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Economic analysis of grape production in Nashik District of Maharashtra State

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Abstract

Grapes (*Vitis vinifera*) of family Vitaceae is one of the most popular fruits in the world and is grown in temperate as well as sub-tropical climates. The study aimed to analyze the trend in area, production and productivity of grapes, economics of grape production, and constraints. Results revealed that area under grape cultivation is rising over a period of 18 years by 6 per cent. The production also rising by 7 per cent and productivity is neither resizes nor declined by 0 per cent per in India and also area under grape cultivation is rising over a period of 18 years by 6 per cent. The production also rising by 5 per cent and productivity is declined by 1 per cent in Maharashtra per annum. The establishment cost of grape orchard was Rs. 637028.98 and Total cost of cultivation i.e. Cost C was Rs 690422.19 for grape cultivation, in which share of the cost-A Rs 470571.82 and cost-B Rs 678600.36 was 68.16 per cent and 98.29 per cent respectively. The net income i.e. (Gross return-cost-C) was arrived at Rs. 395714.47 on grape. The benefit cost ratio i.e. ratio of gross returns to total cost (Cost-C) was 1.5. It indicated that grape production was more profitable in the study area. Age of vine yard, FYM and phosphorus are the factors that have positive and significant influence on the yield of grapes. Pest and disease infestation, changes in climatic condition, labour problem, price fluctuation and lack of price information were the major constraints faced by the gape farmers. The study suggested that grape growers association may provide price information and research should focus on developing new high yielding variety that are resistant to disease infestation and tolerant to local climatic condition. And also proper canopy management should be done by using technical knowledge for control the destroying vineyard.

Key words: Trend, cost, return, profitability and constraint

Introduction

Grapes (*Vitis vinifera*) of family Vitaceae is one of the most popular fruits in the world and is grown in temperate as well as sub-tropical climates. Grapes are best grown in all types of climates and soils where the Production of other deciduous fruits is restricted. It can be grown well in cold and dry climates in valleys in high elevations. A soil having low water holding capacity sandy loam is the best for its growth. Fruits are the chief source of vitamins and minerals, without which human body cannot maintain proper health and resistance to disease.

In the international scenario, total area under grape cultivation in world was 7449 (000 ha), production was 77.8 (mt) and productivity was 10.9 (in ton/ha) in 2018-19. Area under destined for the production of wine grapes, Table grapes or dried grapes, in production. In that Spain is first position for the cultivation of grapes in world and also china is first position for the production of grapes in world. 57% of wine grape, 36% of Table grape and 7% of dried grape and wine production 292 mhl, Table grape-27.3mt, dried grape-1.3mt respectively. Unlike in India, 70% of the world grape production is used for wine making. However, Italy, Chile, Argentina, Brazil and USA considerable quantity of grapes is also used for Table purpose and making raisin.

In India, total area under grapes cultivation was 151 (IN 000, Ha) and annual production 4001.5 (million ton) with productivity is 26.5 IN MT/Ha) during the year 2018-19. The major grape growing states are Maharashtra, in the west Karnataka, Andhra Pradesh and Tamil Nadu in the south and Punjab, Haryana and Western, Uttar Pradesh in the North. Maharashtra rank first in terms of production accounting for more than 81.22% of total production and highest productivity in the country. The country is also major exporter of grapes to the world. The country has exported 246133.79 (In MT) of fresh grapes worth 233525.08 lakh during the year 2018-19. And also the country has exported 193690.54 (In MT) of fresh grapes worth 217686.82 lakh during the year 2019-20. The major destinations of India's grapes were Netherland, Russia, UK, Bangladesh Pr, Germany, United Arab Emirates, Saudi Arabia, Thailand, Hong Kong, Malaysia and Others countries Respectively.

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(Source: DGCIS Annual Export).

Grape production in Maharashtra has been hit by an estimated 40 per cent in the 2019-20 (Dec-March) seasons due to delayed monsoon, according to Maharashtra State Grape Growers Association. In Maharashtra, total area under grape cultivation was 97 (In 000, Ha) and annual production 2376.5 (IN 000, MT) with productivity is 24.5 (IN MT/Ha) during the year 2019-20. At present the cultivation of grape is mostly concentrated in five districts namely Nashik, Sangali, Sholapur, Pune and Osmanabad. (Ministry of Agriculture & Farmer Welfare Govt. of India [0N1955]).

