27.97	58.17	49.45
Packing	12.37	38.32	34.27	0.68	44.83	42.30	-	56.38	36.05	30.37	38.99	37.29	16.19	44.66	37.86
Local Transport	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loading/	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unloading	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note : Dash indicate cent per cent Male Labour Utilization

be 7-8 per cent each in total labour employment. In general, various cultivation operations accounted for 53 per cent of the total labour employment and the remaining 47 per cent share of the same was found to be accounted for by various marketing operations.

When the labour utilization component was broken into male and female labour, it was noticed that in general male labour absorption was much higher than female labour absorption in most of the cultivation and marketing operations. In the case of various operations such as maintenance of basin, irrigation, pruning, spraying of insecticides and pesticides, watch and ward, local transport and loading/unloading, no female labour was seen to be employed (Table 7.7 (b)). However, the proportion of female labour absorption was found to be higher than male labour in manuring operation (59 per cent) and also in picking/plucking operations (54 per cent). In the case of assembling, grading and packing operations also, the proportions of female labour were seen to be quite high, though these proportions were still lower than the proportions noticed in the case of male labour employed during these operations (Table 7.7 (b)). At the same time, it is to be noted that in grading operation the proportion of hired female labour was much higher than proportion of hired male labour. These facts are symptomatic of the importance of female labour in various cultivation and marketing operations.

Due to labour intensive nature of horticultural crop production, both onion and grape producers were seen to employ female labour during various cultivation and marketing operations since the availability of female labour was not only cheap but also in abundance. The absorption of female labour was found to be particularly high on onion farms compared to grape orchards. On onion farms, the proportion of absorption of female labour was higher than male labour in the case of sowing, manuring, fertilizing, interculture, mulching and harvesting operations among various cultivation operations and in grading operation among various marketing operations. As for grape orchards, it was only in the case of two operations such as manuring and picking/plucking that the proportion of female labour absorption exceeded male labour absorption. In general, both the study crops generated sufficient employment opportunities not only for male workers but also for female workers. However, the employment opportunity for male workers was found to be higher on grape orchards, whereas for female workers, this opportunity of employment was found to be higher on onion farms.

CHAPTER IX
SUMMARY AND CONCLUSIONS

9.1 INTRODUCTION :

The state of Maharashtra enjoys a pre-eminent position in fruits and vegetable production and leads the country in the production of grapes, bananas, oranges, onions and a host of other horticultural commodities. The importance of Maharashtra could be substantiated by the fact that during the early nineties this state accounted for 25 per cent of the country's total production of banana and in the case of grapes, this share during the same period was as high as 55 per cent. The state also accounted for 10 per cent of the oranges and 26 per cent of the onion production in the country during this period. These observations are symptomatic of the great potential that the state of Maharashtra has in the cultivation of various horticultural crops, particularly fruits and vegetables.

More recently, horticultural commodities have gained fresh grounds in international trade. Thus, even in the face of wide fluctuations in the international prices and burgeoning high domestic demand, India's horticultural exports have surged ahead. Under such a variable scenario, the questions that may merit consideration are : What prospects do the state of Maharashtra hold in the exports of these high value crops? And, what are the constraints involved in their trade? In due course of time, what structural changes have taken place vis-à-vis area, production, productivity and marketing of horticultural crops grown in the state? What is the economics involved in the cultivation of various fruits and vegetables? What is the extent of labour utilization and employment generation in the cultivation of these valued crops? What is the magnitude of post-harvest losses in the state involving these crops? What are the various marketing channels available to various horticulture crop growers of the state? What price do they receive in the domestic market and in the export market? No discussion on horticulture sector development may be complete without going into these very many questions.

The present study, therefore, was an attempt to address the above issues. The broad objectives of this study were, thus, centred around examining all the aforementioned aspects with a view to evaluate comprehensively the economics of

various export-amenable horticultural crops, particularly fruits and vegetables, grown in the state of Maharashtra.

9.2 OBJECTIVES OF THE STUDY :

The specific objectives of the study were as follows :

- i) to identify the major horticultural crops in the state of Maharashtra and to evaluate their growth trends aside from instabilities in their area of cultivation, quantum of production and export,
- ii) to estimate the economics of selected crops,
- iii) to assess the impact of horticultural crops on income and employment levels,
- iv) to estimate the price spread and producer's share in consumer rupee in domestic markets,
- v) to study the producer's share in export earnings, and
- vi) to study the prospects of export of horticultural crops and problems associated thereof.

9.3 METHODOLOGY :

The aim of this study was to evaluate the economics of export driven horticultural crops, particularly onions and grapes, produced in the state of Maharashtra. The criteria for the selection of a district in the state for this study was based on certain parameters such as area, production and productivity of grapes and onions, irrigation potential, cropping intensity, literacy rate, etc., as obtaining in each district of the state. Appropriate weights were assigned to these parameters to calculate standard score and a scale was developed for ranking all the 30 districts of the state. Since Nasik district showed the highest score on the basis of parameters taken into consideration, it was finally selected for this investigation. The procedure for the selection of the taluka in the selected district was similar to that of selection of the district in the state. Based on total score, Niphad taluka was selected from Nasik district, both for the study of onions and grapes. Stratified random sampling procedure was adopted for the selection of villages, onion producers and grape growers. A sample of five villages was selected for the study of onion producers' and another five villages for the study of grape orchardists'. It was decided to select a sample of 50 households from the selected grape growing villages. The onion producing households were categorised as marginal (less than one hectare),

small (1-2 hectares), medium (2-4 hectares) and large (above 4 hectares) based on land holding size of the households using cumulative frequency square root technique. The households to be selected from each village were distributed among these four categories in proportion to the number of households in each category subject to the condition that each category had a minimum 10 households. Similar procedure was adopted for the selection of grape orchardists. The number of onion producing households were 12 in marginal category, 13 in small, 13 in medium and 12 in large category. On the other hand, the number of selected grape producing orchardists were 4 in marginal category, 16 in small, 14 in medium and 16 in large category. The primary data on the relevant aspects were collected from the sample households/orchardists for the reference year 1995-96. However, in addition to the collection of primary data, secondary data related to district-wise area, production, productivity of various horticultural crops, their prices, exports, etc., were also collected from various secondary sources and suitable tools and techniques were used to analyse both secondary and primary data.

9.4 MAIN FINDINGS OF THE STUDY :

9.4.1 Structural Changes in Horticultural Production :

Although Maharashtra accounted for bulk of the nation's total output of banana, grapes, oranges and onions, the scenario obtaining over the past decade or so 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 found to decline from 28 per cent during the early eighties to about 25 per cent by the early nineties. A steep decline in Maharashtra's share in India's total onion production was also noticed during the late eighties with surging production growths observed in the subsequent period being the only saving grace. Despite this, Maharashtra could still emerge as the leading state in banana and onion production cornering the lion's share. In contrast to declining share of Maharashtra in country's total production of banana and onions, the state's share of grape in India's total grape production increased dramatically from a low of 16 per cent during the early eighties to a recorded high of 55 per cent during the early nineties.

During the period between 1981/82 and 1993/94, while grape production of Maharashtra grew at an annual compounded growth rate of 25 per cent, the same figure for the country was a mere 11 per cent. Similarly, the production growth of oranges was estimated at about 12 per cent per annum in Maharashtra as against an annual growth rate of 6 per cent for India. Cashewnut production of Maharashtra also grew appreciably over time, though the production growth in cashewnut for India was very slow. The good showing of Maharashtra in the production of grapes, oranges and cashewnuts also saw its share in the country's total output of these commodities to grow at an annual growth rate of nearly 12 per cent for grapes, 5 per cent for oranges and 6 per cent for cashewnuts. However, in the case of banana and onions, the share of Maharashtra in nation's total production of these commodities was estimated to have declined at the rate of 1.2 per cent a year for banana of 1.5 per cent a year for onion during the 1981/82 – 1993/94 period.

