UNIT 9 AGRICULTURAL GROWTH, PRODUCTIVITY TRENDS AND CROP PATTERNS

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9.0 OBJECTIVES

After going through this unit, you shall be able to:

- identify the trends in the growth of agricultural production;
- point out some of the important factors contributing to changes in the rate of growth of production in agriculture;
- analyse the causes of variations in production and productivity;
- assess the scope for further increases in productivity and production;
- deduce the policy imperatives for sustained growth in agricultural production and productivity in India; and
- analyse emerging changes in the cropping pattern over time and over regions.

9.1 INTRODUCTION

Despite a steady decline in the share of agriculture in the Gross Domestic Product (GDP) of India, this sector continues to remain a very important sector of the Indian economy. Its share in the GDP, in the first five years of the 21st century has averaged around 20 per cent. Moreover, nearly 58 per cent of the work force in India derives its sustenance through direct employment in agriculture either as cultivators (32 per cent) or as agricultural labourers (26 per cent). It is also noteworthy that almost 72 per cent of the
besides being the largest employment providing sector and a major contributor to the GDP, agriculture contributes significantly to the import earnings of India. Agricultural sector is a major user of rail and road transport facilities as these two modes of transport secure bulk of their business from the transportation of agricultural commodities. The sector also generates demand for industrial products such as tractors, tube wells, pump sets as well as construction material for storage and warehousing, fertilisers etc. Agriculture in India has been the source of supply of raw materials to some of the major industries viz, cotton and jute textiles, sugar, vegetable oils, food processing etc. Moreover, a steady growth in the marketed surplus of foodgrains is crucial for the workforce engaged in non-agricultural sectors. As such, rapid industrial growth and overall development in the economy hinges on the growth of production of foodgrains in the agricultural sector. On the whole, agriculture continues to remain the backbone of the Indian economy; the decline in its share of GDP notwithstanding its role in the supply of raw materials to some of the industries as well as in the supply of foodgrains is vital for smooth and sustained growth. Income generated in agriculture, with a bulk of the workforce engaged in this sector, also becomes a major source of demand for industrial produce.

In the course of more than half a century of planned economic development, Indian agriculture has made great strides. The country has been able to achieve self-sufficiency in foodgrains and has succeeded in attaining food security to an extent despite a phenomenal increase in population. The steady transformation of the farming sector from traditional to modern needs to be sustained and accelerated for not only raising incomes in the relatively backward agricultural sector but also rapid growth of the economy as a whole. Hence in this unit, we shall discuss the growth and productivity of agriculture over a period of time, cropping pattern, potentials of productivity growth and policy implications for accelerating agricultural production and productivity.

### 9.2 GROWTH OF PRODUCTION

The performance of Indian agriculture during more than half a century of planned economic development can be broadly characterised by three distinct phases. In the first phase covering a period from independence to the mid 1960’s, generally known as the pre-green revolution phase, priority was accorded to land reforms, community development and restructuring of rural credit institutions besides providing a major thrust to irrigation infrastructure. There were some major achievements in these spheres. The country was, however, still subsisting from ship to mouth. Growth of the output of foodgrains was far from adequate to meet the needs of growing population. India’s food security was in jeopardy. At the same time, experience of other countries in the sphere of agriculture demonstrated the need to achieve a quantum jump in the productivity of land.

The second phase was initiated by a new agricultural strategy or so called green revolution. The strategy consisted of applying a package of inputs to irrigated areas. The package constituted high yielding variety of seeds, chemical fertilisers, pesticides and insecticides besides application of water at the right time and in right proportions. In the initial period of about 15 years,
the green revolution was confined to irrigated areas largely in wheat growing regions. It was only during the 1980’s that the green revolution spread to other regions and crops. Over 1970’s and 1980’s, there was a significant rise in yields per hectare resulting also in the productivity of all inputs or Total Factor Productivity. As a result of rise in per capita incomes, there was a discernible diversification in the demand of the consumers to other food production like milk, poultry meat, fish, vegetables and fruits. This has created an environment for diversification of agriculture.

The third phase coincides with the period following the implementation of new economic policy of the year 1991 and thereafter. In this phase, greater incentives were provided to private investment in agriculture. Even though such investment did increase to an extent, there was a steady decline in public investment in agriculture. This has adversely affected the rural infrastructure, particularly irrigation, agricultural research and extension. The acceleration experienced in the yield per hectare during the second phase got arrested. There has been a noticeable slowdown in agricultural growth on account of declining input use, factor productivity and profitability during this phase.

Check Your Progress 1

Note: i) Space is given below each question for your answer.
ii) Check your answer(s) with those given at the end of the unit.

1) State in about 4 lines the importance of agriculture in the Indian economy.

2) Identify three distinct phases in the growth of agricultural production since independence?

3) Why was there a need for new agricultural strategy?
9.2.1 Growth of Agricultural Production and Productivity: Phase I (1949-50 to 1964-65)

Post-independence period was marked by severe and recurrent shortages of foodgrains. Dependence on imports of foodgrains was on the rise. This continued and persisted for a fairly long period until the mid-1960s when a war with Pakistan highlighted the fragility of the country’s food security system. Even though, there was significant increase in agricultural production including the production of foodgrains, the gap between the domestic demand and supply was persistent. To examine the trends in production during this phase and the factors contributing to this trend, let us examine table 9.1 below:

Table 9.1: Growth in Production of different Agricultural Crops during Phase I and Rates of Growth in Area, Yield and Production

<table>
<thead>
<tr>
<th>Crop</th>
<th>Production*</th>
<th>Rate of Growth (1949-50 to 1964-65)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1949-50</td>
<td>1964-65</td>
</tr>
<tr>
<td>All Foodgrains of Which</td>
<td>55</td>
<td>89</td>
</tr>
<tr>
<td>a) Rice</td>
<td>24</td>
<td>39</td>
</tr>
<tr>
<td>b) Wheat</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>c) Coarse Cereals</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td>d) Pulses</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>All Non-foodgrains of Which</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>i) Oilseeds</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>ii) Sugar-cane</td>
<td>50</td>
<td>122</td>
</tr>
<tr>
<td>iii) Cotton</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>iv) Potato</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>All Crops</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

* Production figures are in million tonnes except for cotton which are in million bales of 170 kg. each.


