

CHAPTER - III
AGRICULTURE AND ANIMAL RESOURCES

3.0 Introduction

Agriculture and Animal Husbandry continue to be the main stay of the state's economy. Taking into account the predominant position the sector occupies and the large percentage of people depending on the sector, the Government enunciated the agriculture policy in 1996 to double the production of food grains and oil seeds by the end of 9th plan. The policy also envisages bringing all-round development of agriculture. It has been made equivalent to industry because about 85% of the State's people are rural and virtually all depend on agriculture. There are about 3.97 million operational holdings of which small and marginal farmers holdings (upto 5 acres) account for 84.33%. As much as 52.25% of total operated area is owned by small and marginal farmers.

3.1 Food Grain Production

Production of food grains fluctuates in the years depending on rainfall pattern, particularly, that from June to October. In 1999-2000 the production was low due to super cyclone in October 1999. Due to severe drought situation the food production become very low in 2000-2001. But for good rainfall and good distribution there was a production of 7.54 million tons food grains in 2001-2002. Again it declined to a very low level in 2002-2003 (about 3.55 million tonnes). However during 2003-04 wheat production increased to 7.1 million tons due to very favourable weather conditions. Of the total gross cropped area rice commands about 78%.

The year-wise food grain production is presented in the following *Table-3.1*.

TABLE: 3.1
Year-wise Food Grain Production

Year	Production (in thousand T)
1970-71	5104
1971-72	4354
1972-73	4860
1973-74	5480
1974-75	3971
1975-76	5500
1976-77	4075
1977-78	5561
1978-79	5765

Year	Production (in thousand T)
1979-80	3872
1980-81	5977
1981-82	5538
1982-83	4688
1983-84	7001
1984-85	5609
1985-86	6968
1986-87	6378
1987-88	5058
1988-89	7002
1989-90	7974
1990-91	7031
1991-92	8273
1992-93	6898
1993-94	8216
1994-95	7986
1995-96	7923
1996-97	5347
1997-98	7311
1998-99	6288
1999-00	5602
2000-01	4975
2001-02	7540
2002-03	3555
2003-04	7152
2004-05 (P)	6965

Source: Upto 1998-99, Orissa Development Report, Planning Commission, Govt. of India, 2002. For the rest of the years, Source: Economic Survey, Govt. of Orissa, 2003-04, Annex - 17.

Area under rice crop (upland, medium land and low land) depends on rainfall pattern. Per capita land resources were 0.39 ha in 1950-51 and has decreased to 0.16 ha in 2002-2003. As the population is increased productivity has to increase correspondingly. Land utilization pattern remains almost same except the rice area and is given for the year 2004-2005 (*Table-3.2*).

TABLE: 3.2
Land Utilization Pattern in Orissa (2001-2002)

	Area in MHa
Geographical Area	15.571
Forest Area	5.813
Misc. Tree and Groves	0.482
Permanent Pasture	0.443
Culturable Waste Land	0.392
Land Put to non-agril. Use	0.999



Barren and uncultivable land	:	0.843
Current Fallow	:	0.426
Other Fallow	:	0.434
Net area shown	:	5.739

Source: Economic Survey, 2005-06, Govt. of Orissa (Annex-15)

In 1950-51 there was hardly any irrigation and so also fertilizer consumption. Increased irrigation increased fertilizer consumption too and brought more areas under dalua cropping and increased dalua crop productivity.

TABLE: 3.3
Percentage of Gross Cropped Area under Different Crops

Sl. No.	Principal Crops	1970-71	1980-81	1990-91	2000-01	2001-02	2002-03
1.	Paddy	66.1	47.9	45.9	77.5	76.2	77.7
2.	Total cereals	72.4	59.3	51.7	81.1	79.5	80.8
3.	Total pulses	12.5	19.7	22.2	9.7	11.4	10.9
4.	Total food grains	84.9	79.0	73.9	90.8	90.9	91.7
5.	Total oilseeds	4.9	8.4	12.1	5.9	5.5	4.9
6.	Total fibres	1.2	1.1	0.9	1.4	1.8	1.3
7.	Other crops	8.1	10.6	12.4	1.9	1.8	2.1
Total area in '000 ha.		5601	6130	6304	5720	5907	5499

Source: Compiled from Govt. of Orissa, Economic Survey, 1999-2000, 2003-04.
Agricultural Statistics of Orissa at a Glance, Govt. of Orissa, 1996.

