

PROSPECT AND PROBLEMS OF GRAPE CULTIVATION IN INDIA

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Abstract- The goal of the current work is to examine the potential for grapevine growing in India. One of the most significant fruit crops grown for commerce worldwide is the grape. The tropical and subtropical fruit of the grapevine is a perennial, long-living plant that may be grown in a variety of climatic conditions. With an output of 2689910 tonnes, or 3.88 percent of the world's total grape production, India ranks as the ninth-largest grape-producing nation in the world. With an average yield of 25 to 30 tonnes per hectare, the nation holds the distinction of having the highest productivity of grapes among the 91 grape-growing nations worldwide. The current research makes an effort to investigate the potential for grapevine growing in India's area of grape cultivation, production, and productivity.

Keywords: Grape, India, cultivation, productivity

INTRODUCTION:

India is mostly an agricultural nation and will likely continue to be so in the foreseeable future. Eighty two percent or more of the population sleeps in communities. About 70% of people depend on agriculture either directly or indirectly for their livelihood, and agriculture contributes about 50% of the economy's total value. A large market for domestically manufactured goods is provided by agricultural production, which also provides the raw materials for industrial production, the exchange obtained from exporting agricultural products, the investable surplus as part of the domestic product, and (e) the food needed to feed the world's expanding population. There are many connections between the agricultural and, by extension, non-agricultural sectors of the economy. India may be a nation of farmers, and a substantial portion of the Bharat population depends on agriculture for their livelihood. The agriculture sector is the foundation of the Indian economy, and no economic process design can be successful without it. Due to the population expansion, this industry has a specific significance, and it is essential that agricultural design be developed in a way that ensures agricultural production keeps pace with population growth. Economic agricultural management designed to confirm ever-increasing productivity may be a great asset to India's economy as it grows steadily and evenly. Agriculture occupies a central position within the Indian economy. Nineteen are contributed by it. Using 64% of the nation's workforce, 40% of value was produced. Sericulture, gardening, and agriculture are only a few of the many sub-fields that make up the agriculture industry. Agriculture is one of those areas that dominates in Bharat. Fruits of all kinds are grown by horticulturists. When compared to other fruits, the production of grapes requires more acreage and produces more fruit per acre than other crops. A key factor contributing to the state's economy is the production of fruits. In fact, indicators of the standard of living of the people in a nation are frequently drawn from the per capita consumption and production of fruits.

REVIEW OF LITERATURE:

Sudharshan G.M (2013) in his study of Marketing & Post-Harvest Losses in Fruits: Its Implications on Availability & Economy - A Study on Pomegranate in Karnataka. Our nation is recognized as basket of berries and vegetables on the global platform. It is the second largest maker of complete berries and vegetables. However, it is one of the major creators of fruit, the per capita accessibility of berries is not more than at 109 Gms in a day as compared to the than the commended mark of not more than 120 Gms. One of the parameters endorsed to inferior availability is the superior magnitude of the losses occurred at post-harvest periods that transpires at several junctures of promotion.

Dr. M.K. Sheikh et.al (2014) has authored Recent Advances in Grapes. He has brought out through his study of horticulture, prior to the inception of the cultivation of agro and horticulture produce, it is very mandate to have promotion awareness as well as cultivation. The accessibility of plot and the water resources with adequate facilities for irrigation and assortment of rootstocks also carries some weightage. Moreover, the sustainability of the crop needs to be taken in consideration. Prolonged duration should be cost-effective.

S. R. Takle (2015) in the book Agricultural Marketing and Supply Chain Management of Grapes speaks out about the agricultural segment plays a lively character in the nation budget. However, the portion of main sector in Gross National Produce more than 15 percent in 2015 and part in transfer is subsidized to less than 9.9% (2015) still more than 59% employed populace is reliant on the cultivation and associated segments. In 12th Five Year Plan forecasting commission

absorbed on to realize more than 9% growth rate of the entire budget. Unquestionably, the character of provision segment must be transfigured.

