**Trends in area, production and productivity of horticultural crops in India with special reference to Karnataka**

**ABSTRACT**

The present study was conducted to analyze the growth in area, production and productivity of overall horticultural crops in India and Karnataka**.** The study was based on purely secondary data related to area, production and productivity of horticultural crops, collected from various public sources especially; Karnataka State Department of Horticultural for a period of 20 years, which was divided into two periods (10 years each); Period-I (2000-01 to 2009-10)and period-II (2010-11 to 2019-20). The Compound Annual Growth Rate (CAGR) technique was employed to evaluate trends in area, production and productivity. The results obtained from analysis indicated that, the Compound Annual Growth Rate for area, production and productivity of horticultural crops in India for a period-I was reported 3.04 per cent, 5.45 per cent and 2.34 per cent, respectively and for a period-II was showed 1.74 per cent, 3.00 per cent and 1.24 per cent respectively, which were positively significant in both periods. Whereas, the Compound Annual Growth Rate for area, production and productivity of horticultural crops in Karnataka for period-I was around, 2.28 per cent, 5.10 per cent and 2.74 per cent respectively and for the period-II was also reported significantly positive trend in area (2.6%), production (3.25%) and productivity (0.58%) respectively. The study concluded with positive trend in all cases. Hence, there is a potential scope for growth in horticulture sector in both country and state.

**Keywords:** Area, Compound Annual Growth Rate, Production, Productivity, Horticultural crops.

**INTRODUCTION**

“Horticulture is the branch of agriculture which deals with intensive cultivation of fruits, vegetables, flowers, herbs, ornamentals, plantation, medicinal and spices etc and also involved in processing and marketing of Horticultural produce”. [16] The word horticulture derived from Latin word **‘hortus’** means **garden** and **‘cultura’** means **cultivation**. Professor **M. H. Marigowda** created a history in upliftment of horticultural crops to enhance production. Hence, he is considered as **“Father of Horticulture”** and his birth anniversary is celebrated as “**Horticulture day**” in India. According to report Food and Agriculture Organization (FAO) “announced the year **2021** as **International Year of Fruits and Vegetables** with slogan of ‘***Fruits and Vegetables, your dietary essentials’*** in the view to create awareness about the nutritional and health benefits of fruit and vegetables for balanced and healthy diet and to safeguard the attention to reduce losses and wastage of horticultural produce in supply chain”.

Horticulture sector has become comparatively more remunerative than the agricultural sector against food grains. It enables the population to consume diverse and balanced diet for a healthy lifestyle. The importance of horticulture can be substantiated by its benefits in economic proposition as they provide higher returns per unit area in terms of energy, income and employment. Horticultural produce perceived high export value oriented, best utilization of wasteland especially dryland horticulture, provision of raw materials for food and processing industries, whole engagement by a grower or labourer, better use of undulating lands, women empowerment, religious significance in terms of floriculture, aesthetic consideration and environment protection.

**HORTICULTURE SCENARIO**

 Globally, 1,850 million tonnes of fruits and vegetables are produced, contributing 22 per cent share in total food production with market value of US$ 20.77 billion during 2019-20. China is the largest producer of horticulture crops contributing 40 per cent of global production, followed by India (12%), USA (3%) and Brazil (3%) (Anonymous, 2021d).

Currently, India leads the second largest producer of horticulture crops in the world with total area of 27.74 million hectares and production of 341.63 million tonnes during 2020-21 (Anonymous, 2021c). It stood first in production of mango, banana, guava, papaya, citrus fruits and okra and second largest producer of potato, tomato, onion, cabbage, cauliflower and brinjal. In India, Uttar Pradesh state is the leading producer of horticulture crops constituting 13 per cent of total production, followed by West Bengal and Madhya Pradesh contributing 10 per cent each. Karnataka stands eighth position in terms of production (200.46MT) from an area of 23.93 lakh hectares (Anonymous, 2019b)**.**

**OBJECTIVE OF THE STUDY**

* To analyse the growth in area, production and productivity of horticultural crops in India and Karnataka.

