Agriculture plays an essential role in the process of economic development of less developed countries like India. Besides providing food to nation, agriculture releases labour, provides saving, contributes to market of industrial goods and earns foreign exchange. Agricultural development is an integral part of overall economic development. In India, agriculture was the main source of national income and occupation at the time of Independence. Agriculture and allied activities contributed nearly 50 percent to India’s national income. Around 72 percent of total working population was engaged in agriculture. Since independence India has made much progress in agriculture. The present paper is an attempt to analyze plan-wise agricultural productivity in India since 1951. It has been shown that overall performance of the Indian agriculture growth, production and productivity have shown the significant change in the last six and half decades. It reveals that the agriculture major crop has increased over the period of time.

[Keywords: Agriculture, Agricultural productivity, Economic development, Crop production]

1. Introduction

India has gone ahead fast on the agricultural front during the past four decades. Much of the credit for this success goes to the crores of small farmers, the backbone of Indian agriculture and Indian economy. Policy support, production
strategies, public investment in infrastructure, research and extension for crop, livestock and fisheries have significantly helped in increasing the agricultural productivity, food production and its availability. Still producing additional food with limited land, and providing economic access to food at household level for ensuring food security continue to be major challenges for the nation. Changes in agricultural technology and availability of advanced inputs have resulted in a high yield growth per unit of input.

2. **Objectives**

   The Present Study is based on secondary data. They have been collected from various Government of India Reports, RBI reports, Ministry of Agriculture reports, books, articles, and Economic Survey of India (various issues). In this background, the present study is to analyze the trends and pattern of agricultural growth and Production in India. The specific objectives are:

   1. To understand the meaning and concept of agricultural productivity in India.
   2. To study of agricultural productivity trends (since 1951- A plan wise analysis)

3. **Meaning of Agricultural productivity**

   Agricultural productivity indicates the relationship between output and input employed in any work situation. Agricultural productivity is an efficiency index that measures the rate of output per unit of input.

4. **Indian Agriculture : Performance and Challenges**

   India is the second largest producer of food in the world: more than 200 million tons of food grains, 150 million tonnes of fruits and vegetables, 91 million tonnes of milk, 1.6 million tonnes of poultry meat, 417 million livestock, and 6.05 million tonnes of fish and fish products. Over the last decades the food grain production has increased manifolds-from 51 million tonnes in 1950-51 to 252.22 million tonnes during 2014-15 growing at an annual average rate of more than 2.4 percent per annum.

   India accounts for only about 2.4 percent of the world's geographical area and 4 percent of its water resources, but has to support about 17 percent of the world's human population and 15 percent of the livestock. Agriculture is an important sector of the Indian economy, accounting for 14 percent of the nation’s GDP, about 11 percent of its exports, about half of the population still relies on agriculture as its principal source of income and it is a source of raw material for a large number of industries. Accelerating the growth of agriculture production is therefore necessary not only to achieve an overall GDP target of 8 percent during the 12th Plan and meet the rising demand for food, but also to increase incomes of those who are dependent on agriculture for their livelihood.
Table 1: Trends in Agricultural Production during Five Year Plans
(Average Production in Million Units)