It may be seen from the **Table- 3.3** that food grain productions over the last three years have remained at over 90 per cent of the total gross cropped area. Paddy occupies more than three fourth of area. There is hardly any significant change in area devoted to remunerating cash crops.

Even though food grain production is the single most major occupation, the compound annual growth rate of these is one of the poorest both in terms of area, yield and production which is presented in **Table-3.4** given below.

TABLE: 3.4
Growth Rates of Area, Yield and Production of Food Grains in Orissa

Period	Triennium Compound Annual Growth Rate		Production
	Area	Yield	
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: Planning Commission, Orissa Development Report, 2002, Table 4.3.

After all development, 50% area will remain rainfed. To increase productivity in rainfed areas, we have to delineate areas suitable for upland rice as per probability of rainfall and safe growing period.

To increase production per unit area per unit time (productivity) we have to go in for cultivation of plantation crops like cashew nut, coffee, tea, rubber, black pepper, cardamom, agave, sabai, palmarosa, coconut, betel vine, simarouba, etc and agro forestry.

Even though rice is the single most agricultural production of the state, the yield rate of rice is much lower than many states. The yield rates of rice for Orissa stood at 1210 kg. per hectare (1998-99) which during the same year was 1300 kg. for Bihar, 2260 kg. for West Bengal, 2780 kg for Andhra Pradesh, 2530 kg for Karnataka, 2240 kg. for Haryana and 3150 kg. for Punjab (Centre for Monitoring Indian Economy - November 2000-Agriculture). Such low yield for Orissa is mostly due to scanty use of fertilizer, organic manure and inadequate crop protection prophylactic measures.

3.1.1 Dependence on Rainfall Pattern

Summer paddy cultivation depends on irrigation water availability. Hill agriculture, Bagada Chasa, shifting cultivation (Podu cultivation), Myda cultivation are the characteristic features of Orissa's Agriculture. Most of the agricultural land in Orissa is rain fed. Irrigation potential created till 2004-05 from all sources stand at about 2696 thousand hectares, the gross cropped area for the same year being 5840 thousand hectares. Though the potential created is about 46 percent of the gross cropped area, actual availability of water is much less.

The rice oriented cropping pattern with about 75 percent of gross cropped area devoted to it, has to change in favour of vegetables, fruits, flowers, spices, medicinal plants, etc. to increase the profit / ha and to bring more money to the farmers.

3.1.2 Crop Diversification and Adoption of New Crops

3.1.2.1 Agro Climatic Zones

Due to large variation in physiographic and topographic situations, the problems in agriculture are different in different agro-climatic zones.

Orissa has ten agro-climatic zones on the basis of soil, weather and other relevant characteristics. The agro-climatic zones of Orissa is presented in **Table-3.5**.

TABLE: 3.5
Agro-Climatic Zones in Orissa

Sl. No.	Agro-climatic Zones	Climate	Soil Group
1.	North western plateau	Hot and moist	Red and yellow
2.	North central plateau	Hot and moist	Red loamy
3.	North eastern coastal plateau	Hot and moist sub-humid	Alluvial
4.	East and south eastern plateau	Hot and humid	Coastal alluvial saline (near the coast line)
5.	North eastern ghat	Hot and moist sub humid	Laterite and brown forest
6.	Eastern ghat high land	Warm and humid	Red
7.	South eastern ghat	Warm and humid	Red, mixed red and yellow
8.	Western undulating	Warm and moist	Black, mixed red and black
9.	West central table land	Hot and moist	Red, heavy textured colourous
10.	Mid central table land	Hot and dry sub-humid	Red loamy, laterite mixed red and black

