

# “AN OVERVIEW ON GROWTH OF HORTICULTURE SECTOR IN INDIA”

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**Abstract:** India is endowed with a wide variety of agro climatic conditions and enjoys an enviable position in the horticultural map of the world. Almost all types of horticultural crops can be grown in one region or the other. Horticultural crops occupy 8 per cent of the gross cropped area of the country contributing 24.5 per cent of the gross value of agricultural output and 54.55 per cent of export earnings in agriculture (1998-99). India is the second largest producer of both fruits and vegetables. Total production of fruits has been estimated at 44.04 million tonnes from 3.72 million ha. Vegetables occupy an area of 5.78 million ha with a production of 87.53 million tonnes. Our share in world production in fruits and vegetables is 10 and 13.38 per cent, respectively. India has made noticeable advance in production of flowers. Floriculture is estimated to cover an area of 73,970 ha with production of 4,59,163 mt of loose and 61,21,523 lakh cut flowers. The area under cut flowers has increased in recent years, so has the product range. Horticulture Development received a major boost in X plan and some major schemes were launched that increased the trajectory of growth in this sector. Horticulture sector is recognized to have the potential to raise the farm income, provide livelihood security and earn foreign exchange. The diversification towards horticulture provides a major source of growth in agriculture sector and India can look forward to emerge as a major producer and exporter of horticultural products. There is need to prioritize the development of research, technological up-gradation, infrastructure for transportation and marketing as thrust areas for future development of the horticulture sector. The development of horticulture sector will help in creation of employment opportunities, generation of foreign exchange and enhance the income of farmers. Horticulture has become a key driver for economic development in many of the states in the country and it contributes 30.4 per cent to GDP of agriculture. Horticultural crops play a unique role in India's economy by improving the income of the rural people. This paper examines the various patterns and successes achieved in diversification towards horticulture since 1970-71 at national and state level with a view to identify the factors underlying its progress and explores further scope for diversification towards horticulture and its role in achievements. The study also examines the trends of the horticultural sector in India and identifies the growth prospects.

**Key Words:** Horticulture, Technology, Crop Management, Productivity, Prospects.

## 1. INTRODUCTION:

Horticulture is increasingly recognized as a sunrise sector, owing to its potential to raise farm income, provide livelihood security and earn foreign exchange through export. The potential of horticulture in raising agricultural production, value added, farm income and employment in the country has been recognised long ago. The Fourth Five Year Plan (1969-74) recognised the importance of this sector. Towards late 1970s dependence on imports for meeting food grain demand almost vanished and a sort of food self sufficiency was in sight. This led to a turnaround in policy towards diversification and area under cereal crops started declining for the first time after 1983-84. However, this diversification did not focus on horticulture alone and it followed in many directions, away from cereals. Diversification towards horticulture got real boost in the early 1990s which coincided with liberalisation of economy. Augmenting facilities for processing, marketing and storage, development of rain fed and irrigated horticulture was one of the objective of new agricultural policy resolution, 1992, (Government of India, 1993). The diverse agro-climatic conditions and rich diversity in crops and genetic resources enable India to produce a wide range of horticultural crops round the year. To cite an example, India produces a tropical fruit like mango and sub-tropical fruit like apple at same season in a year. Horticulture sector encompasses a wide range of crops like fruits, vegetables, flowers, spices, plantation crops like coconut, beverages like tea and coffee and some medicinal and aromatic plants. Statistics provided by National Horticulture Development Board indicate that, by accounting for 13% of the global production of fruits and 21% of vegetables, India is the second largest producer, after China, in both the commodity groups (Horticultural Statistics at a Glance 2017).

### 1.1. OBJECTIVES:

- To find out the progress and potential of horticulture sector at the national and state levels.
- To find out the future prospects in horticulture sector in India.

## 1.2. HORTICULTURE:

The term horticulture is derived from two Latin words 'hortus', meaning 'garden', and 'cultura' meaning 'cultivation'. It refers to crops cultivated in an enclosure, i.e., garden cultivation. Horticulture is a science, as well as, an art of production, utilisation and improvement of horticultural crops, such as fruits and vegetables, spices and condiments, ornamental, plantation, medicinal and aromatic plants.

## 1.3. BRANCHES OF HORTICULTURE:

Horticulture is perhaps the most important branch of agriculture. It is further divided into four different branches.

### a. POMOLOGY:

The term is derived from Latin words 'poma' and 'logus'. Poma means 'fruit' and logus means 'study, knowledge or discourse'. It can be defined as a branch of horticulture, which deals with the scientific study of fruit crops.