During this phase increase in agricultural production was fairly high at 3.1 per cent per annum. This rate of increase appears to be phenomenal particularly in comparison to the dismal rate of growth of about 0.5 per cent per annum during the first half of the twentieth century. Even the rate of growth of production of foodgrains was pretty high touching almost 3 per cent per annum. However, but for some significant rise in the yield per hectare for rice crop, most of other increase in production was attributable to the increase in area under the crops. A growth rate of 4 per cent per annum in the production of wheat was largely contributed by growth in area under wheat. Similar was the case of non-foodgrain crops.


In a country with rapidly growing population and the consequent increase in the density of population, the increase in agricultural production could not be sustained over a long time through an increase in bringing more and more area under cultivation. Land is a scarce resource with absolute limits on its supply. A sustained increase in agricultural production is possible only through a sustained increase in productivity of land. It was perhaps this realisation
which led to the adoption of new agricultural strategy in the mid-1960s. Moreover, continued increase in area under crops can be a possibility if the intensity of cultivation is enhanced. That means to say that agricultural land is brought under cultivation more than once during a year. This will enhance the use of land without creating demand for additional land for cultivation. New agricultural technology and modernisation of technology in general as well as extension of irrigation is one of the ways in which intensity of land use can be increased. Moreover, increased productivity of land can augment incomes at the farm level which is sure to have a spillover effect on the rest of the economy.

Factors contributing to the growth of production are summarised in the Table 9.2 below. The compound rates of growth of Area (A), Yield per hectare (Y) and Production (O) of different crop groups and some of the important crops are presented. The period begins with 1967-68 leaving out the three consecutive years of drought during 1964-67. The results presented in this table are based on a study by Sawant & Achuthan. Since the compound annual rates of growth are estimated by using the trends of three year moving averages the period mentioned in the table begins with 1968-69, where the year is central year of the first triennium. Likewise the period covered is up to 1992-93, but the central year of the last triennium is represented by 1991-92. Such averaging enables reduction in the year-to-year fluctuations. The purpose of dividing the entire period into two such periods is to highlight how the higher rates of growth in yield per hectare contributed significantly to the acceleration in agricultural production during the decade of 1980’s.

### Table 9.2: Rates of Growth in Area (A), Production (P) and Yield Per Hectare (1968-69 to 1991-92)

<table>
<thead>
<tr>
<th>Crop/Crop Group</th>
<th>Compound Annual Rates of Growth</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area</td>
<td>Yield</td>
<td>Production</td>
</tr>
<tr>
<td>All Foodgrains of Which</td>
<td>0.4</td>
<td>1.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Rice</td>
<td>0.7</td>
<td>1.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Wheat</td>
<td>2.6</td>
<td>2.6</td>
<td>5.2</td>
</tr>
<tr>
<td>Pulses</td>
<td>0.5</td>
<td>0.7</td>
<td>0.2</td>
</tr>
<tr>
<td>Non-foodgrains of Which</td>
<td>1.1</td>
<td>1.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>1.2</td>
<td>0.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Sugar-cane</td>
<td>1.6</td>
<td>1.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Cotton</td>
<td>0.3</td>
<td>2.5</td>
<td>2.8</td>
</tr>
<tr>
<td>All Crops</td>
<td>0.5</td>
<td>1.7</td>
<td>2.3</td>
</tr>
</tbody>
</table>


For the entire period of what has been called phase II here, the rate of growth in production for all crops was 2.8 per cent per annum, which is somewhat lower than the rate of growth of 3.1 per cent per annum observed for phase I (Refer Table 9.3). The contribution of growth in yield per hectare to this growth was however much higher at 2.3 per cent per annum and the contribution of growth in Area was only 0.5 per cent per annum.

A comparison between the two such periods makes it evident that even though the annual rate of growth in area in both the periods was stable at 0.5 per cent, the rate of growth in yield per hectare was significantly higher during the decade of 1980’s (1981-82 to 1991-92 – sub-period 2) as compared the decade of 1970’s (1968-69 to 1981-82 – sub-period). It was 2.9 per cent for all crops in the sub-period 2 as compared to 1.7 in sub-period 1.
For foodgrains as a whole as well as the two major foodgrain crops viz. Rice and Wheat, the rates of growth in yield per hectare contributed much more to the increase in the production during the 1980’s as compared to the 1970’s. It is also instructive to note from the table that the rate of growth in area under non-foodgrains has been increasing far more rapidly than the area under foodgrains. It is the rapid growth in area coupled with the growth in productivity, which has raised the rate of growth of non-foodgrains production to a level higher than that of the foodgrains production.

Thus, in the phase II of agricultural production there was acceleration in aggregate production and productivity growth. A few interesting conclusions of the analysis are as follows:

First, the growth in productivity does not necessarily induce growth in area under a crop. There may, however, be some cases where the higher productivity potential in the water-seed-fertiliser technology might have induced increase in area under a crop. Second, the emphasis on foodgrains has been clearly on the decline. It is very significantly discernible in the decade of 1980’s. On the whole, allocation of area under commercial crops is on the rise. Thirdly, it may be added that some diversification in agricultural production has been observed in recent decades; fruits and vegetable crops have been steadily gaining ground at the cost of coarse cereals and pulses. However, it is important to note that at the beginning of the decade of 1990’s almost 83 per cent of the small and marginal farmers and 68 per cent of the large farmers were engaged in he production of foodgrains. The proportion of farmers involved in the production of commercial crops is, thus, very small.