Source: *Economic Survey, 2003-04, Government Of Orissa.*

3.1.2.2 Vegetable Production

The area under vegetable was 625,110 hectare during 2004-05, which was higher than the previous year by more than 2000 hectares. The total vegetable production was about 7719.36 thousand tones. Brinjal is the major vegetable followed by tomato, cauliflower, cabbage etc. cultivated in the state. In KBK districts, under Long Term Action Programme, vegetable cultivation is getting great support for which in many areas of these districts, vegetable cultivation has been taken up by small and marginal farmers.

Due to more fertilizer consumption production of vegetables has increased over time. Orissa is self sufficient in vegetables but not in fruits, spices, flowers and medicinal crop requirements. The share of vegetables per head per day is 540 g which may not be considered inadequate from dietary requirement point of view. Important vegetable crops grown in the state are:

- Solanaceous - Potato, Brinjal, Tomato
- Malvaceous - Vendi
- Roots and & bulbs - Yams, Arums, Sweet Potato
- Cucurbits - Pumpkins, gourds, melons

- Leguminous - Cowpea, Beans, Agasti, Barbati
Cruciferae - Cabbage, Cauliflowers, Knolkhol, Radish, Beet, Carrots.
Green Saga (Khada, Neutia, Kosala, Palanga, Bathua, Muthi, Kalam, Sunusunia, Puruni, Madaranga, Balubatua etc.)

3.1.2.3 Sugarcane

Since Orissa's climate is suitable for sugarcane production it is important commercial crop of the State. Sugar cane area and productivity is given in **Table-3.6**.

TABLE: 3.6
Sugarcane Area and Productivity in Orissa

Year	Area (,000 Ha)	Production (,000 T)	Ton/Ha
1996-1997	23.52	1332.08	--
1997-1998	18.70	1144.72	--
1998-1999	22.33	1469.53	--
1999-2000	20.65	1196.45	57.93
2000-2001	16.78	963.92	57.44
2001-2002	10.99	648.01	58.96
2002-2003	14.18	753.19	53.12
2003-2004	15.00	858.00	57.20
2004-2005	14.00	926.00	66.14

Source: State Statistical Abstract, 2005, Economic Survey-2005-06

3.1.3 Fertilizer Consumptions

For the same quantity of yield different crops remove different quantities of nutrients (N, P, K, etc.) and our soils being poor in organic matter and nitrogen, respond linearly to N application and quadratically to P and sporadically to K and other nutrients. Consumption of fertilizer, which averaged about 35.51 kg. per hectare in 1998-99, has increased to about 41 kg. in 2001-02. Compared to other states consumption of fertilizer is very low in Orissa. In 2001-02 the average of fertilizer use per hectare in some other state are given in **Table-3.7**. (Govt. of Orissa, Economic Survey, 2003-04, Annex- 21.2).

TABLE 3.7
Fertilizer Use in Other States (2001- 02)

State	Fertilizer Use per Ha (Kg)
Orissa	41
Andhra Pradesh	143.46
Bihar	87.39
West Bengal	126.87
Karnataka	101.48
Punjab	173.38

