

Production and marketing of horticulture products with special reference to apple in India

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Abstract: India produces all deciduous fruits including pome fruits (apple and pear) and stone fruits (peach, plum, apricot and cherry) in considerable quantity. In India apple is mostly grown in the states of Jammu & Kashmir, Himachal Pradesh, Uttarakhand and Arunachal Pradesh. During the last decade, India has observed an increasing trend in the area, production and productivity of crops in the horticulture sector. Apple production plays an imperative role in humanizing the standard of living, per capita income and employment generation. Over the last decade, the area under horticulture sector grew by about 2.7% per annum and annual production increased by 7.0%. During 2010-11, the production of horticultural crops was about 240.531 million tons from an area of 21.825 million hectares (ha). The income per acre in apple cultivation is much higher than any other horticulture crops, if it is done in a very systematic way. Apple cultivation is highly gainful economic activity. It is farm-based, labor intensive and commercially attractive economic activity. The present paper has tried to analyze the trends and growth in the area, production and Productivity of apples in the horticulture Sector of India from the year 2001-02 to 2017-18, and together its marketing. It has also visualized on finding out the annual compound growth rates (ACGR), average and, annual growth rate of area, production and Productivity of apples in India for a period of seventeen years i.e. from the year 2001-02 to the year 2017-18.

Key Words: Deciduous, Apple, Trend, Area, Production, Productivity, ACGR.

1. INTRODUCTION:

India produces all deciduous fruits including pome fruits (apple and pear) and stone fruits (peach, plum, apricot and cherry) in considerable quantity. In India apple is mostly grown in the states of Jammu & Kashmir, Himachal Pradesh, Uttarakhand and Arunachal Pradesh is showing in figure 1 below.

The North-Eastern Hills region, comprising of the States of Arunachal Pradesh, Nagaland, Meghalaya, Manipur and Sikkim also grow some of the deciduous fruits on a limited scale. Due to introduction and adaptation of low chilling cultivars of crops like peach, plum and pear, they are also now being grown commercially in certain areas of the north Indian plains¹. Out of all the deciduous fruits, apple is the most important in terms of production and extent. Apple (*Malus pumila*) is commercially the most important temperate fruit and is fourth among the most widely produced fruits in the world after banana, orange and grape. China is the largest apple producing country in the world. The United States is the second-leading producer with more than 6% of world production. Turkey is the third largest producer, followed by Italy, India and Poland. Apple was introduced into the country by the British in the Kulu Valley of the Himalayan State of H.P. as far back as 1865, while the colored 'Delicious' cultivars of apple were introduced to Shimla hills of the same State in 1917. The apple cultivar 'Ambri' is considered to be indigenous to Kashmir and had been grown long before Western introductions. Over 700 accessions of apple, introduced from USA, Russia, U.K., Canada, Germany, Israel, Netherlands, Australia, Switzerland, Italy and Denmark have been tried and tested during the last 50 years. The delicious group of cultivars predominate the apple market. The areas covered under Delicious cultivars are: 83% of the area under apple in H.P., 45% in J&K and 30% in U.P. hills². In more recent times improved spur types and standard color mutants with 20-50% higher yield potential are favored. The horticulture sector covers a wide range of crops e.g., fruit crops, vegetables crops, potato and tuber crops, ornamental crops, medicinal and aromatic crops, spices and plantation crops. While the first few Five Year Plans assigned priority to achieving self sufficiency in food grain production, over the years, horticulture has emerged as an indispensable part of agriculture, offering a wide range of choices to the farmers for crop diversification. It also provides ample opportunities for sustaining large number of agro industries which generate substantial employment opportunities³. The horticulture sector contributes about 24.5% of the GDP from about 8% of the area. Agriculture sector is considered as backbone of Indian Economy and around 50% work force is still dependent on Agriculture for livelihood, despite of structural changes taking place. Presently Agriculture sector (including livestock) is contributing 14% to the Gross Domestic Product (GDP) at National level, and 20.59% to GSDP (at current prices) but it is still the main source of livelihood for majority of rural population⁴. Therefore, rapid growth of Agriculture is indispensable for faster inclusive and sustainable growth. Area under apple in India has

increased from 241.8 8 thousand hectares in 2001-02 to 306.0 thousand hectares in 2017-18 and the production has increased from 1158.4 thousand MTs in 2001-02 to 2371.0 thousand MTs in 2017-18⁵.



