

Marine Fisheries Research and Management

Editors

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15 Marine fisheries of Orissa

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ABSTRACT

A brief account of marine fish landings in Orissa during 1985 to 1995 is given in this paper. Gearwise, groupwise and districtwise marine fish landings in this state was also discussed together with a critical analysis of marine fishery of the state during the last five decade.

Introduction

The state of Orissa accounts for 4.7% of the geographical area of India. Its 4 coastal districts viz. Balasore, Cuttack, Puri and Ganjam together have coastline of 480 km forming 5% of the coastal line of the country. Orissa's continental shelf upto 200 m depth covers 4.5% of the total area of the country's continental shelf. In spite of this the contribution of this state towards the marine fish production of the country was only 2.5%.

An appraisal of the marine fishery of Orissa during 1975--84 is given in CMFRI Special Publication No. 32. A brief investigation of the marine fish landings in Orissa during 1985-95 is given in this study. It is also attempted here to analyse data for the last five decades before making critical comments on the status of marine fisheries of Orissa.

Material and methods

Catch and effort data collected, following multistage random sampling method, by the data centre of Central Marine Fisheries Research Institute have been used for this study.

Marine fish landings

Marine fish landings in Orissa during the period 1985-95 showed a fluctuating trend with the peak in 1990 (64,736 t). Quarterwise analysis of marine fish landings for the above period showed that the maximum landing was during the fourth quarter followed by first quarter (Table 1). The least landing was during the second quarter concurrent with low fishing effort during this quarter (the monsoon season in the state).

Table No 1. Quarterwise and gearwise marine fish landings in Orissa during 1985-1995 (In tonnes)

year	Gear	Trawl Net			Gill Net			Other mech		Non-mech		Total
		Catch	Effort	CPU	Catch	Effort	CPU	Catch	Catch	Effort		
1985	1	11312	28965	390.5	44	1224	36	-	5559	211408	16915	
	2	100	588	170	116	1587	73	-	2343	541896	2559	
	3	1274	3922	324.8	448	5711	78	-	5249	140436	6971	
	4	14308	34608	413	1649	19553	84	-	4438	117238	20395	
Total		26994	68083	396	2257	2807	80	-	17589	1010978	46840	
		(58)			(5)							
1986	1	19016	27055	703	1391	7098	196	-	5725	159488	26132	
	2	54	655	82	56	731	77	-	3442	104606	3552	
	3	933	3793	246	1358	5810	234	-	6443	149743	8734	
	4	9879	25201	392	1407	9794	144	-	7214	197135	18500	
Total		29882	56704	527	4212	23433	180	-	22824	610972	56916	
		(53)			(7)							
1987	1	9191	28358	324	3578	36468	98	-	8212	193163	20981	
	2	46	608	76	164	1559	105	-	5486	142061	5696	
	3	3321	11227	296	626	12768	49	-	3021	117033	6968	
	4	13826	42823	323	1433	13290	108	-	9590	289926	24849	
Total		26384	83016	318	5801	64085	90	-	26309	742183	58494	
		(45)			(10)							
1988	1	5813	22992	253	652	5686	115	-	6273	184256	12738	
	2	191	1160	165	55	658	84	-	2023	100856	2269	
	3	4405	17296	255	2159	11420	189	-	2310	90361	8874	
	4	15259	40240	379	1164	10507	114	-	6006	173182	22429	
Total		25668	81688	314	4030	28271	142	-	16612	548655	46310	
		(55)			9							

