CHAPTER - 1

INTRODUCTION
SECTION – I

INTRODUCTION
This chapter has been categorized into three sections. Section I provides the significance of agriculture in India as well as in Gujarat; rice economy in world, in India and in Gujarat economy. Detailed reviews of literature of rice cultivation at macro and micro levels have been presented in Section II. Section III describes the methods of the study.

SECTION – I
INTRODUCTION

Rice (paddy) is grown in almost all the continents of the world except the Antarctica. The major rice producing countries in the world are China, India, Indonesia, Bangladesh, Thailand and Japan. The other countries like Burma, Brazil, Pakistan, USA, North Korea and Australia are also producing rice crop (Singal Vikash – 1996). The total rice production in the world was 307 million tones in 1970-70; it was increased to 601 million tones in 2000-01 and decreased to 589 million tonnes in 2004-05 (Fertilizer Statistics-2004-05). Among the all continents, Asia accounts for about 90 per cent under rice area of the total area under rice and 92 per cent production of rice in the total production in the world. (Hazra C.R.-2001)

Major Rice Producing Countries in the World

Rice is an important crop of the world. It is the staple food of nearly half of the world’s population. Among the rice producing countries, India has the largest area under rice in the world in 2003-04 (44 million hectares) and ranks second in production (132 million tonnes). China’s share in the world’s production was 28.25 per cent and that of India was 22.41 per cent in 2003-04. Other important rice producing countries and their respective shares in world area and production of rice are Bangladesh (7.23 percent and 6.46 per cent), Thailand (7.17 per cent and 4.58 per cent), Vietnam (4.85 per cent and 5.86 per cent), Philippines (2.67 per cent and 2.38 per cent), Brazil (2.05 per cent and 1.73 per cent) and Japan (1.08 per cent and 1.65 per cent). The productivity of rice in India is higher than Thailand but much below the productivity in the Egypt, China, Japan, Vietnam, Bangladesh, Brazil, Philippines and also the world average. Area, production and productivity of rice in important rice growing countries are indicated in table 1.1.
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Source: Calculated on the basis of data collected from Fertilizer Statistic – 2004-05, New Delhi
Graph 1.1

Major Rice Growing Countries

Source: Fertilizer Statistic – 2004-05, New Delhi

Graph 1.2

Country wise Rice Production

Source: Fertilizer Statistic – 2004-05, New Delhi
World Rice Market

The world rice market has been expanding over the years, particularly since 1990s. Currently, around 24 million tonnes of rice is traded annually. The rice market also tends to be highly concentrated in a few countries. During the 1990s, around 80 per cent of the rice exports came from just only six countries, namely, Thailand, Vietnam, India, China, Pakistan and The US. (Gulati Ashok and Narayanan Sudha – 2003)

HISTORY OF RICE (PADDY)

Rice is an important food crop of India as also in Asia since immemorial. The Chinese literature where in it is recorded that, the crop was being grown in China in about 2800 B.C. This is the earliest mention of rice in any writing. In India, rice has been cultivated since ancient times. This is supported by archaeological evidences and by the many references made to rice in ancient Hindu texts. (R.L.M.Ghose-1960, K.K.Framji-1977)

Rice (oryza sativa - scientific name) belongs to the genus oryza. There are 18 valid species distributed mainly in Asia, Africa and America. Among the two cultivated species, oryza sitiva and oryza glaberrima, the former is cosmopolitan and the latter is confined to Africa. The carbonized grains obtained in India could be dated around 2300 B.C. Samples from Lothal (extension of the Harappan civilization - Ahmedabad district) excavation in India reveal the use of paddy husk in potteries, bricks etc. It is generally felt that the domestication had secured independently, India is one of the oldest regions where domestication began. There is a mention of 'nivara', wild from of rice, in Vedic literature. 'Atharva Veda' mentions 'vrithi', probably means wild rice (Kainth G. S. and Mehra P. L. –1985, Government of Indai-1955).

There is oldest rice specimen yet known in the world. The oldest literary recorded of rice in India is in the 'Rugveda' which mentions a period not later than 1500 B.C. The possibility was derived from Arruzz of Arabic and Arisi of the Dravidian languages. It is possible that Dravidian people utilized rice as a crop before it was used in Sanskrit language. Rice cultivation probably spread to North India from
South India. In the subsequent literary and religious works, there are numerous references for rice and rice cultivation (Ratna K. Bandila-1992)

Paddy (rice with husk) is generally cultivated in shallow-medium black soil and in the area where rainfall is higher or in irrigated area. Paddy is generally grown as wet crop or irrigated crop. Paddy farming requires higher moisture conserving soil. Paddy cultivation is conditioned by temperature parameters at different phases of growth. A temperature range of 20.6° C to 37.5° C is required for its optimum growth. The crop requires a higher temperature at the time of sowing and during its early growth. The temperature requirement for blossoming ranges between 26.5° C and 29.5° C. (Solapurkar and Balkundi-1972, Kainth G. S. and Mehra P. L. –1985)

There are three main seasons for growing paddy in India. The main rice-growing season in the country is the kharif (winter rice) sown in June-July and harvested in November-December. About 45 to 48 per cent of the India’s rice crop is grown in this season and usually consists of medium to long duration varieties. Pre-kharif (autumn rice) crop is grown in May-June and harvested in September-October. In this season, nearly 43 per cent of the India’s rice crop is grown and mostly varieties of shorter duration ranging from 90 to 110 days are grown. Rabi (summer rice) is sown in November to February and harvested in March-June. The area under summer rice is only 9 per cent. (Hazra C.R.-2001 and Roy R.N. & Other- 1980)

SIGNIFICANCE OF AGRICULTURE IN INDIAN ECONOMY

India is predominantly an agrarian economy with 72 per cent of its population living in villages and 58 per cent of the population largely depend on agriculture and allied agricultural activities for their livelihood (Fertilizer Statistics 2005-06).

The total geographical area of India is 328.73 million hectares. The net sown area was 141.35 million hectares in 2001-02. The gross cropped area was 190.28 million hectares. The gross irrigated and net irrigated area was 76.44 million hectares and 55.88 million hectares respectively in same year. The country has attained a secular growth rates in agricultural area 0.57 per cent, in production 2.66 per cent and in productivity 1.68 per cent per annum during 1949-50 to 2001-02 respectively
The liberalization of the economy led to some shift in area under food grains to non-food grains. Efforts are being made to encourage farmers to diversify their cropping pattern towards high-value crops. Changes in cropped area at All India level are assessed for major crop/crop groups, namely rice, wheat, coarse cereals, pulses, food grains, groundnut, rapeseed and mustard, soya been, oilseeds, cotton and sugarcane (Sharma Vijay Paul-2007). The per capita net availability of food grains reached 494.1 grams per day in 2002 compared to 394.9 grams per day in 1951. Availability of edible oils has increased from 2.5 kg in 1955-56 to 8 kg during 2000-01. In spite of mounting population pressure, we have been able to sustain and improve the availability of consumer articles and thus raise the standard of living of population.

The contribution of the agricultural sector in national income, employment, government’s revenues, industries and foreign exchange resources show the importance of it in the overall economy. This all pervading influence can be judged from the following facts and figures:

(1) **Contribution to National Income:**

The primary sector which includes agriculture, forestry and logging, fishing and quarrying etc. still dominates the national economy of India. The contribution of agriculture in national income is a crucial indicator of the role that agriculture plays an important role in the economic development of the country. The share of agriculture in national income has declined from 56.5 per cent in 1950-51 to 52.1 per cent in 1960-61, 45.7 per cent in 1970-71, 36.6 per cent in 1980-81, 33 per cent in 1990-91, 24.2 per cent in 2000-01 (quick estimates) and 22 per cent in 2003-04 (advance estimates) (Singh and Sadhu-1991, Shelat Kirit- 2007, Misra and Puri- 2005 and Kapila Uma-ed –2006-07). On the basis of these data it can be concluded that,

(a) Agriculture contributes, even at present, a major share of the national income in India, and

(b) The share of agriculture in national income has been decreasing continuously and the shares of the manufacturing and service sectors are increasing in India.
Comparison can be made between the position of agriculture in India with that in the other countries as regards the share of agriculture in national income. In the United Kingdom, agriculture contributes only 2 per cent of the national income; in USA it is 3 per cent; in Canada it is 4 per cent; in Australia it is 5 per cent and. Therefore, it can be revealed that, agricultural sector is still a dominant sector in India (Misra S. K. and V. K. Puri – 2005).

(2) Agriculture and Employment:

Agriculture, directly or indirectly, has continued to be the main source of livelihood for the majority of the population in India. The share of agriculture in national income has been declining, while the workforce engaged in agriculture has exhibited only a marginal decline. The Census of India reveals that in absolute terms, agriculture provided employment to 97 million persons in 1951, which increased to 235 million persons (cultivators and agriculture labourers) in 2001. However, in terms of percentage, people working on land come down from 70 per cent to 59 per cent during the five decades between 1951 to 2001. It is, however, really disturbing that the proportion of agricultural labourers has increased from 20 per cent to 27 per cent between 1951 and 2001, but that of cultivators has indicated a decline from 50 per cent to 32 per cent (Misra and Puri – 2005).

According to 2001 Census figures, out of the total population of 1025.3 million, 313.2 million were main workers accounting for 30.55 per cent. Out of the total main workers, 40.74 per cent were engaged in cultivation and 34.32 per cent were engaged as agricultural labourers. In short, agricultural sector have been a main source of employment to the working population.

(3) Contribution to Government Revenues:

Agriculture contributes to governments revenues both directly as well as indirectly. Directly agriculture contributes to the revenues of the state government in the form of land revenues, cesses and surcharges on land revenue. Indirect taxes are those taxes which are imposed on the farm inputs and other consumable items. The agriculturists also pay indirect taxes in the form of excise duty, sales tax, import duty, transport tax, recreation tax etc (Singh and Sadhu-1991).
The budgets of the governments, both the states and the centre, have been considerably influenced by the land and tax revenues on one hand and the expenditure on its development on the other. The total land revenues and agricultural income tax was Rs. 52 crores in 1951-52, which increased to Rs. 1780 crores in 2001. The land revenue was Rs. 48 crores in 1951-52 which has increased to 172 crores in 2000-01 (Datt and Sundheram-2006)

(4) Contribution to Industries:

Another important feature of our economy is the dependence of industries on agriculture. This is because agriculture provides a number of raw materials required by industries. In India, most of our leading industries depend on agriculture for their raw materials. For instance, the cotton textile industry requires raw cotton, the jute textile industry requires the jute, the sugar industry requires the sugarcane and the vanaspati industry requires the oilseeds like til, groundnut, rapeseed and mustard. The plantation industries like tea, coffee, rubber etc. also depend directly on agriculture. There are a number of other industries, which depend on agriculture in indirect manner. These are the hand pounding and husking of rice, the crushing of oil, the weaving of handloom and khadi cloth and tanning matches etc. which depend on agriculture. They are together, account for 50 per cent of income generated in the manufacturing sector in India (Singh and Sadhu-1991).

Further, the entire industrial sector depends heavily on the supply of food from the agricultural sector. New processing units utilize agricultural raw materials not only help to develop processing industries but also to create export surpluses. However, in recent years, the importance of food processing industries is being increasingly recognized both for generation of income and for generation of employment (Datt and Sundheram-2006). Thus, rising agricultural productivity and production support and sustain industrial development in several ways.

Industry and agriculture are interdependent. The close interdependence between agriculture and industry relates to:

(a) the supply of raw materials and inputs from agriculture to industry and vice versa;
(b) the supply of wage goods to the industrial sector;
(c) the supply of materials for the building up to economic and social overheads in the agricultural sector; and

(d) the supply of basic consumption goods to the agricultural population.

Empirical studies show that a unit increase in agricultural output would have a positive effect on both industrial production and national income. It is estimated that a one per cent increase in agricultural output tends to raise industrial production by 0.7 per cent (Rangarajan C. -2004). Thus, the importance of agriculture for industry lies not only in the raw materials supplied by agriculture but also in the demand for industrial output it enervates.