Figure 1 showing the major fruit producing states of India.

The analysis shows that the average area under the apple cultivation during 2001-02 to 2017-18 was 271.1 thousand hectares and the average production during the same period was 1986.3 thousand MT. During the study period the highest production was recorded in year 2010-11. The productivity of the apple fruit is also showing an increased trend during the study period in India.

2. PRIME OBJECTIVES OF STUDY:

- To study the trends in area, production and productivity of apple in India from 2001-02 to 2017-18.
- To analyze the annual growth rate of area, production and productivity of apple in India from 2001-02 to 2017-18.
- To analyze the percentage share area and production of apple with total area and production of fruits in India from 2001-02 to 2017-18.

3. METHODOLOGY:

To fulfill the mentioned objectives of the present paper “Trends and Growth in Area, Production and Productivity of Apples in India from 2001-02 To 2017-18” the secondary source of the data has been used and the data has collected from the reliable sources such as National Horticulture Board (NHB), government official records, Books, journals, magazines, websites and other active related agencies of the Department of horticulture in the country etc. The period of analysis ranged from 2001-02 to 2017-18. In this study simple statistical tool like average, annual growth rate, percentage and Annual compound Growth Rate (ACGR) were used.

4. DATA ANALYSIS:

Table 1 shows the statistics regarding area, production and productivity of apples in India from the year 2001-02 to the year 2017-18. In the year 2001-02, the area, production and productivity of apples in India was 241.8 thousand

hectares, 1158.4 thousand MTs and 4.8MTs/hectare respectively. In the years 2002-03 and 2003-04 the area under apples in India was 193.1 and 201.2 thousand hectares respectively, production was 1348.4 and 1521.6 thousand MTs respectively and productivity was 7.0 and 7.6 MTs/hectare respectively. In the year 2004-05 the area, production and productivity of apples in India was 230.7 thousand hectares, 1739.0 thousand MTs and 7.5MTs/hectare respectively. Similar rising trends in area, production and productivity of apples in India were also witnessed in the remaining years. In the year 2017-18, the area, production and productivity of apples was 306.0 thousand hectares, 2371.0 thousand MTs and 7.7MTs/hectare respectively in India.

Table 2 highlights the annual growth rate of area, production and productivity of apple in India from 2001-02 to 2017-18. During the study period Year 2002-03, 2005-06, 2012-13 and 2015-16 shows the negative annual growth rate in area of apple this can be clearly seen from the figure 3.1 while as there was highest annual growth rate in the year 2004-05. Similarly on the production side year 2006-07,2009-10,2011-12,2012-13,2014-15 and 2016-17 shows the negative annual growth rate while as the year 2010-11 shows the highest annual growth rate during the study period. Similar is the case with productivity side of apple.

Table 3 shows the Percentage Share of Apple in Total Area of Fruits in India From 2001-02 To 2017-18. In the year 2001-2002 the percentage share area of apple in total fruits was 5.85 percent which is the highest among the remaining years of study period. From the year 2002-03 up to 2013-14 the percentage share area of apple in total fruits was almost same with slight variations. In the year 2014-15 the percentage share area of apple in total fruits was 5.11. The percentage share area of apple in total fruits during the year 2017-18 was 4.69% which is represented in the fig.4

Table 4 shows the Percentage Share of Apple in Total production of Fruits in India From 2001-02 To 2017-18. In the year 2001-2002 the percentage share production of apple in total fruits was 2.68 percent. Year 2010-11 shows the highest percentage share production of apple in total production of apples during the study period. From the year 2003-04 up to 2005-06 the percentage share production of apple in total fruits was increasing almost in same pace with slight variations. In the year 2006-07 the percentage share production of apple in total fruits was 2.71%. The percentage share production of apple in total fruits during the year 2008-09 up to 2017-18 remains around 2 to 3 percent and in the year 2017-18 it was 2.44 percent which is indicated in the fig.5

Table 1: Area, Production and productivity of Apples in India from 2001-02 to 2017-18 (Area in 000 Hectares, Production in 000 M T and Productivity MT/Hectare)

