

# Development of Horticultural Sector in India – The Way Forward

Mudasir Hassan Bhat

Aligarh Muslim University  
E-mail: [mudasirbhat85@gmail.com](mailto:mudasirbhat85@gmail.com)

**Abstract**—Horticulture development was not a priority in the immediate post-independence period in India, as the agriculture development policy was mainly focused on attaining the food self-sufficiency. But the decline in growth rate of agriculture and stagnating yields in the decade of 1990's forced the policy makers to look for alternative mechanism of growth in agriculture sector. It was in this backdrop that diversification towards horticulture was identified as an important source for growth. Horticulture Development received a major boost in X plan and some major schemes were launched that increased the trajectory of growth in this sector. For the first time, total horticultural production, at 268.8 million tonnes, surpassed food grain production, at 257.1 million tonnes, in 2012-13. The share of horticulture in value of agriculture output stands at 34.4 percent indicates the significance of this sector. India has emerged as world's second largest producer of fruits and vegetables contributing to 13.6 percent and 14.0 percent respectively of the total world production. 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.

## 1. INTRODUCTION

Horticulture development was not a priority in the immediate post-independence period in India. This was for the obvious reasons that India was a food deficient country. There were huge imports of foodgrains to feed the increasing population, agriculture was backward and productivity was very low. There was absolute shortage of food supplies in 1960s with average annual imports of wheat around 3 million tonnes [1]. The major focus of agriculture development policy was attainment of food self-sufficiency. The major policy initiatives were agrarian reforms, institutional support and development of irrigation system. The increase in area under cultivation was the major source of increase in production. Despite these initiatives India remained dependent on imports to feed its population. It was only in mid 1960s with the adoption of New Agriculture Strategy India attained food self-sufficiency in foodgrain production. The strategy relied on

high yielding varieties, research and extension, irrigation and institutional credit. The successful implementation of the strategy in 1970s not only made India food self-sufficient but emerged as a major exporter of food grains with exports of rice and wheat of about 10 million tonnes in 2002-03 [1]. But the growth in agriculture could not be sustained in the post liberalization period. The agriculture GDP growth rate declined from 3.3 percent in 1980-1995 to 2 percent 1995-2002. The crop sub-sector growth rate declined from 3.22 percent in 1990-91 to 1996-97 to 0.61 percent in 1996-97 to 2003-04 (Planning commission XI Report). The decline in growth rates coupled with stagnating yields forced the policy makers to look for alternative mechanism of growth in agriculture sector. It was in this backdrop that diversification towards high value crops was identified as an important source for growth in agriculture sector. The diversification towards horticulture crops has potential to increase employment opportunities and raise the farm income [2-3].

## 2. PLAN ALLOCATION FOR DEVELOPMENT OF HORTICULTURE

The horticulture development received a meager allocation of funds in post-independence period for the reasons mentioned above. The plan allocation for horticulture and agriculture & allied activities is given in Table 1. The plan allocation for horticulture has not been mentioned till IV five year plans. The IV five year plans allocated a meager of 2.05 crores for horticulture development, which is just 0.89 percent of plan allocation for agriculture and allied activities.

Table 1: Plan allocations (in Rs. Crores)

Plan Period	Allocation for Horticulture	Allocation for Agriculture & Allied Activities	Percentage of Horticulture to Agriculture
IV (1969-74)	2.05	2320	0.89
V (1974-79)	7.62	4865	0.16
VI (1980-85)	14.64	5695	0.26
VII (1985-90)	25	10525	0.23
VIII (1992-97)	1000	22467	4.45

IX (1997-02)	1453	37546	3.87
X (2002-07)	5025	58933	8.53
XI (2007-12)	15800	136381	11.59
XII (2012-17)	16840	363273	4.63
Annual Plan (2012-13)	3062	54748	5.60
Annual Plan (2013-14)	4128	18781	21.99
Annual Plan (2014-15)	2922	11531	25.34

Sources: Working Group on Horticulture, Plantation Crops and Organic Farming XI; Agricultural Statistics at a Glance 2013 and 2014, DES; Horticultural Statistics at a Glance 2015- (MIDH), DAC&FW.