9.2.3 Growth of Agricultural Production and Productivity:
Phase III

The acceleration witnessed in the rates of growth of production as well as productivity during the earlier phase has not been maintained in the decade of 1990’s and beyond. There are clear symptoms of a green revolution fatigue with a slowdown in the rates of growth. This retrogression in agricultural production highlights the third phase. This is brought out by the data contained in the table 9.3 below:

<table>
<thead>
<tr>
<th>Crop Group/Crop</th>
<th>1990-91 to 2000-01 Compound Annual Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area</td>
</tr>
<tr>
<td>Foodgrains of Which</td>
<td>-0.20</td>
</tr>
<tr>
<td>Rice</td>
<td>0.63</td>
</tr>
<tr>
<td>Wheat</td>
<td>1.21</td>
</tr>
<tr>
<td>Coarse Cereals</td>
<td>-1.84</td>
</tr>
<tr>
<td>Pulses</td>
<td>-1.02</td>
</tr>
<tr>
<td>Non-food Crops of Which</td>
<td>0.84</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>0.44</td>
</tr>
<tr>
<td>Sugar-cane</td>
<td>1.72</td>
</tr>
<tr>
<td>Cotton</td>
<td>2.2</td>
</tr>
<tr>
<td>All Crops</td>
<td>0.08</td>
</tr>
</tbody>
</table>

The rate of growth in yield per hectare for all crops was barely over 1 per cent per annum as compared to around 3 per cent per annum for the preceding decade. The rate of growth in yield as well as production was lower than that in the pre-green revolution period i.e. independence to mid 1960’s. Even the rate of growth of food production was around 1.7 per cent per annum which is less than the estimated rate of growth of population.

But for wheat where the rate of growth of production remained at the level of about 3 per cent per annum, the rate of growth of production of other foodgrain crops was much lower than that in the earlier decade. The major concern was that the rate of growth of productivity declined for nearly all foodgrain and non-foodgrain crops. The rate of growth in area for wheat, cotton and sugar cane crop, however, picked up possibly at the cost of area under coarse cereals and pulses.

In the period beyond 2001, the situation in respect of growth in agricultural production and productivity has remained more or less similar. The index number of agricultural production showed violent fluctuations but little growth. It declined from 177 to 166 between 1999-2000 and 2000-01, rose to 178 in 2001-02 and declined again to 151 in 2002-03. In the year 2003-04, it stood at 179.5. The average rate of growth of production for this period has also been around 1 per cent for all crops with a negative growth in the area and only 1 per cent growth rate in the yield of all crops. The situation in respect of foodgrains is no better with the average rate of growth for foodgrains production remaining around 1 per cent again. In fact, the index of production of both rice and wheat is lower in 2003-04 as compared to 1999-2000. The rate of growth in production and productivity in respect of non-foodgrain crops is only slightly better than that for foodgrains, largely due to the increase in productivity of oilseeds and cotton. In the case of sugar-cane, falling trend in the rate of growth of productivity has persisted.

Check Your Progress 2

Note: i) Space is given below each question for your answer.
   ii) Check your answer(s) with those given at the end of the unit.

1) List some of the achievements of the agricultural sector in phase I.

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2) State the factors which contributed to the growth of production of non-foodgrain during phase I.

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........................................................................................................
........................................................................................................
........................................................................................................
3) State some of the major features of growth in productivity and production during phase II.

4) What were the main features of growth in the production of non-foodgrain crops during phase II?

5) State the main features of growth in agricultural production and productivity during phase III.

9.2.4 Trends in the Growth of Production and Productivity since Independence: An Overview

From an analysis of the trends of growth of production and productivity of agricultural sector as a whole and of different crops in the preceding section, it can be safely concluded that:

1) Growth rate of agricultural production picked up immediately after independence but largely due to allocation of more area under cultivation. This was, however, not enough, as the country was becoming increasingly dependent on food imports. Moreover, the increase in production through increase in area under cultivation has its obvious limitations.

2) The new agricultural strategy of water, seed and fertiliser technology brought about a change in the rate of growth of production through an increase in productivity. This was a welcome change not only for the farmer whose income could rise from his existing holding but also for the economy where growth in agricultural production could facilitate higher rate of economic growth.

3) The growth rate of production of the agricultural sector rose to around 3.4 per cent per annum during the decade of 1980’s and was higher than the rate of growth in production of 2.5 per cent per annum during the earlier decade. Increase in yield was the major contributor to the growth rates in agricultural production.
4) Similar trends were witnessed in the rates of growth of production and productivity of foodgrains. The growth rates witnessed in the decade of 1980’s were distinctly higher than those in the earlier decades.

5) In respect of foodgrains, the gains of technological change were largely confined to Rice and Wheat. Other Coarse Cereals and pulses lagged behind.

6) For the period up to 1980’s, the growth in production and productivity in non-foodgrain sector is only marginally higher than for the entire sector. However, since the decade of 1980’s the non-foodgrain sector has grown at a rate which is distinctly higher than the growth of the sector as a whole.

7) There are clear symptoms of the agricultural sector showing symptoms of retrogression in growth of production and productivity of agricultural sector as a whole and foodgrains as well. The sluggishness in the rates of growth of production and a significant decline in rate of growth of yield per hectare call for a major overhaul of agricultural policy framework.

9.2.5 Potentials of Productivity Growth

It needs to be noted that growth in productivity witnessed in the past are an average rate at the All-India level. There are considerable regional and inter-farm variations. In the decade of 1980’s, the average rate of growth of yield per hectare for foodgrain crops was around 3.1 per cent annum at the all India level but states like Assam, Gujarat, Karnataka, Kerala and Maharashtra experienced much lower growth rates in yield. Sustained increase in agricultural production and productivity calls for reduction in these inter-regional and inter-farm variations. Overall increase in productivity would obviously be higher if all states and regions as well as all farms adopted the new technology and adjusted their farming operations keeping in view the possibility of raising productivity further.