Need for the study:

The economic analysis of grape production is crucial because of the high initial establishment costs and subsequent high maintenance costs, however there aren't many studies that have been done on the subject. An effort has been made in the domain of production and yield performance research in India using the current study.

Objectives

The present study was undertaken with the following objectives:

1. To study the perspective of Grapevine Cultivation in India.
2. To study the growth rate of area, production, and productivity of grapes in India.

Data Base and Methodology

The current investigation is supported by secondary information. The National Horticulture Board, a department of the Indian government, provided the information on the area planted with grapevine crops. The data have been analysed using the appropriate statistical method. The time frame for this research is from 2001-02 through 2020-21. Cartographic techniques were used to analyse and present the acquired data.

Grape Cultivation in India

One of the most lucrative farming ventures in India is grape production. Currently, 250 000 hectares of land in India are used to grow grapes. About 78% of the total grape crop in India is utilised for fresh consumption (table fruit), 1 to 2% is used to make wine, and the remaining percentages are used to make raisins.

History of Grape Cultivation in India

The Persian invaders brought grape to India around the year 1300 AD, and it quickly spread to the rest of the nation. The Chinese Buddhist pilgrim Hiuen Tsiang, who visited India in 629 AD, recorded grape and other fruit plantations in various parts of the country (Phule, 2002). The kind of land suited for grape cultivation was specified by Kautilya in his "Arthashastra" work from the fourth century BC. Grape was brought to the South in the 14th century during the historic event of Mohammad- Bin- Tughlak transferring the capital from Delhi to Daulatabad. It is said that the Moorish pilgrim Ibn Batuta (1430) saw well-kept vines in India. As a result, during the reign of Aurangzeb in the 17th century, viticulture in the Deccan region reached its pinnacle. With the fall of the Mogal empire, viticulture in the North entered the Deccan phase. Grapes were first brought to Madras by a French priest in the villages of Melpatti and Michaelputti in 1832. During that time, it was introduced into the Tamil Nadu districts of Mysore, Salem, and Madurai (Todkari, 2012). South India has seen a rise in grape culture since this time. Around 1550, the monarchs of Bijapur and Ahmednagar made generous grants. From 1717 to 1817, a century of the Maratha Empire, the industry flourished under the patronage of Pesewa of Pune. Following that, grape farming began to spread throughout the nation. Systematic grape cultivation was initiated during the middle of the 20th century. Since grape is commercially cultivated in India.

Grape Regions in India

Due to the warm environment, grapes are primarily grown in subtropical regions of the world. By choosing the appropriate cultivars and implementing the correct cultural trends for grape production, viticulture can also be done in tropical regions. However, between latitudes of 20° to 50° North and 20° to 40° South, viticulture is largely feasible (Sathe, 2010). India is endowed with benefits including a variety of soil types and climates. As a result, it gathers a range of fruits all year long. Fruits can be successfully grown in tropical, subtropical, and temperate climates. Three major fallow grape farming zones have been created as a result of the varied climate (Singh et al., 1967; Patil, 1978).

● Temperate and sub-tropical region

This region includes Delhi, the district of Meerut in Uttar Pradesh, the districts of Hissar and Jind in Haryana, the districts of Bhatinda, Ferozpur, Gurdaspur, and Ludhiana in Punjab, as well as the northwest plains between 28° N and 32° N latitude. The alluvial soils have a strong potential to retain water. Only 90–95 days pass from the start of growth to harvest because vines go into dormancy in the first week of March, bud break begins the following week, and rains start in the first week of June. Its climatic conditions are variable. This zone's characteristics—a mild winter, a dry, hot summer, moderate sunlight, and little rainfall—make it ideal for growing grapevines. The customary procedure is one pruning and one harvest. Due to their propensity for berry breaking and decay during the rainy season, late season types like Thompson Seedless do not thrive in these areas. In this area, Thompson Seedless has an issue with rain damage. In this area, single pruning and single cropping are used. Early season cultivars like Perlette and Beauty Seedless were well-liked in this area, although their quality and preserving capabilities could have been much better. Early season cultivars with improved traits, such Flame Seedless, are therefore growing in popularity in this area.

