



TREND OF GROWTH AND PRODUCTIVITY OF HORTICULTURAL PRODUCTS IN INDIA AND ODISHA

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ABSTRACT

The objective of the study is to analyse the trend, growth and productivity of horticulture crops in India and Odisha. The study is based on secondary data. It is observed that the factors like market scenario, export promotion, suitable climatic condition, and storage facility to avoid damage risk of crops are very crucial. There are lots of factors that affect the growth trend of different horticulture crops. The overall trend is fluctuating over the years. All the crops those are taken in to consideration for the study are in declining trend. There is a need of effective approach to enlarge horticulture sector. The factors like irrigation facility, market condition of the horticultural products, promotion of the crops, storage facility of the crops, training of the farmers and environmental factors such as climate and geographical characteristics such as quality of soil and ground water table influence the horticulture practices as well as other agriculture productivity and export of the products. Moreover, awareness, skill and quality control strategies depreciate the turnover and so as the farmers in India.

KEY WORDS: Area, Crop, Growth, Horticulture, Productivity

I. INTRODUCTION

India is a land with varied soil and climatology comprising diverse agro-climatic regions provides huge opportunity to grow a huge variety of horticulture crops. These huge variety of crops from a substantial part of total agricultural produce in the country including fruits, vegetables, flowers, tuber crops, roots, ornamental plants, medicinal and aromatic plants, spices, plantation crops, mushrooms and condiments. According to the history of horticulture science horticulture development had not been precedence until recent years. During the 80's the main emphasis was on cereals. But in 90's the developing of horticulture was started. The institutional support and planned process for the development of horticulture had started. Later the post 1993 period more attention was given on the development of horticulture through the efficient

allocation of the plan and knowledge-based techniques (KBT).

Though horticulture practices were started earlier period of time (Srinivasan, 1961) but after launching National Horticulture Mission (NHM) in April 2005 the promotion of horticulture have been started by implementing different strategies. The role of Foreign trade policy in 2004-09 is also important to enhance the agricultural exports, growth and promotion of horticultural yields (ICAR Report, 2010). The horticulture sector started growing at an average of 3.6 percent after launching the NHM in 2005 (ICAR Report, 2010) during the period of 2001-02 to 2009-10.

II. OBJECTIVES

The main objective of this paper is to show the trend of growth of area and production of horticulture crops in India and Odisha. The study also



focusses on inter-crop and inter-state comparison of growth of horticultural production.

III. DATA AND METHODOLOGY

The present study is based on secondary data. The Secondary data are collected from published sources of Horticulture Division, Department of Agriculture & Cooperation, Ministry of Agriculture & Farmers Welfare, Govt of India, Reports of National Horticulture Board, The Directorate of Horticulture, Bhubaneswar, Odisha, Reserve Bank database, and Food Statistics. The growth trend has been analysed with the help of graphical method.

IV. LITERATURE REVIEW

To understand the growth and productivity as well as the factors that affect horticulture production past literatures have been extensively swotted. According to **Patel (2005)** the importance and scope of under explored horticultural crops having lot of potential to grow with less maintenance in North Eastern region, the underutilizing horticulture crop are blessed with many merits and easily tolerate the adverse climate condition, soil structure. According to **George et al. (2010)** through diversification of crops small and marginal coconut grower improving their food and nutritional security. Suitable intercrop like vegetables, plantation, crops and tubers are major success factors, it accelerated the horticulture growth as well as improve the purchasing power per people. **Sati (2018)** trying to focus the progress in horticultural farming and undergoing used pattern of cultivation in rural area of Uttarakhand. A huge range of horticultural crops grown in Uttarakhand. **Vishnu et al. (2014)** argued that recently people are diversified towards horticulture rather than cereal farming. This has been revealed in the different areas of Karnataka. Most of the diversified areas under dry agro climatic zone, the growth rate also high in horticulture crop cultivation whereas less diversified area got less growth rate. The benefit and barriers of organic fertilizer which are the waste product from horticulture itself. As per the study more than 90% of manners were applied directly to the land. **Nabi and Bagalkoti (2017)** have identified that the change of customers habit, more employment opportunity, modern technology, urbanization push the farmers towards the horticulture practices in the rural areas. Also, storage facility, use of waste lands can boost the growth rate more. As argued by **Kamei (2013)** despite having basic transport facility connecting to nearby big cities and huge range of land having potentiality for growing other kind of horticultural crops still it comes under the negligence of the policy

makers. According to **Pathak et al., (2019)** there is a massive diversion seen from the traditional agriculture to the horticultural sector in Madhya Pradesh. The farmers are experiencing the crop damage by irregularity of rain. According to **Patra (2014)** by making district wise analysis the author has outlined that the district like, Mayurbhanj, Keonjhar, Sundargarh districts have achieved unceasing achievements while rest of the districts are lacking behind except Khordha, Raygada, Koraput, Nabarangapur, Malkangiri and Boudha which are on the way of progress. This would be due to the both regional and agro-climatic inconsistencies.