District-wise average fertilizer consumption per hectare is given in Table-3.8

TABLE 3.8
District-wise Fertilizer Consumption during 2001-2002

District	Fertilizer Consumption (Kg/Ha)	Remarks
Northern Plateau		
Mayurbhanj	29	
Keonjhar	27	
Sundargarh	24	
Average	27	
Central Table Land		
Sambalpur	69	Fertilizer consumption per ha for Kharif and Rabi crop is respectively 41 kg and 39 kg
Bargarh	98	
Jharsuguda	82	
Deogarh	23	
Dhenkanal	21	
Angul	25	
Bolangir	23	
Sonepur	48	
Average	48.62	
Eastern Ghat Zone		
Koraput	21	Consumption of fertilizer is the least in Eastern Ghat Zone followed by Northern Plateau. Bhadrak and Bargarh due to high irrigation and dalua rice, have more fertilizer consumption.
Rayagada	20	
Nabarangpur	34	
Malkangiri	17	
Kandhamal	03	
Baudh	25	
Kalahandi	46	
Nuapada	17	
Average	25.9	
Coastal Areas		
Bhadrak	102	
Balasore	77	
Cuttack	58	
Kendrapara	31	
Jajpur	44	
Jagat Singhpur	34	
Ganjam	47	
Gajpati	24	
Puri	53	
Khurda	33	
Nayagarh	37	
Average	45	
State Average All District	40	

3.2 Irrigation and Environmental Issues

Potential irrigation claimed to have been created is much in excess of actual areas irrigated. The distribution of irrigation facilities is also not uniform in all the districts. The coastal districts have more irrigation facilities than the inland districts which are mostly rainfed. Out of total gross irrigated areas of 3.65 million ha, (2001-2002) 51.3% is in coastal districts 23.2 % in central table land, 23.2 % in eastern ghat zone and only 9.8% in northern plateau. Most of the old canal system areas are also in coastal districts.

Irrigation brings about many economic benefits to the area. It saves the crop from drought hazards, increases yield and ensures stability. It increases income and improves living standards. It has increased production in Orissa over time. Cropping intensity of 115% in 1950-51 has increased to 151% in 2001-2002. There is appreciable shift in agriculture over years. In 2001-2002 rice, wheat, maiza, ragi, arhar, black gram, other pulses, ground nut, til, mustard, potato and other vegetable area under irrigation were 1.817 MHa (1.545 MHa in Kharif and 0.272 MHa in Rabi). Percentage area under irrigation for different crops is given in **Table - 3.9**.

Irrigation alone has increased the yield of crops to the tune of Rs.250 crores annually.

TABLE: 3.9
Percentage Irrigated Area Under Different Crops (2000-2001)

CROP	AREA IRRIGATED (%)
Rice	36
What	100
Maize	11
Ragi	12
Total cereals	33
Mung	13
Biri	7
Total Pulscs	7
G.nut	35
Mustard	16
Oilseeds	14
Jute	69
Sugar cane	100

The backwardness of agriculture is clearly revealed when the gross cropped area is compared with net sown area of Orissa (expressed as cropping intensity). Due to lack of assured irrigation, farmers do not go

for double cropping. Poor as most of them are, their risk-bearing capacity is very low. Over the last fifty years several major, medium and minor irrigation projects have been completed and there are several ongoing projects. Wherever irrigation facilities exist, farmers are doing well and are able to earn more by increasing grossed cropped area as well as by cultivating cash and high valued crops.

Irrigation, however, is not an unmixed blessing. Irrational use of water without proper drainage creates problems of water logging. During rainy seasons, vast stretches of lowlands in the flat plains remain submerged for considerable periods because of lack of adequate drainage. Certain parts of the command areas are also inundated during peak periods of river floods and cyclonic storms occurring towards the later part of monsoon. Water logging has assumed a menacing problem in the Mahanadi delta of coastal Orissa with reportedly about a third of the command area suffering from varying degrees of poor drainage and consequent salination and alkalization.

While greater use of chemical fertilizer increases yield, it has serious effects on soil and future fertility of land. Though Orissa is one of the lowest chemical fertilizer consuming states of the country, its use in coastal plains for growing High Yielding Variety rice has created concern in terms of increased soil salinity. Leaching of nitrogenous and other fertilizers to ground water and run-offs to water bodies affect the aquatic eco-systems adversely. Increased use of toxic plant protection chemicals (pesticides and fungicides) may further compound the problem beyond control. Fortunately, due to lower use of chemical fertilizers and toxic pesticides the state has not faced such problems to any significant extent. Nevertheless, people should be made aware of the serious consequences of unscientific use of chemical fertilizer and pesticide encouraged to use more bio-fertilisers and bio-pesticides. Production and use of green manure, Azolla, Blue and Green Algae etc. are being promoted. The state is also encouraging the farmers to use “Dhanicha Seed” a kind of green manure and during 2002-03 have supplied 1174 quintals of such seed to farmers. Similarly under Integrated Pest Management (IPM) excessive use of hazardous pesticides is being discouraged and farmers are encouraged to use more of organic pest control substances.