However, the average productivity at the economy wide level for India seems to have been far below the productivity levels realised in some of the other countries where these crops are grown. For an inter-country comparison and for examining the gaps between the productivity of different crops in India and that in some of the other countries, we present the data relating to productivity of selected food crops for the year 2003 in Table 9.4 below:

Table 9.4: Comparative Yield of Major Crops in Selected Countries in 2003 (Kg/Ha)

<table>
<thead>
<tr>
<th>Country</th>
<th>Paddy</th>
<th>Wheat</th>
<th>Maize</th>
<th>Groundnut</th>
<th>Sugar-cane</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>3000.3</td>
<td>2617.1</td>
<td>2114.3</td>
<td>937.5</td>
<td>62859.2</td>
</tr>
<tr>
<td>China</td>
<td>6074.1</td>
<td>3906.5</td>
<td>4854.4</td>
<td>2623.7</td>
<td>69555.7</td>
</tr>
<tr>
<td>Australia</td>
<td>10289.5</td>
<td>1999.0</td>
<td>5266.7</td>
<td>1681.8</td>
<td>85134.8</td>
</tr>
<tr>
<td>Canada</td>
<td>-</td>
<td>2250.0</td>
<td>7819.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>USA</td>
<td>7448.2</td>
<td>2973.8</td>
<td>8923.6</td>
<td>3540.4</td>
<td>77515.1</td>
</tr>
<tr>
<td>Indonesia</td>
<td>4537.5</td>
<td>-</td>
<td>3252.2</td>
<td>2016.3</td>
<td>73142.9</td>
</tr>
<tr>
<td>Thailand</td>
<td>2454.5</td>
<td>615.4</td>
<td>3913.0</td>
<td>1517.2</td>
<td>66399.7</td>
</tr>
<tr>
<td>Pakistan</td>
<td>3054.8</td>
<td>2380.2</td>
<td>1457.1</td>
<td>1060.0</td>
<td>47933.5</td>
</tr>
<tr>
<td>Brazil</td>
<td>3238.1</td>
<td>2371.2</td>
<td>-</td>
<td>2082</td>
<td>72289.5</td>
</tr>
<tr>
<td>South Africa</td>
<td>2285.7</td>
<td>1777.8</td>
<td>2899.8</td>
<td>1041</td>
<td>63388.6</td>
</tr>
<tr>
<td>Japan</td>
<td>5849.8</td>
<td>4030.2</td>
<td>-</td>
<td>2308.5</td>
<td>60869.6</td>
</tr>
<tr>
<td>World Average</td>
<td>3837.4</td>
<td>2665.0</td>
<td>4471.7</td>
<td>1347.5</td>
<td>65292.6</td>
</tr>
</tbody>
</table>

Source: FAO database “FAOSTAT”. 13
It is evident from this table that agricultural productivity in India even in the year 2003 (even after the impact of a rise in productivity over the years) is far below the productivity levels realised in some of the other countries. In respect of rice, for instance, the productivity per hectare in India is less than even one-third of that in Australia. It is less than half that in China and USA and almost half of the per hectare yield in Japan. In the case of wheat, the productivity level in India is close to the world average but is far below that of China and Japan or even USA. Maize, which is included among the coarse cereals, shows a productivity level which is less than half that of world average and also less than one-fourth of the productivity level in USA. In China, the productivity of land under maize is more than double of that in India. Equally dismal is the productivity profile in respect of groundnut in India. However, the productivity situation for sugar-cane crop in India compares favourly with several other countries, although there is still a substantial difference between the productivity of sugar-cane in India and that in Brazil, Australia, USA and China.

This comparison indicates that there is a tremendous scope for further improvement in agricultural productivity in India. The rise in productivity in the post-green revolution period, particularly in the decade of 1980’s, is only a step in the direction of realising the potentials of growth in productivity. This need not be a wishful dream particularly when we note that India is well endowed with a fairly advanced agricultural research system among the developing countries in terms of scientific skills. The country has to exploit the frontier technologies like biotechnology. It may also have to re-organise and restructure its research organisation to ensure that benefits of research are smoothly transferred from the laboratories to the land.

Check Your Progress 3

Note: i) Space is given below each question for your answer.

ii) Check your answer(s) with those given at the end of the unit.

1) Compare the rates of yield per hectare in some of the major crops between India and China.

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2) Do you think that there is a potential for further growth in yield per hectare? State any two reasons.

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9.2.6 Some Policy Imperatives for Accelerating Growth in Agricultural Production and Productivity

It is important to note that India is one of the large producers of agricultural products. It is World’s largest producer of tea and pulses. It is the second largest producer of several other crops like rice, wheat, groundnut, sugar-cane. It is a leading producer of eggs and meat and ranks first in terms of the livestock population. This may be seen from the following table.

Table 9.5: India’s Position in World Agriculture

<table>
<thead>
<tr>
<th>Item</th>
<th>India</th>
<th>Next to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Share in World (%)</td>
<td>Rank</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Area</td>
<td>2.3</td>
<td>Seventh</td>
</tr>
<tr>
<td>Arable Land</td>
<td>11.8</td>
<td>Second</td>
</tr>
<tr>
<td>Irrigated Area</td>
<td>21.5</td>
<td>First</td>
</tr>
<tr>
<td>Crop Production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat</td>
<td>12.8</td>
<td>Second</td>
</tr>
<tr>
<td>Rice (Paddy)</td>
<td>22.4</td>
<td>Second</td>
</tr>
<tr>
<td>Total Pulses</td>
<td>23.6</td>
<td>First</td>
</tr>
<tr>
<td>Oilseeds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groundnut</td>
<td>17.1</td>
<td>Second</td>
</tr>
<tr>
<td>Fruits &amp; Vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables &amp; Melons</td>
<td>9.2</td>
<td>Second</td>
</tr>
<tr>
<td>Onion (Dry)</td>
<td>10.4</td>
<td>Second</td>
</tr>
<tr>
<td>Commercial Crops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugar-cane</td>
<td>24.6</td>
<td>Second</td>
</tr>
<tr>
<td>Tea</td>
<td>25.1</td>
<td>First</td>
</tr>
<tr>
<td>Jute &amp; Jute Like Fibers</td>
<td>43.3</td>
<td>Second</td>
</tr>
<tr>
<td>Tobacco Leaves</td>
<td>10.0</td>
<td>Second</td>
</tr>
<tr>
<td>Livestock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattle</td>
<td>16.2</td>
<td>First</td>
</tr>
<tr>
<td>Buffaloes</td>
<td>57.0</td>
<td>First</td>
</tr>
<tr>
<td>Animal Products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eggs total</td>
<td>n.a.</td>
<td>Fifth</td>
</tr>
<tr>
<td>Total Meat</td>
<td>n.a.</td>
<td>Seventh</td>
</tr>
</tbody>
</table>

n.a.: Not available.