<table>
<thead>
<tr>
<th>Crop</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
<th>Fourth</th>
<th>Fifth</th>
<th>Sixth</th>
<th>Seventh</th>
<th>Eighth</th>
<th>Ninth</th>
<th>Tenth</th>
<th>Eleventh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>25.0</td>
<td>30.3</td>
<td>35.1</td>
<td>41.8</td>
<td>47.3</td>
<td>54.5</td>
<td>65.1</td>
<td>78.7</td>
<td>87.3</td>
<td>85.6</td>
<td>97.3</td>
</tr>
<tr>
<td>Wheat</td>
<td>7.9</td>
<td>9.7</td>
<td>11.1</td>
<td>25.4</td>
<td>29.8</td>
<td>41.2</td>
<td>48.3</td>
<td>62.9</td>
<td>71.3</td>
<td>70.2</td>
<td>84.4</td>
</tr>
<tr>
<td>Jowar</td>
<td>7.5</td>
<td>8.7</td>
<td>8.8</td>
<td>8.3</td>
<td>10.8</td>
<td>11.3</td>
<td>10.90</td>
<td>10.7</td>
<td>7.9</td>
<td>7.2</td>
<td>7.0</td>
</tr>
<tr>
<td>Bajra</td>
<td>3.4</td>
<td>3.4</td>
<td>3.9</td>
<td>6.0</td>
<td>5.0</td>
<td>6.0</td>
<td>5.2</td>
<td>6.7</td>
<td>7.1</td>
<td>8.2</td>
<td>9.2</td>
</tr>
<tr>
<td>Maize</td>
<td>2.7</td>
<td>3.6</td>
<td>4.6</td>
<td>6.1</td>
<td>6.3</td>
<td>7.3</td>
<td>7.6</td>
<td>9.8</td>
<td>11.6</td>
<td>14.0</td>
<td>19.8</td>
</tr>
<tr>
<td>Other</td>
<td>6.6</td>
<td>6.5</td>
<td>6.3</td>
<td>6.4</td>
<td>7.1</td>
<td>6.0</td>
<td>5.4</td>
<td>4.9</td>
<td>4.5</td>
<td>3.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Pulses</td>
<td>10.1</td>
<td>11.7</td>
<td>11.1</td>
<td>10.9</td>
<td>11.7</td>
<td>11.8</td>
<td>12.5</td>
<td>13.3</td>
<td>13.1</td>
<td>13.3</td>
<td>15.9</td>
</tr>
<tr>
<td>Total</td>
<td>63.2</td>
<td>74.0</td>
<td>81.0</td>
<td>103.0</td>
<td>118.1</td>
<td>138.1</td>
<td>155.0</td>
<td>189.0</td>
<td>202.9</td>
<td>202.2</td>
<td>237.4</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>5.5</td>
<td>6.7</td>
<td>7.3</td>
<td>8.3</td>
<td>8.9</td>
<td>11.4</td>
<td>13.9</td>
<td>21.9</td>
<td>21.2</td>
<td>23.2</td>
<td>28.9</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>55.3</td>
<td>80.3</td>
<td>109.2</td>
<td>128.1</td>
<td>153.3</td>
<td>174.9</td>
<td>196.4</td>
<td>258.4</td>
<td>292.4</td>
<td>277.0</td>
<td>325.8</td>
</tr>
<tr>
<td>Cotton</td>
<td>3.9</td>
<td>4.8</td>
<td>5.4</td>
<td>5.9</td>
<td>6.8</td>
<td>7.5</td>
<td>8.4</td>
<td>12.2</td>
<td>10.8</td>
<td>16.0</td>
<td>28.1</td>
</tr>
<tr>
<td>Jute</td>
<td>3.9</td>
<td>4.4</td>
<td>5.7</td>
<td>5.5</td>
<td>5.2</td>
<td>6.4</td>
<td>8.9</td>
<td>8.1</td>
<td>9.6</td>
<td>10.1</td>
<td>10.3</td>
</tr>
</tbody>
</table>


Agricultural production has two components food grains and non-food grains. The former contributes approximately two-thirds of total agricultural and production. The most important component in the food grains category is rice followed by wheat. In non-food grains category, oilseeds constitute the most important group. Sugarcane stands second while cotton stands third.

As far as foodgrains output in concerned, the total production increased form 50.8 million tonnes in 1950-51 to 187.0 million tonnes in the Eighth plan, to 202.9 million tonnes in the Ninth Plan. However, because of drought conditions in the first year of the Tenth Plan 2002-03, the food grains output declined to 174.8 million tonnes but again rose to 213.2 million in 2003-04 and 252.22 million tonnes in 2014-15. Production of wheat which averaged only 9.7 million tonnes per annum in the Second Plan and 11.1 million tonnes per annum in the Third Plan, rose to 25 million tonnes per annum in the Fourth plan. The momentum has been consistently maintained with wheat production averaging 84.4 million tonnes per annum in the Eleventh Plan. Wheat production is expected to touch the record level of 84.4 million tonnes in 2007-2012. It was 86.53 million tonnes in 2014-15. Rice production has also picked up considerably since 1980s although there have been setbacks in some years. Rice production increased from 35.1 million tonnes in Third Plan to 97.03 million tonnes in Eleventh Plan. It touched the level of 105.48 million tonnes...
in 2014-15. As is clear from Table 1.1 jowar and bajra have shown erratic trends over the planning period as a whole with production remaining almost stagnant for most of time. Maize also exhibited stagnant production levels for a considerable period of planning. However, the introduction of hybrid maize seeds in recent years has suddenly pushed up production. Maize production which was 15.1 million tones in 2002-07 rose to as high as 23.7 million tonnes in 2014-15. It was only in 2010-11 that this level was breached and the actual production of pulses rose to 18.2 million tonnes. It was 17.2 million tonnes in 2014-15.

