CHAPTER 4

AGRICULTURE

OVER VIEW

4.01 Agriculture is the process of producing food, feed, fodder, fibre and other goods by the systematic raising of plants and animals. The history of agriculture is closely linked with human history, and agricultural developments have been crucial factors in Social Change including the specialization of human activity.

4.02 Forty two percent of the World labourers are employed in agriculture, making it by far the most common occupation. Agricultural production accounts for less than 5% of the Gross World product.

4.03 Agriculture is the mainstay of State's economy and sustenance of the life of the people. Agriculture and Animal Husbandry contributed 23.43% of the Net Domestic Product of the state in 2005-06(A) at 1993-94 prices and provided employment directly or indirectly to around 65% of the total work force as per 2001 Census. The per-capita availability of cultivated land was 0.39 ha. in 1950-51 and has declined to 0.14 ha. during 2004-05.

4.04 Development of Agriculture in Orissa has lagged behind due to several constraints, such as traditional method of cultivation, inadequate capital formation and low investment, inadequate irrigation facilities and uneconomic size of holdings. This dominant sector of the State's economy has become, more often than not, a helpless victim of natural calamities like flood, drought and cyclone. For sustaining economic development, much emphasis has been laid during the planning process for accelerating the pace of agricultural development, by increasing both production and productivity, by taking steps to remove regional imbalances in cropping pattern and agricultural practices, to evolve new variety of seeds, to expand irrigation facilities, to extend the supply of institutional credit and also a price support to farmers which will place this dominant sector on a sound and safe footing.

CROP IMPROVEMENT

4.05 Domestication of plants is done in order to increase yield, improve disease resistance, ease harvest and to improve the taste and nutritional value and so many other characteristics. Centuries of careful selection and breeding have had enormous effect on the characteristics of crop plants. Plant breeders use greenhouses and other techniques to get as many as three

generation of plants per year, so that they can make improvements all the more quickly.

4.06 Improvement in production and productivity needs to be effected for meeting the increasing demand of the growing population, step up income of farmers and increase agricultural exports. Taking all these aspects into consideration during the Seventh Plan, several new programmes were launched for development of Cereals, Pulses, Oilseeds, Jute etc. These programmes continued during the Eighth and subsequent Plan periods with the objectives of improving the level of production and productivity. Priority was laid on crop planning, productivity, expansion of area under cash crops, cropping intensity, use of fertilizers, pest management, marketing and use of modern agricultural implements and farm machinery.

AGRICULTURAL POLICY

4.07 Agricultural policy focuses on the goals and methods of agricultural production. At the policy level, common goals of agriculture includes –

- *Food safety: Ensuring that the food supply is free of contamination.*
- *Food security: Ensuring that the food supply meets the population needs.*
- *Food quality: Ensuring that the food supply is of a constant and known quality.*
- *Conservation*
- *Environmental impact*
- *Economic stability*

4.08 So considering the importance of this sector, the State Government have developed a comprehensive Agriculture Policy and recognizing agriculture as the status of an industry. The objectives of the above policy has been pursued vigorously during the Tenth Plan period to make Agriculture sector one of the growth engines for accelerating the pace of development of the State. The State Agriculture Policy 1996 aims at doubling the production of food grains 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 State Agriculture Policy 1996 are as follows:

i. *To enhance the status of Agriculture from the present level of a subsistence one to a profitable and commercial venture, so that young persons can accept agriculture as a means of self employment.*

ii. To generate adequate employment opportunities.

iii. To adopt integrated programmes for problem soils such as water logged areas, areas with soil erosion, dry / rain fed areas, area under shifting cultivation, waste land, saline and alkaline soil etc.

iv. To create entrepreneurship in the field of agriculture and horticulture.

v. To create skilled labourers for management of modern agriculture.

vi. To help mechanization of agriculture to increase productivity.

vii. To establish Agro-based and Food Processing Industries.

viii. *To provide irrigation facilities to 50% of cultivable land through completion of incomplete irrigation projects and promotion of individual and group irrigation projects.*

ix. *To promote private enterprise in the marketing of agricultural produces.*

x. *To identify and promote thrust crops in different agro-climatic zones of the State.*

xi. *To reorient agriculture towards export.*

ENVIRONMENTAL PROBLEMS

4.09 Agriculture may often cause environmental problems because it changes natural environment and produces harmful by-products. Source of the negative effects are :

- *Surplus of nitrogen and phosphorus in rivers and lakes.*
- *Detrimental effects of herbicides, fungicides, insecticides and other bio sides.*
- *Conversion of natural ecosystems of all types in to arable land.*
- *Consolidation of diverse biomass in to few species.*
- *Soil erosion.*
- *Depletion of minerals in the soil.*
- *Particulate matter, including ammonia and ammonium off-gasing from animal waste contributing to air pollution.*
- *Weed science – feral plants and animals.*
- *Odor from agricultural waste.*
- *Soil salivation.*

4.10 Agriculture is cited as a significant adverse impact to bio-diversity in many nations. Bio-diversity Action Plans due to reduction of forests and other habitats are being taken when new lands are converted to farming. Some critics also include agriculture a cause of current global climatic change.

PRODUCTION OF FOODGRAINS

4.11 Food grain production in the State showing a fluctuating trend due to various natural calamities. During 2001-02, there was a record production of food grains of 75.40 lakh MT which was declined to only 35.55 lakh MT in 2002-03 due to severe drought in Kharif 2002. Again the food grain production was increased to 71.52 lakh MT in 2003-04. Due to excessive rainfall with cyclonic weather in the coastal belt, the food grain production again declined to 69.65 lakh MT during 2004-05, which was less by 2.61% over 2003-04. During 2005-06, the food grain production in the State was about 73.59 lakh MT, which exceeds the food grain production of 2004-05 by 5.66% . But it is still 2.41% lower than the food grain produced during 2001-02. Table 4.1 shows the food grain production in the State since 2001-02.

IRRIGATION

4.12 Double cropping in existing farm land is one of the basic elements of green revolution. This encompassed to have two crop seasons for year instead of one that depend on the monsoon. So irrigation projects were built up to support crops with adequate water supply during the growing period. Drains were built up to store large volumes of monsoon water which were earlier drained in to rivers and sea. Irrigated agricultural land comprises less than 30% of

net area sown, but produces 40% to 50% of the World's food.

4.13 In Asia, irrigated land accounts for about 50% of the total amount of water diverted for irrigation, which in itself accounts for 80% of the amount of fresh water diverted. In India, irrigation facilities cover about 43% of the rice growing area, where state wise distribution of irrigation is highly variable. In Andhra Pradesh, Haryana, Punjab, Tamilnadu over 95% of the area under rice/paddy is irrigated. But in Bihar, Orissa, Uttar Pradesh only 30% to 45% of the cultivated area under paddy is irrigated.

RICE

4.14 Rice is the singlemost important food crop in India that occupies 44.0 million hectares of agricultural land which is the largest rice area in the world. It is grown in all most all states of India and the state of Orissa contributes 4.4 million hectares to rice cultivation practice (IRRI – 2005). Rice is grown in three seasons in India. Autumn and winter (or Kharif) season from June to October and summer (or Rabi) from December to May. The Kharif season accounts for 88% and Rabi season accounts for 12% of the total production.