(5) Contribution to Foreign Exchange Resources:

The importance of agriculture may also be seen from its contribution to exports. Agricultural products-primary products and manufacture-based thereon-occupy an important place in country's export. For a number of years only three items, from agriculture have base in exports in India- cotton textiles, jute and tea-accounted for more than 50 per cent of export earnings of the country. Other agricultural commodities are cashew kernels, tobacco, coffee, vanaspati oil, sugar etc. Such heavy dependence on agricultural commodities for export earnings reflected the underdeveloped nature of the economy. With the economic progress and consequent diversification of the production base, the share of agricultural goods in total exports has consistently decreased. During 1970-71, the share of agricultural export to total exports was 31.66 per cent and it decreased to about 12.65 per cent in 2003-04 (Misra and Puri - 2005). The value of exports of some of the agricultural products during 2001-02 were (Rs. crores): rice 3163; tea 1711; coffee 1088; tobacco 806; spices 1481; sesame seed 562; oil meals 2251; sugar 1728; fruits and vegetable 467; meat and preparations 1193; marine products 5790; cotton and jute 230 and paper-wood products 1499 (Sathe and Despande-2007 and Agricultural Statistics-At a Glange-2004).

From the above analysis, it can be concluded that agriculture continues to be the dominant sector in the Indian economy. It produces goods for about 102 crores of the people living in rural, semi urban and urban areas and provides the much needed raw materials to agro industries and other processing industries. The steady
modernization of agriculture has been sustaining input industries such as seeds, fertilizers, pesticides, implements and equipments. In the field of employment, it is still a principal provider of the employment in rural areas. As a foreign exchange earner, it is an important source. Thus, agriculture is a dominant and important segment of the Indian economy.

RICE ECONOMY AT A GLANCE IN INDIA

Food grain crops play a crucial role in the agriculture economy of India. An increasing agriculture output is important for providing the necessary food for the growing population (Prandila R.K.-1992). The total food grain production was 57051 thousand tones in 1950-51. It increased to 215000 thousand tones (target) in 2005-06 (323 per cent rise). (Fertilizer Statistics-2004-05) Food grains produced in India can be broadly classified into three major groups viz. (i) superior cereals, (ii) inferior cereals (coarse grains/millets) and (iii) pulses.

Superior cereals crops are rice and wheat. The crops such as jowar, bajra and maize constitute the coarse grains of the country. The pulses are red gram, black gram, bengal gram, tur, masur, mug, urad and other minor crops.

Rice in Crop Pattern of India

Since independence, crop pattern at the national and state level has rapidly changed. At all India level, during the last four decades food grains and cereals share in gross cropped area has been declining. The detail is given in Table 1.2. The share of food grains in GCA was about 74 per cent (average of GCA figure) in 1970-75 which marginal declined to 73 per cent in 1980-85. Than after it declined to 67 per cent in 1990-95 and further declined to about 65 per cent in 1997-02. Beside, the area under non-food gains rapidly increased from 26 per cent in 1970-75 to 35 per cent in 1997-02. The share of cereals in GCA was about 60 per cent in 1970-75 and in 1980-85 which declined to 54 per cent in 1990-95. Than after it further declined to 53 per cent in 1997-02. The share of pulses in GCA was about 13 per cent in 1970-75 and declined to around 12 per in 1997-02. Thus, the share of cereals declined more as compared to share of pulses. (Patel A.S. – 1997)
Among the cereals, rice accounted for the largest share of about 23 per cent in 1970-75, in 1980-85 and 1990-95 and remained about 24 per cent in 1997-02. Thus, "Rice has been the most important crop at All India level and throughout the three and half-decades its share in GCA remained nearly at the same level over the study period".

Table 1.2:
Rice Position in the Crop Pattern of India

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Crop</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1970-75</td>
</tr>
<tr>
<td>1</td>
<td>Rice</td>
<td>22.75</td>
</tr>
<tr>
<td>3</td>
<td>Total Cereals</td>
<td>59.94</td>
</tr>
<tr>
<td>4</td>
<td>Pulses</td>
<td>13.42</td>
</tr>
<tr>
<td>5</td>
<td>Total Food grains</td>
<td>74.21</td>
</tr>
<tr>
<td>6</td>
<td>Total Oilseeds</td>
<td>10.15</td>
</tr>
<tr>
<td>7</td>
<td>Total Non-food grains</td>
<td>25.79</td>
</tr>
<tr>
<td>8</td>
<td>Total</td>
<td>100.00</td>
</tr>
</tbody>
</table>


Graph 1.3

The data regarding the growth performance of rice in area, production, percentage share in total cereal and total food grain at All India level are presented in table 1.3. Average area under rice which was 37643 thousand hectares in 1970-75 increased to 42322 thousand hectares (88.94 per cent rise) in 2000-05, while average production of rice which was 41639 thousand tonnes in 1970-75 increased to 84746 thousand tonnes (49.13 percent rise) in 2000-05.

Out of the total area under cereals, the area under rice was about 38 per cent in 1970-75 and out of the total area under food grains, area under rice was near 31 per cent in 1970-75. Out of the total cereals production, the share of rice production was 45 per in 1970-75. Out of the total food grains production, the share of rice production was about 40 per cent in 1970-75. During the study period, the share of area under rice has significantly increased to near 44 per cent of area under total cereals and 36 per cent of area under total food grains in 2000-05. The share of rice production has marginally increased to 46 per cent in 1990-95 and it again declined to 42.54 per cent of total cereals production in 2000-05. The share of rice production has also marginally increased to 42.27 per cent of total food gains in 2000-05. Thus, the share of area under rice has significantly increased of the area under cereals as well as area under food grains during the study period.

Table 1.3:
Growths of Area, Production and Yield of Rice, Percentage Share in Total Cereals and Total Food grains in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Rice Area</th>
<th>Rice Prod</th>
<th>Percentage share in total cereals</th>
<th>Percentage share in total food grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-75</td>
<td>37643</td>
<td>41639</td>
<td>37.96</td>
<td>45.03</td>
</tr>
<tr>
<td>1980-85</td>
<td>40305</td>
<td>54486</td>
<td>38.51</td>
<td>43.14</td>
</tr>
<tr>
<td>1990-95</td>
<td>42493</td>
<td>76790</td>
<td>42.10</td>
<td>46.06</td>
</tr>
<tr>
<td>2000-05</td>
<td>43322</td>
<td>84746</td>
<td>43.90</td>
<td>42.54</td>
</tr>
</tbody>
</table>

Source: Calculated on the basis of data collected from Agricultural Statistics at a Glance (2004), Ministry of Agriculture, GOI, New Delhi

In India, major rice producing states are West Bangal, Tamil Nadu, Andhra Predesh, Bihar, Orissa, Uttar Pradesh, and Madhya Pradesh. It is also cultivated in some part of Jammu and Kashmir, Panjab, Hariyana, Gujatat and Rajasthan (Bhall G. S. and Alagh Y. K. - 1979).

12
Rice in Food Consumption Pattern

During the process of agricultural development, per capita net availability of food grain has been increasing. Among the cereals, superior cereals (rice and wheat) accounted about 71 to 86 per cent during 1971 to 2001. Consequently the share of coarse grains has continuously declined from 29 per cent in 1971 to 14 percent in 2001. Rice is a major staple food in both rural and urban areas, constituting nearly more than half of the cereal consumption (Selvarajan and Ravishankar-1996). The expenditure on cereals dominates food expenditures in India, rice ranks first followed by wheat and coarse grain. The shares of rice and wheat have been increasing in consumption pattern of India. (Kumar Praduman – 1996, Ram G. S. – 1996).

The data regarding net availability of rice and other food grains in India are depicted in Table 1.4. The table reveals that per capita net availability of cereals was 417.6 grams and food grain 468.8 grams in 1971. These has increased to 468.5 grams and 510.1 grams in 1991, than marginally declined to 386.2 grams and 416.2 grams in 2000-01. Per capita availability of rice has from increased 192.6 grams in 1971 to 208.1 grams in 2000-01. This was mainly due to increase in the production of rice in India.

Table 1.4:
Net Availability of Rice and Food grains in India

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Year</th>
<th>Rice</th>
<th>Wheat</th>
<th>Other</th>
<th>Cereals</th>
<th>Gram</th>
<th>Pulses</th>
<th>Food grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1971</td>
<td>192.6</td>
<td>103.6</td>
<td>121.4</td>
<td>417.6</td>
<td>20.0</td>
<td>51.2</td>
<td>468.8</td>
</tr>
<tr>
<td>2</td>
<td>1981</td>
<td>197.8</td>
<td>129.6</td>
<td>89.9</td>
<td>417.3</td>
<td>13.4</td>
<td>37.5</td>
<td>454.8</td>
</tr>
<tr>
<td>3</td>
<td>1991</td>
<td>221.7</td>
<td>166.8</td>
<td>80.0</td>
<td>468.5</td>
<td>13.4</td>
<td>41.6</td>
<td>510.1</td>
</tr>
<tr>
<td>4</td>
<td>2001</td>
<td>208.1</td>
<td>124.1</td>
<td>54.0</td>
<td>386.2</td>
<td>7.0</td>
<td>30.0</td>
<td>416.2</td>
</tr>
<tr>
<td>5</td>
<td>2002</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>458.1</td>
<td>-</td>
<td>35.4</td>
<td>493.5</td>
</tr>
<tr>
<td>6</td>
<td>2003</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>407.1</td>
<td>-</td>
<td>29.1</td>
<td>436.2</td>
</tr>
</tbody>
</table>

Source: Agricultural Statistics at a Glance-2004, GOI, MOA, New Delhi

Per capita availability of cereals in rural and urban areas is presented in Table 1.5. The data form table shows that the per capita availability of cereals was more in rural areas as compared to urban areas. Among the cereals, per capita availability of rice was higher in rural areas and in urban areas also during 1987-88 to 1996-97. Thus, rice is a major cereal for human consumption.
Table 1.5:
Per Capita Availability of Cereals in Rural and Urban Area in India
(Quantity in kg.)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Year</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rice</td>
<td>Wheat</td>
</tr>
<tr>
<td>1</td>
<td>1987-88</td>
<td>7.1</td>
<td>4.9</td>
</tr>
<tr>
<td>2</td>
<td>1992-93</td>
<td>7.2</td>
<td>4.5</td>
</tr>
<tr>
<td>3</td>
<td>1993-94</td>
<td>7.0</td>
<td>4.4</td>
</tr>
<tr>
<td>4</td>
<td>1994-95</td>
<td>7.1</td>
<td>4.3</td>
</tr>
<tr>
<td>5</td>
<td>1995-96</td>
<td>7.0</td>
<td>4.2</td>
</tr>
<tr>
<td>6</td>
<td>1996-97</td>
<td>6.7</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Source: NSS Report No. 442

Export of Rice

Exports constitute a key factor in economic development of the country. Table 1.6 highlights the percentage share of rice in total agricultural exports in India.

Table 1.6:
Percentage Share of Rice in Total Agricultural Export of India

<table>
<thead>
<tr>
<th>Year</th>
<th>Rice (Rs.)</th>
<th>Per cent to Total Export</th>
<th>Per cent to Total Agri.</th>
<th>Agri. &amp; Allied Products (Rs.)</th>
<th>Per cent to Total Export</th>
<th>Total Export (Rs.)</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-71</td>
<td>5</td>
<td>0.33</td>
<td>1.03</td>
<td>487</td>
<td>31.66</td>
<td>1538</td>
<td>100.00</td>
</tr>
<tr>
<td>1980-81</td>
<td>224</td>
<td>3.34</td>
<td>10.89</td>
<td>2057</td>
<td>30.65</td>
<td>6711</td>
<td>100.00</td>
</tr>
<tr>
<td>1990-91</td>
<td>462</td>
<td>1.42</td>
<td>7.31</td>
<td>6317</td>
<td>19.41</td>
<td>32553</td>
<td>100.00</td>
</tr>
<tr>
<td>1999-00</td>
<td>3126</td>
<td>1.96</td>
<td>12.35</td>
<td>25314</td>
<td>15.91</td>
<td>159095</td>
<td>100.00</td>
</tr>
<tr>
<td>2000-01</td>
<td>2926</td>
<td>1.44</td>
<td>10.12</td>
<td>28910</td>
<td>14.28</td>
<td>202510</td>
<td>100.00</td>
</tr>
<tr>
<td>2002-03</td>
<td>5831</td>
<td>2.29</td>
<td>16.83</td>
<td>34654</td>
<td>13.58</td>
<td>255137</td>
<td>100.00</td>
</tr>
<tr>
<td>2003-04</td>
<td>4133</td>
<td>1.42</td>
<td>11.20</td>
<td>36894</td>
<td>12.65</td>
<td>291582</td>
<td>100.00</td>
</tr>
</tbody>
</table>


During 1970-71, the total export of our nation was Rs. 1538 crores, in which the share of agriculture was 31.66 per cent. In the agricultural export the share of rice was 1.03 per cent only. However with the pace of time tremendous increase is observed in export of India. During 2003-04, the total export of the nation was worth Rs. 2,91,582 crores, in which the share of agriculture sector was 12.65 per cent. Due to fast development of other sectors of economy and uneven nature of Indian
agriculture, the share of agricultural export in total exports had declined continuously during 1970-71 to 2003-04. Except the years 1990-91 and 2000-01, the share of the export of rice in the total agricultural exports increased considerably during 1970-71 to 2002-03. It has declined to 11.20 per cent in 2003-04. Thus, rice is an important food crop which contributes a significant share in our export.

