

CHAPTER - IV

PERFORMANCE OF AGRICULTURE IN ORISSA: INTERTEMPORAL AND SPATIAL VARIATIONS

IMPORTANCE OF AGRICULTURE

Orissa is primarily an agrarian economy. Agriculture is the state's dominant sector with a contribution of nearly 30 per cent to the Net State Domestic Product (NSDP). About 73 per cent of total main workers are engaged in agriculture including 44.3 per cent cultivators and 28.7 per cent agricultural labourers (1991 census). Nearly 87 per cent of total population live in rural areas. Though the contribution of agriculture to NSDP has significantly declined from 67 per cent in 1951 to around 30 per cent in 1998, the percentage of workforce engaged in agriculture has remained somewhat unchanged with 73.8 per cent in 1960 and 73 per cent in 1990 (Table 4.1). This implies that there has been an overcrowding in agriculture without any perceptible increase in production. There has been a spectacular increase in disguised unemployment or underemployment in the agriculture sector with zero or near zero marginal productivity of agricultural labour. Cultivated land area remaining more or less fixed, with increase in population the land-man ratio has worsened over time. The per capita availability of cultivated land which was 0.39 ha. in 1950 has been drastically reduced to 0.17 ha. in 1999.

Percentage of cultivators to main workers has decreased from 57 per cent in 1960 to 44 per cent in 1990. By contrast the percentage of agricultural labourers to main workers has increased from 17 per cent in 1960 to 29 per cent in 1990. Thus, within a span of three decades the ratio of agricultural labourers to cultivators has increased substantially from about 3:7 in 1960 to 6.5:3.5 in 1990. This is primarily due to increase in landlessness or near landlessness on account of population growth and sub-division of land holdings among legal heirs. As the pace of industrialisation in the state is slow and has not taken off, agriculture continues to provide sources of livelihood to a significant segment of population. Therefore, agricultural growth holds the key to the overall development of the state by way of creating

employment, generating income, providing raw materials to the industrial sector and last but not the least ensuring self-reliance in food production and food security to the deprived sections.

Table -4.1

Importance of Agriculture in Orissa Economy

Sl. No.	Indicators	1950-51	1960-61	1970-71	1980-81	1990-91
1	2	3	4	5	6	7
1	Share of Agriculture in NSDP (%)	66.8*		54.6		30.0**
2	Percentage of Total Population Living in Rural Area	95.9	93.7	91.6	88.2	87.0
3	Percentage of Total Workforce Engaged in Agriculture		73.8	77.4	74.7	73.0
a	Percentage of Cultivators to Main Workers		56.8	49.2	46.9	44.3
b	Percentage of Agricultural Labourers to Main Workers		17.0	28.3	27.8	28.7
4	Per Capita Availability Of Cultivated Land (Ha)	0.39	0.38	0.31		0.18**

Note : * Figures for 1951-52

**Figures for 1998-99

Source Government of Orissa, *Economic Survey* (Various Issues), and *Statistical Abstracts of Orissa*, (Various Issues)
Directorate of Economics and Statistics, Orissa, Bhubaneswar.

PERFORMANCE OF AGRICULTURE: INTER-STATE COMPARISON

Over the last two to three decades there has been stagnation in agriculture in Orissa. The yearwise area, yield rate and production of food grains have been indicated for the period 1970-1998 in Table 4.2 and Figure 4.1. A careful analysis of the trend reveals that there has

been a distinct increase in area, yield and production of foodgrains in the year 1983-84. The yield of foodgrains has increased from 883 kg/ha in 1970 to 956 kg/ha in 1983. Thereafter, there has been a distinct increase in yield rate in the year 1988 and this rate has more or less sustained till 1998.

The triennium ending compound annual growth rates for area under foodgrains, production and yield have been computed for five time periods as shown in Table 4.3. The growth rates are found to be hovering around one per cent during all the time periods. During the period 1996-99 over 1970-73 the growth rates in area under foodgrains, yield and production are found to be 1.004, 1.004 and 1.011 respectively. These growth rates are much lower in comparison to other Indian states and all-India average as discussed below.

A state and region-wise analysis of levels of yield and compound growth rate as contained in Table 4.4 reveals that the average value of crop yield is the highest in the Southern region of India followed by North-western region, Eastern region and Central region. For the triennium ending 1992-95 the average value of yield is the highest for Kerala and then in descending order are Tamil Nadu, Punjab and Haryana. For Orissa the average value of yield was only Rs.5979 per hectare whereas it was Rs.15626 for Kerala, Rs.14073 for Tamil Nadu, Rs.13597 for Punjab and Rs.7388 for all-India. As regards annual compound growth rate of yield over the period 1962-92, it is computed to be the highest for North-Western region followed by Southern region, Central region and Eastern region. A statewise comparison indicates that the per cent annual compound growth rate is the highest for Haryana (3.2) followed by Punjab (3.1) and Andhra Pradesh (2.8). In Orissa the compound annual percentage growth rate is only 1.3, whereas for all-India it is 2.3.

Table-4.2
Area, Yield and Production of Foodgrains in Orissa

Year	Area (^{'000} Ha.)	Yield (kg/Ha)	Production (^{'000} mt)
1970-71	5781	883	5104
71-72	5950	732	4354
72-73	5915	822	4860
73-74	6218	881	5480
74-75	5992	663	3971
75-76	6484	848	5500
76-77	6038	675	4075
77-78	6519	853	5561
78-79	6680	863	5765
79-80	6455	600	3872
80-81	6909	865	5977
81-82	6738	822	5538
82-83	6417	731	4688
83-84	7323	956	7001
84-85	6652	843	5609
85-86	7043	989	6968
86-87	7010	910	6378
87-88	6728	752	5058
88-89	6856	1021	7002
89-90	6972	1144	7974
90-91	7089	992	7031
91-92	7252	1141	8273
92-93	6946	993	6898
93-94	7208	1140	8216
94-95	7120	1122	7986
95-96	7194	1101	7923
96-97	6360	841	5347
97-98	6616	1105	7311
98-99	6516	965	6288
S.D.	442.30	153.30	1331.14
C.V. (%)	6.6	16.9	21.9

Source: 1. Government of Orissa, *Agricultural Statistics of Orissa- At a Glance*, 1996, 2. *Orissa Agricultural Statistics*, (Various Issues); Directorate of Agriculture & Food Production, Orissa, Bhubaneswar.

AREA, YIELD AND PRODUCTION OF FOODGRAINS IN ORISSA
(1970-98)

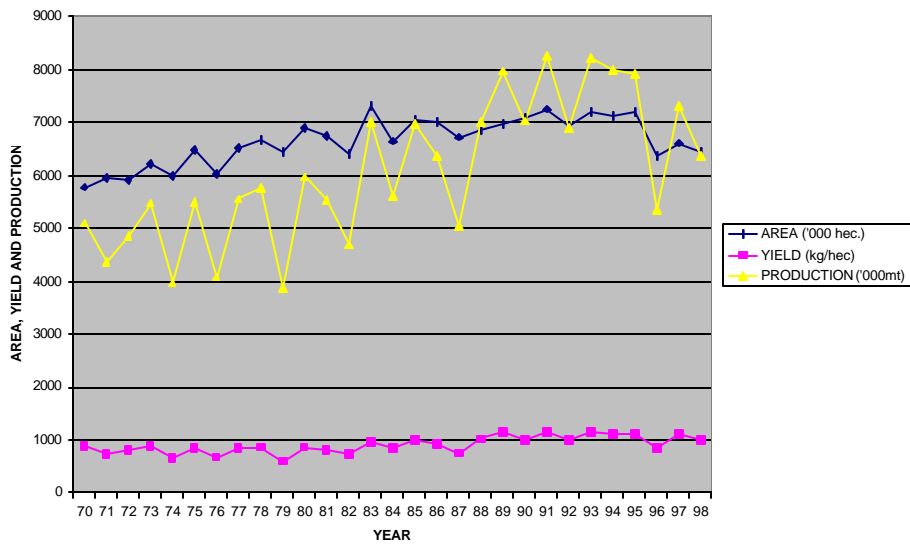


FIGURE - 4.1

YIELD OF FOODGRAINS IN ORISSA
(1973-98)

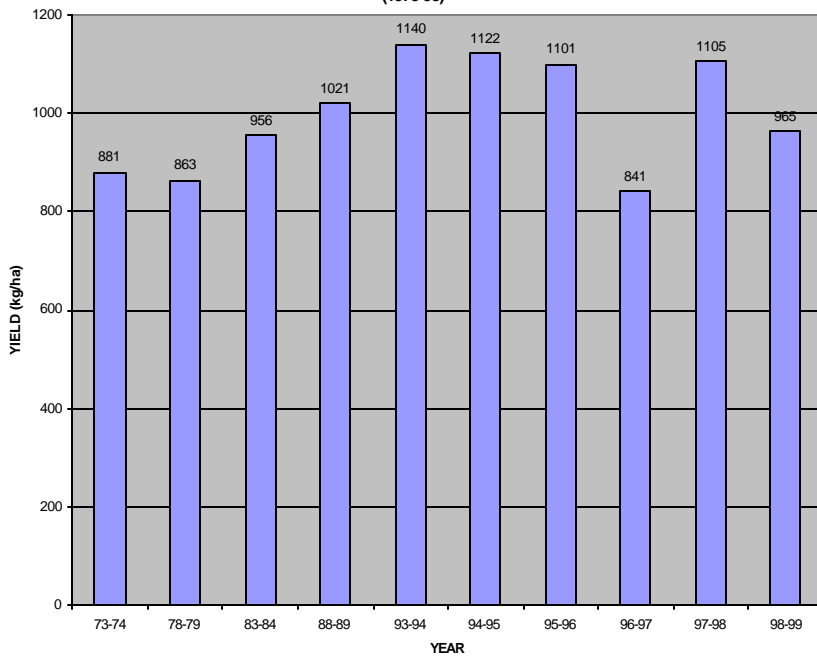


FIGURE- 4.2

Table-4.3**Growth Rates of Area, Yield and Production of Foodgrains in Orissa**

Period	Triennium Compound Annual Growth Rate		
	Area	Yield	Production
1980-83 over 1970-73	1.013	0.999	1.012
1990-93 over 1980-83	1.006	1.025	1.032
1996-99 over 1990-93	0.985	0.989	0.975
1996-99 over 1980-83	0.998	1.012	1.010
1996-99 over 1970-73	1.004	1.004	1.011

Source: Computed from *Agricultural Statistics of Orissa-At A Glance*, 1996; *Agricultural Statistics*,

(Various issues); Directorate of Agriculture & Food Production, Orissa, Bhubaneswar.

Table-4.4
States and Resign-wise Average Yield and Compound Growth Rates of Crops

(At

1990-93 constant prices)

Sl. No.	States/Region	Average Value of Yield (Rs./Ha)				Annual Compound Growth Rate (%)			
		1962-65	1970-73	1980-83	1992-95	1970-73 over 1962-65	1980-83 over 1970-73	1992-95 over 1980-83	1992-95 over 1962-65
1	Orissa	4114.37	4072.70	4374.84	5979.16	-0.13	0.72	2.64	1.25
2	Assam	5727.97	6241.20	6906.69	8196.82	1.08	1.02	1.44	1.20
3	Bihar	3679.55	4009.73	4048.56	5678.08	1.08	0.10	2.86	1.46
4	West Bengal	5074.57	5614.56	5943.81	9958.45	1.27	0.57	4.39	2.27
I	Eastern Region	4338.30	4671.31	4944.00	7318.50	0.93	0.57	3.32	1.76
5	Haryana	3927.21	5090.01	6229.13	10128.73	3.30	2.04	4.13	3.21
6	Himachal Pradesh	3048.15	3733.76	3917.69	5195.63	2.57	0.48	2.38	1.79
7	Jammu & Kashmir	2986.95	4481.40	5758.75	5567.01	5.20	2.54	-0.28	2.10
8	Punjab	5395.62	7476.29	9707.65	13597.22	4.16	2.65	2.85	3.13
9	Uttar Pradesh	3970.10	4589.98	5805.13	8656.20	1.83	2.38	3.39	2.63
II	North-west Region	4092.75	5024.54	6422.63	9582.50	2.60	2.49	3.39	2.88
10	Gujarat	3673.01	4326.57	5693.43	7460.09	2.07	2.78	2.28	2.39
11	Madhya Pradesh	2603.49	2835.86	3069.65	4773.12	1.07	0.80	3.75	2.04
12	Maharashtra	2898.61	2343.57	3794.68	5176.94	-2.62	4.94	2.62	1.95
13	Rajasthan	1740.45	2217.10	2334.77	3715.22	3.07	0.52	3.95	2.56
III	Central Region	2653.78	2763.12	3464.09	4943.84	0.51	2.29	3.01	2.10
14	Andhra Pradesh	4064.96	4363.05	6276.23	9390.64	0.89	3.70	3.41	2.83
15	Karnataka	3207.56	4267.23	4989.92	6969.70	3.63	1.58	2.82	2.62
16	Kerala	11375.65	12957.56	12333.85	15625.96	1.64	-0.49	1.99	1.06
17	Tamil Nadu	6689.49	7899.75	8756.47	14073.94	2.10	1.03	4.03	2.51
IV	Southern Region	4873.34	5872.68	6848.20	9990.63	2.36	1.55	3.20	2.42
	All-India	3738.19	4256.79	5090.42	7388.05	1.64	1.80	3.15	2.30
	C.V (%)	56.86	58.19	48.12	46.30	91.34	85.20	39.05	29.26

Note : 1. Average Yield = (Value of output of 43 crops/area under 43 crops)

Source : Calculated from Government of India, *Area and Production of Principal Crops in India* (Various Issues), Ministry of Agriculture, New Delhi;
Bhalla, G.S. ed Gurmail Singh, (2001), *Indian Agriculture: Four Decades of Development*, New Delhi: Sage, p.24-25.

