CHAPTER 4

RECENT TREND AND PATTERN OF MAJOR HORTICULTURE CROPS IN INDIA

4.1 Introduction

This chapter deals with analysis of first objective of the study. Percentage and regression method have used for analysis of the 'trend and performance of major fresh fruits and vegetables in India'. Chapter includes the commodity wise analysis.

4.2 Trend and Pattern of Fruits and Vegetables in India

Due to dominance of diverse agro- climate conditions and rich variability available in genetic resources India can become the largest producer of fruits and vegetables in the world. Not only in the production but also area India will be at the top position major horticulture crops. The changes in area and production with their growth have been portrayed below in the table 4.1.

Table no. 4.1: Change in area and production under fruits in India (2001- 14)

Year	Area	G. R. A.	Production	G.R.P.
2001-02	4010	---	43001	---
2002-03	3788	-5.86	45203	4.87
2003-04	4661	18.73	45942	1.61
2004-05	5049	7.68	50867	9.68
2005-06	5324	5.17	55356	8.11
2006-07	5554	4.14	59563	7.06
2007-08	5857	5.17	65587	9.18
2008-09	6101	4.00	68466	4.21
2009-10	6329	3.60	71516	4.26
2010-11	6383	0.85	74878	4.49
2011-12	6705	4.80	76424	2.02
2012-13	6982	3.97	81285	5.98
2013-14	7216	3.24	88977	8.64

Source- National Horticulture Database, 2014
Note- Area in 000 hectare, Production in 000 Metric tons

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production.

The above table 4.1 shows that changes in area and production during the study period. It also says the growth rate for area as well as the growth rate of production of fruit crops in India. The share of area of fruits in 2001-02 was 4010 thousand hectare and production was 43001 thousand metric tons. In 2003-04 the area of fruits was increased to 4661 thousand hectare and their growth rate was 18.73 per cent. But the production of fruits was increasing slowly. Further growth rate of fruits area in 2010-11 has declined it was 0.85 percent. In 2013-14 area of fruits was 7216 thousand hectare and production of fruits 88977 thousand metric tons. The growth rate of production has increased more than the growth rate of area in 2013-14. The result of simple regression analyzed that on average 272.91 thousand hectare has been changed due to one year change of time and on an average 3898.07 thousand metric ton production of fruits has been changed due to one year change in time. These changes in area of fruits and production can be easily understood by the help of below figure no 4.1.

Figure no. 4.1 Growth Rate of Fruits in India

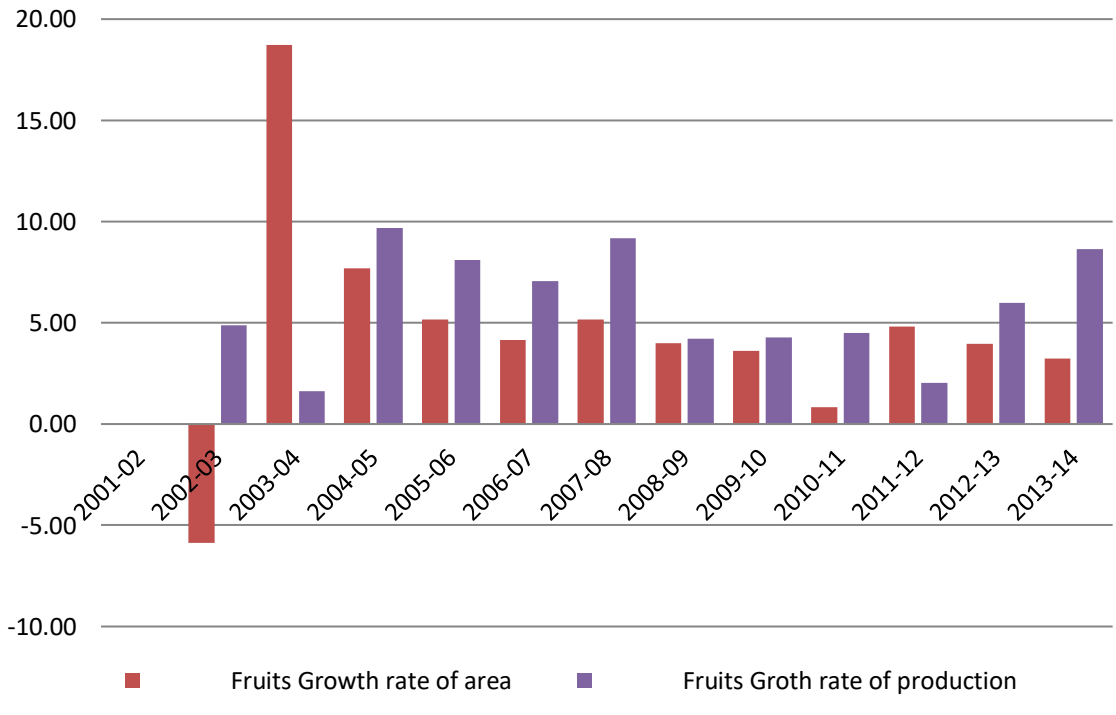
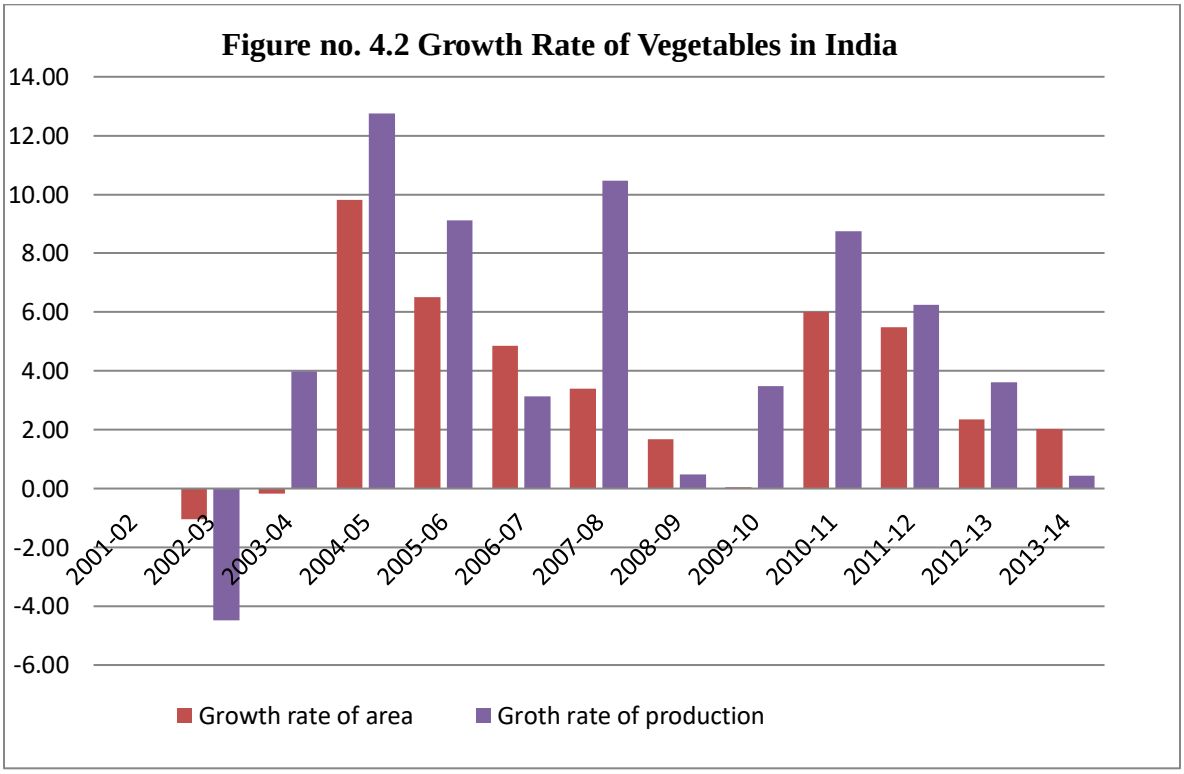


Table no. 4.2 Change in area and production under vegetables in India (2001- 14)				
Year	Area	G.R.A.	Production	G. R. A.
2001-02	6156	---	88622	---
2002-03	6092	-1.05	84815	-4.49
2003-04	6082	-0.16	88334	3.98
2004-05	6744	9.82	101246	12.75
2005-06	7213	6.50	111399	9.11
2006-07	7581	4.85	114993	3.13
2007-08	7848	3.40	128449	10.48
2008-09	7981	1.67	129077	0.49
2009-10	7985	0.05	133738	3.49
2010-11	8495	6.00	146554	8.74
2011-12	8989	5.50	156325	6.25
2012-13	9205	2.35	162187	3.61
2013-14	9396	2.03	162897	0.44
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tons.				

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production.

Figure no. 4.2 Growth Rate of Vegetables in India



The above table no. 4.2 shows that changes in area and production of Vegetables Crops during the study period. It also says the growth rate for area as well as the growth rate of production of Vegetables crops in India. The share of area of Vegetables Crops in 2001-02 was 6156 thousand hectare and production was 88622 thousand metric tons. But In

2002-03 the area and production have declined. But in 2004-05 the area and production of Vegetables crops have significantly increased Because traditional crops like Brinjal, Cabbage, Onion and Potato crops have increased their area and production terms, that year climate situation was favorable for growing the Vegetables Crops. Further growth rate of Vegetables crops area and production have declined during in 2008-09. Again the area and production of vegetables crops have increasingly from 2010-11 to 2013-14. The result of simple regression analyzed that area on average 307.41 thousand hectare has been changed due to one year change of time and on an average 7488.70 thousand metric tons production of Vegetables crops has been changed due to one year change in time. These changes in area of vegetables and production can be easily understood by the help of above figure no. 4.2.

4.3 Trend and Performance of Major Fresh Fruits in India (2001-2014)

This section analysis major fresh fruits like Apple, Banana, Guava, Grapes, Mango, Papaya, Pineapple, Litchi and Sapota in India, it also analyzed growth rate of area, production and productivity with the commodity wise.

