



Examining the Indian Gooseberry cultivation and its Productivity trends in the state of Madhya Pradesh, India

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Abstracts

Indian Gooseberry which is known as the Amrit phal (life-giving fruit) because of its therapeutic and medical benefits, nutritional value, delicious flavour, alluring aroma, and health-improving attributes. Among the different fruits, Indian Gooseberry having the most therapeutic fruit and has been grown on the Indian subcontinent for well over 3500 years. According to historical evidence, the Indian Gooseberry was brought from the main continent to the Indian archipelago. It has been growing throughout the world but its natural habitats are in Europe, northern Africa, west-south and south-east Asia. The Indian gooseberry is a native of much of Europe and western Asia, where it grows in lower alpine thickets and rocky woods from France east to the Himalayas and peninsular India. Here, in India some of the states like Uttar Pradesh, Madhya Pradesh, Maharashtra, Gujarat, Rajasthan, Andhra Pradesh, Karnataka, Tamil Nadu, Himachal Pradesh, etc. are the states where Indian Gooseberries are primarily grown. Therefore, in this study we are analysing the area, production and productivity of Indian Gooseberry Production in the state of Madhya Pradesh, India through primary and secondary data by applying MS Excel using of formula Annual growth and Compound Annual growth rate. Finally, we conclude that this much of important medicinal fruit is not growing in any terms either absolute or relative. Hence, the governing agencies must intervene in this regard with the collaboration of farmer for short-term and long-term policies.

Keywords Indian Gooseberry, Growers, Area

Introduction

The phyllanthaceae family's *Embllica officinalis* Gaertn, also known as the Indian Gooseberry, is one of the most significant tropical and subtropical fruit types in the world. It is consumed both fresh and processed. It is known as the Amrit phal (life-giving fruit) because of its therapeutic and medical benefits, nutritional value, delicious flavour, alluring aroma, and health-improving attributes. Since ancient times, Indian Gooseberry has been the most therapeutic fruit and has been grown on the Indian subcontinent for well over 3500 years. According to historical evidence, the Indian Gooseberry was brought from the main continent to the Indian archipelago. According to some scholars, the region around Burma is where it first

founded. Currently, it is grown not only in India but also throughout the rest of the world, particularly in the tropical southeast, including Pakistan, Bangladesh, Sri Lanka, Malaya, southern China, and the Mascarene Islands. Its natural habitats are in Europe, northern Africa, west-south and south-east Asia. Indian Gooseberry started gaining popularity as early as 1879. The Indian gooseberry is a native of much of Europe and western Asia, where it grows in lower alpine thickets and rocky woods from France east to the Himalayas and peninsular India. It can be found in various Indian states. The states of Uttar Pradesh, Madhya Pradesh, Maharashtra, Gujarat, Rajasthan, Andhra Pradesh, Karnataka, Tamil Nadu, Himachal Pradesh, etc. are where Indian Gooseberries are primarily grown. The following are the regional names for Indian Gooseberry used in various Indian states:

Table No. 1.1 Regional Names of Indian Gooseberry among different states in India

Regional Names of Indian Gooseberry	
English	Indian Gooseberry
Bengali	Amlaki
Gujarati	Ambala Amala
Hindi	Amla or Aonla
Malayalam	Nelhi
Marathi	Avala
Kannada	Amalaka Nelhi
Tamil	Nelhi
Telugu	UsirikaiUsirika

In addition to under the current changing regime of degradation of fundamental natural resources such as land, water, and vegetation, encouragement of plantation of the most resilient fruit species Indian Gooseberry is a very important source in waste land rehabilitation, resulting in Ecosystem balancing. Indian Gooseberry plays an important role in medicinal system, which is the major branch of horticulture sector. The Importance of Indian Gooseberry cultivation in improving the productivity of land, generating employment, improving Economic condition of the cultivators, entrepreneurs and enhancing export are seen overtime. Indian Gooseberry is one of the most important horticulture fruits cultivated in India and especially, Madhya Pradesh is known as the most important producer of Indian Gooseberry in India, Madhya Pradesh, one of the states of India enjoys a favourable environment, which inter-alia includes suitable Agro climate condition, huge domestic market, cheap labour etc. for it. All these offer a tremendous potential to increase the overall production of Indian Gooseberry and Indian gooseberry-based products are best kind of products on the one hand and contributing to the nation's exportable surplus on the other. The commercial cultivation of Indian Gooseberry is expanded from Uttar Pradesh to almost all the states of India, Including Maharashtra, Gujarat, Rajasthan, Madhya Pradesh, Jharkhand, Chhattisgarh, Andhra Pradesh, Karnataka, Haryana, Punjab and Himanchal Pradesh. In India, the productions of Indian