The data regarding the export of Basmati and Non-basmati rice are presented in Table 1.7. It seems from the table that out of total rice export, 232.33 tonnes Basmati rice exported in 1990-91, which increased steadily over the year (770.76 tones - 2003-04). The foreign exchange earned during this period has gone up from Rs. 287.31 crore to Rs. 2166 crores. It is exported mainly to Saudi Arabia, UAE, UK, Kuwait and others. India enjoys monopoly over basmati export in the world market. Half the quantity of basmati exported from country is (parboiled) basmati mainly to the Gulf countries (Sananse S. L. and et al – 2004). India has shown tremendous increase in its rice export and the country now has strong position in global rice market (Chand Ramesh-2005).

The India’s share of export in the total export of world and the export rice share in agricultural exports are presented in Table 1.8. The export of India in the world was 1.28 per cent in 1970 which declined to 1.06 per cent in 1980 and further declined to 0.94 per cent in 1990. This share was increased to 1.24 per cent in 2000 and again increased to 1.25 per cent in 2002. The export rice share in total export of the agriculture has been increased from 0.60 per cent in 1970 to 18.10 per cent in 2002. Thus, rice is an important agricultural commodity for the export.

<table>
<thead>
<tr>
<th>Year</th>
<th>Basmati Rice</th>
<th>Non-Basmati</th>
<th>Total Rice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>Per cent</td>
<td>Quantity</td>
</tr>
<tr>
<td>1980-81</td>
<td>440.91</td>
<td>53.29</td>
<td>386.44</td>
</tr>
<tr>
<td>1985-86</td>
<td>244.30</td>
<td>99.71</td>
<td>0.72</td>
</tr>
<tr>
<td>1990-91</td>
<td>232.33</td>
<td>46.01</td>
<td>272.66</td>
</tr>
<tr>
<td>1995-96</td>
<td>373.31</td>
<td>7.60</td>
<td>4540.70</td>
</tr>
<tr>
<td>2001-02</td>
<td>667.00</td>
<td>13.33</td>
<td>4336.00</td>
</tr>
<tr>
<td>2002-03</td>
<td>708.79</td>
<td>14.27</td>
<td>4259.08</td>
</tr>
<tr>
<td>2003-04</td>
<td>770.76</td>
<td>22.86</td>
<td>2601.47</td>
</tr>
</tbody>
</table>

Source: Agricultural Statistics at a Glance, various issues Ministry of Agri. Govt. of India
Table 1.8:
India's Share in World Exports by Commodity and Rice Share in total Agricultural Commodity

<table>
<thead>
<tr>
<th>Year</th>
<th>India's Share In World</th>
<th>Rice's Share in Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>1.28</td>
<td>0.60</td>
</tr>
<tr>
<td>1980</td>
<td>1.06</td>
<td>3.70</td>
</tr>
<tr>
<td>1990</td>
<td>0.94</td>
<td>6.40</td>
</tr>
<tr>
<td>1995</td>
<td>1.24</td>
<td>18.90</td>
</tr>
<tr>
<td>2000</td>
<td>1.20</td>
<td>10.20</td>
</tr>
<tr>
<td>2002</td>
<td>1.25</td>
<td>18.10</td>
</tr>
</tbody>
</table>

Source: Agriculture Situation in India, Vol. LX11, No.5, May-2005

Rice Research in India

The Indian Council of Agricultural Research (ICAR) is an apex body at the national level, which promotes, aids and coordinates research in agriculture. In 1946 under ICAR, the Central Rice Research Institute (CRRI) was established at Cuttack, Orissa. This was followed by the establishment of main Centre and regional Centre for rice research in different States. In 1965, the All India Coordinated Rice Improvement Project (AICRIP) was established at Hyderabad to undertake research work on rice. (Desai D.K. and Madalsa Gandhi- 1988 and Singal Vikas - 1996)

Rice Development Programmes (Promotional Activities)

For increasing the rice production and productivity, the GoI has been implementing from time to time various rice development programmes. (Selvarajan S. and Ravishankar- 1996) These programmes are as follows:

1. Rice Seed minikit Programme: Since 1972
2. State level Training Programme on Rice Production Technology: Since 1975-76
3. Special Rice Production Programme (SRPP): From 1985-86
4. Special Food grains Production Programme (SFPP) and Rice: During 1988-89, (7 five years plans) 106 potential districts in 13 States i.e. 6 SRPP State. Among these states: Assam-3, Bihar-13, Madhya Pradesh-11, Orissa-5, Uttar Pradesh-21, West Bangal-7 and other 7states (Aandra Pradesh-8, Gujarat-4, Haryana-5, Karnataka-8, Maharashtra-7 Punjab-3, Tamil Nadu-8) were identified SFPP programme was fully funded by the government.
5. Integrated Cereals Development Programme in Rice based Cropping System Area (ICAP-Rice)
6. Promotion of Hybrid Rice: Since 1989
7. Minimum Support Price of Rice
State-Wise Area, Production and Yield of Rice:

In order to have a clear understanding regarding significance of rice economy at the macro level, the information regarding state wise - area, production and yield of rice have been presented in the following paragraphs:

(1) State - wise Area under Rice

The state wise area under rice has been presented in Table 1.9. The area under rice in India which was 37592 thousand hectares in 1970-71 increased to 42496 thousand hectares in 2003-04, i.e. 113.05 per cent increase over the period of study. Among rice growing states in India, the highest area under rice was found in West Bengal and its percentage share remained about 13 to 14 per cent of total area under rice during the entire study period. It was followed by Utter Pradesh (12 to 15 per cent), Bihar (11 to 14 per cent), Madhya Pradesh (around 12 per cent) and Orrisa (10 to 12 per cent) during the study period. The lowest area under rice was found in Kerala (1 to 2 per cent), Gujarat (around 1.5 per cent) and Haryana (1 to 1.5 per cent) during 1970-71 to 2003-04.

Table 1.9:
State wise Area under Rice

<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>1</td>
<td>West Bengal</td>
<td>4956</td>
<td>5176</td>
<td>5813</td>
<td>5857</td>
<td>13.18</td>
<td>12.89</td>
<td>13.62</td>
<td>13.78</td>
</tr>
<tr>
<td>2</td>
<td>Uttar Pradesh</td>
<td>4563</td>
<td>5292</td>
<td>5615</td>
<td>6245</td>
<td>12.14</td>
<td>13.18</td>
<td>13.15</td>
<td>14.70</td>
</tr>
<tr>
<td>3</td>
<td>Madhya Pradesh</td>
<td>4383</td>
<td>4860</td>
<td>5118</td>
<td>5393</td>
<td>11.66</td>
<td>12.10</td>
<td>11.99</td>
<td>12.69</td>
</tr>
<tr>
<td>4</td>
<td>Bihar</td>
<td>5275</td>
<td>5551</td>
<td>5390</td>
<td>4920</td>
<td>14.03</td>
<td>13.82</td>
<td>12.63</td>
<td>11.58</td>
</tr>
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<td>4191</td>
<td>4404</td>
<td>4501</td>
<td>12.00</td>
<td>10.44</td>
<td>10.32</td>
<td>10.59</td>
</tr>
<tr>
<td>6</td>
<td>Andhra Pradesh</td>
<td>3521</td>
<td>3600</td>
<td>4036</td>
<td>2975</td>
<td>9.37</td>
<td>8.97</td>
<td>9.45</td>
<td>7.00</td>
</tr>
<tr>
<td>7</td>
<td>Assam</td>
<td>1968</td>
<td>2275</td>
<td>2490</td>
<td>2530</td>
<td>5.24</td>
<td>5.67</td>
<td>5.83</td>
<td>5.95</td>
</tr>
<tr>
<td>8</td>
<td>Punjab</td>
<td>390</td>
<td>1178</td>
<td>2024</td>
<td>2614</td>
<td>1.04</td>
<td>2.93</td>
<td>4.74</td>
<td>6.15</td>
</tr>
<tr>
<td>9</td>
<td>Tamil Nadu</td>
<td>2686</td>
<td>2230</td>
<td>1856</td>
<td>1397</td>
<td>7.15</td>
<td>5.55</td>
<td>4.35</td>
<td>3.29</td>
</tr>
<tr>
<td>10</td>
<td>Maharashtra</td>
<td>1356</td>
<td>1504</td>
<td>1581</td>
<td>1535</td>
<td>3.61</td>
<td>3.75</td>
<td>3.70</td>
<td>3.61</td>
</tr>
<tr>
<td>11</td>
<td>Karnataka</td>
<td>1160</td>
<td>1101</td>
<td>1173</td>
<td>1149</td>
<td>3.09</td>
<td>2.74</td>
<td>2.75</td>
<td>2.70</td>
</tr>
<tr>
<td>12</td>
<td>Haryana</td>
<td>269</td>
<td>472</td>
<td>661</td>
<td>1016</td>
<td>0.72</td>
<td>1.18</td>
<td>1.55</td>
<td>2.39</td>
</tr>
<tr>
<td>13</td>
<td>Gujarat</td>
<td>489</td>
<td>478</td>
<td>531</td>
<td>675</td>
<td>1.30</td>
<td>1.19</td>
<td>1.24</td>
<td>1.59</td>
</tr>
<tr>
<td>14</td>
<td>Kerala</td>
<td>875</td>
<td>802</td>
<td>559</td>
<td>292</td>
<td>2.33</td>
<td>2.00</td>
<td>1.31</td>
<td>0.69</td>
</tr>
<tr>
<td>15</td>
<td>Other States</td>
<td>1190</td>
<td>1442</td>
<td>1436</td>
<td>1398.7</td>
<td>3.17</td>
<td>3.59</td>
<td>3.36</td>
<td>3.29</td>
</tr>
</tbody>
</table>

Source: Calculated on the basis of data collected from Ministry of Agriculture, GOI.
Graph 1.4

State wise Area under Rice (Selected States)

Source: Agricultural Statistics at a Glance, Ministry of Agriculture, GOI

(2) State-wise Production of Rice

The state-wise production of rice has been presented in Table 1.10. The production of rice which was 42224 thousand tonnes in 1970-71 increased to 88285 thousand tonnes in 2003-04 (209.08 per cent rise) in India. The major production of rice was found in West Bengal and its share was around 14 to 17 per cent in total rice production, followed by Andhra Pradesh (10 to 13 per cent), Uttar Pradesh (9 to 15 per cent), Bihar (8 to 13 per cent); while lesser rice producing states were Kerala (1 to 3 per cent), Haryana (1 to 3 per cent) and Gujarat (near 1.5 per cent) during the last three decades.
Table 1.10:
State wise Production of Rice

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>West Bengal</td>
<td>6140</td>
<td>7466</td>
<td>10437</td>
<td>14662</td>
<td>14.54</td>
</tr>
<tr>
<td>2</td>
<td>Uttar Pradesh</td>
<td>3701</td>
<td>5570</td>
<td>10256</td>
<td>13588</td>
<td>8.76</td>
</tr>
<tr>
<td>3</td>
<td>Madhya Pradesh</td>
<td>3697</td>
<td>4053</td>
<td>5738</td>
<td>7091</td>
<td>8.76</td>
</tr>
<tr>
<td>4</td>
<td>Bihar</td>
<td>4154</td>
<td>5635</td>
<td>6564</td>
<td>7703</td>
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</tr>
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<td>Orissa</td>
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<td>4301</td>
<td>5275</td>
<td>6802</td>
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</tr>
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<td>4786</td>
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<td>11.33</td>
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<td>1981</td>
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<td>8</td>
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<tr>
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<td>12.56</td>
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<td>2361</td>
<td>2314</td>
<td>2839</td>
<td>3.94</td>
</tr>
<tr>
<td>11</td>
<td>Karnataka</td>
<td>1953</td>
<td>2208</td>
<td>2415</td>
<td>2516</td>
<td>4.63</td>
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<tr>
<td>12</td>
<td>Haryana</td>
<td>460</td>
<td>1228</td>
<td>1834</td>
<td>2793</td>
<td>1.09</td>
</tr>
<tr>
<td>13</td>
<td>Gujarat</td>
<td>598</td>
<td>557</td>
<td>791</td>
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<tr>
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<td>53631</td>
<td>74291</td>
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</tr>
</tbody>
</table>

Source: Calculated on the basis of data collected from Ministry of Agriculture, GOI.