4.15 In India the rice crop is highly dependent on the south west monsoon, which occurs over the subcontinent from June through September. Green Revolution in India (1967-1978) brought substantial increase in production of Cereals, particularly wheat and rice which dominates among other various crops. These crops are grown in very vast regions in the country due to adaptability to wider range of agro-climatic conditions. Thus rice is the principal food grain of future and therefore management of rice crop production can emerge as the key area of management in agriculture.

4.16 Rice constitutes more than 75% of the total food grain production in the State. The average yield rate of rice in Orissa which was 14.55 quintal / ha. in 2004-05 had increased to 15.31 quintal / ha. during 2005-06. The per capita production of food grains per annum, which was 180 kg in 2004-05, has also increased to 190 kg. in 2005-06.

Table - 4.1
Food grain Production in Orissa.

(in lakh MT)

Total Food Crop	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Rice	46.13	71.49	32.44	67.34	65.37	68.59
Cereals	47.67	72.81	33.50	68.86	67.04	70.23
Pulses	2.08	2.59	2.05	2.66	2.61	3.36
Food grains	49.75	75.40	35.55	71.52	69.65	73.59

Source : Directorate of Economics and Statistics, Orissa, Bhubaneswar/ Directorate of Agriculture and Food Production, Orissa, Bhubaneswar.

4.17 The "Integrated Cereal Development Programme - Rice" is being implemented since 1994-95 with the objective of augmenting paddy production and productivity as it is the single major cereal crop of the

State. A major factor to boost agricultural production is to increase the coverage under HYV paddy. There has been a significant expansion of area under HYV paddy in Orissa despite inadequate irrigation facilities, shortage of inputs like HYV seeds, fertilizers and pesticides etc. Area under HYV paddy has increased by 8.9% during the period from 2001-02 to 2005-06. The total irrigated and un-irrigated area under HYV paddy during 2005-06 was 3,102.32 thousand ha. Area under HYV paddy over years is presented in Table 4.2. The State agriculture policy, 1996 accords priority to multiplication of high yielding varieties of seeds to replace the traditional varieties being used in the State. With a view to encourage farmers to take up seed production of extra early and early varieties of paddy suitable for escaping drought condition and saline tolerant varieties of paddy in coastal districts, production incentives were given to farmers through the Orissa State Seeds Corporation,(OSSC). Seed multiplication is organised through departmental agricultural farms, Orissa State Seeds Corporation, seed village programme and private registered seed growers. During 2005-06 about 70,000 qtls. of subsidized paddy seeds were sold to the farmers with expenditure of Rs.140.00 lakh up to January,2005. It has been proposed to sale 65,000 qtls. of such seeds with a proposed out lay of Rs.130.00 lakh during 2006-07. For cross-learning and adoption of best practices followed elsewhere in field, 700 farmers were sent to different places within the State and 100 to outside the state on exposure visits with an expenditure of Rs.8.25 lakh during 2005-06. During 2006-07, 1400 farmers will be sent on exposure visit within the state and 320 farmers out side the state for which the proposed outlay is Rs.23.60 lakh.

Table - 4.2
Area under HYV Paddy in Orissa.

(In thousand hectares)

Year	Autumn		Winter		Summer		Total	
	Irrigated	Un-irrigated	Irrigated	Un-irrigated	Irrigated	Un-irrigated	Irrigated	Un-irrigated
2000-01	32.03	367.48	866.08	1,155.97	206.74	-	1,104.85	1,523.45
2001-02	30.00	395.00	852.00	1,301.00	272.00	-	1,154.00	1,696.00
2002-03	20.99	382.66	859.63	1,225.75	177.55	-	1,058.17	1,608.41
2003-04	15.22	434.64	839.09	1,345.94	253.47	-	1,107.78	1,780.58
2004-05	28.00	406.00	925.00	1,351.00	293.00	-	1,246.00	1,757.00
2005-06	24.05	411.57	913.31	1427.90	325.49	-	1262.86	1839.46

Source : Directorate of Economics and Statistics, Orissa, Bhubaneswar.

PULSES

4.18 Next to paddy, pulses are the important food grain crops. During 2005-06, the total area under pulses counted for 8.09 lakh hectares which constitutes 14.83% of the total area under food grain (54.54 lakh hectares) and contributed 4.56% (3.36 lakh MT) of the total food grain production of 73.60 lakh MT in the State. However the

productivity of the pulses in the State is around 415 kg. /hectare as against national average of 609 kg./hectare. Non availability of suitable HYV seeds is the main constraint for productivity. Therefore to meet the minimum requirement of the state, it has been proposed to increase the area under pulses and to raise productivity by adopting dry land farming technology, adoption of mixed and intercropping system, use of quality seeds, fertilizers. National Pulse Development Programme is being implemented in the State since 1994-95 with the objective of increasing production and productivity of pulses in the State. Assistance is being provided for breeder seeds, foundation seeds and block demonstration. During 2005-06, about 20.00 qtls. Of breeder seeds of different pulse crops were procured through Govt. of India allocation for production of foundation seeds.

4.19 Farmers and OSSC were provided with incentive of Rs.375.00 and Rs.125.00 per quintal respectively for production of certified seeds of various pulses under seed village programme. About 2402 qtls. of certified seeds were produced for supply to farmers during 2005-06. In order to increase the irrigation efficiency 716 sprinkler sets were supplied to the farmers at subsidized rates.

4.20 Besides, the above 100 Farmer's Training Programme were conducted for up-gradation of farmer's knowledge on crop production technology during 2005-06. During 2005-06, 5000 farmers were trained with an expenditure of Rs.15.00 lakh. It has been programmed to take up 120 camps at a cost of Rs.18.00 lakh during 2006-07.

OIL SEEDS

4.21 The major oil seeds grown in the State are groundnut, sesamum, mustard and niger. Sunflower cultivation has also been introduced in western Orissa. For improving oil seeds production in the State, emphasis is being laid on production of certified seeds, supply of input kits, subsidised sale of quality seeds, plant protection chemicals, plant protection equipments, and farm implements under the Centrally Sponsored Plan Scheme "Oil Seeds Production Programme" (OPP). The coverage under oil seeds in 2005-06 was 2.71 lakh hectare with production level of 1.63 lakh MT as against coverage of 3.25 lakh hectare and production level of 1.75 lakh MT during 2004-05. Out of the total area under oilseed crops during 2005-06, groundnut was cultivated in 33.5% of the total area covered under oilseeds, followed by Niger 21.5% and Till Sesamum 20.2%. During 2005-06, Oilseed Production Programme (OPP), National Pulse Development Programme (NPDP), Accelerated Maize Development Programme (AMDP) and Oil Palm Development Programme (OPDP) have been merged into a single scheme named ISOPOM (Integrated Schemes of Oilseeds, Pulses, Oil

palm and Maize) with 75% and 25% financial assistance from the Centre and the State respectively.

4.22 In order to improve the availability of HYV seeds, procurement of breeder Seeds and production of Foundation seeds and certified seeds under seed village progamme were taken up during 2005-06 with an expenditure of Rs.28.56 lakh. During 2005-06, 353 qtls. of Breeder seeds were procured through Govt. of India and 939 qtls. of Foundation Seeds and 1600 qtls. of certified seeds have been produced.

4.23 Under Seed Distribution Programme, 57,400 qtls. of quality seeds of groundnut, mustard, till, niger, were supplied during 2005-06 to the farmers at subsidised rate with an expenditure of Rs.3.00 crore towards subsidy for distribution of certified seeds. Twenty Farmers Field Schools have been conducted in undivided Cuttack, Puri, Koraput, and Balasore districts.