Gooseberry are 1075000 metric tons with the area of 91000 hectare and 11.56 metric tons per hectare average productivity. Area, production and productivity under cultivation of Indian Gooseberry orchard in the state of Madhya Pradesh are about 22660-hectare, 30520 metric tons and 13.46 metric tons per hectare respectively. Thus the present study Examining the Indian Gooseberry cultivation and its Productivity trends in the state of Madhya Pradesh, India

Review literature

(J. Rai, Shesh Pratap singh and Arun kumar Singh, 2017)Based on source data, an economic analysis of Indian gooseberry production in Pratapgarh, Uttar Pradesh, was conducted. In sadar block, district Pratapgarh, Uttar Pradesh, thirty Indian gooseberry growers—eight marginal, six small, and sixteen large farmers—were chosen together with six villages within the chosen block. A hectare of planted was estimated to cost 47000 in total. For a six-year gestation period, the cost of the gestation period was computed to be 78860.60. Indian gooseberry production cost Rs. 27386.02 per acre on average. The highest cost intake for orchards aged 6 to 12 was calculated to be Rs. 33272.08/ha, while the lowest cost was found in orchards aged 24 and above, at Rs. 23836.00/ha. The input-output relationship.

(Swagatika Patra and Pinaki Samal, 2018). conducted a study on the nutritional and medicinal attributes of the Indian gooseberry (*Emblica officinalis* G). This study reveals the fruit's nutritional and therapeutic properties, as well as its employment prospects. It also explores the industry's potential, including the various colloquial names for the Indian gooseberry, its geographical distribution, climatic requirements, soil conditions, plant morphology, varieties, and yield.

(Anuj Kumar, Bhanu Pratap and Sachin Tyagi, 2018) In the years 2012–2013, the Main Experiment Station, Horticulture, Narendra Deva University of Agriculture & Technology, Faizabad (U.P.) conducted a study on the "Effect of nutrients on fruit quality of Indian Gooseberry (*Emblica officinalis* Gaertn.) cv. Chakaiya." One plant was used as a unit in the four replications of the Randomized Block Design study, which included eight treatments. The quality of the Indian gooseberry fruits was observed and noted. With foliar application of $ZnSO_4 + MgSO_4 + CuSO_4$ (0.5 percent each), the maximum Total soluble solids (TSS), Acidity, Ascorbic acid, reducing sugars, non-reducing sugars, and Total sugars were observed. Furthermore, it can be said that applying $ZnSO_4 + MgSO_4 + CuSO_4$ in combination (0.5 percent each) was found to be the most effective way to improve Indian gooseberry yield and fruit quality.

(Shailesh S. Shawant et.al, 2022): This study reveals the limitations on the cultivation of Indian gooseberries, which prevent them from growing more quickly. The author also discussed how, during the previous ten years, the area devoted to this fruit has expanded to over 25,000 acres, while 93,000 acres are utilized for fruit cultivation, yielding a yearly production volume of 1,090 thousand metric tonnes. India is the world's largest producer of Indian gooseberries with this many farms.

Gaps in Literature

On the basis of the above Review literature, this has been observed that the study related to the Indian Gooseberry cultivation in India and its vicinity state are found on cost benefits analysis, physical change during Growth and development of Indian Gooseberry fruit, Economics of Indian Gooseberry production, Yield, soil health, nutritional and medicinal attributes till date. While analysis of Area, Production and Productivity of Indian Gooseberry Cultivation, identification of Major constraints during the cultivation period to marketing, study for Madhya Pradesh is negligible. It becomes significant to study about the above issues in the nutshell present study is focus on Examining the Indian Gooseberry Cultivation and its Productivity trends in the state of Madhya Pradesh, India where the major farming of Indian Gooseberry.