The Plan allocations for horticulture increased in successive plans but its proportion in plan allocation for agriculture & allied activities remained very low. The plan allocation for horticulture development received a major push in VIII plan. The allocation increased both in absolute terms from 25 crores in VII Plan to 1000 crores in VIII Plan and also in proportion terms from 0.23 percent to 4.45 percent of total allocation for agriculture & allied activities. The plan allocations have been increasing since then. The cabinet committee on economic affairs approved a centrally sponsored scheme for integrated development of horticulture for implementation during XII plan with an outlay of Rs. 16840 crores, out of which Rs. 866 crores will be contributed by state governments where the scheme is implemented. The plan allocation and expected growth rate of horticulture sector is 4.63 percent and 7.2 percent respectively for the XII plan. Despite the fact that horticulture sector constitutes 34 percent of value of agriculture output the sector has not received adequate allocation. Horticulture can play an important role in increasing growth of agriculture sector and employment generation. There is need for increasing resource allocation to boost the infrastructure development and technological advancement in this sector.

### 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

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

### 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 Utrakhand 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.

### 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, Utrakhand, 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.

#### 4. ALL INDIA AREA, PRODUCTION AND PRODUCTIVITY OF HORTICULTURE CROPS

For the first time, total horticultural production, at 268.8 million tonnes, surpassed food grain production, at 257.1 million tonne, in 2012-13. The horticulture crops are mainly grouped as fruits and vegetables, flowers and aromatic, plantation crops and spices. India is the world's second largest producer of fruits and vegetables contributing to 13.6 percent and 14.0 percent respectively of the total world production (NHB Database 2015). India is the largest producer of papaya, banana, mango, sapotas and acid limes and enjoys reputation for highest productivity in grapes, sapota and banana. The production of fruits has increased to 88.819 million tonnes in 2014-15. In vegetables, India occupies prime position in the production of Okra and pea; second in cauliflower onion, tomato, potato and brinjal, and third in cabbage in the world. Over the last five decades, there has been a three-fold increase in area under fruits and four-fold increase in its production. In 1991-92, the total area under horticultural crops was 12.77 million hectares, which has increased to 24.918 million hectares by 2014-15, an increase of 95 percent. Total production has increased nearly 2.8 times during this period, with productivity increasing 1.5 times. The demand and supply of these high value commodities have grown much faster than those of food-grains [4-5].

**Fig. 1: Horticulture vs. Foodgrain production in India**

Source: Indian Horticulture Database (NHB) & Horticulture Statistics Division, DAC&FW

Note: Value for 2014-15 is 3<sup>rd</sup> advance estimate

Table 2 shows the area and compound annual growth rate of various horticulture crop groups. Fruits and vegetables have the largest share about 61 percent of area under horticulture crops having compound annual growth rate (CAGR) above 3 percent. The flowers and aromatics having lowest share in area; have highest CAGR of 15.69 percent. Only spices have registered a negative CAGR of 0.13 percent.

**Table 2: All India area under horticulture crops groups**  
(Area in 000 ha)

Year	Fruit s	Vegetable s	Flowers & Aromatic c	Plantatio n	Spice s	Total
2001-02	4010	6156	106	2984	3220	16592
2002-03	3788	6092	70	2984	3220	16270
2003-04	4661	6082	101	3102	5155	19208
2004-05	5049	6744	118	3147	3150	18445
2005-06	5324	7213	129	3283	2366	18707
2006-07	5554	7581	144	3207	2448	19389
2007-08	5857	7848	166	3190	2617	20207
2008-09	6101	7981	167	3217	2629	20662
2009-10	6329	7985	183	3265	2464	20876

2010-11	6783	8495	191	3306	2940	21825
2011-12	6705	8989	760	3577	3212	23243
2012-13	6982	9205	790	3641	3076	23694
2013-14	7216	9396	748	3675	3163	24198
2014-15	6358	9541	816	3538	3163	24918
CAGR*	3.61	3.43	17.00	1.32	-0.14	3.18