As for the instability in production growth rates, oranges showed the highest yearly fluctuation in output growth in Maharashtra. The fluctuations in output growth for other commodities produced in Maharashtra like banana, grapes, cashewnuts and onions were seen to waver in the range of 14 to 17 per cent. By and large, Maharashtra showed much higher instability in production growth than the nation as a whole.

Notwithstanding slow expansion of acreage under the crops, all the selected horticultural crops grown in Maharashtra showed perceptible rise in their production levels over the period between 1981/82 and 1993/94. Thus, rise in horticulture crop production in the state of Maharashtra could be mainly attributed to rise in productivity rather than acreage under the crops. Among the various horticultural crops, yield growth was highest for mosambi followed by cashewnuts, oranges, grapes, arecanut and banana. The productivity of onion, however, was observed to have declined marginally over time. This was despite the fact that the acreage under onion had increased significantly. This slower production growth in onion in Maharashtra was mainly attributable to decline in productivity and even reasonable acreage expansion could not offset this observed overall decline.

9.4.2 Decomposition of Production Increase for Onions and Grapes :

The rise in onion production in Maharashtra was due mainly to acreage expansion rather than yield and interaction between area and yield. In fact, yield and the interaction between area and yield impacted production rise in onions negatively, that is, these had a negative effect on the production increase in onions. However, in districts like Dhule, Ahmednagar and Satara, yield expansion played a significant role towards rise in output. As regards grapes, the area and the interaction effects outweighed yield effect. The output increase in the case of grapes was seen to be due to acreage expansion and interaction between area and yield as the effect of yield towards rise in production appeared to have been very low. In general, the effects of area and the interaction between area and yield on the output growth of grapes were found to be of the order of about 50 and 40 per cent and the remaining 10 per cent owed it to the yield effect.

9.4.3 Price Behaviour of Onions in Maharashtra :

During the period between 1984/85 and 1995/96, the wholesale prices of onions in the state of Maharashtra increased by nearly three and a half times notwithstanding deceleration in these prices observed during some of the phases of this overall period. Observing the seasonal indices of wholesale prices of onions developed over the last 15 years clearly brought out the fact that while these prices peaked in the month of November, they touched their lowest in the month of May. June through November marked the period when the wholesale prices of onions were found to be in the midst of a rising trend. In general, the wholesale prices of onions for the state peaked during the months of September, October, November and December and, February, March, April, May and June marked the lean months in this respect. Thus, not only the wholesale prices of onions tended to fluctuate widely during different years over the past fifteen years, but, within the same year also, there was considerable variation in the wholesale prices during different months.

9.4.4 Factors Affecting Changes in Total Value of Onion Production :

Most of the increase in value of onion production in the state of Maharashtra during the period between 1981/82 – 1983/84 and 1991/92 – 1993/94 was due to price effect with area effect impacting this increase only to some extent. The effect of yield on

the rise in value of this high value crop was negative. Even the effects of interaction between area and yield, price and yield and among area, yield and prices were negative. However, the overall interaction effect was observed to be positive and quite substantial too due mainly to effect of interaction between price and area. Thus, price effect emerged as the most powerful factor impacting the change in value of production of onion in the state of Maharashtra.

9.4.5 Land Use and Cropping Pattern of Sample Producers:

The study revealed a much higher average size of operational holding for various categories of grape orchardists' compared to onion producers. In the case of sample onion producers, the average size of operational holding stood at 1.92 acres (0.78 ha) for marginal category, 3.74 acres (1.51 ha) for small category, 6.69 acres (2.71 ha) for medium category and 15.32 acres (6.20 ha) for the large category with an overall average land holding size of 6.85 acres (2.77 ha) for the average category of onion producer. As for sample grape orchardists, the average size of operational holding was seen to be 1.98 acres (0.80 ha) in the case of marginal category, 3.70 acres (1.50 ha) for small category, 7.56 acres (3.06ha) for medium category and 16.85 acres (6.82 ha) for large category with the overall average land holding size per orchardist standing at 8.86 acres (3.59 ha). Although both sample onion producers and grape orchardists were found to grow various other field crops also on their farms such as hybrid jowar, bajra and groundnut in kharif season and wheat and hybrid gram in rabi season, the cropping pattern of grape orchardists differed significantly from onion producers. Grape orchardists, in fact, were found to grow certain other additional field crops during the kharif season such as tomato, cabbage, brinjal, maize, tur, etc. Despite this, the grape orchardists were observed to have a lower intensity of cropping (120 per cent) compared to onion producers (139 per cent).

9.4.6 Cost Structure of Sample Onion Producers :

A comparative analysis of cost structure revealed the total cost of onion production to be much higher in rabi season compared to that during kharif season. This held true for all the categories of onion producers. The per acre total cost of onion production during kharif season was estimated at Rs. 12,667 for marginal category, Rs.

11,850 for small category, Rs. 12,532 for medium category and Rs. 11,313 for the large category. As for rabi season, the estimated per acre total cost of onion production turned out to be Rs. 13,674 for marginal category, Rs. 12,551 for small category, Rs. 12,827 for medium category and Rs. 13,352 for the large category. In general, the per acre total cost of onion production for an average category of farmer in the kharif season was estimated at Rs. 11,678 and the same figure during rabi season stood at Rs. 12,949. During the kharif season, the production cost as proportion of total cost varied from 80 per cent in the case of medium category to 85 per cent for the small category. In rabi season too, no significant difference in production cost as proportion of total cost was observed for various categories of onion producers with this proportion varying from 79 per cent for large category to 85 per cent for the medium category. The per acre production cost was seen to decline with the increase in size of land holding of the sample producers, though the difference in per acre cost of production for the small and the medium categories was not very high. Both the seasons had preponderance of this trend. As for the per acre marketing cost, it was highest for the medium category in kharif season and for large category in rabi season; lowest per acre marketing costs were recorded by the small category producers in both the seasons.

The labour cost as proportion of the total cost was observed to decline steadily with the rise in land holding size of onion producers, though the decline in this proportion being not very sharp. As against this pattern, the material input cost as proportion of the total cost was found to increase with increase in the land holding size of the producers in the kharif season; the increase being from 14 per cent in the case of marginal category to nearly 18 per cent in the case of large category. In the rabi season, the material input cost as proportion of the total cost turned out to be the highest for medium category (23 per cent), followed by large and small category (about 20 per cent) and then by marginal category (about 18 per cent) in that order. Most of the material input cost owed it to investments made on the purchase of fertilizers. While the large category of onion producers invested nearly two and a half times more on the fertilizer input in the kharif season compared to the marginal category, this investment in the rabi season was

observed to be 75 per cent higher for the medium category of onion producers as compared to those belonging to the marginal category.

9.4.7 Share of Various Components of Costs in Gross Operational Cost of Onion Production :

In general, it was observed that the average category of onion producer spent nearly 70 per cent of the gross operational cost of onion production on cultivation related activities such as ploughing (6 per cent), sowing (10 per cent), manuring (8 per cent), fertilizing (16 per cent), interculture operations (8 per cent), mulching (1 per cent), irrigation and maintenance (10 per cent), plant protection measures (3 per cent) and harvesting operations (8 per cent); various marketing functions accounted for the rest of the 30 per cent investment of the gross operational cost of onion production and this included expenditure on family as well as hired labourers engaged in various marketing related operations.

