6. FINDINGS, CONCLUSIONS AND SUGGESTIONS

6.1 Findings.

Fruit cultivation has been practiced in India since ancient times. This art of growing fruits has now gradually changed into one of the skillful and commercial propositions. Cultivation of fruits plays an important role in the economy and prosperity of a nation. It is believed that standard of living of people of a country can be judged by per capita production and consumption of fruits. Importance of fruits in the human diet is universally recognized.

As is well known, India with its diversity of soils and climate is advantageously placed for producing practically all varieties of tropical and subtropical fruits. Grape is one of these fruits. In India it is predominantly grown in states like Maharashtra, Karnataka, Tamil Nadu, Punjab and other major states. The predominant grape growing districts are Nashik, Sangali, Pune, Solapur, Ahmed Nagar and Osmanabad district.

In Maharashtra grape cultivation has acquired place of pride in the economy of state. During the year 2003-04 area under grapes in State was 35,236 hectares with the production of 9.8 lakh MT. Having realized, the importance of grape cultivation, Government of Maharashtra is providing special infrastructure facilities to boost the production, marketing including processing and export of grapes in the State. Being a very perishable produce, grapes cannot be stored for a longer period under ordinary condition so produce has to reach to the consumer well in time, in fresh and good quality. So both production and efficient marketing management become prime concern.

The efforts are underway to evolve location specific technologies transfer them to grape growers field and assure input supply to grape growers in right time at right place and of a good quality. The rate at which new technology and yield increasing inputs are adopted by the grape growers is affected by the prices of input and output. Simultaneously the consumers also expect the availability of goods at reasonable prices. For achieving these conflicting objectives grapes production management and marketing system has to play a crucial role.

An attempt has been made in present study to examine the various aspects of production and marketing management in Pune district with the specific objectives:
1. To study the Patterns of growth in area, production and productivity of grapes in the study area.
2. To examine the resource management in grapes production.
3. To analyze the cost and returns in grapes cultivation.
4. To study the feasibility of investment in grapes cultivation.
5. To identify marketing channels and to estimate price spread in grapes marketing.

The Pune district was purposively selected for the study. Fifteen villages having highest area under grapes were selected from the Junnar, Indapur, Baramati and Daund tahsil. A list of grape growers was prepared by grouping the grape growers on the basis of area under grape vine orchard into three size groups viz., Small (below 2 ha), medium (2 to 4 ha) and large (above 4 ha). A sample of 150 grape growers from above size groups along with 50 market intermediaries was studied.

Data pertaining to various aspect of the study were collected personally in a specially designed schedule by the survey method. From the selected grape growers and co – operative organization for the year 2012-13. The data relating to agro economic features of the study area viz, land use, cropping pattern, soil, climate etc. were collected from the secondary sources. The data collected were complied and analyzed for interpretation of results. Both tabular and statistical method of analysis was used to accomplish the objectives of the study.

The findings are briefly summarized below.

1) As regards to land utilization pattern of the sample grape growers, at the overall level the average size of land holding was 4.07 hectares. The per farm cultivated area was 3.91 hectares. The proportionate area under irrigation was to the extent of 66.34 per cent to the total operational holding.

2) Cropping pattern of the sample grape growers was dominated by cash crops constituting Grape, sugarcane and vegetables. Among these crops, grape occupied major shared, i.e. of 43.07 per cent in the gross cropped area. The cropping intensity worked out to 144.90 per cent.
3) The respective temporal growth rates of area, production and productivity of grapes in the study area for the period from 1987-88 to 2011-12 were calculated and it was seen from the table and graph that the area under grapevine cultivation was 280 hectares, the production was 46.2 tone and the productivity was 16.5 tons per hectare in beginning of 1986-87, which jumped to 1010 hectares with production 286.84 tone and productivity was 28.40 tons in 1995-96. Later on area, production and productivity was reduced to 820 ha, 225.01 tone and 27.44 tons respectively.

4) It was observed that, at the overall level, the source of inspiration regarding managerial decision in selecting grape for cultivation was mainly from the relatives (63.33%) followed by friends (24.44). Sample grape grower preferred cultivation of grapes because of fetching and generate high income as compared to other fruit crops. Mostly high capital investment and careful management is a key factor in deciding the decision of grape cultivation.