Year	Apple		
	Area	Production	Pdy
2001-02	241.8	1158.4	4.8
2002-03	193.1	1348.4	7.0
2003-04	201.2	1521.6	7.6
2004-05	230.7	1739.0	7.5
2005-06	226.8	1814.0	8.0
2006-07	252.0	1624.0	6.4
2007-08	264.0	2001.0	7.6
2008-09	274.0	1985.0	7.2
2009-10	282.9	1777.2	6.3
2010-11	289.1	2891.0	10.0
2011-12	321.9	2203.4	6.8
2012-13	311.5	1915.5	6.1
2013-14	313.0	2497.7	8.0
2014-15	319.2	2133.8	6.7
2015-16	277.2	2521.1	9.1
2016-17**	305.0	2265.0	7.4
2017-18**	306.0	2371.0	7.7
AVERAGE	271.1	1986.3	7.4
CAGR (%)	1.48	4.57	2.99

Source: Horticultural Statistics at a Glance, Dept. of Agriculture cooperation and farmer's welfare, Govt. of India. ** (3rd Advance Estimate)

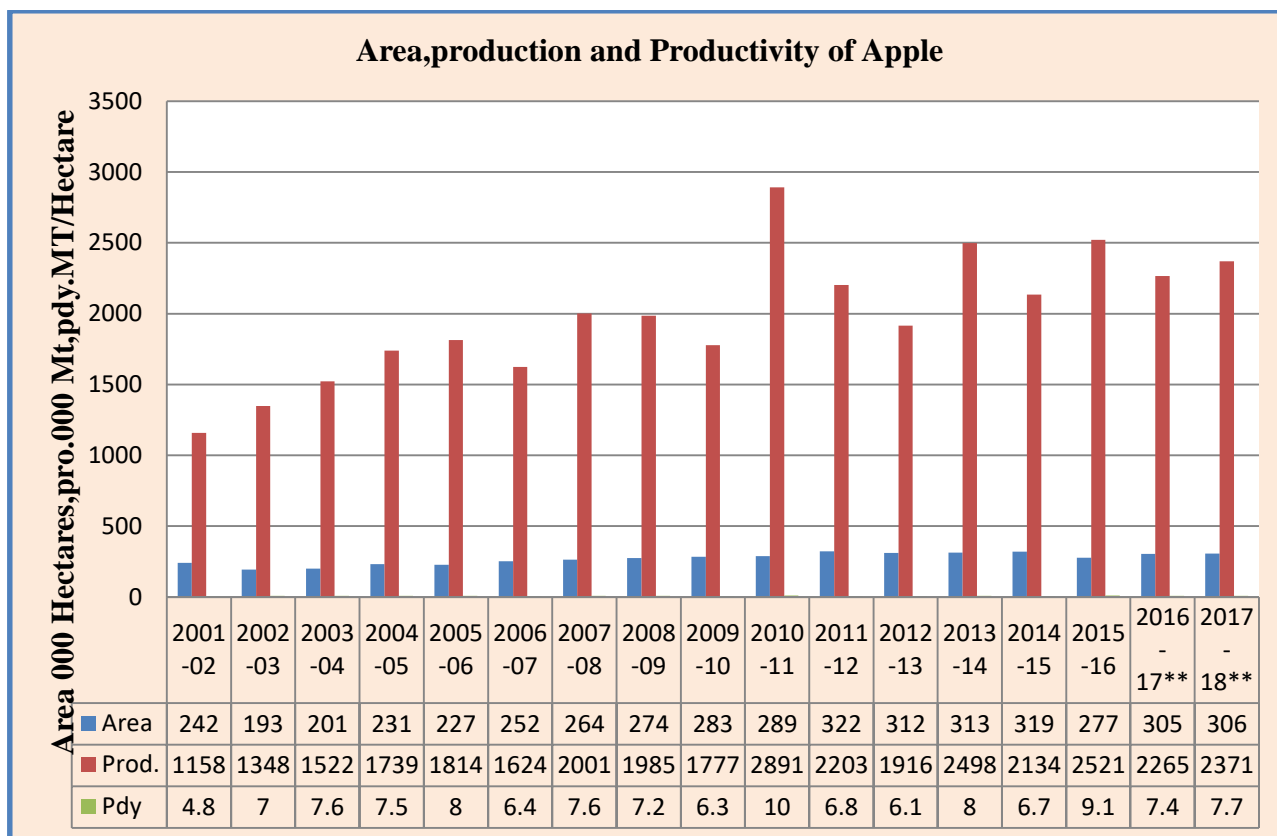


Figure 2: Area, Production and productivity of Apples in India from 2001-02 to 2017-18