Table no. 4.1.1 Growth Rate of Apple

Year	Area	G.R. A.	Productio	G.R.P.	Productivit	G. R.
2001-02	241.6	---	1158.4	--	4.8	--
2002-03	193.1	-20.07	1348.4	16.40	7	45.83
2003-04	201.2	4.19	1521.6	12.84	7.6	8.57
2004-05	230.7	14.66	1739	14.29	7.5	-1.32
2005-06	226.6	-1.78	7814	349.34	8	6.67
2006-07	252	11.21	1624	-79.22	6.4	-20.00
2007-08	264	4.76	2001	23.21	7.6	18.75
2008-09	274	3.79	1985	-0.80	7.2	-5.26
2009-10	282.9	3.25	1777.2	-10.47	6.3	-12.50
2010-11	289.1	2.19	2891	62.67	10	58.73
2011-12	321.9	11.35	2203.4	-23.78	6.8	-32.00
2012-13	311.5	-3.23	1915.4	-13.07	6.1	-10.29
2013-14	313	0.48	2497.7	30.40	8	31.15

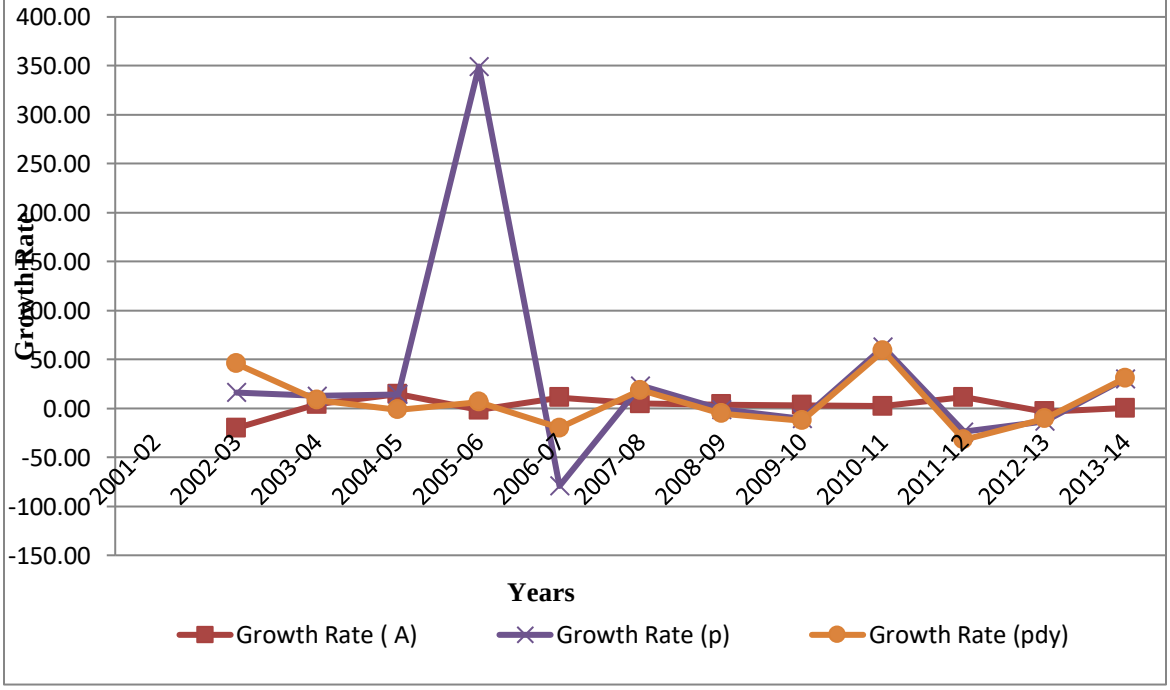
Source- National Horticulture Database, 2014
Note- Area in 000 hectare, Production in 000 Metric tone

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

Apple is Fruit which is mostly produced in colder area. The Largest producer of apple Jammu and Kashmir (66.0%), Himanchal Pradesh (29.6%) and Uttrakhand (3.1%)

The above table 4.1.1 shows that changes in area and production of Apple Crops during the study period. It also says the growth rate for area as well as the growth rate of production of Apple Crops in India. The share of area of Apple Crops in 2001-02 was 241.6 thousand hectare and production was 1158.4 thousand metric tons. But In 2002-03 the area of Apple has declined but production has increased due to their climate reason. in 2005-06 production of Apple crops has significantly increased due to optimum climate and monsoon further growth rate of Apple crops area, production and productivity have ups and down during the study period. The result of simple regression analyzed that area on average 11.76 thousand hectare has been changed due to one year change of time and on an average -16.55 thousand metric tons production of Apple crops has been changed due to one year change in time. These changes in area of Apple and production can be easily understood by the help of below figure no. 4.1.1.

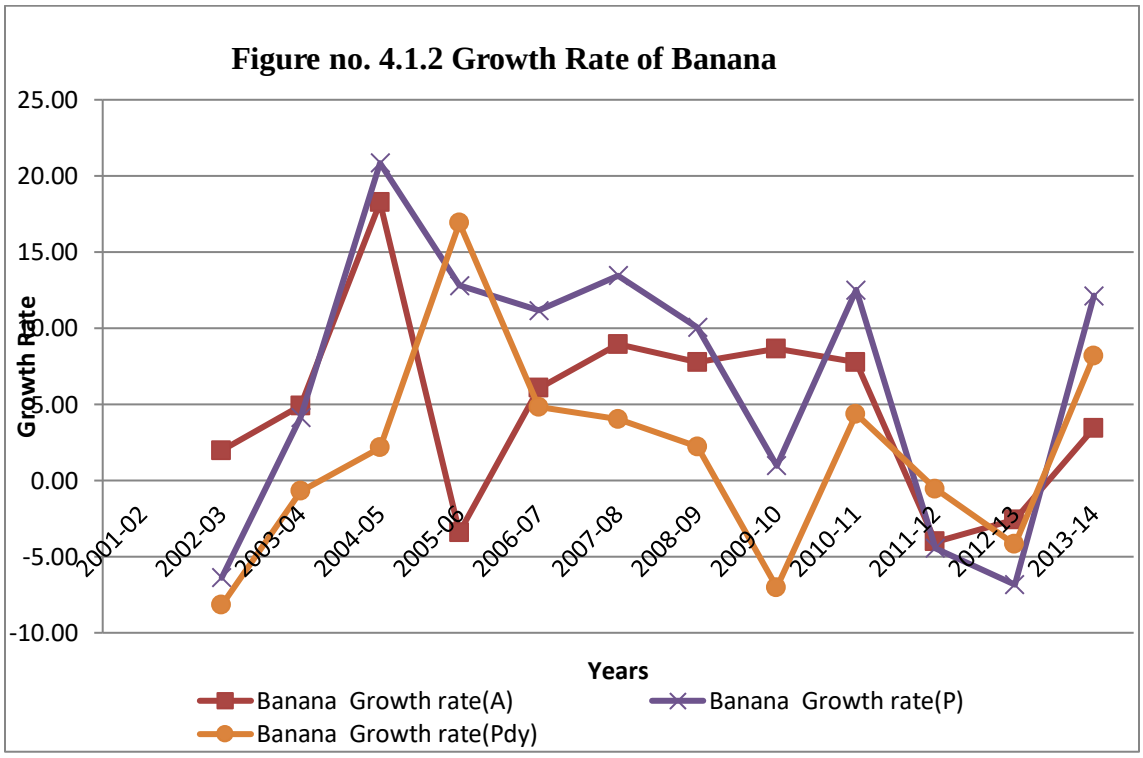
Figure no. 4.1.1 Growth Rate of Apples



Note- (A) = Area, (P) = Production, (Pdy) = productivity

Table no. 4.1.2 Growth Rate of Banana in India						
Year	Area	G.R. A.	Production	G.R.P.	Productivity	G.R.Pdy.
2001-02	466.2	---	14209.9	---	30.5	---
2002-03	475.3	1.95	13304.4	-6.37	28	-8.20
2003-04	498.6	4.90	13856.6	4.15	27.8	-0.71
2004-05	589.6	18.25	16744.5	20.84	28.4	2.16
2005-06	569.5	-3.41	18887.8	12.80	33.2	16.90
2006-07	604	6.06	20998	11.17	34.8	4.82
2007-08	658	8.94	23823	13.45	36.2	4.02
2008-09	709	7.75	26217	10.05	37	2.21
2009-10	770.3	8.65	26469.5	0.96	34.4	-7.03
2010-11	830	7.75	29780	12.51	35.9	4.36
2011-12	796.5	-4.04	28455.1	-4.45	35.7	-0.56
2012-13	776	-2.57	26509.1	-6.84	34.2	-4.20
2013-14	802.6	3.43	29724.6	12.13	37	8.19
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity



Note- (A)= Area, (P)= Production, (Pdy)= productivity

Banana is Fruit which is mostly produced in Tropical area. The Largest producer of Banana in Tamilnadu (19.0%), Maharashtra (16.3%), Gujarat (14.22%) and Andhra

Pradesh (10.7%) in 2013-14.The above table 4.1.2 shows that changes in area and production of Banana Crops during the study period. It also says the growth rate for area as well as the growth rate of production and productity of Banana Crops in India. The share of area of Banana Crops in 2001-02 was 466.2 thousand hectare and production was 14209.9 thousand metric tons. Its growth rate of area declined marginally in 2005-06. Further it has increased. But Banana's growth rate of area and growth rate of production have declined from 2011-12 to 2012-13 due lack of cultivated area again its growth was increased. Banana has more cultivated crops in India due to tropical climate. The result of simple regression analyzed that area on average 32.85 thousand hectare has been changed due to one year change of time and on an average 1572.51 thousand metric tons production Banana crops has been changed due to one year change in time. These changes in area of Banana and production can be easily understood by the help of above figure no. 4.1.2.

Table no. 4.1.3 Growth Rate of Guava in India

Year	Area	G.R A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	154.6	--	1715.5	--	11.1	--
2002-03	154.6	0.00	1793	4.52	11.6	4.50
2003-04	166.4	7.63	1830.7	2.10	11	-5.17
2004-05	161	-3.25	1682.8	-8.08	10.5	-4.55
2005-06	166.5	3.42	1736.6	3.20	10.4	-0.95
2006-07	176	5.71	1831	5.44	10.4	0.00
2007-08	179	1.70	1981	8.19	11.1	6.73
2008-09	204	13.97	2270	14.59	11.1	0.00
2009-10	219.7	7.70	2571.5	13.28	11.7	5.41
2010-11	205	-6.69	2462	-4.26	12	2.56
2011-12	219.9	7.27	2510.4	1.97	11.4	-5.00
2012-13	235.6	7.14	3198.3	27.40	13.6	19.30
2013-14	268.2	13.84	3667.9	14.68	13.7	0.74

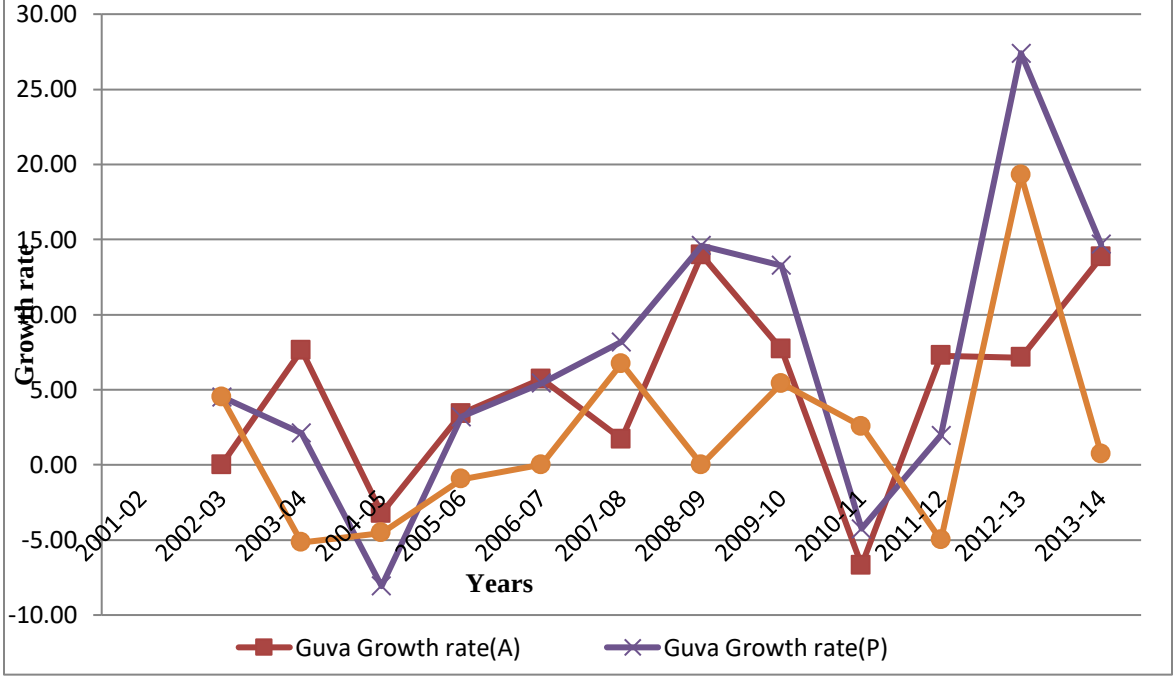
Source- National Horticulture Database, 2014
Note- Area in 000 hectare, Production in 000 Metric tone