Source: Indian Horticulture Database (NHB) & Horticulture Statistics Division, DAC

\*CAGR is in percentage

Table 3 presents the change in percentage share of various horticulture crops from 1991-92 to 2014-15. The share of vegetables has registered impressive growth in share from 43.8 in percent in 1991-92 to 59.4 percent in 2014-15. The share of area under fruits has increased from 22.5 percent in 1991-92 to 31.3 percent in 2014-15. The area share of spices and plantation crops has registered a drastic decline.

**Table 3: Percentage share of various horticulture crops in total area under horticulture**

Crops	1991-92	2001-02	2011-12	2014-15
Fruits	22.5	24.2	29.7	31.3
Vegetables	43.8	37.2	60.8	59.4
Flowers &	-	0.60	0.9	1.1
Plantation	18.0	17.9	6.4	6.0
Spices	15.7	19.4	2.3	2.1

Source: Computed from Table 2

The production of various horticulture crop groups is presented in Table 4. Fruits and vegetables that constitute major share in production have also registered an impressive growth rate of 5.32 percent and 4.69 percent respectively. Flowers and aromatics that have highest growth rate in area have also the highest growth rate of 13.71 percent in production. Except flowers, where share in production has increased from nil to 1.1 percent, the share of all other crop groups have largely remained unchanged in period from 1991-92 to 2014-15 (Table 5).

**Table 4: All India production of horticulture crops (in 000 tonnes)**

Year	Fruits	Vegetabl es	Flowers & Aromatic c	Plantatio n	Spice s	Total
2001-02	43001	88622	535	9697	3765	145,785
2002-03	45203	84815	735	9697	3765	144,380
2003-04	45942	88334	580	13161	5113	153,302
2004-05	50867	101246	659	9835	4001	166,939

2005-06	55356	111399	654	11263	3705	182,816
2006-07	58563	114993	880	12007	3953	191,813
2007-08	65587	128449	868	11300	4357	211 235
2008-09	68466	129077	987	11336	4145	214,716
2009-10	71516	133738	1021	11928	4016	223,089
2010-11	74878	146554	1031	12007	5350	240,531
2011-12	76424	156325	2218	16359	5951	257,277
2012-13	81285	162187	2647	16985	5744	268,847
2013-14	88977	162897	3192	16301	5908	277,352
2014-15	88819	168300	3233	17131	5908	277,768
<b>CAGR</b>	<b>5.32</b>	<b>4.69</b>	<b>13.71</b>	<b>4.15</b>	<b>3.27</b>	<b>4.84</b>

Source: Indian Horticulture Database (NHB) & Horticulture Statistics Division, DAC

**Table 5: Percentage share of various crops in total horticulture production**

Crops	1991-92	2001-02	2011-12	2014-15
Fruits	29.6	29.5	29.7	31.3
Vegetables	60.7	60.8	60.7	59.3
Flowers & Aromatic	-	0.4	0.9	1.1
Plantation Crops	7.8	6.6	6.4	6.0
Spices	1.9	2.6	2.3	2.2

Source: Computed from Table 4.

The Table 6 below presents the share of various horticulture crop groups in value of horticulture and agriculture output. Fruits and vegetables have largest share of 78.25 percent and 26.9 percent in value of horticulture and agriculture output respectively. This is followed by condiments & spices, plantation crops and flowers and aromatics. The total share of horticulture in value of agriculture output stands at 34.4 percent in 2012-13.