Now coming to the physical crop productivity, it is observed that in the year 1998-99 the yield rate of foodgrains in Orissa was only 1080 kg/ha, whereas for all-India the figure was quite higher i.e. 1620 kg/ha (Table 4.5). Also, in the neighbouring states of West Bengal and Andhra Pradesh having similar agro-climatic conditions, the yield was substantially higher i.e. 2200 kg/ha and 2000 kg/ha respectively. The yield rate was the highest for Punjab (3740kg/ha) followed by Haryana (2700 kg/ha), Tamil Nadu (2280 kg/ha) and West Bengal (2200 kg/ha). If we consider the yield rate of rice which is the staple cereal crop of Orissa, the picture is, also, not encouraging. The average per hectare yield rate of rice in Orissa is only 1210 kg, whereas the all-India average is 1930 kg. A probe into the reasons for low productivity in Orissa unfolds that in agriculturally advanced states like Punjab, Haryana and Tamil Nadu the use level of yield enhancing inputs like irrigation and fertiliser is found to be too high in comparison to Orissa.

In Orissa foodgrains account for a major proportion of gross cropped area (Table 4.6). The percentage of gross cropped area under foodgrains was 89.4 per cent in 1998. Thus, only 11 per cent of the gross cropped area were under cash crops which include oilseeds, fibre crops, plantation crops and vegetables. There has not been any perceptible change in the cropping pattern during the period 1970-1998. Instead of diversification in cropping pattern favouring cultivation of more of remunerative cash crops, percentage area under foodgrains has increased from 85 per cent in 1970 to 89 per cent in 1998. This is due to the reason that agriculture in Orissa is not yet commercialised. The farmers mainly produce for domestic consumption purposes and not for the market. Subsistence farming is pervasive in Orissa. Capitalist or commercial agriculture has not yet taken firm roots in Orissa. Regarding intensity of cropping Orissa is far behind achieving double cropping. Cropping intensity which was 146 per cent in 1985 has actually declined to 139 per cent in 1998.

Recently cultivation of commercial crops like sugarcane, jute, mesta, cotton, soyabean, groundnut, potato, chilly, onion etc. are being encouraged by the state government. In low rainfed areas of Kalahandi, Koraput, Nabarangpur and Rayagada, cotton cultivation is given more attention. In the coastal districts, river bed potato cultivation is being promoted by providing certified potato seeds and other inputs. Steps are taken to cover at least 1.5 lakh hectares under sugarcane during the next five years. Sugarcane growers are provided with

Table-4.5
Inter-State Comparison of Agricultural Indicators in India

State	Yield Rate of Foodgrains (kg/ha) (1998-99)	Yield Rate of Rice (kg/ha) (1998-99)	% of GCA Irrigated (1996-97)	Fertiliser Use (kg/ha) (1998-99)	Average Size of Operational Holding (hectares) (1990-91)	% of Marginal & Small Holdings to Total Operational Holding (1990-91)	% of Operational Area Leased in (1991)	% Rural Population Below Poverty Line (1993)
I. Eastern Region								
Orissa	1080	1210	27.5	43.8	1.34	79.9	9.5	49.72
Bihar	1440	1300	46.0	97.2	0.93	82.6	3.9	58.21
West Bengal	2200	2260	27.5	136.0	0.90	91.4	10.4	41.72
Assam	1290	1340	14.4	27.7	1.31	82.6	8.9	45.01
II. Southern Region								
Andhra Pradesh	2000	2780	43.1	155.5	1.56	77.3	9.6	15.92
Karnataka	1350	2530	23.7	103.1	2.13	66.6	7.4	29.88
Kerala	1770	1890	15.4	70.0	0.33	97.7	2.9	25.76
Tamil Nadu	2280	3440	51.8	162.9	0.93	89.0	10.9	32.48
III. Central Region								
Madhya Pradesh	1110	1010	25.8	47.2	2.63	60.1	6.3	40.64
Gujarat	1430	1630	33.1	87.8	2.93	52.3	3.3	22.18
Rajasthan	960	1220	32.6	39.5	4.11	49.7	5.2	26.46
Maharashtra	970	1660	14.5	88.9	2.20	63.4	5.5	37.93
IV. North-Western Region								
Utter Pradesh	1960	1960	66.9	125.4	0.89	89.4	10.5	42.28
Punjab	3740	3150	94.1	184.6	3.61	44.8	18.5	11.95
Haryana	2700	2240	78.8	148.5	2.43	60.5	33.7	28.02
Himachal Pradesh	1770	1420	18.6	13.4	1.20	83.6		30.34
Jammu & Kashmir	1730	2180	41.5	58.2	0.80	90.2		30.34
India	1620	1930	38.7	95.3	1.57	78.0	8.3	37.27

Source : 1. Agriculture, CMIE, November-2000.

2. Report of the expert Group on estimation of Proportion and number of poor, Planning Commission (1993)

Table-4.6

Percentage of GCA under Different Crops in Orissa

(Figures in percentage)

Sl. No.	Principal Crop	1970-71	1980-81	1990-91	1995-96	1996-97	1997-98	1998-99
1	2	3	4	5	6	7	8	9
1.	Paddy	66.1	47.9	45.9	71.8	75.7	74.7	74.4
2.	Total Cereals	72.4	59.3	51.7	75.0	79.6	78.0	77.6
3.	Total Pulses	12.5	19.7	22.2	14.2	10.6	12.2	11.8
4.	Total Foodgrains	84.9	79.0	73.9	89.2	90.2	90.2	89.4
5.	Total Oil Seeds	4.9	8.4	12.1	7.3	6.9	7.0	6.4
6.	Total Fibres	1.2	1.1	0.9	1.0	1.2	1.2	1.2
7.	Other Crops	8.1	10.6	12.4	2.5	1.7	1.6	3.0
	All Crops	100	100	100	100	100	100	100
	Total Area (‘000 Hectare)	5601	6130	6304	6309	5897	6022	5980

Source: (1) Government of Orissa, *Economic Survey*, 1999-2000, Directorate of Economics and Statistics, Bhubaneswar,

(2) *Agricultural Statistics of Orissa – At a Glance*, 1996, Directorate of Agriculture and Food Production, Bhubaneswar.

quality cane seeds, farm implements and drip irrigation under two schemes, namely, Sugarcane Development Programme under the state plan and Sustainable Development of Sugarcane Based Cropping System under the centrally sponsored plan.

State government is now putting emphasis on development of horticulture. Hill tracts of KBK districts and of Phulbani and Gajapati districts have been identified as suitable regions for cultivation of commercial fruits, use of hybrid vegetable seeds, propagation of off-season vegetable cultivation and the like. Oil palm plantation and use of drip irrigation are being given priority during Ninth plan.

INTER-DISTRICT AND REGIONAL VARIATIONS

It is observed that there are wide variations in agricultural performance in Orissa across zones and districts. There are broadly four agro-climatic zones in Orissa : Northern Plateau, Central Table Land, Eastern Ghat and Coastal Plain. Though Orissa has 30 districts since 1993, we have presented the data for the old undivided 13 districts for the purpose of showing changes

in different agricultural indicators over time. Table 4.7 shows that during 1998 yield rate of foodgrains was the highest in Coastal Plain followed by Central Table Land, Eastern Ghat and Northern Plateau in that order. Interdistrict variations in yield rate of foodgrains show that it ranges from the highest 1279 kg/ha in Ganjam to the lowest 590 kg/ha in Kalahandi. Irrigation is the most important determining factor of agricultural productivity. Percentage of gross cropped area irrigated is the highest, 69 per cent, for Cuttack district and the lowest, 25 per cent, for Kalahandi.

To depict the district-wise agricultural development disparity scenario, composite Agricultural Development Index (ADI) have been constructed by 'Deprivation Method' by using nine agricultural development indicators, such as (i) % cultivable land to total land area, (ii) % area sown to total cultivatable area, (iii) % irrigated area to GCA, (iv) cropping intensity in %, (v) % GCA under HYV rice, (vi) fertiliser consumption per hectare of GCA, (vii) total road per 100 sq. km of area, (viii) per capita credit to agriculture and, (ix) average yield of rice (Table 4.8).

A careful analysis of the computed ADIs for different districts reveals that the four coastal districts (Balasore, Cuttack, Puri and Ganjam) and two districts of Central Table Land Area (Sambalpur and Bolangir) are agriculturally more advanced than other districts; as they have always occupied the first six positions in the three reference years over three decades (1980-81 to 1998-99). All the above districts have exchanged the first six ranks among themselves during the reference years. The agricultural success of four coastal districts is due to well-developed irrigation facilities and vast tracts of plain and fertile land comprising alluvial soil. Districts of northern plateau zone namely Mayurbhanj, Keonjhar and Sundergarh, and Koraput of eastern ghat area are found to be the most backward districts as they have secured the lowest ranks during the reference years. A significant proportion of gross cropped area in these districts is under rainfed agriculture and, thus, drought prone. Phulbani is the only district having sliding or worsening agricultural development index over the reference time period.

Table – 4.7

Factors Affecting Inter-District and Regional Variations in Yield in Orissa

Sl. No.	Zone/District	Area Under Foodgrain (⁰ 000 Ha) (1998-99)	Yield Rate of Foodgrains (kg/Ha) (1998-99)	Foodgrain Production (⁰ 000 tonnes) (1998-99)	Cropping Intensity in % (1998-99)	Fertiliser Consumption per Hectare of Gross Cropped Area (kg/Ha) (1998-99)	Annual Rainfall (in mm) (1998-99)	% of Gross Cropped Area Irrigated (1998-99)	Average size of Operational Holdings (Hectares) (1991)	Proportion of literate Population in Rural Area (1991)
1	2	3	4	5	6	7	8	9	10	11
I	NORTHERN PLATEAU	1018.7	645.0	657.0	126.0	20.5	1024.4	29.4	1.38	
1	Mayurbhanj	410.0	798.0	327.0	127.0	24.0	1029.6	32.5	1.25	28.8
2	Kendujhar	302.9	623.0	116.9	134.0	20.0	1006.9	30.8	1.28	34.5
3	Sundargarh	305.8	697.0	213.1	120.0	16.0	1090.5	24.0	1.73	34.4
II	CENTRAL TABLE LAND	1508.3	1006.0	1518.2	132.0	40.5	1003.9	38.5	1.53	
4	Bolangir	455.1	933.5	365.4	133.0	24.5	862.0	35.2	1.61	30.5
5	Sambalpur	659.2	1109.3	844.6	128.0	60.8	1059.6	41.0	1.71	38.3
6	Dhenkanal	394.1	773.0	308.3	143.5	18.5	1090.1	32.0	1.22	42.3
III	EASTERN GHAT	1507.5	881.0	1327.6	133.0	22.4	1081.9	29.1	1.71	
7	Koraput	753.6	1111.3	837.7	131.5	20.5	1151.0	30.9	1.70	14.3
8	Kalahandi	564.4	590.0	326.9	138.5	18.5	1051.0	25.3	1.89	23.5
9	Phulbani	189.1	866.0	163.0	135.0	11.5	1043.9	32.5	1.38	29.5
IV	COASTAL PLAIN	2481.1	1151.0	2785.4	157.0	50.1	1192.2	57.4	1.07	
10	Baleswar	453.7	1044.5	461.2	127.5	89.5	1203.5	49.9	1.19	48.0
11	Cuttack	781.3	1202.5	939.0	162.8	44.3	1371.9	69.1	1.05	51.5
12	Puri	589.9	1156.0	674.9	167.3	37.0	1043.9	58.6	1.01	50.9
13	Ganjam	593.2	1278.5	710.4	153.0	36.5	1149.5	46.1	1.03	32.7
	Orissa	6515.7	965.1	6288.3	139.0	36.0	1151.0	41.6	1.34	34.5

Source: 1. *Agricultural Statistics of Orissa- At a Glance*, 1996, Orissa Agricultural Statistics, 1998-99, Directorate of Agriculture & Food Production, Orissa, Bhubaneswar.

2. *Report on Agricultural Censuse in Orissa*, (Various Issues), Agricultural Census Commissioner, Board of Revenue, Orissa, Cuttack.