COMMERCIAL CROPS

4.24 The development of commercial crops like, sugarcane, jute, mesta, cotton, soyabean, groundnut, potato, chilly and onion is being given more thrust to improve the rural economy. Cotton is a major commercial crop predominately grown in the KBK districts in Kharif. Area coverage under cotton is growing in Bolangir, Kalahandi and Rayagada districts. The production of cotton decreased from 1.11 lakh bales in 2004-05 to 0.57 lakh bales during 2005-06. In the coastal districts, river bed potato cultivation is being promoted by using certified potato seeds and other improved planting materials. Cultivation of Sugarcane, which is a high- value commercial crop, is being widely accepted by farmers. Steps are being taken to cover at least 1.5 lakh ha. under sugarcane during the next five years. The resulting production should provide sufficient feedstock not only to the existing sugar mills that are currently in operation in the State but also to the sugar mills that are likely to come up in the coming years. Sugarcane growers are provided with 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. The production of sugarcane increased from 9.26 lakh M.T. during 2004-05 to 10.73 lakh M.T. during 2005-06.

CROPPING PATTERN

4.25 Agro-climatic conditions exercise big influence on the type of crop to be grown in an area. More than 75% of the cultivated area in the State is covered under paddy crop. Since the Eighth Plan, efforts are being made to divert land from paddy to cash crops like pulses, oil seeds, sugarcane, potato etc. to ensure better returns. Table 4.3 presents the cropping pattern of principal crops in Orissa from 2000-01 to 2005-06.

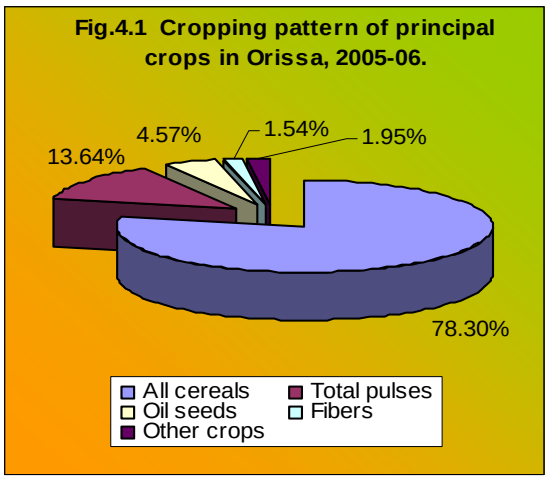
Table - 4.3
Cropping Pattern of Principal Crops in Orissa.

(Figures in percentage)

Principal crop	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06(P)
Paddy	77.5	76.2	77.7	76.4	76.9	75.46
All cereals	81.1	79.5	80.8	79.3	79.8	78.3
Total pulses	9.7	11.4	10.9	12.2	11.2	13.64
Total food grains	**90.8**	**90.9**	**91.7**	**91.5**	**91**	**91.94**
Oil seeds	5.9	5.5	4.9	5.2	5.6	4.57
Fibers	1.4	1.8	1.3	1.3	1.4	1.54
Other crops (sugarcane, potato, tobacco, chilly and ginger)	1.9	1.8	2.1	2	2	1.95
All crops	**100**	**100**	**100**	**100**	**100**	**100**
Total Area (thousand hectare)	**5720**	**5907**	**5499**	**5891**	**5840**	**5932**

P : Provisional Estimate

Source : 1) Directorate of Economics and Statistics, Bhubaneswar.
2) Directorate of Agriculture and Food Production, Bhubaneswar.
3) Directorate of Horticulture, Bhubaneswar.



4.26 From the above Table, it is clear that only paddy covered 76.9% of the total cropped area during 2004-05, followed by pulses (11.2%) and oilseeds (5.6%). The area under fiber crops accounted for only 1.4% and other cash crops, which include sugarcane, potato, chilly, ginger and tobacco etc. constituted only 2.0% of the total gross cropped area under principal crops. The percentage of area under pulses & food grains has increased in 2004-05 over 2000-01 while that of cereals and oilseeds has declined.

CROPPING INTENSITY

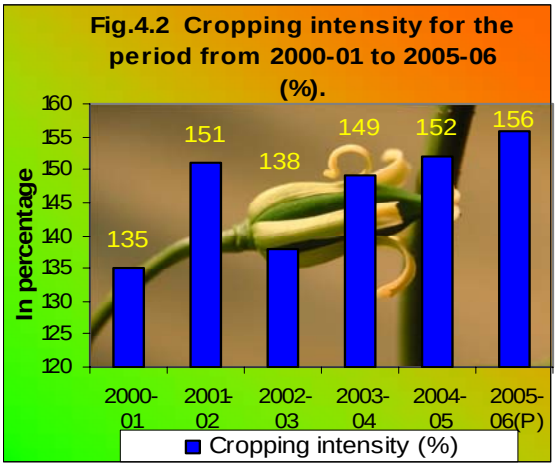
4.27 Cropping intensity is one of the indices of the level of agricultural development. The cropping intensity of the State went up from 151% in 2001-02 to 156% in 2005-06. Due to development of irrigation facilities more areas were brought under cultivation and farmers could raise more than one crop in same land in the same year. Further it is also reveals that the cropping intensity is highest in Puri district (221%) followed by Cuttack district (197%) and Jagatsinghpur (192%). Lowest cropping intensity have been recorded in Sundargarh district (121%). Table 4.4 shows net area sown, gross cropped area and cropping intensity from 2000-01 to 2005-06. The cropping intensity shows an increasing trend since 2003-04.

Table - 4.4
Cropping Intensity for the Period from 2001-02 to 2005-06 (P).

(Area in thousand hectares)

Year	Net area sown	Gross cropped area	Cropping intensity (%)
2000-01	5,829	7,878	135
2001-02	5,845	8,798	151
2002-03	5,680	7,853	138
2003-04	5,796	8,637	149
2004-05	5,739	8,718	152
2005-06(P)	5,691	8,903	156

Source : Directorate of Agriculture and Food Production, Orissa.



HORTICULTURE

4.28 Orissa is blessed with varied agro-climatic condition suitable for growing fruits, vegetables and spice crops. Hill tracts of KBK districts and of Kandhamal and Gajapati districts are suitable for intensive horticultural activities. The development of horticulture has importance not only for increasing the production of fruits and vegetables but also for improving the rural economy of the state by generating employment and income particularly for small and marginal farmers. Cultivation of commercial fruits, use of hybrid vegetable seeds, propagation of off-season vegetable cultivation, establishment of bio-centres for production of quality planting materials, use of quality potato seeds, installation of drip irrigation systems, beneficiary oriented cultivation of oil palm etc. are the major thrust areas in horticulture. The Tenth Plan proposals have been formulated for promoting integrated development of horticulture through area expansion of fruit crops, vegetables, spices, root and tuber crops and floriculture. Emphasis has also been given for dissemination of technology by way of massive training programmes, incentives for production of quality foundation and certified vegetable seeds.

4.29 For encouraging farmers to establish fruits orchard financial assistance up to 75% of cost of cultivation of mango @ Rs.15,750/- per hectare, Rs.11,500/- per hectare of cashew and 50% cost of cultivation @ Rs.15,000/- per hectare of banana are being provided under National Horticulture Mission Programme along with technical support.