### b. OLERICULTURE:

The term is derived from Latin words 'olerus' meaning 'vegetables' and cultura meaning 'cultivation'. It can be defined as a branch of horticulture, which deals with the scientific study of vegetable crops.

### c. FLORICULTURE:

The term floriculture is derived from Latin words 'florus' and 'cultura'. Florus means 'flower' and cultura means 'cultivation'. It can be defined as a branch of horticulture, which deals with the scientific study of flowering and ornamental crops (Fig. 1.4). Landscaping is the art of beautifying a piece of land using garden designs, methods and plant material. Professionals who do landscaping are called 'landscape architects'.

### d. POST-HARVEST TECHNOLOGY:

It is a branch of horticulture, which deals with the principles and practices of handling, packaging and processing of harvested crops to increase their storage life and availability. Vegetable crops are different from fruit crops.

## 2. PLANNING PROCESS:

The planning process in the country, through the Five Year Plans, has been instrumental in creating favorable policy environment, through earmarking resources for different sectors to ensure the overall development of the country. Even though, separate allocation for horticulture sub-sector started from the IV Plan onwards, this sub-sector attracted the attention of the planners only from the VII Plan onwards. There was a quantum leap during the VIII Plan in financial allocation for horticulture development programmes, which was sustained even during the IX Plan. The Working Groups constituted by the Planning Commission during the VIII and IX Plans provided the necessary directions in setting priority for programmes in horticulture development. Now that, the IX Plan will be ending in March 2002, the Planning Commission has initiated advance action for the formulation of the X Five Year Plan by constituting a number of groups to cover various national activities.

## 3. RESEARCH INFRASTRUCTURE IN HORTICULTURE DEVELOPMENT:

Although Horticulture section was established in the Division of Botany, IARI in 1954, the horticulture research and development received major attention from IV plan onwards. In this plan the allocation for horticulture research was Rs 3.48 crore and 2.05 crore for establishment of institute for Horticulture research at Hassarghatta Bangalore. Another major initiative was in the XI plan with the creation of Division of Horticulture from the Crops Division of Department of agriculture and cooperation of Ministry of Agriculture in 1981. The Division of Horticulture supported by three Boards i.e. (a) National Horticulture Board, (b) Coconut Development Board, (c) National Bee Board is overseeing the overall development of Horticulture in India. A position of Horticulture Commissioner was created in 1985. The Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW) of the Ministry of Agriculture and Farmers Welfare (MoA&FW) are the nodal department for overseeing horticulture development in the country. It coordinates the activities and programme implementation through Department of Horticulture in all the states. Horticulture Development received a major boost in X plan (2002-07). In this plan some major schemes were launched for development of horticulture that increased the trajectory of growth in horticulture Sector. The plan witnessed the launch of -

- Technological Mission for Integrated Development of Horticulture in North East Region.
- National Horticulture Mission.
- Micro-irrigation Mission.

## 4. TECHNOLOGY MISSION FOR INTEGRATED DEVELOPMENT OF HORTICULTURE IN NORTH EAST REGION & HIMALAYAN STATES:

The Technology Mission for Integrated Development of Horticulture was launched in 8 states of north-east region in 2001-02 to harness the potential of horticulture development. This centrally sponsored scheme was approved

with outlay of Rs. 229.38 crores in Xth Plan. In 2003-04 the coverage of scheme was extended to the three Himalayan states of Jammu and Kashmir, Himachal Pradesh and Uttarakhand with an additional outlay of Rs. 260 crores. The scheme aimed at providing adequate and timely assistance for all activities and horizontal and vertical integration of various programmes involved in development of horticulture sector.

#### **5. NATIONAL HORTICULTURE MISSION:**

The national Horticulture Mission was the major initiative launched in 2005 (X plan) for holistic growth of horticulture; enhance horticulture production, dissemination of knowledge and technology and synergy among various programs for horticulture development. The mission was launched for horticulture development in all States and Union Territories excluding the North-Eastern States, Uttarakhand, Himachal Pradesh and Jammu and Kashmir, where Technology Mission for Integrated Development of Horticulture was already in place. The mission document included human resource development and capacity building as key activities for horticulture production, post-harvest management, marketing and value addition. During X Plan a number of programmers for horticulture development in states such as Post harvest Management & Value addition in Horticultural Crops (PVA), Hybrid Seed Production of Vegetables and Flower Crops (HVF) and Financial Assistance to the Trainees of Specialized Entrepreneurs (FAT) etc. were merged into National Horticulture Mission.