**DISTRICTWISE YIELD OF FOODGRAINS IN ORISSA
(1998-99)**

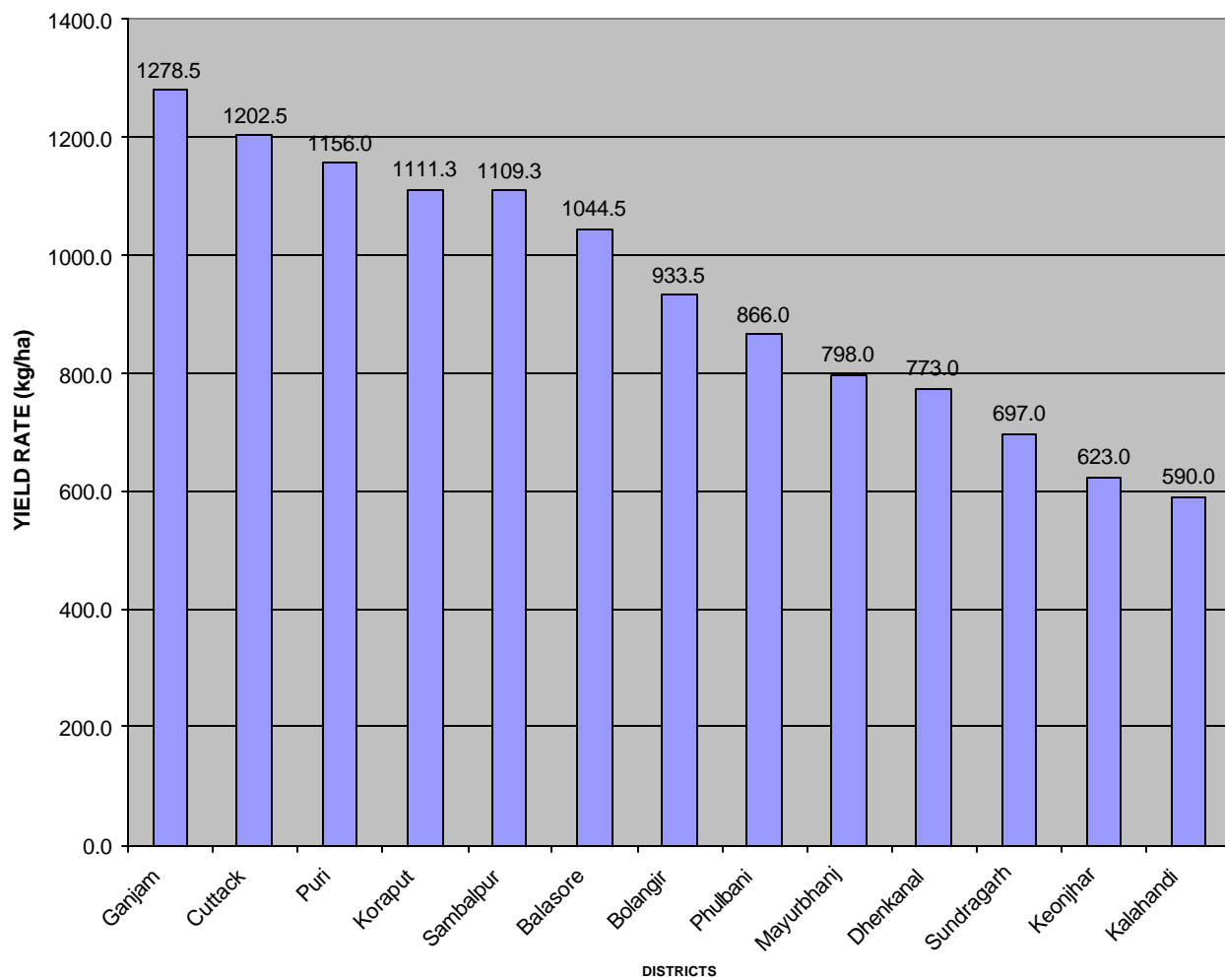


FIGURE- 4.3

Table- 4.8

District-wise Agricultural Development Indices in Orissa

Sl. No.	Zone/Districts	Agricultural Development Index	Rank	Agricultural Development Index	Rank	Agricultural Development Index	Rank
		1980 - 81		1990 - 91		1998 - 99	
I	NORTHERN PLATEAU						
1	Mayurbhanj	0.2868	8	0.2222	12	0.3267	10
2	Kendujhar	0.1135	13	0.2452	8	0.2546	11
3	Sundargarh	0.1326	12	0.2290	11	0.2286	12
II	CENTRAL TABLE LAND						
4	Bolangir	0.4133	6	0.4645	6	0.4127	6
5	Sambalpur	0.5452	4	0.6618	2	0.6192	3
6	Dhenkanal	0.2101	10	0.2895	7	0.4022	7
III	EASTERN GHAT						
7	Koraput	0.1712	11	0.2142	13	0.3569	9
8	Kalahandi	0.2605	9	0.2305	10	0.3581	8
9	Phulbani	0.3477	7	0.2429	9	0.1672	13
IV	COASTAL PLAIN						
10	Baleswar	0.5049	5	0.6136	3	0.5878	4
11	Cuttack	0.6963	1	0.4986	5	0.6946	2
12	Puri	0.5656	3	0.5785	4	0.7503	1
13	Ganjam	0.6961	2	0.7208	1	0.4860	5
14	C.V (%)	54.06		48.19		41.99	

Source: Computed from : 1.Orissa Agricultural Statistics 1980-81, 1990-91, 1998-99, Department of Agriculture and Food Productions, Orissa, Bhubaneswar.
2.Profile of Districts, CME, Oct.2000.

1. The component indices are constructed by using the following formula:

$$I_{ij} = \frac{X_{ij} - \min X_j}{\max X_j - \min X_j}$$

where I_j = component index for the j th district with respect to the i th variable.

X_i = actual value of the j th district in the i th variable.

$\min X_i$ and $\max X_i$ are the minimum and maximum value of the i th variable.

2. After calculating the component indices the agricultural development index is constructed by using the following formula:

$$I_j = \frac{\sum_{i=1}^n I_{ij}}{\sum_{i=1}^n i}$$

where I_j = the index of the j th district. Here, equal weights are given to all the indicators

However, it is heartening to note that the co-efficient of variation (C.V) in ADI values of districts is gradually declining over time. In 1980-81, C.V was 54.06 %, which decreased to 48.19%

during 1990-91 and to 41.99% during 1998-99. From this it may be inferred that with passage of time the inter-district agricultural disparity in Orissa has declined.

The next logical step is to probe into the causes for inter-district variations in agricultural performance in Orissa. To identify such factors responsible for variations in agricultural productivity across districts we have estimated a regression equation as mentioned below.

Y	= 231.35	+	0.929X1+	0.009X2 +	13.667 X3 +	94.931X4
Standard Error	= (691.0248)		(3.01446)	(0.5441)	(7.1494)	(243.109)
t value	=(0.3348)		(0.3081)	(0.0166)	(1.9117)	
	(0.3905)					
R square	= 0.601					
F value	=3.84	d.f.= 8		n=13		

Where

- Y= Yield rate of foodgrains in kg/ha
- X1= Fertiliser use in kg/ha
- X2= Annual rainfall in mm
- X3= % of GCA irrigated
- X4= Average size of operational Holding in ha

The results of regression analysis indicate that the percentage of gross cropped area irrigated is the most significant variable in affecting the yield of foodgrains and the second most important factor is the average size of operational holding. All the estimated regression coefficients bear positive signs as expected. This testifies that fertiliser use, rainfall, % GCA irrigated and size of operational holding positively affect yield rate of foodgrains. All the coefficients are found to be significant at 0.05 % level of significance. R-square value is computed to be 0.601 indicating that about 60.1% of inter-district variations in yield are explained by our regression model.

AGRICULTURAL BACKWARDNESS OF KBK DISTRICTS

The KBK districts of Orissa which comprised the undivided Kalahandi, Bolangir and Koraput districts now cover eight divided districts namely Koraput, Malkanagiri, Nabarangpur, Rayagada, Bolangir, Sonepur, Kalahandi and Nuapada. These districts are inhabited mostly by tribals and SC population. The land areas in the KBK districts are chronically affected by

drought due to uneven and erratic rainfall over the years. The entire KBK region is predominantly rural in character with more than 90 per cent of its population residing in rural areas as against 87 per cent at the state level (1991 census). The workforce structure of the KBK districts reveals that while at the state level there has been a marked shift of the workers from primary sector to secondary sector occupations in recent years, the KBK districts continue to show all the symptoms of economic backwardness with little occupational diversification taking place in the region. While the workers engaged in primary sector has marginally declined from 85 per cent in 1971 to 84 per cent in 1991, the workers engaged in the secondary sector has been stagnating around 5 per cent of total workforce.

The Agricultural Development Index (ADI) of the undivided KBK districts point to the fact that the undivided Bolangir district has retained its rank at 6 during the three reference time periods i.e. 1980-81, 1990-91 and 1998-99 (Table 4.8). But the ranks of undivided Koraput and Kalahandi have been lowered in 1990 with respect to their positions in 1980. However, in 1998 their positions have improved. District-wise variations in area, yield and production of foodgrains for the period 1978-1998 as contained in Table 4.10 show that Koraput has the highest level of fluctuations in area under foodgrains with C.V of 15.3 per cent and Bolangir has the highest level of fluctuations in foodgrain production with C.V of 31.45 per cent and the second highest variation in foodgrain yield with C.V. of 28.2 per cent.

Though a number of poverty alleviation programmes have been implemented in the area to create employment and generate income, the living standards of the people have not improved. News of starvation death occurring in the area is catching headlines of many newspapers frequently. Many irrigation schemes launched in the area primarily to improve soil and water conservation/ availability, have not yielded desired results. Due to low level of education and social and economic backwardness, people of the area have been unable to adopt appropriate technology for proper water and land management.

Under such a situation it is imperative to harvest the abundant rainwater and run off which are otherwise wasted and use it properly by proper watershed management. Also, creation of new irrigation potential by investing in new irrigation projects and utilisation of already created potentials is of paramount importance. But irrigation development in these districts is not up to the satisfactory level. In the year 1998-99 the percentage of gross cropped area irrigated in

Koraput, Bolangir and Kalahandi was 30.9 per cent, 35.2 per cent and 25.3 per cent respectively, whereas the state average was 34.5 per cent (Table 4.7). Also, in the KBK districts the consumption of fertiliser per hectare of gross cropped area was much lower in comparison to state average (Table 4.7).

By the end of 8th plan, the total irrigation potential created in these districts was 3.54 lakh hectares constituting 14.34 per cent of the total irrigation potential created in the state. During 1997-98 to 1999-00 of 9th plan, additional irrigation potential for 55,176 hectares has been created. The annual plan 2000-01 envisages creation of additional irrigation potential of 15,290 Ha. with an outlay of Rs.146.99 crore through ongoing and new irrigation projects such as Upper Indrabati, Upper Kolab, Potteru, Lower Indra, Lower Suktel etc.

It may be noted that, about 9 lakh ha of cultivable land of western Orissa including KBK districts have been affected by severe droughts in most of the years, affecting 15 lakh families with 85 lakh population. Under-utilisation of ground water resources, inability to use 70 per cent of the rainwater and mismanagement of irrigation projects with inadequate fund allocation, have aggravated the drought problem in the KBK region.

The ground water development in the KBK districts is at a very low level. The level of ground water development is expressed as the ratio of Net Yearly Draft to Utilisable Ground Water Resource for Irrigation multiplied by hundred. The level of ground water development is 1.9 per cent in Koraput, 0.7 per cent in Malkangiri, 5.03 per cent in Rayagada, 4.5 per cent in Nabarangapur, 9.7 per cent in Bolangir and Sonepur, 8.9 per cent in Kalahandi and 14.2 per cent in Nuapada. The stage of ground water development for the state as whole is also very low i.e. 8.4 per cent compared to 98.2 per cent for Punjab and 80.2 per cent for Haryana and all India average of 30.1 per cent. In the KBK districts the ground water level remains 6/7 meters below the ground. In these districts ground water can be utilised for irrigation by sinking dugwells through pumpsets as followed widely in South Indian states like Andhra Pradesh, Maharashtra, Tamil Nadu and Karanataka. Also, In dry land areas of KBK districts low cost and efficient irrigation systems like drip and sprinkler irrigation need to be propagated for cultivation of fruits and vegetables. The irrigation works in case of Upper Kolab project in Koraput, Upper Indrabati in Kalahandi, and Suktel and Indra in Bolangir and Nuapada need to be speeded up,

so that the poverty stricken vulnerable sections of the KBK districts can get the benefits of irrigation within a couple of years.

In upland rainfed areas of KBK districts the farmers should be motivated to cultivate drought resistant light duty crops and varieties like ragi, green gram, black gram and groundnut in place of paddy. Also, farmers should be motivated to practise inter-cropping for stabilising farm production and income. The ideal inter-cropping systems in Orissa are cereals and pulses, pulses and ragi, maize and arhar, and groundnut and arhar. Moreover, emphasis should be given on research and development of appropriate dry-land farming technology and its transfer to farmers for adoption. In dry-land areas of KBK districts stability in crop production can be ensured through appropriate soil and water management on watershed basis, run-off water collection and recycling, construction of water harvesting structures like farm ponds, percolation tanks, crop substitution, mixed cropping and adoption of alternative land use systems like agro-forestry, agro-horticulture and silviculture.