Graph 1.5

Source: Statistical At a Glance - Ministry of Agriculture, GOI.
(3) State-wise Yield of Rice

The state wise yield of rice has been presented in Table 1.11. The yield of rice per hectare, at the national level, was 1123 kg. in 1970-71 in India. It increased to 2077 kg with 184.95 per cent rise during the study period (Table 1.11). The maximum yield of rice was observed in Punjab (3694 kg/hect.) in 2003-04, followed by Andhra Pradesh (3009 kg/hect.), Haryana (2749 kg/hect); whereas the lowest yield were observed in Madhya Pradesh (1315 kg/hect), Orrisa (1511 kg/hect.) and Bihar (1566 kg/hect) in 2003-04.

Table 1.11:
State wise Yield of Rice

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<tbody>
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<td>1442</td>
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<td>116</td>
<td>427</td>
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<td>2</td>
<td>Uttar Pradesh</td>
<td>811</td>
<td>1053</td>
<td>1827</td>
<td>2176</td>
<td>-312</td>
<td>-283</td>
<td>87</td>
<td>99</td>
</tr>
<tr>
<td>3</td>
<td>Madhya Pradesh</td>
<td>843</td>
<td>834</td>
<td>1121</td>
<td>1315</td>
<td>-280</td>
<td>-502</td>
<td>-619</td>
<td>-762</td>
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<tr>
<td>4</td>
<td>Bihar</td>
<td>787</td>
<td>1015</td>
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<td>1566</td>
<td>-336</td>
<td>-321</td>
<td>-522</td>
<td>-511</td>
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<td>5</td>
<td>Orrisa</td>
<td>962</td>
<td>1026</td>
<td>1198</td>
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<td>-161</td>
<td>-310</td>
<td>-542</td>
<td>-566</td>
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<td>1359</td>
<td>1948</td>
<td>2392</td>
<td>3009</td>
<td>236</td>
<td>612</td>
<td>652</td>
<td>932</td>
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<td>Assam</td>
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<td>1534</td>
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<td>-227</td>
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<td>-543</td>
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<tr>
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<td>Punjab</td>
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<td>641</td>
<td>1400</td>
<td>1489</td>
<td>1617</td>
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<td>9</td>
<td>Tamil Nadu</td>
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<td>1865</td>
<td>3115</td>
<td>2523</td>
<td>851</td>
<td>529</td>
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<td>446</td>
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<td>Maharashtra</td>
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<td>1850</td>
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<td>234</td>
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<td>-227</td>
</tr>
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<td>Karnataka</td>
<td>1684</td>
<td>2005</td>
<td>2059</td>
<td>2190</td>
<td>561</td>
<td>669</td>
<td>319</td>
<td>113</td>
</tr>
<tr>
<td>12</td>
<td>Haryana</td>
<td>1710</td>
<td>2602</td>
<td>2775</td>
<td>2749</td>
<td>587</td>
<td>1266</td>
<td>1035</td>
<td>672</td>
</tr>
<tr>
<td>13</td>
<td>Gujarat</td>
<td>1223</td>
<td>1165</td>
<td>1490</td>
<td>1891</td>
<td>100</td>
<td>-171</td>
<td>-250</td>
<td>-186</td>
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<tr>
<td>14</td>
<td>Kerala</td>
<td>1483</td>
<td>1586</td>
<td>1945</td>
<td>2141</td>
<td>360</td>
<td>250</td>
<td>205</td>
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<td>1629</td>
<td>1699</td>
<td>106</td>
<td>95</td>
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<td>-378</td>
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<td>India</td>
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<td>1123</td>
<td>1336</td>
<td>1740</td>
<td>2077</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Calculated on the basis of data collected from Ministry of Agriculture, GOI.
RICE ECONOMY AT A GLANCE IN GUJARAT

Gujarat is situated on the west coast of India, between 20.1° and 24.7° degrees north latitude and 68.4° and 74.5° degrees east longitude. The state has an area of 1.96 lakh sq. km., forming 6 per cent of the country’s geographical area. According to 2001 Census of India, the total population of the state was 5.07 crore. The density of population in the state was 258 persons per sq km. The rural and urban population accounts for 62.64 per cent (3.17 cr.) and 37.36 per cent (1.89 cr.) respectively in the state. The literacy rate in the state was 69.14 per cent in 2001.

According to Season and Crop Report of 2002-03, out of total reporting areas of 188.1 lakh hectares in the state, 94.25 lakh hectares (50.1 per cent) was net area sown and 18.4 hectares (9.8 per cent) was forest areas. The GCA was 106.31 lakh hectares. The cropping intensity, i.e. the rate of GCA to net cropped area for this year was at 112.79 per cent (estimated). Out of the total GCA, area under food crops was 43.32 per cent and the area under non-food crops was 56.68 per cent during the year 2002-03. Total foodgrain production was 6154 thousand tones in 2005-06.

Agricultural Income and Employment:

The agriculture sector occupies a prominent place in the economy of Gujarat. This sector is a primary source of income and employment of the state. Agriculture, as
a primary sector, contributed to 47 per cent of the gross state domestic production at current prices in 1970-71, which declined to 20.43 per cent in 2005-06. The share of agricultural sector is a major but uncertain source of income in the state. Uncertainty of monsoon is the main reason for the fluctuation in the agriculture production in the state. (Patel A.S.-2006, Shelat Kirit- 2007, Pathak M.T. & Patel H.F.-1994)

The data regarding farm employment during the different census years in Gujarat have been presented in table 1.12. The share of primary sector has declined in the total main workers. In primary sector, the contribution of cultivators in the total main workers has gone down while the share of agricultural labour has almost remained stable except 1971. Table 1.13 shows that in Gujarat 28 to 37 per cent of the total rural population was engaged in agricultural activities during the various census years. There was a marginal change in trend reported in agricultural employment. This table further indicates that the rural agricultural employment in the total rural main workers has gradually declined. (Dutta R.A. and S.R.Bhaiya – 2004)

Table 1.12:
Census wise Industrial classification of workers (Workers as a percentage of the total main worker)

<table>
<thead>
<tr>
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<th></th>
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<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cultivators</td>
<td>53.33</td>
<td>43.12</td>
<td>37.47</td>
<td>33.37</td>
<td>27.27</td>
</tr>
<tr>
<td>2</td>
<td>Agricultural labour</td>
<td>14.77</td>
<td>22.49</td>
<td>22.65</td>
<td>22.92</td>
<td>24.28</td>
</tr>
<tr>
<td>3</td>
<td>Agriculture</td>
<td>68.10</td>
<td>65.61</td>
<td>60.12</td>
<td>56.29</td>
<td>51.55</td>
</tr>
<tr>
<td>4</td>
<td>Primary sector</td>
<td>68.10</td>
<td>67.59</td>
<td>62.38</td>
<td>59.34</td>
<td>51.55</td>
</tr>
<tr>
<td>5</td>
<td>Secondary sector</td>
<td>15.19</td>
<td>13.19</td>
<td>17.06</td>
<td>18.29</td>
<td>2.02</td>
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<tr>
<td>6</td>
<td>Tertiary sector</td>
<td>16.71</td>
<td>18.50</td>
<td>20.56</td>
<td>22.38</td>
<td>46.40*</td>
</tr>
</tbody>
</table>

Note*: Other workers
Source: Dutta R.A. and S.R.Bhaiya (2004)"Rural Non-farm Employment in Gujarat, Agro Economic Research Centre, S.P. University, V.V.Nagar, Gujarat

Moreover, agriculture provides (6154 thousand tones Foodgrain, 2005-06) food grains for people and fodder for livestock. It provides the bulk of our export in respect of oilseed, tobacco, cotton etc. which are important commodities to earn foreign exchange. It also serves basis of our various industries including trade and transport. Thus, Gujarat has achieved significant progress in agriculture sector.
Table 1.13:
Rural Agricultural Employment in Gujarat during the Census Year

<table>
<thead>
<tr>
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<th></th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percentage share to total rural population</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Agriculture employment</td>
<td></td>
<td>37.13</td>
<td>28.32</td>
<td>27.89</td>
<td>29.36</td>
<td>33.55</td>
</tr>
<tr>
<td>2</td>
<td>Non-agriculture employment</td>
<td></td>
<td>7.78</td>
<td>4.59</td>
<td>5.91</td>
<td>7.18</td>
<td>13.70</td>
</tr>
<tr>
<td></td>
<td>Percentage share to total rural main workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Agriculture employment</td>
<td></td>
<td>81.44</td>
<td>85.92</td>
<td>82.57</td>
<td>80.35</td>
<td>71.00</td>
</tr>
<tr>
<td>4</td>
<td>Non-agriculture employment</td>
<td></td>
<td>18.56</td>
<td>14.08</td>
<td>17.43</td>
<td>19.65</td>
<td>27.00</td>
</tr>
</tbody>
</table>

Source: Dutta R.A. and S.R.Bhaiya (2004)'Rural Non-farm Employment in Gujarat, Agro Economic Research Centre, S.P. University, V.V.Nagar, Gujarat

Cropping Pattern of Rice in Gujarat

Table: 1.14 provides information about cropping pattern in Gujarat. It seems from the table that during the last three and half decades, the share of foodgrain crops in GCA declined significantly from 47 per cent (average of GCA) in 1970-75 to 43 per cent in 1980-85. Than it’s share marginally increased to 44 per cent in 1990-95 and again declined to 40 per cent in 1998-03. On the other hand, the share of non-foodgrain crops in GCA has fluctuated and increased from nearly 53 per cent to 60 per cent during the study period. The share of cereals was about 42 per cent of GCA in 1970-75, which declined to 32 per cent in 1998-03. While the percentage share of pulses increased more than two times between 1970-75 to 1990-95 but it declined marginally in 1998-03. (Patel A.S – 2006)

The area under rice has gradually increased during the above indicated period. Out of the total cropped area under cereals in the state, rice ranked second after the bajara. Among the two superior cereals viz. rice and wheat, the area under rice occupied first position.
Table 1.14:
Rice Position in the Crop Pattern of Gujarat
(Percentage to GCA)

<table>
<thead>
<tr>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Rice</td>
<td>4.60</td>
<td>4.85</td>
<td>5.76</td>
<td>6.74</td>
</tr>
<tr>
<td>2</td>
<td>Wheat</td>
<td>4.90</td>
<td>6.26</td>
<td>5.63</td>
<td>5.86</td>
</tr>
<tr>
<td>3</td>
<td>Bajra</td>
<td>17.97</td>
<td>13.01</td>
<td>12.9</td>
<td>11.52</td>
</tr>
<tr>
<td>4</td>
<td>Total Cereals</td>
<td>42.88</td>
<td>36.74</td>
<td>35.14</td>
<td>31.86</td>
</tr>
<tr>
<td>5</td>
<td>Pulses</td>
<td>4.16</td>
<td>6.54</td>
<td>8.77</td>
<td>8.18</td>
</tr>
<tr>
<td>6</td>
<td>Total Food grains</td>
<td>47.04</td>
<td>43.28</td>
<td>43.92</td>
<td>40.04</td>
</tr>
<tr>
<td>7</td>
<td>Total Oilseeds</td>
<td>17.51</td>
<td>23.81</td>
<td>56.08</td>
<td>59.96</td>
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<tr>
<td>8</td>
<td>Total Non-food grains</td>
<td>52.96</td>
<td>56.72</td>
<td>53.94</td>
<td>59.96</td>
</tr>
<tr>
<td>9</td>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>


Graph 1.7

Place of Rice in Gujarat

Table 1.15 gives information regarding the position of rice in the economy of Gujarat.