● Hot tropical region

This area includes the northern Karnataka districts of Bijapur, Bagalkot, Belgaum, and Gulberga, which are located between 15° and 20° North latitude, as well as the Maharashtra districts of Nashik, Sangli, Solapur, Pune, Satara, Latur, and Osmanabad, as well as the Andhra Pradesh districts of Hyderabad, Ranga Reddy, Mahbubnagar, and Medak. 80% of the nation's vineyard space is located in this important grape-growing region. In this area, repeated pruning and a single harvest are the norm because vines do not enter a dormant period. The summertime maximum temperature exceeds 42° C, and the wintertime minimum temperature in some places is approximately 8° C. Drought and salinity of the land and water are the main issues in this area. Temperatures that

drop to a low of 8° C impede berry growth and, in some places, green berries may occasionally develop a pink blush. The types planted here include Flame Seedless, Anab-e- Shahi, Sharad Seedless, and Thompson Seedless and its clones (Tas-A-Ganesh, Sonaka). The commercial cultivars farmed in this area include Red Globe and Crimson Seedless, with more than 90% of the land being planted to Thompson Seedless and its clones. Wine varieties like Cabernet sauvignon, Chardonnay, Merlot, Shiraz, and Sauvignon Blanc are being grafted in bigger regions as a result of the growing demand in the wine business. This region's Thompson Seedless is quite prone to downy and powdery mildews.

- **Mild tropical region**

An area between 10° N and 15° N latitude that includes the Karnataka districts of Bangalore and Kolar, the Andhra Pradesh district of Chittoor, and the Tamil Nadu districts of Coimbatore, Madurai, and Theni. The maximum temperature in this area does not go above 36° C, and the minimum temperature is around 12° C. In this area, the prevalence of grape disease is a serious problem. Historically, cultivars of juice grapes including Isabella and Muscat Hamburg were grown in this region. Bangalore Blue (Syn. Isabella), Anab-e-Shahi, Gulabi (Syn. Muscat Hamburg), and Bhokri are the main kinds. Thompson Seedless is only occasionally successful in growing. The only crop that is harvested more than twice a year is Thompson Seedless. Unprecedented rainfall during blooming and fruit set in hot and moderate tropical climates cause losses in vinifera cultivars that are mildew-prone.

- **Harvesting Season of Grape in India**

Major grape-producing regions in India have very different harvesting seasons. Details about the various grape harvesting seasons in India are provided below. Harvesting often begins in the middle of December and lasts until June. Beginning in the middle of January, grapes enter the market; their peak season of availability is from February to March. However, depending on the state of the market, grape harvesting may be accelerated or delayed by 10 to 15 days. By storing the produced grapes in cold storage, the availability season is extended to April and May.

Table No 1: Harvesting Season of Grape in India

SI, No	State	Period of Availability	Peak Season
1	Maharashtra, Karnataka and Andhra Pradesh	Middle of December - May	February-March
2	Tamil Nadu	Mid of December-Mid of April	February-March
3	Punjab and Haryana	1st week of June to 3 rd week of June	Mid-June

Problems of Grape cultivation in India:

Barrenness:

It has emerged as the main issue facing the plains of North India's vineyards. The vines have grown unusable wood. The majority of the shoots are discovered to be dry at the time of pruning. There are only a few fruiting canes per vine, which results in decreased productivity. Bunches with few berries are produced by the canes.

Water Berries:

It is fairly typical for water berries to develop in grape clusters. These berries don't grow to their full size, maintain an unappealing color, lack typical sugar, and have a higher acidity. The berries hang from the clusters like tiny cellophane bags that are partially filled with sap. By the time they are ready for harvest, the berries may also dry up because they lack a firm pulp. The major cause is a group of berries that are too crowded. The development of water berries is also brought on by over-irrigation in heavy soils and excessive vegetative growth that prevents berries from developing into clusters. By administering a balanced quantity of fertilizers and monitoring flooding of vines during irrigation, water berry formation can be reduced.