9.4.8 Returns from Onion Cultivation :

During the kharif season, the per acre gross return from onion cultivation was estimated at Rs. 16,829 for marginal category, Rs. 17,332 for small category, Rs. 17,613 for medium category and Rs. 16,272 for the large category. During the same season, the per acre net return was estimated at Rs. 4,162 for marginal category, Rs. 5,842 for small category, Rs. 5,081 for medium category and Rs. 4,959 for the large category of onion producer. The higher per acre net return witnessed in the case of small category during the kharif season was mainly due to lower per acre total cost of production for this category compared to other categories of producers. The gross per acre returns in the rabi season for various categories of onion producers was estimated at Rs. 18,574 for the marginal category, Rs. 18,589 for small category, Rs. 18,562 for medium category and Rs. 20,442 for the large category. And, the net per acre return in the same season was estimated at Rs. 4,901 for the marginal category, Rs. 6,038 for small category, Rs. 5,735 for medium category and Rs. 7,090 for the large category. Thus, one acre onion farm yielded much higher net returns for the small category of producers during the kharif season and, for the large category of producers in the rabi season. In general, for an average category of onion producer, the per acre net return was estimated at Rs. 5,098 in

the kharif season and at Rs. 6,282 in the rabi season. Thus, the average category of producer was seen to obtain 23 per cent higher net return from one acre onion farm during the rabi season as compared to kharif season. In this sequel, the input-output ratio was seen to be higher in rabi season (1:1.49) compared to kharif season (1:1.44).

9.4.9 Production and Utilization of Onion :

The total per household production of onion for an average category of producer during the kharif season was estimated at 584.19 quintals, of which 85.36 per cent or 502.92 quintals was sold as marketed surplus. Although the percentage sale of production remained constant for various categories of producers, a steady decline in home consumption as proportion of production could be observed with the increase in land holding size of onion producers. Nonetheless, in absolute terms, the quantity used for home consumption was seen to be much higher for large category compared to marginal and other categories of onion producers. During the rabi season, the per household production of onion for an average category of producer was estimated at 631.58 quintals, of which nearly 85 per cent, that is, 538.13 quintals was sold in the market as surplus.

9.4.10 Cost Structure of Sample Grape Orchardists :

In the case of all-bearing age grape orchards, the per acre annual gross maintenance cost was estimated at Rs. 53,828 for marginal category, Rs. 59,431 for small category, Rs. 66,473 for medium category and Rs. 63,795 for large category of orchardists. This indicated that the medium category of orchardists spent 23 per cent more than those in the marginal category on the maintenance of every acre of grape orchard. Upon splitting this gross maintenance cost of production into various component costs, it was noticed that among various categories of orchardists, about 67 per cent of the gross maintenance cost was spent on various production related operations and the remaining 33 per cent owed it to investments in various marketing functions. Among various components of production cost, the prorated establishment cost alone accounted for about 34-35 per cent of the gross maintenance cost of production. The share of material input cost in gross maintenance cost of production was seen to be of the order of about 10-11 per cent. This held true for all the categories of orchardists. Similarly, the

share of labour cost in gross maintenance cost for all categories of orchardists was found to be about 6 per cent. As regards the marketing cost, packing material alone accounted for 10 per cent of the gross maintenance cost. Nearly 5-6 per cent of the gross cost of grape production was found to have been spent towards labour cost hired to facilitate various marketing functions. An increase in expenditure on various items of costs, both production and marketing, was seen with the increase in land holding size of orchardists.

9.4.11 Returns from Grape Orchards :

The per acre gross annual return for various categories of grape orchardists was estimated at Rs. 76,934 for marginal category, Rs. 92,755 for small category, Rs. 96,442 for medium category and Rs. 95,968 for the large category. On the other hand, the per acre net annual income from grape orchard was estimated at Rs. 23,107 for marginal category, Rs. 33,324 for small category, Rs. 29,969 for medium category and Rs. 32,173 for the large category of grape producer. Thus, while the small category grape orchardist was observed to garner maximum returns in the form of net annual income accruing from per acre of grape farm, the return for the marginal orchardist was the lowest. In fact, per acre earnings of small category of grape orchardist were found to be 44 per cent more than the marginal orchardist.

9.4.12 Structural Changes in Costs and Returns During Different Stages of Grape Production :

The per acre annual gross maintenance cost of grape orchardists increased sharply during the phase the production rose before levelling off to a constant stage and, thereafter, it declined. The per acre gross and net annual returns for the average category of orchardists also found to follow a trend similar to that of per acre gross maintenance cost, that is, an increase in gross and net annual returns was observed from the increasing to constant production stage which declined rather sharply during the declining production stage. The prorated establishment cost of the orchardist increased in every successive stage of production even though the per acre production cost showed declines from the constant to declining production stage after showing an increase in the same from increasing to constant production stage. The share of labour cost and material input cost in gross maintenance cost of production declined from increasing to constant and

constant to decreasing production stage, though in absolute terms the expenditure on labour employment and on various material inputs had increased from increasing to constant production stage. A similar trend was noticed in the case of expenditure of the orchardist on packing material. The share of packing material cost in gross maintenance cost of production declined with every successive stage of production despite the fact that in absolute terms the expenditure of the orchardist rose sharply on packing material from increasing to constant production stage, though, thereafter, a steep decline in the same was also seen. In general, during each stage of production, the expenditure on various items of cost, both production and marketing, increased with the increase in land holding size of the orchardists, that is, big orchardists invested more on various items of cost compared to small orchardists.

9.4.13 Production and Utilization of Grape :

The average per orchardist production of grapes was estimated at 270.47 quintals, of which on-farm spoilage (post-harvest loss) accounted for 11.77 per cent, 1.03 percent was used up in home consumption, 2.12 per cent was bartered away as gratis to labourers working on the farms as payment in kind and remaining 85.08 per cent was sold in the market. As the land holding size of orchardists increased, it was interesting to note that the share of spoilage in the total production registered declines. Similarly, the payment made in kind to labourers and the share of home consumption as proportion of total production also declined with the rise in land holding size of the orchardists.

9.4.14 Pre-Harvest Contract of Grape Orchards:

The practice of getting into pre-harvest contract for their orchards was seen to be very common among orchardists in the study area. Out of 50 sample grape orchardists, as many as 21 had given their orchards on contract. At least five reasons were cited by the sample orchardists for giving their orchards on contract. The most prominent among these reasons were : avoiding labour problem during marketing operations, avoiding problems associated with marketing and avoiding risks and uncertainties associated with harvesting, product pricing and other marketing functions. Contractors were found to lay down their own terms and conditions before contracting orchardists. In general, the contract of the orchard was taken on the basis of quality of the orchard, and

the variety of grapes grown in the orchard was considered as the main criterion in finalising the value of the contract.