Objectives

- To analysis the Area, Production and Productivity of Indian Gooseberry cultivation in the state of Madhya Pradesh, India

Research question

- Had the area, production and productivity of the Indian Gooseberry cultivation in the state of Madhya Pradesh, India been increased marginally?

Research methodology

The study is based on the both secondary and primary data. Secondary data was collected mainly from published sources of the state government, Government of India, Publications from Agriculture and Processed Food Products Export Development Authority (APEDA), National Horticulture Board and Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmer Welfare. Primary data was collected by growers through discussion.

Analysis of Area, Production and Productivity of the Indian Gooseberry in the study was analyzed by the applying of MS Excel using the formula annual growth rate and compound annual growth.

Formula for Annual Growth Rate:

$$R_p = (\beta_t - \beta_0) / (\beta_0) \times 100$$

Where

R_p = percentage Annual Growth rate between different points of time.

β_t = Area/Production/Productivity of Gooseberry cultivation at time t.

β_0 = Area/Production/Productivity of Gooseberry cultivation at the base year.

Methodology for compound Annual Growth Rate:

For evaluating the area, production and productivity under Indian Gooseberry cultivation in Madhya Pradesh. CAGR formula of MS Excel has been employed i.e. $\left(\frac{\text{Ending value}}{\text{beginning Value}}\right)^{1/n}-1$

Where n is number of years.

Data Analysis

An Analysis of Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in India

Analysis of Area, Production and Productivity of the Indian gooseberry Cultivation in India are analysed by the using data published by Horticulture statistics division, department of agriculture, cooperation & farmer welfare. We have used in table no. 5.1, the data of eleven years i.e., 2010-11 to 2020-21 for the calculating of annual growth rate of area, production and productivity of Indian gooseberry cultivation in India. The result of the data is as follows-

Table no. 1.2 Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in India

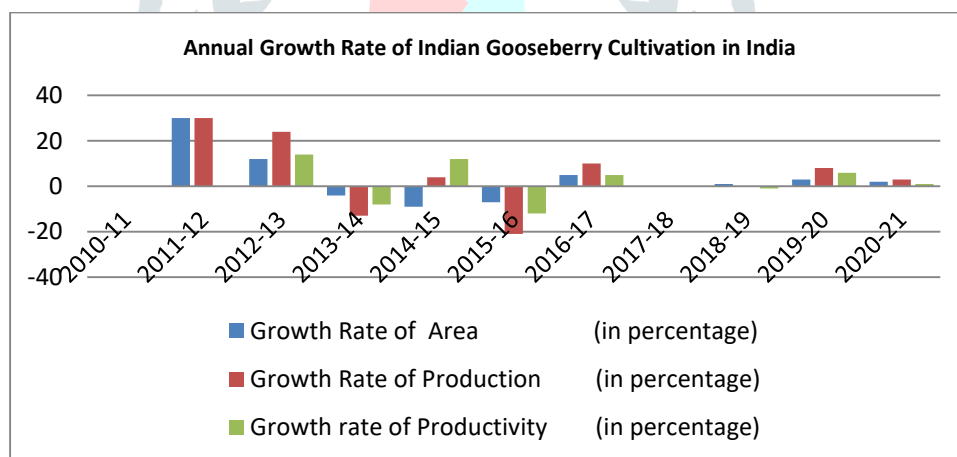
Year	Area in'000Ha	Growth Rate of Area (in percentage)	Production in 000'MT	Growth Rate of Production (in percentage)	Productivity In MT/Ha	Growth rate of Productivity (in percentage)
2010-11	67.00		677.00		10.10	
2011-12	95.20	30	960.90	30	10.09	0
2012-13	108.06	12	1266.46	24	11.72	14
2013-14	103.55	-4	1125.21	-13	10.87	-8
2014-15	95.09	-9	1173.33	4	12.34	12
2015-16	88.47	-7	972.29	-21	10.99	-12
2016-17	93.00	5	1075.00	10	11.56	5
2017-18	93.00	0	1075.00	0	11.56	0
2018-19	94.00	1	1077.00	0	11.45	-1
2019-20	97.00	3	1176.00	8	12.12	6
2020-21	99.00	2	1216.00	3	12.28	1