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

Guava is also tropical crop, many state cultivated this crops in 2013-14 largest producer of Guava Madhya Pradesh (22.9%), Uttar Pradesh (16.5%), Bihar (10.2%), Maharashtra (8.8%) and many other state producing Guava in India. In 2004-05 and 2010-11 area and production have declined due to monsoon reason. From 2011-12 its

Production is positive increasing. The result of simple regression analyzed that area on average 9.20 thousand hectare has been changed due to one year change of time and on an average 156.8 thousand metric tons production Guava crops has been changed due to one year change in time. These changes in growth rate of area of Guava and growth rate of production can be easily understood by the help of below figure no. 4.1.3

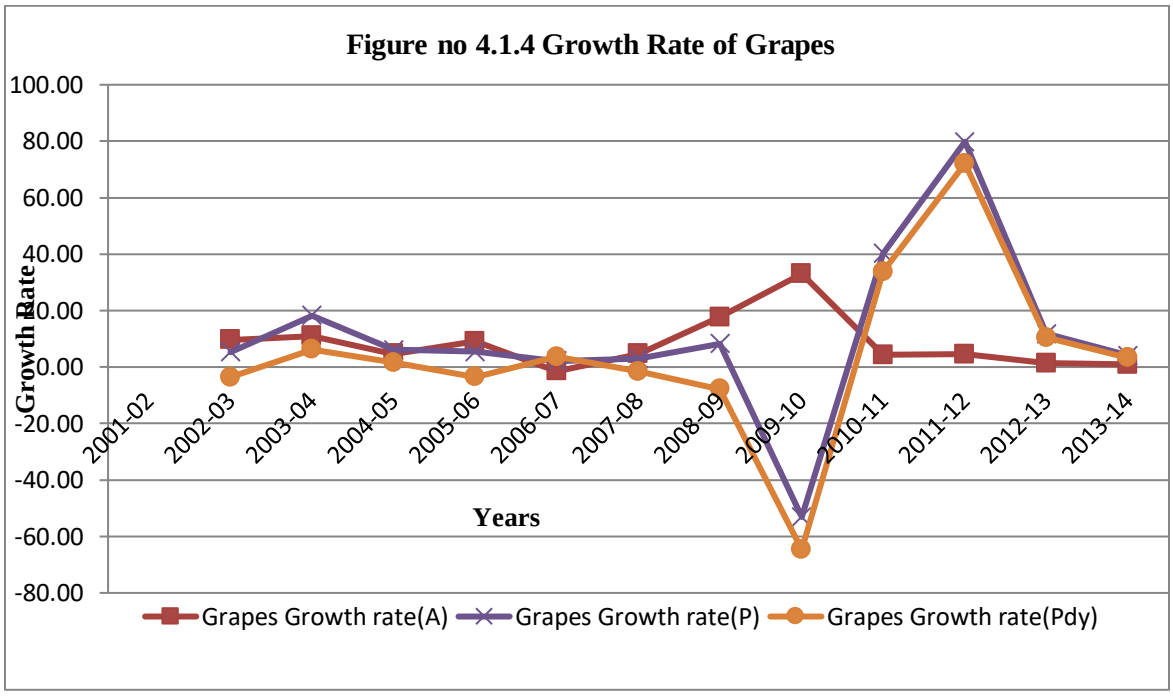
Figure no. 4.1.3 Growth rate of Guava



Note- (A)= Area, (P)= Production, (Pdy)= productivity

Table no 4.1.4 Growth Rate of Grapes in India						
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	47.5	----	1184.2	----	24.9	----
2002-03	52.1	9.68	1247.8	5.37	24	-3.61
2003-04	57.8	10.94	1474.8	18.19	25.5	6.25
2004-05	60.5	4.67	1564.7	6.10	25.9	1.57
2005-06	66	9.09	1649.6	5.43	25	-3.47
2006-07	65	-1.52	1685	2.15	25.9	3.60
2007-08	68	4.62	1735	2.97	25.5	-1.54
2008-09	80	17.65	1878	8.24	23.5	-7.84
2009-10	106.4	33.00	880.7	-53.10	8.3	-64.68
2010-11	111	4.32	1235	40.23	11.1	33.73
2011-12	116	4.50	2220.9	79.83	19.1	72.07
2012-13	117.6	1.38	2483.1	11.81	21.1	10.47
2013-14	118.7	0.94	2585.3	4.12	21.8	3.32
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity



Note- (A) = Area, (P) = Production, (Pdy) = productivity

Grape is an important commercial fruit crops in South India. It is a tropical crop in India. Maharashtra has largest producer (83.5%) of grape and second larger producing state has

Karnataka (11.7%) in 2013-14. From 2001-02 to 2008-09 growth rate of area and growth rate of production was slowly increasing but 2008-09 to 2009-10 its growth rate of production have declined. From 2010-11 to 2013-14 its growth have increased. The result of simple regression analyzed that area on average 7.06 thousand hectare has been changed due to one year change of time and on an average 84.04 thousand metric tons production of Grape crop has been changed due to one year change in time. These changes in growth rate of area of Grapes and growth rate of production can be easily understood by the help of above figure no. 4.1.4.

Table no. 4.1.5 Growth Rate of Mango in India

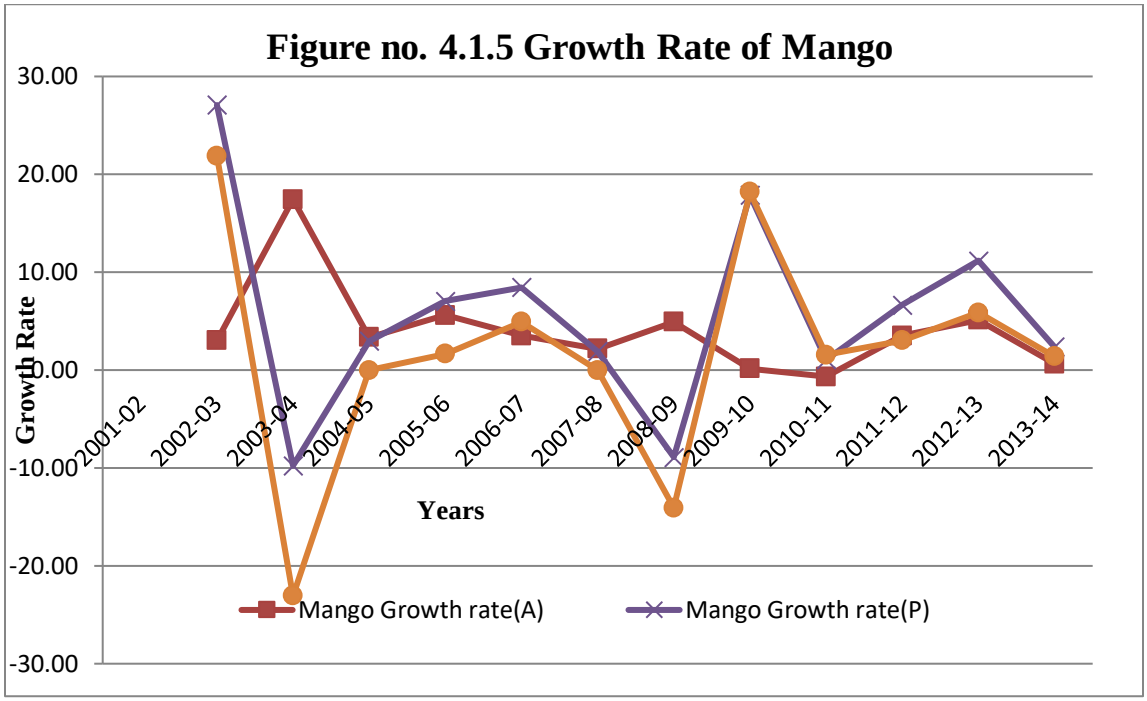
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	1575.8	----	10020.2	----	6.4	----
2002-03	1623.4	3.02	12733.2	27.08	7.8	21.88
2003-04	1906.7	17.45	11490	-9.76	6	-23.08
2004-05	1970.4	3.34	11829.7	2.96	6	0.00
2005-06	2080.7	5.60	12663.1	7.04	6.1	1.67
2006-07	2154	3.52	13734	8.46	6.4	4.92
2007-08	2201	2.18	13997	1.91	6.4	0.00
2008-09	2309	4.91	12750	-8.91	5.5	-14.06
2009-10	2312.3	0.14	15026.7	17.86	6.5	18.18
2010-11	2297	-0.66	15188	1.07	6.6	1.54
2011-12	2378.1	3.53	16196.4	6.64	6.8	3.03
2012-13	2500	5.13	18002.4	11.15	7.2	5.88
2013-14	2516	0.64	18431.3	2.38	7.3	1.39

Source- National Horticulture Database, 2014
Note- Area in 000 hectare, Production in 000 Metric tone

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

The richest producer of mango in 2013-14 was Uttar Pradesh (23.3%), Andhra Pradesh (14.4%), Karnataka (9.5%) and new state Telangana (9.3%) which has fourth number and many other states which have tropical climate. In the above table 4.1.5 shows area of Mango and production was 1575.8 and 10020.2 respectively in 2001-02. During 2003-04 growth rate of area was significantly increased but growth rate of production has declined due to climate change further its growth rate of area and production have ups and down. Basically mango's crop based on climate change. The result of simple regression analyzed that area on average 68.79 thousand hectare has been changed due to one year change of time and on an average 548.31 thousand metric tons production of

Mango crop has been changed due to one year change in time. These changes in growth rate of area of Mango and growth rate of production can be easily understood by the help of below figure no. 4.1.5.



Note- (A) = Area, (P) = Production, (Pdy) = productivit

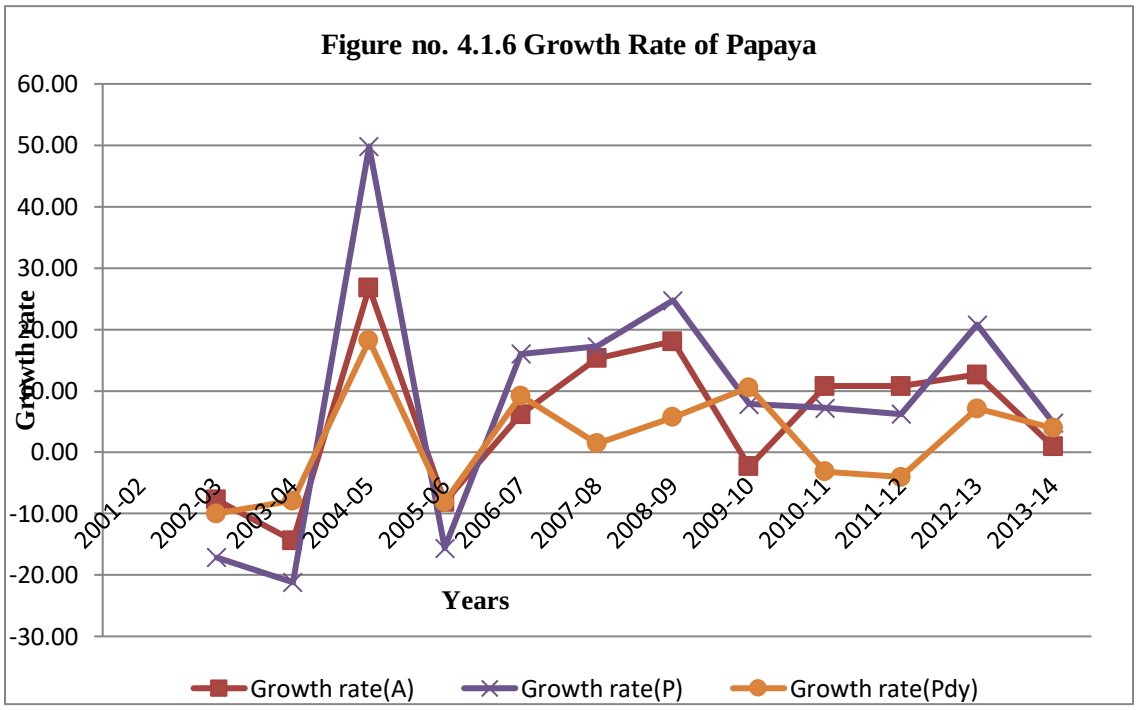
Table no 4.1.6 Growth Rate of Papaya in India

Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	73.7	----	2590.4	----	35.1	----
2002-03	68	-7.73	2147.2	-17.11	31.6	-9.97
2003-04	58.2	-14.41	1692.1	-21.20	29.1	-7.91
2004-05	73.8	26.80	2535.1	49.82	34.4	18.21
2005-06	67.8	-8.13	2139.3	-15.61	31.6	-8.14
2006-07	72	6.19	2482	16.02	34.5	9.18
2007-08	83	15.28	2909	17.20	35	1.45
2008-09	98	18.07	3629	24.75	37	5.71
2009-10	95.7	-2.35	3913.5	7.84	40.9	10.54
2010-11	106	10.76	4196	7.22	39.6	-3.18
2011-12	117.4	10.75	4457.1	6.22	38	-4.04
2012-13	132.2	12.61	5381.7	20.74	40.7	7.11
2013-14	133.4	0.91	5639.3	4.79	42.3	3.93

Source- National Horticulture Database, 2014
Note- Area in 000 hectare, Production in 000 Metric tone

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

The largest producer of Papaya in 2013-14 Andhra Pradesh(27.4%), Gujarat(21%), Maharashtra(8.9%) and many other tropical state produced it. In above table 4.1.6 shows from 2002-03 to 2004-05 and 2005-06 when area was declined then its production was also declined, it means papaya was based on their area. When area increased then its production will also increase. The result of simple regression analyzed that area on average 6.88 thousand hectare has been changed due to one year change of time and on an average 350.94 thousand metric tons production Papaya crops has been changed due to one year change in time. These changes in growth rate of area of Papaya and growth rate of production can be easily understood by the help of below figure no. 4.1.6

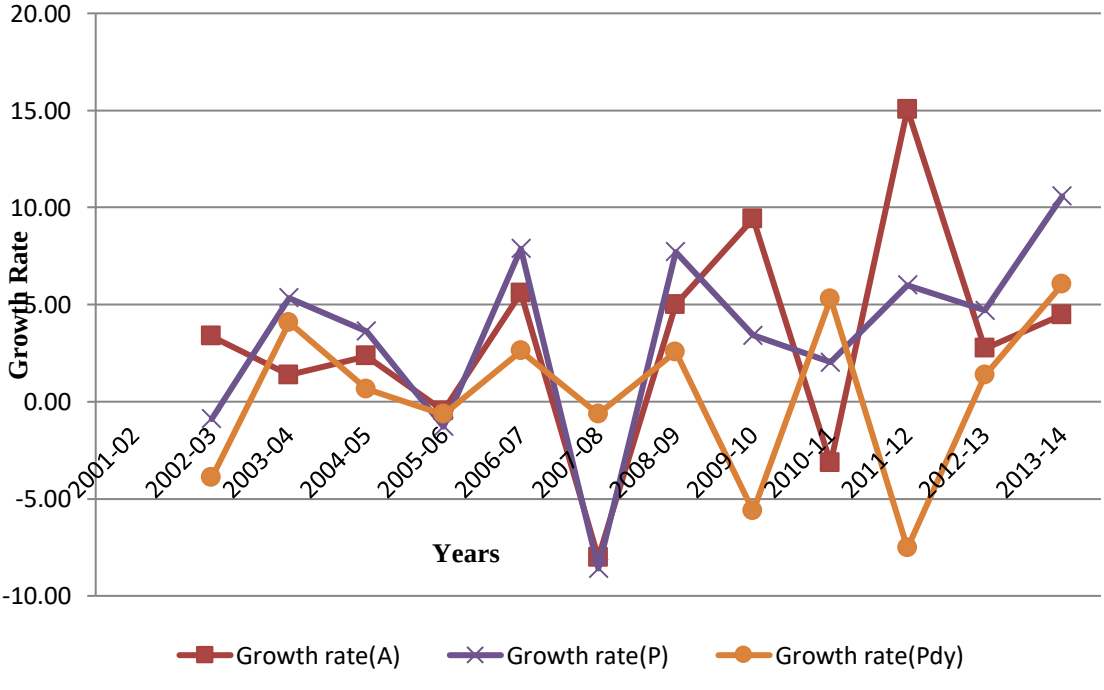


Note- (A) = Area, (P) = Production, (Pdy) = productivity

Table no. 4.1.7 Growth Rate of Pineapple in India						
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.RPdy
2001-02	77.2	----	1182.1	----	15.3	---
2002-03	79.8	3.37	1171.7	-0.88	14.7	-3.92
2003-04	80.9	1.38	1234.2	5.33	15.3	4.08
2004-05	82.8	2.35	1278.9	3.62	15.4	0.65
2005-06	82.4	-0.48	1262.6	-1.27	15.3	-0.65
2006-07	87	5.58	1362	7.87	15.7	2.61
2007-08	80	-8.05	1245	-8.59	15.6	-0.64
2008-09	84	5.00	1341	7.71	16	2.56
2009-10	91.9	9.40	1386.8	3.42	15.1	-5.63
2010-11	89	-3.16	1415	2.03	15.9	5.30
2011-12	102.4	15.06	1500	6.01	14.7	-7.55
2012-13	105.2	2.73	1570.6	4.71	14.9	1.36
2013-14	109.9	4.47	1736.7	10.58	15.8	6.04
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

Figure no. 4.1.7 Growth Rate of Pineapple



Note- (A) = Area, (P) = Production, (Pdy) = productivity

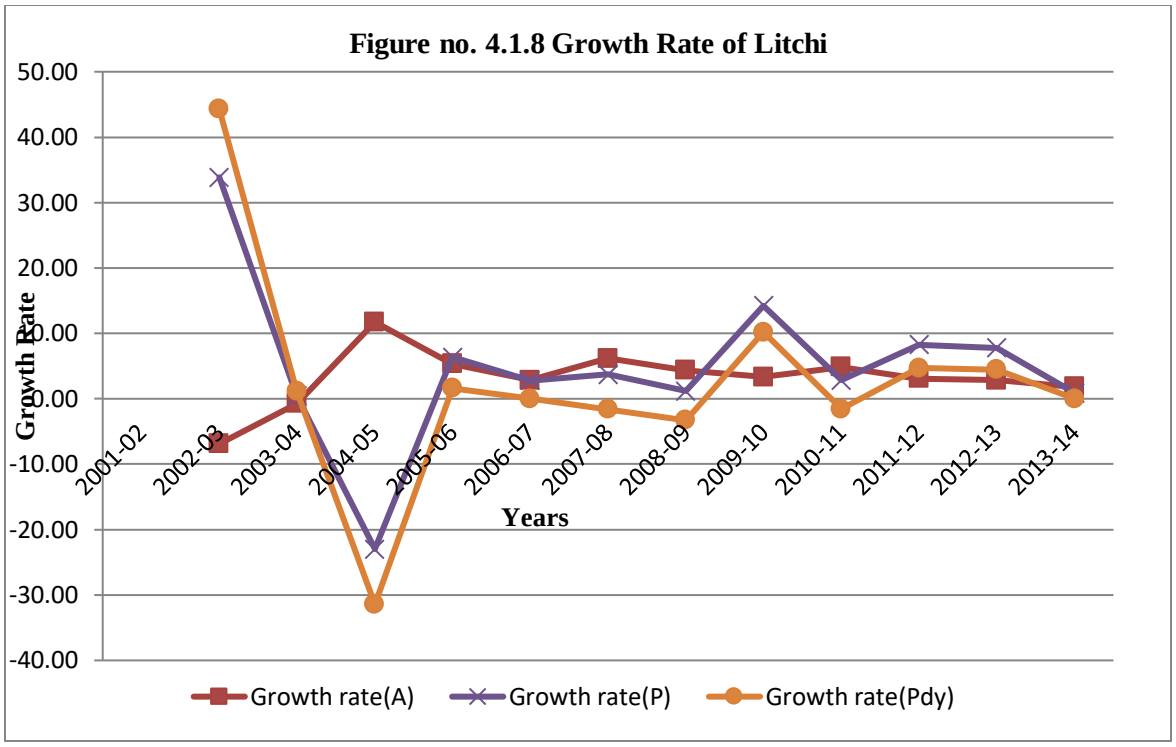
The largest producers of pineapple in 20013-14 have West Bengal (18.2%), Assam (16.6%) and other state. Basically its grown soil has alluvial soil and humid climate. On above figure no. 4.1.7 shows when its growth rate of area increased then its production will also increases. But after 2009-10 its area and production have dramatically changed. The result of simple regression analyzed that area on average 2.58 thousand hectare has been changed due to one year change of time and on an average 40.98 thousand metric tons production of pineapple crops has been changed due to one year change in time. These changes in growth rate of area of Pineapple and growth rate of production can be easily understood by the help of above figure no. 4.1.7.

Table no. 4.1.8 Growth Rate of Litchi in India.

Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy.
2001-02	58.1	----	355.9	----	6.1	----
2002-03	54.1	-6.88	476.4	33.86	8.8	44.26
2003-04	53.7	-0.74	478.5	0.44	8.9	1.14
2004-05	60	11.73	368.6	-22.97	6.1	-31.46
2005-06	63.2	5.33	392.1	6.38	6.2	1.64
2006-07	65	2.85	403	2.78	6.2	0.00
2007-08	69	6.15	418	3.72	6.1	-1.61
2008-09	72	4.35	423	1.20	5.9	-3.28
2009-10	74.4	3.33	483.3	14.26	6.5	10.17
2010-11	78	4.84	497	2.83	6.4	-1.54
2011-12	80.4	3.08	538.1	8.27	6.7	4.69
2012-13	82.7	2.86	580.1	7.81	7	4.48
2013-14	84.2	1.81	585.3	0.90	7	0.00

Source- National Horticulture Database, 2014
Note- Area in 000 hectare, Production in 000 Metric tone