Singh (2009) has outlined the scenario and influences of export of horticulture products by encompassing a wide range of crops such as fruits, vegetables, tuber, medicinal, aromatic, spices, plantation with diversification of environmental factors. **Birthal et al., (2008)** have distinguished different demand and supply side factors that enrich the growth and influence the factors for comprehensive agriculture growth. **Rupa et al. (2019)** have analyzed the need of fertilizer in horticultural crops to boost up the production of the horticultural crops. Gradually they demand for horticultural crop are increasing both for export and domestic consumption many places have deficiency symptoms of various minerals and soil structure also different in every area. To overcome the lacuna appropriate application of fertilizer management is required. According to **Bader et al. (2020)** irrigation facility is like a blessing for the horticulture. Lack of irrigation facility dishearten the agriculture practices. Drip irrigation helps plants to grow in a better way which directly affect the growth in productivity. **Kundu (2018)** The export chain can give much better result which will increase the interest of the farmers as well as provide a better livelihood to the farmers. According to **Mittal (2007)** the main constraints of horticulture marketing quality products are quality of seeds, lack of irrigation, soil examine facilities (**Kumar and Pal, 2004**), problem in pest management, cost of production, improper post-harvest management, shortage of market knowledge about the different products and the transportation facilities. In Odisha the organizations like ORMAS, Kandhamal Apex Association and Marketing (KASAM) are playing a pivotal role to market the agricultural as well as the horticultural products. As discussed by **Datta (2013)** high temperature and air pollution depreciate the horticultural yields. The horticultural such as apple, saffron, Rhododendron, Orchid, spongy tissue of mango, litchi and floriculture are very much affected by the climate uncertainties. According to **Meena et al., (2009)** in an underdeveloped region post-harvest issue is a very



throbbing for the farmers due to storage and marketing system of the agricultural yields and climate risks. As a consequence, farmers are disheartened by the pull influences. There is a reduction of rice cultivation area due to the climatic hammer (Singh 2018). The agriculture system of Odisha has been affected from the barrage of climate change. As it is the part of semi-arid zone the impact of climate change is a matter-of-fact to think about it.

V. GROWTH AND PRODUCTIVITY OF HORTICULTURE CROPS IN INDIA

In Table- 1 state wise growth percentage of horticulture crops has been portrayed for India throughout the period 2001-02 to 2017-18. It has been observed that the growth scenario of horticulture crop in Odisha is not up to the mark over the period with below 10 percent. Only during 2010-11 has been registered a noteworthy growth with 17.2 percent. Main reason is to lack of focus on horticulture practices in Odisha. Climate is another factor to deteriorate the growth rate of horticulture in Odisha. Market structure is another vigorous factor to deter the horticulture practices. Among the states

Andhra Pradesh, Assam, Gujarat, Madhya Pradesh and Uttar Pradesh have registered a remarkable growth in horticultural, crops practices. The supply side factors like new technology, diversification of value of the crops, increase in price of the crops, area expansion, increasing use of modern seeds, chemical fertilizers and electricity have the combined role to accelerate the cumulative growth of the agriculture productivity. On the other hand, the factors viz., the lethargic growth in inputs, deprivation of soil health, exhausting water table and price policy of the government and credit facility depreciated the productivity of the agriculture sector. “Demand-led growth” in horticulture is supported by pleasing to the eye towards the public infrastructure such as market communication and sound policy implication in the food processing environment. Horticulture crop production has a tremendous impact on agriculture system. The production increases near about 5 times from 5.5 million tons to 54.04million tones since 2013. Innovative technology, market channels, market behavior modern technologies boost the productivity. Despite this India export only 1.4% fruit and vegetable in global share.

Table 1: Crop wise percentage growth of horticulture Production in India.

Year	Fruits		Vegetables		Flowers, Aromatic & Medicinal		Plantation Crops		Spices		Total	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
2001-02	-5.536	5.121	-1.040	-4.296	-33.962	37.383	0.000	0.000	0.000	0.000	-1.941	-0.964
2002-03	23.046	1.635	-0.164	4.149	44.286	-21.088	3.954	60.093	60.093	35.803	18.058	6.180
2003-04	10.599	10.983	10.885	14.617	146.535	41.034	1.451	-38.894	-	-21.748	-3.972	8.896
2004-05	3.278	8.567	6.954	10.028	57.028	4.645	4.290	-24.889	-	-7.398	1.420	9.511
2005-06	4.320	7.600	5.102	3.226	19.693	23.598	-2.285	3.466	3.466	6.694	3.646	4.921
2006-07	5.456	10.114	3.522	11.702	20.299	19.471	-0.530	6.904	6.904	10.220	4.219	10.125
2007-08	4.166	4.390	1.695	0.489	6.039	12.104	0.846	0.459	0.459	-4.866	2.252	1.648
2008-09	3.737	4.455	0.050	3.611	15.913	12.421	1.492	-6.276	-6.276	-3.112	1.036	3.993
2009-10	0.853	4.701	6.387	9.583	1.301	2.699	1.256	19.318	19.318	33.217	4.546	7.722
2010-11	5.045	2.065	5.815	6.667	8.417	35.575	8.197	9.252	9.252	11.234	6.497	6.962
2011-12	4.131	6.361	2.403	3.750	3.947	19.342	1.789	-4.234	-4.234	-3.478	1.940	4.497
2012-13	3.351	9.463	2.075	0.438	-5.316	20.589	0.934	2.828	2.828	2.855	2.127	3.163
2013-14	-	-2.669	1.554	4.040	21.390	-1.535	-3.837	4.869	4.869	3.385	-3.256	1.310
2014-15	15.327	4.135	5.911	-0.244	0.441	2.004	4.131	4.733	4.733	14.407	4.537	1.851
2015-16	3.126	4.135	1.306	5.387	6.360	4.928	-2.228	5.671	5.671	16.228	1.549	5.051
2016-17	1.143	3.033	0.205	3.492	7.629	8.532	4.058	5.639	5.639	0.025	2.334	3.682
2017-18	2.087	4.778	-	-95.152	-99.367	-99.318	-	-96.184	-	-93.727	-	-92.486
	66.834	-85.810	93.594				94.710		96.184		87.544	