#### **6. PROMOTION OF SOIL TEST BASED BALANCED AND JUDICIOUS USE OF CHEMICAL FERTILIZERS, BIO-FERTILIZERS AND LOCALLY AVAILABLE ORGANIC MANURES:**

The Government is promoting soil test based on balanced and judicious use of chemical fertilizers, bio-fertilizers and locally available organic manures like Farm Yard Manure, compost, Vermi Compost and Green manure to maintain soil health and its productivity. 'Soil Health Card' (SHC) scheme has been launched in February 2015 to assist State Governments to evaluate fertility in all 14 crore farm holdings and issue soil health cards to farmers regularly in a cycle of 2 years. Soil health cards provide information to farmers on nutrients status of their soil along with recommendations on appropriate dosage of nutrients to be applied for improving soil health and its fertility. In order to reduce use of pesticides and chemical fertilizers in the country, Indian Council of Agricultural Research (ICAR) is recommending Integrated Pest Management (through a combination of agronomic, chemical and biological methods) and Integrated Nutrient Management (INM) envisaging conjunctive use of both inorganic and organic sources of nutrients. Besides, split application and placement of fertilizers, use of slow releasing N-fertilizers and nitrification inhibitors, inclusion of legumes in cropping system, adoption of Resource Conservation Technologies (RCTs) and fertiligation are also being advocated. ICAR also imparts training, organizes Front Line Field Demonstrations to educate farmers on all these aspect.

#### **7. REFORMS IN AGRICULTURAL MARKETING:**

To address the demands for marketing of increased and diversified agricultural marketable surplus, there is a need to strengthen the network of regulated markets and augment it with alternative marketing channels. As per the recommendation of the National Farmers Commission (2004), that a regulated market should be available to farmers within a radius of 5 Km (corresponding market area of about 80 square km.). However, presently, all-India average area served by a regulated market is 487.40 square km. The number of commodity specific markets with requisite infrastructure is also limited. Agriculture Marketing is governed by the Agricultural Produce Marketing Committee (APMC) Acts, which are administered by respective State Governments. Some State Governments have ushered reforms in their marketing sector to meet the challenges. In order to keep pace with the changing production pattern and growing marketable surplus, the Government advocates development of adequate number of markets equipped with modern infrastructure, with increased private sector participation and development of other marketing channels like direct marketing and contract farming etc. The Government is actively pursuing with States to amend their marketing laws to provide suitable legal framework and policy atmosphere to usher such developments. The reform agenda of the Government focuses on 7 vital areas for reforms. State-wise progress is given below. Further, as a part of reforms, Government announced a scheme for setting up of National Agriculture Market (NAM). Under NAM, a common e-market platform is to be deployed for on-line trading across the States/ Country. It is expected that NAM would address the marketing constraints of fragmentation, lack of transparency in bidding, poor price discovery, information asymmetry between sellers and buyers and provide farmers with a larger share of the consumer rupee.

#### **8. UNIFIED NATIONAL MARKET FOR AGRICULTURAL COMMODITIES:**

The Government has approved a scheme for setting up of National Agriculture Market (NAM) through Agri-Tech Infrastructure Fund (ATIF) on 01.07.2015 with a budget of Rs.200 crore and to be implemented during 2015-16 to 2017-18. The scheme envisages implementation of the National Agricultural Market (NAM) by setting up of an appropriate common e-market platform that would be deployable in regulated wholesale markets in States/UTs

desirous of joining the e-platform. Small Farmers Agribusiness Consortium (SFAC) will implement the national e-platform in 585 selected regulated markets and will cover 400 mandis in 2016-17 and 185 mandis in 2017-18. Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) will meet expenses on software and its customization for the States and provide it free of cost to the States and Union Territories (UTs). DAC&FW will also give grant as one time fixed cost subject to the ceiling of Rs.30.00 lakhs per Mandi (other than to the private mandis) for related equipment / infrastructure in 585 regulated mandis, for installation of the e-market platform. State Governments will propose the regulated markets which are to be integrated with NAM. Integration of regulated markets with NAM requires certain pre-requisites in the State Agricultural Produce Marketing Committee (APMC) Acts, namely- (i) a single license to be valid across the State, (ii) single point levy of market fee and (iii) provision for electronic auction as a mode for price discovery. Only those States/UTs that have provided for these three pre-requisites will be eligible for assistance under the scheme.