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity



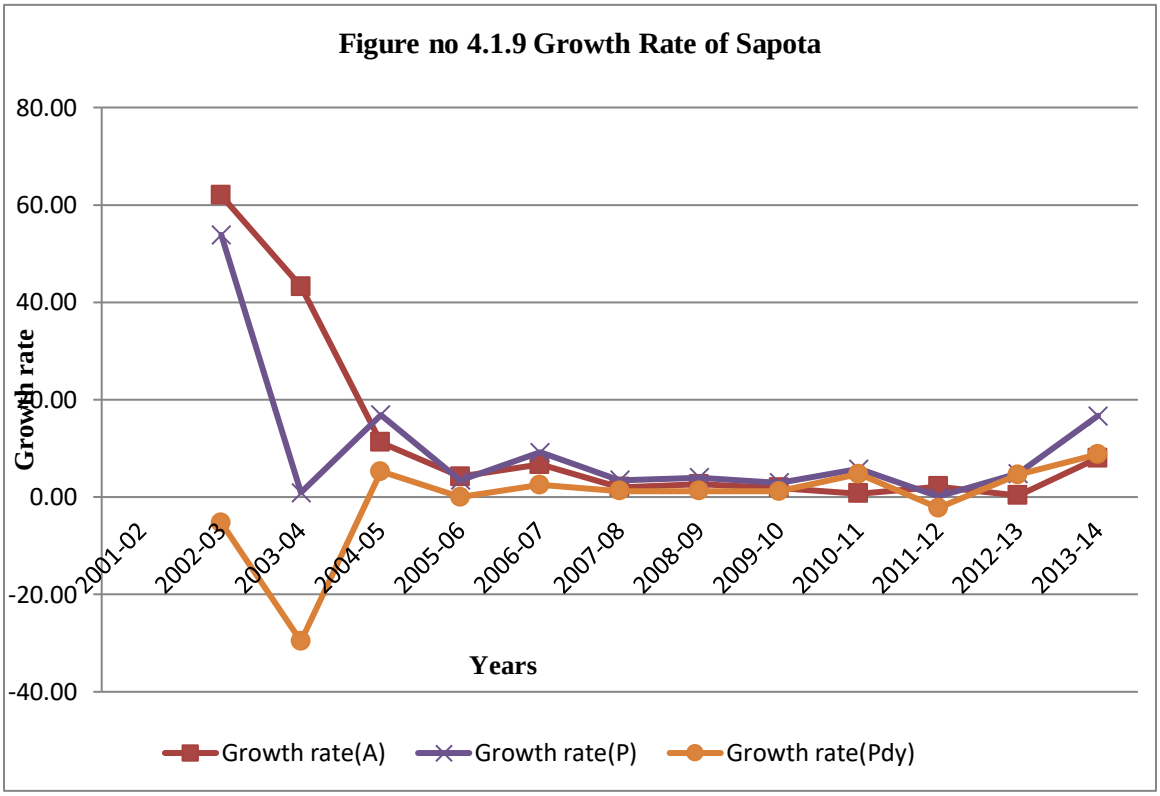
Note- (A) = Area, (P) = Production, (Pdy) = productivity

The largest producer of Litchi in 2013-14 was Bihar (40%), after then West Bengal (16%) in India. in the above figure no. 4.1.8 shows the growth rate of litchi. From 2002-03 to 2004-05 the growth rate of production and productivity both are declined due to monsoon reason after 2004-05 its growth of area and production were increasing slowly only 2008-09 to 2009-10 its production was marginally increased. Next years the production of Litchi was positive than its area. The result of simple regression analyzed that area on average 2.93 thousand hectare has been changed due to one year change of time and on an average 14.22 thousand metric tons production of Litchi crops has been changed due to one year change in time. These changes in growth rate of area of Litchi crop and growth rate of production can be easily understood by the help of above figure no. 4.1.8.

Table no 4.1.9 Growth Rate of Sapota in India						
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	52	----	593.5	----	11.4	----
2002-03	84.2	61.92	913.1	53.85	10.8	-5.26
2003-04	120.6	43.23	921.3	0.90	7.6	-29.63
2004-05	134.1	11.19	1076.5	16.85	8	5.26
2005-06	139.7	4.18	1114	3.48	8	0.00
2006-07	149	6.66	1216	9.16	8.2	2.50
2007-08	152	2.01	1258	3.45	8.3	1.22
2008-09	156	2.63	1308	3.97	8.4	1.20
2009-10	158.9	1.86	1346.8	2.97	8.5	1.19
2010-11	160	0.69	1424	5.73	8.9	4.71
2011-12	163.4	2.13	1425.8	0.13	8.7	-2.25
2012-13	163.9	0.31	1495	4.85	9.1	4.60
2013-14	177	7.99	1744.3	16.68	9.9	8.79
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of productivity

Figure no 4.1.9 Growth Rate of Sapota



Note- (A) = Area, (P) = Production, (Pdy) = productivity

Sapota is a marginal crop in India. Their major producers in 2013-14 were Maharashtra (27.2%) and Karnataka (21%). The above figure 4.1.9 shows the growth rate of area and production have declined from 2001-02 to 2003-04 of Sapota crop. After then its production growth rate and growth of area were positive increasing to 2013-14. The result of simple regression analyzed that area on average 6.12 thousand hectare has been changed due to one year change of time and on an average 65.53 thousand metric tons production of Sapota crops has been changed due to one year change in time. These changes in growth rate of area of Sapota crop and growth rate of production can be easily understood by the help of above figure no. 4.1.9.

4.4 Trends and Performance of Major Fresh Vegetables in India

India is the second largest vegetable producer in the world. This study explains the commodity wise vegetable crops and their growth rate.in this chapter analyses major fresh Vegetables like Brinjal, Cabbage, Cauliflower, Okra, Onion, Peas, Potato, Tomato and Sweet Potato in India.

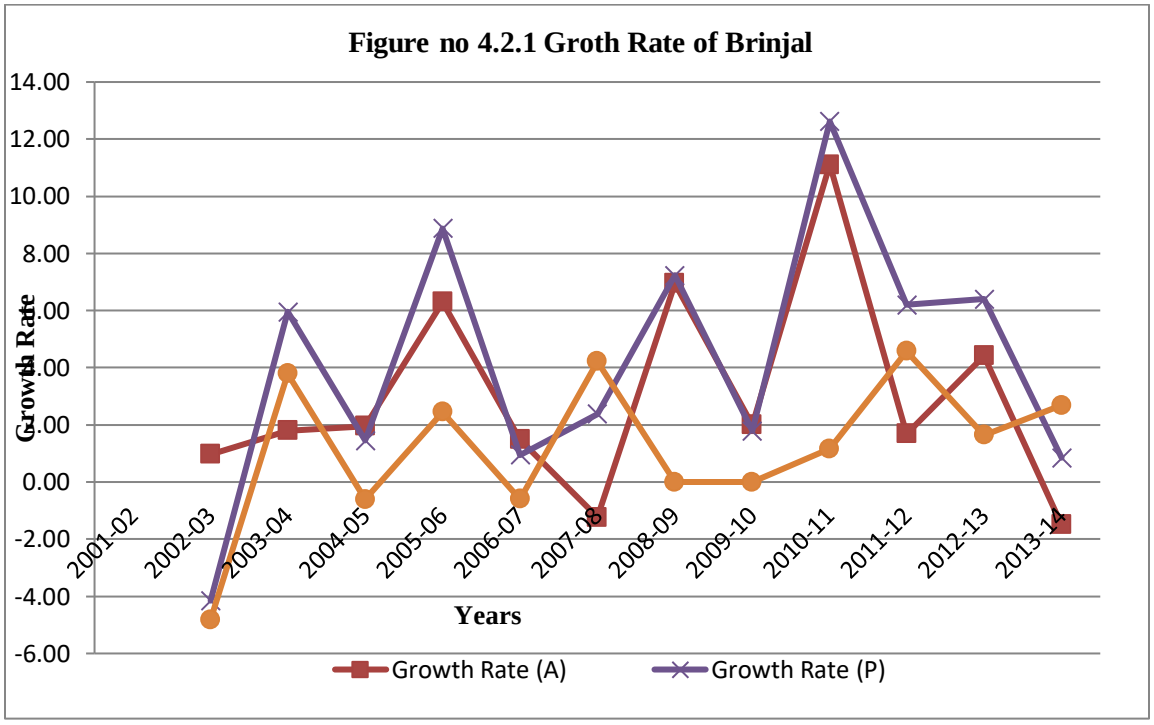
Table no. 4.2.1 Growth rate of Brinjal in India

Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	502.4	----	8347.7	----	16.6	----
2002-03	507.3	0.98	8001.2	-4.15	15.8	-4.82
2003-04	516.4	1.79	8477.3	5.95	16.4	3.80
2004-05	526.5	1.96	8600.8	1.46	16.3	-0.61
2005-06	559.7	6.31	9364.6	8.88	16.7	2.45
2006-07	568	1.48	9453	0.94	16.6	-0.60
2007-08	561	-1.23	9678	2.38	17.3	4.22
2008-09	600	6.95	10378	7.23	17.3	0.00
2009-10	612	2.00	10563	1.78	17.3	0.00
2010-11	680	11.11	11896	12.62	17.5	1.16
2011-12	691.5	1.69	12634.1	6.20	18.3	4.57
2012-13	722.1	4.43	13443.6	6.41	18.6	1.64
2013-14	711.3	-1.50	13557.8	0.85	19.1	2.69

Source- National Horticulture Database, 2014
Note- Area in 000 hectare, Production in 000 Metric tone

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

In 2013-14 the largest Brinjal producer was West Bengal (23%), Odisha (17%) and some other states in India. in above table no. 4.2.1 shows that in 2002-03 the growth rate of production was declined due to climate reason, next year its production have increased. In 2007-08 and 2013-14 the growth rate area of brinjal crop have negative than its production growth rate. The area and production of brinjal crops was ups and down during the study period. The result of simple regression analyzed that area on average 21.05 thousand hectare has been changed due to one year change of time and on an average 527.06 thousand metric tons production of Brinjal crops has been changed due to one year change in time. These changes in growth rate of area of Brinjal crop and growth rate of production can be easily understood by the help of below figure no. 4.2.1

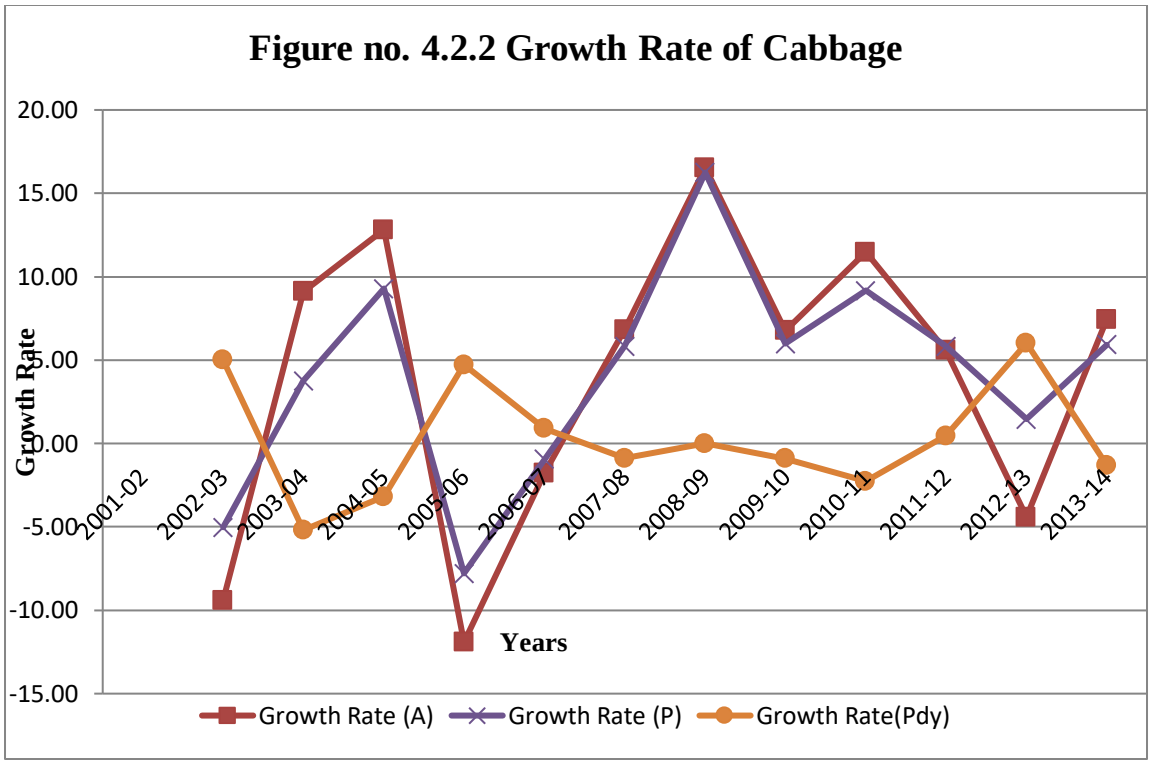


Note- (A) = Area, (P) = Production, (Pdy) = productivity

Table no. 4.2.2 Growth Rate of Cabbage in India						
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy.
2001-02	258.1	----	5678.2	----	22	----
2002-03	233.8	-9.41	5392	-5.04	23.1	5.00
2003-04	255.1	9.11	5594.6	3.76	21.9	-5.19
2004-05	287.8	12.82	6113.5	9.28	21.2	-3.20
2005-06	253.5	-11.92	5637.3	-7.79	22.2	4.72
2006-07	249	-1.78	5584	-0.95	22.4	0.90
2007-08	266	6.83	5910	5.84	22.2	-0.89
2008-09	310	16.54	6870	16.24	22.2	0.00
2009-10	331	6.77	7281.4	5.99	22	-0.90
2010-11	369	11.48	7949	9.17	21.5	-2.27
2011-12	389.6	5.58	8412.1	5.83	21.6	0.47
2012-13	372.4	-4.41	8534.2	1.45	22.9	6.02
2013-14	400.1	7.44	9039.2	5.92	22.6	-1.31
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