3.2.1 Floral Diversity

Floral diversity is high in the state. The important local (desi) flowers are Mallee, Malati, Madhavi, Jai, Jui, Chamkpa (golden & white), Chhuriana, Kadamba, Sugandharaj, Marua, Daana, Gaisha, Hena, Kurubeli, Parijat, Nageswar, Rajanigandha, Mandar, Sebati, Tagar, Tarat,

Gangaseuli, Aparajita, Gendu, Nagaballi, Golap, Kaniar, Karabira, Kunda, Radhachuda and Krushnachula, Rangani, etc. The important European flowers are gladioli, aster, dianthus, carnation, Pitunia, dahlia, Cock's comb, holihoeks, flox, garbera, sun flowers, pansy, salvia, Zinia, flower of an hour, etc., and many of these flowers are also grown in Orissa now.

In Orissa annual business of flowers is around Rupees four crores. Gradually flower cultivation as a commercial enterprise is coming up. Unfortunately, no place in the state has been declared a centre of biodiversity in flowers.

3.3 Livestock

Over 80% of rural households in Orissa keep livestock of one species or another. Scientific breeding, balanced feeding, adequate health care, (breeding, feeding, weeding, heading), better marketing facilities for the products and improved management practices are important for livestock development. The object of livestock maintenance is to increase animal resources and to increase the availability of their products (milk, curd, ghee, cheese, paneer, meat, eggs, etc). In 9th and 10th plan sufficient attention is given for development of livestock in Orissa.

The livestock population in the state is about 23.46 million of which, cattle constitutes 58.9%, buffaloes 5.9%, Goats 25% Sheep 7.6% and Pigs 2.5% (*Table-3.10*).

TABLE: 3.10
Livestock Population (Lakhs) in Orissa

Census year	Cattle		Buffaloes	Goats	Sheep	Pigs	Total
	Total	Cross-breed					
1982	129.30	N.A.	13.33	49.31	19.90	4.10	215.94
1991	135.77	5.63	15.09	48.04	18.41	5.90	223.21
1995	147.66	7.44	16.52	54.12	18.65	5.72	242.67
2001	138.10	8.70	13.88	58.80	17.79	6.02	234.59

Source: Economic Survey 2003-2004, Govt. of Orissa

Over the years production of livestock and availability of products is increasing (*Table 3.11*)

TABLE: 3.11
Production of Milk Products, Meat, Eggs over the Years

Year	Production of Milk (000,t)	Availability of milk per head per day (g)	Meat production (C,000t)	Availability of meat per head (Kg/year)	Egg production million number	Availability per head per year (number)
1997-1998	671.83	52	37.12	0.966	729.99	19
1998-1999	733.00	57	38.12	1.080	762.79	22
1999-2000	847.78	65	36.67	1.029	648.31	18
2000-2001	875.00	67	38.38	1.067	730.10	20
2001-2002	929.03	70	42.64	1.176	858.02	29
2002-2003	894.00	67	44.72	1.224	1088.27	30

Orissa is lagging behind the national level with respect to production of milk and eggs and their availability.

There is good potentiality for sheep, goat, piggery development in the state. At present for their development and increased production six goat farms, four pig farms and two sheep farms are functioning in the state. Efforts are being made to introduce goat-semen technology to increase the weights of goats and to increase their production. It is proposed to increase the pig breeding programme.

3.3.1 Cattle and Buffalo Development

Total cattle and buffalo population is about, 15.20 million (64.8% of the total live stock) in the state. The number of female animals milched and dry cattle and buffalo are given in Table 3.12.