Sources: Author's calculation from the secondary data

According to Table- 1 and Figure 1 it is clear that the trend of both the area and production under fruit cultivation is fluctuating over the years. It

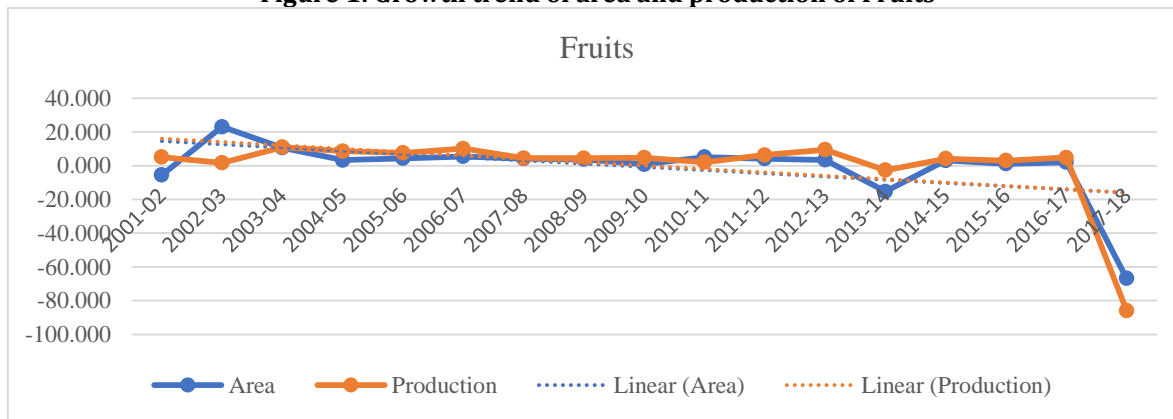
has been noticed that if there is increase in area there is increase in production. Sometime area does not affect the production due to fertility of the lands and



use of fertilizers (both organic and chemical). Some time there is a huge pest problem which directly affect the quantity as well as the quality of the products. Overall growth trend of the fruit cultivation under the horticulture practices for both the area and the production is declined. This is due to the less

demand of confined products. During the period of 2001-02, 2013-14 and 2017-18 the growth rate of area under fruits cultivation is negative and in 2017-18 it is -66.84 percent. Similarly, the growth rate of production of fruits in 2013-14 (-2.669 percent) and 2017-18 (-85.81 percent) is negative.

Figure 1: Growth trend of area and production of Fruits



Likewise, the growth trend of vegetables crops under horticulture is fluctuating throughout the years. It is revealed that there is lack of scope and opportunities for the for the horticulture practices in India. From the Table 1 during the period 2017-18 the growth rate is above the 90 percent with negative sign. It implies

farmers are not interested to adopt the practices as there may be huge risk factors like, market conditions, storage facilities, demotion of export of quality products as there is a huge competition of confined products.

Figure 2: Growth trend of area and production of Vegetables

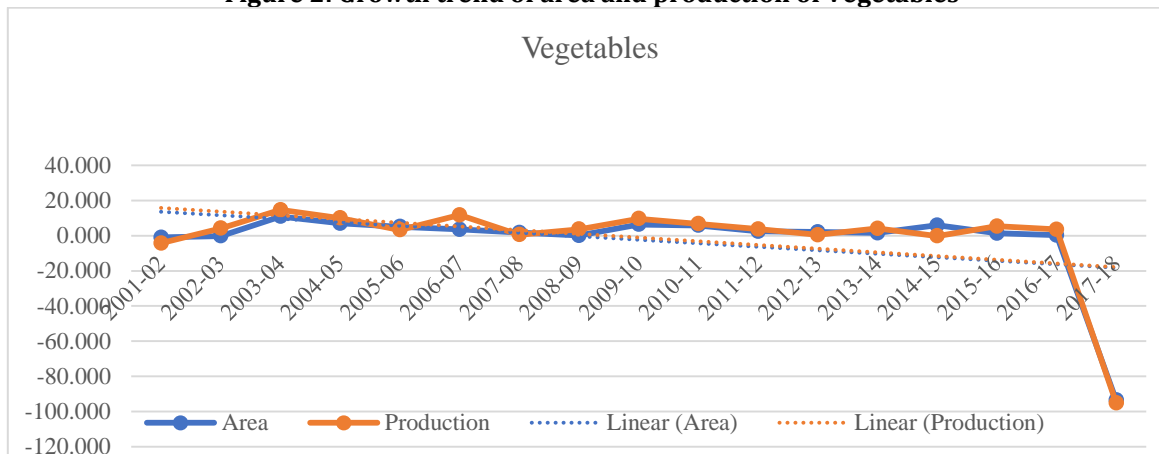
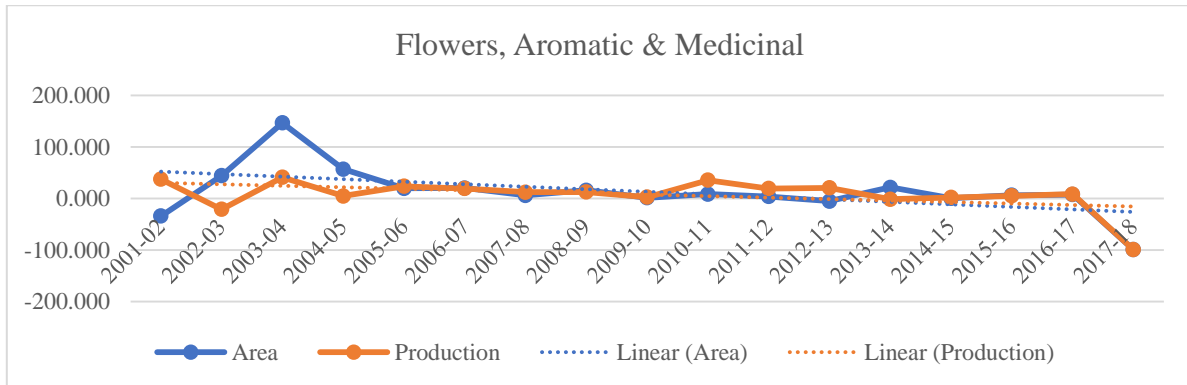