Grape export from Maharashtra has come down by over 4000 tons compared with February 2019 export. By February 3 last year, Maharashtra had exported over 13,221 tons of grapes while this year during the same period, the State has exported over 9,105 tons of grapes. And also in 2018-19, Maharashtra exported 121469 tons of grapes. The export figures on the APEDA website shows that Maharashtra is the only State which has started exporting grapes this season. Karnataka, Andhra Pradesh, and Telangana have not yet started exports. Out of the total grape export from Maharashtra, 5995 tons have been export to the Netherlands, followed by 1352 tons to Germany and 633 tons to the UK. (Source: thehindubusinessline.com).

Hence, the study aimed to analyze the economics of grape cultivation in Nashik District of Maharashtra with specific objectives viz. i) to analyze the trend in area production and productivity of grapes in Maharashtra. ii) To estimate cost and returns of grape cultivation. iii) To study constraints and suggestion in grape production.

Materials and Methods

Sampling: Multistage sampling design was adopted in selection of district, tehsils, villages and grapes growers. The sampling design adopted for study in detail below.

In the first stage, Nashik district was purposively selected on the basis of availability of area under Grapes. In second stage, two tehsils of Nashik district was selected for the present study. In third stage from selected tehsils 6 villages were selected on the basis of highest area under Grapes cultivation. From each village 10 grape growing farmers were selected randomly. Hence totals 60 farmers were selected for the study. The primary data was being collected from grape growers by the help of pretested interview schedule and pertaining for the year 2018-2019. The secondary data on APY of grapes for 18 years i.e. from 2001 to 2018 were collected from National Horticulture Board (NHB), www.Indiastat.com, Directorate of Economics and Statistics Food & Agriculture Organization, Ministry of Agril & Farmer Welfare Govt. of India etc.

Results and Discussion

Trends in Area, production and productivity of grapes in India and Maharashtra State: The data on area, production and productivity of grapes for 19 years (2001-2019) in India and Maharashtra were collected and analyzed. The results are presented in Table 1. The area under grapes had rising from 49.5 ha in 2001-02 to 151 ha in 2019-20. During the same period, productivity had also rising from 25 tones/ha to 26.5 tones/ha. Compound growth rate analysis (CGR) revealed that area under grape cultivation has increased over a period of 18 years to the tune of 6 per cent per annum. The rising in production was high with 7 per cent and productivity neither

increases nor decreases were 0 per cent for the same period. The results indicated clearly that area and production were rising and productivity was neither rising nor declined of grapes in India had rising trend during the last decade. And also in Maharashtra, The area under grapes had rising from 32.50ha in 2001-02 to 97 ha in 2019-20. During the same period, productivity had also rising from 28.1tones / ha to 24.5 tones/ha. Compound growth rate analysis (CGR) revealed that area under grape cultivation has increased over a period of 18 years to the tune of 6 per cent per annum. The rising in production was high with 5 per cent and productivity is declined were 1 per cent for the same period. The results indicated clearly that area and production were rising and productivity was declined of grapes in Maharashtra had rising trend during the period of 18 years.

Economics of grape production: In Maharashtra, only Thompson seedless variety is being grown in all the sample districts. Crop rotation is followed once in 15 years. Three pruning in a year and three harvests after 90 days of pruning is practiced in Nashik district. However, two pruning in a year and one harvests after 120 days of pruning is followed in Nashik district. And also Various Varieties are growing in Nashik District such as Sonaka, TAS-A-Ganesh, Manik Chaman, Sharad seedless etc.

Per hectare establishment cost of grapes orchard: Grape is a perennial crop which one time established continues to bear fruits for number of years. Therefore, proper establishment of the vine yard best for further prospects of income from the crop.

The cost of establishment of grape orchard in that was including the initial investment on the land preparation (leveling and ploughing), plantation, installment of drip set, fertigation, Gap filing, Bamboo support, Training vines, Pruning, Plant protection, Irrigation cost and Installment of training system etc.

The establishment cost was calculated considering 18 month initial expenditure in case of under the study. The average per hectare cost of establishment of orchard was established on the basis of standard cost concepts.