TABLE: 3.12
Cattle and Buffalos Population in Orissa (In Million)

Category	Total animals	Adult female animals		Milch animals	
		Total	Cross bred	Total	Cross bred
Cattle	13.81	4.062	0.362	1.939	22.4
Buffalos	1.39	0.385	0.016	0.206	0.0097
Total	15.20	4.447	0.378	2.145	23.34

Productivity of cattle in Orissa is very low. To upgrade the production potential of cattle and buffaloes, artificial insemination scheme through frozen semen technology for superior breeds and strengthening of state cattle breeding farms for breeding bulls have been taken up.

For collection of milk from the producers at reasonable rate and to make the pasteurized milk available to people the state cooperative milk

producers' federation (OMFED) is working for about 25 years. It is linked with the National Dairy Development Board (NDDB) and State Government. At present the OMFED is working in 7 districts of Orissa. Besides OMFED, there is Orissa Women's Dairy Project (OWDP) working in 18 districts to make the women of SC., ST. and BPL families to become self dependent.

To increase milk production and to generate self-employment an integrated dairy development project particularly for hilly and backward areas is necessary.

3.3.2 Fisheries

Orissa is one of the poorest fishery producing states of India (Table-3.13.A) in spite of its long coast line of 480 kilometres and continental self area of 15,000 sq. kms. Among the nine maritime states of the country, Orissa's place is sixth in terms of continental self area. Production of fish, both inland and marine, and crab has not undergone much of change in spite of their vast potential.

TABLE: 3.13.A
Fish Production by States

Sl. No.	States	(In '000 MT)				
		1995-96	1996-97	1997-98	1998-99	1999-2000 (P)
1.	Andhra Pradesh	355.96	359.36	372.86	410.82	547.06
2.	Gujrat	660.00	725.35	816.50	630.00	741.28
3.	Karnatak	304.87	324.43	285.13	255.61	292.30
4.	Kerala	582.14	631.03	583.86	649.22	649.40
5.	Maharashtra	464.00	590.00	580.00	520.38	533.29
6.	Orissa	258.04	276.96	309.51	284.23	261.24
7.	West Bengal	893.00	937.00	950.02	995.00	1045.70
India		4949.39	5348.24	5388.49	5262.25	5656.57

P: Provisional. Source: Hand Book on Fisheries Statistics, Government of India.

TABLE: 3.13.B
Production of Fish and Crab in Orissa

Sl. No.	Year	Inland Fish Production			Marine fish	Total	Crab Production	Per Capita Consumption of Fish (kg.)
		Fresh Water	Brackish Water	Total				
1.	1998-99	145.00	14.90	159.90	124.33	284.23	0.47	8.23
2.	1999-00	124.86	10.44	135.30	125.94	261.24	0.54	7.33
3.	2000-01	125.11	13.44	138.55	121.09	259.64	1.35	7.71
4.	2001-02	147.40	20.66	168.06	113.89	281.95	1.15	8.14
5.	2002-03 (P)	154.24 (4.64)	19.96 (-) 3.39	174.20 (3.65)	115.01 (0.98)	289.21 (2.57)	2.19 (90.43)	8.14

P: Provisional - Figures in brackets indicate % change over previous year.

Source: Directorate of Fisheries, Orissa, Cuttack. Orissa's position in fish production vis-a-vis other major states of India is given in the following table.

In pisciculture a major concern has been the large scale adoption of shrimp / prawn culture both in sea coast as well as in the largest brakish water lagoon of Asia - the Chilika Lake. Leasing of areas for shrimp culture has increased the economic activities of the area enormously leading to a significant change in the socio-economic status of those live in and around the lake. Large number of net enclosures otherwise known as Penculture or Shrimp Gheries have reduced the fish stock as in a Shrimp Gheri no other fish seedlings are allowed to grow. Such Gheries not only cause obstacles to free flow of water, particularly the tidal water from the sea, but also hinder migration of shrimp and fish juveniles. These also cause silting of the lake and the outlet to sea at much faster rate than what it would have been otherwise. Large-scale shrimp culture, construction of shrimp pond around the lake and in coastal areas, use of rich phosphorus and nitrogen feed has caused massive algal blooms and oxygen depletion in the lake. The water of the lake is continuously polluted by feed waste, organic waste and dissolved metabolites. Intensive shrimp ponds use saline water from 120 to 150 days and is periodically replaced. Long retention of saline water in ponds affects the sub-soil water and results in loss of land productivity.