Source: (Horticulture Statistics Division, Department of Agriculture, Cooperation &Farmer Welfare)

Table no. 1.2 shows annual growth rate of Area, Production and Productivity of Indian gooseberry cultivation in India. It may be seen from table no. 1.2. We observed from table no. 1.2 that the annual growth rate of area and Production of the Indian gooseberry cultivation has been showing a decreasing trend

over the last few years. In the year 2011-12 annual growth rate of area, production and productivity of Indian gooseberry cultivation were 30 percentages, 30 percentages and 0.00 percentages respectively. It decreased to (-) 4 percentages and (-) 13 percentages and (-) 8 respectively in the year 2013-14. After the year 2013-14, it is showing positive trend in the production and productivity while area is showing negative trend of Indian gooseberry cultivation in India. There was recovery in the annual growth rate of area, production and productivity of the Indian gooseberry cultivation in the year 2019-20. Table no. 1.2 also indicates that since 2016-17 area, production and productivity under the Indian gooseberry cultivation have remained stagnant. Due to Arid environments have a number of challenges, including limited water supplies; poor soil quality, temperature extremes, dry wind, and low precipitation remained stagnant of Indian gooseberry Cultivation in India. The annual growth rate of area, production and productivity under Indian gooseberry cultivation in India are also depicted in Figure no. 1.2, derived from table no.1.2. This reveals that there is fluctuating trends of area, production as well as productivity of Indian gooseberry cultivation in India from 2010-11 to 2020-21.

Figure no. 1.1 Distribution of Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in India



Source: (Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmer Welfare)

An Analysis of Compound Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in India

The compound annual growth rate of Area, Production and Productivity of the Indian Gooseberry Cultivation in India are analysed by the using data published by Horticulture statistics division, department of agriculture, cooperation and farmer welfare. We have used in table no. 1.3, the data of eleven years i.e., 2010-11 to 2020-21 for the calculating of compound annual growth rate of area, production and productivity of Indian gooseberry cultivation in India. The result of the data is as follows –

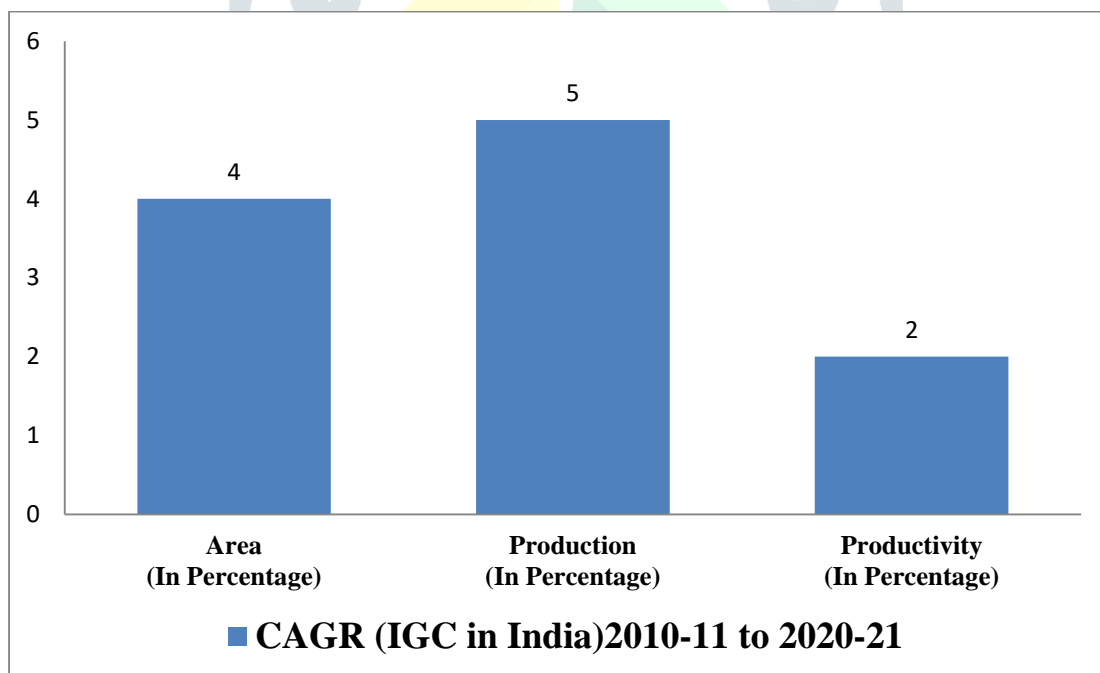
Table no. 1.3 Compound Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry cultivation in India