Table 2: Annual Growth Rate of Area, Production and Productivity of Apples in India from 2001-02 to 2017-18. (Area in 000 Hectares, Production in 000 M T and Productivity MT/Hectare)

Year	Area	%growth in area	Prod.	%growth in Prod.	Pdy	%growth in pdy
2001-02	241.8	-	1158.4	-	4.8	-
2002-03	193.1	-20.14	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	14.28	7.5	-1.31
2005-06	226.8	-1.69	1814	4.31	8	6.66
2006-07	252	11.11	1624	-10.47	6.4	-20
2007-08	264	4.76	2001	23.21	7.6	18.75
2008-09	274	3.78	1985	-0.79	7.2	-5.26
2009-10	282.9	3.24	1777.2	-10.46	6.3	-12.5
2010-11	289.1	2.19	2891	62.67	10	58.73
2011-12	321.9	11.34	2203.4	-23.78	6.8	-32
2012-13	311.5	-3.23	1915.5	-13.06	6.1	-10.29
2013-14	313	0.48	2497.7	30.39	8	31.14
2014-15	319.2	1.98	2133.8	-14.56	6.7	-16.25
2015-16	277.2	-13.15	2521.1	18.15	9.1	35.82
2016-17**	305	10.02	2265	-10.15	7.4	-18.68
2017-18**	306	0.32	2371	4.67	7.7	4.05

Calculated by Author from table 1

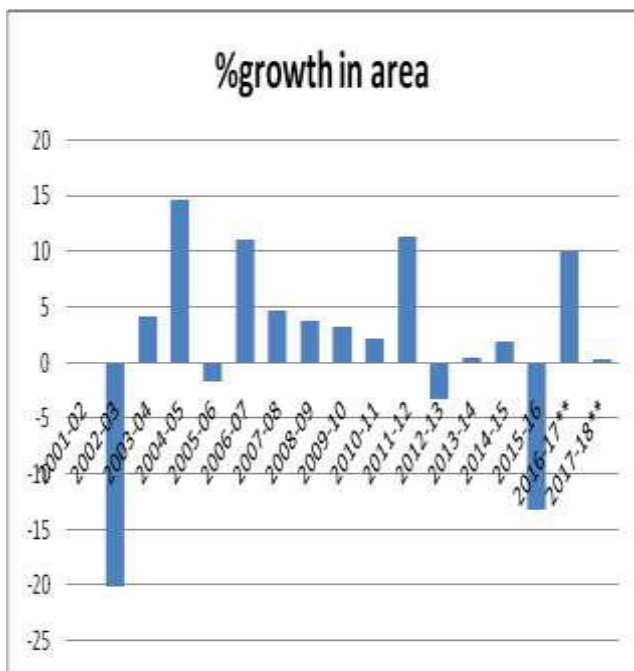


Figure 3.1 showing annual growth rate of area

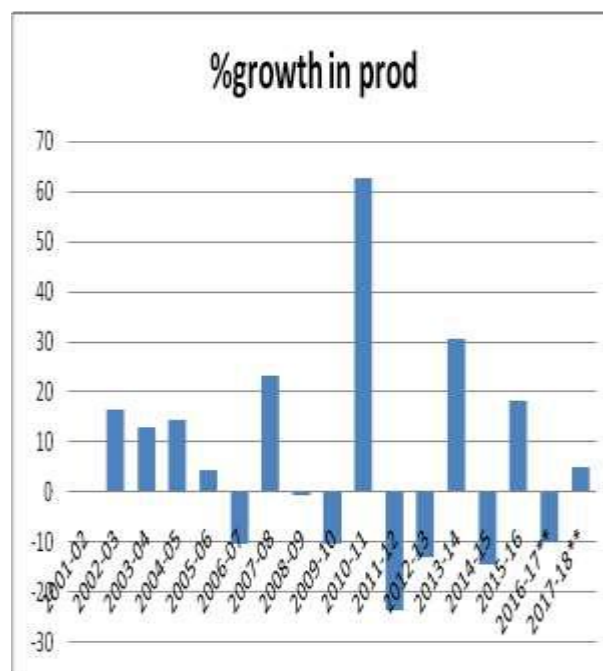


Figure 3.2 showing annual growth rate of prod.