## 9. SUBSIDY FOR PURCHASING COMBINE HARVESTER:

Under the Sub-Mission on Agricultural Mechanization being implemented by the Department of Agriculture, Cooperation & Farmers Welfare, subsidy @ 40% of the project cost limited to a maximum of Rs. 24 lakhs, whichever is less, is extended to the rural entrepreneurs, progressive farmer and self help groups for establishment of farm machinery banks for custom hiring comprising of various agricultural machinery & equipment including combine harvester.

## 10. PROMOTION OF MICRO IRRIGATION:

The Micro Irrigation technologies (both Drip and Sprinkler) are quite popular amongst the farmers and adoption rate is also high. The National Mission on Micro Irrigation programme in the country, State-wise including West Bengal, was subsumed under National Mission on Sustainable Agriculture (NMSA) and implemented as “On farm Water Management” (OFWM) during 2014-15. The same is now being implemented as “Per Drop More Crop” component under PradhanMantriKrishiSinchyeeYojana (PMKSY) from 2015-16 onwards. Various steps taken by Government for promotion of micro irrigation include (i) Training and awareness programmes, (ii) Awareness through print media and radio & TV talks, (iii) Organization of workshops, seminars and interactive meetings, (iv) Publicity creation through Exhibitions, Fairs and KisanMelas, (v) Publication of literature and (vi) Short duration films.

## 11. INTERVENTION MADE IN DROUGHT AFFECTED AREAS:

Intervention made in drought affected areas:

- Implementation of Diesel Subsidy Scheme for protective irrigation of crops;
- Enhancement of ceiling on seed subsidy to partially recompense the farmer for the additional expenditure incurred in resoling and/or purchasing appropriate varieties of seeds;
- Implementation of interventions on perennial horticulture crops under Mission for Integrated Development of Horticulture (MIDH);
- Implementation of Additional Fodder Development Programme (AFDP) as a sub-scheme of Rashtriya Krishi Vikas Yojana (RKVY).

Central Research Institute of Dryland Agriculture (CRIDA), in collaboration with State Agricultural Universities, has prepared contingency plans for 600 districts for implementing location specific interventions to sustain agriculture production in the eventuality of any extreme climatic events. Central Government has relaxed the norms under MGNREGA to provide additional employment of 50 days over and above the 100 days per household in the areas affected by natural calamities including drought for the current year.

## 12. CHANGING SCENARIO:

The changing scenario encourages private investment, to go for hi-tech horticulture with micro propagation, protected cultivation, drip irrigation, fertigation, and integrated nutrient and pest management, besides making use of latest post harvest measures particularly in the case of perishable commodities. As a result, horticulture crop production has moved from rural confines to commercial ventures and has attracted youth since it has proved to be intellectually satisfying and economically rewarding. Besides, use of modern technologies has also brought about improvement in productivity.

## 13. IMPORTANT HORTICULTURAL CROPS AND THEIR GROWING REGIONS IN INDIA:

STATE	MAJOR HORTICULTURAL CROPS
Haryana	Bottle gourd, marigold.
Himachal Pradesh	Apple.

Jammu and Kashmir	Apple, Punjab, Citrus, fruits.
Uttar Pradesh	Mango,banana,watermelon,bottlegourd,jasmine.
Rajasthan	Pomegranate, onion, jasmine, tuberose.
Chhattisgarh	Bottlegourd,rose,GoaCoconut,arecanut, cashew.
Goa	cashew Coconut, arecanut nut.
Gujarat	Banana, papaya, sapota, onion, tomato, rose.
Maharashtra	Mango, banana, grapes, citrus fruits, sapota, pomegranate, chilli, onion, rose.
Madhya Pradesh	Citrus fruits, papaya, pomegranate, chilli, potato, sweet potato, onion, bottle gourd, tomato.
Andhra Pradesh	Mango, banana, grapes, citrus fruits, papaya, sapota, pomegranate, coconut, chilli, watermelon, tomato, jasmine, tuberose, marigold
Karnataka	Mango, banana, grapes, papaya, sapota, pomegranate, coconut, chilli, onion, watermelon, tomato, rose, chrysanthemum, jasmine, tuberose, marigold
Kerala	Banana, coconut, sweet chrysanthemum, jasmine.
Tamil Nadu	Banana, papaya, sapota, coconut, chrysanthemum, jasmine, tuberose.
Telangana	Mango, citrus fruits, tomato.
Andaman and Nicobar Islands	Mango, chilli, potato, onion, bottle gourd.
West Bengal	Coconut, potato, sweet potato, watermelon, rose.
Odisha	Coconut, sweet potato, watermelon, bottle gourd.
Arunachal Pradesh	Turmeric, ginger Assam Banana, papaya, pomegranate, coconut, tuberose.
Meghalaya	Papaya, arecanut, ginger Sikkim Ginger Tripura Papaya, arecanut, turmeric.