	Area (in percentage)	Production (in percentage)	Productivity (in percentage)
2010-11 to 2020-21	4	5	2

Source: (Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmer Welfare)

Table no. no.1.3 reveals compound annual growth rate of Area, Production and Productivity of Indian gooseberry cultivation in India. The overall trend over a time period of (11Years) is shown in table no. 1.3. The table no. reveals that area, production and productivity have increased 4 per cent, 5 per cent and 2 per cent respectively over the period of 2010-11 to 2020-21. This calculation is done by adopting MS Excel formula compound annual growth rate by taking the data of table no. 1.3 and Figure no. 1.2 derived from table no. no. 1.3

Figure no. 1.2 Distribution of Compound Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry cultivation in India



Source: (Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmer Welfare)

An Analysis of Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in Madhya Pradesh

Analysis of Area, Production and Productivity of the Indian gooseberry Cultivation in Madhya Pradesh are analysed by the using data published by Horticulture statistics division, department of

agriculture, cooperation & farmer welfare. We have used in table no. 1.4, the data of eleven years i.e., 2010-11 to 2020-21 for the calculating of annual growth rate of area, production and productivity of Indian gooseberry cultivation in Madhya Pradesh The result of the data is as follows-

Table no. 1.4: Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in Madhya Pradesh

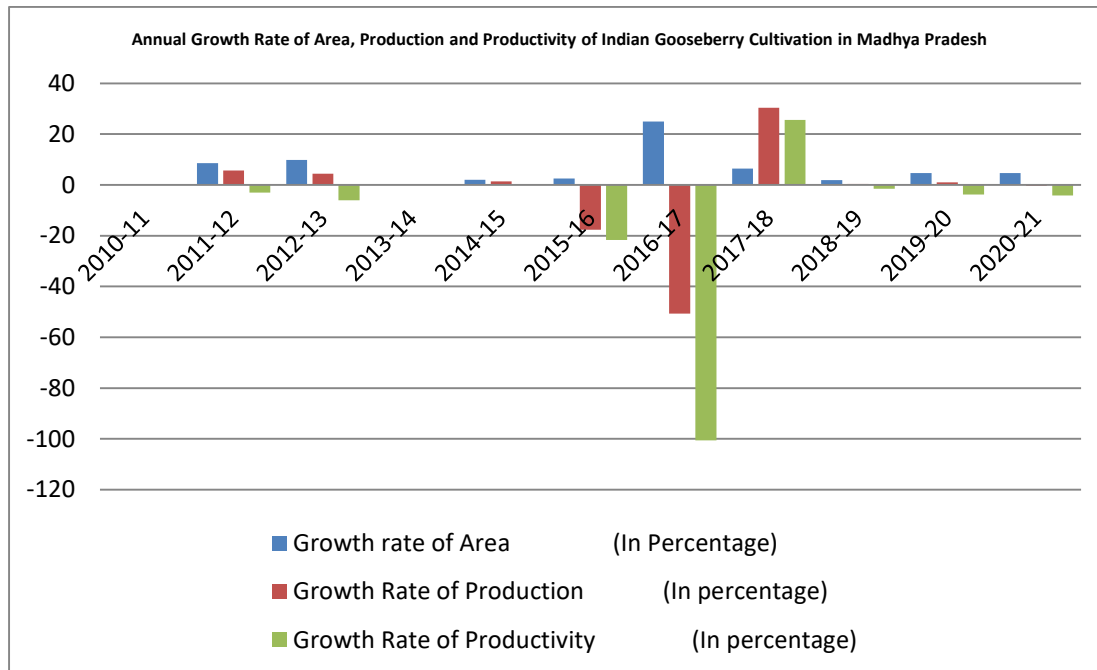
Year	Area in 000 Ha	Growth rate of Area (In Percentage)	Production in 00MT	Growth Rate of Production (In percentage)	Productivity in MT/Ha	Growth Rate of Productivity (In percentage)
2010-11	11.30		330.70		29.26	
2011-12	12.35	08.50	350.70	5.70	28.39	-3.06
2012-13	13.70	09.85	367.00	4.44	26.78	-6.01
2013-14	13.70	00.00	367.80	0.21	26.84	0.14
2014-15	13.98	02.00	373.00	1.39	26.88	0.14
2015-16	14.35	02.57	317.11	-17.63	22.09	-21.68
2016-17	19.11	24.90	210.44	-50.68	11.01	-100.63
2017-18	20.42	06.41	302.18	30.35	14.79	25.55
2018-19	20.80	1.82	303.18	00.32	14.57	-1.50
2019-20	21.83	4.71	306.27	1.00	14.02	-3.77
2020-21	22.66	4.70	305.20	-00.35	13.46	-4.16