Figure 3: Growth trend of area and production of Flowers, Aromatic & Medicinal plants



It has been observed that have seen there is a positive sight to encourage the production of flowers. It is peak with 146. 53 percent in 2003-04. The government has initiated different policies to encourage the farmers to produce more flowers and spread the floriculture enterprises. But there was some lacuna located in case of business. In bossiness purpose there are some draw backs found where neither the businessman nor the farmers get benefits

which discourage the business personal as well as farmers' interest and as result there is negative trend during the period 2017-18. Though in India floriculture plays an important part of horticulture to grow the agriculture sector but in reality, there are a bunch of problems owing to the market imperfection and weak policy axioms. The insufficiency of new dynamic marketing strategies discourages the Indian farmers to market their yields.

Figure 4 Growth trend of area and production of plantation crops

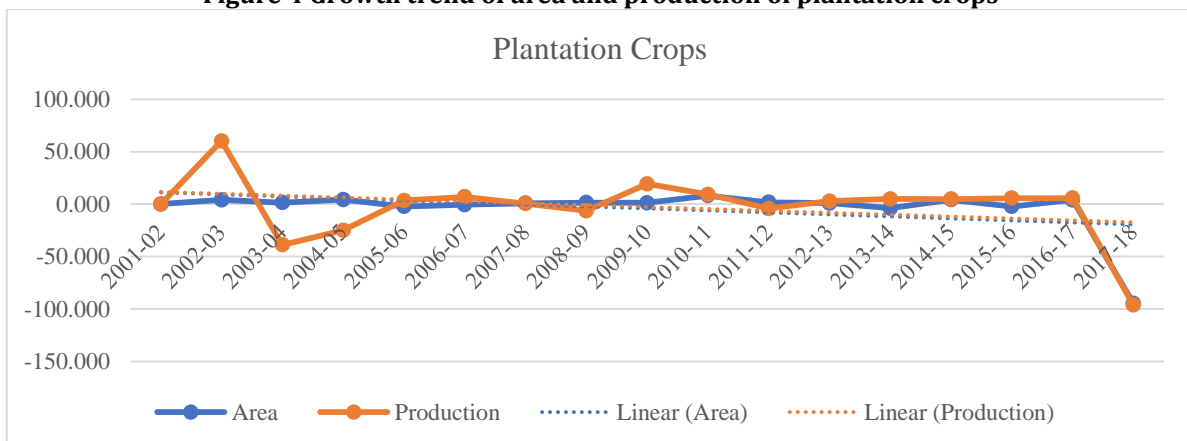




Figure 5: Growth trend of area and production of Spices

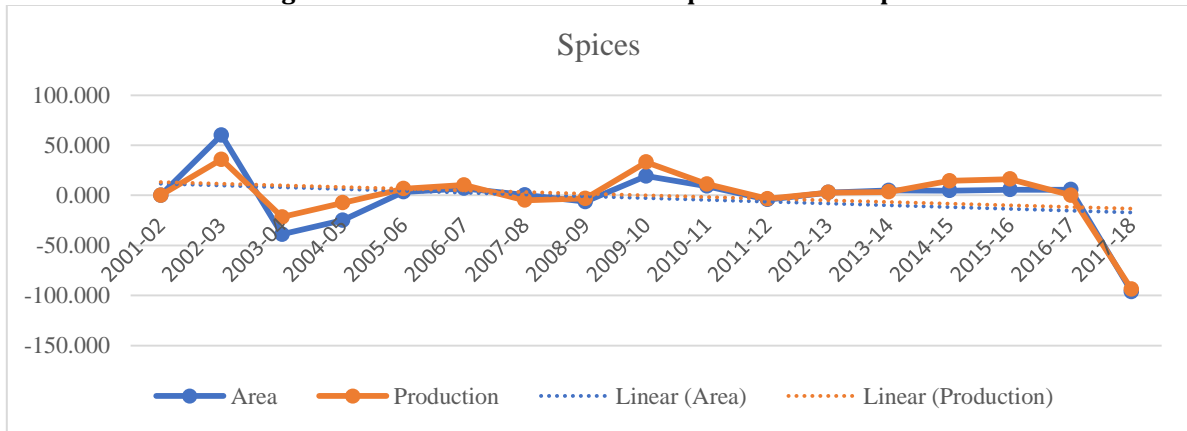
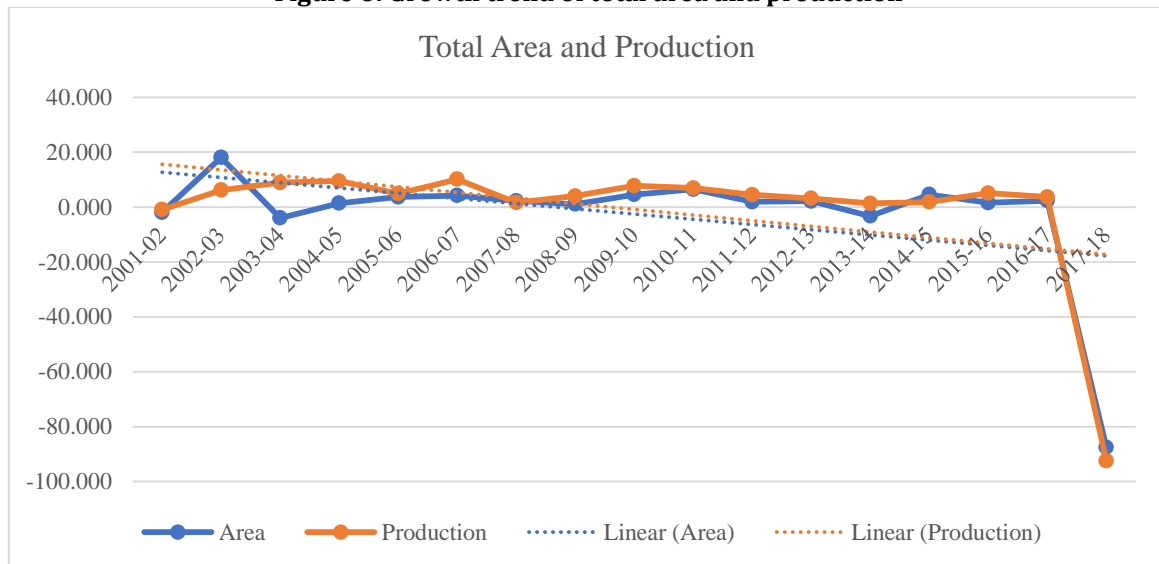


Figure 6: Growth trend of total area and production



Overall growth of fruits, vegetables, flowers, plantation crops, spices are in declining trend. So, there is effective policy implication is required upliftment of the horticulture practices. As the

horticulture practice is one of the dynamic sectors for the rural livelihood, it is important to enhance, mobilize and to reshape to enlarge the rural economy.