Physical indicators of India’s agricultural sector in the world perspective present a mixed picture. India has the second largest share in the global arable land, next only to US. Even though it holds the largest share in the world’s total irrigated area, only 40 per cent of the cultivated area is irrigated. The dependence on monsoon continues to be glaring factor governing the performance of Indian agriculture. Likewise, despite a considerable progress in the mechanisation of agriculture, the availability of tractors in the country...
continues to be low (94 per 100 square kilometres of arable land) as compared to some other Asian Countries (Malaysia 39 and Thailand 147). The use of chemical fertilisers has increased rapidly but its application is far below the standards in other countries. Per hectare consumption of fertilisers (nitrogenous, phosphoric and potassic = NPK) has increased from 69 kgs. per hectare in 1990-91 to 90 kgs. in 2003-04.

The arrested growth in the overall production and productivity in the decade of 1990’s and beyond needs to be examined. The crop yields have shown an unstable trend in recent years. Although yield of foodgrains showed an increase from 719 kg./hectare in 1960-61 to 1704 kg./hectare in 1999-2000, the yield per hectare stands only at 1707 kg./hectare in 2003-04. For rice and wheat, the situation is very similar. The productivity in case of oilseeds improved significantly during the 1980’s and 1990’s but has fluctuated in recent years. Sugar-cane yields have also been declining after steadily rising for nearly four decades. The yield per hectare of cotton which more than doubled from 125 kg./hectare in 1960-61 to 265 kg./hectare in 1996-97 has been declining thereafter.

Decline in the rates of growth of yield per hectare and production has resulted in a decline in the per capita net availability of foodgrains; it has declined from 510 grams per day in 1991 to 436 grams per day in 2003. It has been argued that the consumption pattern of people is changing due to increase in per capita income, urbanisation, change in the food habits and greater availability of horticulture and livestock products. Food security, therefore, need not be confined to the availability of foodgrains and it should be extended to the overall availability of the edibles including fruits, vegetables, dairy products, eggs, meat and fish. Based on this argument, the focus of the Government policy on agriculture has been gradually shifting to diversification of agriculture, comprising high-value horticulture and livestock products and non-food commercial crops, which cater to the requirements of the fast growing middle and upper middle class households. Such a policy would doubtless bring about a diversification of farm sector and will generate productive and remunerative employment in the farm sector and rural non-farm sector such as agro-processing and marketing. However, in the absence of an adequate marketing infrastructure and institutional support, the farmers growing such products will be exposed to the vagaries of violent price fluctuations. As the products of horticulture, poultry, dairy are highly perishable in nature, the farmers cannot hold on to the stocks of these products even when their prices are unremunerative. As a result, the farmers suffer and may, therefore, not involve themselves with diversification of their production.

Stabilisation and augmentation of agricultural yield is particularly important in view of the limited scope for increasing area under cultivation of various crops. There has been also a decline in the size of land holding, an increase in the cost of production and depletion of ground water. Increase in production would, therefore, be possible mainly from improvements in productivity from the existing cultivated area. Development of location specific high yielding varieties of seeds, balanced fertiliser doses along with organic manures/biofertilisers, along with a sustained increase in irrigation infrastructure can all add up to a sustained growth in agricultural productivity.

One of the important factors that has influenced the growth rate of yield per hectare is the slowdown of the rate of investment in agriculture which has, in
Agricultural Growth, Productivity Trends and Crop Patterns

Deceleration in public sector investment in agriculture has adversely affected major irrigation projects. It has also impeded adequate private sector investment in critical areas. The Committee on Capital Formation in Agriculture (2003) [Chairman Prof. B.B. Bhattacharya] had pointed out that lagging share of agriculture in aggregate capital formation relative to its share in GDP raises a strong case for increasing the capital formation in agriculture commensurate with its share in GDP.

There may be several reasons for the declining share of public sector investment in agriculture. Some of these are: (a) increase in the cost of maintenance of existing projects, (b) delays in completion of projects and consequent cost over-runs, (c) diversion of resources from direct investment to subsidies and (d) inadequate institutional credit support. In the post economic reform period, the declining developmental role of the state has been an important factor contributing to dwindling public sector investment in agriculture. As curtailing non-plan expenditure to reduce fiscal deficit was difficult for the Government, it seems to have cut down its capital expenditure, especially in agriculture.

Slow growth of productivity, rising input costs and depressed prices of agricultural products have made agriculture an unprofitable activity. A recent study by Central Institute of Agricultural Engineering (CIAE) has shown that profitability has declined on account of market prices failing to keep pace with the rising import costs besides slow growth in productivity. This has trapped...
many a farmer in debt-trap leading to extreme social distress (and suicides) among farmers.

For the purpose of availability of bank credit, agriculture is treated as a priority sector and 18 per cent of total institutional credit flow is meant for the agriculture sector. However, bank credit to this sector has hardly ever reached this expected percentage. For instance, the relative share of agriculture in the net bank credit in March 1997 stood at 12.8 per cent. It declined to 11.7 per cent in March 1999 and further to 10.6 in March 2003. The farmers have to depend upon the informal sources of borrowing which besides the uncertainty of availability of adequate credit are extremely costly, adding to the cost of production.

The Tenth Plan document has emphasised the need for taking concerted steps to augment the rate of growth in productivity and improve the conditions in the farm sector. Following are some of the measures that have been delineated in the plan document:

i) The most important area of focus must be to raise the cropping intensity of the existing agricultural land. India is quite fortunate in having the possibility of multiple crops practically all over the country. For this purpose, water resources need to be harnessed. Despite large investments in irrigation in the past, only about 40 per cent of the agricultural land is irrigated. Unfortunately, public investment in irrigation has declined over successive plans. There is, thus, a need for a major revival of public investment in irrigation capacity and water management. The efficiency of the existing irrigation infrastructure also must be improved besides rain water harvesting and scientific watershed development.

ii) Priority has to be accorded to the development of other rural infrastructure that supports not only agriculture but also all rural economic activities. Poverty alleviation programmes need to be reoriented so that there is a growth in the rural assets for productive employment and income generation.

iii) The plan document also emphasises the need for development and dissemination of agricultural technologies. Strengthening of the agricultural research and development system, with special emphasis on bio technology and a significant improvement in the methods of technology dissemination are essential for achieving rapid and sustained growth in agricultural productivity.

iv) The need for diversification of agricultural products is also emphasised for realising the true potential of agriculture in India. Diversification can gain momentum only if the requisite science and technology input are provided along with a supportive price system.

v) There is also a need to recognise the inter-regional diversities and to frame plans of action which are specific to agro climatic regions. Strategies have to be worked out keeping the local resource base in view.