5) At the overall level, adoption behaviour of grape growers towards recommended cultivation technology viz., soil selection, direction of planting, planting distance as per training system, trench planting method, selection of Tas-A-Ganesh variety, own root nursery and bower training system found to be at the higher side (i.e. more than 50 % sample grape grower) as per the recommendation.

6) As regard to the management practices in production of grapes such as financial, labour, irrigation, nutrition, use of growth regulators, pest and diseases management and mechanization played vital role. At the overall level, most of the grape growers (88.89%) preferred co-operative sector and Nationalize Bank as main source of medium term and long term loan for establishment of grape garden. Seasonal labor plays important role in cultivation practices as they contributed 64.38 per cent in total labour management, at overall level. About 100.00 per cent of grape growers preferred drip irrigation method for grapes. At the overall level, 48.84 per cent of the total grape growers adopted Integrated Nutrient Management. While 92.22 per cent grape growers applied fertilizers in split doses. As regards to method of application of growth regulators, 78.89 per cent grape growers at overall level followed dipping along with the sprayings. About 48.84 per cent grape growers adopted Integrated Pest and disease Management techniques.
7) At the overall level the per hectare cost of establishment of grape garden was worked to Rs. 6,46,544.06. It was decreased with increase in size group. Major items of the establishment cost were the cost of supporting structure and irrigation system installation which together contributed 63.17 per cent of the total cost.

8) Including initial investment cost and interest on working capital, total variable cost was worked out to Rs. 7,11,198 which constitute to 80.37 per cent of total maintenance cost. The total fixed cost was calculated to Rs. 1,71,213.00 which consists of 19.35 per cent of total maintenance cost and per hectare overall maintenance cost during gestation period including initial establishment cost was Rs. 8,82,411.

9) It can be revealed that total cost of cultivation of grape worked out in table no 5.11 to Rs. 6,14,518.98 at the overall level and it was maximum in large size group of sample grape growers i.e. Rs. 6,41,296.60. The amortized establishment cost is also important and it contributed to the extent of 15.80 per cent at the overall level. The paid out cost shared 51.27 per cent is total cost at the overall level. The cost ‘B’ shared 91.17 per cent in the total cost at the overall level. Per tone cost of cultivation for small, medium and large farmers was Rs. 23,109.59, 22,452.95 and 21,628.89 respectively.

10) It was noted from the table that per hectare total yield obtained from grape cultivation was 25.50, 27.30, 29.65 and 27.48 tones in small, medium, large size groups and at the overall level, respectively. The gross income received from the grape cultivation was Rs. 7,39,500, Rs. 7,91,700 Rs. 8,59,850 and Rs. 7,97,016.67 respectively for small, medium, large size groups and at overall level. At the overall level, total cost was observed Rs. 6 14,518.98. At overall level, the per hectare net returns were worked to Rs. 1,82,497.69. The output-input ratio i.e. B:C ratio which indicates the profitability of investment estimated for sample grape growers were 2.53,1.42 and 1.30 at cost ‘A’ ‘B’ and ‘C’ for small, medium, large size groups and at overall level, respectively. As the output input ratio at cost ‘C’ was greater than unity it indicated that the cultivation of grapes was profitable.

11) Yield, Cost and Return structure of sample grape growers.(Year 2008-09 to 2012-13) for last five years revealed that, per hectare yield was increased from 19.43 tones to 27.30 tones, while production cost per kg was increased from Rs. 12.98 to Rs.18.95. Simultaneously
returns per kg was also increased from Rs. 15.71 Rs. 29.00 for the above five years which indicates the increasing productivity and profitability of the grapes in study area.

12) The financial feasibility of investments in grape cultivation, measures of project appraisal was computed. In grape the payback period was 5 years. The per ha net present values of grape was Rs. 83749.79 discounted at the rate of 12 per cent opportunity cost of capital. The benefit cost ratio in grape was 1.05 at 12 per cent discount rate which was more than unity. The internal rate of return 18.5 per cent was higher than the opportunity cost of capital i.e. 12.00 per cent. This indicates a higher average earning power of money invested in the project.