It is observed from the Table-2. that, the per hectare establishment cost of grape orchard was Rs. 637028.98 in which maximum cost that is 25.82 per cent was Installment of training system (which include the cost of stone, cement, wire mess and sand etc.) followed by cost of Installment of drip set was 15.39 per cent. The cost of Plant protection was 11.51 per cent, cost of Land preparation was 9.40 per cent (which includes levelling and ploughing), cost of bamboo support was 7.02 per cent, weeding was 3.38 per cent, pruning was 2.33 per cent, fertigation cost in that including the FYM was 9.68 per cent, micronutrient was 3.27 per cent and fertilizer was 3.79per cent and gap filling was 0.47 per cent. The annual cost of establishment was Rs.63702.89.

Per hectare cost of cultivation of grape: The item wise cost of cultivation for grapes is given in Table 3. It is observed from Table that, per hectare total cost of cultivation Cost C was Rs 690422.19 for grape cultivation, in which share of the cost-A and cost-B was 68.16 per cent and 98.29 per cent respectively. Among the different items of the cost such as rental value of land is the first position it was Rs180587.6 i.e. 26.16 per cent, followed by family human labour cost in that

male labour was Rs 6264.38 i.e. 0.91 per cent and female labour was Rs 5557.45 i.e. 0.80 per cent on farms. The cost of different items of working capital, in which includes the hired human labour cost is male labour was 11.25 per cent and female labour was 5.65 per cent. Followed by manure cost was 9.6 per cent, plant protection cost is 9.35 per cent, Annual establishment cost was (9.22%), depreciation on farm implement (6.28%), Interest on working capital (6.04%), machine labour cost was (4.81%), Interest on fixed capital cost was (3.98%), micronutrient cost was (2.41%), Phosphorous cost was (0.90%), irrigation charge cost was (0.87%), Nitrogen (0.75%), Incidental charges (0.46%), potash cost was (0.30%), Repairs on farm implement cost was (0.12%), land revenue and other taxes (0.06%), bullock labour cost (0.022%).

Per hectare profitability of grape production: The per hectare total cost, total production and return from grape crop which is show various level of cost such as Cost-A, Cost-B and Cost-C were total values are present in the Table-4. It is seen from Table that per hectare average production was 204.38 qtl and returns from grape cultivation were Rs 1086136.66 while, total cost of cultivation was Rs 690422.19 and per qtl cost of production was Rs. 3378.12. The share of cost-A and cost-B in cost-C was Rs. 470571.82 and Rs. 678600.36 in grape.

The profit also worked out at particular cost level and is also presented in Table 4. Farm business income i.e. (gross return-cost A) was estimated to Rs. 615564.84 on the grape farm. Family labour income i.e. (gross return- cost-B) was estimated to Rs. 407536.3 on grape. The net income i.e. (gross return- cost-C) was arrived at Rs. 395714.47 on grape. The benefit cost ratio i.e. ratio of gross returns to total cost (Cost-C) was 1.5. It indicated that grape production was more profitable in the study area.

Table 1: Area, production and productivity of grapes in Maharashtra from 2001 to 2018-19

Year	Area in 000 Hectares	Production in 000 Tone	Productivity in MT/Hectare
2001-02	32.50	913.25	28.10
2002-03	35.4	962.88	27.2
2003-04	41.1	1163.1	28.3
2004-05	43.8	1233.9	28.2
2005-06	45.1	1275.0	28.3
2006-07	45.4	1284.2	28.3
2007-08	45.6	1290.0	28.3
2008-09	55.7	1415.0	25.4
2009-10	82.0	440.0	5.4
2010-11	86.0	774.0	9.0
2011-12	92.0	1810.0	19.7
2012-13	90.0	2050.0	22.8
2013-14	90.0	2160.0	24.0
2014-15	93.30	2292.5	24.6
2015-16	90.09	2048.11	22.73
2016-17	104.08	2378.17	22.85
2017-18	105.50	2286.44	21.67
2018-19	90	2286	25.4
2019-20	97	2376.5	24.5
Average	71.7	1602.05	23.4
CAGR	6(%)	5(%)	-1(%)

Source: Ministry of agriculture and farmers welfare, Govt. of India, (ON2224) & Past issues

Table 2: Compound growth rate of area, production and productivity of grapes in India and Maharashtra

Sr. No.	Particular	Compound Growth rate (%)	
		India	Maharashtra
1	Area	6	6
2	Production	7	5
3	Productivity	0	-1