Shot Berries:

Grape varieties, particularly perlette, can have very tiny berries in their clusters. These berries, known as millerandage, are often seedless. Poor pollination or inadequate carbohydrate accumulation following grape fertilization are the causes of these berries' development. Small berries typically die out as a result of embryo abortion or malnutrition. The ones that don't fall become shotberries. The development of shoot berries can be prevented by treating clusters with GA2 and thinned clusters.

Bud and Flower Drop:

This physiological condition, often referred to as colored or shelled, is a significant issue with the Thompson seedless cultivar. The panicles enlarge their necks. Insufficient pollination or fertilization may have caused the shattering. Clusters become extremely loose or straggly as a result of severe shattering.

The way that different grape cultivars react to breaking varies greatly. By adhering to the right cultural techniques and spraying plant growth regulators to maintain the canopy of vines, shattering can be avoided. Before anthesis, exogenous applications of zinc or NAA can lessen this issue.

Cluster Apex Wilt:

In the Perlette and Thompson seedless cultivars, the wilting of the cluster's apex is a significant issue. When the clusters reach maturity, the apical regions have wilted fruit. The taste of these berries is still sour. The entire apex may occasionally dry up. When berries are developing, this condition is typically linked to dense bunches and insufficient soil moisture.

Area, production, and productivity of grapes in India

Table No 2: Area, production, and productivity of grapes in India

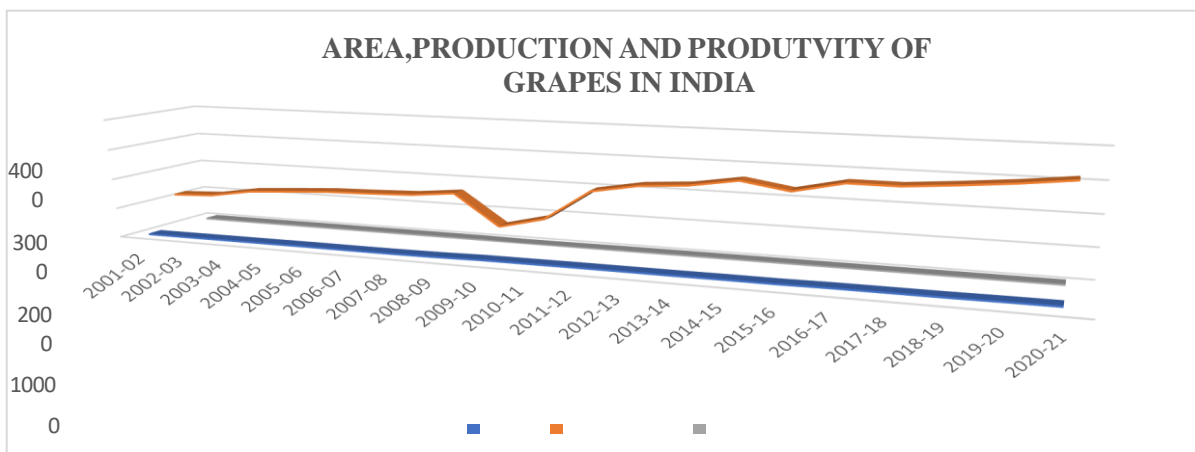
Year	Area (000 ³ ha)	Growth rate (%)	Production (000 ³ ton)	Growth rate (%)	Productivity (tons/ha)	Growth rate (%)
2001-02	47.50	00	1184.20	00	24.90	00
2002-03	52.10	09.68	1247.80	05.37	24.00	-3.61
2003-04	57.80	10.94	1474.80	18.91	25.50	6.25
2004-05	60.50	04.67	1564.70	06.09	25.90	1.56
2005-06	66.00	09.09	1649.60	05.42	25.00	-3.40
2006-07	65.00	-1.51	1685.00	02.14	25.90	3.60
2007-08	68.00	04.61	1735.00	02.97	25.50	-1.54
2008-09	80.00	17.64	1878.00	08.24	23.50	-7.84
2009-10	106.40	33.00	880.70	-53.10	8.30	-64.68
2010-11	111.00	04.32	1235.00	40.22	11.10	33.34
2011-12	116.40	04.86	2220.00	79.75	19.13	72.34
2012-13	118.00	1.72	2483.00	11.79	21.04	9.90
2013-14	117.00	-0.84	2585.00	04.10	22.09	4.99
2014-15	123.00	5.12	2823.00	09.20	22.95	3.87
2015-16	122.00	-0.81	2590.00	-8.25	21.22	-7.50
2016-17	136.00	11.47	2921.00	12.77	21.47	1.17
2017-18	139.00	2.20	2920.00	-0.03	21.00	-2.19
2018-19	140.00	0.71	3041.00	04.14	21.72	3.39
2019-20	150.00	7.14	3181.00	04.60	21.20	-2.36
2020-21	155.00	3.33	3358.00	05.56	21.66	2.15
CAGR	6.09		5.34		-1.38	