**Table 2: Percentage share of different horticulture crops in India during 2001-02 to 2018-19**

Year	Area of fruits	Production of fruits	Area of vegetables	Production of vegetables	Area of flowers, aromatic & medicinal	Production of flowers, aromatic & medicinal	Area of plantation crops	Production of plantation crops	Area of spices	Production of spices
2001-02	24.168	29.496	37.102	60.790	0.639	0.367	17.985	6.652	19.407	2.583
2002-03	23.282	31.308	37.443	58.744	0.430	0.509	18.341	6.716	19.791	2.608
2003-04	24.266	29.968	31.664	57.621	0.526	0.378	16.150	8.585	26.838	3.335
2004-05	27.948	30.543	36.563	60.649	1.350	0.490	17.062	5.891	17.078	2.397
2005-06	28.460	30.280	38.558	60.935	2.090	0.468	17.544	6.161	12.648	2.027
2006-07	28.645	31.053	39.099	59.951	2.414	0.552	16.540	6.260	12.626	2.061
2007-08	28.985	31.049	38.838	60.809	2.786	0.598	15.787	5.349	12.951	2.063
2008-09	29.528	31.887	38.626	60.115	2.889	0.660	15.570	5.280	12.724	1.930
2009-10	30.317	32.028	38.250	59.895	3.315	0.713	15.640	5.342	11.803	1.799
2010-11	29.246	31.130	38.923	60.929	3.212	0.680	15.148	4.992	13.471	2.224
2011-12	28.847	29.705	38.674	60.761	3.270	0.862	15.390	6.359	13.819	2.313
2012-13	29.467	30.235	38.849	60.327	3.334	0.985	15.367	6.318	12.982	2.137
2013-14	29.821	32.081	38.830	58.733	3.091	1.151	15.187	5.877	13.071	2.130
2014-15	26.100	30.821	40.760	60.315	3.879	1.119	15.096	5.543	14.169	2.174
2015-16	25.748	31.512	41.296	59.074	3.727	1.120	15.038	5.821	14.196	2.442
2016-17	25.645	30.906	41.198	59.264	3.903	1.119	14.478	5.978	14.772	2.702
2017-18	25.583	31.233	40.341	59.155	4.105	1.171	14.722	5.801	15.249	2.606
2018-19	146.799	58.985	20.746	38.168	0.209	0.106	6.253	0.565	4.672	2.176