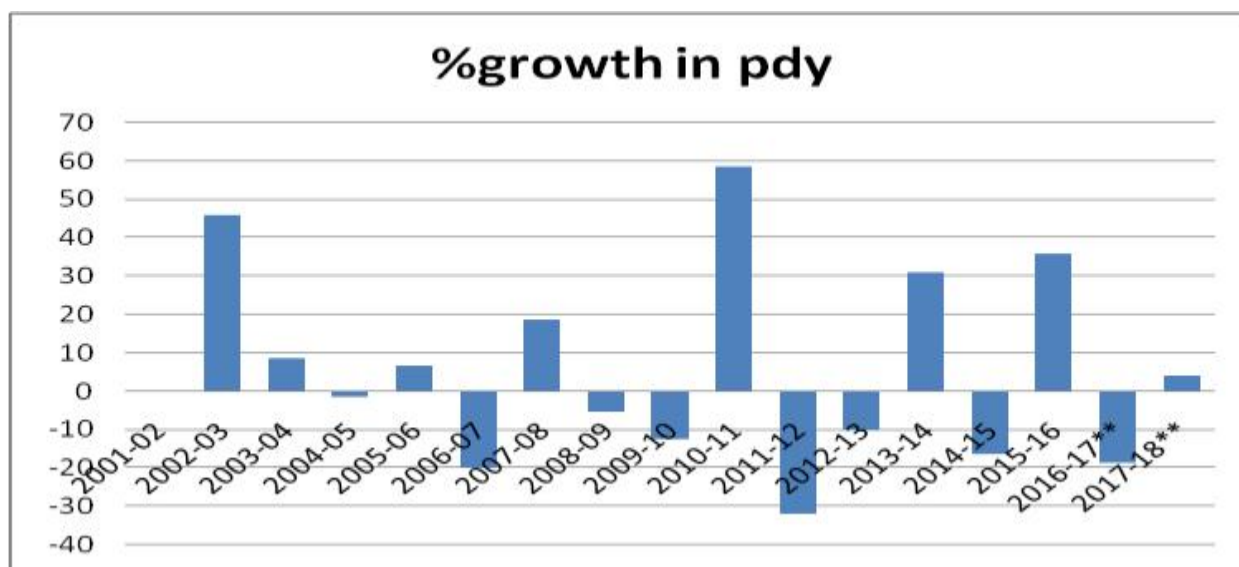


Figure 3.3 showing annual growth rate of pdy.

Table 3: Percentage Share of Apple in Total Area of Fruits in India From 2001-02 To 2017-18. (Area in 000 Hectares)

Year	Percentage Share of Apple in Total Area of Fruits		
	Area	Total Area of Fruits	Percentage Share
2001-02	241.8	4127	5.85
2002-03	193.1	3905	4.94
2003-04	201.2	4767	4.22
2004-05	230.7	5155	4.47
2005-06	226.8	5454	4.15
2006-07	252.0	5686	4.43

2007-08	264.0	5989	4.40
2008-09	274.0	6237	4.39
2009-10	282.9	6474	4.36
2010-11	289.1	6383	4.52
2011-12	321.9	6705	4.80
2012-13	311.5	6982	4.46
2013-14	313.0	7216	4.33
2014-15	319.2	6235	5.11
2015-16	277.2	6301	4.39
2016-17**	305.0	6373	4.78
2017-18**	306.0	6514	4.69

Calculated By Author

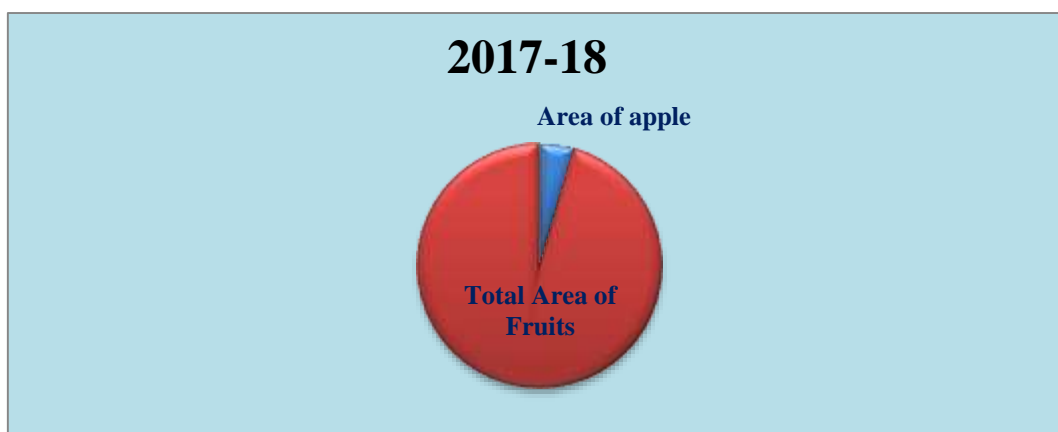


Figure 4: Percentage Share of Apple in Total Area of Fruits in India in 2017-18.