4.30 In order to promote banana cultivation it has been programmed to cover 1600 hectare by using both suckers and planting materials produce through tissue culture. It has also been programmed to promote betel vine over 200 hectare with an expenditure of Rs.52.35 crore for both banana and betel vine cultivation. Besides, it has also been programmed to rejuvenate 4,500 of old

orchards at a cost of Rs.6.75 crore during 2006-07.

4.31 During 2005-06, the total area under fruit crops in the State was 288.38 thousand hectares, out of which mango area accounted for 125.29 thousand hectare, coconut 50.84 thousand hectare, banana 21.46 thousand hectare, citrus fruits 26.50 thousand hectare, pineapple 0.66 thousand hectare and papaya 0.75 thousand hectare. All other fruits covered 62.88 thousand hectare. Table 4.5 presents data on area, production and yield rate of different fruits crop during 2005-06.

Table - 4.5
Area, Production and Yield Rate of different Fruits in Orissa during 2005-06(p).

Name of the fruits	Area ('000 ha.)	Production ('000 MT)	Yield rate (qtl/ ha)
Mango	125.29	428.8	34.22
Banana	21.46	269.93	125.78
Citrus	26.5	205.31	77.48
Pine apple	0.66	7.35	111.36
Papaya	0.75	13.67	182.27
Coconut	50.84	2750	5409 (nuts)
Other fruits	62.88	478.34	76.07
Total	288.38	1403.4 & 2750 lakh nuts	59.08 & 5409 nuts per hectare

P – Provisional
Source : Directorate of Horticulture, Orissa, Bhubaneswar.

4.32 Suitable agri-climatic conditions and growing market demand has creates a lot of scope for vegetable cultivation in the State. During 2005-06 the area covered under vegetable cultivation was about 625 thousand hectare and vegetable production was about 7719 thousand MT. The yield rate of vegetable during 2005-06 stood at 123.44 qtls./hect.. The area, production and yield rate of vegetable remained almost same as 2004-05. The area production and yield rate of major vegetables is given below.

Table - 4.6
Area, Production & Yield Rate of different Vegetables during 2005-06(P.)

Name of the vegetables	Area ('000 hect.)	Production ('000 M.T.)	Yield rate (qtls./hect.)
Brinjal	127.86	1853.91	145.00
Tomato	100.37	1332.24	132.73
Cabbage	33.74	931.63	276.12
C. Flower	45.08	638.87	141.72
Pea	4.81	41.96	87.23
Okra	71.40	619.83	86.81
Sweet Potato	47.11	394.27	83.69
Potato	8.31	75.08	90.35
Others	186.69	1831.65	98.11
Total	**625.37**	**7719.44**	**123.44**

P - Provisional
* Directorate of Economics & Statistics, Orissa, Bhubaneswar.
Source :- Directorate of Horticulture, Orissa, Bhubaneswar

FLORICULTURE

4.33 Demand for flowers like rose, marigold, gladioli, tube-rose etc. is increasing day by day in the State and most of the flowers are being imported from the neighbouring states like West Bengal, Andhra Pradesh. Therefore emphasis is being given to encourage farmers of the State to increase their firm income as well as to create employment opportunities through floriculture. Financial assistance up to 50% of the cost of cultivation for small and marginal farmers and 33% for other farmers, ranging from Rs.7920/- per hectare to Rs.45,000/- per hectare is being provided for commercial cultivation of flowers.

4.34 Table 4.7 shows the area and production of different floricultural crops for the last three years. It is reveals from the above table that floriculture is being popular among the farmers. During 2005-06 Rose cultivation was made over an area of 111.55 hectare, increased by 141.76% over 2004-05. Similarly the Gladioli and Tube-rose cultivation were also increased 974.15% and 207.84% respectively over 2004-05. This shows the positive attitude of the farmer towards floriculture. During 2005-06 about 17.5 thousand qtls. of marigold, 0.25 thousand qtls. of rose and 129.64 lakh numbers of spike were produced in the State. Highest production of flower has been recorded in Cuttack district.

Table - 4.7
Area and Production of different Floricultural Crops.

(Area in ha./ Prodn. in Qtl.)
(Gladioli – in nos.of lakh spike)

Year	Marigold		Rose		Gladioli		Tube rose.	
	Area	Production	Area	Production	Area	Production	Area	Production
2003-04	194.64	14,581	41.62	92.19	11.37	11.37	33.62	540
2004-05	221.05	16,599	46.14	98.63	12.07	12.06	34.92	555
2005-06	243.05	17,514	111.55	245.55	129.65	129.64	107.5	1515

P- Provisional
Source: - Directorate of Horticulture, Orissa, Bhubaneswar.

Spices

4.35 Ginger and Turmeric are the major spices grown in the State. Although, Orissa has a major share in production of ginger and turmeric, the varieties cultivated are mostly traditional and low yielding. Emphasis is being given for introduction of improved varieties and assistance @ Rs.11,250/- per hectare is being provided under National Horticulture Mission (NHM). It has been targeted to cover 2000 hectare each for Ginger and turmeric cultivation during 2006-07 with financial assistance of Rs.4.50 crore. Table 4.8 shows the area and production of different spices crops during 2005-06.

Table - 4.8
Area & Production of Spice crops in Orissa.

(Area in 000' hectares)
(Production in 000' MT)

Spice	2004-05		2005-06	
	Area	Production	Area	Production
Onion	26.78	241.85	26.81	243.87
Garlic	11.05	34.92	11.04	35.43
Coriander	19.06	9.02	19.06	9.04
Chilly	75.11	63.26	75.12	63.29
Ginger	15.67	30.37	15.81	30.64
Turmeric	23.89	56.77	24.02	57.09
Total	171.56	436.19	171.86	439.36

Source: Directorate of Horticulture, Orissa.

4.36 Further it is also reveals from the Directorate of Horticulture that highest spice production in the State during 2005-06 recorded in Phulbani district (39,366 MT) followed by Angul (35,628 MT) and Kalahandi district (29,383 MT). While the area under spice cultivation remained almost same as

compared to 2004-05, the production has increased marginally by 0.73%.

4.37 The State Government have signed an agreement with the Agricultural & Processed Food Products Export Development Authority (APEDA) in January, 2003 for setting up an Agricultural. Export Zone (AEZ) on ginger and turmeric for contiguous districts of Kandhamal and Koraput for promotion of export of these commodities. Under Cashew Development Programme, 2,980 hectares have been covered during 2004-05, under new plantation by distributing 5.96 lakh grafts to the beneficiaries. (For 2005-06, there is a proposal to cover 4,000 ha. under cashew plantation with a financial provision of Rs.244.26 lakh).

LAND REFORMS

4.38 The main objective of land reforms is to establish a new agrarian structure based on social justice by reducing inequalities in regard to possession of lands. Various land reform measures include abolition of intermediary rights, tenancy reforms that includes 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.

4.39 Land ceiling is imposed to acquire surplus lands by the Government and redistribute it among landless people. By the end of 2005-06, 1,62,249.241 acres of ceiling surplus land has been distributed among 1,45,452 landless persons.

4.40 Most of the farmers in the State possess marginal or no cultivable land due to fragmentation of holdings. Consolidation of holdings 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. From inception of consolidation; 10,039 the villages have been taken up for consolidation, out of which 764 villages were excluded from the consolidation due to unsuitable for consolidation work. 130 villages are amalgamated with nearby villages through Boundary Change Proceeding (BCP) and 112 villages are newly created through BCP and the balance 9257 villages with an area of 1,47,557 hectares of land taken up for consolidation work. Consolidation work of 7951 villages with an area of 12,03,582 hectare have been completed by the end of 2005-06, of which 12 villages with 1777 hectares of land have been completed during 2005-06.