Table 3: Per hectare establishment cost of grapes orchard

Sr. No.	Name of operation	Cost (Rs.)	Percentage
1	Land preparation	59911.5	9.40
2	Plantation		
	A. Digging of pit	10130.9	1.59
	B. Planting material and plantation	19005.8	2.99
3	Installment of drip set	98087.84	15.39
4	Fertigation		
	A. FYM	61686.86	9.68
	B. Micro nutrient	20786.6	3.27
	C. Fertilizer	24171.8	3.79
5	Gap filing	2974	0.47
6	Bamboo support	44660.1	7.02
7	Training vines	8118.4	1.28
8	Pruning	14852.2	2.33
9	Weeding	21524.35	3.38
10	Plant protection	73352.87	11.51
11	Irrigation cost	13265.36	2.08
12	Installment of training system	164500.4	25.82
	Total establishment cost	637028.98	100
	Annual Establishment cost	63702.89	

Table 4: Per hectare cost of cultivation of grape, (Rs/ha.)

Sr. No.	Particular	Value (Rs.)	Per cent
1	Hired human labour		
	A. Male	77720.49	11.25
	B. Female	39043.12	5.65
2	Bullock labour	152.7	0.022
3	Machine labour	33194.12	4.81
4	Manures	66305.31	9.6
5	Fertilizer		
	A. N	5199.28	0.75
	B. P	6237.24	0.90
	C. K	2078.63	0.30
6	Irrigation charges	6074.67	0.87
7	Micronutrient	16619.69	2.41
8	Plant protection	64599.33	9.35
9	Incidental charges	3230.14	0.46
10	Repairs on farm implement	827.54	0.12
11	Working capital (1+10)	321282.29	46.53
12	Interest on working capital (13%)	41766.69	6.04
13	Annual establishment cost	63702.89	9.22
14	Depreciation on farm implement	43384.78	6.28
15	Land revenue and other taxes	435.17	0.06
16	Cost A (11to 14)	470571.82	68.16
17	Rental value of land	180587.6	26.16
18	Interest on fixed capital (10%)	27440.94	3.98
19	Cost B (16+17+18)	678600.36	98.29
20	Family labour (man days)		
	A. Male	6264.38	0.91
	B. Female	5557.45	0.80
21	Cost C (19+20)	690422.19	100
22	Supervision charges@ 10% cost A	47057.18	

Table 5: Per hectare profitability of grape production, (Rs/ha.)

Sr. No.	Particulars	Value (Rs.)
1	Total cost (Rs.)	690422.19
2	Total output (qtl)	204.38
3	Per qtl cost of production	3378.12
4	Gross income (Rs.)	1086136.66
5	Cost	
	Cost A	470571.82
	Cost B	678600.36
	Cost C	690422.19
6	Income	
	Farm business income	615564.84
	Farm labour income	407536.3
	Net income	395714.47
7	Output-input ratio cost A	2.3
	Output-input ratio cost B	1.6
	Output-input ratio cost C	1.5

Constraints in grape cultivation: The analysis of constraints faced by grape farmers in production and marketing revealed that in Nashik district, the most important constraint was pest and disease infestation (downy mildew and powdery mildew) followed by labour scarcity. In marketing of grapes price fluctuation was the major constraint followed by lack of price information. The other problems are damage by change in climatic condition such as high wind, high rainfall and more attack of pest and diseases. The farmers were of the opinion that they could achieve the Medium yield due to severe, pest and diseases attacks, and damage by change in climatic conditions.

Conclusion

Based on the results of the study, it is concluded that area and production of grapes were rising and productivity of grapes was neither rising nor declined during the period of 18 years from 2001-02 to 2019-20 in India and also area and production were rising and productivity was declined during the period of 18 years from 2001-02 to 2019-20 in Maharashtra State. Net income of grape crop was Rs. 395714.47. It was clear that grape crop was profitable. The benefit cost ratio i.e. ratio of gross returns to total cost (Cost-C) was 1.5. It indicated that grape production was more profitable in the study area. The Production of grape was 207.07 quintals in the area of 1 hectare and consumption for home was 2.69 quintals. Powdery and downy mildew is a major disease and hence, farmer use more of inorganic chemicals which affects the marketing of produce. Hence, it is suggested that research may be conducted to control the disease in an effective manner. Lack of price information was also major constraint faced by the farmers. The grape growers association may provide the price information to the growers and technology and credit support through the Department of Horticulture and banks may be given to promote grape production in Maharashtra. And also proper canopy management should be done by using the technical knowledge for the control of damaging of vineyard.

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