**METHODOLOGY**

The secondary data pertaining to the study area was collected from various published and unpublished reports from National Horticulture Board, Horticultural statistics at a glance, Statistical abstracts and Departments of Horticulture, Government of Karnataka from 2000-01 to 2019-20 to analyse the growth trends. The twenty years data is divided into two time periods (10 years each); Period-I (2000-2009) and period-II (2010-2019) to compare trends between two periods in India and Karnataka. The growth in area, production and productivity of horticultural crops was estimated using the compound growth function of the form,

Y= ABtUt,

Estimated form,

Log Y= log A + t log B+ log Ut

i.e. y=a+bt+ut

Where,

Y= area or production or productivity,

a= constant,

b= regression coefficient,

ut= disturbance term, and

t= time in years starting from the base year 2000-01

The Compound Annual Growth Rate (CAGR); (Antilog of b-1) \* 100, was used to calculate the growth rates in area, production and productivity for both the periods in India and Karnataka

**RESULTS AND DISCUSSION**

**Trends in area, production and productivity of horticultural crops in India**

It is evident from the Table 1 and table 2 that, the area, production and productivity of horticultural crops showed an increase trend by 3.04 per cent, 5.45 per cent and 2.34 per cent, respectively in the period-I (2000-2009) and during period-II, area, production and productivity of horticulture crops also showed significantly positive growth rate of 1.74 per cent, 3.00 per cent and 1.24 per cent respectively concerned to India. The Compound Annual Growth Rate in area, production and productivity of horticultural crops in India was recorded higher in period-I against period-II. It was observed that during period- I, all three components showed rapid growth but which was slower in period-II. The overall growth rate in area, production and productivity of total horticultural crops in India, showed increasing trend over the time period 2000-01 to 2019 which were positively significant. The similar results were reported in the study conducted by Nabi *et al.,* (2017) and Jha *et al.,* (2019) in India during the period (2005-2017).

**Trends in area, production and productivity of horticultural crops in Karnataka**

The table 3 and table 4 depicted the trends in area, production and productivity of horticultural crops in Karnataka. The Compound Annual Growth Rate in area, production and productivity of horticultural crops in Karnataka for period-I (2000-2009) was found, 2.28 per cent, 5.10 per cent and 2.74 per cent respectively. Similarly, in period-II also the Compound Annual Growth Rate in area, production and productivity was observed that 2.67 per cent, 3.25 per cent and 0.58 per cent respectively. In both the periods the trends in all three components showed positive and significant except productivity during period-II which non- significant due to high variations in production of horticultural crops which might be attributed due to adverse climatic factors and shift in cultivation, leads to lag in economic yield.

 **Table.1: Trends in area, production and productivity of horticultural crops in India during period -I**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Area****(In Million Hectare)** | **Production****(In Million Tonne)** | **Productivity****(In MT/Hectare)** |
| 2000-2001 | 16.00 | 153.00 | 9.56 |
| 2001-2002 | 17.00 | 146.00 | 9.00 |
| 2002-2003 | 16.00 | 144.00 | 9.00 |
| 2003-2004 | 19.00 | 153.00 | 8.05 |
| 2004-2005 | 21.00 | 171.00 | 8.14 |
| 2005-2006 | 19.00 | 183.00 | 10.00 |
| 2006-2007 | 19.00 | 192.00 | 10.10 |
| 2007-2008 | 20.00 | 211.00 | 11.00 |
| 2008-2009 | 21.00 | 215.00 | 10.23 |
| 2009-2010 | 21.00 | 223.00 | 11.00 |
| **AVERAGE** | 18.90 | 179.10 | 9.44 |
| **CAGR (%)** | 3.04\* | 5.45\* | 2.34\*\* |

(Source: National Horticulture Board, Department of Horticulture, Government of India)

\*significant at 1 per cent level of significance

\*\*significant at 5 per cent level of significance

**Table.2: Trends in area, production and productivity of total horticultural crops in India during period-II**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Area****(In Million Hectare)** | **Production****(In Million Tonne)** | **Productivity****(In MT/Hectare)** |
| 2010-2011 | 22.00 | 241.00 | 11.00 |
| 2011-2012 | 23.00 | 257.00 | 11.17 |
| 2012-2013 | 24.00 | 269.00 | 11.20 |
| 2013-2014 | 24.00 | 277.00 | 12.00 |
| 2014-2015 | 23.00 | 281.00 | 12.21 |
| 2015-2016 | 24.00 | 286.00 | 12.00 |
| 2016-2017 | 24.90 | 300.60 | 12.07 |
| 2017-2018 | 25.40 | 311.70 | 12.27 |
| 2018-2019 | 25.70 | 311.10 | 12.10 |
| 2019-2020 | 26.40 | 320.00 | 12.12 |
| **AVERAGE** | 24.24 | 285.44 | 11.75 |
| **CAGR (%)** | 1.74\* | 3.00\* | 1.24\* |