Biggest Cabbage producer have in 2013-14 West Bengal (24%) and Odisha (13%) in India. Cabbage production is basically depending upon area. In the above table 4.2.2 shows the growth rate of area and growth rate of production have negative in 2002-03, 2005- 06 and 2006-07. Next year its area and production was increasing due to optimum climate and soil. The result of simple regression analyzed that area on average 15.61 thousand hectare has been changed due to one year change of time and on an average 350.61 thousand metric tons production of Cabbage crops has been changed due to one year change in time. These changes in growth rate of area of Cabbage crop and growth rate of production can be easily understood by the help of below figure no. 4.2.2



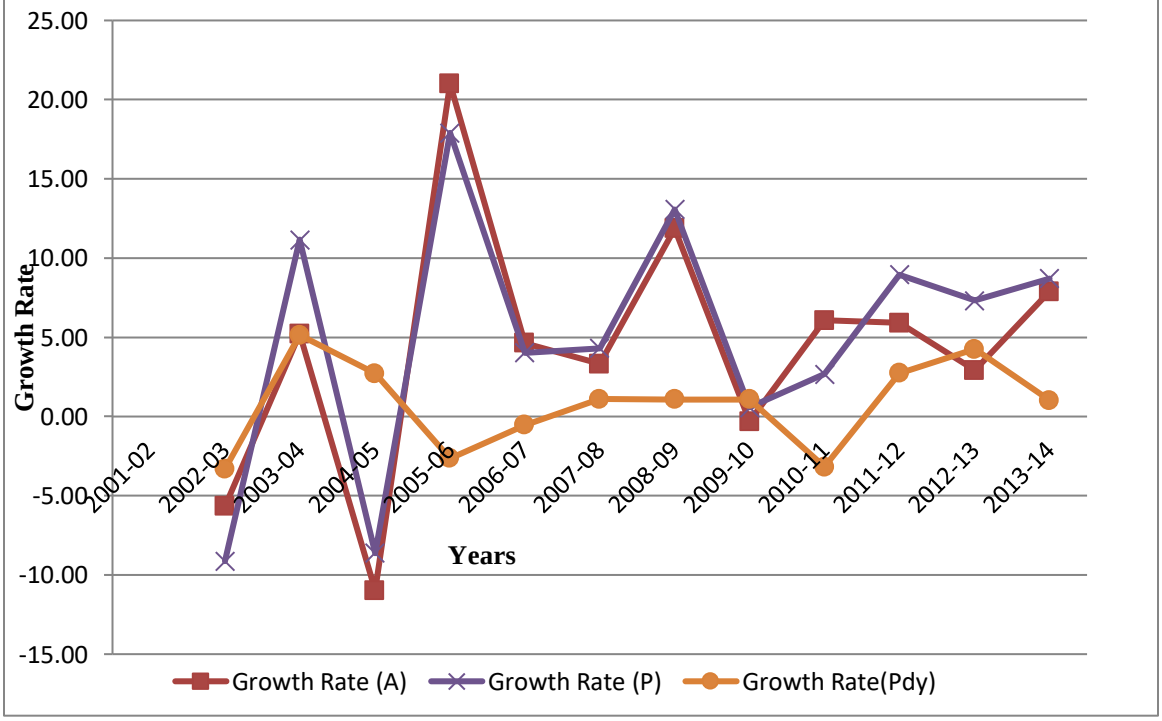
Note- (A) = Area, (P) = Production, (Pdy) = productivity

Table no 4.2.3 Growth Rate of Cauliflower in India						
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	269.9	----	4890.5	----	18.1	----
2002-03	254.6	-5.67	4444.1	-9.13	17.5	-3.31
2003-04	267.9	5.22	4940.2	11.16	18.4	5.14
2004-05	238.5	-10.97	4514.8	-8.61	18.9	2.72
2005-06	288.6	21.01	5323.1	17.90	18.4	-2.65
2006-07	302	4.64	5538	4.04	18.3	-0.54
2007-08	312	3.31	5777	4.32	18.5	1.09
2008-09	349	11.86	6532	13.07	18.7	1.08
2009-10	347.9	-0.32	6569	0.57	18.9	1.07
2010-11	369	6.06	6745	2.68	18.3	-3.17
2011-12	390.8	5.91	7348.9	8.95	18.8	2.73
2012-13	402.2	2.92	7886.7	7.32	19.6	4.26
2013-14	433.9	7.88	8573.3	8.71	19.8	1.02
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

The largest producer of Cauliflower in 2013-14 was West Bengal (22%) and Bihar (13%) in India. In the above table 4.2.3 shows in 2002-03 and 2004-05 the growth rate of area and production have negative due insets infection because Cauliflower is a climate sensitive crop. If its cultivated area declined then its production has also declined. In 2009 -10 its growth rate area has declined than its production. Remain years its area and production have increased. The result of simple regression analyzed that area on average 16.86 thousand hectare has been changed due to one year change of time and on an average 359.21 thousand metric tons production of Cauliflower crops has been changed due to one year change in time. These changes in growth rate of area of Cauliflower crop and growth rate of production can be easily understood by the help of below figure no. 4.2.3

Figure no. 4.2.3 Grwth Rate of Cauliflower



Note- (A) = Area, (P) = Production, (Pdy) = productivity

Table no. 4.2.4 Growth Rate of Okra in India						
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	347.2	----	3324.7	----	9.6	----
2002-03	329.2	-5.18	3244.5	-2.41	9.9	3.13
2003-04	353.1	7.26	3631.4	11.92	10.3	4.04
2004-05	357.3	1.19	3512.4	-3.28	9.8	-4.85
2005-06	391.8	9.66	3974.6	13.16	10.1	3.06
2006-07	396	1.07	4070	2.40	10.3	1.98
2007-08	407	2.78	4179	2.68	10.3	0.00
2008-09	432	6.14	4528	8.35	10.5	1.94
2009-10	452.5	4.75	4803.3	6.08	10.6	0.95
2010-11	498	10.06	5784	20.42	11.6	9.43
2011-12	518.4	4.10	6259.2	8.22	12.1	4.31
2012-13	530.8	2.39	6350.3	1.46	12	-0.83
2013-14	532.7	0.36	6346.4	-0.06	11.9	-0.83
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

The largest producer of Okra in 2013-14 was West Bengal (14%). The above Table No.4.2.4 shows in 2002-03 area and production of okra have declined. In 2004-05 its growth rate of production has declined due to irrigation facilities. From 2005-06 to 2012-13 its area and production have positively increased. further in 2013-14 the production of Okra declined due to proper irrigation facility. The result of simple regression analyzed that area on average 19.89 thousand hectare has been changed due to one year change of time and on an average 312.63 thousand metric tons production of Okra crops has been changed due to one year change in time. These changes in growth rate of area of Okra crop and growth rate of production can be easily understood by the help of below figure no. 4.2.4

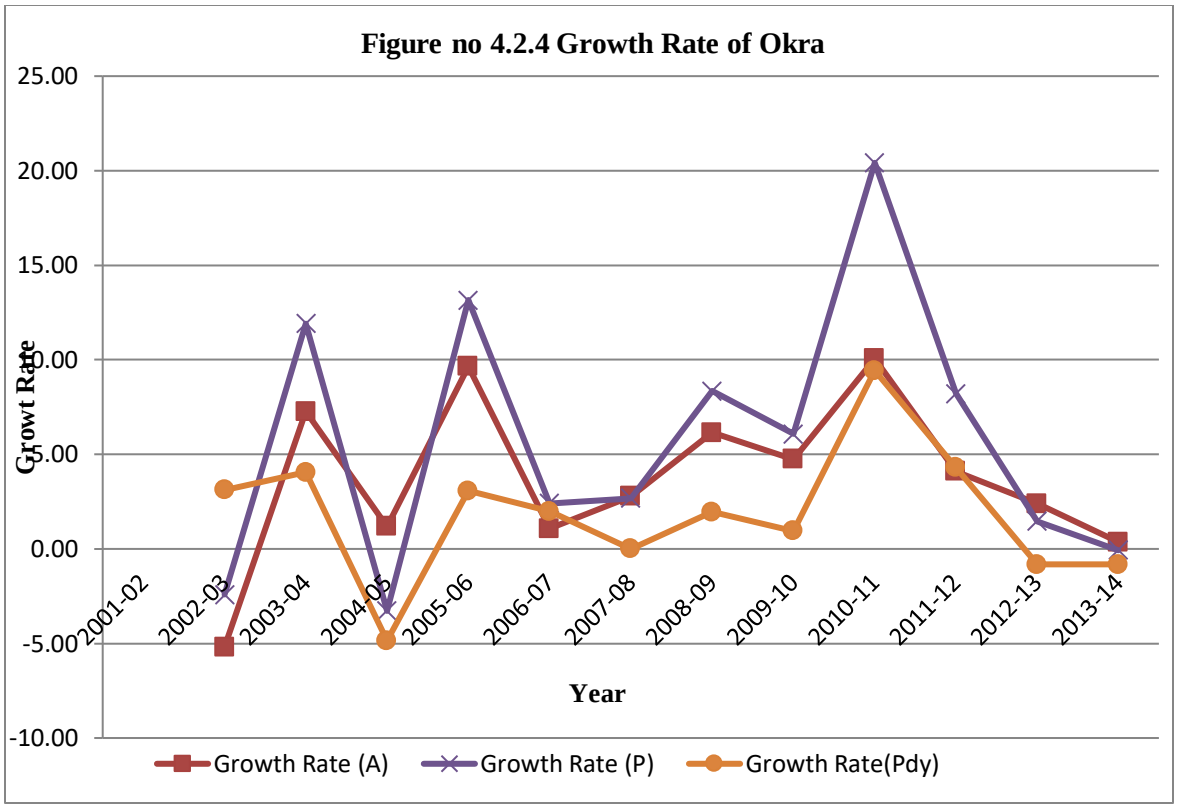
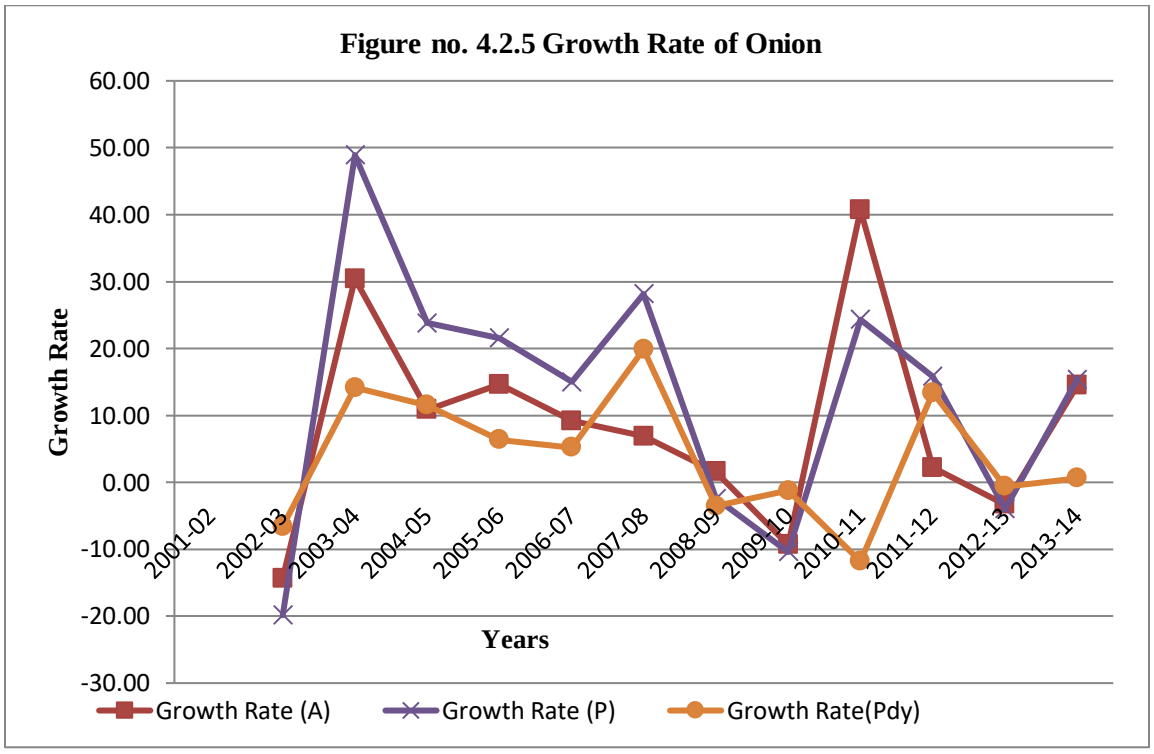