**Table 6: Percentage share of various horticulture crops in 2012-13**

Crops	Value of Horticulture Output	Value of Agriculture Output
Fruits & Vegetables	78.25	26.9
Flowers & Aromatic	5.06	1.7
Plantation Crops	7.06	2.4
Condiments & Spices	9.64	3.3
Total	100	34.4

Source: Indian Horticulture Database (NHB) & Horticulture Statistics Division, DAC

The yield of various horticulture crop groups their growth rate and coefficient of variation is presented in Table 7. The vegetables and fruits have highest yield with lower coefficient of variation 8.15 and 9.16 respectively. Though spices have registered highest growth rate but has relatively higher coefficient of variation 19.16. Flowers and aromatic have negative growth rate in yield and also highest coefficient of variation 33.24.

**Table 7: All India yield of horticulture crops** (tonne/ha)

Year	Fruits	Vegetables	Flowers & Aromatic	Plantation	Spices	Total
2001-02	10.72	14.40	5.05	3.25	1.17	8.79
2002-03	11.93	13.92	10.50	3.25	1.17	8.87
2003-04	9.86	14.52	5.74	4.24	0.99	7.98
2004-05	10.07	15.01	5.58	3.13	1.27	9.05
2005-06	10.40	15.44	5.07	3.43	1.57	9.77
2006-07	10.72	15.17	6.11	3.74	1.61	9.89
2007-08	11.20	16.37	5.23	3.54	1.66	10.45
2008-09	11.22	16.17	5.91	3.52	1.58	10.39
2009-10	11.30	16.75	5.58	3.65	1.63	10.69
2010-11	11.73	17.25	5.40	3.63	1.82	11.02
2011-12	11.40	17.39	2.92	4.57	1.85	11.07
2012-13	11.64	17.62	3.35	4.66	1.87	11.35
2013-14	12.33	17.34	4.27	4.44	1.87	11.46
2014-15	13.97	17.64	3.96	4.84	1.87	12.11
<b>CAGR</b>	<b>1.91</b>	<b>1.46</b>	<b>-1.72</b>	<b>2.89</b>	<b>3.41</b>	<b>2.32</b>
<b>C.V.*</b>	<b>9.16</b>	<b>8.15</b>	<b>33.24</b>	<b>15.07</b>	<b>19.16</b>	<b>11.72</b>

Source: Indian Horticulture Database (NHB) & Horticulture Statistics Division, DAC

\*C.V. - Coefficient of variation= (standard deviation/mean)\*100

The growth rates in area and production reflect the positive impact of National Horticulture Mission and government support in developing horticulture sector. However there has been slow growth in productivity due to lack of technology progress in inducing high yielding varieties. Though India ranks second in fruit production globally but in terms of productivity it ranks eighth position.

## 5. 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 (Table 8). 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

**Table 8: Compound growth rate of area under fruits and vegetables in 1990s and 2000s in various states**

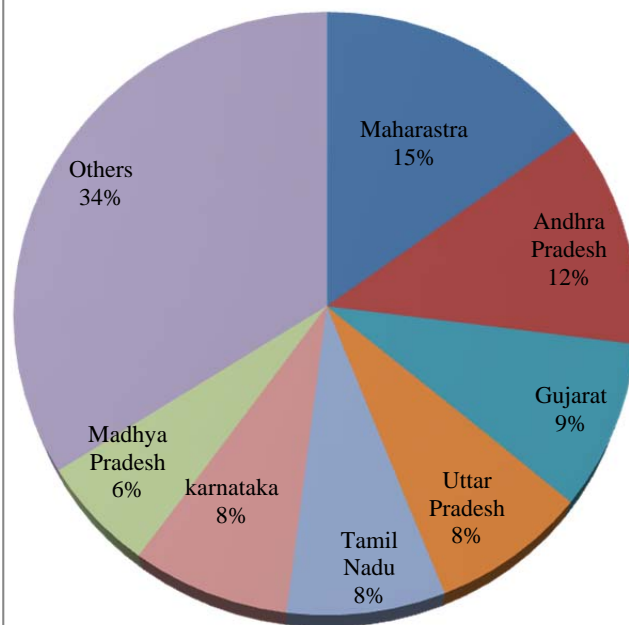
S. No	States	Fruits		Vegetables		Total	
		1990s	2000s	1990s	2000s	1990s	2000s
1	Maharashtra	8.6	10.3	5.3	3.9	7.1	8.1
2	Andhra Pradesh	6.3	1.6	3.7	11.5	5.5	5.3
3	Gujarat	5.8	9.0	7.3	8.3	6.7	8.6
4	Tamil Nadu	5.3	3.9	-13.3	3.7	-8.1	3.8
5	Uttar Pradesh	-0.5	1.6	3.0	0.9	1.9	1.1
6	Karnataka	2.1	3.8	0.2	2.4	0.9	3.0
7	Bihar	0.2	0.9	-3.7	4.0	-2.6	3.1
8	West Bengal	2.9	3.9	9.6	1.6	8.5	1.9
9	Kerala	-0.1	2.4	-5.5	2.7	-2.3	2.5
10	Odisha	5.1	3.9	-1.0	0.7	0.3	1.6
11	Jammu Kashmir	1.8	12.4	-11.9	2.2	-4.3	10.4
12	Himachal Pradesh	3.6	-0.4	-1.1	9.5	2.8	1.5
13	Uttarakhand	2.8	0.2	5.1	-0.5	3.4	0.0
14	Punjab	-6.4	6.7	4.8	2.8	0.9	3.8
	All India	3.4	5.3	1.0	3.9	1.8	4.4