9.4.15 Cost of Marketing of Grapes :

The per box (4 kgs.) total marketing cost was estimated to be the highest when the produce was sold through forwarding agents in the wholesale market compared to produce sold through other marketing channels. Interestingly, orchardists secured least per box marketing cost when they sold the product directly to wholesalers. In the case of grapes marketed through forwarding agents in the wholesale market, the per box total marketing cost was estimated at Rs. 12.05 for the marginal category, Rs. 10.76 for small category, Rs. 12.79 medium category and Rs. 12.58 for the large category with an overall average of Rs. 12.35 for the average category of orchardist. Of the total cost of marketing, nearly 40 per cent was accounted for by the preparation of fruits alone. All categories of orchardists spent about 6 per cent of their total marketing cost on local transportation. The share of various marketing charges put together in the total marketing cost also did not vary much among various categories of orchardists and this share hovered around 55 per cent

9.4.16 Cost of Marketing of Onions :

All the sample onion producers were also found to employ forwarding agents for trading their produce in the wholesale market. In kharif season, the per quintal cost of marketing of onion varied from Rs. 19.92 in the case of small category to Rs. 29.49 in the case of medium category. As for marginal and large category of producers, no significant difference in total cost of marketing of onion was seen and, in these two cases, the estimated total cost of marketing revolved around Rs. 25 per quintal. Transportation, commission and such other marketing charges accounted for bulk of the total marketing cost. In general, various marketing charges accounted for 73 per cent of the total cost of marketing in the kharif season. In rabi season too, the expenditure on preparation of vegetable accounted for 27 per cent of the total cost of marketing and the remaining 78 per cent owed it to various marketing charges.

9.4.17 Producer's Share in Consumer Rupee:

The producer's share in consumer rupee was found to be very high for all the categories of grape orchardists. This share was seen to vary from 55.71 per cent for the marginal category to 60.46 per cent for the medium category. The average category of orchardists had an overall average of 59.49 per cent share in the consumer rupee. Although all categories of grape orchardists had a fairly high share in the consumer rupee, such was not the case in the case of onion producers. In general, for the average category of onion producers, the producer's share in consumer rupee was estimated at 44 per cent in the case of rabi season and it stood at 47 percent during kharif season.

9.4.18 Incremental Income from Onion and Grape Cultivation :

A comparative economics of growing onion crop vis-a-vis other field crops revealed a much higher net income from onion cultivation compared to the cultivation of other field crops. On an average, the per acre net incremental income accruing from growing onion crop was estimated at Rs. 3043 over that of groundnut and at Rs. 4777 over that of soyabean crop. This showed that onion growers improved their net earnings by 64 per cent when they confined themselves to producing onions only instead of groundnut and this improvement was to the tune of 159 per cent vis-à-vis soyabean crop. In general, the per acre incremental income in growing onion crop over that of bajra, jowar, wheat and gram was estimated at Rs. 6821, Rs. 6105, Rs. 6282 and Rs. 7561, respectively. Like onion producers, grape orchardists were also found to grow various field crops on their farms. The most profitable field crops grown on the sample farms of grape orchardists were tomato and groundnut. The profit margin in tomato cultivation surpassed even what accrued from onion cultivation. In general, per acre net incremental income in grape cultivation was found to be to the tune of Rs. 43,037 over that of tomato cultivation and Rs. 47883 over that of groundnut cultivation. It could be worth mentioning that though the cultivation of some of the field crops was not found to be a lucrative proposition, these crops were still grown on the sample farms mainly because of the farmer's need to meet his family consumption requirements.

9.4.19 Labour Utilization Pattern for Onion and Grape Cultivation:

An analysis of human labour utilization pattern in various cultivation and marketing operations of onion crop revealed the extent of total absorption of human labour to be to the tune of 98 man days per acre during the kharif season and during rabi season, it was 108 man days per acre. As the land holding size increased, a steady decline in the per acre human labour absorption could also be observed, especially in the kharif season. Splitting of labour utilization component of onion crop cultivation into men and women revealed that female labour absorption was much higher than the male labour during various operations such as sowing, manuring, fertilizing, interculture, mulching harvesting and grading. On the other hand, maintenance of grape orchards was more labour intensive so much so that per acre human labour absorption for grape orchards was equivalent to 200 man days. Also, in grape cultivation, male labour absorption was much higher compared to female labour absorption and this held true for majority of the operations. It was only in the case of manuring and picking/plucking operation that female labour exceeded male labour on grape orchards.

9.4.20 Export Trade of India in Grapes and Onions :

Two differing scenarios were noticed in terms of export trade of India in grapes and onions over the past decade and a half. While on one hand grape exports from India increased by leaps and bounds during the period between 1979 and 1993, onion exports from India grew very slowly during this period; in fact, during some phases of this overall period the export of this high value crop from India was seen to decline, both in quantity and value terms. Overall, onion export trade of the country could still show some encouraging trend and it was found that in quantity terms, the onion exports from India had expanded by 163 per cent between the 1979-1993 period and this expansion in value terms was of the order of 215 per cent. Most of the export expansion for onion was noticed between the early – and the mid-eighties and, thereafter, it had considerably slowed down. In contrast to slow growth of onion export from India, grape exports were found to register sharp increases, particularly after the mid-eighties so much so that during the period between 1985 and 1993 the grape exports from India rose by 525 per cent in quantity terms and 370 per cent in value terms. During 1993-94, UAE,

Bangladesh and Malaysia were the major importers of Indian onion, who along with Sri Lanka, Singapore and Saudi Arabia together accounted for 95 per cent of the India's export of onions, both in quantity and value terms. During the same period, the major importers of Indian grape were UAE, UK, Saudi Arabia and Bangladesh.

9.5 CONCLUSIONS AND POLICY IMPLICATIONS :

Maharashtra tops the country in the production growth of many of the horticultural crops, particularly various fruits like grapes, oranges and chewnuts. Notwithstanding such impressive credentials for Maharashtra in horticulture crop production, the share of this state in the nation's total production of banana and onion has often been marked with declining trends which could be construed as depressing because these two commodities have long been at the forefront of India's horticultural exports. Two differing scenarios were perceptible in Maharashtra's trend of grape and onion production. While Maharashtra's grape production recorded impressive and significant growth owing mainly to perceptible rise in productivity and acreage under the crop, the state appeared to lose its share in the nation's total onion production due to losses in productivity. The decline in productivity inspite of reasonable growth in acreage under the crop meant slow growth for the state in onion production. It might appear that the onus of technological efforts have been more favourably inclined and concentrated behind the cultivation of grape rather than onion in the state of Maharashtra. Although both onion and grape turned out to be profitable crops in this state, the element of profit involved in the cultivation of grape was certainly much higher compared to onion. In fact, annual profit from grape cultivation was found to be 3 to 4 times higher than that accruing from onion cultivation. No wonder therefore that more of the farmers were switching over to better profitable grape cultivation. One of the reasons for slow acreage growth under onion compared to grape can be traced in this changing cropping pattern in favour of grape.

One of the important features of grape cultivation in the state of Maharashtra as observed in this study was the practice of pre-harvest contract adopted by majority of the orchardists. Pre-harvest contracting not only facilitated risk-free welcome finance for the orchardists, it also spared them of the botheration of looking after the crop through to the

harvest and marketing. However, mention may be made here that this practice of pre-harvest contracting definitely reduced the actual profits accruing to orchardists and, also discouraged them from producing the crop on a large scale. In the ultimate analysis, this may not only affect the economic position of the farmer but also the cultivation of this high value crop. As a matter of fact, a higher production performance can be achieved only by providing a complete package of necessary post-harvest infrastructural facilities. Not much has been achieved in this direction and there is practically a vacuum in this regard. Post-harvest operations such as cooling, grading, packing, transportation, warehousing, etc., involve enormous efforts and investments which the Government alone cannot provide. It becomes, therefore, necessary for the farmers to come forward, join hands and collectively share the responsibility. In this respect, the Government's endeavour should be limited to equipping the producer with the latest technology, tools equipments and facilities so that they are able to offset and minimise initial post—harvest losses and also slow down the chain of reactions that trigger spoilage.