Source: Horticulture Statistics at a Glance2017,National Horticulture Board,Government of India

#### 14. AREA AND PRODUCTION OF INDIA:

##### Area and Production of Horticulture Crops : All India

Area in '000 Ha  
 Production in '000  
 MT

Crops	2017-18		2018-19		2018-19	
	(Final)		(2nd Advance Estimate)		(3rd Advance Estimate)	
<b>Fruits</b>	Area	Product ion	Area	Productio n	Area	Product ion
Almond	11	14	11	11	10	11
Aonla/Gooseberry	93	1075	93	1069	92	1039
Apple	301	2327	308	2387	314	2503
Banana	884	30808	900	31218	898	31747
Ber	50	513	50	644	52	639
<b>Citrus</b>		0				
(i) Lime/Lemon	286	3148	290	3304	296	3397
(ii) Mandarin	428	5101	438	5383	437	5380
(iii) Sweet Orange( Mosambi)	185	3266	186	3247	190	3401
(iv) Others	103	1030	110	1216	112	1022
Citrus Total (i to iv)	<b>1003</b>	<b>12546</b>	<b>1025</b>	<b>13150</b>	<b>1034</b>	<b>13200</b>
Custardapple	46	401	38	325	40	338
Grapes	139	2920	115	2395	139	2958
Guava	265	4054	272	4234	276	4236

Jackfruit	185	1830	187	1803	187	1815
Kiwi	4	12	4	12	4	13
Litchi	92	686	94	710	95	727
Mango	2258	21822	2283	20955	2293	20798
Muskmelon	54	1231	56	1274	57	1277
Papaya	138	5989	146	6096	143	5980
Passion Fruit	14	82	14	85	12	82
Peach	19	114	19	123	19	121
Pear	44	318	43	301	43	306
Picanut	1	0	1	0	1	0
Pineapple	103	1706	105	1718	105	1729
Plum	23	89	23	89	24	89
Pomegranate	234	2845	246	2791	262	3034
Sapota	97	1176	91	1097	90	1089
Strawberry	1	5	1	5	1	5
Walnut	109	300	108	297	113	317
Watermelon	101	2520	100	2438	103	2504
Others	238	1977	245	2151	241	2024
<b>Total Fruits</b>	<b>6506</b>	<b>97358</b>	<b>6577</b>	<b>97378</b>	<b>6648</b>	<b>98579</b>
<b>Vegetables</b>						
Beans	228	2277	234	2364	228	2257
Bittergourd	97	1137	97	1181	99	1198
Bottlegourd	157	2683	187	3079	186	3052
Brinjal	730	12801	733	12890	728	12660
Cabbage	399	9037	402	9153	399	9095
Capsicum	24	326	32	493	34	487
Carrot	97	1648	112	1918	108	1865
Cauliflower	453	8668	468	9235	469	9103
Cucumber	82	1260	107	1652	109	1696
Chillies (Green)	309	3592	373	3771	364	3720
Elephant Foot Yam	30	774	35	898	35	917
Mushroom	198	487		505		*173
Okra/Ladyfinger	509	6095	508	6168	513	6170
Onion	1285	23262	1267	23284	1263	23485
Parwal/Pointedgourd	20	310	55	742	55	740
Peas	540	5422	553	5536	551	5533
Potato	2142	51310	2167	52959	2161	53027
Radish	209	3061	206	3252	202	3145
Pumpkin/Sitaphal/Kadd	78	1714	99	2115	94	2030
Sweet Potato	131	1500	116	1210	116	1207
Tapioca	173	4950	183	5596	177	5484
Tomato	789	19759	769	19660	778	19397
Others	1580	22320	1421	19703	1431	19441
<b>Total Vegetables</b>	<b>10259</b>	<b>184394</b>	<b>10126</b>	<b>187367</b>	<b>10100</b>	<b>185883</b>
Aromatics and Medicinal	720	866	687	846	656	819
Flowers Cut		823		817		807
Flowers Loose	324	1962	307	2076	313	2059
<b>Total Flowers</b>	<b>324</b>	<b>2785</b>	<b>307</b>	<b>2893</b>	<b>313</b>	<b>2865</b>
Honey		105		115		120
<b>Plantation Crops</b>						
Arecanut	497	833	518	852	518	853
Cashewnut	1062	817	1101	743	1089	743
Cocoa	89	20	93	18	94	24
Coconut	2097	16413	2215	16046	2179	14748
<b>Total Plantation</b>	<b>3744</b>	<b>18082</b>	<b>3927</b>	<b>17659</b>	<b>3880</b>	<b>16368</b>