INSTABILITY IN PRODUCTION

Agriculture in Orissa is a gamble in monsoon, as quantum of rainfall not only varies from year to year, but there is wide dispersion in rainfall within a year. In some years there is deficient rainfall resulting in drought conditions and in others when there is excess of rainfall, flood is caused. Also, the rainfall is not received uniformly distributed over the year. Eighty per cent of the rainfall is received within four months of the year i.e. June to September. Very often late arrival of monsoon and its early retreat cause water stress during crucial growth stages of plant causing reduction in yield. Being a coastal state Orissa also suffers from cyclones, hurricane, hailstorms and tornado resulting in colossal loss of life and property. Almost in each alternate year Orissa suffers from natural calamities like drought, flood and cyclone. Table 4.9 shows that out of 41 years 29 years are abnormal years having occurrence of natural calamities like drought, flood and cyclone with varying intensity.

Table 4.2 shows yearwise data on area, yield and production of foodgrains for the period from 1970 to 1998. During this period the co-efficients of variation for area, yield and production have been computed to be 6.6 per cent, 16.9 per cent and 21.9 per cent respectively. Thus, the co-efficient of variation in case of yield rate (16.9 per cent) is significantly higher than that

of area (6.6 per cent). Therefore, variations in production can be explained more in terms of yield effect than area effect.

Table- 4.9
Rainfall and Natural Calamities in Orissa

(Fig in m.m)

Year	Normal Rainfall	Actual Rainfall	Deviation from Normal Rainfall		Natural Calamities
			in m.m	in %	
1961	1502.5	1262.8	-239.7	-16.0	
1962	1502.5	1169.9	-332.6	-22.1	
1963	1502.5	1467.0	-35.5	-2.4	
1964	1502.5	1414.1	-88.4	-5.9	
1965	1502.5	997.1	-505.4	-33.6	Severe Drought
1966	1502.5	1134.9	-367.6	-24.5	Drought
1967	1502.5	1326.7	-175.8	-11.7	Cyclone, Flood
1968	1502.5	1296.1	-206.4	-13.7	Cyclone, Flood
1969	1502.5	1802.1	299.6	19.9	Flood
1970	1502.5	1660.2	157.7	10.5	Flood
1971	1502.5	1791.5	289.0	19.2	Severe Cyclone, Flood
1972	1502.5	1177.1	-325.4	-21.7	Flood, Drought
1973	1502.5	1360.1	-142.4	-9.5	Flood
1974	1502.5	951.2	-551.3	-36.7	Severe Drought, Flood
1975	1502.5	1325.6	-176.9	-11.8	Flood
1976	1502.5	1012.5	-490.0	-32.6	Severe Drought, Flood
1977	1502.5	1326.9	-175.6	-11.7	Flood
1978	1502.5	1261.3	-241.2	-16.1	Hailstorm, Whirlwind, Tornado
1979	1502.5	950.7	-551.8	-36.7	Severe Drought
1980	1502.5	1321.7	-180.8	-12.0	Flood, Drought
1981	1502.5	1187.4	-315.1	-21.0	Whirlwind, Tornado, Flood, Drought
1982	1502.5	1179.9	-322.6	-21.5	Severe Flood & Drought, Cyclone
1983	1502.5	1374.1	-128.4	-8.5	
1984	1502.5	1302.8	-199.7	-13.3	Drought
1985	1502.5	1606.8	104.3	6.9	Flood
1986	1502.5	1566.1	63.6	4.2	
1987	1502.5	1040.8	-461.7	-30.7	Severe Drought
1988	1502.5	1270.5	-232.0	-15.4	
1989	1502.5	1283.9	-218.6	-14.5	
1990	1502.5	1865.8	363.3	24.2	Flood
1991	1502.5	1465.7	-36.8	-2.4	
1992	1502.5	1344.1	-158.4	-10.5	Flood & Drought
1993	1502.5	1421.6	-80.9	-5.4	
1994	1502.5	1700.2	197.7	13.2	Flood
1995	1502.5	1739.3	236.8	15.8	Flood
1996	1502.5	1042.4	-460.1	-30.6	Drought
1997	1502.5	1493	-9.5	-0.6	
1998	1502.5	1277.5	-225.0	-15.0	
1999	1502.5				Super Cyclone, Flood
2000	1502.5				
2001	1502.5				Severe Flood

Source:

1. *Agricultural Statistics of Orissa- At a Glance*, 1996, Directorate of Agriculture and Food Production, Orissa, Bhubaneswar.
2. *Compendium of Environmental Statistics*. 1999, Central Statistical Organisation, New Delhi.

Table- 4.10
District-wise Coefficients of Variation of Area, Yield and
Production of Foodgrains in Orissa (1978-1998)

Sl. No.	Zone/District	Mean			Coefficients of Variation (%)		
		Area ('000 Ha.)	Yield (kg/Ha.)	Production ('000 tonnes)	Area	Yield	Production
I	NORTHERN PLATEAU						
1	Mayurbhanj	421.16	1027.09	433.19	2.39	31.82	32.40
2	Kendujhar	298.50	823.98	247.09	5.68	25.89	28.07
3	Sundargarh	303.77	777.80	237.73	6.38	16.96	19.87
II	CENTRAL TABLE LAND						
4	Dhenkanal	425.31	861.46	369.72	6.39	20.65	24.84
5	Bolangir	472.51	953.91	454.91	5.22	28.22	31.45
6	Sambalpur	660.26	1161.57	781.93	12.97	22.50	28.98
III	EASTERN GHAT						
7	Koraput	768.03	943.56	727.64	15.30	13.59	22.46
8	Kalahandi	609.87	696.55	427.78	7.24	17.45	21.70
9	Phulbani	222.25	848.10	189.94	10.89	21.82	26.19
IV	COASTAL PLAIN						
10	Baleswar	506.04	1025.41	521.25	5.40	21.40	24.11
11	Cuttack	859.50	995.36	850.59	9.11	19.93	18.89
12	Ganjam	644.88	1032.05	671.11	8.96	20.81	25.11
13	Puri	616.62	1005.31	618.96	6.60	19.74	20.17
V	ORISSA	6858.10	948.57	6533.00	4.30	16.06	18.89

Source: Computed from : *Agricultural Statistics of Orissa-At a glance*, 1996,

Orissa Agricultural Statistics (Various Issues). Directorate of Agriculture and Food Production, Orissa, Bhubaneswar.

As regards district-wise instability in agricultural production (Table 4.10), over the period 1978 to 1998, Mayurbhanj, Bolangir and Kendujhar show higher instability both in foodgrain production and yield with high C.V. values. Interestingly, during the period of two decades under study Cuttack district has the highest average foodgrain production (850.59 thousand tonnes), but the lowest co-efficient of variation (18.89 per cent). Phulbani district is having the lowest average foodgrain production i.e. 189.94 thousands tonne. Rainfed and drought prone areas like Koraput and Phulbani show higher level of fluctuations in area under foodgrain production with C.V. 15.3 per cent and 10.9 per cent respectively.

EXPLAINING LOW PRODUCTIVITY

As already discussed Orissa is one of the most agriculturally backward states of India. Agricultural productivity in Orissa is quite low due to traditional farming practices, low use of yield stimulating inputs like HYV seeds, chemical fertiliser, organic manure; uneconomic size of operational holding, incidence of high tenancy, low capital formation and investment in agriculture, inadequate rural infrastructure and services and inappropriate policy environment. An inter-state comparison of yield and input use reveals that in the agriculturally progressive states like Punjab, Haryana and Tamil Nadu the use of chemical fertiliser is significantly higher in comparison to Orissa (Table 4.5). The per hectare application of fertiliser in case of Orissa in the year 1998 was only 43.8 kg/ha, whereas in Punjab, Haryana and Tamil Nadu it was nearly 185 kg, 149 kg and 163 kg respectively. Also, percentage of gross cropped area irrigated was markedly higher in agriculturally advanced states like Punjab (94 per cent), Haryana (79 per cent) and Tamil Nadu (52%). Thus, the low application of two important yield enhancing inputs like irrigation and fertiliser are considered to be the most immediate and important determining factors responsible for low agricultural productivity in Orissa. Further, various other factors in socio-economic, cultural, institutional and infrastructural, spheres as well as policy environment and historical antecedents also cause low yield in Orissa. For convenience we have grouped the different factors under four heads: agrarian structure, rural infrastructure and services, rural institutions and state policy.

Agrarian Structure

Though several factors are attributed for lower agricultural productivity in Orissa, many consider skewed distribution of agricultural land, small size of operational holding, high incidence of share tenancy and rural poverty as major impediments to agricultural growth. An analysis of

trends in the number of operational holdings and area operated reveals that the number of operational holdings in Orissa has increased substantially from about 30 lakh in 1961 to 42 lakh in 1991 (Table 4.11). During the same period the total operational area has increased from 43 lakh ha to only 48 lakh. Thus within a span of thirty years there has been 42.6 per cent increase in number of operational holdings which far exceeds the 11.4 percentage increase in operated area. As a result the average area operated per household has decreased from 1.44 ha in 1961 to 1.13 ha in 1991 showing 21.5 per cent decline.

The size-wise distribution of operational holdings and area operated (Table 4.12) shows that in the year 1991-92, more than eighty per cent of farm operators belonged to marginal farmer and small farmer categories cultivating less than 2 hectares of land. Though they constituted 84 per cent of operational holdings, operated only 52 per cent of total operational area. On the other hand, the large farmers (operating land area more than 4 hectares) constituting only 4 per cent of total holdings cultivated a substantial proportion i.e. 20 per cent of operated area. Thus, in Orissa there is skewed distribution of land area with its concentration in a few hands of big farmers. However, percentage of area operated by large farmers shows a declining trend during the period 1961 to 1991. Moreover, the holdings are fragmented and scattered. Consolidation of holdings has been completed only in some major irrigation commands.

Table- 4.11
Characteristics of Operational and Tenant Holdings in Rural Orissa
1961-62 to 1991-92

Characteristics	1961-62 (17 th)	1971-72 (26 th)	1981-82 (37 th)	1991-92 (48 th)
No. of Operational Holdings (lakh)	29.66	30.31	29.15	42.30
Area Operated (Lakh Ha.)	42.72	41.90	42.40	47.59
Average Area Operated (Ha.)	1.44	1.38	1.45	1.13
No. of Parcels per Holding			5.02	3.10
No. of Tenant Holdings (Lakh)			5.06	6.92
% of Tenant Holdings to Total Operational Holdings		32.34	17.35	16.37
Total Operated Area Leased in (Lakh Ha.)			4.21	4.51
% of Leased in Area to Total Operated Area		13.46	9.92	9.48
Area Leased in per Tenant Holding (Ha)			0.83	0.65

Source: (a) N.S.S Report 17th Round (1961-62); (b) N.S.S. Report 26th Round (1971-72);
(c) N.S.S Report 37th Round (1981-82); (d) N.S.S Report 48th Round (1991-92).

Table- 4.12**Distribution of Operational Holdings and Area Operated by Size Class of Land Holdings in Rural Orissa.**

Size Class of Operational Holdings (Ha)	% of Operational Holdings				% of Operated Area			
	1961-62	1971-72	1981-82	1991-92	1961-62	1971-72	1981-82	1991-92
Less than 1.01	39.42	54.52	54.45	59.99	6.97	18.60	17.02	22.09
1.01-2.00	22.92	25.78	26.11	24.34	12.51	27.32	26.48	30.16
2.01-4.00	19.65	13.90	14.08	12.02	20.73	27.06	26.16	27.87
4.01-10.00	13.66	5.25	4.63	3.36	31.04	21.56	17.84	16.20
Above 10.00	4.35	0.55	0.73	0.29	28.75	5.46	12.50	3.68
All Sizes	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: (a) N.S.S Report 17th Round (1961-62); (b) N.S.S. Report 26th Round (1971-72); (c) N.S.S Report 37th Round (1981-82); (d) N.S.S Report 48th Round (1991-92).

An inter-state comparison of size of operational holding shows that during 1990-91 it was only 1.34 ha for Orissa whereas it was quite large for agriculturally advanced states like Punjab (3.61 ha) and Haryana (2.43 ha). It is not only the size of land holding is small in Orissa, but also most of the farmers are ultra-poor and are nearly resource-less. The percentage of rural population below poverty line in Orissa is extremely high (49.7%). Due to the poor resource base the farmers in Orissa are not in a position to invest in costly inputs like chemical fertiliser, High Yielding Varieties of seeds, mechanised farm implements, pumpsets etc. Though in the cultivation of HYV seeds using fertiliser and irrigation water, the yield is high, the fluctuations in yield are significant. If the inputs are not applied in time, in required quantity and in right combination at appropriate growth stages of plant, the yield is reduced substantially. Apart from this, the high yielding varieties are highly susceptible to plant diseases and pest attacks. On the whole, in the cultivation of HYV seed, production risk is quite high. Given the low resource base, the poor farmers in Orissa are naturally risk averters. In addition to production risk, there is also price risk. In the absence of proper storage, transport and marketing facilities, there is a great risk of post-harvest losses of production and income. Therefore, the resource poor farmers of Orissa are not in a position to bear the risk of cultivating HYV seeds adopting modern method of production.