Apart from the environmental and ecological effects, commercial exploitation of shrimp through modern enclosure technique creates a great divide between the poor traditional fishermen who for generations have depended on the lake for their livelihood and the modern profit-seeking entrepreneurs. Forcible encroachment of common property resources (other than the lease area), putting Gheries near the sea mouth by prawn mafias have seriously affected the livelihood of thousands of families, the expression of which at times have become explosive leading to blood-shed and deaths. Law courts including the highest form of judiciary have intervened and Commissions including the House Committee of the State Assembly have intervened to rationalise the whole process and resolve the conflict. Much, however, remains to be done to save the fauna and flora of this great lake and its surroundings.

It is needless to say that fisheries promise great employment/income and overall development potential which need to be exploited. Processing would give rise to further value addition as the product would have global market. Here too there is the great risk of environmental pollution and ecological imbalance that needs to be taken care of.

3.3.3 Poultry Development

Total poultry and duck population in the state is 18.44 million. The demand for eggs and meat is increasing. The state has nine poultry and duck breeding farms. During 2002-03 1088.27 million eggs with per capita

availability of 30 eggs were produced per annum. The state poultry producers' cooperative marketing federation (OPOLFED) is the apex organization for marketing poultry products of 71 poultry producers' cooperative societies affiliated to OPOLFED. It has two feed mixing plants, two hatcheries besides many privately organized poultry units, OPOLFED assists poultry producers cooperatives by providing day-old broiler chicks, pre-mixed poultry feed at subsidized rate, technical guidance and health care, training, medical care, technical knowhow to the poultry farmers and increasing awareness through workshops, symposia and exhibitions. OPOLFED is also implementing a women's poultry project under STEP (Support to training and employment programme for women). The objectives of OPOLFED and STEP are to uplift the socio-economic standard of rural women through poultry farming.

All the cattle and buffalo, goat, duck breeds are non-specific and no one has been declared a national breed. There is no centre of biodiversity for cattle, buffalo, goat, sheep, etc. in the state.

3.3.4 Feed and Fodder Development

Green fodder is essential for raising milk and egg production and for keeping the animals healthy. Farmers having milch cattle and buffaloes and poultry unit are being encouraged to take up fodder cultivation in their own lands. From the departmental seed and fodder farms fodder seeds at subsidized rates are being supplied too. The farmers are being trained for raising fodder in their lands.

3.4 Suggestion to Improvement

Irrigation has to be more productive and cropping intensity, particularly in rabi and summer to increase to 175-180% by choosing suitable non-rice crops. Rice dependent agriculture has to be entrepreneur oriented and commercialized. For this there is necessity to find out safe growing period and delineate areas suitable for non-rice crops like vegetables and tropical fruits like mango, banana & coconut etc. The eutopian ideas to be shun with. Agriculture is to be made a profitable and commercially viable venture through applications of modern farming technology and precision farming, encouragement of entrepreneurship, establishment of agro based industries, food processing industries. The per capita availability of food grains, eggs, milk and meat, should match to that at the national level. Production fish and fish products to go up. Intensive fishing operation in deep sea, training to fishermen & their social upliftment and security is to increase State's rich mineral resources and forests are to be harnessed by setting more processing and production plants instead of sending the raw materials outside. This will also

generate more employment avenues and reduce dependence on agriculture. For this growth and utilization of energy, (energy sector as a whole) need to be improved. Industrial facilities including power, energy, communication and transport by surface, air and sea in private sector is to increase. In the name of rapid industrial progress, the conservation and protection of environment should not be lost sight of the technology should be eco-friendly. These should be given priority. Environmental planning, joint forest management and involvement of people more in development work are necessary.