Spices						
Ajwain	35	24	39	26	35	23
Cardamom	84	28	73	22	78	22
Chillies (Dried)	752	2149	706	2386	721	1690
Cinnamon/Tejpata	3	5	2	5	2	5
Celery,Dill & Poppy	36	34	36	33	30	30
Clove	2	1	2	1	2	2
Coriander	532	710	641	756	468	567
Cumin	966	689	835	423	1028	608
Fenugreek	149	202	177	248	122	189
Fennel	66	104	240	83	90	157
Garlic	317	1611	272	1505	354	2836
Ginger	160	1118	175	1451	174	#1846
Nutmeg	23	15	19	12	19	12
Pepper	134	66	135	62	139	62
Vanilla	5	0	4	0	4	0
Tamarind	48	201	47	173	49	202
Turmeric	238	1133	246	1389	246	@ 931
Mint (Mentha)	327	33	334	35	334	34
<b>Total Spices</b>	<b>3878</b>	<b>8124</b>	<b>3984</b>	<b>8612</b>	<b>3895</b>	<b>9216</b>
<b>Total</b>	<b>25431</b>	<b>311714</b>	<b>25608</b>	<b>314870</b>	<b>25492</b>	<b>313851</b>

\* Data reported by Directorate of Mushroom Research, Solan  
 # Data in terms of Fresh Ginger  
 @ Data in terms of Dry Turmeric

Sl. No.	STATES/UTs	FRUITS		VEGETABLES		PLANTATION		AROMATICS & MEDICINAL		FLOWERS		SPICES		HONEY	TOTAL		
		A	P	A	P	A	P	A	P	A	P	A	P		A	P	
										LOOSE	CUT						
1	ANDHRA PRADESH	718.91	17614.67	259.83	7091.37	342.84	1220.81	6.50	11.00	28.04	302.53	0.00	199.05	742.61	1.90	1555.18	26984.89
2	ARUNACHAL PRADESH	48.14	125.84	2.62	17.39	0.07	0.21	0.24	0.16	0.00	0.00	0.00	11.64	69.03	0.10	62.71	212.73
3	ASSAM	167.20	2518.89	324.13	4060.36	107.56	198.90	4.53	0.17	5.19	34.892	58.341	103.58	309.78	1.25	712.19	7182.59
4	BIHAR	313.95	4384.46	872.55	16699.84	8.79	40.12	6.79	2.68	1.41	10.13	0.39	8.28	12.33	15.00	1211.76	21164.95
5	CHHATISGARH	225.24	2580.31	498.93	6910.32	16.53	29.15	9.67	67.53	13.06	54.94	214.81	11.58	18.25	0.85	775.02	9876.16
6	GUJARAT	433.79	9227.76	626.26	12552.15	34.89	185.12	0.00	0.00	20.50	195.86	0.00	490.73	747.15	0.70	1606.16	22908.74
7	HARYANA	67.28	712.02	438.39	7172.11	0.00	0.00	0.32	1.08	5.96	72.85	2.64	11.12	64.88	4.80	523.06	8030.38
8	HIMACHAL PRADESH	230.852	571.739	87.31	1755.43	0.00	0.00	1.12	0.91	0.64	12.35	10.56	6.90	17.58	6.00	326.82	2374.57
9	JAMMU & KASHMIR	345.39	2564.27	60.12	1337.12	0.00	0.00	3.83	0.01	0.28	27.00	4.45	4.85	1.19	2.20	414.47	3936.23
10	JHARKHAND	105.39	1111.96	293.42	3501.45	15.58	5.76	0.00	0.00	0.81	4.45	4.17	0.00	0.00	1.50	415.20	4629.29
11	KARNATAKA	395.550	6567.293	430.925	7044.88	1038.305	4220.698	1.708	9.470	24.756	178.033	75.211	223.744	677.865	2.200	2114.988	18775.658
12	KERALA	321.36	1885.97	98.77	3042.86	965.15	5421.89	0.01	0.00	53.26	0.08	44.84	152.53	192.86	2.20	1591.08	10590.71