SIZewise DISTRIBUTION OF OPERATIONAL HOLDINGS AND AREA IN ORISSA

(1991)

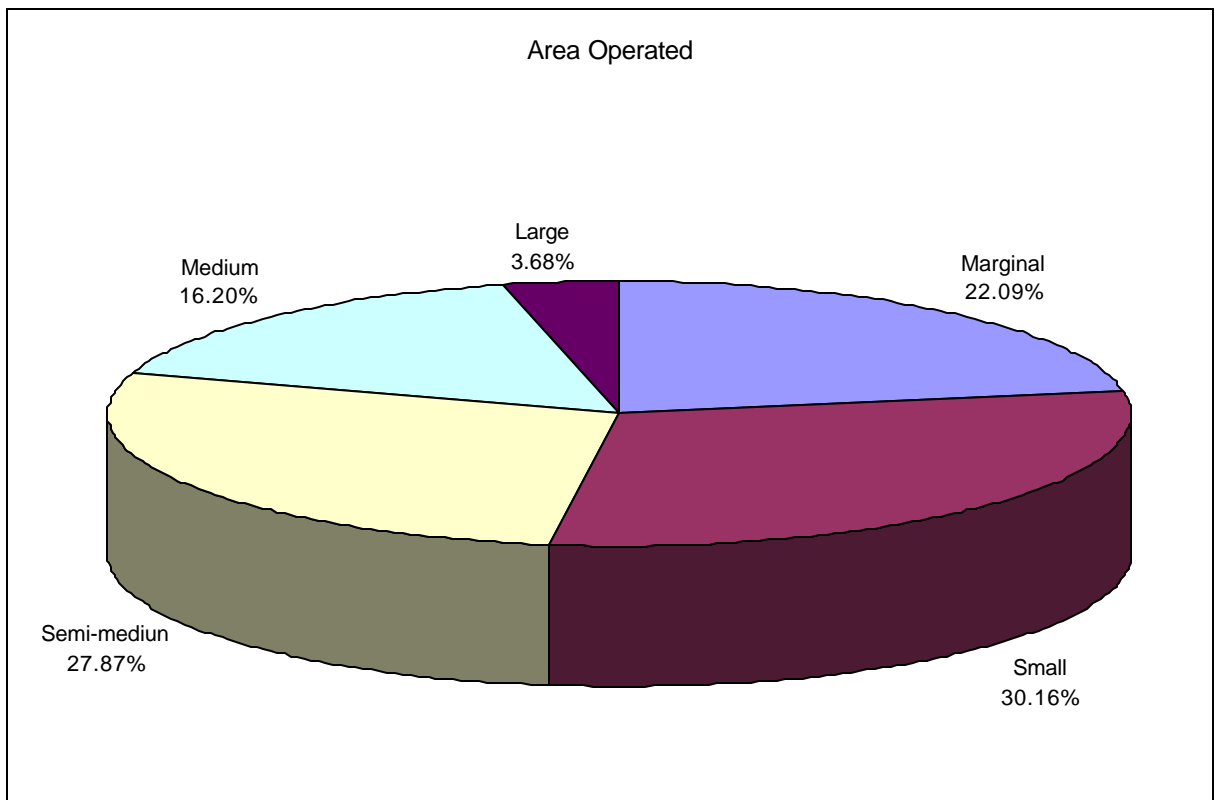
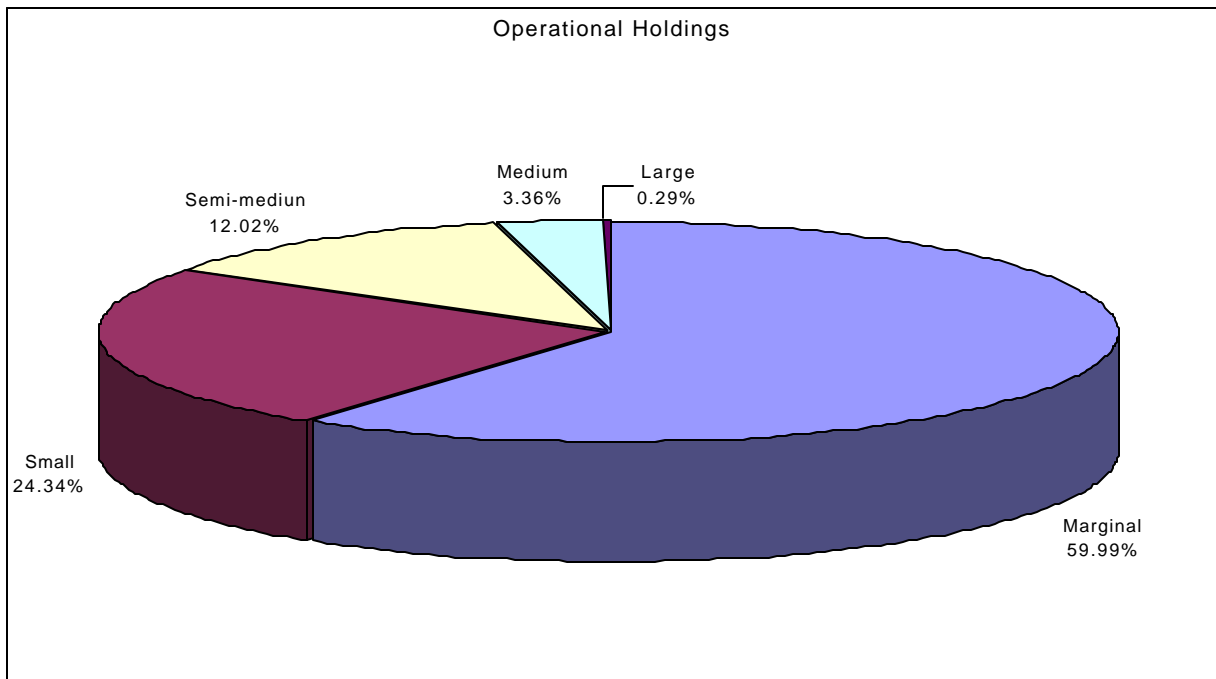


FIGURE - 4.4

As regards incidence of tenancy in Orissa, it belongs to the category of high tenancy states in India. In 1991 the percentage of area leased-in to area operated in case of Orissa was 9.5 which was greater than the All-India average of 8.3 per cent (Table 4.5). In Orissa, in 1991-92 there were numerically 6.9 lakh tenant holdings (Table 4.11). They constituted 16.4 per cent of total operational holdings. They leased in 4.5 lakh hectares of land, which was 9.5 per cent of total operational area. Average area leased-in per tenant holding was only 0.65 ha. But incidence of tenancy reveals a declining trend. The proportion of operated area leased-in has decreased from 13.5 per cent in 1970-71 to 9.5 per cent in 1991-92.

The major manifestation of tenancy in Orissa is sharecropping. The breakup of total leased-in area into different types of tenancy reveals that in Orissa sharecropping is more pervasive than fixed produce and fixed money tenancy (Table 4.13). In 1991-92 about 50.9 per cent of leased-in area was under sharecropping. The coverage under fixed money and fixed produce was only 19.7 per cent and 4.7 per cent respectively. Proportion of area under share tenancy shows an increasing trend. In 1971-72, 41.8 per cent of leased-in area was under sharecropping which has increased to 50.9 per cent in 1991. It is to be noted that in agriculturally advanced states like Punjab, Haryana, Tamil Nadu fixed tenancy is more prominent than share tenancy.

Table- 4.13

Changes in Percentage Distribution of Leased in Area by Terms of Lease

Terms of Lease	1971-72 (26 th)	1981-82 (37 th)	1991-92 (48 th)
Fixed Money	7.6	5.1	19.7
Fixed Produce	13.6	8.1	4.7
Share of Produce	41.6	42.0	50.9
Others	37.2	44.8	24.7
All terms	100.0	100.0	100.0

Source: (a) N.S.S Report 17th Round (1961-62); (b) N.S.S. Report 26th Round (1971-72); (c) N.S.S Report 37th Round (1981-82); (d) N.S.S Report 48th Round (1991-92).

However, NSSO figures on tenancy are considered underestimates as tenants are often hesitant to reveal their tenurial identity in fear of eviction. In Orissa, tenancy is legally forbidden excepting under some unusual circumstances. As lease contracts are mostly oral and informal, they remain in concealed form. Recently many micro-level studies undertaken by research scholars report that the share tenancy is quite pervasive in Orissa due to emigration of able adult male members of farm family to urban areas for employment, increase in wage cost and difficulty in labour supervision. In the absence of alternative job opportunities in the non-farm sector the land scarce and labour abundant households are leasing in land to earn their livelihood.

In Orissa mostly the marginal and small farmers lease in land. The distribution of leased-in area according to size classes of operational holdings shows that in 1991-92 about 71 per cent of leased in area was in the size classes of less than 2 hectares and only 5 per cent of leased-in area was in size classes above 4 hectares. In Orissa subsistence tenancy is more widespread than commercial or capitalist tenancy. The next logical question is who are the lessors? There is a popular belief that the landlords or the big farmers lease out land to small peasants to wield economic power over them. An analysis of distribution of lessor households and leased-out area according to size classes of ownership holdings shows that in 1991-92, a significant proportion (90%) of lessor households belonged to category of 'less than 2 ha' and they also accounted for a major proportion (81%) of leased out area. Thus the lessor households were mainly marginal and small farmers. On the other hand, a very small percentage (3%) of lessors belonged to big farmer category owning more than 4.01 ha of land which accounted for only 8 per cent of leased-out area. Thus, in Orissa mainly marginal and small farmers lease out land.

High incidence of share tenancy with high rents (50% of gross produce), absence of input cost sharing and no security of tenure adversely affects use of yield enhancing inputs and fixed investments in agriculture by the tenants and, thus, acts as a barrier to agricultural development of Orissa.

Rural Infrastructure and Services

Rural infrastructures include irrigation, roads, power supply, marketing channels, storage and transport facilities. Under services extension service, credit delivery, input supply, crop insurance may be considered. In Orissa the rural infrastructures are quite underdeveloped and rural services are inadequate in comparison to other states.

Irrigation is considered as the most important infrastructure and critical and vital input required for agricultural production, as availability of irrigation facility enables the farmers to use other yield enhancing inputs like HYV seeds and chemical fertiliser. In Orissa irrigation facility has been provided to only 34.5 per cent of gross cropped area and the rest 65.5 per cent is rainfed and depends on monsoon. There is a need to extend irrigation facility to hitherto unirrigated areas. Given the financial crisis facing the Government of Orissa, recently it is stressed that irrigation sector should generate its own resources and self-finance its expenditures instead of depending on budgetary allocation. In this respect specifically emphasis is laid on increasing water rates so as to at least cover the operation and maintenance expenses of irrigation systems. Since 1981 the irrigation water rates for major and medium irrigation projects in Orissa had not been revised. Recently under the mandate of World Bank under Water Resources Consolidation Project Orissa Government has increased the water rate substantially. For kharif paddy for class I irrigation the water rate has been increased from Rs.39.5 to Rs.100. However, the poor farmers in Orissa are reluctant to pay the higher water charges unless there is corresponding improvement in quality of irrigation service.

In the state the performance of canal irrigation is unsatisfactory considered from the viewpoint of efficiency in water use and its equitable distribution. There is ample conveyance loss of water through canal seepage. In coastal districts more than one lakh hectare of land are waterlogged and adversely affect crop yield. Construction of big dams, major and medium reservoir irrigation projects has also many adverse ecological and environmental effects by causing displacement of human settlement, deforestation and soil degradation. In order to avoid these detrimental effects recently the development of ground water is stressed which is less costly and more efficient by providing controlled irrigation ensuring timeliness and adequacy in water supply.

In dry land areas development of watershed is increasingly being emphasized. The watershed is a manageable hydrological unit that makes a harmonious use of the prevailing climate, soil, water, locally available material and human resources towards stepping up crop yield. In Orissa, watershed concept was first introduced during 2nd five year plan and refined to some extent during 5th plan through the Directorate of Soil Conservation. In the beginning of 8th plan, three major projects namely Integrated Watershed Development (plains) Project (IWDP), National Watershed Development Project for Rainfed Areas (NWDPA) and Indo-Danish Comprehensive Watershed Development Project (ICWDP) were launched in the state with

the primary objectives to (i) prevent land degradation, (ii) promote and balance the ecosystem, (iii) enhance capacity to retain moisture and (iv) increase the fertility and productivity of the soil. Apart from this, watershed development projects are also being implemented under other schemes like Employment Assurance Scheme (EAS), Drought Prone Areas Programmes (DPAP) and Integrated Wastelands Development Programmes (IWDP) on watershed basis.

According to the guidelines of the All India Soil Survey and Land Use Planning, the entire river system of Orissa has been divided into 10 catchments. Each catchment has been again subdivided to sub-catchments, watersheds, mini-watersheds. In Orissa, 9663 mini-watersheds, 3729 sub-watersheds and 771 watersheds have been delineated by the soil survey wing of the Soil Conservation Directorate covering 14.39 lakh hectares. In case of 412 saturated watershed, out of 6.65 lakh hectares of treatable area, an area of 4.61 lakh ha have been treated constituting 69.3 per cent of treatable area as on December 2000. On the other hand, in case of 1943 on-going watersheds and mini-watersheds covering 11.91 lakh ha of geographical area, 2.04 lakh ha area have been treated out of 8.27 lakh ha of treatable area constituting 24.7 per cent.

