

# The Trend of Growth and Productivity of Horticulture Products in India

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## ABSTRACT

The primary aims of this research are to examine the patterns of growth in both the area cultivated and the production of horticultural crops in India, as well as to conduct a comparative analysis of the inter-crop growth of these products. This study relies on secondary data sourced from various governmental entities such as the Horticulture Division of the Department of Agriculture & Cooperation, Ministry of Agriculture & Farmers Welfare, Government of India, and the National Horticulture Board. The study period spans from 2005 to 2019, and descriptive statistical methods are employed to analyze the data. The findings indicate an overall decline in trend lines for various horticultural crops over the specified period. Notably, the share of vegetables and fruits consistently outweighs that of other horticultural crops such as spices, flowers, aromatics, and medicinal varieties. Consequently, there is a pressing need for immediate policy interventions by the Government to enhance the cultivation of these lesser-represented crops.

**Keywords:** Horticulture, Inter-crop, India, Trend line and growth

**JEL Classification Codes:** Q1

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## I. INTRODUCTION

Horticultural crops constitute a significant portion of India's overall agricultural output, encompassing fruits, vegetables, flowers, tuber crops, roots, ornamental plants, medicinal and aromatic plants, spices, plantation crops, mushrooms, and condiments. While horticultural practices have historical roots, the promotion of horticulture gained momentum with the launch of the National Horticulture Mission (NHM) in April 2005, which implemented various strategies to bolster this sector. The role of foreign trade policy during 2004-09, as highlighted by the Indian Council of Agricultural Research (ICAR), has also been instrumental in boosting agricultural exports and fostering the growth of horticultural yields. Following the initiation of the NHM in 2005, the horticulture sector experienced an average growth rate of 3.6 percent during the period spanning from 2001-02 to 2009-10 (ICAR, 2010).

Agriculture remains a primary source of livelihood for a significant portion of the



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global poor and holds the potential to alleviate poverty. Worldwide, agricultural development has proven to be two-to-four times more effective in reducing hunger and poverty compared to other sectors (BMGF, 2011). In China, agricultural advancements have been reported to be about four times more effective in poverty reduction (World Bank, 2008). In India, agriculture stands as one of the three major sectors of the economy and has demonstrated remarkable growth in the production and surplus of food grains, horticultural crops, and commercial crops (GoI, 2007). Particularly noteworthy is the recent diversification of Indian agriculture towards high-value horticultural crops, predominantly fruits and vegetables, which has infused commercial vitality into the sector. Presently, India ranks second in global fruit and vegetable production (NHB, 2011). With concerted efforts from the Government of India through initiatives like the National Horticulture Mission, the growth rate in horticultural production has outpaced that of food grains (Sharma, 2011).

The estimated surplus of agricultural commodities, as reported by the Government of India for the 2011-12 period, suggests a greater surplus in fruits and vegetables compared to food grains and oilseeds (GoI, 2007). However, despite this surplus, only a small fraction of horticultural produce undergoes processing (2%), with an even smaller percentage being exported (0.4%), while a significant portion (22%) is lost within the market chain (Singh, 2008). The drive to increase horticultural production without adequate investment in market infrastructure could have adverse repercussions for farmers. A transformative approach is needed to reduce agricultural product prices for consumers through efficient supply chain management while incentivizing farmers to boost production. The horticultural supply chain in India faces significant challenges, characterized by fragmentation and a disconnect from producers due to factors such as small landholdings, low literacy rates, limited access to financial services, markets, and information (World Bank, 2008). Numerous supply chains operate in India, facilitating the movement of goods from farms to consumers. This study primarily focuses on the flow of commodities from farmers to consumers, involving producers, traders, and retailers. Key challenges within the Indian agricultural supply chain include the unavailability of high-quality seeds, inadequate soil testing facilities and extension services, limited access to credit, insufficient information, substantial post-harvest losses, inadequate infrastructure like roads and cold storage, deficient market intelligence, and high transportation costs (Kumar et al., 2004; Mittal, 2007).

Both governmental and private entities have been endeavoring to tackle the immediate and enduring hurdles within agriculture, particularly concerning the fulfillment of the sector's extensive informational needs. Disseminating this information proves to be a formidable task, given factors such as low literacy rates, limited access to modern communication tools, small-scale farming, and diverse crop cultivation, all of which compound the sector's informational demands. Therefore, effectively distributing information using existing technologies becomes imperative for bolstering supply chain efficiency through the integration of producers. Leveraging information and communication technology (ICT) emerges as a pertinent solution in this endeavor. ICT encompasses a spectrum of tools from radio to satellite imagery to mobile phones and electronic data transfers, offering the potential to empower farmers by delivering timely, accurate, reliable, and demand-responsive information in a user-friendly format across various domains.