Sources: Author's calculation from the secondary data

It is observed from the Table- 2 that the percentage of area under fruits cultivation is increased up to 2013-14 after that it has been started declining and it is 25.59 percent in 2017-18. In 2018-19 it has increased suddenly to 146.80 percent and accordingly production of fruits has also been increased to 58.98 percent from 31.23 percent from the previous year. This is due to the growing market demand of fruits. People also prefer to have quality of products and as horticulture is one of the best agriculture practices for fruits with scientific technique to improve the quality of food. During the period of 2001-02 the level of production was very low with 29.50 percent.

In case of vegetables, it is quite different. From the Table- 2 it is evocated that the percent share of area and production of vegetable under horticulture cropping practices is stable during the period of 2001-02 to 2017-18 with close to 40 percent and 60 percent respectively. But in 2018-19 the total area has declined to 20.75 percent under vegetable cultivation which is half of the previous years. Similarly, the production in 2018-19 is also declined to 38 percent. This is due to the poor market condition and the adverse climate impact which directly affect the agriculture sector. Sometimes price

of the product affects the horticulture as well as the agriculture practices. Increase in price embolden the framers and vice-versa. Similarly, in case of flowers, aromatic and medicinal plants the area as well as the production is also been decayed. The percentage share of area and the quantity is not even cross the 5 percent over the years. It is very heart throbbing for those are adopting horticulture practices. There is lack of motivations, scope for the products which demote the farmers.

Unlikely, for the plantation crops there is no remarkable increment. The area under plantation crops started falling from 2002-03 and reached it 18.34 percent to 6.25 percent in 2018-19. Similarly, the percentage share of production of plantation crops is also declined to 0.57 percent in 2018-19 from 8.58 percent in 2003-04. In 2003-04 the production of plantation crops was maximum at it was new to the market people were encouraged for the newly emerged products. But gradually due to the market competition and failure in allocation of the products and as a result the dynamic scenario of plantation crops is declined. It is also been revealed that in between the period 2001-02 to 2017-18 the production was stable which affect the dynamism of demand of the product and as an outcome there is a



sudden decline of the production process of the plantation crops. It is spotted that the percentage share of area and production of spices is under horticulture practices is deteriorated to 4.68 and 2.18 percent respectively from the 15.25 and 2.60 percent respectively in 2018-19 from the period 2017-18. In 2001-02 the percentage share of both area and the production of spices was quite noteworthy with 19.40 percent and 2.583 percent respectively. It is observed that the area and production are increased accordingly. It implies when area increases according production of the crops also increase and vice-versa.

VI. INTER-STATE VARIATION IN GROWTH RATE OF HORTICULTURAL PRODUCTION FROM 2008 TO 2018

The growth rate of horticulture production has wide variation across the states in India. In 2008-09, the growth rate is observed to be better in north eastern hilly states, particularly Mizoram, Sikkim and Assam because hilly lands and their climatic conditions are suitable for horticultural crops. The statewise percentage growth rate from 2008-09 to 2017-18 is shown in Table-3. The average growth rate in 2010-11 is 17.52 per cent whereas it is only 1.02 per cent in 2017-18. There is declining trend of growth rate during the period of study. The coefficient of variation in growth rate is highest in 2015-16 and lowest in 2008-09. Since the coefficient of variation is above 100 in all the years, it implies significant variation in horticulture production across the states in India.

Table 3: State wise growth percentage of horticulture Production in India

State	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Andhra Pradesh	8.4	18.5	3.4	19.9	2.7	-20.5	-25.8	37.3	2.8	9.01
Arunachal Pradesh	-14	-62.5	293.8	-36.1	1.7	-10.8	-12.1	-50	1.2	0.68
Assam	32.2	-23.3	8.5	8.4	-7.1	8.4	7.8	-8.8	1.5	19.61
Bihar	1.4	5.4	7	4.2	-7	-1.2	-1.3	0.7	11.5	0.5
Chhattisgarh	18.9	17.6	8.4	6	10.2	8.6	7.9	7	5.8	-1.09
Gujarat	12.5	20.6	3.1	10.9	3.4	6.1	5.8	0.2	-3.6	1.56
Haryana	3	14	12.3	-1.8	10.7	5.9	5.5	1	14.1	-0.76
Himachal Pradesh	-5.4	32.3	-17	1.4	20.6	2.8	2.8	-9.5	-0.8	-2.33
Jammu & Kashmir	13.1	25.8	1.1	-17.9	10.7	0.8	0.8	4.2	-1.9	8.9
Jharkhand	0.3	20.8	-2.8	9.7	-1.5	-7.8	-8.5	2.5	2.4	1.13
Karnataka	1.1	19.8	4.6	5.6	-4.9	2.3	2.3	8.8	0.1	-11.892
Kerala	-0.5	0.3	1	0.3	5.4	-3.9	-4	-1.2	9.3	-2.42
Madhya Pradesh	-7.6	27.7	77.7	39.5	3.7	7.6	7.1	17	-0.4	8.06
Maharashtra	-4.2	3	12.9	-7.2	32	-8.5	-9.2	9.1	13	-8.57
Manipur	-2.3	0.9	17.9	6.2	18.7	-0.2	-0.2	7.8	-5.5	1.43
Meghalaya	0	-8.7	7.5	11.5	18.8	1.8	1.8	6.1	-10.8	-0.84
Mizoram	101.2	-13.9	15.3	43.6	9.8	-14.9	-17.5	6.5	-0.3	-1.11
Nagaland	29.1	-15.9	118	-9.7	78.9	2.1	2.1	7.5	-4.1	-15.58
Odisha	7.7	-7.4	17.2	1.5	-0.6	-2	-2	1	-0.2	-2.14
Punjab	6.3	2.5	-88.4	-9.7	78.9	276	73.4	4.7	6.8	5.55
Rajasthan	42.7	36.5	-20.5	37	-4.6	28.4	22.1	11.9	-8.3	7.17
Sikkim	43.4	13.8	-7.9	32.6	-4.5	-4.3	-4.5	41.3	22.6	11.57
Tamil Nadu	-12.7	25.8	-0.6	-10.5	8.9	-7.2	-7.7	-3.6	-5.2	-3.78
Uttar Pradesh	17.7	0.5	4.8	2.5	3.1	21.4	17.6	5.5	1	-1.26
Mean	12.47	4.41	17.52	6.67	10.32	10.81	2.41	1.69	3.89	1.02
S.D	23.65	25.71	64.52	17.71	22.08	53.92	17.18	19.15	11.18	7.03
C.V	189.61	582.80	368.28	265.45	214.02	498.70	711.63	1130.54	287.14	692.18