On the whole, it must be realised that even in this regime of liberalisation, the role of Government by way of public policies, programmes and even investment is very important. The success of this role has so far been a mixed
bag because of lack of effective governance. The quality of programmes and projects can improve considerably if there is a greater interaction at the grass-root level at the stage of preparing the plan of action. Effective implementation of the plan of action can be achieved by entrusting the task relating to its implementation to the Panchayati Raj Institutions. Major initiatives are needed in the direction of devolution of powers to the Panchayats which should be more responsive and accountable. In the genuine spirit of liberalisation, there is a need to shed the bureaucratic controls if the grass-root institutions have to be made effective in the process of implementation.

Check Your Progress 4

Note: i) Space is given below each question for your answer.
   ii) Check your answer(s) with those given at the end of the unit.

1) Bring out the place of India in world agriculture in about four sentences.
   …………………………………………………………………………………
   …………………………………………………………………………………
   …………………………………………………………………………………
   …………………………………………………………………………………

2) Explain in three sentences the implications of the deceleration in the growth in production during the 1990’s and thereafter on farm incomes?
   …………………………………………………………………………………
   …………………………………………………………………………………
   …………………………………………………………………………………
   …………………………………………………………………………………

3) Suggest some of the major initiatives in policy framework for sustained agricultural growth in India.
   …………………………………………………………………………………
   …………………………………………………………………………………
   …………………………………………………………………………………
   …………………………………………………………………………………

9.3 CROP PATTERNS

Analysis of crop patterns in India should relate to the following aspects:

a) The relative significance of different crops/crop groups in the overall area under different crops. This would be an analysis across crops but relate to a specific period.

b) Trend in the change in area under different crops over time. This will be an analysis across crops and over time.
c) Relative share of different regions or states in the crop production would give a view of the regional cropping pattern.

In brief, the analysis should cover the inter-crop differences, inter-temporal differences or time trends and inter-regional differences. In the first section of this unit, let us have a view of the cropping pattern for the latest year for which figures are available. These are presented in Table 9.7 below.

<table>
<thead>
<tr>
<th>Crop/Crop Group</th>
<th>Area Million Hectares</th>
<th>Crop/Crop Group</th>
<th>Area Million Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Foodgrains of Which</td>
<td>124.2</td>
<td>Oilseeds</td>
<td>23.4</td>
</tr>
<tr>
<td>Rice</td>
<td>42.4</td>
<td>Sugar-cane</td>
<td>4.0</td>
</tr>
<tr>
<td>Wheat</td>
<td>26.6</td>
<td>Cotton</td>
<td>7.6</td>
</tr>
<tr>
<td>All Cereals</td>
<td>99.8</td>
<td>Tea</td>
<td>0.5</td>
</tr>
<tr>
<td>Pulses</td>
<td>24.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 9.3.1 Current Cropping Pattern

It is evident from these data that foodgrains constitute the most dominant crop group that is cultivated in India. It is estimated that total cropped area in the year 2003-04 is around 181 million hectares; the area under foodgrains constitutes more than 2/3rd of the gross cropped area. Of the foodgrains, the major share goes to cereals. The cereals are cultivated on almost 80 per cent of the area under foodgrains; the remainder 20 per cent being used for producing pulses. The most dominant crop amongst foodgrains is paddy or rice, which was cultivated on more than 34 per cent of the total area under foodgrains and 42 per cent of the area under cereals. Wheat constitutes another major crop sown in India with more than 21 per cent of the area under foodgrains used for the cultivation of wheat alone. It may be added that among the coarse cereals bajara and jowar are the most important.

Oilseeds constitute the most important crop group among the commercial or the non-foodgrain crops. Two other important crops in the category of non-foodgrain crops are cotton and sugar-cane. Tea, coffee and rubber are the only significant crops in the category of plantation crops with areas under each being around half a million hectares. Besides cotton, jute and mesta are the other two-three crops which have together about one million hectare of land under cultivation.

In sum, the relative importance of foodgrain crops in India is far more than that of the non-foodgrain crops. As has been stated earlier, around 83 per cent of small and marginal farmers and around 68 per cent of the large farmers grow foodgrains. Consequently, only about 17 per cent of small and marginal farmers and about 32 per cent of the large farmers are engaged in growing commercial crops. In the case of small and marginal farmers with steadily declining size of land holding, subsistence farming may be one major reason for the predominance of food crops. In recent years because of the emergence of reverse tenancy (where small and marginal farmers lease-out land to the large farmers), the role of commercial crops among these farms may be an explanatory factor. It must, however, be noted that preference for foodgrain crops among large farmers may be partly explained in terms of the impact of yield growth and the existence of Minimum Support Price System which reduces the risk of farmers in the boom years. In the boom years, excess
production need not be accompanied by distress sales at very low prices given the minimum support price system. It is equally important to note that in a large number of cases the tradition of growing foodgrain crops over a long time may be a factor contributing to its dominance.