As regards employment generation through horticultural crops, both onions and grapes were seen to generate sufficient employment opportunities for both female and male workers. However, male workers had better employment opportunities on grape orchards while females were the preferred lot in onion cultivation.

Indian grapes and onions are arguably valued commodities in world trade. The imperative need of the hour is to cut down upon the past-harvest losses in order to meet their increasing demand in the international market. Marketing systems encompassing grapes and onions also need improvement in their efficiency so that the producer has a better stake in the consumer rupee involving these two commodities.

In this changing liberalised economic era, India should give boost to its horticultural production and international trade in horticultural commodities through a concerted drive towards providing proper technological back up, improvements in productivity, efficient marketing, attractive price support and appropriate extension services. The country's international horticultural trade can definitely have a cutting edge over several of the current player nations if our current efforts at giving a major fillip to horticultural production continue unabated with a unflinching zeal.

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Appendix 1 (a) : Operational Cost of Grape Production Among Marginal Orchardists (Increasing Production Stage)

Operations	(in Rupees/Acre)													
	M	F	Family	Human Labour Cost			Hired	T	Total Human Labour	Bulllock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total
Making & Maintenance of Basin	21.84	-	-	21.84	115.68	-	-	115.68	137.52	-	-	-	-	-
Interculture	5.28	33.56	-	38.84	22.68	210.03	-	232.71	271.55	308.00	133.60	-	-	-
FYM/Compost	17.28	6.59	-	23.87	46.90	48.81	-	95.71	119.58	-	-	1755.60	-	-
Fertilizer	28.66	4.38	-	33.04	67.03	37.84	-	104.87	137.91	-	-	1230.78	-	-
Irrigation/ Watering	100.84	-	-	100.84	86.28	-	-	86.28	187.12	-	-	2160.00	-	-
Pruning/ Training	78.45	-	-	78.45	357.68	-	-	357.68	436.13	-	-	-	-	-
Insecticides/Pesticides	140.48	-	-	140.48	180.45	3.05	-	183.50	323.98	-	-	1179.53	-	-
Watch and Ward	450.79	-	-	450.79	525.00	-	-	525.00	975.79	-	-	-	-	-
Other Operations	94.95	58.25	-	153.20	133.61	156.31	-	289.92	443.12	-	-	-	-	-
Marketing Operations	123.48	13.00	-	136.48	360.00	115.28	-	475.28	611.76	-	-	-	-	-
Picking/Plucking	62.40	10.22	-	72.62	189.04	219.63	-	408.67	481.29	-	-	-	-	-
Assembling	132.72	14.22	-	146.94	246.48	31.78	-	278.26	425.20	-	-	-	-	-
Grading	66.96	4.56	-	71.52	308.72	136.34	-	445.06	516.58	-	-	5055.00	-	-
Packing	100.44	-	-	100.44	107.81	-	-	107.81	208.25	100.00	400.00	-	-	-
Local Transport	-	-	-	-	465.52	-	-	465.52	465.52	-	-	-	-	-
Loading/Unloading	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Marketing Cost	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-	-	3577.70	-
Octroi	-	-	-	-	-	-	-	-	-	-	-	-	1096.35	-
State Tax	-	-	-	-	-	-	-	-	-	-	-	-	1685.00	-
Commission & Fee	-	-	-	-	-	-	-	-	-	-	-	-	2461.20	-
Others	-	-	-	-	-	-	-	-	-	-	-	-	659.35	-
Total	1424.57	144.78	1569.35	3212.88	959.07	4171.95	408.00	5741.30	11380.91	533.60	9479.60	27543.41	9479.60	27543.41

Appendix 1 (b) : Operational Cost of Grape Production Among Small Orchardists (Increasing Production Stage)

(in Rupees/Acre)

Operations	Family		Human Labour Cost		Hired		Total Human Labour	Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total
	M	F	T	M	F	T						
King & Maintenance of Basin	12.56	-	12.56	137.68	84.72	137.68	150.24	-	254.40	-	-	-
Interculture	36.93	-	36.93	132.48	63.13	106.33	152.01	-	-	2291.70	-	-
FYM/Compost	32.80	12.88	45.68	43.20	60.44	152.54	215.84	-	-	1145.28	-	-
Fertilizer	56.10	7.20	63.30	92.10	-	102.80	186.08	-	-	2000.00	-	-
Irrigation/ Watering	83.28	-	83.28	102.80	-	102.80	186.08	-	-	-	-	-
Pruning/ Training	128.30	-	128.30	556.10	-	556.10	684.40	-	-	1418.84	-	-
Insecticides/Pesticides	146.40	-	146.40	353.90	-	353.90	500.30	-	-	-	-	-
Ward and Ward	348.75	-	348.75	581.25	-	581.25	930.00	-	-	-	-	-
Other Operations	38.18	49.00	87.18	207.08	125.06	332.14	419.32	-	-	-	-	-
Marketing Operations												
Picking/Plucking	153.83	31.63	185.46	361.64	275.97	637.61	823.07	-	-	-	-	-
Assembling	80.80	6.81	87.61	240.32	111.47	351.79	439.40	-	-	-	-	-
Grading	160.64	19.63	180.27	100.08	110.06	210.14	390.41	-	-	5877.90	-	-
Packing	36.45	-	36.45	336.40	252.72	589.12	625.57	-	-	-	-	-
Local Transport	68.84	-	68.84	127.29	-	127.29	196.13	100	200	-	-	-
Loading/Unloading	35.85	-	35.85	578.40	-	578.40	614.25	-	-	-	-	-
Marketing Cost												
Freight	-	-	-	-	-	-	-	-	-	-	-	3307.50
Octroi	-	-	-	-	-	-	-	-	-	-	-	1247.40
State Tax	-	-	-	-	-	-	-	-	-	-	-	1890.00
Commission & Fee	-	-	-	-	-	-	-	-	-	-	-	2475.90
Others	-	-	-	-	-	-	-	-	-	-	-	567.00
Total	1419.71	127.15	1546.86	3950.72	1083.57	5034.29	6581.15	325.00	454.40	12733.72	9487.80	2958.

Appendix 1 (c) : Operational Cost of Grape Production Among Medium Orchardists (Increasing Production Stage)

Operations	Human Labour Cost						Total Human Labour	Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total
	M	F	T	M	F	T						
Making & Maintenance of Basin												
Interculture	41.08	-	41.08	80.28	-	80.28	121.36	-	-	-	-	-
FYM/Compost	223.24	-	223.24	48.52	31.94	80.46	303.70	85.60	586.40	-	-	-
Fertilizer	44.98	21.16	66.14	51.58	85.25	136.83	202.97	-	-	2118.30	-	-
Irrigation/ Watering	49.18	8.31	57.49	131.34	25.25	156.59	214.08	-	-	1720.40	-	-
Pruning/ Training	87.20	-	87.20	129.12	-	129.12	216.32	-	-	2320.00	-	-
Insecticides/Pesticides	65.89	-	65.89	533.79	-	533.79	599.68	-	-	1488.13	-	-
Watch and Ward	140.70	-	140.70	346.11	-	346.11	486.81	-	-	-	-	-
Other Operations	300.30	-	300.30	525.90	-	525.90	826.20	-	-	-	-	-
Marketing Operations	105.45	78.13	183.58	293.78	163.00	456.78	640.36	-	-	-	-	-
Picking/Plucking	90.91	34.94	125.85	384.74	331.94	716.68	842.53	-	-	-	-	-
Assembling	112.31	31.59	143.90	315.57	142.78	458.35	602.25	-	-	-	-	-
Grading	83.69	21.56	105.25	235.20	141.06	376.26	481.51	-	-	-	-	-
Packing	180.00	-	180.00	120.48	125.25	245.73	425.73	-	-	6816.00	-	-
Local Transport	41.12	-	41.12	76.88	-	76.88	118.00	-	440	-	-	-
Loading/Unloading	60.64	-	60.64	515.36	-	515.36	576.00	-	-	-	-	-
Marketing Cost												
Freight	-	-	-	-	-	-	-	-	-	-	-	-
Octroi	-	-	-	-	-	-	-	-	-	-	4112.00	-
State Tax	-	-	-	-	-	-	-	-	-	-	1528.00	-
Commission & Fee	-	-	-	-	-	-	-	-	-	-	1920.00	-
Others	-	-	-	-	-	-	-	-	-	-	2618.40	-
Total	1626.69	195.69	1822.38	3788.65	1046.47	4835.12	6657.50	85.60	1026.40	14462.83	10850.40	33082.7