As revealed by table-2, an increasing trend has been observed in the area, production and yield per hectare of Grape in India from two decades. The total area cultivated under Grape was

47.50 hectares in 2001-02 whereas production was 1184.20 metric tons and yield per hectare is

24.90. In 2012-13, area and production increased tremendously i.e., by 118.00 hectares and 2483.00 metric tons respectively. In 2019-20 area increased by 150.00 hectares, production increased by 3181.00 metric tons and yield per hectare increased by 21.20. Total area cultivation under Grape decreased by -1.51% whereas production and yield per hectare increased by 02.14% and 3.60% respectively in 2006-07. The main reason for a decrease in area was inadequate knowledge about Grape cultivation, unseasonal rainfall and low-quality planting materials. Again in 2009-10 area under Grape cultivation increased by 33.00%, but production and yield per hectare decreased by

-53.10% and -64.68% respectively. The main reason for increasing in area was better returns from Grape crop than traditionally grown crop. During the year 2016-17, there was a tremendous increase in area, production and yield per hectare i.e., by 11.47%, 12.77% and 1.17% respectively. A considerable increment in the annual area, production and yield per hectare has been observed i.e., 5.88%, 16.43% and 9.96% respectively in 2020-21. So, the compound growth rate of area is 6.09%, production is 5.34% and yield per hectare is -1.38%. Hence, there is an increasing trend in the area, production, but compared to area and production, yield per hectare is not satisfactory.



DISCUSSION:

In light of the condition of Indian Grape mentioned above, I'd like to briefly highlight some of my musings. It is evident that over the past 20 years, there has been an increase in area, output, and yield. The cultivation of grapes has undergone numerous changes. According to the aforementioned data, although the area being farmed has expanded significantly over the past few years, the production and yield per hectare have gone in the opposite direction. This may occur when farmers are unable to comprehend production technologies, when some farmers lack sufficient knowledge of the market environment, or when grape prices are too high. This explains why the yield per hectare experienced a negative growth rate in parts of the last 20 years.

Future prospects:

India succeeds in maintaining its status as a major producer of table grapes. An analysis of this situation reveals that new research can advance the horticulture industry. One of the crucial tasks to feeding the globe by 2050 is preserving the germ-plasm for future development. One of the earliest fruit crops to be grown commercially is the grape, whose cultivation has become a science unto itself. In cold storage, the shelf life of many newly developed cultivars has been increased to 6–9 months. In farmed clones of Thompson Seedless and Sharad Seedless, grape drop or bunch rots during rains cause significant output losses.

CONCLUSION:

Therefore, grape production will only be viable with an understanding of crop and management limits and regular maintenance during the pre-harvest and post-harvest periods. Grape production requires a significant initial investment and requires intensive maintenance. Otherwise, it will result in high operational costs and a burdensome loan load since a greater number of farmers rely on lender financing. Despite this, Indian farmers still struggle with a lack of precise information regarding the location and production of various grapes, which makes it difficult to plan production for both the domestic and export markets. They also struggle with a lack of knowledge regarding new or dominant varieties, which are constantly changing on global markets. The cultivation of grapes today requires extensive understanding. The government must make a serious and honest effort through its many programs to spread knowledge about scientific grape cultivation.

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