Recently the perspective ten years Action Plan has been prepared for 5,000 micro-watersheds covering an area of 25 lakh ha in the state which will be treated during the period from 2001-02 to 2009-10 at an estimated cost of Rs. 1500 crore.

The point to note is that mere creation of agricultural infrastructures does not ensure its proper utilisation. For proper management and use of created rural infrastructures, knowledge on appropriate technology and practices should be disseminated to farmers through effective extension services. In Orissa the extension services are woefully inadequate. The Village Agricultural Workers and Agricultural Extension officers hardly visit the villages. Attempts should be made to impart training to these field functionaries on modern method of agricultural practices and how to convince the farmers to adopt these techniques.

Rural Institutions

Recently for proper natural resource management, democratic decentralisation through devolution of power to gram panchayats and formation of user groups and self-help groups are emphasized. In the irrigation sector formation of Water Users Association (WUA) or *pani*

panchayat is stressed. Under World Bank aided Water Resources Consolidation project it is contemplated to hand over some functions like operation and maintenance of the downstream parts of the irrigation canal system like minors/sub-minors, irrigation water distribution among water users and collection of water rates to WUA. Similarly with aid from European Commission formation of water users' groups is encouraged in minor surface irrigation schemes. DFID is funding formation of *pani panchayat* in lift irrigation projects. In spite of the best efforts of Orissa Government and concerned bureaucrats, it is observed that the water users are not coming forward to form associations to take up the management of the irrigation system. As conditions of the irrigation systems are found to be defective having plan and design deficiencies and construction errors, the water users are reluctant to take over such derelict and faulty systems.

However, for small farm based agriculture cooperation is a prime requisite and pre-condition for achieving better yield. If a farmer over irrigates, or exploits more water, another is deprived of its due share. For proper water management, common cropping pattern is necessary. For availing credit and marketing facility credit cooperatives and marketing societies need to be set up. Due to fragmentation of holdings, farmers should be encouraged to cultivate land on cooperative basis to reap economies of scale. In the case of joint farming use of farm implements like tractor, harvester and installation of pumpsets will be easier and cost effective. This will ensure timely completion of farm operations and will be economical and cost saving.

Policy Environment

Though agriculture is the dominant sector in Orissa, it has been utterly neglected during plan periods. As shown in Table 4.14, percentage plan outlay on agriculture and allied services shows a declining trend. Also, outlay on irrigation and flood control as percentage of total plan outlay has declined from 31.3 per cent during 6th plan to 22.6 per cent during the 9th plan. Plan outlay on agriculture and allied services, rural development and irrigation and flood control need to be stepped up to provide the necessary rural infrastructures so that agricultural growth can be accelerated.

Government of Orissa has taken several land reform measures to root out the evils present in the regressive land-labour relations inherited from the *zamindari* system of land revenue administration during pre-independence period. The land reform measures include abolition of intermediary rights, tenancy reforms such as regulation of rent, provision of security of tenure to

tenants, distribution of ceiling surplus land to the landless agricultural labourers and small land holders, consolidation of land holdings, and updating and maintenance of land records. Recently much emphasis is laid on consolidation of holdings. Consolidation of holding includes preparation, correction, and updating of land records and amalgamation of small and scattered holdings in a rational manner with a view to ensuring better land management and optimum utilisation of limited water resources. By the end of 1998-99, consolidation of holdings in respect of 7244 villages covering an area of 10.83 lakh hectares has been completed. Thus, out of 60.5 lakh ha of net sown area consolidation has been completed only in 17.9 per cent of the area. Tenancy reforms have not been successful in the state. In spite of being legally forbidden share tenancy is widely observed across the state. The rent is too high i.e. 50 per cent of the gross produce, whereas the legally stipulated rent is only 25 per cent. There is no security of tenure and the tenants can be evicted at any time. The landowners do not in most cases share in input cost. These features of tenancy are inimical to agricultural growth of the state.

As Orissa suffers from natural calamities almost every year of varying intensity, there is a need for providing crop insurance facility to the farmers in the event of crop failure. Realising this, the State Government introduced the Comprehensive Crop Insurance Scheme (CCIS) in the year 1985. This scheme covered only the farmers availing crop loans from co-operative banks, commercial banks and regional rural banks. The farmers who were self-financing their cultivation expenses could not insure their crops. Thus the CCIS was nothing but a loan insurance scheme. A modified and a more liberal and broadbased scheme formulated by Government of India named as National Agricultural Insurance Scheme (NAIS) has been implemented in the state since rabi season of 1999-00. Crops like paddy, groundnut and mustard were covered under the crop insurance scheme. However, the implementation of the scheme is not up to the satisfaction. As the scheme operates on the basis of area approach, individual farmers having substantial yield losses are not benefited from the scheme if the defined area as a whole does not suffer remarkably. During kharif season of 1999-00, an amount of Rs.6653.85 lakh was paid to 2,14,315 farmers for the loss of paddy crop over an area of 3.2 lakh ha. Also, an amount of Rs.0.07 lakh was paid to 6 farmers on account of loss of groundnut crop in an area of 3 ha and Rs.0.33 lakh was paid to 97 farmers for loss of ginger crop over an area of 122 ha. However, regularly complaints are lodged that indemnities are not paid to the farmers in time. Undue delay in making payment does not help in stabilizing income of the farmers during disaster and abnormal years. The State Agriculture Policy 1996

envisages extension of insurance cover to crops like sugarcane, cotton, jute, arhar, gram, peas, sunflower, soyabeans, til, niger and maize etc.

Table- 4.14

Percentage Share of Sectoral Allocation of Plan Outlay on Agriculture

Sl. No.	Development Sector	Percentage Share							
		4th Plan (1969-74)	5th Plan (1974-78)	Two Annual Plans (1978-80)	6th Plan (1980-85)	7th Plan (1985-90)	Two Annual Plans (1990-92)	8th Plan (1992-97)	9th Plan (1997-2002)
ORISSA									
1	Agriculture and Allied Services	18.65	14.89	22.01	6.01	7.02		7.49	3.75
2	Rural Development	16.16	15.67	13.59	9.02	7.45		4.05	5.61
3	Irrigation and Flood Control	45.70*	57.28*	51.01*	31.33	25.78		30.79	22.59
4	Others	19.49	12.16	13.39	53.64	59.75		57.67	68.05
5	Total	100	100	100	100	100		100	100
INDIA									
1	Agriculture and Allied services	14.7	12.3	16.4	5.8	5.8#	5.85#	5.2	4.9
2	Rural Development	1.5**	1.5**	2.1**	5.5	7.0#	6.75#	7.9	8.7
3	Irrigation and Flood Control	8.6	9.8	10.6	12.5	7.6#	6.65#	7.5	6.5
4	Others	75.2	76.4	70.9	76.2	79.6#	80.75#	79.4	79.9
5	Total	100	100	100	100	100	100	100	100

*Included Power Sector also

**Figures represent Village & SSIs instead of Rural Development

Figures are actuals instead of outlays

Source: Government of Orissa, *Economic Survey* (Various Issues), Government of India, *Economic Survey*, 2000-01.

In recognition of the crucial role of agriculture sector in the State's economy, the State Government has announced the Agriculture Policy in 1996 according agriculture the status of an industry. The State Agriculture Policy 1996 aims at doubling the production of foodgrains and oil seeds, generation of adequate employment opportunities in the rural sector and eradication of rural poverty within a specific time frame. The main objectives set out in the Sate Agriculture Policy 1996 are as follows:

- i. To double the production of foodgrain and oil seed crops by the end of the Ninth Plan Period.
- ii. To enhance the status of agriculture from the present level of subsistence agriculture to a profitable and commercial venture, so that young persons can accept agriculture as means of self employment.
- iii. To generate adequate employment opportunities.
- iv. To make agriculture the main route of poverty eradication.
- v. To make available the knowledge of modern farming system at the door step of the farmer.
- vi. To adopt integrated programmes for problem soil such as water logged areas, areas with soil erosion, dry/rainfed areas, area under shifting cultivation, waste land, saline and alkaline soil etc.
- vii. To create entrepreneurship in the field of agriculture.
- viii. To create skilled labourers for management of modern agriculture.
- ix. To help mechanisation of agriculture to increase productivity.
- x. To establish agro-based industries and food processing industries.
- xi. To be self-sufficient in the production of fruits, flowers, vegetables, potato, onion, milk, egg, fish and meat.
- xii. To increase area under tea, coffee, rubber, cashew and other plantation crops.
- xiii. To provide irrigation facilities to 50% of cultivable land through completion of incomplete irrigation projects and promotion of individual and group enterprise.
- xiv. To take up extensive training in the field of agriculture and related activities.
- xv. To promote private enterprise in the marketing of agricultural produces.
- xvi. To identify and promote thrust crops in different agro-climatic zones of the State.
- xvii. To reorient agriculture towards export.

It is laudable that for the first time in history of Orissa, the present state government is putting a lot of emphasis on development of agriculture through formation of *pani panchayats*, organising *krushak bazar*, supply of improved seeds, encouraging construction of cold storage and godowns and establishing agro-processing industries etc.

VISION FOR THE STATE

Any future projection for agricultural development of the state has to take into account the population growth and its food requirement. The population of Orissa, which was 103 lakh in 1901 has increased to 316.6 lakh in 1991 and 367.07 lakh in 2001. Based on the projected growth rate it is estimated that population would be 424.60 lakh in 2021.

The food requirement of the population, as projected above, has to be based on the food consumption pattern and dietary requirement. Consumption pattern in Orissa (1995) reveals that, per capita consumption of cereals and millets (524 gm/day) and green leafy vegetables (40 gm/day) are well above national level and more than recommended dietary allowances (RDA: 460 gm/day and 40 gm/day respectively). But the per capita consumption of pulses (29 gm/day/person), milk and milk product (15), fats and oils (8), sugar (5) and other vegetables (21) in Orissa are much below the RDA levels (pulses:40, milk & milk product: 150, fats and oils:8, sugar: 5, other vegetables :60).

For achieving the desired level of food production keeping in mind the dietary requirement, we need to raise GCA and cropping intensity which, in turn, depends on increase in irrigation facilities and infrastructure. Based on possible development of irrigation facilities and changes in cropping pattern, future projections are made, which are presented in Table 4.15. However, this may change if there is major breakthrough in agriculture in the next 20 years.

To sustain the agricultural production as indicated in Table 4.15, we need adequate and timely availability of the basic inputs such as quality seeds, fertiliser and plant protection chemicals etc. Total seed supplied for all crops during 1997-98 was 28, 375 tonnes and the projected seed requirements are 57, 429 tonnes for 2001-02, 72, 568 tonnes for 2011-12 and 94, 930 tonnes for 2021-22. Likewise fertilizer consumption per ha. of GCA was 35 kg for 1997-98, which is projected to be 66.5 kg for year 2001-02, further to 134 kg and 191kg for the year 2011-12 and 2021-22 respectively. The fertiliser supply should increase at the rate of 17.5 % per year to ensure desired level of nutrient use in the projected years. Infrastructure items such as farm energy and power, agricultural credit, marketing, warehousing and extension support need to be developed concurrently to sustain agricultural growth at desired level.

Table- 4.15
Existing Status and Future Agricultural Requirements

Items	Existing Status		Future Requirements		
	1995-96	1998-99	2001-02	2011-12	2021-22
A. Production (lakh tonne)					
1. Rice	62.26	53.90	83.08	98.88	115.24
2. Total Cereals	67.29	57.67	90.30	107.48	125.25
3. Total Pulses	11.94	6.10	7.00	8.59	10.26
4. Total Edible Oilseeds	8.55	4.54	10.67	14.55	18.80
5. Vegetables	64.57	39.97	16.38	26.81	38.45
6. Fish and Meat	2.89	-	4.56	6.64	10.71
B. Others					
7. Yield Rate of Rice	1375	1212	1760	1988	2148
8. (i) Area under Rice	45.29	44.47	47.20	49.80	53.63
(ii) Area under Major Pulses	15.45	-	18.45	21.32	24.85
(Green gram, Black gram, Ahrar)	10.77	-	12.42	14.75	17.68
(iii) Area under Major Oilseeds					
(Groundnut, Mustard, Sesum and Niger)					
9. Fertilizer Use					
(i)Compound Growth Rate (CGR)	14.7*	-	17.5	7	3.6
(ii)Nutrient Use (Kg/Ha)	35*	46	66.5	134	191
10. Seed Requirement (in tonnes) for					
(i) Rice	19,998*	-	44, 249	46,690	50, 288
(ii) Total Pulses	874*	-	4, 221	7, 874	12, 156
(iii) Total Oilseeds	6,721*	-	6, 602	15, 006	28, 402
11. Total Crop Loan & Investment Credit (crores rupees)	-	-	2100.16	5906.82	11614.54

Source: Mitra, G.N. (2000), Vision 2021 for Progressive Agriculture in Orissa, *Yojana*, Vol.44,
No.3.