13	MADHYA PRADESH	357.01	7464.97	897.99	17773.19	0.00	0.00	38.16	90.79	31.42	375.62	0.00	640.17	2961.02	2.55	1964.75	28668.14
14	MAHARASHTRA	756.97	10822.77	649.79	11283.23	236.60	363.76	0.41	0.22	11.36	57.61	0.11	33.89	194.43	1.70	1689.02	22723.82
15	MANIPUR	46.74	451.23	45.55	354.92	0.90	0.31	0.04	0.12	0.05	0.02	0.27	11.51	28.61	0.35	104.79	835.82
16	MEGHALAYA	35.75	331.67	49.02	514.75	26.14	30.86	0.00	0.00	0.01	0.00	0.02	15.44	74.26	0.28	126.36	951.83
17	MIZORAM	62.91	339.18	34.65	163.80	12.17	9.20	0.77	0.78	0.17	0.00	2.36	27.67	100.93	0.20	138.34	616.46
18	NAGALAND	33.94	315.34	41.11	455.87	2.17	10.25	0.13	0.88	0.04	0.00	24.40	9.96	58.79	0.70	87.35	866.23
19	ODISHA	337.29	2361.13	613.62	8466.17	256.29	328.57	1.92	0.61	6.61	24.91	48.79	148.20	297.26	1.50	1363.92	11528.94
20	PUNJAB	94.80	2001.69	249.32	5207.36	0.00	0.00	13.20	2.79	2.09	13.07	0.00	32.29	100.71	16.50	391.71	7342.12
21	RAJASTHAN	62.35	919.90	178.01	2047.13	0.00	0.00	416.14	382.98	4.10	7.60	0.00	928.45	942.69	10.50	1589.05	4310.79
22	SIKKIM	19.54	55.45	38.80	231.40	0.00	0.00	0.00	0.00	0.24	16.50	0.09	42.60	106.27	0.40	101.19	410.10
23	TAMIL NADU	293.97	5767.95	235.77	6082.54	620.21	3743.50	15.14	232.73	39.80	521.78	17.15	104.87	178.33	2.10	1309.76	16546.07
24	TELANGANA	175.90	2034.29	140.31	2548.69	0.45	3.23	0.05	0.44	4.60	20.71	10.96	144.39	651.10	0.76	465.70	5270.19
25	TRIPURA	53.702	555.473	46.708	813.378	14.038	29.458	0.00	0.00	0.00	0.00	0.00	6.15	30.22	0.18	120.60	1428.71
26	UTTAR PRADESH	480.53	10651.26	1256.27	27703.82	0.00	0.00	135.04	13.53	21.33	46.70	65.58	393.80	250.81	22.00	2286.97	38753.71
27	UTTARAKHAND	178.80	670.63	100.14	1002.64	0.00	0.00	0.00	0.00	1.55	2.55	12.02	9.44	40.30	2.80	289.93	1730.95
28	WEST BENGAL	266.33	3829.85	1490.39	29545.23	53.70	299.69	0.00	0.00	29.10	77.42	208.82	120.22	343.72	18.50	1959.73	34323.23
29	OTHERS	18.23	141.30	39.11	503.81	127.99	226.14	0.00	0.00	6.54	1.12	0.59	2.09	3.41	0.28	193.96	876.65
	All India Total	6647.78	98579.27	10099.82	185883.22	3880.37	16367.63	655.72	818.89	312.93	2058.72	806.55	3895.15	9216.37	120.00	25491.77	313850.66

### 15. STATE-WISE PATTERN OF DEVELOPMENT OF HORTICULTURAL SECTOR:

The trend in the compound growth rate in area under the horticultural crops is an indicator of growth and importance of horticulture sector. At the national level the growth rate in area under horticulture crops was 4.4 percent from 2001-02 to 2011-12 against 1.8 percent in the decade of 1990s. However in the states where horticulture crops assume significance, the growth rate varied significantly. Since fruits and vegetables form major share of area under horticulture crops we have analyzed the growth rate of area under fruits and vegetables separately. Whereas the state of Maharashtra, Andhra Pradesh and Gujarat achieved a fairly higher growth rate of 7.1, 5.5 and 6.7 percent respectively in 1990s, these states maintained the growth rate of 8.1, 5.3, and 8.6 percent respectively in the decade of 2000s.

### 16. SHARE OF HORTICULTURAL CROPS TO THE GROSS VALUE OF AGRICULTURAL OUTPUT:

The contribution of horticultural sector to the gross agriculture output is another important indicator of significance of horticulture sector. The share of horticulture sector is computed for the TE 1992, 2002 and 2011 in value of agriculture output (livestock is not included) Table 9. The share of horticulture varies widely across states, as has been the growth rate in area under horticulture. The share of horticulture has been continuously increasing for the decade of 1990s and 2000s, except for Bihar that has shown a decline in share from 45.2 percent in 2000 to 43.8 percent in 2011, though its contribution stands high in agriculture output. For the state of Himachal Pradesh and Jammu and Kashmir the contribution of horticulture sector continues to be the highest of 69.6 percent and 67.1 percent respectively for TE 2011. These figures show the high significance of horticulture sector in these states. The states of West Bengal, Tamil Nadu and Odisha have shown moderate but increasing significance of horticulture sector in agriculture output.