CROP INSURANCE

4.41 The comprehensive Crop Insurance Scheme was introduced in the State in 1985 with an objective to provide financial support on the event of crop failure in order to restore

credit eligibility of farmers after crop failure for subsequent cropping season. The scheme was modified and made more liberal by Govt. of India and renamed as National Agricultural Insurance Scheme (NAIS) and being implemented since 1999-2000 Rabi season.

4.42 During Kharif, 2005 about 9.23 lakh hectares of cropped land belongs to 9.00 lakh farmers were covered under the insurance scheme and the sum insured was about Rs.962.60 crore. In Kharif 2005, claim amount of Rs.3.74 crore was paid to 19352 farmers for the loss of crop viz Paddy, Groundnut, Maize, Niger, Red gram and Cotton.

4.43 Similarly in Rabi, 2005-06 season 2.17 lakh hectare of cropped land belongs to 2.30 lakh farmers were covered under the scheme, but there was no claimant for loss of crop viz. Paddy, Groundnut, Mustard, Potato and Sugarcane.

DRY LAND FARMING

4.44 Dry land farming is practiced under rainfed condition over more than 60% of the cropped area of the State for which yield rate is much lower. The programme of cultivation under rainfed condition aims at minimising the dependence on monsoon through conservation of water in small projects and maximising production through diversification of crops, mainly from dry land paddy to pulses and oilseed crops. The intensive approach of this programme envisages development of water sheds for proper management of rain water and the extensive approach is diversification of crops. Hence, for stabilising production in rainfed areas, more particularly in the KBK, Gajapati and Kandhamal districts, farmers need to be motivated to divert uplands for growing drought resistant crops. Inter-cropping is a very appropriate practice in dry land agriculture since it offers a kind of insurance against total crop failure in drought years. It also ensures proper utilisation of soil moisture as well as plant nutrients. The ideal inter-cropping system in Orissa is cereals and pulses, pulses and ragi, maize and arhar, and groundnut and arhar.

4.45 Another measure taken to make dry land farming remunerative is mixed farming Paddy crops even in the medium and low land suffer from moisture stress in the event of early cessation of monsoon. Early maturing variety of paddy cultivation is the solution to this problem. To store the monsoon run-off and to regulate release of water in order to increase moisture content of soil, water harvesting structures are being constructed in watershed areas.

4.46 Adoption of land and water conservation techniques and alternative land use systems like agro-forestry, agro-horticulture, and silvi pasture development can be taken up in dry land areas for increasing and stabilizing production.

CONSUMPTION OF FERTILISER

4.47 Optimum use of fertilizer in an opportune time is an essential ingredient for increasing agricultural productivity. It also protects land fertility by meeting the nutrition requirement of crops. Fertiliser consumption in the State was only 0.76 kg./hectare in the year 1961-62 , which has gradually increasing and mounted to 46 kg./ha. during 2005-06. Even within Orissa there exists great disparity between districts in this regard. Highest fertilizers consumption has been recorded in Bargarh district (116 kg./Hect.) followed by Balasore (106 kg./hect.) and Bhadrak district (105 kg./hect.). The lowest consumption has been recorded in Kandhamal district (4 kg./hect.). Map-I reflects the completion of fertiliser per hectare between different districts of Orissa during 2005-06.

Map-1

4.48 The total fertilizer consumption in the State during 2005-06 was 394.89 TMT as against 344.66 TMT in 2001-02, showing an increase of 14.6% over 2001-02. Fertiliser consumption in the State from 1961-62 to 2005-06 is given in Table 4.9.

Table - 4.9
Fertiliser Consumption in Orissa.

(000' MT)

Year	Nitrogen(N)	Phosphates (P)	Potash (K)	Total	Kg. / hect.
1961-62	4.38	0.49	-	4.87	0.76
1971-72	37.43	8.38	4.01	49.82	7.25
1981-82	54.16	17.92	9.91	81.99	9.68
1991-92	126.22	41.52	28.29	196.03	19.96
2001-02	221.17	71.94	51.55	344.66	41.00
2002-03	185.41	62.86	42.29	290.56	39.00
2003-04	210.07	66.64	40.50	326.21	39.00
2004-05	223.54	77.99	53.77	355.30	43.00
2005-06(P)	243.21	91.05	60.63	394.89	46.00

P: Provisional

4.49 Further it is also reveals that fertilizer consumption in the State is too low as compared to all other major states and at all India level. During 2002-03, the fertilizer consumption in the State was 39 kg./ hectare while in the neighboring states like Andhra Pradesh and West-Bengal it was 128.44 kg./hect. and 122.23 kg /hect. respectively and 84.82 kg./hect. at all India level, i.e. per hectare consumption of fertilizer in the State is about half of the per hectare consumption at all India level and about one-third of the consumption in the neighbouring States like Andhra Pradesh, West Bengal etc. Table 4.10 shows the fertilizer consumption in some selected states since 2001-02.

Table - 4.10
Consumption of Fertilisers in some selected States.

(kg./hect.)

Name of the State	2000-01	2001-02	2002-03	2003-04	2004-05
Andhra Pradesh	159.84	143.47	128.44	145.30	155.80
Assam	35.68	38.81	42.73	47.50	41.60
Bihar	97.48	87.39	87.15	81.00	85.70
Gujarat	70.14	85.52	77.76	94.70	106.80
Haryana	147.2	155.69	152.79	161.70	166.20
Karnataka	109.52	101.48	90.91	78.80	110.80
Kerala	59.38	60.72	68.17	64.20	67.40
Madhya Pradesh	38.35	39.96	36.44	51.60	56.00
Maharashtra	74.35	78.24	73.80	64.20	77.70
Orissa	40.52	39.00	39.00	37.10	40.40
Punjab	166.69	173.38	174.99	190.10	192.50
Tamil Nadu	145.31	141.55	114.00	114.50	152.90
Uttar Pradesh	111.31	130.44	126.51	125.70	125.50
West Bengal	113.68	126.82	122.23	114.10	129.00
Rajasthan	31.06	38.88	28.54	67.40	36.60
All India	86.34	**90.12**	**84.82**	88.20	96.60

P: Provisional
Figures of Directorate of Agricultural & Food production, Orissa, Bhubaneswar.
Source: 1) Centre for Monitoring Indian Economy (CMIE), December, 2002.
2) Agricultural Statistics at a glance,2003 , Government of India.

4.50 In order to promote balanced use of fertilizers, soil health cards will issued to farmers and awareness will be created to enhance. The Junior Agriculture Officers of irrigated tracts have been provided with portable soil testing kits for the purpose. As a supplementary source of nutrient in integrated nutrient management system promotion of bio-fertilizers like Rhizobium culture, Azoto bacter, Azospirillum, Azolla and fortified composting including vermin composting and green manuring has been emphasized.

4.51 In order to provide assistance to the farmers in tribal areas, where off-take of fertilisers is very low, a transport subsidy of Rs.100 per tonne has been made available by State Government.

PEST CONTROL

4.52 Timely use of pesticides is an essential activity to obviate crop damage. As high yielding varieties of crops are susceptible to pests and diseases, plant protection measures are as necessary as use of fertiliser. However, excessive use of pesticides may be hazardous to human health. As such, Integrated Pest Management (IPM) has been made a thrust area in the Tenth Plan in order to achieve effective pest control on one hand and to curb its possible adverse effects on environment on the other. This technology inter-alia envisages encouraging the use of biological pest control measures, identifying the most poisonous / toxic pesticides and putting a ban on their use, and restricting the use of pesticides in a sustainable manner.