*For year 1997-98.

Based on performance of banking sector, projected credit (crop loan + investment credit) requirement would be 2100.16 crore rupees for year 2001-02, 5906.82 crore rupees for 2011-12 and 11614.54 crore rupees for year 2021-22. There is already a large no. of marketing outlets under the cooperative sector. Many of them are either non-functional or are running at loss. The primary task for the future is to restructure them and make them functional rather than to increase their numbers.

Agroprocessing is a neglected sector in the state. There are 196 rice mills, 25 vegetable oil mills 7 sugar mills, fruits and vegetables processing units, 2 cashewnuts processing units and 2 hydrogenated oil processing units.

There are number of other rural infrastructures, which need considerable improvement for achieving targeted agricultural growth. The food requirement of the population of the state by 2021 can easily be met if modest growth rates in irrigation, power supply, rural roads, transport, storage and marketing facilities are ensured within the first two decades of this millennium.

POLICY IMPLICATIONS

For accelerating agricultural growth of the state public investments in agriculture sector need to be stepped up substantially. Keeping in view the importance of agriculture in creating employment, generating income and ensuring self-sufficiency in food production, share of agriculture in total plan outlay needs to be enhanced. Emphasis should be laid on providing appropriate rural infrastructures and services. Irrigation facilities should be extended to dry land and rainfed areas. Instead of constructing big dams and reservoir canal projects, ground water development should be encouraged by providing subsidised credit for construction of wells and tube wells and, also, for purchase of diesel or electric pumpsets. Other infrastructural facilities like rural road, transport, power supply, marketing and storage should be improved. Agricultural credit should be provided to the needy farmers in time and as per requirement. For better recovery of crop loans group lending may be encouraged. Effective extension services should be provided to the farmers. Agricultural inputs like quality seeds, chemical fertiliser, pesticides should be made available to the farmers in time and as per their requirement at reasonable prices. It is most important that all the inputs should be supplied to the farmers under one roof and through one window, so that transaction costs can be minimised. Farmers should be motivated to undertake joint farming and to form user groups for efficient, equitable and sustainable management of irrigation system and watershed. Micro-financing through formation of self-help groups should be given due importance. The coverage of crop insurance should be extended and instead of defined area approach individualistic assessment of crop loss should be made and accordingly indemnities be paid. Land leasing should be legalised with proper regulation of its terms and conditions for achieving efficient production and equitable distribution of production gains.

Annexure- 4.1

District-wise Key Indicators of Orissa Agriculture

Sl. No.	Zone/District	Year	Foodgrain Production ('000 tonnes)	Area under Foodgrain ('000 Ha)	Yield Rate of Foodgrain (kg/Ha)	Cropping Intensity in %	Fertiliser Consumption per Hectare of Gross Cropped Area (kg/Ha)	Annual Rainfall (in mm)	Gross Irrigated Area (In '000 ha)	Total Gross Cropped Area (GCA) (In '000 ha)	% GCA Irrigated
1	2	3	4	5	6	7	8	9	10	11	12
I	NORTHERN PLATEAU										
1	Mayurbhanj	75-76	352.5	425.5	830.0	NA	NA	NA	39.0	487.0	8.0
		80-81	389.1	407.7	950.0	NA	3.6	NA	53.5	496.0	10.8
		85-86	411.4	425.8	966.0	125.0	6.1	1798.6	86.9	542.9	16.0
		90-91	412.2	425.0	970.0	128.0	12.8	1871	165.3	555.9	29.7
		93-94	498.4	423.4	1177.0	129.0	13.8	1671.2	158.2	555.3	28.5
		98-99	327.0	410.0	798.0	127.0	24.0	NA	166.5	513.0	32.5
2	Kendujhar	75-76	237.5	277.4	860.0	NA	NA	NA	18.6	331.0	5.6
		80-81	207.3	267.6	770.0	NA	3.1	NA	26.6	341.0	7.8
		85-86	268.8	325.4	826.0	134.0	8.1	1959.4	41.2	426.0	9.7
		90-91	288.7	304.6	948.0	135.0	8.8	1727.1	94.3	412.6	22.9
		93-94	325.6	313.8	1038.0	140.0	9.8	1292.2	109.8	422.7	26.0
		98-99	116.9	302.9	623.0	134.0	20.0	1006.9	123.4	401.0	30.8
3	Sundargarh	75-76	238.9	291.1	820.0	NA	NA	NA	23.0	295.0	7.8
		80-81	241.0	276.1	770.0	NA	6.3	NA	23.9	340.0	7.0
		85-86	259.0	310.0	835.0	130.0	12.7	1514.6	161.9	394.4	41.0
		90-91	277.1	316.4	876.0	128.0	9.9	1264.7	86.0	424.7	20.2
		93-94	272.1	310.5	876.0	125.0	11.3	1945.2	88.2	419.9	21.0
		98-99	213.1	305.8	697.0	120.0	16.0	1090.5	94.9	395.0	24.0
II	CENTRAL TABLE LAND										
4	Dhenkanal	75-76	374.3	459.8	810.0	NA	NA	NA	57.5	547.0	10.5
	(Dhenkanal +	80-81	327.9	407.6	800.0	NA	3.8	NA	59.7	523.0	11.4
	Angul)	85-86	423.5	453.7	933.0	140.0	7.1	1628.6	102.9	642.2	16.0
		90-91	391.7	445.7	879.0	145.0	11.9	1603.6	130.2	660.1	19.7
		93-94	458.4	453.8	1010.0	160.0	10.3	1698.15	175.0	691.9	25.3
		98-99	308.3	394.1	773.0	143.5	18.5	1090.1	190.2	594.0	32.0

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District-wise Key Indicators of Orissa Agriculture

Sl. No.	Zone/District	Year	Foodgrain Production (^{'000 tonnes})	Area under Foodgrain (^{'000 Ha})	Yield Rate of Foodgrain (kg/Ha)	Cropping Intensity in %	Fertiliser Consumption per Hectare of Gross Cropped Area (kg/Ha)	Annual Rainfall (in mm)	Gross Irrigated Area (In ^{'000 Ha})	Total Gross Cropped Area (GCA) (In ^{'000 Ha})	% GCA Irrigated
1	2	3	4	5	6	7	8	9	10	11	12
5	Bolangir	75-76	311.9	389.5	800.0	NA	NA	NA	88.0	467.0	18.8
	(Bolangir +	80-81	414.7	450.5	920.0	NA	9.1	NA	106.6	555.0	19.2
	Sonepur)	85-86	466.2	477.5	976.0	132.0	12.9	1879.4	173.6	617.0	28.1
		90-91	567.3	493.4	1150.0	141.0	13.3	1674.2	200.7	661.8	30.3
		93-94	550.4	498.4	1104.0	143.0	11.9	1933.65	177.2	664.6	26.7
		98-99	365.4	455.1	933.5	133.0	24.5	861.95	203.3	577.0	35.2
6	Sambalpur	75-76	684.8	662.4	1030.0	NA	NA	NA	219.0	756.0	29.0
	(Sambalpur +	80-81	695.9	677.0	1030.0	NA	22.1	NA	236.8	812.0	29.2
	Baragarh + Deogarh	85-86	786.5	707.0	1112.0	135.0	47.3	1678.6	310.2	894.6	34.7
	+Jharsuguda)	90-91	1005.5	718.2	1400.0	144.0	47.8	1403.2	347.7	950.3	36.6
		93-94	1027.4	7171.2	1432.0	141.0	42.1	1977.75	363.6	971.8	37.4
		98-99	844.6	659.2	1109.3	128.0	60.8	1059.63	382.9	846.0	45.3
III	EASTERN GHAT										
7	Koraput	75-76	636.6	710.8	890.0	NA	NA	NA	53.0	893.0	5.9
	(Koraput +	80-81	662.1	814.5	810.0	NA	3.3	NA	53.8	1098.0	4.9
	Malkanagiri +	85-86	843.2	795.4	1060.0	142.0	5.5	1351.1	86.9	1089.5	8.0
	Nabarangpur	90-91	901.5	846.3	1065.0	155.0	10.1	1868.5	212.4	1177.7	18.0
	+ Rayagada)	93-94	885.8	852.8	1039.0	156.0	9.7	1649.2	289.7	1187.6	24.4
		98-99	837.7	753.6	1111.3	131.5	20.5	1151	330.4	1068.0	30.9
8	Kalahandi	75-76	345.5	508.0	680.0	NA	NA	NA	22.5	625.0	3.6
	(Kalahandi +	80-81	379.8	579.3	660.0	NA	0.6	NA	60.0	757.0	7.9
	Nuapada)	85-86	521.5	632.6	824.0	140.0	1.3	1824.3	83.7	823.8	10.2
		90-91	522.9	635.2	823.0	147.0	7.1	2142.5	96.3	829.5	11.6
		93-94	500.6	642.9	779.0	154.0	8.0	1705.8	127.1	826.8	15.4
		98-99	326.9	564.4	590.0	138.5	18.5	1050.95	183.2	725.0	25.3

Contd.....

District-wise Key Indicators of Orissa Agriculture

Sl. No.	Zone/District	Year	Foodgrain Production (⁰ 000 tonnes)	Area under Foodgrain (⁰ 000 Ha)	Yield Rate of Foodgrain (kg/Ha)	Cropping Intensity in %	Fertiliser Consumption per Hectare of Gross Cropped Area (kg/Ha)	Annual Rainfall (in mm)	Gross Irrigated Area (In ⁰ 000 Ha)	Total Gross Cropped Area (GCA) (In ⁰ 000 Ha)	% GCA Irrigated
1	2	3	4	5	6	7	8	9	10	11	12
9	Phulbanil	75-76	139.7	218.5	830.0	NA	NA	NA	33.0	244.0	13.5
	(Phulbani + Boudh)	80-81	144.1	224.3	660.0	NA	2.7	NA	41.9	337.0	12.4
		85-86	253.1	224.6	1036.0	150.0	3.2	1666.1	55.6	372.36	14.9
		90-91	180.1	229.6	784.0	136.0	6.9	2122.8	80.6	356.44	22.6
		93-94	195.3	223.8	873.0	136.0	6.4	1952	85.3	363.91	23.4
		98-99	163.0	189.1	866.0	135.0	11.5	NA	87.1	268.0	32.5
IV	COASTAL PLAIN										
10	Baleswar	75-76	348.9	453.1	770.0	NA	NA	NA	99.4	523.0	19.0
	(Baleswar	80-81	484.9	478.1	1010.0	NA	10.6	NA	120.8	590.0	20.5
	+Bhadrak)	85-86	447.3	514.9	869.0	141.0	15.9	1805.8	162.3	640.1	25.4
		90-91	439.8	534.3	823.0	155.0	35.3	1775.2	269.4	714.1	37.7
		93-94	695.8	549.6	1266.0	157.0	43.8	1664.55	256.7	715.0	35.9
		98-99	461.2	453.7	1044.5	127.5	89.5	1203.45	270.8	543.0	49.9
11	Cuttack	75-76	795.1	906.8	880.0	NA	NA	NA	378.1	1107.0	34.2
	(Cuttack+ Jajpur +	80-81	853.7	940.8	910.0	NA	13.3	NA	390.0	1227.0	31.8
	Jagatsinghpur	85-86	834.4	589.5	971.0	174.0	13.8	1606.5	425.4	1182.0	36.0
	Kendrapara)	90-91	816.7	857.0	953.0	177.0	19.8	1727.8	510.2	1193.1	42.8
		93-94	1128.3	907.3	1244.0	183.0	26.8	1576.3	569.1	1244.4	45.7
		98-99	939.0	781.3	1202.5	162.8	44.3	1371.9	697.3	1009.0	69.1
12	Ganjam	75-76	570.9	620.6	920.0	NA	NA	NA	232.0	725.0	32.0
	(Ganjam +	80-81	647.9	701.1	920.0	NA	22.8	NA	251.3	850.0	29.6
	Gajapati)	85-86	729.6	653.3	1117.0	174.0	28.7	1276.1	272.4	835.7	32.6
		90-91	707.5	715.2	989.0	196.0	32.5	1754.3	308.5	940.5	32.8
		93-94	857.5	699.9	1225.0	190.0	33.3	1334.65	301.9	908.9	33.2
		98-99	710.4	593.2	1278.5	153.0	36.5	1149.45	352.0	763.0	46.1

Contd.....