 (Source: National Horticulture Board, Department of Horticulture, Government of India)

\*significant at 1 per cent level of significance

**Table.3: Trends in area, production and productivity of horticultural crops in Karnataka during period -I**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Area****(In Million Hectare)** | **Production****(In Million Tonne)** | **Productivity****(In MT/Hectare)** |
| 2000-2001 | 1.53 | 10.81 | 7.06 |
| 2001-2002 | 1.58 | 9.87 | 6.23 |
| 2002-2003 | 1.58 | 9.58 | 6.06 |
| 2003-2004 | 1.54 | 8.92 | 5.79 |
| 2004-2005 | 1.63 | 9.73 | 5.96 |
| 2005-2006 | 1.65 | 12.24 | 7.42 |
| 2006-2007 | 1.72 | 13.02 | 7.55 |
| 2007-2008 | 1.76 | 13.66 | 7.74 |
| 2008-2009 | 1.80 | 13.63 | 7.57 |
| 2009-2010 | 1.89 | 14.78 | 7.78 |
| **AVERAGE** | 1.67 | 11.62 | 6.92 |
| **CAGR (%)** | 2.28\* | 5.10\* | 2.74\*\* |

(Source: Annual report 019-20, Department of Horticulture, Government of Karnataka)

\*significant at 1 per cent level of significance

\*\*significant at 5 per cent level of significance

**Table.4: Trends in area, production and productivity of horticultural crops in Karnataka during period-II**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Area****(In Million Hectare)** | **Production****(In Million Tonne)** | **Productivity****(In MT/Hectare)** |
| 2010-2011 | 1.90 | 15.21 | 7.99 |
| 2011-2012 | 1.88 | 15.50 | 8.22 |
| 2012-2013 | 1.83 | 14.95 | 8.14 |
| 2013-2014 | 1.92 | 16.25 | 8.45 |
| 2014-2015 | 2.03 | 17.36 | 8.52 |
| 2015-2016 | 2.03 | 19.12 | 9.39 |
| 2016-2017 | 2.07 | 18.90 | 9.10 |
| 2017-2018 | 2.06 | 18.50 | 8.97 |
| 2018-2019 | 2.32 | 18.34 | 7.89 |
| 2019-2020 | 2.39 | 20.04 | 8.37 |
| **AVERAGE** | 2.04 | 17.42 | 8.50 |
| **CAGR (%)** | 2.67\* | 3.25\* | 0.58NS |

(Source: Annual report 019-20, Department of Horticulture, Government of Karnataka)

\*significant at 1 per cent level of significance

 NS-Non-significance

**CONCLUSIONS**

In India, the Agriculture crops were cultivated for food grain production to feed family members. So, agriculture crops were less profitable as compared to horticulture crops and the farm income from agriculture crops was not sufficient to provide a livelihood security of the farm families (Chand *et al.,* 2011). In this situation, diversifying into high-value horticulture crops is a key tactic to double farmers' revenue. The total amount of horticultural crops is growing, both as a percentage of the gross planted area and at the level. The proportion of high-value crops to the overall production value is likewise rising. Horticultural crops account for almost one-third of the increase in the value of production from the total agricultural and related sectors. The market for horticulture commodities has expanded and become more profitable due to rising income trends. These high value and nutrition rich commodities are substituting majorly cereals and other food grains with higher value productivity, resulting in higher income to farmers **t**herefore, to increase the farmer’s income diversification from agriculture crops especially horticultural crops which were considered as a cash crops which helps in improving standard of living. The study concluded that both in India as well as Karnataka, area and production of horticultural crops showed increasing trend but not in productivity, which was fluctuating. Hence, timely and better availability of quality planting material, mechanization, quality research and development are required and there is greater scope for public and private investments mainly in horticulture processing sector for economic development of the country.

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