As far as the non-food grains group is concerned, the production of oilseeds rose considerably in the latter half of the 1980s, in certain years of 1990s and the first decade of the present century. For instance, oilseeds production increased from 12.7 million tonnes in 1987-88 to 18.6 million tonnes in 1990-91, and to a level of 24.7 million tonnes in 1998-99. However, it fell thereafter and stood at only 14.8 million tonnes in 2002-03 but rose subsequently. It was 24.9 million tonnes in 2009-10 and touched the record level of 32.5 million tonnes in 2006-2007. In 2011-12, the production of oilseeds declined to 30.9 million and was 33.0 million tonnes in 2013-14. However, just like pulses, there is a large gap. Between demand and supply forcing the country to import large quantities of edible oils.

Production of cotton which averaged 12.2 million tonnes per annum in the Eighth Plan and 10.1 million tonnes per annum in the Ninth Plan rose significantly in later years due to the widespread adoption of Bt cotton in 2002. From an average annual production of 16.0 million tonnes in the Tenth Plan period, the production rose to 34.2 million tonnes during 2002-07 and 34.80 million tonnes in 2014-15. Now almost 90% of cotton area is covered under Bt cotton.

In the non food grains, jute has shown a slow and halting progress during the entire period of planning. As far as sugarcane production is concerned, it registered a more or less steady growth during the first four decades 1952-53 to 2002-03, but fell sharply in 2003-04 and 2004-05. In 2006-07, sugarcane production attained a high level of 355.5 million tonnes but declined in subsequent years. In 2009-10, it was only 292.2 million tonnes but rose to the record level of 361.0 million tonnes during 2002-07. The production of sugarcane rose to 362.34 million tonnes in 2014-15.

### Table-2 : Yield per Hectare of Major Crops from 1950-51 to 2014-15 (Kgs per hectare)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>668</td>
<td>1,013</td>
<td>1,336</td>
<td>1,740</td>
<td>1,901</td>
<td>2,372</td>
<td>2,462</td>
<td>2,390</td>
</tr>
<tr>
<td>Wheat</td>
<td>655</td>
<td>851</td>
<td>1,630</td>
<td>2,281</td>
<td>2,708</td>
<td>3,140</td>
<td>3,118</td>
<td>2,872</td>
</tr>
<tr>
<td>Jowar</td>
<td>353</td>
<td>533</td>
<td>660</td>
<td>814</td>
<td>764</td>
<td>962</td>
<td>862</td>
<td>953</td>
</tr>
<tr>
<td>Bajra</td>
<td>288</td>
<td>286</td>
<td>458</td>
<td>658</td>
<td>688</td>
<td>1,171</td>
<td>1,214</td>
<td>1,272</td>
</tr>
<tr>
<td>Maize</td>
<td>547</td>
<td>926</td>
<td>1,159</td>
<td>1,518</td>
<td>1,822</td>
<td>2,478</td>
<td>2,552</td>
<td>2,557</td>
</tr>
</tbody>
</table>
Data contained in the table above reveal increases in yield per hectare. This table shows the over the period 1950-51 to 2014-15, yield per hectare of given crops. If we focus on the entire period of planning, the most significant increase has been recorded by wheat with its yield increasing from 655 kgs per hectare in 1950-51 to as high as 3,118 kgs per hectare in 2012-13. Jowar and Bajra recorded much slower rates of growth in productivity. Most disappointing has been the performance of pulses. In fact, productivity of pulses in 2000-01 was at the same level as it was in 1960-61. However, the productivity rose somewhat to 694 kgs per hectare in 2011-12 and further to 786 kgs per hectare in 2012-13 but it reduced to 744 kgs per hectare in 2014-15.

As mentioned earlier, due to the adoption of hybrid maize varieties and Bt cotton in recent years, the productivity of maize and cotton has increased substantially. As is clear from table 1.2, the productivity of maize from 1,822 kgs per hectare in 2000-01 rose to 2,557 kgs hectare in 2014-15. The most disappointing has been the performance of pulses. If we consider the entire period planning, we find that the average yield per hectare of pulses has grown by less than one percent annually, an average, since the 1950s. The productivity of oilseeds rose from 4181 kgs per hectare in 1950-51 to 810 kgs per hectare in 2000-01 and 1,037 kgs per hectare in the year 2014-15.