### 9.3.2 Cropping Pattern Over Time

The dominance of food crops and among food crops that of rice and wheat only states the existing cropping patterns. It is important to study the trend and trace the changes, if any. This may be done with the help of the following table (Table 9.8):

**Table 9.8: Change in the Cropping Pattern of India Over Time**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Cereals of which</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Rice</td>
<td>59.3</td>
<td>60.2</td>
<td>61.4</td>
<td>60.4</td>
<td>55.5</td>
<td>55.7</td>
<td>55.6</td>
<td>55.3</td>
<td>55.2</td>
</tr>
<tr>
<td>ii) Wheat</td>
<td>23.6</td>
<td>22.3</td>
<td>22.7</td>
<td>23.3</td>
<td>23.0</td>
<td>24.7</td>
<td>24.8</td>
<td>24.3</td>
<td>23.4</td>
</tr>
<tr>
<td>b) Pulses</td>
<td>7.6</td>
<td>8.5</td>
<td>11.0</td>
<td>12.9</td>
<td>13.0</td>
<td>14.2</td>
<td>14.6</td>
<td>15.0</td>
<td>14.7</td>
</tr>
<tr>
<td>Total Foodgrains</td>
<td>76.7</td>
<td>75.7</td>
<td>75.0</td>
<td>73.4</td>
<td>68.8</td>
<td>67.0</td>
<td>67.7</td>
<td>67.4</td>
<td>68.7</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>8.3</td>
<td>9.0</td>
<td>10.0</td>
<td>10.2</td>
<td>13.0</td>
<td>12.6</td>
<td>12.5</td>
<td>12.8</td>
<td>12.9</td>
</tr>
<tr>
<td>Sugar-cane</td>
<td>1.3</td>
<td>1.6</td>
<td>1.6</td>
<td>1.5</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Cotton</td>
<td>4.3</td>
<td>5.0</td>
<td>4.6</td>
<td>4.5</td>
<td>4.0</td>
<td>4.7</td>
<td>5.0</td>
<td>4.6</td>
<td>4.1</td>
</tr>
<tr>
<td>Jute &amp; Mesta</td>
<td>0.5</td>
<td>0.6</td>
<td>0.6</td>
<td>0.7</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Tobacco</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

**Source:** Estimated from data in different Economic Surveys & Handbook of Agricultural Statistics.

Some of the salient features of the cropping pattern over time are as follows:

1) **Foodgrains** constitute the crop group, which is cultivated on a very large area. This share was more than 3/4th of the cultivated area up to the beginning 1970’s. The share started declining steadily and by the beginning of 2000-01, the share of area under foodgrains decreased to nearly 2/3rds of the total cultivated area. This proportion has more or less stabilised at this level with only minor year-to-year fluctuations.

2) **Largest share** of the foodgrains is devoted to the cereals. Up to the beginning of 1980’s, the share of area under cultivation of all types of cereals was around 60 per cent. From the beginning of 1990’s, it declined to around 55 to 56 per cent and has stabilised at that level. We have noted earlier that there was rapid growth in productivity during the 1970’s and 1980’s. This might have contributed to the decline in area under this crop group. Thus, the green revolution and particularly the sharp increase in productivity particularly in wheat and rice proved to be a land saving technology.

3) **There are only minor variations** in the proportion of area under the rice crop. It varied between 22 to 25 per cent. The relatively shrinking area under rice crop may largely be due to greater increase in area brought under cultivation which did not have access to water resources which is
vital for the rice crop. However, the proportion of area under rice has risen since the beginning of 2000-01.

4) The proportion of area under wheat has been almost consistently on the rise.

5) The proportion of area under pulses has shown a steady decline.

6) It may be noted that the area under both rice and wheat put together has risen since the beginning of the decade of 1980’s. It fluctuated around 31 to 33 per cent up to the beginning of the 1970’s. Thereafter, it picked up and has varied between 36 to 38 per cent in the 1980’s and thereafter.

7) Among the non-foodgrain crops the only crop group that has shown a discernible rise in its share of the total cultivated area is oilseeds. It increased from nearly 8 per cent to almost 13 per cent between 1950’s and 1990’s. It has continued to fluctuate around 13 per cent with minor year-to-year variations.

8) Some rise in the share of sugar-cane is noticed. It has increased from around 1.3 per cent in 1950’s to almost double the proportion in the year 2002-03.

9) There is a substantial stability in respect of share of other crops i.e. cotton, jute & mesta and tobacco and no discernible variations are observed in the case of the share of these crops.

It becomes apparent from the above examination of the changes in cropping pattern over time that beginning with the 1990’s some significant changes are noteworthy. While the relative share of food crops showed some decline, there was a rise in the share of the major commercial crops, namely oilseeds and sugar-cane. Among the foodgrain crops also there is a basic upward trend in the share of wheat crop. At the same time, a falling share of the area under pulses is also observed. The marked dominance of the foodgrain crops and cereals in particular, remains the characteristic feature of the cropping pattern in India.

9.3.3 Inter-regional Cropping Pattern

In the analysis of inter-state cropping pattern, there are no significant changes that are distinguishable. But some variation over the years may be observed. Since data are available at the state level and states are of different sizes, inter-state comparison can only be a reference point for the study of inter-regional cropping pattern.

Some of the salient features of inter-state cropping pattern are summarised as under:

1) Uttar Pradesh has remained the largest producer of foodgrains for quite some time. Punjab has been the second largest producer of foodgrains with Madhya Pradesh remaining at the third rank. It is, however, interesting to note that while this ranking was maintained during the decade of 1990’s, the figures for 2002-03 show that West Bengal was the third largest producer of foodgrains displacing Madhya Pradesh. For the year 2003-04, however, it is Rajasthan, which has risen to the rank of
third largest producer of foodgrains. This, obviously suggests that some changes in production and productivity in the dry land farming are leading to encouraging results.

2) In respect of the production of rice, some very interesting changes are appearing in the pattern. West Bengal, Uttar Pradesh and Andhra Pradesh were the three major rice producing states during decade of 1990’s. For the year 2002-03, Punjab rose to the second rank in rice production leaving Uttar Pradesh at the third rank. In the year 2003-04, Uttar Pradesh again appears to have become the second largest producing state of rice with West Bengal remaining the largest producer and Punjab becoming the third largest producer of rice. It appears Punjab has gradually emerged as a major producer of rice with the relative share of Andhra Pradesh going down in respect of rice production.

3) Uttar Pradesh, Punjab and Haryana have remained the three largest wheat producing states in that order.

4) Rajasthan has been steadily emerging as a major producer of coarse cereals. In the year 2003-04, it ranked first among the states producing coarse cereals. Maharashtra and Karnataka have, for a long time, been among the top two states producing coarse cereals. In 2003-04, these states ranked as second and third in the production of coarse cereals.