Table: 1.15
Growth of Area, Production and Yield of Rice, Percentage Share in Total Cereals and Total Food grains in Gujarat

<table>
<thead>
<tr>
<th>Year</th>
<th>Rice Area</th>
<th>Rice Prod</th>
<th>Percentage share in total cereals</th>
<th>Percentage share in total food grains</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Area</td>
<td>Prod</td>
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<tr>
<td>1970-75</td>
<td>4708</td>
<td>4264</td>
<td>10.42</td>
<td>12.80</td>
</tr>
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<td>1990-95</td>
<td>6764</td>
<td>9760</td>
<td>17.81</td>
<td>22.30</td>
</tr>
<tr>
<td>2000-05</td>
<td>6446</td>
<td>9471</td>
<td>21.89</td>
<td>21.84</td>
</tr>
</tbody>
</table>

Source: Calculated on the basis of data collected from Agriculture Statistics Gujarat, Directorate of Economics and Statistic, GOG, Gandhinagar

It is clear from the table that the absolute average area under rice which was 4708 hundred hectares in 1970-75, continuously increased to 6446 hundred hectares in 2000-05. The average production of rice was 4264 hundred tonnes in 1970-75, which continually increased to 9760 hundred tonnes in 1990-95. But in 2000-05, the production of rice declined to 9471 hundred tonnes. The percentage share of area under rice was about 10.42 per cent to total cereal's area and 9.48 per cent to total food grain’s area in 1970-75. This percentage share significantly increased to 21.89 per cent to total cereal’s area and 17.43 per cent to total food grain’s area in 2000-05. Similarly, the share of rice production was about 12.80 per cent to total cereal’s production and 12.32 per cent to total food grain’s production in 1970-75. It also considerably increased in 2000-05, to about 21.84 per cent to total cereal’s production and 19.91 per cent to total food grain’s production. Thus, as a cereal, share of rice in total area of cereals and in total area of food grain as well as in total cereal production and in total food grain production has continuously increased during the study period.

Utilization of Paddy (Rice)

(A) Use of Paddy Grain

The uses of paddy (rice) grain are:

1. Rice is an important article of food for human being. About 90 per cent of the rice grain is consumed in various cooked preparations.
(2) Paddy is used after preparing parboiled rice. This product is popular mainly in West Bengal, Bihar, Orrisa and Uttar Pradesh.

(3) The rice is used as converting/processing items by human in different regions of the country in different ways. Recently rice-processing commodities are most popular as part of different fast food.

(4) Rice is also used in various social/religion occasions in the country.

(5) Rice is used in non-edible or preparation of different parched products.

(6) Rice is used in cottage wearing and indigenous cosmetic industries.

(7) Rice is utilized for animals' feed also.

(B) Use of by-Product of Paddy

Paddy straw, husk and rice bran are main by-product of paddy. The uses of by-products of paddy are:

(1) The paddy straw is utilized as a fodder for livestock.

(2) As a raw material, the paddy straw is utilized in various industries i.e. paper, brick, packing product etc.

(3) Paddy straw is utilized in bulk quantity in packing of durable and soft commodities in transportation.

(4) Paddy husk and rice bran are important by-products of the rice mills. They are utilized as raw materials for brewing and distilling starch manufacturing for textile industries.

(5) Paddy husk is also utilized in many ways at household level.

(Bhaiya S. R. – 2000 and Rice Economy in India – 1973)

PURPOSE OF THE STUDY

The foregoing discussion indicates that the rice is an important food grain crop of India as well as Gujarat. Rice is the staple food for more then 60 per cent population of the world. Indian people consume about 50 per cent rice in their daily meal (208.1 grams rice and food grains 417 grams - 2001). Among the rice growing countries in the world India has covered the largest rice cultivated area of total rice cultivated area of the world and the second largest rice producer in the world. In cropping pattern of India, rice has occupied around 23 per cent of gross cropped area during the last four decades. In Gujarat agriculture economy, the area under non-food grain crops has increased gradually, but the area under rice has continuously increased (around 5 to 7 per cent) since 1970. Out of the total cropped area under cereals in
Gujarat, rice ranked second position (6.74 per cent) in 1998-2003. In the two superior cereals viz. rice and wheat, the cropped area under rice occupied first position. In Gujarat, kharif is the main season for paddy cultivation, but the development of irrigation facility in the State, (15.14 percent of gross cropped area was under irrigation in 1970-75, increased to 33.75 per cent in 2000-05 in the State -Season and Crop Reports) it is also possible to cultivate summer paddy in various districts viz. Kheda, Anand, Valsad, Surat etc. The area under summer paddy was 174 hundred hectares (Total area under paddy 6980 hundred hectares) in 2001-2002 (Season and Cropped Report, 2001-02). However, the growth in production and yield of rice has not been uniform across the different districts of the State.

The present study investigates some of the vital and sensitive issues of the rice crop. The study makes the critical examination of growth of area, production and yield, cost of cultivation, net benefit return, marketing pattern, their cost and efficiency, minimum support price and its impact on farm harvest price etc., are the aspects of paddy cultivation in Gujarat.

Objectives of the Study

The major objectives of the study are as follows:

1. To examine the growth pattern of area, production and yield of rice for both kharif and summer seasons, district wise as well as Gujarat State as a whole during the last three decades;
2. To identify the problems, locate problem of rice cultivation and suggest remedial measures;
3. To examine the relationship between minimum support price (MSP) and farm harvest price (FHP) of paddy;
4. To use the Cost concepts and efficiency measures being employed by Cost of Cultivation Scheme (GoI) of the selected sample paddy growers;
5. To examine the relationship between the farm size and productivity of paddy of the sample farm households and to assess the factors responsible for the variations, if any;
6. To examine the benefit-cost ratio of paddy cultivation of the selected sample households;
7. To study the selling structure of paddy produce of the selected sample households; and
8. To highlight the policy implications.
CHAPTER SCHEME

The study has been categorized into five chapters. A brief outline of the chapters is as follows:

Chapter – 1: Introduction

This chapter includes the introduction, rice economy in India and Gujarat, Scope, objectives and methodology of the study and review of relevant studies/literature.

Chapter – 2: Growth Pattern of Area, Production and Yield of Rice and Impact of Minimum Support Price on Farm Harvest Price of Rice in Gujarat

The study of growth pattern of the area under rice in kharif and in summer seasons, production of rice and productivity of rice and impact of minimum support price on farm harvest price of rice in Gujarat are presented in this chapter.

Chapter – 3: Agricultural Constraints in India and Gujarat - Major Problems of Rice Cultivation in Gujarat

This chapter reveals the agricultural constraints in India and Gujarat. The problems of rice cultivation, locates problem of rice cultivation in Gujarat and remedial measures are narrated in the Chapter.

Chapter – 4: Socio and Agro Economic Profile of Sample Farmers - Cost of Production, Marketable Surplus and Marketing of Paddy

In this chapter, the paddy cultivation practice and relationship between farm size and productivity of paddy of the sample farmers, marketable surplus and marketing of paddy, problems of paddy cultivation and their remedial measures are described.

Chapter – 5: Summary, Conclusions and Policy Implications

The major findings of the study have been presented and certain policy implications to improve the production and productivity of rice are suggested in this chapter.
LIMITATION OF THE STUDY

The subject selected for the detailed study has a fairly wide scope, particularly in agriculture. But due to time and financial constraints, it is obviously not possible for an individual researcher to cover and justice to all aspects of paddy economy of Gujarat. Apart from the policy issues relating to the paddy economy of Gujarat, the study is mainly limited to only Kheda district. From this district only five villages from Sojitra and five villages from Matar have been selected for a micro study. The findings derived from the study may/may not be applied at the macro level.
SECTION – II

Methodology of Study
SECTION - II
METHODOLOGY OF STUDY

This section deals with the methods of investigation, research pattern and statistical tools employed in the study.

Since ‘Green Revolution’, seed, fertilizer, modern farm technology etc. have spread gradually. An attempt is made here to study the changes in the instability and inequality in output and productivity of paddy crop over a period of time. The necessary data for area, production and yield of rice are collected from 1970-71 to 2004-05 for the purpose of analysis. Thus, the present study confined to the period 1970-71 to 2004-05. The entire period is divided into four segments namely:

(i) I - period (1970-71 to 1974-75), initial period of new seed, fertilizer and technology
(ii) II - period (1980-81 to 1984-85), spread of new technology
(iii) III - period (1990-91 to 1994-95), wide spread of new technology and new economic policy and
(iv) IV - period (2000-01 to 2004-05), open market policy

All the districts of the State have been taken into consideration for the analysis. However, in the absence of complete time series data for the period 1970-71 to 2004-05 for the newly formed districts viz., Patan, Dahod, Anand, Narmada, Navsari and Porbandar (before bifurcation 1997), these six districts are considered as part of Mehsana, Panchmahals, Kheda, Bharuch, Valsad and Junagadh districts respectively. Accordingly, Mehsana and Patan districts are treated as Mehsana, Panchmahals and Dahod districts are treated as Panchmahals, Kheda and Anand districts are treated as Kheda district, Bharuch and Narmada districts are treated as Bharuch district, Valsad and Navsari districts are treated as Valsad district and Junagadh and Porbandar districts are treated as Junagadh district.

These districts of Gujarat have been divided in two groups i.e. (1) major rice producing districts and (2) minor rice producing districts.
Major Rice producing districts are Ahmedabad, Vadodara, Bharuch, Valsad, Dangs, Gandhinagar, Kheda, Mehsana, Panchmahals, Sabarkantha and Surat. The share of major rice producing districts is more than two per cent in area under rice cultivation to total rice area of the state. Minor rice producing districts are Banaskantha, Bhavnagar, Jamnagar, Junagadh, Rajkot, Kutch, Rajkot and Surendranagar, whose share is less than two per cent in area under rice cultivation.

**DATA COLLECTION**

The present study is based on the primary data as well as secondary data.

**Primary Data**

The primary data regarding socio-economic profile of the paddy growers, land utilization, cropping pattern, agriculture and non-agriculture assets, inputs and its expenditure, paddy produce and by-product, marketable surplus, knowledge of market like price of paddy per quintal and MSP, attitude/opinion, views of sample farmers regarding cost of production, transportation cost, marketing, suggestions for improvement etc. were collected through interview schedules from the paddy growers.

**Secondary Data**

The secondary data on area, production and yield of paddy for the major rice producing countries, for the different States of India and for the different districts of Gujarat, other information related to the topic are collected from various published as well as unpublished sources which are given below:

Keeping in view the nature of the study, for obtaining proper and perfect data from the selected farmers, it was decided to collect information through personal interview using the interview schedules. The separate interview schedules were prepared for the field survey. For preparing the interview schedules the available literature and research reports were referred. Some critical points were clarified through discussion with concern experts'. On the basis of their suggestions, the interview schedules were revised and finally used for data collection.

SAMPLE DESIGN

Selection of Sample District

An attempt is made in this research study to study Economics of the Paddy Cultivation in one district of Gujarat State (KHEDA district) which has the maximum area under the paddy crop in both kharif and summer seasons. As compared to other districts of the state, Kheda district had highest cultivated area under paddy (of the GCA) and hence, Kheda district is purposively selected for the in-depth study.

Selection of Sample Talukas

From the selected district, two tehsils Sojitra (61.63 per cent to GCA) and Matar (57.15 per cent to GCA) having paddy as a major crop in kharif and summer season were selected for the study.

Selection of Sample Villages

Five sample villages from each of the selected tehsils were selected purposively considering criteria as shown below:

1. Villages which have adequate number of kharif as well as summer paddy growers in the reference year;
2. Villages which have canal water facilities for irrigation particularly in summer season for paddy cultivation and
3. Villages which are in the radians of 15 kms from the town places and have road linkage.
Thus, from each selected Taluka, it was decided to select 5 villages for the in-depth study. The primary data were collected regarding cropping pattern, cost of cultivation of paddy, marketing of paddy, problems of paddy cultivation, opinions and suggestions of paddy etc. by personal interviews. Thus, altogether 10 villages were selected from both the Talukas. From Sojitra taluka Malataj, Deva- Sejvapura, Kasor, Trambovad and Dabhou and form Matar taluka Malavada, Heranj, Dethali, Vasai and Nandoli villages were selected.