13) It was revealed from the table that the per hectare use of human labour was 432.36 man days at the overall level. The per hectare use of bullock labour was relatively high in the case of large size group sample grape grower (19.10 pair days). The percent gap observed in utilization of nitrogen and potassium between recommended and actual observed to be 55.42 per cent and 49.82 per cent at overall level, respectively. The per hectare use of manures and phosphorus was observed to be as per recommended dose. Thus it can be stated that the sample grape growers have not managed these important inputs to have maximum output.

14) The seven resource variables included in the production analysis have explained jointly 61.86 per cent variation in the total output of grape. The total human labour (X₁), nitrogen (X₄) and plant protection expenditure (X₇) were turned out to be positive and highly significant at 1 per cent level indicating that these are the important variables for which the output is highly responsive as all the inputs are given in split doses and have short day effects. The regression coefficients of bullock labour (X₂) and Manure (X₃), were positive and significant at 5 per cent level indicating that, there is a scope to increase the use of their input for maximizing the output. The regression coefficients of Phosphorus (X₅) and Potassium (X₆) were found to be non significant as once they applied have long lasting effect.

15) It was noticed that, at the overall level, 58.89 and 48.49 per cent growers were said that replacement of variety is very difficult and non availability quality planting material
respectively. Non availability of manures/fertilizer in time and shortage of fertilizers was the major problem reported by 47.78 and 75.56 per cent growers. Increasing prices of fertilizers, and pesticides was an important problem in front of growers because prices of grapes were more or less constant on one side and costs of inputs were increasing on the other side.

Major problems of pesticide management were reported as increased resistance in paste and diseases and non availability of insecticide and pesticides in time by 82.22 and 68.89 per cent growers respectively. About 85.56 and 90.00 per cent growers at overall level reported that generally skilled labour are not available and particularly face acute problem during peak season respectively. An improved technology is not suitable to small & fragmented land holding was told by 83.33 per cent small farmers. Financial constraints are important one. About 87.78 per cent growers at overall level reported that rate of interest is very high. More than 50.00 per cent growers reported that credit is not made available in time and its procedure to obtain is Complex, lengthy and rigid. General constraints like irregular supply of electricity, difficulty in mechanization, fragmentation of land holdings lack of insurance support and irregular supply of canal and river water were reported by some of the growers.

16) The marketing management was broadly classified into pre harvest and post harvest practices. The pre harvest practices viz., girdling, thinning were adopted by 95.56 per cent and 90.00 per cent sample grape growers. In case of pruning time 76.11 per cent grape growers adopted timely pruning. (16th Sep. to 15th Oct.)

17) As regards to pre harvest practices viz., harvesting criteria, time, single pickings etc. were followed by majority of grape growers as per recommendation as it is indicated 81.11, 95.56 and 80 per cent.

18) At the overall level, it was seen that the marketed surplus was 99.01 per cent in the total production. It decreases from 99.10 to 98.95 per cent with increase in size group.

19) The sample grape growers graded their produce in three grades. Grade I, Grade II and Grade III which constituted 59.31, 30.52 and 10.17 per cent of the total produce at overall level.
20) Almost 91.11 per cent sample grape grower carried out packing according to quality of grape. Cent per cent grape growers used lining material and labels.

21) As regards to quantity of grapes sold different markets at the overall level the largest portion (36.76 tones) 45.02 per cent of the total quantity of grapes was sold in the outside state market. The quantity sold in local and within the state market were (16.73 tones) 20.50 per cent and (28.15 tones) 34.48 Per cent respectively at the overall level. In case of small size group grape growers major quantity sold (11.97 tones) 47.36 per cent in local market. In case of medium and large size group, the quantity sold in the outside state market were (14.64 tones) 54.16 per cent and (14.80 tones) 50.44 per cent respectively.

22) The per kg marketing cost for 20 kg, 5 kg and 2 kg box were Rs. 4.39, Rs. 5.70 and Rs. 5.20, respectively

23) In all four marketing channels were identified in sale of grapes viz.,

   a) Channel –I (Producer – Retailer – Consumer),

   b) Channel – II (Producer-Commission agent – Retailer – Consumer),

   c) Channel III- (Producer-Hundekari-Wholesaler – Cum-Commission agent-Retailer-Consumer) and

   d) Channel IV (Prouder-Pre harvest contractor – Retailers – Consumers).