The outcomes of ICT interventions encompass augmented crop yields, profitability, and information accessibility, alongside reductions in pesticide and fertilizer usage, input costs, and consumer prices (Ramaraju et al., 2011).

ICT-driven interventions employ diverse technologies, yet their effectiveness in reaching end-users is constrained by multiple factors, including literacy rates, familiarity with ICT, the scope of telecommunications infrastructure, levels of awareness, and farmers' specific informational requirements. Consequently, the collected information often suffers from underutilization (Shalendra et al., 2011). To improve the dissemination efficiency and maximize information utilization, identifying the specific information needs of farmers becomes paramount. By considering the above background, this study has been formalised taking into consideration the following two main objectives: (1) To analyze the trend of growth of area and production of horticulture crops in India, and (2) To compare inter-crop growth of horticulture products in India.

## II. REVIEW OF LITERATURE

Garg (2018) in her study on "Deficient Cold Chain Infrastructure in India: An Analysis", has analyzed that despite of heavy production of horticultural products, around 30-40 percent of the produce gets spoiled and wasted due to lack of cold storage facilities (Garg, 2018).

Shalendra et al. (2013) conducted research in three districts of Madhya Pradesh, examining a sample of farmers. Their findings suggest that farmers play a crucial role in the supply chain of horticultural crops and have diverse information needs (Shalendra, Gummagolmath, & Sharma, 2013).

Sharma (2011) has investigated the impact of the Government of India's initiatives, particularly through the National Horticulture Mission, and found that horticultural production has experienced a faster rate of growth compared to food grains (Sharma, 2011).

In Singh's (2009) research titled "Initiating Agricultural Progress through Horticultural Crops," it was revealed that merely 2% of horticultural produce undergoes processing, a meager 0.4% is exported, and a significant 22% is lost or wasted within the market chain (Singh, 2009).

According to Datta et al. (2018), the introduction of Geographical Indication (GI) tags enhances the branding and marketing of horticultural products, both domestically and internationally. Additionally, it serves to safeguard local crops and ensures fairer returns for genuine rural producers (Datta, Sharma, & Bora, 2018).

Ramaraju et al. (2011) have examined that the effects of ICT initiatives encompass enhanced crop yield, profitability, and information accessibility, alongside reduced usage of pesticides, fertilizers, input costs, and consumer prices (Ramaraju, Singh, & Kumar, 2011).

## III. OBJECTIVES

- To analyze the trend of growth of area and production of horticulture crops in India



- To compare inter-crop growth of horticulture products in India

#### IV. METHODOLOGY

The study is based on secondary data. The secondary data on horticultural production are collected from Horticulture Division, Department of Agriculture & Cooperation, Ministry of Agriculture & Farmers Welfare Government of India, and from National Horticulture Board. The period of study is from 2005 to 2019. To analyze the data descriptive statistics have been used.

#### V. ANALYSIS AND FINDINGS

##### Objective 1

The Table-1 shows the growth of horticultural products from 2005 to 2017. We can see from this table that there is positive relationship between growth of area and production. But in some cases this positive relationship does not hold.

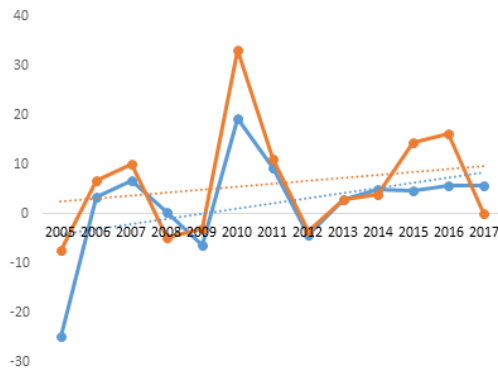
**Table-1: Growth of Area and Production of Horticultural Crops**