Source: Computed from data in Indian Horticulture Database (NHB) & Horticulture Statistics Division, DAC

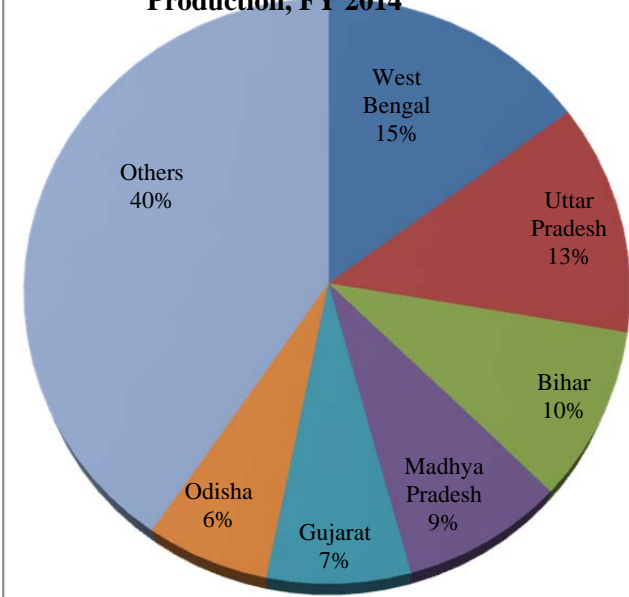
Note: Figures are in percentage.

More importantly these states achieved higher growth rates for both fruits and vegetables. The rest of states had wide variations in growth rate of area under horticulture. The major surprising are the states of West Bengal and Jammu and Kashmir. The growth rate in West Bengal declined from 8.5 percent in 1990s to a low of 1.9 percent in the decade of 2000s. The analysis reveals that the decline was caused by drop in growth rate of area under vegetables from 9.6 percent in 1990s to 1.6 percent in 2000s. The state of Jammu and Kashmir which had a negative growth rate in total area under horticulture crops of 4.3 percent, mainly due to negative growth rate of 11.9 percent in area under vegetables, registered a drastic turn around in the decade of 2000s. The state witnessed a highest growth rate of 10.4 percent, mainly due to area under fruits showing growth rate of 12.4 percent. Though the cropping decision are taken at micro/ farm level are influenced by a number of factors, the drastic drop in area under vegetables in Jammu and Kashmir may be partially due to substitution effect and partly due to the cheap imports from nearby states of Himachal Pradesh and Punjab. The state of Himachal Pradesh witness a negative growth rate in area under fruits of 0.4 percent had a strong growth rate of area under vegetables of 9.5 percent, with an overall growth rate of 1.5 percent in decade of 2000s.