Sources: National Horticulture Board, Ministry of Agriculture & Farmers Welfare, Government of India



VII. HORTICULTURE IN ODISHA

Odisha produces about 10.30 million tons of horticulture products from an area of 1.21 Million hectares and accounts for 4.28 percent of the total horticultural production of the country. The agro-climatic conditions are immensely suitable for perennial fruit crops like mango, litchi, guava, Oranges, and lime annual fruit crops like banana, pineapple, and papaya spices like ginger, turmeric, and chilly variety of roots and tuber and a whole range of vegetables. Odisha ranks 2nd position as per production of vegetables at the national level. The per capita consumption of vegetables is highest in the country. Over the years, horticulture has emerged as one of the most potential agricultural enterprises in accelerating the growth of the economy. There are many reasons to develop horticulture in the rural area of Odisha. Due to the rising domestic demand for horticulture commodities, driven by rising incomes, urbanization, and perhaps changing preferences. On the other, trade liberalization has opened export

markets in other countries where high-income consumers demand fruits, vegetables, and spices which have put a lot of demand for horticultural products. And finally, market reforms have allowed more foreign direct investment in developing countries, introducing more competition in food processing and retailing sectors, as well as allowing foreign companies to organize production for export. Under NHM Odisha performed well and a National level winner. It includes planting material production to post-harvest management. Horticulture can provide better livelihood along with much better income opportunity. A positive growth trend was seen in the production of fruit and vegetable from 18-23% to 10-20% during 1993-94 to 2011-12 the share of horticulture sector accounts near about 37% of total agricultural commodity exported. The production trend shows 5.3% per year growth rate between 2001-02 to 2016-17.

The comparative growth trend between India and Odisha has been shown in Table- 4.

Table 4: Comparison of growth percentage of horticulture production between Odisha and India

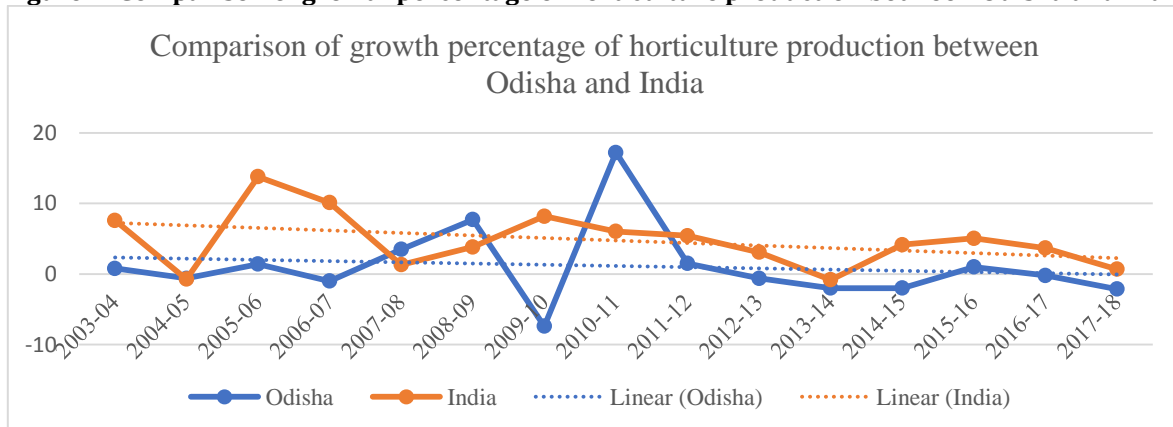
Year	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Odisha	0.8	-0.6	1.4	-1	3.5	7.7	-7.4	17.2	1.5	-0.6	-2	-2	1	-0.2	-2.14
India	7.6	-0.72	13.78	10.11	1.32	3.84	8.19	6.02	5.43	3.09	-0.82	4.16	5.05	3.68	0.69