Year	Spices		Plantation Crops		Flowers, Aromatic and Medicinal		Vegetables		Fruits		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
2005	24.89	-7.39	4.29	24.89	57.03	4.64	6.95	10.03	3.27	8.57	1.42	9.51
2006	3.47	6.69	-2.28	3.46	19.69	23.59	5.1	3.22	4.32	7.6	3.64	4.92
2007	6.9	10.22	-0.53	6.9	20.29	19.47	3.52	11.71	5.45	10.11	4.21	10.12
2008	0.46	-4.86	0.84	0.45	6.03	12.1	1.69	0.49	4.16	4.39	2.25	1.65
2009	-6.27	-3.11	1.49	-6.27	15.91	12.42	0.05	3.61	3.73	4.45	1.03	3.99
2010	19.31	33.21	1.25	19.32	1.3	2.69	6.38	9.58	0.85	4.71	4.54	7.72
2011	9.25	11.23	8.19	9.25	8.41	35.57	5.81	6.67	5.04	2.06	6.49	6.96
2012	-4.23	-3.48	1.79	-4.23	3.94	19.34	2.4	3.75	4.13	6.36	1.94	4.49
2013	2.82	2.85	0.93	2.82	-5.31	0.58	2.07	0.44	3.35	9.46	2.12	3.16
2014	4.86	3.85	-3.84	4.86	21.39	-1.53	1.55	4.04	-15.32	-2.67	-3.25	1.31
2015	4.73	14.4	4.13	4.73	0.44	2.04	5.91	-0.24	3.12	4.13	4.53	1.85
2016	5.67	16.22	-2.22	5.67	6.36	4.93	1.3	5.38	1.14	3.03	1.54	5.05
2017	5.63	0.02	4.05	5.63	7.62	8.53	0.21	3.49	2.08	4.78	2.33	3.68

Source: Author's calculation from secondary data sources

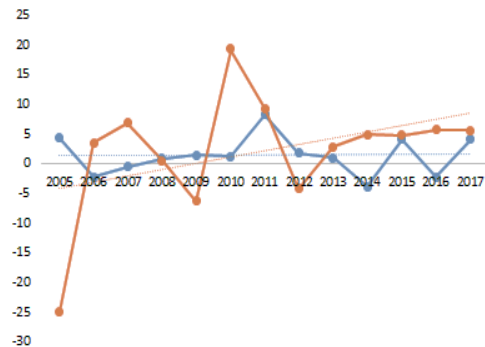
Figure-1 shows there is increasing trend of growth of area and production of spices over the given period. There is fluctuation in growth rate for both area and production. In case of plantation products too it can be observed that trend lines are increasing and remain constant for production and area respectively, as shown in Figure-2. Trend line for area is above the trend line for production up to 2010 then it remains below trend line for production. For flowers, aromatic, and medicinal plants, the trend is declining in both cases (Figure-3). For vegetable products, Figure-4 shows there is positive growth both for area and production over the given period, but the trend lines for both are showing negative because the rate of growth for both area and production are declining. Like other products, the trend lines for both area and production in case of fruits are declining over the same period (Figure-5). We can see from Figure-6 that the rate of growth of all horticultural production taken together remained positive up to 2017. But overall trend lines for area and production are declining.

**Figure-1: Growth Trend of Area and Production of Spices**



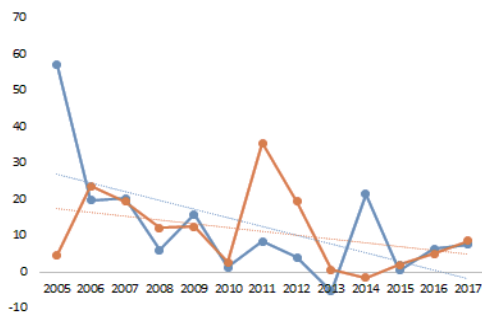
Source: Author's calculation from secondary data sources  
 Note: Area is shown in blue and production in orange

**Figure-2: Growth Trend of Area and Production of Plantation**



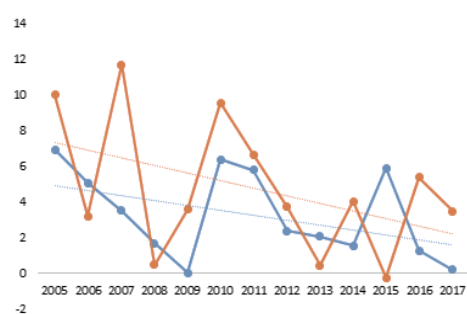
Source: Author's calculation from secondary data sources  
 Note: Area is shown in blue and production in orange

**Figure-3: Growth Trend of Flowers, Aromatic and Medicinal**



Source: Author's calculation from secondary data sources  
 Note: Area is shown in blue and production in orange