Source: (Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmer Welfare)

Table no. 1.4 shows annual growth rate of Area, Production and Productivity of Indian gooseberry cultivation in Madhya Pradesh. Firstly, we see the growth rate of area which had grown from 11.30 Ha since 2010 to 22.66 Ha to the year 2021. During this period the growth rate of area was highest in the year 2016-17, 24.90 per cent and second-best growth rate in the year 2012-13, that was 9.85per cent. Furthermore, the third best growing year is 2011-12 with the growth rate of 8.50per cent and remaining years having the growth rate below the 5per cent and even in the 2020-21, there were the rate of growth of area of Indian gooseberry cultivation was only 4.70per cent. In the same way, the growth rate of production was highest was 30.35per cent in the year 2017-18 and second best was 5.70 per cent whereas the third best was 4.44per cent in the year 2011-12 & 2012-13 respectively. During the study period, the growth rate of productivity of

Indian gooseberry has got shrieked by 21.68 per cent and (-) 100.63per cent in the year 2015-16 and 2016-17 respectively. Figure 1.3 derived from table no. 1.4.

Figure no. 1.3 Distribution of Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in Madhya Pradesh



Source: (Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmer Welfare)

An Analysis of Compound Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in Madhya Pradesh

The compound annual growth rate of Area, Production and Productivity of the Indian gooseberry Cultivation in Madhya Pradesh are analysed by the using data published by Horticulture statistics division, department of agriculture, cooperation & farmer welfare. We have used in table no. 1.5, the data of eleven years i.e., 2010-11 to 2020-21 for the calculating of compound annual growth rate of area, production and productivity of Indian gooseberry cultivation in Madhya Pradesh. The result of the data is as follows -