**Leading States in Fruits Production, FY 2014**



**Leading States in Vegetable Production, FY 2014**



**Fig. 2: Share of major states in fruits and vegetables production in India (Percentage of All India Production)**  
Source: Horticultural Statistics 2015, GOI

### 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.

**Table 9: Share of Horticultural Crops to Total Value of Agricultural**

S.No.	State	TE 1992	TE 2002	TE 2011
1	Maharashtra	24.32	30.6	25.0
2	Andhra Pradesh	11.4	15.8	35.1
3	Gujarat	10.6	18.6	22.4
4	Tamilnadu	19.8	27.5	38.3
5	Uttar Pradesh	11.1	15.0	21.3
6	Karnataka	25.2	28.7	40.1
7	Bihar	32.0	45.2	43.8
8	West Bengal	28.1	39.0	54.9
9	Kerala	32.2	27.0	32.8
10	Odisha	28.0	42.5	55.3
11	Jammu	34.0	48.3	67.1
12	Himachal	32.4	47.3	69.6
14	Punjab	5.3	7.0	11.8

Sources: CSO, MOSPI, GOI ( various issues)

Note: Figures are in percentage

## 6. THE WAY FORWARD

Diversification of agriculture in favour of high-value commodities are emerging as a promising source of income acceleration, employment generation, poverty alleviation and export promotion [6-7-8]. The Diversification towards horticulture sector is a major source of pushing up growth of agricultural sector. The significance of horticulture sector is reflected in its contribution to the gross agriculture output but the resource allocation and infrastructure development has not received adequate attention. The horticulture sector has to prioritize research and development, technological upgradation and supporting institutional changes. With the

development of this sector, India can emerge as a major producer and exporter of horticultural products. The government can play an important role in framing policies that favour horticulture development and provide basic infrastructure for marketing and transportation of horticulture produce. The diversification towards horticulture needs to follow an agro-climatic approach by identifying potential crops favoring climatic conditions to increase productivity and profitability. There is the need to improve postharvest operations related to storage, transportation and marketing of fresh and processed horticulture produce. The horticulture crops are labour intensive and the sector has an immense potential of generating employment. The sector has strong forward and backward linkages and developing the horticulture as an organized industry will stimulate and sustain the growth in agriculture sector.

## REFERENCES

- [1] Majumdar, N. A., "Centrality of Agriculture to Indian Economic Development", *Economic and Political Weekly*, 41(1), January 2006, pp. 31-34.
- [2] Joshi, P. K., BIRTHAL, P. S., and Minot, N., "Sources of Agricultural Growth in India: Role of Diversification towards High Value Crops". *MTID Discussion Paper No. 98, IFPRI, Food Policy*, 20-3, 2006. Washington D.C.
- [3] Chand, R., *Agriculture Diversification in India*, Mittal Publications, New Delhi, 1999.
- [4] Kumar, P., Mruthyunjaya., and BIRTHAL, P. S., "Changing Consumption Pattern in South Asia", *Proceedings International Workshop on Agricultural Diversification and Vertical integration in South Asia*, November 5-7, 2003. New Delhi.
- [5] Ramesh Chand., "Diversification through high-value crops in western Himalayan Region: Evidence from Himachal Pradesh", *Indian Journal of Agricultural Economics*, 1996, 41(4), pp. 652-663.
- [6] Vyas., "Diversification in agriculture, Concept Rationale and Approaches". *Indian Journal of Agriculture Economics*, 51-4, 1996, pp. 636-643.
- [7] Delgado, C. L., and Siamwalla, A., "Rural economy and farm income diversification in developing countries", *Proceedings of twenty-third International Conference of Agricultural Economists. Brookfield, Vermont, USA*, Ashgate Publishing Company, 1999, pp. 126-143
- [8] Joshi, P. K., Gulati, A., BIRTHAL, P. S., and Tewari, L., "Agriculture Diversification in South Asia: Patterns, Determinants, And Policy Implications". *Economic and Political Weekly*, 39-24 June 2004, pp. 2457- 2467.