5) In the production of pulses, Madhya Pradesh, Uttar Pradesh and Maharashtra have been the three largest producers in that order. However, in 2003-04, Rajasthan emerged as the third largest producer of pulses.

6) In the case of oilseeds, Madhya Pradesh, Rajasthan, Maharashtra and Gujarat are the main producers with their ranks interchanging contingent upon the weather and crop conditions. Gujarat is a major producer of groundnut whereas Madhya Pradesh, Maharashtra and Rajasthan largely produce other oilseeds like soyabean, sunflower, rapeseed and mustard etc.

7) Uttar Pradesh and Maharashtra are among the two largest producers of sugar-cane in that order. The third rank has been occupied either by Karnataka in some years or by Tamil Nadu.

8) In respect of cotton, Punjab was at one time a leading producer particularly in the early 1990’s with Maharashtra and Gujarat also producing a fairly large share of cotton. In recent years, however, Andhara Pradesh seems to be emerging as the third largest producer of cotton with Gujarat and Maharashtra remaining amongst the top two producers not always in that order.

These data show that there is a given inter-regional cropping pattern with the states of North and Central India concentrating largely on foodgrains. Rajasthan, Madhya Pradesh, Gujarat and Maharashtra are the major producers of oilseeds. With the role of Tamil Nadu, Karnataka and Andhra Pradesh increasing in the production of groundnut, their share in oilseeds production is on the rise. Maharashtra, Gujarat and Andhra Pradesh are the three large producers of cotton with the relative share of Punjab and Haryana somewhat on the decline. It may be added that Punjab which has been producing greater
Sectoral Performance

proportion of rice and has displaced Andhara Pradesh, the latter has emerged as a major producer of cotton displacing Punjab from among the top ranking producers of cotton. On the whole, there does appear to be a semblance of inter-regional specialisation with the states of Northern and Central India producing foodgrains whereas the states of Western and Southern regions are concentrating on the cash crops. It must, however, be added that UP remains the most dominant state producing both foodgrains and sugar-cane.

Check Your Progress 5

Note: i) Space is given below each question for your answer.
    ii) Check your answer(s) with those given at the end of the unit.

1) On what basis cropping pattern is analysed?

2) State the salient features of current cropping pattern in India in three sentences.

3) State three main features of changes in cropping pattern in India over the last 50 years or so.

4) What are the main features of inter-regional cropping pattern in India?
9.4 LET US SUM UP

In this unit, we have examined the trends in growth of agricultural production over time particularly since Independence. The factors contributing to the growth of agricultural production are identified as the growth in area under cultivation and growth in productivity. An examination of the growth of production shows that there are three clearly distinct phases. In the first phase, there was a rapid growth contributed largely by growth in area under cultivation and only partly by growth in productivity. The second phase shows a greater contribution by the growth in yield per hectare. This was a phase where agricultural productivity started accelerating possibly under the influence of water-seed-fertiliser technology adopted in the mid 1960s. This phase is divided into two sub-phases with a sharper growth in the yield contributing to the growth in producing in the second sub-phase. The third phase reveals a setting in of some deceleration in the rate of growth of yield per hectare. It has been brought out that there is still adequate potential for growth in productivity of different crops with the provision that the policy framework undergoes some changes which strengthen the incentive system so that farmer can gain from increased output.

The second part of the unit deals with the cropping pattern in India. It highlights the importance of foodgrains both in the current scenario as well as over a longer period of time. Some indications of the growing importance of the commercial crops are seen to be emerging, with oilseeds gaining in relative share over time. The variation in cropping pattern across states show a fairly stable pattern with some changes emerging in respect of cash crops particularly oilseeds and cotton. Again broad indications of inter-regional complementarily emerging between Northern States on the one hand, and Western and Southern States on the others are observed.

9.5 EXERCISES

1) ‘Declining share of agriculture in GDP has not been accompanied by commensurate decline in workforce in agriculture.’ Comment.

2) Do you consider the agricultural sector in India as the backbone of the economy? State your reasons.

3) Trace the growth of production in the agricultural sector in India since independence. Delineate the factors that have contributed to this growth at different times.

4) Explain some of the factors that may have contributed to variations in agricultural productivity in India over time. Do you consider that a peak has already been reached in relation to yield per hectare in agriculture?

5) Suggest some policy measures for sustained and steady growth of agricultural production in the near future.

6) Trace the salient feature of the changes in cropping pattern in India.

9.6 SOME USEFUL BOOKS

9.7 ANSWERS OR HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) Agriculture is the (i) largest employment provider (58% of the workforce is engaged in agriculture) and major contributor to the GDP (around 20 per cent), (ii) it is major user of rail and road transport facilities and contributes significantly to the import earnings.

2) Broadly there can be three distinct phases:
   i) 1947-1965
   ii) 1965-June 1991
   iii) July 1991-onwards

3) Due to inadequate growth of the production of foodgrains to meet the insufficient food security.

Check Your Progress 2

1) Significant increase in agricultural production, higher yield per hectare for rice and wheat crop.

2) Growth in the area of production and higher yield.

3) The growth in production of all crops during IInd phase was 2.8 per cent per annum which is slightly lower in comparison to phase I. However, the contribution of growth in yield per hectare to this growth was much higher at 2.3 per cent whereas contribution to area was only 0.5 per cent per annum.

4) During phase II, growth in area coupled with growth in productivity has raised the rate of growth of non-foodgrains production to a level higher than that of foodgrains production.

5) See Sub-section 9.2.3.

Check Your Progress 3

1) See Table 9.4

2) Yes, the rise in productivity in post green revolution period and advanced agricultural system in India.
Check Your Progress 4
1) See Table 9.5
2) See Sub-section 9.2.6
3) See Sub-section 9.2.6

Check Your Progress 5
1) Inter-crop differences, inter-temporal differences or time trends and inter-regional differences.
2) Foodgrains are the most dominant crop group. Of foodgrains, 80 per cent of the area goes to cereals and rest 20 per cent to pulses. Within the cereals, rice and wheat are major crops. Oilseeds are the major crops among the commercial or non-foodgrain crops. Among the plantation crops, tea, coffee and rubber are the significant crops.
3) See Table 9.8
4) See Sub-section 9.3.3