Appendix 1 (d) : Operational Cost of Grape Production Among Large Orchardists (Increasing Production Stage)

(in Rupees/Acre)

Operations	Family		Human Labour Cost		Hired		Total		Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total
	M	F	T	M	F	T	Human Labour	Total					
King & Maintenance of Basin	31.19	-	31.19	78.88	-	78.88	110.07	-	82.40	542.40	-	-	110.07
Interculture	96.95	-	96.95	171.59	-	171.59	268.54	-	-	-	-	-	893.37
FYM/Compost	31.08	25.41	56.49	56.64	66.41	123.05	179.54	-	-	-	1986.60	-	2166.1
Fertilizer	40.64	5.22	45.86	101.11	18.84	119.95	165.81	-	-	-	1579.25	-	1745.0
Irrigation/Watering	61.08	-	61.08	108.52	-	108.52	169.60	-	-	-	2160.00	-	2329.6
Pruning/ Training	43.93	-	43.93	506.49	-	506.49	550.42	-	-	-	-	-	550.42
Insecticides/Pesticides	80.68	-	80.68	358.84	-	358.84	439.52	-	-	-	1162.74	-	1602.2
Watch and Ward	206.55	-	206.55	536.96	-	536.96	743.51	-	-	-	-	-	743.51
Other Operations	117.23	32.59	149.82	252.49	138.88	391.37	541.19	-	-	-	-	-	541.19
<u>Marketing Operations</u>													
Picking/Plucking	60.44	22.44	82.88	304.16	366.47	670.63	753.51	-	-	-	-	-	753.51
Assembling	56.72	19.44	76.16	180.28	178.84	359.12	435.28	-	-	-	-	-	435.28
Grading	84.04	34.48	118.52	120.68	188.50	309.18	427.70	-	-	-	63111.20	-	427.7
Packing	78.30	25.65	103.95	260.90	124.20	385.10	489.05	-	-	-	-	-	6800.0
Local Transport	46.88	-	46.88	124.00	-	124.00	170.88	-	80	520	-	-	770.8
Loading/Unloading	84.76	-	84.76	444.44	-	444.44	529.20	-	-	-	-	-	529.2
<u>Marketing Cost</u>													
Freight	-	-	-	-	-	-	-	-	-	-	-	-	4051.20
Octroi	-	-	-	-	-	-	-	-	-	-	-	-	1681.60
State Tax	-	-	-	-	-	-	-	-	-	-	-	-	1960.00
Commission & Fee	-	-	-	-	-	-	-	-	-	-	-	-	2646.00
Others	-	-	-	-	-	-	-	-	-	-	-	-	862.40
Total	1120.47	165.23	1285.70	3605.98	1082.14	4688.12	5973.82	162.40	1062.40	13199.79	11201.20	31595.20	31595.20

Appendix 2 (a) : Operational Cost of Grape Production Among Small Orchardists (Constant Production Stage)

Operations	Human Labour Cost						Total Human Labour	Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total
	M	F	T	M	F	T						
Planting & Maintenance of Basin	24.84	-	24.84	170.64	-	170.64	195.48	-	-	-	-	-
Interculture	61.32	-	61.32	188.64	66.34	254.98	316.30	353.40	213.60	-	-	-
FYM/Compost	20.43	27.39	47.82	206.33	93.69	300.02	347.84	-	-	2568.30	-	-
Fertilizer	40.84	8.34	49.18	77.76	62.56	140.32	189.50	-	-	1380.89	-	-
Irrigation/ Watering	72.44	-	72.44	80.28	-	80.28	152.72	-	-	2160.00	-	-
Pruning/ Training	76.76	-	76.76	488.64	-	488.64	565.40	-	-	-	-	-
Insecticides/Pesticides	60.92	-	60.92	356.72	-	356.72	417.64	-	-	1493.86	-	-
Watch and Ward	300.03	-	300.03	664.24	-	664.24	964.27	-	-	-	-	-
Other Operations	41.66	60.09	101.75	193.84	147.39	341.23	442.98	-	-	-	-	-
Marketing Operations	96.88	41.31	138.19	410.72	316.38	727.10	865.29	-	-	-	-	-
Picking/Plucking	165.92	56.84	222.76	245.76	118.19	363.95	586.71	-	-	-	-	-
Assembling	40.44	13.31	53.75	162.40	225.53	387.93	441.68	-	-	-	-	-
Grading	86.10	7.48	93.58	590.40	235.36	825.76	919.34	-	-	6738.42	-	-
Packing	100.68	-	100.68	119.44	-	119.44	220.12	90.00	440.00	-	-	-
Local Transport	75.10	-	75.10	640.05	-	640.05	715.15	-	-	-	-	-
Loading/Unloading	-	-	-	-	-	-	-	-	-	-	-	-
Marketing Cost	-	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-	-
Octroi	-	-	-	-	-	-	-	-	-	-	4068.48	-
State Tax	-	-	-	-	-	-	-	-	-	-	1483.30	-
Commission & Fee	-	-	-	-	-	-	-	-	-	-	2119.00	-
Others	-	-	-	-	-	-	-	-	-	-	2797.08	-
Total	1264.36	214.76	1479.12	4595.86	1265.44	5861.30	7340.42	443.40	653.60	14341.47	11145.94	33924.83

Appendix 2 (b) : Operational Cost of Grape Production Among Medium Orchardists (Constant Production Stage)

(in Rupees /Acre)

Operations	Human Labour Cost				Total Human Labour	Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total		
	M	F	T	M							Hired	T
Pruning & Maintenance of Basin	28.76	-	28.76	79.72	-	79.72	-	-	-	-		
Interculture	88.52	5.88	94.40	164.72	50.09	214.81	309.21	2208.30	-	-		
FYM/Compost	24.92	48.48	73.40	62.72	84.97	147.69	221.09	1579.21	-	-		
Fertilizer	69.43	9.34	78.77	138.51	24.19	162.70	241.47	2240.00	-	-		
Irrigation/ Watering	101.00	-	101.00	133.68	-	133.68	234.68	-	-	-		
Pruning/ Training	110.03	-	110.03	557.86	-	557.86	667.89	1228.44	-	-		
Insecticides/Pesticides	165.24	-	165.24	303.48	-	303.48	468.72	-	-	-		
Watch and Ward	413.36	-	413.36	457.24	-	457.24	870.60	-	-	-		
Other Operations	64.46	60.09	124.55	267.71	132.38	400.09	524.64	-	-	-		
Packing/Operations	75.00	47.66	122.66	330.08	372.75	702.83	825.49	-	-	4532.16		
Picking/Plucking	140.68	31.84	172.52	344.84	130.09	474.93	647.45	-	-	1823.52		
Assembling	109.86	15.66	125.52	297.02	169.73	466.75	592.27	-	-	2096.00		
Grading	129.81	-	129.81	173.12	192.30	365.42	495.23	6916.80	-	-		
Packing	28.44	-	28.44	119.40	-	119.40	147.84	-	-	-		
Local Transport	131.30	-	131.30	654.70	-	654.70	786.00	-	-	-		
Loading/Unloading	-	-	-	-	-	-	-	-	-	-		
Marketing Cost	-	-	-	-	-	-	-	-	-	-		
Freight	-	-	-	-	-	-	-	-	-	-		
Ostroil	-	-	-	-	-	-	-	-	-	-		
State Tax	-	-	-	-	-	-	-	-	-	-		
Commission & Fee	-	-	-	-	-	-	-	-	-	-		
Others	-	-	-	-	-	-	-	-	-	-		
Total	1680.81	218.95	1899.76	4084.80	1156.50	5241.30	7141.06	135.00	820.00	14172.75	11999.68	34268