24) The producer’s share in consumer’s rupee was maximum in Channel I (71.06 %) followed by Channel IV (63.48%) and Channel II (61.70%).

25) Packaging is an important aspect in marketing management 44.44 per cent growers at overall level pointed out that cost of packing material used for grape marketing is costly. With the increasing input cost, cultivation cost is increasing alone with it cost of marketing is also increasing over packing material and other things. About (94.44 %) growers reported that fluctuation of prices is the major problem in grape marketing. About 88.89 per cent growers have pointed out that commission charges of intermediaries were high and Exploitation by them was to the tune of 71.11 per cent. Other major important problems like
lack of market infrastructural facilities, non availability of packing and grading facility, absence of support price in case of glut in market and inefficiency of grape grower’s co-operative societies were reported by almost one third of farmers.

26) Some of the farmers engaged in export of the grape revealed that the major obstacles in export of the grapes were difficult to meet export standards, lengthy procedures and formalities for export. Other minor problems like lack of knowledge about export procedure, non-availability of updated export market information, and un availability of exportable varieties were important one.

6.2 Conclusions

On the basis of findings of the present study, the following conclusions are put forth

1. The average size of land holding of sample grape grower 4.0 hectares and 95.35 per cent area was under cultivation. The cropping pattern was dominated by cash crops, grape occupied major shared i.e. of 43.07 per cent.

2. Co-operative sector and Nationalized Banks were the main source for long and medium term loans for the establishment of grape garden.

3. The respective temporal growth rates of area, production and productivity of grapes in the study area for the period from 1987-88 to 2011-12 showed increasing trend.

4. The source of inspiration regarding managerial decision in selecting grape for cultivation was mainly from the relatives and friends. Adoption behaviour of grape growers towards recommended cultivation technology was more than 50.00 per cent.

5. The management practices in production of grapes such as financial, labour, irrigation, nutrition, use of growth regulators, pest and diseases management and mechanization played vital role.

6. The per hectare cost of establishment and maintenance cost during gestation period of grape garden was worked to Rs. 646544 and Rs.882411.
7. Average per hectare yield obtained from grape cultivation was 27.48 tones, cost of cultivation of grape worked out Rs. 614518.98, net returns was worked to Rs. 182497.69, and B: C ratio was 1.30 which indicated that the cultivation of grapes was profitable.

8. The measures of project appraisal such as pay-back period (5 years), net present values (Rs. 83749.79), benefit cost ratio (1.05), internal rate of return (18.5 per cent) was higher than the opportunity cost of capital i.e. 12.00 per cent. This indicates a higher average earning power of money invested in the project.

9. The per hectare use of manures and phosphorus was observed to be as per recommended dose while rest of inputs were underutilized.

10. The total human labour ($X_1$), nitrogen ($X_4$) and plant protection expenditure ($X_7$) were turned out to be positive and highly significant at 1 per cent level indicating that these are the important variables for which the output is highly responsive.

11. At the overall level growers were said that replacement of variety is very difficult and non availability quality planting material, non availability of manures/fertilizer in time and shortage of fertilizers, increasing prices of fertilizers, and pesticides, increased resistance in paste and diseases, unavailability of skilled labour, credit is not made available in time and its procedure to obtain is Complex, lengthy and rigid.

12. General constraints like irregular supply of electricity, difficulty in mechanization, fragmentation of land holdings, and lack of insurance support and irregular supply of canal and river water were reported by some of the growers.

13. The marketing management was broadly classified into pre harvest and post harvest practices. At the overall level, it was seen that the marketed surplus was 99.01 per cent in the total production. The total produce was graded in proportion of 6:3:1 in Grade I, II an III respectively.

14. As regards to quantity of grapes sold different markets at the overall level the largest portion 45.02 per cent of the total quantity of grapes was sold in the outside state market. The
quantity sold in local and within the state market were 20.50 per cent and 34.48 Per cent respectively at the overall level.