District-wise Key Indicators of Orissa Agriculture

Sl. No.	Zone/District	Year	Foodgrain Production (^{'000 tonnes})	Area under Foodgrain (^{'000 Ha})	Yield Rate of Foodgrain (kg/Ha)	Cropping Intensity in %	Fertiliser Consumption per Hectare of Gross Cropped Area (kg/Ha)	Annual Rainfall (in mm)	Gross Irrigated Area (In ^{'000 Ha})	Total Gross Cropped Area (GCA) (In ^{'000 Ha})	% GCA Irrigated
1	2	3	4	5	6	7	8	9	10	11	12
13	Puri	75-76	533.4	609.7	870.0	NA	NA	NA	218.0	699.0	31.2
	(Puri + Khurda + Nayagarh)	80-81	556.2	689.7	810.0	NA	10.5	NA	286.0	820.0	34.9
		85-86	723.3	643.1	1125.0	173.0	19.5	1356.8	296.0	796.5	37.2
		90-91	520.4	567.9	916.0	159.0	22.2	1745.7	435.3	716.9	60.7
		93-94	820.4	614.3	1336.0	165.0	25.8	1568.8	463.7	774.3	59.9
		98-99	674.9	589.9	1156.0	167.3	37.0	1043.85	425.2	726.0	58.6
V	ORISSA	75-76	5570.0	6484.0	860	NA	6.7	1325.6	1481.5	6761.0	21.9
		80-81	5977.0	6904.0	865	NA	8.7	1321.7	1711.0	6137.0	27.9
		85-86	6968.0	7043.0	989	146	15.2	1606.8	2158.8	8746.0	24.7
		90-91	7031.0	7089.0	992	152	20.1	1865.8	2935.1	9258.9	31.7
		93-94	8216.0	7208.0	1140	155	21.3	1421.6	3135.4	9747.3	32.2
		98-99	6378.3	6452.2	989	139	36.0	1277.5	3436.9	8425	40.8

Source: (1) *Agricultural Statistics of Orissa -At a Glance*, 1996, Orissa Agricultural Statistics, 1998-99, Directorate of Agriculture & Food Production, Orissa, Bhubaneswar.

DISTRICTWISE AREA OF FOODGRAINS IN ORISSA

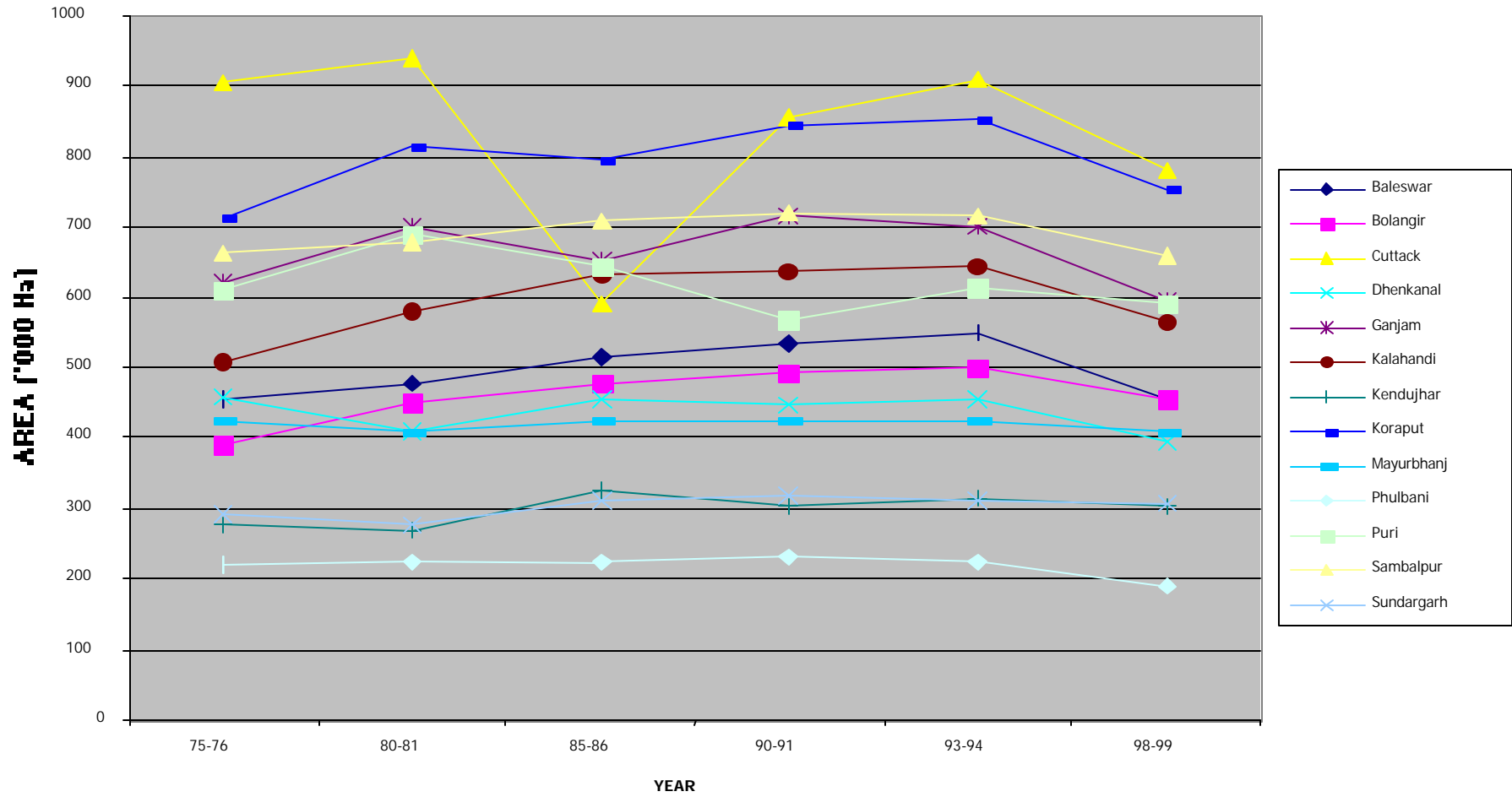


FIGURE - 4.5

DISTRICTWISE YIELD RATE OF FOODGRAINS IN ORISSA

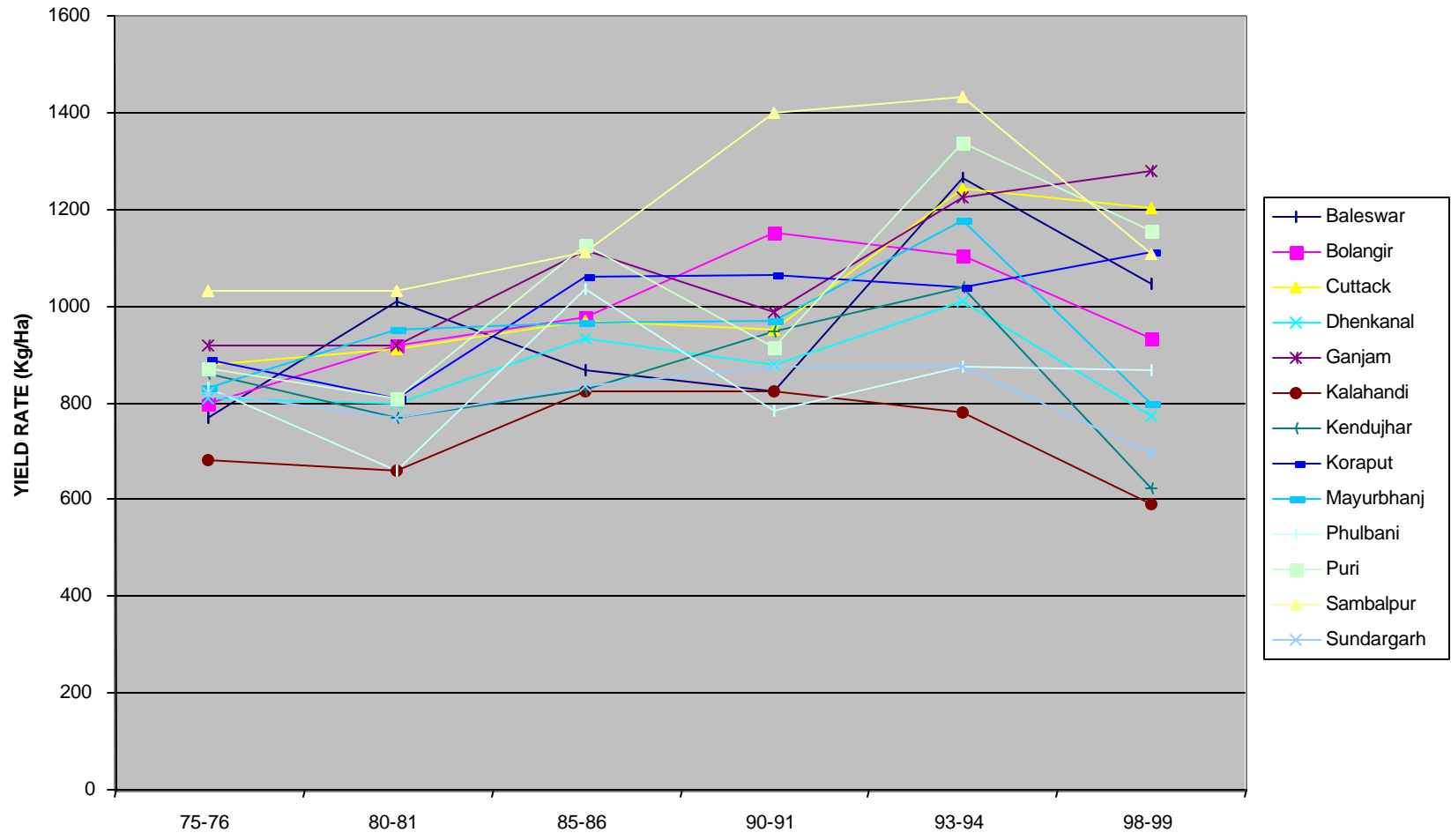


FIGURE- 4.6

DISTRICTWISE PRODUCTION OF FOODGRAINS IN ORISSA

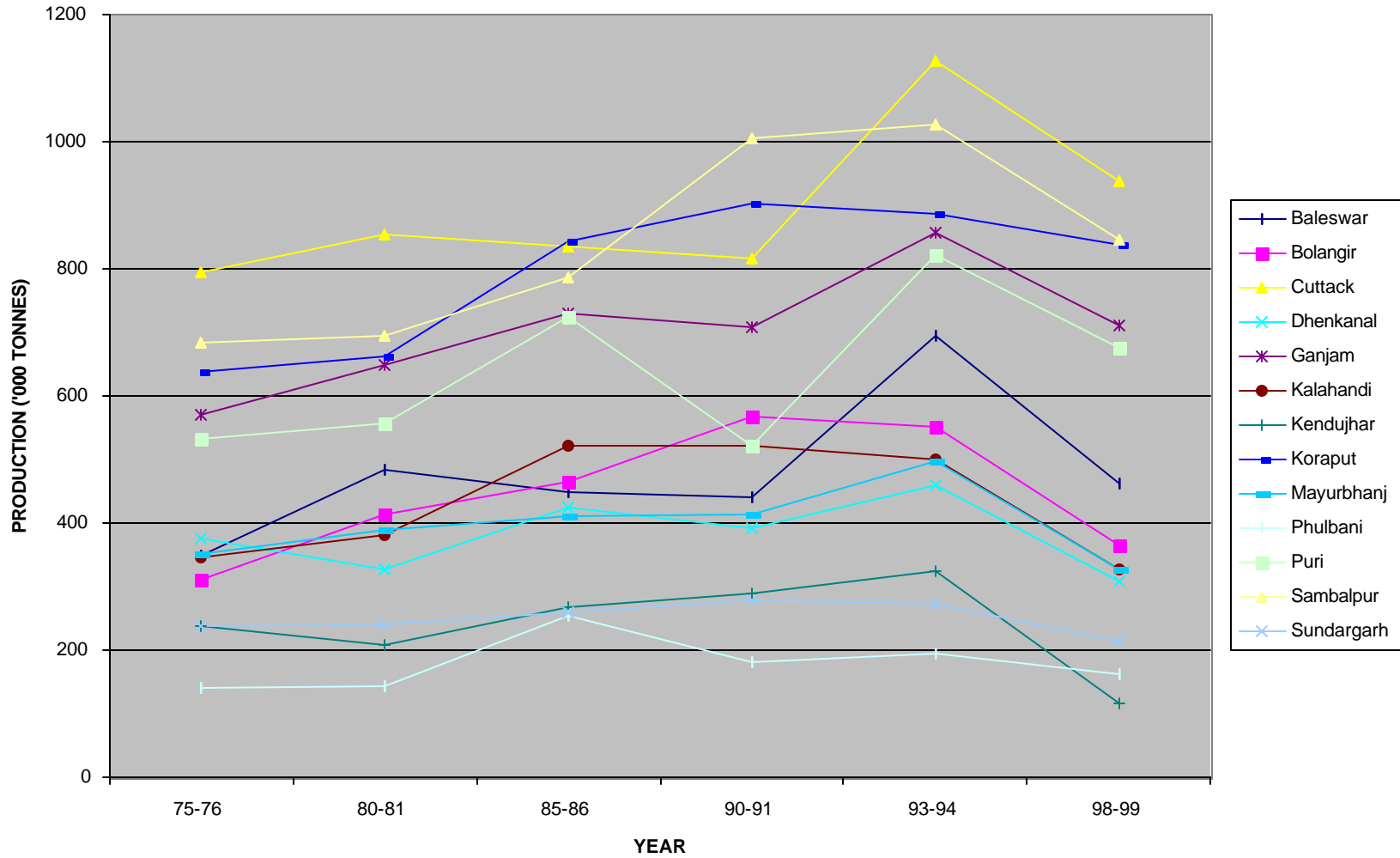


FIGURE- 4.7