Appendix 3 (a) : Operational Cost of Grape Production Among Marginal Orchardists (Declining Production Stage)

Operations	Human Labour Cost				Total Human Labour	Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total
	M	F	T	M						
Planting & Maintenance of Basin	28.92	-	28.92	75.64	104.56	-	-	-	-	-
Interculture	20.88	22.75	43.63	124.88	250.73	224.60	-	-	-	-
FYM/Compost	23.64	15.53	39.17	28.76	63.91	-	92.00	1528.20	-	-
Fertilizer	35.13	-	35.13	90.74	90.74	-	-	991.53	-	-
Irrigation/ Watering	100.92	-	100.92	59.24	160.16	-	-	1920.00	-	-
Pruning/ Training	182.26	-	182.26	273.70	455.96	-	-	-	-	-
Insecticides/Pesticides	172.44	-	172.44	143.20	315.64	-	-	831.09	-	-
Watch and Ward	342.11	-	342.11	458.29	800.40	-	-	-	-	-
Other Operations	83.74	75.87	159.61	124.88	384.24	-	-	-	-	-
Marketing Operations										
Picking/Plucking	72.44	9.78	82.22	294.24	620.93	-	-	-	-	-
Assembling	45.16	23.41	68.57	160.04	357.29	-	-	-	-	-
Grading	134.16	7.16	141.32	121.12	246.34	-	-	-	-	-
Packing	79.08	12.84	91.92	241.52	371.46	-	-	4750.46	-	-
Local Transport	111.41	-	111.41	39.11	39.11	70.00	320.00	-	-	-
Loading/Unloading	38.44	-	38.44	433.48	471.92	-	-	-	-	-
Marketing Cost										
Freight	-	-	-	-	-	-	-	-	3821.26	-
Octroi	-	-	-	-	-	-	-	-	1101.10	-
State Tax	-	-	-	-	-	-	-	-	1573.00	-
Commission & Fee	-	-	-	-	-	-	-	-	2516.80	-
Others	-	-	-	-	-	-	-	-	707.85	-
Total	1470.73	167.34	1638.07	2668.84	5220.51	294.60	412.00	10021.28	9720.01	25668.4

Appendix 2 (c) : Operational Cost of Grape Production Among Large Orchardists (Constant Production Stage)

(in Rupees /Acre)

Operations	Family		Human Labour Cost		Hired		Total Human Labour		Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total
	M	F	T	M	F	T	Labour	Cost					
King & Maintenance of Basin	20.88	-	20.88	112.20	-	112.20	133.08	-	-	-	-	-	-
Interculture	108.52	-	108.52	200.04	-	200.04	308.56	75.80	649.60	-	-	-	-
FYM/Compost	44.48	31.63	76.11	45.12	80.22	125.34	201.45	-	-	2061.15	-	-	-
Fertilizer	22.36	3.16	25.52	114.98	29.03	144.01	169.53	-	-	1724.62	-	-	-
Irrigation/ Watering	44.44	-	44.44	109.40	-	109.40	153.84	-	-	2000.00	-	-	-
Pruning/ Training	115.02	-	115.02	486.28	-	486.28	601.30	-	-	-	-	-	-
Insecticides/Pesticides	94.59	-	94.59	418.03	-	418.03	512.62	-	-	1097.73	-	-	-
Watch and Ward	233.10	-	233.10	558.56	-	558.56	791.66	-	-	-	-	-	-
Other Operations	132.08	49.00	181.08	295.61	120.88	416.49	597.57	-	-	-	-	-	-
Marketing Operations													
Picking/Flucking	20.84	31.50	52.34	392.56	406.31	798.87	851.21	-	-	-	-	-	-
Assembling	86.64	16.34	102.98	205.16	161.44	366.60	469.58	-	-	-	-	-	-
Grading	54.00	31.34	85.34	151.28	247.84	399.12	484.46	-	-	-	-	-	-
Packing	53.15	21.12	74.27	309.10	165.16	474.26	548.53	-	-	6646.44	-	-	-
Local Transport	40.88	-	40.88	149.76	-	149.76	190.64	110.00	600.00	-	-	-	-
Loading/Unloading	139.60	-	139.60	590.75	-	590.75	730.35	-	-	-	-	-	-
Marketing Cost													
Freight	-	-	-	-	-	-	-	-	-	-	-	5015.24	-
Octroi	-	-	-	-	-	-	-	-	-	-	-	2055.80	-
State Tax	-	-	-	-	-	-	-	-	-	-	-	2164.00	-
Commission & Fee	-	-	-	-	-	-	-	-	-	-	-	2921.40	-
Others	-	-	-	-	-	-	-	-	-	-	-	930.52	-
Total	1210.58	184.09	1394.67	4138.83	1210.88	5349.71	6744.38	185.80	1249.60	13529.94	13086.96	34796	

Appendix 3 (b) : Operational Cost of Grape Production Among Small Orchardists (Declining Production Stage)