## 17. EMPLOYMENT OPPORTUNITIES IN HORTICULTURE:

The horticultural industry offers a variety of jobs, both directly and indirectly. Many jobs require knowledge and training in horticulture. The level of training could be vocational or at the college level. The nature of work may be indoor or outdoor. Intense manual labour or paperwork in office may be involved. The following are the identified categories of jobs that require varying degrees of familiarity with horticulture:

## 18. NURSERY OPERATION:

- Nursery manager (coordinates the entire nursery operations)
- Propagator (develops quality planting material)
- Field supervisor (supervises and plans fieldwork)
- Plant technician (advises and provides guidance on plant care)
- Salesperson (works on the promotion and sale of plant material).

## 19. TURF GRASS OPERATION:

- (a) Landscape technician (establishes and maintains landscape)
- (b) Golf course architect (designs a golf course)
- (c) Golf course superintendent (supervises the construction and maintenance of the golf course)

## CROP PRODUCTION

- (a) Farm manager (manages the horticulture farm)
- (b) Crop grower (produces vegetables, fruits and flowers)

## FLORIST OPERATION

- (a) Floral designer (creatively arranges flowers)
- (b) Store manager (manages and supervises the store of the farm)
- (c) Plant rental supervisor (manages plants and pots, and does floral arrangements on rent).

## EDUCATION

- (a) Teacher/trainer (teaches horticulture in formal or informal system)
- (b) Researcher (conducts research to develop new products and varieties)
- (c) Extension person (disseminates innovative techniques and methods among people)

## INDUSTRIAL OPERATION

The horticultural industry has spawned a number of supporting or service industries, including the following:

### DEVELOPER OR PRODUCER:

The horticulture industry depends on a variety of chemicals, including fertilisers, pesticides and growth hormones. These chemicals are called agro-chemicals. Machinery, tools and implements are required for preparing the land, planting, cultivation, spray, harvest, store and packaging. Engineers design and construct the tools and machinery required for extensive and intensive production of horticultural plants. Home garden versions of some of these machineries and equipment are also available. Distributors Horticultural products need to be transported from the areas of production to nearby and distant markets, and ultimately, to consumers. Because of their highly perishable nature and in order to retain their quality for a long duration, horticultural products require special care and handling in transportation. It requires special personnel to look after this aspect.

### DISTRIBUTORS:

Horticultural products need to be transported from the areas of production to nearby and distant markets, and ultimately, to consumers. Because of their highly perishable nature and in order to retain their quality for a long duration, horticultural products require special care and handling in transportation. It requires special personnel to look after this aspect.

## 20. CONCLUSION:

Indian agriculture is generally marked with a low profit. Further, the farm income generated is not sufficient to provide a livelihood (Chand et al 2011). In this context, to double farmers' income, diversification towards high value horticultural crops is a major strategy. The horticultural sector has received considerable attention in recent years as it is recognized as a potentially important source of growth, employment generation and foreign exchange earnings. The trend analysis has shown wide variation in the growth performance of fruits and vegetables across states. Generally, the productivity growth at all India level is low, which needs to be addressed. The major strategy towards this is by improving the total factor productivity growth, through research and development (Suresh and Mathur 2016). Both public and private sector bears significant role in it. Considering the dominant role of small holders in horticultural production, the public sector research needs to be strengthened to produce improved technology and management practices. The export of the horticultural products are mainly as fresh produce or products with low processing, which leads to lower value realisation. Urgent steps are needed to promote value

addition and for entrepreneurship development in processing of horticultural products. The coefficient of variation and Instability index for flower crops was more than 20 per cent and 10 per cent respectively indicating that, the more riskiness for cultivation of flower crops in India. Production is the combined effect of area and productivity, growth of production is majorly contributed by areas while in case of flowers productivity effect is negative. Therefore, keeping the area as constant the productivity of horticultural crops can be further increased by taking appropriate production technologies. Government intervention is also required to make stable markets available for flowers, which are being adopted by farmers recently and whose production has gained impetus, so that its profitable to farmers in long run. The key instrument in development of the horticultural sector would be location specific research and development programmes, development of infrastructure in terms of cold storage, marketing yards and rural roads; and deepening and widening processing facilities.

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