5. **Causes of Low Productivity**

The causes of low productivity are given below:

5.1 **General Causes**

1. The heavy pressure of population on land is caused by the limited growth of employment opportunities in the non-agricultural sector for rural people and rapid growth of rural population. It results in subdivision, fragmentation of land holdings that results into low productivity of land.

2. The social environment in terms of illiteracy, superstitious attitude, poor health and unresponsive behavior towards the new technology is also a major limiting factor to the improvement in the agricultural productivity.

3. The increased land degradation is mainly due to the increased use of chemical fertilizers, and low quality of canal water, resulting in loss of nutrients in the land and fall in the productivity levels.

4. The economic rural infra-structural facilities are inadequate in terms of availability of road, transportation facilities, electricity and power.
5. The capital formation in the agriculture sector particularly the public capital formation in the agriculture sector in declining. The depressed capital formation has resulted into low agriculture productivity.

5.2 Institutional Causes

1. The exploitative character of land tenure system in the form of Zamindari system has reduced the capacity, incentive and motivation of the cultivators to improve productivity.

2. The average land-holding in India is not only small in size but split into pieces and scattered due do sub-division and fragmentation of land. This has resulted into the uneconomic land holding making investments in improved technology and inputs unviable.

3. There has been a drastic reduction of institutional credit for agriculture. Banks and financial institution are reluctant to provide financial assistance at fair rate of interest to farmers. The share of direct financing of farmers has declined tremendously. Thus, a large section of farmers has to depend upon non-institutional credit system (like money lenders, and traders) that charge exorbitant rate of interest.

5.3 Technical Causes

1. Most of the farmers use traditional agriculture methods mainly due to paucity of finance. The use of high-yield variety seeds and fertilizers is very limited. Farmers have to pay exorbitant prices to the private suppliers for the low quality seed variety which has adverse consequences on the agricultural productivity.

2. The increase in the input cost due to reduction in subsidies for fertilizers and better seeds and increase in cost of power are responsible for the deceleration in the agriculture growth in recent years.

3. The vast proportion of cultivable land in India is rain-fed. Further, the infrastructure for irrigation is highly underdeveloped due to defective management. As rainfall is often insufficient, uncertain and irregular, it leads to low productivity. Further, the Government’s expenditure on irrigation coverage and flood control has witnessed a declining trend during the reform period.

6. Measures to Improve Productivity

The following measures are required to strengthen the agricultural productivity:

1. The land reforms in terms of Zamindari abolition, ceiling and redistribution of land tenurial relations, consolidation of small and scattered holdings, minimum wages of landless labour etc need to be effectively implemented.
2. The components of modern technology in terms of improved seeds, fertilizers and pesticides have to be made available easily to the farmers at fair prices. Farmers are required to be given training about the usage of these components especially fertilizers and chemical pesticides.

3. The timely and sufficient financial assistance is the precondition to improve usage of better technology. Moreover there is lack of coordination under the multi-agency credit system.

4. The scientific research has mainly focused upon two major crops viz, wheat and rice. The breakthrough in terms of improved varieties of seeds has to be explored for other crops.

5. The inter-linking of river projects needs to be implemented speedily to reduce the ill-effects of floods and droughts. The greater use of dry and commercial cropping that requires lesser use of water should be encouraged. The surface-irrigation and water-pumping arrangements should be increased.

6. The research labs and agricultural universities have to be established, upgraded and sustained. The weakening of link between laboratory research and application on farm has to be minimized.

7. The warehousing facilities should be well developed to avoid decay of food grains.

8. The family planning and population control should be given top priority.

9. The co-operatives should be given greater operational freedom and allowed to enlarge their activities including banking and marketing of agro products.

7. Conclusion

In brief overall performance of the Indian agriculture growth, production and productivity have shown the significant change in the last six and half decades. It reveals that the agriculture major crop has increased over the period of time.

References


Chand, Ramesh and others, “Growth Crisis in Agriculture”, Economic and Political Weekly, 42(26), 30 June 2007. 2528-2533.


GOI, India’s Economy Survey (Various issues), New Delhi : Government of India.


Article Received on April 12, 2018; Accepted on June 10, 2018