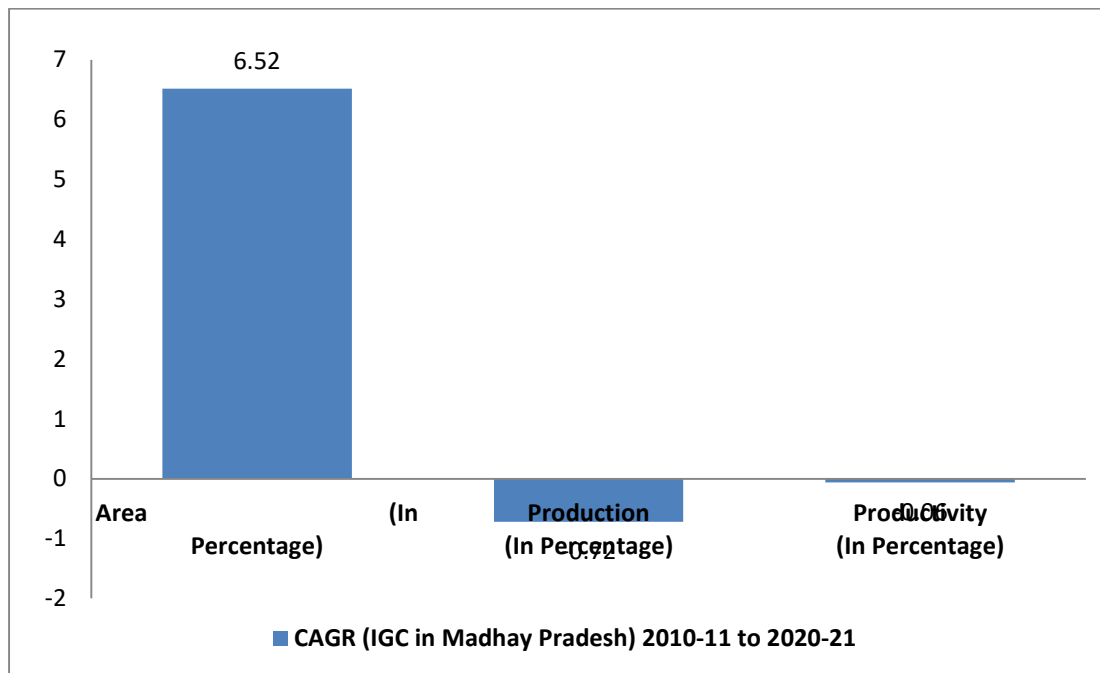
Table no. 1.5: Compound Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in Madhya Pradesh

	Area (In percentage)	Production (In percentage)	Productivity (In percentage)
2010-11 to 2020-21	6.52	-0.72	-0.06

Source: (Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmer Welfare)

Table no. 1.5 reveals compound annual growth rate of Area, Production and Productivity of Indian gooseberry cultivation in Madhya Pradesh between the year 2010-11 to 2020-21 was 6.52 per cent, (-) 0.72 per cent and (-) 0.06 per cent respectively. This calculation is done by adopting MS Excel formula of compound annual growth rate by taking the data of table no. 1.4 and Figure no. 1.4 derived from table no. 1.5.

Figure no. 1.4 Distribution of Compound Annual Growth Rate of Area, Production and Productivity of Indian Gooseberry Cultivation in Madhya Pradesh



Source: (Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmer Welfare)

Conclusion & Suggestions

It is clear from the discussion of above tables and graphs that area, production and productivity has not increased much in absolute term. Hence, in this regard concerned governing agencies must intervene with the collaboration of farmer for short-term and long-term policies like:

- ❖ Small Indian Gooseberry growers should give support and incentives as a result of their viability in order to help them offset some of their start-up costs and compete successfully.
- ❖ With the forward and backward linkage government must help in the establishment of small-scale processing unit of Indian Gooseberry.
- ❖ To guarantee a timely and sufficient supply of raw materials and to reduce the cost of raw materials, contract farming may be encouraged.
- ❖ In order to protect the Indian Gooseberry processing business from changes in demand on the global markets, domestic consumption may be promoted through campaigns and the creation of varied products.

- ❖ Improved root stocks must be introduced, and plans must be established, to encourage the planting of Indian Gooseberries in large densities. The Department of Horticulture may encourage producers to use the enhanced set of techniques and see to it that the new plantations are developed.
- ❖ Setting up pack rooms with washing, waxing, packing, pre-cooling, and storage, as well as refrigerated vans for transportation, is becoming more and more necessary at the manufacturing centre. The pack houses must be constructed to allow for year-round operation, taking into account the accessibility of other perishable goods in the area. These could have connections to terminal markets. One Vapour Heat Treatment Plant (VHTP) must be established in order to address the fruit fly issue, which is the principal barrier to the export of Indian Gooseberries to foreign countries, the United States, and European nations. Indian gooseberries may be allowed to be exported in ships with modified atmospheric containers under certain conditions.

Thus, government must not only design short-term and long-term policies with the collaboration of Indian Gooseberry growers and DOH but executed them in an effective manner.

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