Table no. 4.2.5 Growth Rate of Onion in India						
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy.
2001-02	495.8	----	5252.1	----	10.6	----
2002-03	424.7	-14.34	4209.5	-19.85	9.9	-6.60
2003-04	553.8	30.40	6267.6	48.89	11.3	14.14
2004-05	613.8	10.83	7760.6	23.82	12.6	11.50
2005-06	703.6	14.63	9432.5	21.54	13.4	6.35
2006-07	768	9.15	10847	15.00	14.1	5.22
2007-08	821	6.90	13900	28.15	16.9	19.86
2008-09	834	1.58	13565	-2.41	16.3	-3.55
2009-10	756.2	-9.33	12158.8	-10.37	16.1	-1.23
2010-11	1064	40.70	15118	24.34	14.2	-11.80
2011-12	1087.2	2.18	17511.1	15.83	16.1	13.38
2012-13	1051.5	-3.28	16813	-3.99	16	-0.62
2013-14	1203.6	14.47	19401.7	15.40	16.1	0.63
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of productivity.

The largest Production share of Onion in vegetables groups. In 2013-14 its largest producer of Maharashtra (30%) in India. it is tropical crops. In above table 4.2.5 shows in 2002-03,2009-10 and 2012-13 its area have declined then its production was also declined due to rain fall and lack of seeds . Remaining year its area and production have increased. The result of simple regression analyzed that area on average 63.42 thousand hectare has been changed due to one year change of time and on an average 1266.79 thousand metric tons production of Onion crops has been changed due to one year change in time. These changes in growth rate of area of Onion crop and growth rate of production can be easily understood by the help of below figure no. 4.2.5.

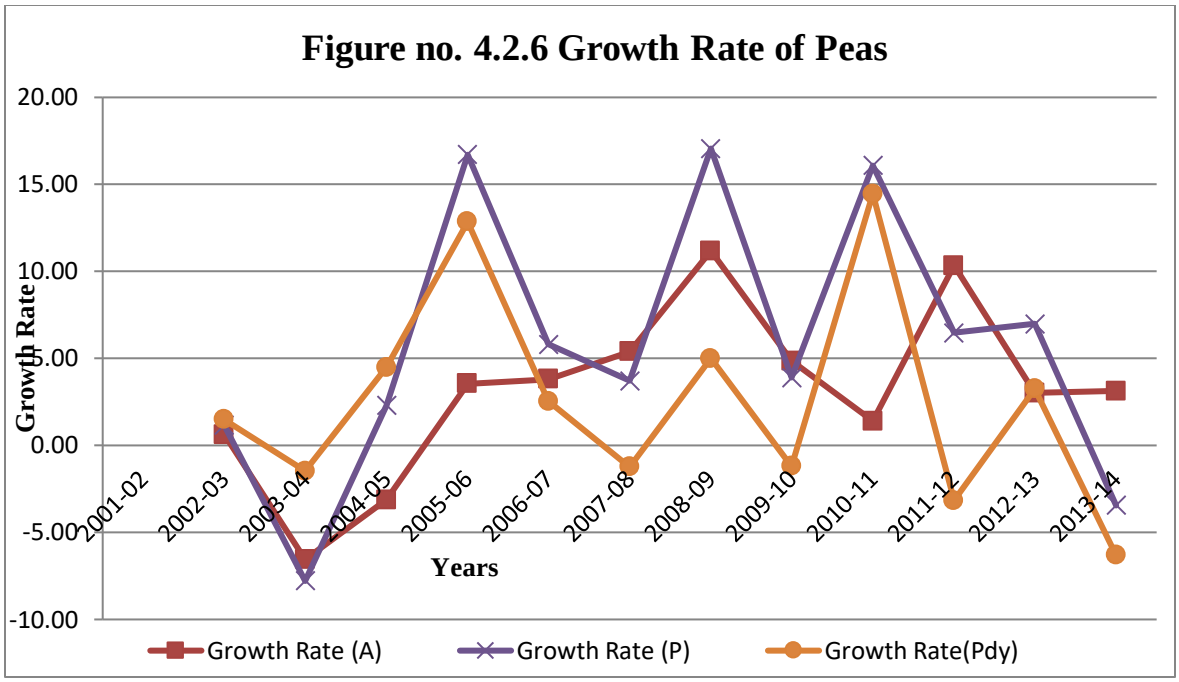


Note- (A) = Area, (P) = Production, (Pdy) = productivity

Table no. 4.3.6 Growth Rate of Peas in India						
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G. R.Pdy
2001-02	303.3	----	2038.2	----	6.7	----
2002-03	305.2	0.63	2061.8	1.16	6.8	1.49
2003-04	285.2	-6.55	1901.2	-7.79	6.7	-1.47
2004-05	276.3	-3.12	1944.8	2.29	7	4.48
2005-06	286.1	3.55	2270	16.72	7.9	12.86
2006-07	297	3.81	2402	5.81	8.1	2.53
2007-08	313	5.39	2491	3.71	8	-1.23
2008-09	348	11.18	2916	17.06	8.4	5.00
2009-10	364.9	4.86	3029.4	3.89	8.3	-1.19
2010-11	370	1.40	3517	16.10	9.5	14.46
2011-12	408.2	10.32	3744.8	6.48	9.2	-3.16
2012-13	420.5	3.01	4006.2	6.98	9.5	3.26
2013-14	433.6	3.12	3868.6	-3.43	8.9	-6.32
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity.

In 2013-14 the largest producer of peas was Uttar Pradesh (46.1%). In above table 4.2.6 shows in 2003-04 growth rates of area and production have declined due to climate. In 2004-05 area has again declined but production of was positive next year its domestic and international demand its area and production have positive increased. In 2013-14 the production of peas has negative due to climate. In the below figure 4.2.6 shows that the growth rate of production have more than growth rate area. The result of simple regression analyzed that area on average 14.42 thousand hectare has been changed due to one year change of time and on an average 209.65 thousand metric tons production of Peas crops has been changed due to one year change in time. These changes in growth rate of area of Peas crops and growth rate of production can be easily understood by the help of below figure no. 4.2.6.



Note- (A) = Area, (P) = Production, (Pdy) = productivity

Table no. 4.2.7 Growth Rate of Tomato in India

Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	458.1	----	7462.3	-----	16.3	----
2002-03	478.8	4.52	7616.7	2.07	15.9	-2.45
2003-04	502.8	5.01	8125.6	6.68	16.2	1.89
2004-05	505.4	0.52	8825.4	8.61	17.5	8.02
2005-06	546.1	8.05	9820.4	11.27	18	2.86
2006-07	596	9.14	10055	2.39	16.9	-6.11
2007-08	566	-5.03	10303	2.47	18.2	7.69
2008-09	599	5.83	11149	8.21	18.6	2.20
2009-10	634.4	5.91	12433.2	11.52	19.6	5.38
2010-11	865	36.35	16826	35.33	19.5	-0.51
2011-12	907.1	4.87	18653.3	10.86	20.6	5.64
2012-13	879.6	-3.03	18226.6	-2.29	20.7	0.49
2013-14	882	0.27	18735.9	2.79	21.2	2.42

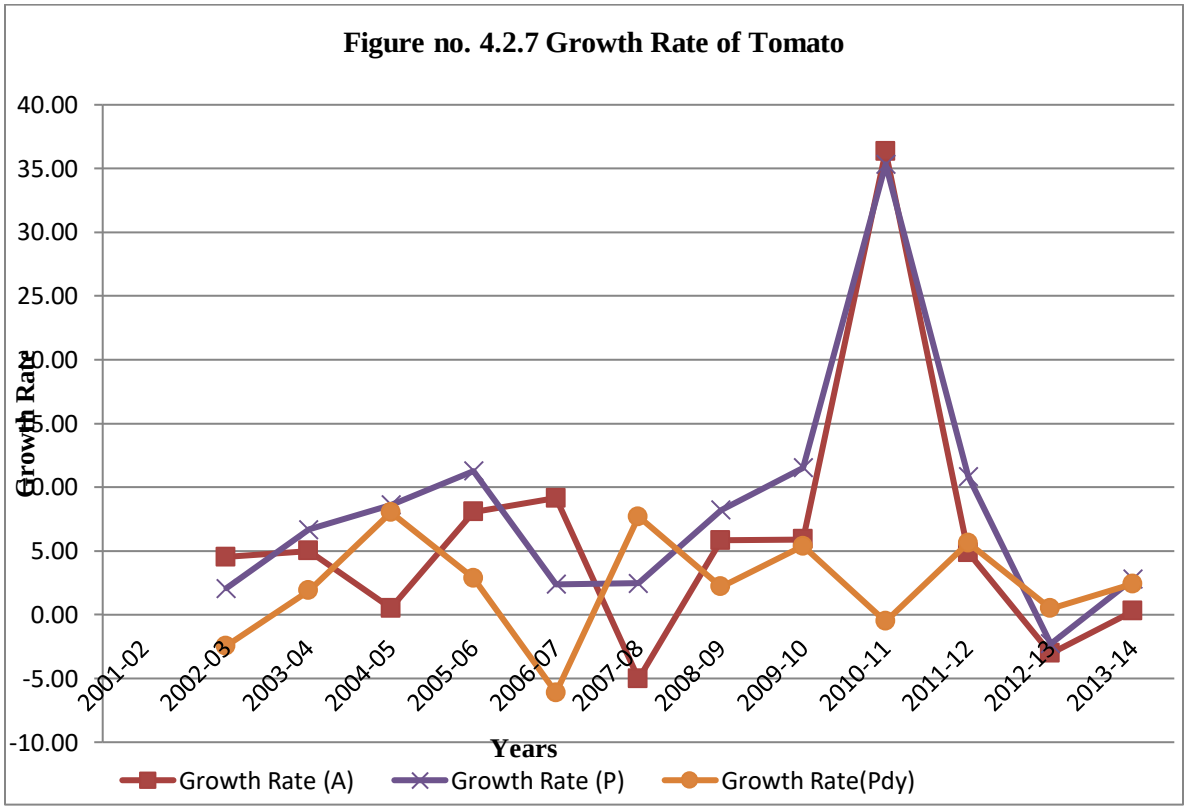
Source- National Horticulture Database, 2014
Note- Area in 000 hectare, Production in 000 Metric tone

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

The largest producer of Tomato in 2013-14 was Andhra Pradesh (17.9%) after then Karnataka (11.4%) in India. Tomato is sub- tropical crop. The above table 4.2.7 shows

area and production of Tomato have increased from 2001-02 to 2006-07 but its growth rate of area has declined in 2007-08. Further its area and production have increased but in 2012-13 its growth of area and production have negative due to lack of irrigation and climate. The major change from 2009-10 to 2010-11 when its growth rate of area and production have fluctuated. The result of simple regression analyzed that area on average 43.29 thousand hectare has been changed due to one year change of time and on an average 1136.44 thousand metric tons production of Tomatoes crops has been changed due to one year change in time. These changes in growth rate of area of Tomatoes crops and growth rate of production can be easily understood by the help of below figure no. 4.2.7.