Table 4: Percentage Share of Apple in Total Production of Fruits in India From 2001-02 To 2017-18. (Production in 000 M T)

Year	Percentage Share of Apple in Total Production of Fruits		
	Production	Total Production of Fruits	Percentage Share
2001-02	1158.4	43115	2.68
2002-03	1348.4	45317	2.97
2003-04	1521.6	46063	3.30
2004-05	1739	50988	3.41
2005-06	1814	55505	3.26
2006-07	1624	59713	2.71
2007-08	2001	65764	3.04
2008-09	1985	68639	2.89
2009-10	1777.2	71709	2.47
2010-11	2891	74878	3.86
2011-12	2203.4	76428	2.88
2012-13	1915.5	81285	2.35
2013-14	2497.7	88977	2.80
2014-15	2133.8	89514	2.38
2015-16	2521.1	90183	2.79
2016-17**	2265	92918	2.43
2017-18**	2371	97055	2.44

Calculated By Author

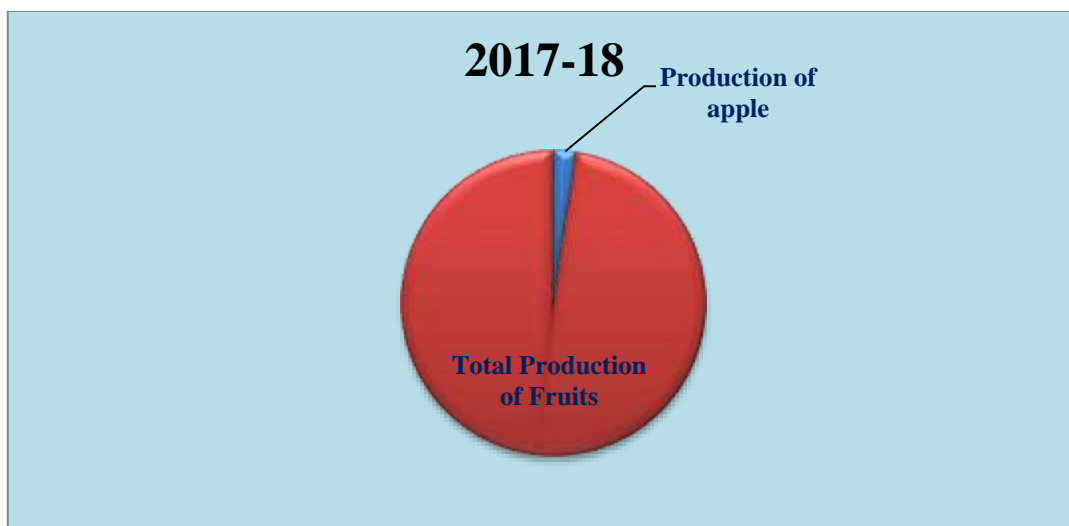


Figure 5: Percentage Share of Apple in Total Production of Fruits in India in 2017-18

5. APPLE MARKETING OF INDIA:

Horticultural marketing is an important economic activity. Besides contributing to higher productivity and production, it influences the income of growers and contributions to the development of a horticultural economy. It opens up an efficient market system, marketing horticulture a reliable source of income. Simultaneously, horticultural marketing ensures the availability of produce a reasonable price to consumers. However, the perishable nature of certain horticultural commodities like fruit and vegetables introduces an element of risk and uncertainty in the economy. Here, growers have no option but to bring the produce to the market as soon as it is harvested. As a consequence, seasonal glut and corresponding low prices are a common phenomenon during the immediate post-harvest period. The production and supply of fruits and vegetables is differently linked to soil, climate and season. The produce is, therefore, localized⁶. Since the areas of consumption are largely concentrated in cities and towns, the goods have to be transported over long and short distances. Further, due to detective methods of picking, packing and transportation, a large proportion of fruits and vegetables deteriorate in transit. All these aspects introduce certain special elements in the marketing of horticultural crops. This makes the study of horticultural crops especially in relation to its marketing, a pertinent one⁷.