15. Majority of grape grower marketed their produce through Channel IV (Producer-Pre-harvest contractor-Retailers-Consumers).

16. The per kg marketing cost for 20 kg, 5 kg and 2 kg box were Rs. 4.39, Rs. 5.70 and Rs. 5.20, respectively.

17. The producer’s share in consumer’s rupee was maximum in Channel I (71.06 %) followed by Channel IV (63.48%) and Channel II (61.70%).

18. Most of the farmers pointed out that cost of packing material used for grape marketing is costly, fluctuation of prices, more commission charges, and exploitation by intermediaries, difficult to meet export standards, lengthy procedures and formalities for export. Other minor problems like lack of knowledge about export procedure, non-availability of updated export market information, and unavailability of exportable varieties were the major constraint.

6.3 Policy implications

Major policy implications based on the findings of the study, the necessary steps to be taken up in the areas of investment, production, marketing and strategies to increase productivity and profitability of grapes are drawn and are presented as under:

1. The growth rate analysis indicated that there is increase in area, production and productivity, production is increased more due to increase in area rather than productivity which calls for intensive efforts to increase productivity of grapes in the study area as well as Maharashtra and country as a whole even though we are leading in productivity of grapes in World and still we have lot of scope to increase the share in world marker by introducing high yielding varieties with exportable quality production.

2. As indicated by the financial measurements, the investment in grape orchard was found to be financially feasible. And as there is higher initial investment in grape orchards the farmers who wish to establish the orchards, timely and enough financial assistance may be provided by the institutional agencies at lower rate of interest.
3. The production function analysis revealed that the major inputs like nitrogen and potassium has been underutilized per hectare. Hence, this calls for increase in dose of both nutrient to achieve recommended level to boost the productivity of grapes and efforts should made to educate and demonstrate to farmers to adopt recommended application of fertilizers, plant protection chemicals, since they are important and costly inputs which affect quality and quantity of produce.

4. The study revealed that the producer’s share in consumer rupee is very less. Market intermediaries enjoy lion’s shares and producers are hard hit. In order to reduce the unwanted clutches of intermediaries, the producers themselves can take up marketing of produce in farmers market and distant market by collective marketing process.

5. It was revealed from the study that use of FYM or organic manure and bio-pesticides is increasing in the study area. Increased awareness and thereby increased demand for organically grown products in recent years is of crucial importance in terms of marketability of the produce. Therefore, the cultivators may think in these lines to produce organic grapes.

6. Scientific storage and cold chain facilities with refrigerated vans for the perishable agricultural commodities like grapes has very important role to play to enhance the self life of the products and thus offer the commodity for sale in a phased manner to avoid unnecessary glut in the market and there by slump in the prices.

7. This crop has good commercial potential and the area under this crop is significantly increasing in the study area, hence Government should plan for establishing new processing (Raisins and Wine) units and arrange marketing set up in the region to safeguard the interest of grape growers and processors.

8. As the grapes have more potential for export, established market but no assurance of getting money in time due to involvement of pre harvest contractors in export trade, Government should make provision to give bank guaranty for delayed payments.

9. The linkages with research, education and extension system like, SAU, NRC, IIHR, DOA, NHM, APEDA, MSGGA and MAHAGRAPE are found to be weak. There is
need for problem based, result oriented and time bound action on this research, education and extension work. Long standing research needs such as effective management of pest and diseases, developing downy and powdery mildew resistant varieties should be considered on priority.

4. **Suggestions for the future research**

   In the present investigation, an attempt has been made to study grape production, marketing management and strategies for increasing productivity and profitability of grape. Hence following suggestions are made for future research.

1. Investigations may be taken up in different regions of the state/country with varying ecological, cultural and socio-economic backgrounds. This will help to make valid and wider generalization regarding production, marketing management and strategies for increasing productivity and profitability of grape growers.

2. Identification of different market channels and profit share of different stake holders can be worked out to facilitate policy formation for ensuring equal share of benefits.

3. Analysis of the specific functions played by different agencies in boosting production and export of grape can be documented.

4. Assessment of research needs and the impact of research out come to enhance grape export.

5. Focused study on documenting important management practices to ensure export quality grape production.