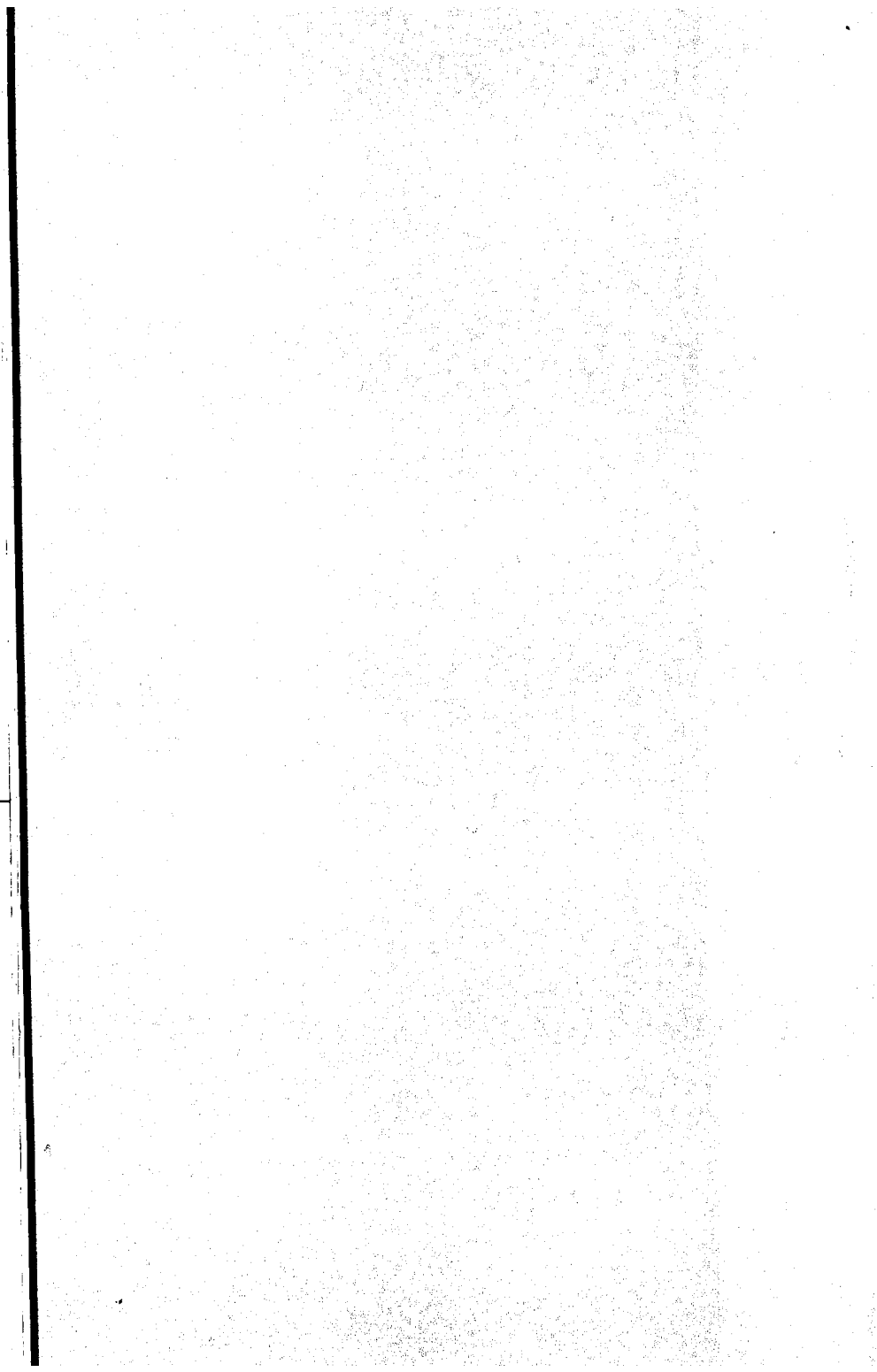
Operations	Family			Haman Labour Cost			Hired F	T	Total Haman Labour	Bullöck Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total
	M	F		T	M									
Making & Maintenance of Basin	29.52	-	-	29.52	87.12	-	-	87.12	116.64	-	-	-	-	-
Interculture	56.64	-	-	56.64	127.12	-	35.25	162.37	219.01	195.00	240.80	-	-	-
FYM/Compost	45.12	42.72	-	87.84	20.04	-	35.22	55.26	143.10	-	-	2006.55	-	-
Fertilizer	25.33	-	-	25.33	132.65	-	-	132.65	157.98	-	-	1133.57	-	-
Irrigation/ Watering	84.88	-	-	84.88	107.64	-	-	107.64	192.52	-	-	1920.00	-	-
Pruning/ Training	92.44	-	-	92.44	438.20	-	-	438.20	530.64	-	-	-	-	-
Insecticides/Pesticides	136.81	-	-	136.81	264.69	-	-	264.69	401.50	-	-	1372.34	-	-
Watch and Ward	412.88	-	-	412.88	418.39	-	-	418.39	831.27	-	-	-	-	-
Other Operations	88.73	67.22	-	155.95	159.00	-	85.44	244.44	400.39	-	-	-	-	-
Marketing Operations														
Picking/Plucking	168.88	28.09	-	196.97	299.72	-	306.59	606.31	803.28	-	-	-	-	-
Assembling	56.56	16.34	-	72.90	219.56	-	131.81	351.37	424.27	-	-	-	-	-
Grading	129.00	13.19	-	142.19	85.12	-	129.50	214.62	356.81	-	-	-	-	-
Packing	51.45	-	-	51.45	409.60	-	116.16	525.76	577.21	-	-	5502.75	-	-
Local Transport	87.56	-	-	87.56	74.44	-	-	74.44	162.00	70.00	320.00	-	-	-
Loading/Unloading	26.10	-	-	26.10	556.10	-	-	556.10	582.20	-	-	-	-	-
Marketing Cost														
Freight	-	-	-	-	-	-	-	-	-	-	-	-	3018.75	-
Outroi	-	-	-	-	-	-	-	-	-	-	-	-	1224.75	-
State Tax	-	-	-	-	-	-	-	-	-	-	-	-	1725.00	-
Commission & Fee	-	-	-	-	-	-	-	-	-	-	-	-	2328.75	-
Others	-	-	-	-	-	-	-	-	-	-	-	-	542.00	-
total	1491.90	167.56	1659.46	3399.39	839.97	4239.36	5898.82	265.00	560.80	11935.21	8839.25	27499.0		

Appendix 3 (d) : Operational Cost of Grape Production Among Large Orchardists (Declining Production Stage)

Operations	Human Labour Cost						Total Human Labour	Bullock Labour Cost	Machinery (Tractor)	Material Input Cost	Others	Total
	M	F	Family	T	M	F						
<u>Making & Maintenance of Basin</u>												
Interculture	20.20	-	-	20.20	88.32	-	88.32	108.52	-	-	-	-
FYM/Compost	102.84	-	-	102.84	160.24	-	160.24	263.08	77.80	461.16	-	-
Fertilizer	28.72	28.81	-	57.53	46.84	63.66	110.50	168.03	-	-	1921.65	-
Irrigation/ Watering	44.14	10.25	-	54.39	89.16	15.34	104.50	158.89	-	-	1552.82	-
Pruning/ Training	73.32	-	-	73.32	75.00	-	75.00	148.32	-	-	2080.00	-
Insecticides/Pesticides	65.10	-	-	65.10	508.16	-	508.16	573.26	-	-	1055.64	-
Watch and Ward	93.14	-	-	93.14	375.46	-	375.46	468.60	-	-	-	-
Other Operations	229.84	-	-	229.84	525.86	-	525.86	755.70	-	-	-	-
<u>Marketing Operations</u>	109.58	40.97	-	150.55	294.00	116.50	410.50	561.05	-	-	-	-
Picking/Plucking	67.12	72.53	-	139.65	232.52	287.72	520.24	659.89	-	-	-	-
Assembling	44.76	19.97	-	64.73	130.66	130.66	290.78	355.51	-	-	-	-
Grading	73.32	36.84	-	110.16	154.96	163.03	317.99	428.15	-	-	-	-
Packing	71.55	16.22	-	87.77	245.40	96.38	341.78	429.55	-	-	5705.70	-
Local Transport	60.60	-	-	60.60	112.88	-	112.88	173.48	90.00	480.00	-	-
Loading/Unloading	66.40	-	-	66.40	538.75	-	538.75	605.15	-	-	-	-
<u>Marketing Cost</u>												
Freight	-	-	-	-	-	-	-	-	-	-	4149.60	-
Octroi	-	-	-	-	-	-	-	-	-	-	1659.84	-
State Tax	-	-	-	-	-	-	-	-	-	-	1729.00	-
Commission & Fee	-	-	-	-	-	-	-	-	-	-	2507.05	-
Others	-	-	-	-	-	-	-	-	-	-	778.05	-
Total	1150.63	225.59	1376.22	3607.67	873.29	4480.96	167.80	5857.18	941.16	12316.81	10823.54	30106.41







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