Sources: Author's calculation from the secondary data

It is seen that the overall growth trend is declining over the year. In Odisha the during the period of 2009-10 it is negative with -7.4 percent. This might be due to the inattention of market policy for the horticultural products which push back the farmers not to produce more. Also due to the storage facilities, export promotions measures discourage the horticulture practices. On the other hand, to overcome the negative growth pattern various incentives

have been taken and as a result there is a sudden growth of overall horticulture productivity during 2010-11 with 17.2 percent. One peculiar thing has been observed from the period of 2003-04 to 2012-13 the trend is opposite to each other between India and Odisha. When the growth trend of Odisha has increased the growth trend of India has declined and vice versa. After 2012-13 the trend of India and Odisha has fluctuated.

Figure 7: Comparison of growth percentage of horticulture production between Odisha and India





IX. SUGGESTIONS AND CONCLUSION

From the above analysis it is revealed that there are many lacunas for the growth of horticulture practices. Horticulture plays an important role for rural livelihood as it has the great impact on rural employment. Enforcement of Government scheme to enhance the horticulture practices. As still there is a problem of food security there is a need to circulate food security chain to curb the problems like starvation and nutrition. It is clearly outlined from the study that horticulture sector is suffering from various issues like market structure, technical, economical as well as geographical discrepancies. To recovery from these sorts of maladies and to make agriculture as well as horticulture sector grass root level research-based approaches should be undertaken by the government. The suggestions for improvement of Horticulture are state below.

- (i) To solve the spatial discrepancies between inter and intra-states the barebones such as technology, crop varieties, augmenting credit delivery, specification of region and plans for specification crops and approaches should be implemented to abate the unstable development in agriculture.
- (ii) To use new technology, knowledge of time operation and they suggest to improve more field mechanism for more benefit through more research.
- (iii) Education level of the farmers needs to be improved. As we know diffusion of innovation is an important medium to channelize the new idea and knowledge and to create awareness about the new strategies. The short messaging service (SMS) through mobile phones has a crucial role circulate and to aware the people about new knowledge. But it is significant to say that except education there no value of new idea and new knowledge.
- (iv) To implement by the government and to adoption capacity of the farmers depend on their own education and skill. Notwithstanding the cost usefulness, mobile messaging has persisted a hindrance of the end users in the farming sector. As it is observed the only and ultimate factor that influences to adopt extension services is the education level of the farmers or the users. The factors like irrigation facility, market condition of the horticultural products, promotion of the crops, storage facility of the crops, training of the farmers and environmental factors such as climate and geographical characteristics such as quality

of soil and ground water table influence the horticulture practices as well as other agriculture productivity and export of the products.

- (v) The environmental factors such as climate and geographical characteristics such as quality of soil and ground water table influence the horticulture as well as other agriculture productivity and export. To increase the horticulture export and ultimately achieve sustainability the role institutions is very crucial. The institutions like The Agricultural and Processed Food Products Export Development Authority (APEDA), International Standard Organization (ISO) to assure and quality control, National Cooperative Development Cooperation (NCDC) etc. play a pivotal role to accelerate the export as well as productivity. Export of Horticultural yields depend on dynamics like domestic production and ingestion, exportable excesses, consumer prejudices, varieties merchandized, quality, domestic and international prices and accessibility of infrastructure facilities for storage and post-harvest management.
- (vi) Various government initiative and projects are moving the interest of people from traditional grains cultivation towards horticulture produce. He analyses how government projects in Nepal doing well apart from its geographical location. Large cardamom, tea, coffee are the leading products which give a push to trade –off with other countries. These cash crops are benefited the farmers and differ reward of government push the interest of people towards the cash crops.
- (vii) It would be better if the farmers adopt proper knowledge, suitable technologies and financial assistance to curtail the risks. The authors have also been stated that to get the better effect for the post-harvest issues farmers' organization can be formed at the cluster level to link with the market and training should be provide by emphasizing the approaches of the market.
- (viii) To make agriculture sustained the techniques like conservation agriculture, use of renewable energy, forest and water conservation should be followed in the horticulture practices.
- (ix) To adopt and implement better irrigation facilities to the rural small and marginal farmers so as to utilize all their barren land to increase their productivity and can boost



their livelihood during the climate change specially shortage of rainfall.

Many evidences reveal that climate change has already affected horticultural production. Horticulture production affected by causes related with a biotic stresses and biotic stresses. For profitable commercial product and satisfying demand of product hi-tech horticulture practice taken into account. Precision farming are more popular among the farmers. Moreover, awareness, skill and quality control strategies depreciate the turnover and so as the farmers in India. It is observed that the tribal as well as other farmers also growing turmeric with traditional method that would be the cause of deteriorate the yield. Land preparation and post-harvesting matters are other characteristics to increase the productivity but as the tribal people are far away from the mainstream of the cotemporary world, they are inept to adopt the new and effective strategies to enhance their productivity. The introduction and standardization of high density planting in key fruits can ensure optimum utilization of land, light and nutrients resulting good harvest of horticultural crops. Good horticultural practices, integrated production and pest management and organic farming can lead to sustainable and environmentally friendly horticultural crops.

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