3.5 Conclusion

Orissa is an ancient land and the civilization is ancient. Due to geographical, historical and political reasons Orissa's economic conditions are poor and Orissa has remained a poor state in the country. Higher proportions of scheduled castes and scheduled tribes (38% of total population)(economically weaker) pull Orissa's economy down. Natural hazards like droughts, flood, cyclone, even all the three occurring in the same year are responsible for economic backwardness. Agriculture is mostly traditional. The rain fed agriculture (>60% of agricultural land) has kept the productivity of crops low. It is characterized by shifting cultivation under cultivation, Bagada chasa, there are not many entrepreneurs and industries. The bold peasantry, however, are the best in the country. Due to variation in physiograph, and climate vegetations varies from Xeric drought prone in the north - western districts to mangroves in saline belt of the coast and flood prone waterlogged conditions the deltas of the interwoven rivers including the mighty river Mahanadi. Proper scientific planning is required for sustainable agriculture development.

Orissa's agriculture is primarily subsistence agriculture and the land is devoted mostly to the production of foodgrains, particularly rice. It may be seen that the production of foodgrains is highly volatile with years where the production has been quite high. Timely well-spread and well-distributed monsoon sometimes have contributed to bumper foodgrain production. But such years are very few.

Unstable agriculture, particularly in the face of such high dependence on agriculture (food production in particular) is a serious situation calling for appropriate long-term investment strategy and intensive extension education impressing the farmers for adopting a different cropping pattern.

Agriculture which is the mainstay in Orissa's economy needs a total revamp through provision of extensive irrigation facilities, adoption of



commercial crops, vegetables and through support of extension and elaborate marketing mechanism. Here in this sector too there is great threat to environment and ecology. It is reported in a study¹ that out of the total cultivated area of 72,085 Sq. km. well protected irrigated area are only to the tune of 18,450 Sq. kms. Eroded land under agriculture is as high as 43,360 sq. kms. Water logged area and salt affected area are 995 and 2541 sq. kms respectively. This is rather a disappointing scenario of the agricultural sector. Cultivation of generic varieties, particularly spices like turmeric have great potential both in domestic and international markets.

¹. State of Orissa Environment, Council of Professional Social Workers, Bhubaneswar, 1994, pp4, Table - 3.

Appendix
Water requirement and irrigation requirement of different crops

CROPS	DURATIONS (IN DAYS)	SEASONS	WATER REQUIREMENT (IN DAYS)
Rice	90-150	Kharif/ Rabi/ Summer	70 - 120 37 - 46 90-130
Wheat	95-120	Rabi	30-40
Maize	95-120	Rabi	50-60
Ragi	85-130	Rabi	40-65
Jowar	110-125	Kharif	45-50
Bajra	115-120	Kharif	45-50
Green gram	65-75	-	15-25
Black gram	80-90	Kharif / Rabi	20-25
Horse gram	90	Kharif	15
Gram	100	Rabi	15-20
Red gram	160	Kharif	40
Peas	138	Rabi	15
Groundnut	110	Kharif	48
Groundnut	120	Rabi/ Summer	35-55
Mustard	100	Rabi	51
Castor	130	Rabi	51
Linseed	120-130	Rabi	35
Jute	120-130	Summer Kharif	35
Sugar beat	210	280	--
Sugar cane	300	170	--
Sunflower	90	42(K) 52 (R)	--
Cotton	120	62	--
Potato	75-110	Rabi	47-65
Tomato	100	Rabi	51
Lady's finger	90	Kharif	45
Chillies	120	Kharif	36
Onion (Multiplier)	105	Rabi	31
Onion (bulb) (Oli)	110	Rabi	70
Cabbage	69	Rabi	60
Saru	180-210	Kharif/Rabi/Summer	95-110

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