4.53 Consumption of pesticides / insecticides in the State showing a fluctuating trend. Consumption of pesticides used in the State during 2003-04 was 1028.50 MT which decreased to 987.00 MT during 2004-05 and again it increased to 1039.00 MT in 2005-06. Per hectare consumption of pesticides in the State has increased from 118 gm. In 2004-05 to 122 gram in 2005-06.

Table - 4.11
Consumption of Pesticides in Orissa.

Year	Total consumption (in MT)	Consumption per hectare (gm./hect.)
2000-01	993.55	
2001-02	1018.00	
2002-03	682.30	
2003-04	1028.50	
2004-05	987.00	118.00
2005-06	1039.00	122.00

AGRICULTURAL MARKETING

4.54 The co-operative movement with its basic democratic set-up plays a crucial role in accelerating the tempo of social and economic progress. The phenomenal growth of co-operatives in the State is responsible for institutionalising the marketing initiatives in regard to credit, fertiliser, pesticides, improved seeds, other inputs, agricultural products and consumer articles etc. During 2005-06, the total number of co-operative societies was 4,612 with a membership of 52.22 lakh and working capital of Rs.3,273.56 crore. The Orissa State Marketing Federation has been functioning as the apex organisation with 51 Regional Co-operative Marketing Societies (RCMS) and 19 Co-operative Cold Storages. The Orissa State Tribal Development Co-operative Corporation and Orissa State Oil Seeds Growers' Federation are also functioning as apex marketing institutions. There are 213 large size Agricultural and Multipurpose Societies (LAMPS) which provide a package of services including credit at a single contact point. One Jute Marketing Co-operative Society, 2 Coconut Growers' Marketing Co-operative Societies, 2 Cashew-nut Marketing Co-operative Societies, 2 Betel Marketing Co-operative Societies, 4 Forest Marketing Co-operative Societies, 27 Fruit and Vegetable Co-operative Societies, 15 Cotton Growers Co-operative Societies, 2 Sabaigrass Co-operative Societies and one Onion Co-operative Society are functioning for assisting the growers in procuring inputs and marketing the products.

4.55 Lack of marketing infrastructure leads to distress sale of farm products which works as disincentive to farmers' efforts. Therefore, farmers need to be assisted and advised on several aspects including market infrastructure, market intelligence, grading of farm produce and its proper storage. With these ends in view, a scheme "Establishment of Krushak Bazar" under the Work plan was introduced and this aims at creating primary rural markets, extension, training of farmers and awareness campaigns.

AGRICULTURAL CREDIT

4.56 Agricultural credit is an essential input for augmenting agricultural production and helps a lot to the poverty stricken farmers of Orissa. The total amount of agricultural loans advanced by different Commercial Banks, Co-operative Banks and OSFC during 2005-06 was to the tune of Rs.2700.71 crore which was higher by 43.50% as compared to the amount financed in 2004-05. Out of the total agricultural loan financed during 2005-06, the

share of Co-operative Banks was 53.43%. Apart from crop financing, term lending for floriculture, horticulture, livestock, pisciculture, plantation and composite projects is also being encouraged. Table 4.12 reflects the amount of agricultural credit advanced in Orissa by different banks.

Table - 4.12
Agricultural Credit Advanced in Orissa from 2001-02 to 2005-06(P).

(Rs. in crore)

Year	Commercial Banks	RRBs	Co-operative Banks	OSFC	Total
2001-02	266.4	396.20	532.25	0.54	928.99
2002-03	281.4	437.29	609	0.26	1,046.55
2003-04	434.9	602.55	724.03	0.31	1,326.88
2004-05	627.9	932.56	971.26	0.22	1,904.03
2005-06	842.3	1257.65	1443.06	0	2,700.71

P : Provisional
Source: State Level Bankers' Committee, Bhubaneswar

FARM MECHANISATION

4.57 Farm mechanization has a great role in enabling farmers to take up timely and quality agricultural operations, reduce costs of production and improve the productivity. Various agricultural implements are supplied to farmers at subsidized rates. In KBK districts an additional 25% subsidy is given on power Tillers under RLTAP. During 2005-06 emphasis given on demonstration of specialised power driven farm implements like self-propelled paddy transplanter, tractor operated renovator, power pulse thresher, maize sheller, sugarcane ridger/cutter/planter etc. During 2005-06 (up to January'05) 1,150 power tillers, 542 tractors, 113 reapers, 3 paddy transplanters, 21 rotavators, 76 power aperated and 2.8 special power implements have been supplied to the farmers at subsidised rates. Subsidy amounting to Rs.2.97 crore have been released to the farmers.

4.58 During 2006-07, it has been proposed to subsidies 1700 power tillers, 75 paddy reapers, 6 paddy transplanters, 800 tractors, 50 tractor operated rotavators and 781 other implements with total financial provision of Rs.7.65 crore subsidy. Agro Service Centres (ASCs) have helped farmers to use custom-hired tractors and other agricultural implements. During 2005-06 (up to December'2005) 47 Agro Service Centres have been setup and subsidy amounting to Rs.53.81 lakh has been released. It has been programmed to setup 250 ASCs during 2006-07.

TRANSFER OF TECHONOLOGY

4.59 The farmers are being sent on exposure visits to other States and within the State to gain awareness and knowledge on advanced technologies. This has been very effective for transfer of technology. During the year 2004-05, 420 farmers went outside the State and 443 farmers visited places inside the State for exposure with a financial involvement of Rs.13.31 lakh. During 2005-06, it is proposed to send 1,300 farmers to outside the State and 1,000 farmers inside the state for exposure visits at a cost of Rs.46.50 lakh.

SOIL CONSERVATION

4.60 Watershed Development Programmes focus on harnessing and conserving land and water through various soil and water conservation interventions coupled with crop substitution and mixed cropping practices for increasing and sustaining the productivity of land and improving the livelihood of the community. Soil Conservation activities are taken up on water-shed basis. Integrated Wasteland Development Project aided by the World Bank,Indo-Danish Comprehensive Watershed Development Project, National Watershed Development Project in rainfed areas and River Valley Programme under Central Sector are the important soil and water conservation programmes which are being implemented in the State. The primary objectives of these programmes are to prevent land degradation, promote and balance the ecosystem, enhance capacity to retain moisture, and increase the fertility and productivity of the soil. People's participation has been built into the programmes at all stages, from planning to execution.

4.61 The total degraded land in the State is 61.21 lakh ha. which works out to 39.31% of the total geographical area of the State. Till the end of 8th Plan Period, a total area of about 15 lakh hectare had been covered under various soil conservation schemes. During 9th Plan Period, another 3.22 lakh hectare was treated under various soil conservation measures. By the end of 2005-06 about 12,520 Water Harvesting Structures have been completed and additional irrigation potential about 113.99 thousand hectares have been created including 590 water harvesting structure have been completed during 2005-06 with additional irrigation potential of about 7.609 thousand hectares.