**Figure-4: Growth Trend of Area and Production of Vegetable**



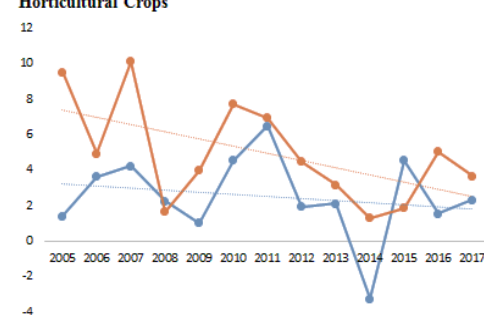
Source: Author's calculation from secondary data sources  
 Note: Area is shown in blue and production in orange

**Figure-5: Growth Trend of Area and Production of Fruits**



Source: Author's calculation from secondary data sources  
 Note: Area is shown in blue and production in orange

**Figure-6: Growth Trend of Total Area and Production of Horticultural Crops**



Source: Author's calculation from secondary data sources  
 Note: Area is shown in blue and production in orange

**Objective 2**

Table-2 depicts the percentage share of different horticultural products from 2005 to 2019. The percentage share of each product except Fruits is showing there is decline in share from the value in 2005 to the value in 2019. But the percentage share of fruits is hovering around 30% from 2005 to 2018, and then there is



sudden increase in share of fruit production along with area under cultivation from 31.23 to 58.98 and from 25.58 to 68.12 respectively.

**Table-2: Share of Different Horticultural Crops from 2005 to 2019**

Year	Spices		Plantation Crops		Flowers, Aromatic and Medicinal		Vegetables		Fruits	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
2005	17.08	2.39	17.06	5.89	1.35	0.49	36.56	60.65	27.95	30.54
2006	12.65	2.03	17.54	6.16	2.09	0.47	38.56	60.93	28.46	30.28
2007	12.63	2.06	16.54	6.26	2.41	0.55	39.18	59.95	28.64	31.05
2008	12.95	2.06	15.79	5.35	2.79	0.61	38.84	60.81	28.98	31.05
2009	12.72	1.93	15.57	5.28	2.89	0.66	38.3	60.11	29.53	31.89
2010	11.8	1.81	15.64	5.34	3.31	0.71	38.25	59.89	30.32	32.03
2011	13.47	2.22	15.19	5.1	3.21	0.68	38.92	60.93	29.25	31.13
2012	13.82	2.31	15.39	6.36	3.27	0.86	38.67	60.76	28.85	29.7
2013	12.99	2.14	15.37	6.32	3.33	0.98	38.85	60.33	29.47	30.23
2014	13.07	2.13	15.19	5.88	3.09	1.15	38.83	58.73	29.82	32.08
2015	14.17	2.13	15.09	5.43	3.89	1.12	40.76	60.31	26.1	30.82
2016	14.21	2.44	15.04	5.81	3.73	1.12	41.29	59.07	25.75	31.51
2017	14.78	2.7	14.48	5.98	3.9	1.12	41.19	59.26	25.64	30.91
2018	15.25	2.61	14.72	5.8	4.1	1.17	40.34	59.15	25.58	31.23
2019	4.67	2.18	6.25	0.56	0.21	0.11	20.75	38.17	68.12	58.98

Source: Author's calculation from secondary data sources

It seems the demand for fruit consumption has remained constant (around 30%) over the period and suddenly its demand got surged in 2019 compared to the demand for all other products in the same year. Like fruit demand, the demand for vegetables among horticultural products is even higher compared to other crops' demand but its demand got slowed down and accordingly production of vegetables also falls down from average 60% to 38% in 2019.

In case of spices and flowers, aromatic and medicinal crops, the share for both area and production is miniscule. And it seems people are not demanding these products as much as their demand for vegetables and fruits. The share of area and production for plantation crops has stayed around 15% and 5% respectively over the period from 2005 to 2018, and its share for both area and production has drastically fallen to 6% and 0.56% in 2019.

## VI. CONCLUSION

Overall growth trend of the fruit cultivation under the horticulture practices for both the area and the production has declined. Except some cases, this study found there is positive relation between area under horticultural cultivation and production of different products. This means, when area under cultivation increases, it leads to increase in production. But in some cases despite increase in area, the production does not increase because some factors like, fertility of land, high yielding varieties of seeds, conducive monsoon, and crop management do matter for the increase in production.

Inter-crop comparison of horticultural products shows the share of fruits and vegetables are high compared to the share of other crops. The share of both area and production of fruits were quite low compared to the same in case of vegetables from the year 2005 to 2018, but in 2019 opposite has happened i.e. the share of area and production for fruits are significantly high (68.12 and 58.98 respectively) compared to the share of area and production for vegetables (20.75 and 38.17 respectively).

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