India imports apples from many suppliers in both the northern and southern hemisphere, and most suppliers have seen their shipments to India that grows during 1999-2004. India’s pattern of imports from alternative suppliers is similar to that of other Asian apple import markets, with a few significant exceptions. The U.S. share of the Indian market is approximately the same as the 31-percent average market share held by U.S. apples in the major Asian apple markets. Despite the recent growth in imports from China, however, India still imports a smaller share of its apples from China and a larger share from Australia than other Asian countries.

India Import of Apple Fruit

The following Table 4 shows the details of India in apple importing from various countries.

Table 4 India Import of apple from various countries

Year	Quantity(000 MT)
2008-2009	77
2009-2010	130
2010-2011	144
2011-2012	208
2012-2013	197
2013-2014	275
2014-2015	204
2015-2016	192

Source: Secondary data

It is clear from Table 4 that in 2013-14, 275 thousand MT apples imported from various countries. In 2008-09, 77 thousand MT of apple have been imported and in the year 2015-16, 192 thousand MT of apples have been imported from various countries.

Export of Apple from India

India is a leading apple exporter in the world. More than 55 percentages of exports are made to neighboring countries like Bangladesh, Nepal and Srilanka. In addition, the Chinese apples are highly competitive in the Indian market on the basis of price as well as quality.

Table 5 shows the apple export from India during the year of 2015-2016 to 2017-2018.

country	2015-16 Qty	2016-17 Qty	2017-18 Qty
Nepal	9180.15	10145.48	8919.02
Bangladesh	11547.77	12129.33	3560.64
Iran	0.00	0.00	43.65
Qatar	0.04	0.00	2.41
United States	0.00	0.00	1.37
United Arab Emirates	0.00	0.00	0.48
Oman	0.21	0.00	0.60
Singapore	0.08	0.02	0.19
Germany	0.00	0.00	0.18
Panama Republic	0.00	0.00	0.11
United Kingdom	0.00	0.00	0.20
Hong Kong	0.00	0.11	0.10
Sri Lanka	0.00	0.06	0.12
Liberia	0.00	0.00	0.05
Thailand	0.00	0.00	0.03
Others	79.85	275.03	0.07
Total	20808.10	22550.03	12529.22

Source: APEDA

It is clear from Table 5 that Bangladesh is the leading apple importer from India; secondly Nepal also imports apples from India.

6. FINDINGS:

The current study has been worked out within the framework of its chief objectives and it has found that:-

- The area under apples has increased from 241.8 (000'HA) in 2001-02 to 306 (000'HA) in 2017-18.
- The rising trends have been witnessed in the production and Productivity of apples in India during the study period.
- Similarly there has been a rising trend in the area under apples in India except 2002-03 during the time period of the study.
- Likewise, the production of the same has gone up from 1158.4 (000'MT) in 2001-02 to 2371 (000' MT) in 2017-18. The yield of apples from 2001-02 to 2017-18 has gone up from 4.8 (MT/HA) to 7.7 (MT/HA).
- The productivity of apples in the country has shown a rising trend during the study period except in the years 2006-07, 2009-10, 2011-12, 2012-13 and 2014-15.

7. RECOMMENDATIONS:

- China is the leading producer of apple in the world. Whereas India ranks 6TH in apple production, but in case of productivity India is outlying behind. During 2013-14 the productivity of apple at world level was 15.48, where as it was only 6.14 in India, in china the productivity was 16.47. The government, should endow with economic incentives to the farmers to persuade them to cultivate apples not only for self consumption but for commercial purposes⁸.
- Imperfection in apple-marketing system should be changed with modern technologies and existing old system of selling should be discarded.
- The government should grant easy loans, quality fertilizers and Insecticides / pest sides and establish apple cultivating and management training centers at various levels like district and block levels⁹.

- Producers should given the accurate information regarding demand and supply of different Mandis across India. So that they could decide where they should sent the Apple.
- The programmes like National Horticulture Mission (NHM), Postharvest Management (PHM), Technology Mission, must be build up further to help out the apple cultivators in the country to augment the production as well as productivity of apples and obtain financial profits on a wider scale¹⁰.

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