WATERSHED MISSION

4.62 Watershed Development Programmes are currently being implemented in the State under various Centrally Sponsored Schemes like Drought Prone Area Programme, (DPAP), integrated watershed Development programme (IWDP), National Watershed Development Programme for Rainfed Area (NWDPRA), River Valley Project (RVP), etc. The Watershed Development Programmes are also implemented with Additional Central Assistance received under RLTAP for KBK districts. One externally aided project funded by DFID namely Western Orissa Rural Livelihood Project (WORLP) is also currently being implemented in two districts namely, Bolangir and Nuapada and is expanding to Kalahandi and Bargarh during 2005-06. The broad objectives of the mission are as follows:-

i. *Identification and prioritization of blocks and GPs on the basis of some identified objective criteria such as moisture index, area under assured irrigation, topographical features and availability of waste land where*

comprehensive treatment is needed for improving soil and moisture regime.

ii. *Identification of particular watersheds.*

iii. *Preparation of integrated watershed development programmes through active community participation.*

iv. *Development of waste lands through appropriate interventions.*

v. *Conservation of run-off water, recharging of aquifers, harvesting of rain-water and formulation and implementation of other related programmes.*

vi. *Promotion of self-help groups of land- less persons.*

4.63 The soil and water conservation activities include construction of water harvesting structures, check dams, nalla bonding, contour trench, village tanks, storage tanks, gully plugging etc. Besides, appropriate plantation in the degraded lands and vegetative treatment in the catchments are also taken up under this programme.

4.64 The Orissa Watershed Development Mission (OWDM) was set up as a State level Umbrella Institution for monitoring, co-coordinating and strengthening the watershed programme in the State. The watershed programmes were implemented through various Government agencies that acted as PIAs (Project Implementing Agency) previously. In order to strengthen the effective implementation of the programme, offices of the Project Directors (Water sheds) have been created in Bolangir, Nuapada, Kalahandi and Baragarh districts. The programme in these districts are being monitored, supervised and implemented through Project Director, Water sheds. At present 741 Micro Watershed is being implemented in 23 districts of the State (except Puri, Jagatsinghpur, Bhadrak, Boudh, Kendrapara, Kandhamal and Nuaparda) under Integrated Waste Land Development Project (IWDP). The total outlay of the projects is Rs.219.75 crore for treating 3.98 lakh hectares. By the end of December'2005, Rs.79.06 crore have been utilized for treating 1.55 lakh hectares including 16,100 hectare in 650 watersheds were treated utilizing Rs.8.53 crore during 2005-06.

4.65 Under the RLTAP for KBK districts, 314 Micro Watershed Projects have been taken up with a project cost of Rs.100.57 crore for treating 1.67 lakh hectares. The scheme is in operation since 2002-03. By the end of 2005-06 (till December'2005) 0.68 lakh hectare have been treated under the programme with an expenditure of Rs. 44.14 crore. During 2005-06 (till December'2005) Rs.583.27 lakh have been utilized for treating 8137 hectares. During 2006-07 it has been programmed for treating 33,200 hectare with a provision of Rs.20.00 crore.

4.66 Drought Prone Area Programme (DPAP) is in operation in 8 districts of the State covering 47 identified Block. Total 1146 Projects (old + new) were sanctioned under this programme with sanctioned project cost

of Rs.329.64 crore for treatment of 5.81 lakh hectares. An amount of Rs.83.09 crore has been utilized in treating 1.66 lakh hectares by December'2005. Out of which Rs.9.55 crore have been utilized in treating 18,270 hectare during 2005-06 (up to December'2005). Out of total 1146 projects, 66 projects have been completed in the district of Bolangir, Sonepur and Kalahandi and the balance 1080 projects are under progress.

4.67 National Watershed Development Project for Rainfed Areas (NWDPRA) is being implemented in the State. 212 re-cast watersheds of 9th plan period were carried over to 10th plan for treating1,38,244 hectares at an estimated cost of Rs.62.11 crore. Out of these 212 projects, 59 were belongs to KBK districts with an area of 33,315 hectares for treatment. During 2005-06, 8,122 hectare have been treated and Rs.365.47 lakh have been utilized.

4.68 River Valley Projects scheme is being implemented in the catchments of inter-State-River Valley projects viz. Hirakud, Machhakunda, Sileru, Rengali Mandira & Upper Kolab and Indrabati with a view for prevention of degrade land by adoption of a multidisciplinary integrated approach to prevent soil loss from the catchments and to reduce siltation of multi purpose reservoirs.

4.69 During 10th five year plan, it was planned to treat 17,231 hectare of land with an estimated cost of Rs.11.20 crore. An area of 6917 hectare has been treated with construction of 3290 soil conservation structure with an investment of Rs.2.86 crore during 2002-03 to 2005-06 (up to November'05).

AGRICULTURAL PROMOTION AND INVESTMENT CORPORATION LTD (APICOL)

4.70 The Agricultural promotion and Investment Corporation of Orissa Limited (APICOL), since its inception as a promotional organisation is engaged in promotion of commercial agricultural enterprises including agro based and food processing industries in the State. The corporation has been implementing various programmes through the agricultural extension network of the department to encourage investment in the field of agriculture. It also acts as the channelising agency for release of subsidy under farm mechanisation component of the Work Plan for Macro Management of Agriculture.

4.71 During the year 2005-06, 93 agricultural Enterprises (80 Agro Service Centres and 13 Commercial Agriculture Enterprises) has been promoted by APICOL with an investment of Rs.5.37 crore and an amount of Rs.1.12 crore incentive have been provided to 93 beneficiaries.

ORISSA AGRO INDUSTRIES CORPORATION (OAIC)

4.72 OAIC is engaged in marketing of various agricultural inputs including agricultural machineries/equipments through a wide network of district as well as branch offices. Besides, the corporation is also executes tube wells, bore wells, direct lift irrigation projects for individuals as well as communities.

4.73 During 2005-06, the Corporation has marketed equipments / machineries worth of Rs.21.81 crore and other inputs viz. fertilizers, pesticides, cattle and poultry feed worth of Rs.36.61 crore. Besides, it has executed 33 community river lift projects in KBK districts and 62 projects in non-KBK districts facilitating irrigation of 792 hectare and 1488 hectare land respectively under Biju Krushak Yojana.

CENTRAL RICE RESEARCH INSTITUTE (CRRI)

4.74 The Central Rice Research Institute (CRRI) was established in Orissa in 1946 against the backdrop of the great Bengal Famine of 1943. This institute not only played a key role in ushering the country in an era of green revolution leading to self sufficiency in food supply in about 25 years from its inception, but also brought glory to the nation by providing research support to become the second largest exporter of rice in the world. The goal of the institute is to improve the income and quality of life of rice farmers. The main objective of the institution is to conduct basic, applied and adaptive research on crop improvement and resource management for increasing and stabilizing rice productivity in different rice ecosystems with special emphasis on rainfed ecosystem and the related a biotic stresses. Till now about 70 high yielding varieties of rice have been developed for different types of land under different maturity groups by this institute and these have been released for cultivation by Central Variety Release Committee (CVRC) as well as State Variety Release Committee (SVRC). Besides, many varieties developed by this institute were released in other States, by respective State Variety Release Committees and also in various countries. The farmers of Orissa have benefited a lot by cultivating the improved high/ yielding varieties developed by this institute. Rice-fish farming system technology has been developed by CRRI, Cuttack for rainfed low lands. This technology involves rain water harvesting-cum-recycling and diversified farming system. This farming system can increase farm productivity and income by about 15 times as compared to traditional rice farming and also it can generate employment round the year.