Selection of Paddy Growers

From each selected villages it was decided to select 12 paddy growers who cultivate paddy in both the seasons. The sample households were randomly selected from each selected village. The selected sample paddy growers were stratified into four categories of farm size groups. It was decided to select 3 households randomly in each category like marginal (up to 1 hectare), small (1.01 to 2 hectare), medium (2.01 to 4 hectare) and large (above 4 hectare). Thus, in the entire 120 (12 × 5 × 2) paddy growers (30 growers in each farm size groups) were selected from the selected sample 10 villages.

REFERENCE PERIOD OF THE FIELD SURVEY

The reference period for the study was the agricultural year 2006-07 and field survey for the study was conducted during June 2006 to July 2007.

RESEARCH TOOLS

The tools and techniques used in the analysis for the present study are as under:

The analysis is largely based on the statistical and mathematical measures viz., average, per cent/percentage, rate of change, growth rate and regression analysis.

Annual Average

\[ A_{yk} = \frac{\sum_{i=1}^{N} A_{yk}}{N} \]  

............... (i)
Where, \( A_{ijk} \) = Annual average area under paddy, production and yield of paddy per hectare in \( j^{th} \) of rice in \( i^{th} \) district during \( k^{th} \) period.

Where,

\[ i = 1, 2, 3 \ldots \ldots 19^{th} \text{ district and Gujarat as whole} \]

\[ j = 1, 2, 3, 4, 5 \text{ i.e. kharif rice, summer rice, total rice, irrigated rice and unirrigated rice} \]

\( N = \) No. of years in the period for the first, second, third, forth and the whole period.

\( Kn = 1970-71 \text{ to } 1974-75 \text{ - first period } , 1980-81 \text{ to } 1984-85 \text{ - second, } 1990-91 \text{ to } 1994-95 \text{ - third, } 2000-01 \text{ to } 2004-05 \text{ - forth and } 1970-71 \text{ to } 2004-05 \text{ - the whole period} \)

**Percent/Percentage:** Annual average percentage share

\[ P_{jk} = \frac{A_{ijk}}{\sum_{i=1}^{19}} \ldots \ldots \text{(ii)} \]

Where, \( P_{jk} = \) annual average percentage share of \( i^{th} \) district for \( j^{th} \) crop (paddy) in the state's total area, production etc. \( j^{th} \) of rice during the \( k^{th} \) period and other notations are same as indicated for equation one.

**Average annual rate of change (per cent)**

\[ R = \frac{A_{knj} - A_{bnij}}{A_{bnij}} \times 100 \ldots \ldots \text{(iii)} \]

\( R = \) Rate of change in area, production and yield per hectare of rice in percentage term in the second over the first period, the third over the second period, the forth over the third period and the forth over the first period.

Other notations are same as indicated for equation one.

**Compound growth rate**

In order to examine the average rate of growth in area, production and yield of rice, the technique of analysis (a) two point of time and (b) regression are used.
(a) **Two point of time:** The average compound growth rate is estimated by using formula of two point of estimating

\[ Y_t = Y_0 (1+r)^t \]

Where,

- \( Y_t \) = Average annual area under rice, production of rice and yield per hectare of rice for the \( t \)th year,
- \( Y_0 \) = Average annual area under rice, production of rice and yield per hectare of rice for the base year,
- \( t \) = Total numbers of year and
- \( r \) = Compound growth rate of area under rice, production of rice and yield per hectare of rice

(b) **Regression analysis:** The average compound growth rate is estimated by using formula of exponential equation of used as:

\[ Y_t = a \cdot b^t \]

\[ \log_e Y_t = \log_e a + (\log_e b) \cdot t \]

\[ Y_t = A + Bt \]

Where,

- \( Y \) = Value of the variable under study, i.e. area under rice, production of rice, yield of rice per hectare, farm harvest price and minimum support price
- \( t \) = Time variable,
- \( a \) = Intercept and
- \( b \) = Regression co-efficient

Compound growth rate = \((\text{Anti log}_e b - 1) \times 100\)

In order to estimate the regression co-efficient in the above equation least square methods were used. Further, the statistical 't' test is used to test the reliability of estimated regression co-efficient.

**COST CONCEPTS**

The cost concepts used in the present study are those laid down in the comprehensive cost of cultivation scheme for principal crops of the Gujarat state (Ministry of Agriculture: technical workshop, GOI – 1970, Pathak M.T and et al -
The concepts of cost viz. Cost A, Cost B and Cost C₂ and the input items included under each category of cost are as follows:

- **Cost: A**
  i) Value of hired human labour
  ii) Value of hired bullock labour
  iii) Value of owned and hired bullock labour
  iv) Value of seed (both farm produced and purchased)
  v) Value of insecticides and pesticides
  vi) Value of manure (owned and purchased)
  vii) Value of fertilizers
  viii) Depreciation on implements, machinery, farm buildings etc.
  ix) Irrigation charges (payments made for canal water, etc.)
  x) Land revenue, cases and other taxes
  xi) Interest paid on crop loan
  xii) Interest on working capital
  xiii) Miscellaneous expenditure

- **Cost: B**

Cost A + inputted rental value of owned landless revenue paid + inputted interest on owned fixed capital (excluding land).

- **Cost: C₂**

Cost B + imputed value of family labour.

The values of purchased inputs were recorded as reported by the farmers after verification.

**ESTIMATION OF INPUTS**

Estimation of owned inputs was made as indicated below:

1. Family labour was valued at the wage rate of usual casual labour prevailing for different operations in the sample villages.
2. Owned bullock labour was valued at the prevailing market rate.
3. Farmyard manure was valued at the market rate.
4. The cost of irrigation and tractor charges were evaluated according to the actual cost incurred by the farmers for getting such inputs and services.

5. Interest on working capital was charged at the rate of 12 per cent per annum for the duration of the crop. The rational behind the selection of this rate of interest is simply the fact that village service co-operative provides short term credit to the farmers at this rate.

6. Depreciation on farm building was charged at the rate of 5 per cent on kuchha and 2 per cent on pacca buildings.

7. 1/6 of the gross income was considered as rental value owned land.

8. Interest on owned fixed capital was calculated at the rate of 10 per cent per annum.

CONCEPTS OF INCOME

The concepts of income used in the cost-benefit analysis in the present study are given below:

1. Value of gross output (Gross income): Value of main product and by-product at the prevailing market prices at which the produce is sold.

2. Farm Business income: Value of gross output minus Cost A

3. Family labour income: Value of gross output minus Cost B

4. Net profit (Net income): Value of gross output minus Cost C (Total cost)

PATTERN OF DISPOSAL

1. On farm utilization: It included the quantity retained for the requirement of domestic consumption and seeds.

2. Wage payment in kind: It included quantity of paddy given to the labourer (labour partner) as labour expenses.

3. Marketed surplus: It was estimated by taking the quantity actually sold by the paddy growers during the reference year.

4. Stock: At the end of the reference year it was estimated by deducting from total supply (Total production + carry out stock from previous year ), the quantity retained for on farm utilization, wage and rent payment in kind and quantity of paddy surplus.

5. Marketable surplus: It was the total of paddy surplus and previous year stock.
PRICES OF PADDY

Following two types of prices were estimated:

1. Producer’s gross sale price: It was estimated by dividing the total quantity actually sold by the paddy growers to the total such value of paddy of the sample growers.

2. Net price received by the paddy growers: It was estimated by deducting the marketing cost incurred by the paddy grower from the producers gross sale price.

3. Marking cost: This cost referred to the expenses incurred by the paddy growers while transacting the paddy from farm to the market i.e. transportation, commission, weigh met, labour charge for loading and unloading etc.
SECTION - III

REVIEW OF LITERATURE
A comprehensive review of literature is an essential part of any scientific investigation. Therefore, an attempt has been made to review the research studies related to rice cultivation, cost of cultivation of paddy and marketing. The findings of the available research works have been presented under the following heads:

1. Cost of cultivation of rice
2. Growth of area and production of rice,
3. Productivity of rice and
4. Market of rice

COST OF CULTIVATION OF PADDY

Patel A.S. and Patel H. F. in their working paper "Recent Trends in the Cost of Cultivation in Gujarat" (1989) observed the trends of the cost of cultivation for the study crops on the basis of Cost of Cultivation Scheme: Gujarat's data. The reference period for the study was two-year ending 1976-77 and 1984-85. They observed that cultivation of food grain crops has been more remunerative for farmers because of the improvement in their productivity. The per quintal cost of food grain was also found to be the lowest. Among the food grain crops', on an average, the economy of irrigated kharif paddy in Gujarat was found better over the study period in Gujarat State.

Shah V.D. and Patel H.F. observed in their research project "Impact of Minimum Support Prices on Agricultural Economy in Gujarat" (2003) found the high inter-district variation of cost of production of paddy due to wide variation in the yield level. They have observed the cost of paddy cultivation and declared minimum support price was not favorable and affordable to paddy growers of the Gujarat State. They conclude that this situation will discourage paddy growers of the State in adopting improved technology, increasing capital investment in farms and allocation of more area to this crop.
Singh K.M. and Singh R.K.P. analyzed in their article "Rice in Bihar - An Economic Analysis with Special Reference to Bcro Rice" (2000) observed the cost of cultivation (Cost C$_2$) per hectare was highest on high yielding verities with irrigation and it was lowest on deepwater rice in Bihar State.

Jain K.K has studied in "An Appraisal of Cost and Prices on Different Farm in Punjab" (1993) the cost of cultivation for paddy (zone wise) and carried out two point of time for 1974-75 and 1987-88. The cost of production (Cost C$_2$) per quintal declined with the increase in farm size in 1974-75, it shows that large farmers were more efficient producers of the paddy in Punjab. While in 1987-88, it was the semi-medium farmers were produced paddy efficiently than the other farmers. In real terms cost of cultivation had declined significantly on all the farm sizes implying the improved modern technology.

Singh Karam has found out in his paper "Relative Strength of Punjab Agriculture in the Globe Economy" (1999) that the net return per hectare of paddy over total costs were estimated at Rs. 3194 and the net return over operational cost was estimated Rs. 9119 in 1994-95 respectively. The cost accounting information for 300 farmers from 30 randomly selected clusters of villages for the Comprehensive Scheme of cost of Cultivation of Principal Crops in Punjab used in his study.

Roy Delsapriya and Jain K. K. have analyzed in their work "A Study into Cost Efficient Yield Levels for Paddy and Wheat in India" (2004) that Punjab had the highest cost efficient yield level of 5134 kg per hectare and the lowest cost of production along with the highest productivity levels.

Snolapurkar V. K. and Bakundi S. V. have found their in his work "Rice" (1972) that the cost of cultivation of rice varies considerably and depends on a number of factors such as methods of cultivation, adoption of improved techniques of production, cost of various inputs etc. It varies from region to region and even within a region from farmer to farmer, depending upon the resourcefulness of the farmer. However, the cost of cultivation of high yielding varieties of paddy is generally higher than that of the local improved varieties of paddy under similar conditions. The HYVs are more susceptible to insects and pests attack than the local verities. Therefore, the
cost of plant protection measures for growing HYVs was higher than that for local improved varieties.

They examined the cost of production of HYVs and local paddy in the East Godavari district. It reveals that the cost of cultivation of the HYV was more about 46 per cent (Rs. 1428 per hectare) than that for the local variety (Rs. 978 per hectare). The higher expenditure incurred on manure and fertilizers (HYV 39 per cent, local 31 per cent), human labour (HYV 27 per cent, local 52 per cent), irrigation (both for 11 per cent) etc. were mainly responsible for the high cost. Per hectare the net return was Rs. 1630 for HYV paddy which was more about 178 per cent than the local variety of paddy (Rs. 586 per hectare).