Figure no. 4.2.7 Growth Rate of Tomato

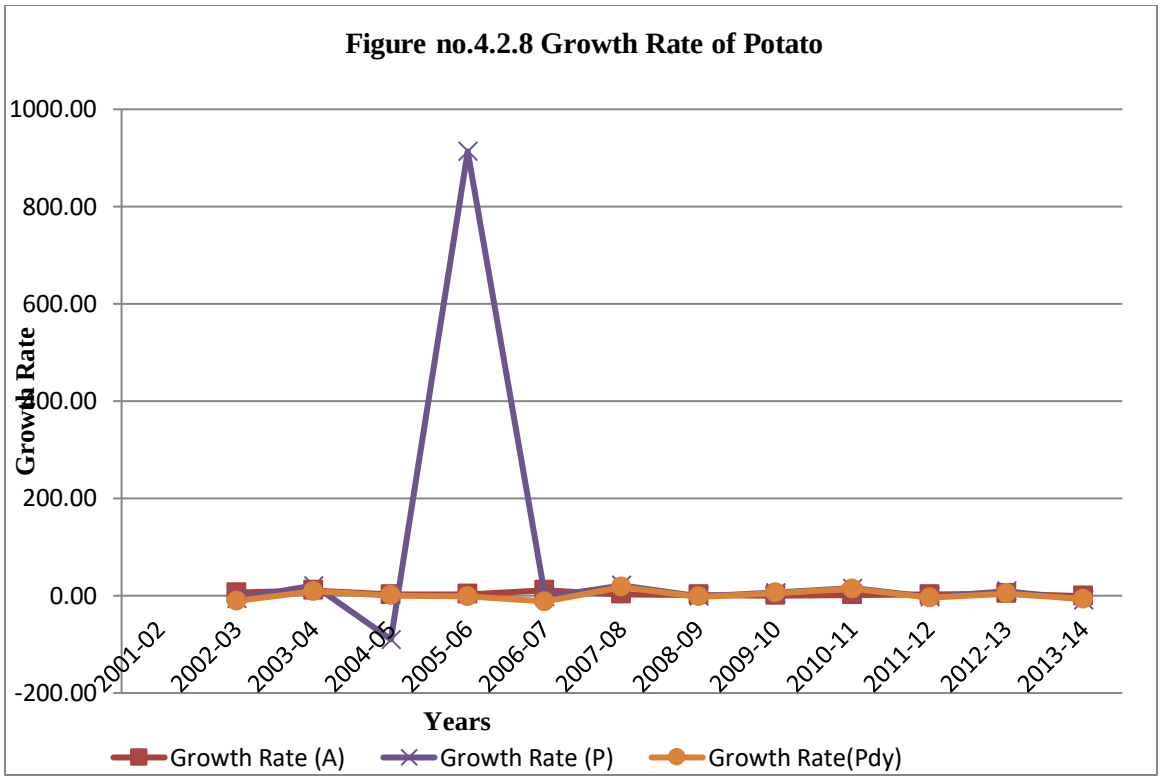


Note- (A) = Area, (P) = Production, (Pdy) = productivity

Table no. 4.2.8 Growth Rate of Potato in India						
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	1259.5	----	24456.1	----	19.4	----
2002-03	1337.2	6.17	23161.4	-5.29	17.3	-10.82
2003-04	1484.7	11.03	27925.8	20.57	18.8	8.67
2004-05	1523.9	2.64	2878.7	-89.69	18.9	0.53
2005-06	1569.2	2.97	29174.6	913.46	18.6	-1.59
2006-07	1743	11.08	28600	-1.97	16.4	-11.83
2007-08	1795	2.98	34658	21.18	19.3	17.68
2008-09	1828	1.84	34391	-0.77	18.8	-2.59
2009-10	1835.3	0.40	36577.3	6.36	19.9	5.85
2010-11	1863	1.51	42339	15.75	22.7	14.07
2011-12	1907	2.36	41482.8	-2.02	21.8	-3.96
2012-13	1992.2	4.47	45343.6	9.31	22.8	4.59
2013-14	1973.2	-0.95	41555.4	-8.35	21.2	-7.02
Source- National Horticulture Database, 2014 Note- Area in 000 hectare, Production in 000 Metric tone						

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

In 2013 -14 the largest producer of Potato crop for Uttar Pradesh (33%) after then West Bengal (22%) and Bihar (16%) in India. in above Table 4.2.8 shows that the growth rate of area have increased from 2001-02 to 2012-13 but many year like 2002-03,2004-05,2006-07,2008-09 and 2011-12 growth rate of production have declined, its major reason is that because rainfall have come that time. in 2013-14 growth rate of area and production have negative due to fluctuations of their prizes related to 2012-13 prizes because farmers have not desired in cropping the potato crops in 2013-14. It is a big issue of prize fluctuations for potato crops. In 2005-06 the production growth rates of potatoes have significantly increased due to optimum climate. The result of simple regression analyzed that area on average 56.02 thousand hectare has been changed due to one year change of time and on an average 2513.32 thousand metric tons production of Potatoes crops has been changed due to one year change in time. These changes in growth rate of area of Potatoes crops and growth rate of production can be easily understood by the help of below figure no. 4.2.8



Note- (A) = Area, (P) = Production, (Pdy) = productivity

Table no. 4.2.9 Growth Rate of Sweet Potato in India

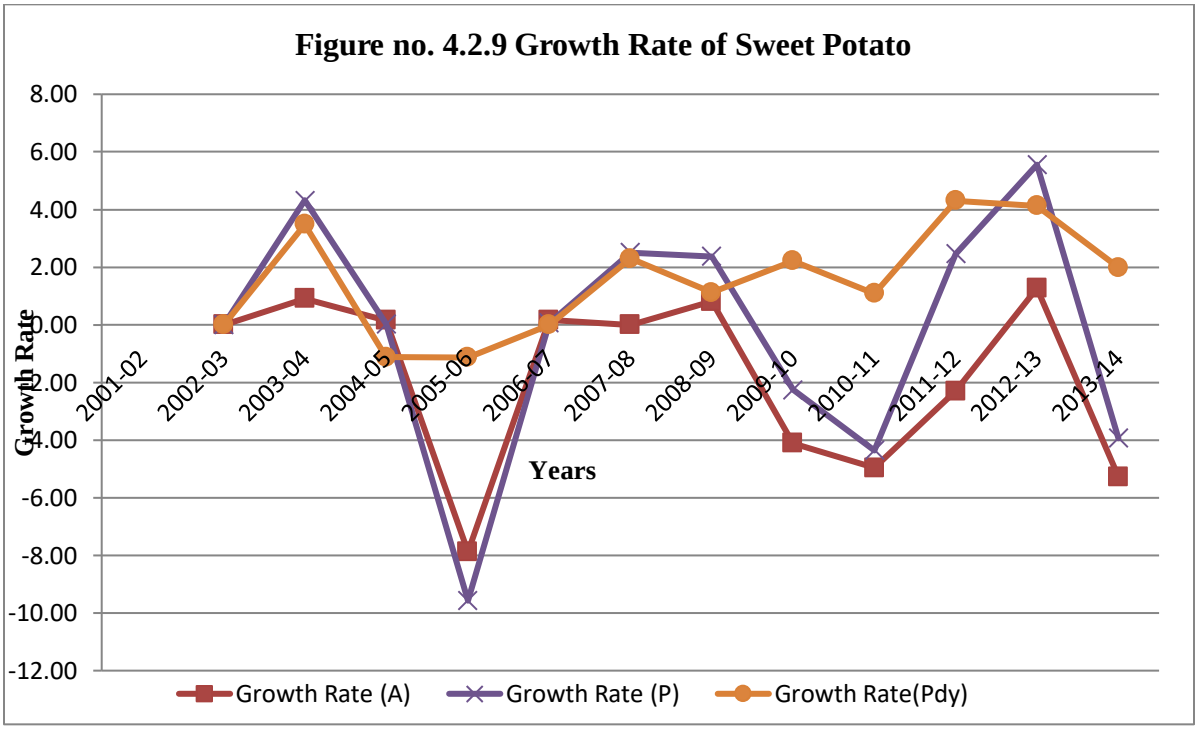
Year	Area	G.R.A.	Production	G.R.P.	Productivity	G.R.Pdy
2001-02	131.9	----	1130.3	----	8.6	----
2002-03	131.9	0.00	1130.3	0.00	8.6	0.00
2003-04	133.1	0.91	1179.1	4.32	8.9	3.49
2004-05	133.3	0.15	1179.4	0.03	8.8	-1.12
2005-06	122.8	-7.88	1066.5	-9.57	8.7	-1.14
2006-07	123	0.16	1067.2	0.07	8.7	0.00
2007-08	123	0.00	1094	2.51	8.9	2.30
2008-09	124	0.81	1120	2.38	9	1.12
2009-10	118.9	-4.11	1094.7	-2.26	9.2	2.22
2010-11	113	-4.96	1047	-4.36	9.3	1.09
2011-12	110.4	-2.30	1072.8	2.46	9.7	4.30
2012-13	111.8	1.27	1132.4	5.56	10.1	4.12
2013-14	105.9	-5.28	1087.9	-3.93	10.3	1.98

Source- National Horticulture Database, 2014
Note- Area in 000 hectare, Production in 000 Metric tones

Note: G.R.A. = Growth Rate of Area, G. R. P. = Growth Rate of Production, G.R. Pdy= Growth Rate of Productivity

The largest sweet potato producer have in 2013-14 Odisha (36%), West Bengal (22%), after then Uttar Pradesh (21%) in India. in above Table 4.2.9 shows that the growth rate of area and production both have relatively increased and decreased during the study period because its production depend upon their area. Sweet potato is marginal vegetables crops in India due to its domestic demand. The result of simple regression analyzed that area on average -2.44 thousand hectare has been changed due to one year change of time and on an average -5.67 thousand metric tons production of Sweet Potatoes crops has been changed due to one year change in time. These changes in growth rate of area of Sweet Potatoes crops and growth rate of production can be easily understood by the help of below figure no. 4.2.9.

Figure no. 4.2.9 Growth Rate of Sweet Potato



Note- (A) = Area, (P) = Production, (Pdy) = productivity