4.75 During 2005-06 the institute introduced six new high yielding varieties of seeds namely Ajay, Rajalaxmi, Naveen,

Varshadhan, Geetanjali and Ketakijoha, recommended for irrigated and rainfed shallow low land/ up land, deep water areas. The details of these high yielding varieties of seeds are given in table 4.13.

Table - 4.13
New high yielding variety of seeds introduced by CRRI in 2005-06.

Year	Name of the variety	Duration (days)	Yield (t/ha.)	Remarks
2005-06	Ajay	135	7.5	Recommended for irrigated and rainfed shallow favourable low land condition
2005-06	Rajalaxmi	135	7.0	Recommended for irrigated and rainfed shallow favourable low land condition
2005-06	Naveen	120	4.5 (Kharif) 6.0(Summer)	Recommended for irrigated and rainfed shallow favourable low land condition
2005-06	Varshadhan	160	4.0	Recommended for rainfed semi-deep and deep water areas
2005-06	Geetanjali	135	5.0	Recommended for irrigated areas
2005-06	Ketakijoha	150	4.0	recommended for rainfed shallow low lands

4.76 This institute has also played a major role in transfer of technology from laboratory to farmer's field through Krishi Vigyan Kendras (KVKs), Institute of Village Linkage Programme (IVLP), Farming System Research Education (FSRE) etc.

4.77 Suitable rice production technologies for rainfed up lands, low land and irrigated rice including production technologies for hybrid rice and scented rice were field tested and transferred to farmers. The institute has also taken steps for evaluation and popularization of its varieties through frontline demonstration in farmer's fields. In addition, farmer's advisory service is provided through regular radio talk and TV telecasts on rice production technologies. The Institute also provides quality seeds of rice to farmers, government agencies and to others. The institute is also provides consultancy services to interested agencies particularly in the field of testing of agrochemicals.

ORISSA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY (OUAT)

4.78 The Orissa University of Agriculture and Technology (OUAT), the second oldest Agricultural University in the Country has grown into a full-fledged Institution having 7 constituent colleges imparting education and training in various aspects of Agriculture, Animal Husbandry and Veterinary, Forestry, Fisheries Sciences etc. The University has developed a research base for generation of technology capable of improving productivity, stability, profitability and sustainability of the major farming systems under varied agro-climatic situations of the State. Dissemination of the latest technology covering different areas of agriculture is achieved through various types of training, distance education programme, on-farm trials and demonstrations in farmer's fields, farmers fair

and various Mass Communication programmes. The University maintains 8 Regional Research Technology Transfer Station, 4 sub-station base by establishing eight zonal research stations, 4 Zonal sub-stations, 10 commodity research stations and 13 adaptive research stations spread all over the state, along-with 46 All India Coordinated Research Projects and 41 National Agricultural Technology Projects currently operating in the University. During 2005-06, the University has made significant contributions in terms of crop improvement, crop production and crop protection. There are 23 Krishi Vigyan Kendras operating in the University with 100% assistance from ICAR for transfer of technology to the farmers field. During 2005-06, 410 training programmes on transfer of technologies to the farmers covering 7172 farmers including farm women and rural youth were conducted. Training was also imparted to 1504 personnel of line departments and NGOs through 114 programmes. Besides, series of on-farm trials and frontline demonstrations on pulse and oilseeds have also been taken up in an area of 637 hectares.

4.79 352 farmers have been enrolled in 10 courses offered by the distance education project of the University during 2005-06. apart from providing technical guidance on production of video film, the University has undertaken shooting of video films on different activities and techniques. Besides, Research and field trials continued in four varieties of rice, two black gram and one variety of brinjal and cowpea each have been released for cultivation during 2005-06. The University has produced 1.36 lakhs quality planting materials of Mango, Guava, Litchi, Rose and Cashew and other flower seedling during 2005-06. In Kharif 2005, programme was taken up for production of foundation paddy seeds in 180 ha. and certified paddy seeds in 75 ha. and non paddy seeds in 14 ha.

AGRICULTURAL CENSUS

4.80 According to Agricultural Census held in 2000-01, there were 40.67 lakh operational holding in the State covering an area of 50.81 lakh hectares as against 39.66 lakh operational holding covered an area of 51.44 lakh hectares during 1995-96 Census. Out of total 40.67 lakh operational holding recorded in 2000-01 census, 22.94 lakh holding (56.4%) belong to Marginal Category, Covered 22.7% of total area and 11.14 lakh small holdings covered 30.4% of the total area i.e. Marginal and small holdings together constitutes 83.8% of the total nos. and 53.1% of the total area under operational holdings. The balance area belongs to semi-medium, medium and large operational holding. The number and area of operational holding for the last three agricultural census is given in table 4.14.

4.81 It is also revealed from the above table that while the numbers of operational holdings are in increasing trend, the area under operational holdings showing a declined trend. Also while the average size of holding was 1.34 hectares in 1990-91, has decreased to 1.25 hectares in 2000-01.

4.82 Agricultural Census, 2000-01 also shows that highest number of operational holdings were recorded in Mayurbhanj district (3.26 lakh) followed by Ganjam district (2.80 lakh) and Keonjhar district (2.33 lakh). While the lowest numbers of holdings recorded in Deogarh district (0.40 lakh). These constituted 8.0%, 6.9%, 5.7% and 1.0% of the total numbers of operational holding in the State.

4.83 Distribution of land holdings by different social groups as per 1990-91, 1995-96 & 2000-01 agricultural census is depicted in Table 4.14. There were 5.69 lakh SC and 12.30 lakh ST operational holdings in the State with 5.14 lakh and 16.31 lakh ha. of total area respectively in 2000-01. Table 4.14 shows that the SC farmers had a share of 13.99% in the total number of holdings while their share in the total area constituted only 10.12 %. Similarly, the number of holdings of ST farmers formed 30.24% to the total number of holdings and their share in the total operational area was 32.10%.

Table - 4.14
Distribution of Holdings among different Social Groups as per different Agricultural Census.

Holding size	Year	No. of operational holdings (in thousand)			Area of operation (thousand hectare)		
		SC	ST	All groups	SC	ST	All groups
Marginal (below 1.00 Ha.)	1990-91						
	1995-96	3.73	5.87	21.45	1.66	3.09	10.64
	2000-01	3.93	6..39	22.95	1.81	3.47	11.55
Small (1.00 - 2.00 Ha.)	1990-91						
	1995-96	1.22	3.54	11.06	1.65	4.88	15.22
	2000-01	1.25	3.70	11.14	1.71	5.17	15.44
Semi- medium (2.00 - 4.00 Ha.)	1990-91						
	1995-96	0.43	1.81	5.44	1.13	4.85	14.51
	2000-01	0.43	1.70	5.01	1.12	4.58	13.44
Medium (4.00 - 10.00 Ha.)	1990-91						
	1995-96	0.07	0.51	1.56	0.39	2.81	8.64
	2000-01	0.08	0.47	1.45	0.45	2.65	8.18
Large (10 Ha. & above)	1990-91						
	1995-96	0.01	0.04	0.15	0.06	0.66	2.43
	2000-01	0.01	0.03	0.13	0.05	0.45	2.20
Total	1990-91						
	1995-96	**5.46**	**11.78**	**39.66**	**4.89**	**16.29**	**51.44**
	2000-01	**5.69**	**12.30**	**40.67**	**5.14**	**16.31**	**50.81**

Source: Agriculture Census.

❖❖❖❖