Hameed Abdul N.D. and et al (1977) have reported in their finding that per acre actual costs of production for wet season were Rs. 424 and for dry season Rs. 456 in 1970-71 agriculture year in Urrapitiya village. Labour cost for both season and exchange labour (excluding family labour) were accounted for over 60 per cent of the total expenses. The cost of fertilizers amounted about 20 per cent and draught power about 14 per cent (40 sample households randomly selected). Net income per acre for HYVs was Rs. 785 and for local variety was Rs. 823.

In Palamunawu village, the sample farmers were making relatively small profit per acre (net income Rs. 135 from paddy cultivation) due to high percentage of their expenses were for hired labour (30 per cent) and rent (38 per cent). In Palamunai village, per acre cost of paddy cultivation was about Rs. 334. The share of cost of hired labour was accounted more than 40 per cent. About 40 per cent costs were accounted for the tractor charges, threshing cost, fertilizers cost and land rent.

Bhaiya S. R has concluded in his study "Economics of Comparative Cost Study of Kharif and Summer Paddy Cultivation in the Kheda District, Gujarat" (2000) that the total expenditure of paddy cultivation per hectare was Rs. 13751 in Kheda district of Gujarat. Out of the total cost, the cost of chemical fertilizers was found the highest (17.43 per cent of the total) followed by harvesting cost (16.54 per cent).
The cost of production per hectare was Rs. 14049 in the kharif season. Out of the total cost, the cost of farm yard manure was highest (18.64 per cent) followed by harvesting cost (15.65 per cent). The cost of cultivation of paddy per hectare was Rs. 13281 in summer season. The cost of chemical fertilizer was highest (20.81 per cent) followed by harvesting cost (18.01 per cent) in the total cost in summer season. He observed that the cost of paddy production was highest in kharif season as compared to summer season.

He also observed that an average gross income was Rs. 21790, net return was Rs. 32071 in kharif season, the gross income was Rs. 32071 and net return was Rs. 18890 in summer season. The cost benefit ratio was 0.55 for kharif and 1.41 for summer paddy cultivation. The yield of paddy per hectare was 3899 kg in kharif season and it was 5455 kg in summer season. The cost of cultivation of paddy was found efficient in case of marginal farmers as compared to other farmers in both the seasons.

Gupta D. D. and et al have examined in their paper "Economics of Paddy Cultivation in Haryana" (1988) that out of the total operational cost the cost of human labour (38.17 per cent) was highest. Out of the total cost on an average, this cost was about 25.15 per cent. About 36 per cent cost was for material inputs cost in the total cost of cultivation. An average fertilizer cost was 13.74 per cent of the total cost and this cost was increased with farm size wise groups. The return on variable cost per hectare was Rs. 1310 and it increased with the farm size groups. The share of fixed cost was found higher in the total cost of cultivation of large farmers as compared to small and marginal farmers. This was indicating a better resources position of the large farmers. The returns over the variable cost increased with larger farm size. He observed that the cost of production per quintal decrease with increase in farm size of coarse and fine varieties but it was increased of superfine varieties of paddy. The input-output ratio increased with farm size in case of all the varieties of paddy.

Venkatesh V. and Srinivasan R. have worked out the cost of cultivation of paddy in his research work “Government Intervention in the Paddy Marketing System - An Economic Investigation" (1988). They have observed that the overall cost of cultivation (Cost-C2) of paddy per hectare was Rs. 6132 of the selected sample. They
found that out the total cost of cultivation nearly two-third was working expenses and remaining one-third was the fixed cost. The major input costs were manures-fertilizers (23.19 per cent of the total) and human labour (21.12 per cent). The gross return per hectare was Rs. 7513 and the net return per hectare was Rs. 1381. The productivity of paddy per hectare was 5767 kg.

Janaiah Aldas and Hossain Mahabub have covered six cities (one in Bangladesh, three in India, one in Philippines and one in Vietnam) in their research work "Hybrid Rice in Andhra Pradesh - Finding of a Survey" (2003). They had selected those households who had adopted the hybrid rice. They found in their work that the gross return per hectare was low due to low price of paddy.

Ahmed Raisuddin has analyzed in his paper “Rice Economy of Bangladesh - Progress and Prospects" (2004), examined that the production of rice had increased about two times, the yield of rice had increased more than two times while area under rice had declined from 25 million acres to 22.8 million acres between 1975-76 and 1999-2000 in Bangladesh. He concluded that the area under rice was falling due to increasing labour cost and decline in the price of rice.

Casiwen Cheryll B. and et al have worked out in their work "Hybrid Rice Cultivation in the Philippines - Early Farm Level Experiences" (2003), the cultivation of hybrid and inbred rice on the bases of primary data in Isabela and Cagayan provinces of the Philippines in 2000-01 crop year. They found in their work that the labour cost was the highest cost component in hybrid rice farming due to higher number of man days required. The cost of seed was a major cost component (about 12 per cent) in the total cost of hybrid rice cultivation. The net profit of hybrid rice was about 14 per cent higher in the dry season and 10 per cent lower in wet season as compared to inbred rice cultivation.

Singh N.P. and et al have reported in their paper "Rice Economy in India: Development and Trade Prospects" (2005), that the cost of cultivation of rice varies considerably across the major rice producing states. The average cost of cultivation of rice per hectare ranged from Rs. 10406 to Rs. 29014 in 2000-01. They have found that the highest cost of cultivation was in Tamil Nadu followed by Andra Pradesh,
Karnataka, Haryana, Panjab and West Bengal. The lowest cost was found in Bihar state.

Ramasamy C. and et al have examined in their study "Hybrid Rice in Tamil Nadu- Evolution of Farmer's Experience" (2003), regarding the farm level performance of hybrid rice and conventional HYVs rice in 2000-01. They have found that only labour cost was about 43 and 44 per cent of the total cost of hybrid and inbred rice cultivation respectively. The cost of fertilizers was about 12 per cent of the total cost in both the seasons. The cost of labour, pesticide cost and cost of seeds were significantly higher in hybrid rice cultivation. They have found out that the cost of hybrid seed was about 48 per cent higher as compared to inbred seed cost. The cost of production per hectare of hybrid rice was about 7 per cent higher than the inbred rice.

Janaiah Aldas (2003) has examined in his paper "Hybrid Rice in Andhra Pradesh Finding of a Survey" input costs of hybrid and inbred rice cultivation in Karimnagar and Nizamabad districts of Andra Pradesh in 2000-01. He has concluded that about 25 per cent additional production cost was found in hybrid rice cultivation as compared to inbred rice cultivation. The farmers used more inputs such as manures, fertilizers, labour and pesticides in hybrid rice crop and hence the cost of hybrid rice cultivation was found highest than inbred rice cultivation. Besides, the yield of hybrid rice was only 4 per cent higher and the profit was 18 per cent less than inbred rice cultivation.

Hossain Mahabub and et al have worked out the farm level performance of hybrid rice cultivation in Bangladesh in their research work "Hybrid Rice in Bangladesh: Farm Level Performance" (2003). They have selected six districts of the six major regions and out of them 180 farm households were selected for field survey in 1999. They have conclude that the total cost of inputs was about 23 per cent higher in hybrid rice cultivation than in the inbred rice. The cost of seed was very high of hybrid rice than the cost of inbred rice seed. They found out that about 48 per cent profit was more in hybrid rice cultivation then inbred rice due to higher yield of hybrid rice ( about 31 per cent yield high) and less additional cost (17.5 per cent). The yield of hybrid rice per hectare was 5.84 to 7.5 tonnes while the yield of inbred rice
per hectare was 5.63 tonnes. The large farmers obtained the highest yield of rice than the other farmers.

Hossain Mahabub and et al have reported in their work "Vietnam's Experience with Hybrid Rice" (2003), the experiments of farm level hybrid rice cultivation. The district was randomly selected from each eight major rice producing provinces of Vietnam and a village was selected from each of the districts. All the selected households in the villages cultivated hybrid as well as inbred rice in 2000-01 crop year. They observed that the yield of hybrid rice was higher about 21 per cent in the dry season and about 22 per cent in the wet seasons as compared to inbred rice yield. The farmers received about 16 to 17 per cent higher returns in the cultivation of hybrid rice. They have also examined that farmers used 39 kg of seeds per hectare in the cultivation of hybrid rice as compared to 109 kg in inbred rice cultivation. The cost of seed hybrid was about 96 per cent higher than the inbred rice crop.

The major cost component was human labour which accounted about 42 per cent of the total cost of cultivation. They have also found that the difference in costs of other inputs were negligible. The hybrid rice cultivation was more profitable and was about 34 per cent in dry season and 42 per cent in wet season as compared to inbred rice crop. The yield of hybrid rice was also higher in dry and wet seasons. The yield of rice per hectare was 6.33 tonnes in the case of hybrid rice and 5.25 tonnes in the case of inbred rice in the dry season. The yield of rice per hectare was 6.07 tonnes in hybrid rice and 4.99 tonnes in inbred rice in the wet season.

Chengappa P.G. and et al have made a research work "Profitability of Hybrid Rice Cultivation - Evidence from Karnataka" (2003), the profitability of hybrid rice cultivation and compared with inbred rice in Karnataka during 2000-01. They worked out that an average cost of production of hybrid rice per hectare was Rs. 17890. An average cost of production of inbred rice per hectare was Rs. 15388. Among the components of costs the expenditure of human labour was the largest in both the varieties. Out of the total cost, this cost was about 43 per cent and 41 per cent in hybrid rice and inbred rice cultivation respectively. The cost of fertilizer was the second most important cost (about 13 to 15 per cent) of the total cost. The gross return of hybrid rice per hectare was Rs. 47736 and inbred rice it was Rs. 45620 i.e. the
gross return was only 4.64 per cent higher in hybrid rice production than the inbred rice production. They observed that the benefit-cost ratio was also lower in hybrid rice cultivation. The average yield of hybrid rice per hectare was 8.41 tonnes and that of inbred rice was 7.42 tonnes. The yield of hybrid rice was higher about 13 per cent as compared to yield of inbred rice.

Janaiah Aldas and et al have examined in their article "Can Hybrid Rice Technology Help Productivity Growth in Asian Tropics? Farmer's Experiences" (2003), that the cost and return of rice in four cities of south Asia (one in Bangladesh and three in India - Andhra Pradesh, Karnataka and Tamil Nadu) and two cities in south-east Asia (one in Philippines and one in Vietnam) during 2000-02. They had found that the profitability of hybrid rice cultivation was about 9 per cent higher in Bangladesh and 14 per cent in Philippines during dry season. The net profit of hybrid rice cultivation was lower in the Philippines during the wet season. They also found that profitability of hybrid rice was higher as compared to inbred rice in the Vietnam.

CACP (Commission for Agricultural Crops and Prices) report reveals the cost of cultivation of paddy crop of the important growing States of India. The estimated cost of cultivation of paddy increased in Panjab, Madhy Pradesh, Orissa, Assam and Andhra Pradesh during 1994-95 and 1995-96. Due to increased rental value of owned land and human labour cost. Besides, the yield of paddy was declined during these years. The cost of cultivation of paddy was marginally declined only in West Bengal but the cost of production increased per quintal due to declined the yield.

Fertilizer Statistics (2004-05) report indicated the data regarding the cost of cultivation of paddy of leading growing states of India. The operational cost of paddy ranged from Rs. 20012 to Rs. 8823 in 2001-02. The overall cost ranged from Rs. 13188 to Rs. 28696. The cost of human labor was the highest from Rs. 4078 to Rs. 9713 followed by fertilizer-manure range from Rs. 1358 to Rs. 3142 in the total cost. The operation cost was found the highest in the Tamil Nadu (Rs. 20012) and lowest in the Madhya Pradesh (Rs. 8823). The productivity of paddy was the highest in Andhra Pradesh (46.67 qtl./hect.) and the lowest in Madhya Pradesh (18.92 qtl./hect.)
It can be concluded from the above review of the studies that the human labour cost, farm yard manure cost and chemical fertilizers cost was the major cost components in the total cost of paddy cultivation. The cost of labour was the higher among the various components. The results of the studies indicated that the cost of cultivation of hybrid rice was higher as compared to inbred rice cultivation. The productivity and rate of return of hybrid rice was also higher than the inbred rice. The results of the some studies show that per hectare cost of production decreased with the increase in farm size.

**Growth of Rice Production**

Trevedi H.P and Patel Nanda reported in their working paper "Fertilizer use Efficiency in Indian Agriculture - A conceptual Inquiry" (1998) that the used of NPK increased from 1.3 kg to 47 kg in production of rice. They concluded that the use fertilizer efficiency in rice which was more conspicuous.

Shah V.D has analyzed in his research project "Fertilizer Consumption in Gujarat" (1989) and concluded that the actual use of fertilizer was very near to the highest recommended level in the unirrigated paddy cultivation while in irrigated paddy cultivation the actual consumption of fertilizer was below 50 per cent of highest level of recommended doses. The yield of paddy was increased about 194 per cent due to the application of fertilizer

Pathak M. T. and Patel H. F have examined in their paper "Agricultural Development in Gujarat: Problems and Prospects" (1985) that rice was an important food grain crop in Surat, Bharuch, Kheda, Vadodara, Panchmahals and Ahmedabad districts of Gujarat. These districts had put together claimed about 92 area under rice in total under rice and about 93 per cent production of rice in the total production of rice in the State.

Bhaiya S.R. has workout in his study "Economics of Comparative Cost Study of Kharif and Summer Paddy Cultivation in the Kheda District, Gujarat" (2000), performance of rice production in Gujarat. The period of analysis for the study was 968-69 to 1978-79. He has concluded that production of rice increased about 65 per
cent during the study period. Due to increased in area under rice as well as productivity of rice.

Pandey R. K. and Sarin B.S. have concluded in their research work "Economics Study of Acreage Response of Rice in Uttar Pradesh" (1984) that production of rice increased due to increased the productivity of rice. The production of rice increased at the rate of 2.58 per cent during 1968-69 to 1978-79. The yield level of the rice was increased at the rate of 1.79 per cent in India during the same period.

Radha Y. and Eswara Y. concluded in their research paper "Variability and Instability Analysis and Area, Production and Productivity of Rice and Maize in Northern Telangana Zone of Andra Pradesh" (1999) and reported no found much variation in area under rice, production of rice and yield of rice during 1973-74 to 1982-83 and 1983-84 to 1992-93. The changes in area under rice, production of rice and yield of rice were found low and positive. The variation was higher in the production of rice due to increased area under rice.

Job Elsammu and Nandamohan V. have brought out in their study "Rice Production in Kerala - Trend and Instability Analysis" (2004) that area under rice and production of rice was declining trend in Kerala during 1975-76 to 1998-99. The rate of decline in area under rice was steeper than the production of rice. The productivity of rice was a raising trend during this period. The trend of area under rice declined because the farmers were cultivating rice mostly in suitable area only. Due to production of rice was declined in this period.

Singh N.P. and et al have reported in their paper "Rice Economy in India: Development and Trade Prospects" (2005) that the production of rice was increased in India about four and a half times during 1950-51 (20 million tonnes) to 2001-02 (93 million tonnes) due to increased the yield and consistent spurt in yield of rice. The production of rice increased at an average rate of 2.76 per cent per annum during the last five decades. The high growth in yield was the major reson for significant growth of rice production.
Dutta R. A. has worked on her research project "Some Aspect of Land use planning in Gujarat" (1993) and found that the area under rice was not any significant change (about 5 per cent of the total area) in Gujarat. Rice was mainly rainfed crop in the state. Out of the total area under rice about 38 per cent area was under irrigated in the state. The maximum area under rice was found in the Surat district (27 per cent of total area) which was followed by Kheda district (22 per cent) during 1980-83. She reported that about 70 per cent area under rice were irrigated in Kheda and Ahmedabad districts in Gujarat. She also examined that the production of rice increased over two times between 1960-63 and 1980-83 in Gujarat. The maximum share of rice production was found in the Surat district (37 per cent of total production) which followed by Kheda district (28 per cent) in 1980-83.

Reddy A. R. and Sen C. have reported in his paper "Technical Inefficiency in Rice Production and its Relationship with Farm - Specific Socio-economic Characteristics" (2004) that yield of rice was considerably improved without increasing the level of used of inputs. They selected the sone canal command area of Bihar for the study. The sample was 270 farmers for the survey which selected through stratified random sampling method in 2001-02. They found in their work that the inefficiency in production of rice were negatively related with farm size, education of the farmer, experience, extension contacts and percentage of good land. It was positively related with age of farmers and fragmentation of the land.

It can be concluded from the above review of the studies that the production of rice increased due to improvement in productivity of rice.

**Productivity of Rice**

AERC has worked in the article "Socio-Economic Evaluation of the National Integrated Pest Management Programm for Rice-A Study in Wokha District of Nagaland" (2001) that the growth in production of rice was 102.87 per cent during the 1973-73 to 1995-96. The factors behind the increase in production were introduction HYV seed, fertilizers consumption, expansion of irrigation, improvement of cultivation practices and used of pesticides etc. The practice of incentive crop management has improved the condition of insect and pests, diseases, rodents and...
nematodes particularly in paddy crop. Due to these various pests, the yield of rice was lose about 35 to 40 per cent of the total production of rice in India.

Jain Reena has studied in his work "High Yielding Varieties and Correlated Response of Yields of Wheat and Rice in Uttar Pradesh" (1990) that the variability in yield of rice and wheat positively correlated across the districts and the regions during pre HYVs period (1954-55 to 1965-66) and the HYVs period (196667 to 1980-81). For the analysis, she had selected 44 districts in Uttar Pradesh. She has concluded in her study that rice and wheat were positive correlation between yields across districts and HYVs.

Pathak M. T. and Patel H. F. have workout in their paper "Agricultural Development in Gujarat: Problems and Prospects" (1982) and observed that significant variation in the growth rate of productivity of rice in the districts of Gujarat. The growth rate of productivity was found the lowest in the Surat district, however, district had the largest share under rice area and production of rice in Gujarat. The growth rate of yield of rice was relatively much lover in Panchmahals and Vadodara which districts have higher area under rice in total rice of the state.

Trivedi H. P. and Patel N. M. have found in their working paper "Paddy Productivity Scenario in India – A Temporal and Spatial Analysis" (1999) that average productivity performance of paddy among State improved at all India level. They have found that productivity of paddy improved in major nine rice growing states. The productivity of rice in these were above the national average during 1977-78 to 1979-80 and 1988-89 to 1990-91. The improvement also found in area under irrigated rice, area under unirrgated rice and in HYVs areas in the majority of States.

Pandey R.R. and Sarup Shanti have observed in their study "Study of Rice Production Function in India" (1989) that the yield of rice was low in most rice producing states of India. The yield of rice was not increase uniformly in all the states during 1961-64 and 1980-83. There examined that large variations have seen in the use of resources in paddy cultivation. The yield of rice were found below than the national average of rice yield in Assam, Bihar, Gujarat, Himachal Pradesh, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bangal.
Chand Ramesh "has examined the variation of yield of rice, price of rice and return of rice in his study Agricultural Diversification in India" (1999). He concluded that the lower variation was found in the farm harvest price of paddy and in returns of paddy in the all district of Punjab during 1972-73 to 1991-92. He also has found lover instability in the gross return of rice.

Kumar Utpal De has studied in his work "Nature and Causes of Inter district Variations in Yield of Rice in West Bengal" (1999) that the yield of rice was increased due to expansion of irrigation facilities and increasing used of fertilizer in rice cultivation.

Singh N.P. and et al have reported in his paper "Rice Economy in India: Development and Trade Prospects" (2005) that during last ten years, rice yield was increased at the rate of about 1.35 per cent per annum in India. The growth rate of yield of rice was not found equitable at the state level.

Janaiah Aldas and et al have examined in their article "Can Hybrid Rice Technology Help Productivity Growth in Asian Tropics? Farmer's Experiences" (2003), the cost and returns of rice in four cites of south Asia (one in Bangladesh and three in India - Andhra Pradesh, Karnataka and Tamil Nadu) and two cites in south-east Asia (one in Philippines and one in Vietman) during the period 2000-02. They found that the yield of hybrid was higher (on average 12 to 16 per cent) than the yield of inbred rice. The yield of hybrid rice was about 14 per cent, 17 per cent and 21 per cent higher than inbred rice in the dry season in Bangladesh, Philippines and Vietnam respectively. In case of wet season, the yield of hybrid rice was higher than the yield of inbred rice only in Vietnam.

Janaiah Aldas has reported in his research work "Hybrid Rice in Andhra Pradesh Finding of a Survey" (2003) that the yield of rice increased at a compound growth rate of 2.62 per cent during the 1970s which declined to 1.6 per cent per during the 1990s in Andra Pradesh. He found that the main reason was declined the yield. Moreover, insects, diseases, soil and water related problems stresses have increased in rice cultivation.
Patel A. S. and et al have worked out in their working paper "Economics of Dry Farming in Gujarat" (1994). They have examined the growth rate of yield of rice was 3.32 per cent in first period (1949-1967), 2.01 per cent in the second period (1967-91) and 2.80 per cent for the entire period (1949-91). They also examined that in the seven good irrigation districts, the growth rate of yield varied from -0.75 per cent in Sabarkantha to 6.39 per cent in Ahmedabad in first period, 1.53 per cent in Vadodara district to 3.24 per cent in Mehsana district in second period. In the low irrigation districts, the growth rate of yield varied from -1.44 per cent in Jamnagar to 5.06 per cent in Bharuch in the first period and from -2.27 per cent in Bharuch to 10.49 per cent in Surendranagar in the second period.

Shanmugam R.R. has studied in his paper "Technical Efficiency of Rice, Groundnut and Cotton Farms in Tamil Nadu" (2003) and analyzed the zone wise economics of cultivation of major principal crop in Tamil Nadu. He is examined that land and labour inputs was the significant determinants of output of all crops in the State during the reference years 1990-91 to 1992-93. In case of rice crop, the fertilizer was influence variable for increasing the yield levels. The results of the study indicated that the farmers were more efficient in raising rice productivity in zones 4 and 5.

It can be concluded from the review of the studies that productivity of rice was increased and the use of modern inputs played an important role in increasing production and productivity of rice. The majority of the studies show that performance of productivity of rice improved but significant variation was found in the growth of productivity of rice.

**Market of Rice**

Venkatesh V. and Srinivasan R. have reported in their research paper "Government Intervention in the Paddy Marketing System - An Economic Investigation" (1988), observed that selected sample farmers sold their major part of marketable surplus of paddy (about 93 per cent of total marketable surplus) through direct purchase centre. The remained surplus surplus sold to private traders during the off season.
Atibudhi H. N. has made a study "The Problem of Marketed Surplus and Distress Sell of Major Food gains in the Kalabandi, Bolangir and Korapur (KBK) Districts, Orissa" (2006) and reported among the sample paddy growers marginal farmers were about 38 and small farmers were 62 per cent paddy surplus of the total marketable surplus sold in the village market and in nearest market. About 40 per cent of marketable surplus sell to the local village traders to meet loan repayments, towards the cost of raising the crop and their consumption needs.

Kumar Parmod and Sharma R.K. have reported in their article "Spatial Price Integration and Pricing Efficiency at the Farm Level: A Study of Paddy in Haryana" (2003) that price of paddy adjustment among the markets were found to take around 2-3 weeks. This adjustment process was found to be quicker after the post liberalization period compared to the pre-liberalization period. The results of the study shows that the paddy markets in both the districts which surveyed appeared to be efficient at the micro level. Due to a well-connected regulated marketing system along with prefect transportation facilities across the farmers. As a result, it was found that the all farmers sold their paddy produce in the regulated markets. However, lack of scientific storage and market intelligence were the causes of concern as these affected the farmers adverse.

Kumar Parmod observed in his study (1999) that the share of marketed surplus is higher in the case of cash crops like paddy, cotton and oilseeds as compared to other crops like wheat, pulses and coarse cereals. In case of paddy, the large farmers sold larger share (about 45 per cent) of total marketed surplus of paddy while marginal farmers sold very little share (only 2.6 per cent).

Shah V. D. and Patel F. H. workout in their research project "Impact of Minimum Support Prices on Agricultural Economy in Gujarat" (2003) that more than 80 per cent quantity of paddy surplus of the total marketable surplus was sold to private traders. They also reported that the privet trader were in prime position in the agricultural marketing system in Gujarat. The paddy growers received higher price of paddy per quintal. Due to they suggests that good gain made by the farmers through selling their produce in the open market.

The studies reviewed reveal that the farmers are sold their marketable surplus and remained surplus trough privet traders during the seasons.
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