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1989	1	4745	21807	218	1110	10247	108	-	6485	206433	12340
	2	457	1853	247	162	2303	70	-	2790	65893	3409
	3	1801	13783	131	1192	9502	125	-	6127	146749	9120
	4	11379	46253	246	751	3203	234	-	10035	221013	22165
	Total	18382	83696	220	3215	25255	127	-	25437	640088	47034
		(39)		(7)							
1990	1	14768	42509	347	3692	30340	122	-	7536	221536	25996
	2	890	4240	210	652	4013	162	7	3126	96511	4675
	3	998	7009	142	2468	22578	109	-	2979	88134	6445
	4	16775	44136	380	2962	26644	111	175	7708	181558	27620
	Total	33431	97894	342	9774	83575	117	182	21349	560739	64736
		(51)		(15)							
1991	1	6398	23217	276	2540	27567	92	114	6437	135623	15489
	2	346	2288	151	466	5686	82	92	1173	64554	2077
	3	1901	13201	144	2396	18204	132	221	2140	75368	6658
	4	11188	39340	284	4483	37065	121	100	4529	172774	20300
	Total	19833	78046	254	9885	88522	112	527	14279	448319	44524
		(45)		(22)							
1992	1	5655	22478	252	1977	21348	93	1045	3528	92110	12205
	2	1290	5043	256	531	8980	59	265	1008	47900	3094
	3	3052	11809	258	1329	14622	91	23	1180	72367	5584
	4	14164	46198	307	9317	70596	132	685	2573	111783	26739
	Total	24161	85528	282	13154	115546	114	2018	8289	324160	47622
		(51)		(28)							
1993	1	12108	43228	280	2434	30540	80	1364	4836	133003	20742
	2	1116	5734	195	380	5097	75	48	951	40438	2495
	3	1801	9500	190	1923	22031	87	113	2220	75378	6057
	4	17887	53224	336	10362	69382	149	347	4391	166483	32987
	Total	32913	111686	295	15099	127050	119	1872	12398	415302	62281
		(53)		(24)							
1994	1	7920	27992	283	1629	34134	48	532	3186	100275	13267
	2	255	1730	147	566	13700	41	217	539	36222	1577
	3	3049	13754	222	7942	67050	118	110	2240	59396	13341
	4	10696	38549	277	7075	99320	71	305	1484	42425	19560
	Total	21920	82025	267	17212	214204	80	1164	7449	238318	47745
		(46)		(36)							

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1995	1	6523	22603	289	1381	33393	41	771	2045	55844	10720
	2	2608	9858	265	633	16124	39	436	451	32740	4128
	3	1643	7977	206	3464	42358	82	122	941	38667	6170
	4	13735	35440	388	5411	82586	66	42	2902	97079	22090
Ttotal		24509	75878	323	10889	174461	62	1371	6339	224330	43108
		(57)			(25)						

On an average, 35, 158 tonnes of marine fish was landed by mechanized gears forming 68% of the total landings. There was a decreasing trend in the landings of mechanized gears during the period 1993-95. The contribution by non-mechanized gears has declined from 26309 t (1987) to 6339 t (1995).

Trawl net and gillnet were the major gears contributed towards the marine fish landings in Orissa. The contribution of trawl net towards the marine fish landings was more than 45%. The contribution of gillnetters to the total marine fish landings varies from 5% (1985) to 36% (1994). In 1989 the share of non-mechanized gears was more than that of the mechanized gears taken together (54%). Trawl and gillnet landings were more during the fourth quarter and minimum during the second quarter. The maximum landings by non-mechanized gears was observed invariably during the fourth quarter. The CPUE of trawlers vary from 220 kg in 1989 to 527 kg in 1986. In the nineties the CPUE varied from 254 kg in 1991 to 342 kg in 1990 whereas in gillnetters it varied from 62 kg (1995) to 119 kg (1993). The CPUE of gillnetters declined since 1993. The non-mechanized effort showed a declining trend over the years. The non-mechanized operation of 1010978 units in 1985 has declined substantially to 224330 units in 1995. Maximum catch by non-mechanized gears was observed in the fourth quarter. However, non-mechanized fishing activity was observed throughout the year.

In the total marine fish landings the pelagic groups comprising of fishes such as oil sardine, lesser sardines, *chirocentrus*, *hilsa* shad, other shads, *stolephorus*, *thryssa*, *setipinna*, *coilia*, other clupeids, bombayduck, halfbeaks, fullbeaks, flyingfish, ribbonfish, carangids, mackerel, seerfish, tunas, barracudas and mullets constituted 36% of total catch.

The demersal group of fishes form 64% in total landing and the component groups are elasmobrachs, eels, catfishes, lizardfishes, red mullets, polynemus, sciaenids, silverbellies, *Lactarius*, pomfrets, soles, prawns, lobsters and cephalopods.

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Groupwise marine fish landing in Orissa during 1985-95 is given below

Year.	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
group\ /											
Pelagic	15490	22894	22087	12344	17043	21697	16080	16469	17736	15780	15310
Demersal	31350	34024	36407	33966	29991	43039	28444	31153	44545	31965	27798
Total	46840	56918	58494	46310	47034	64736	44524	47622	62281	47745	43108

On an average more than 64% of the annual marine fish landings in Orissa were contributed by demersal group of fishes. Most of the gears operated in this state were meant mainly for catching demersal fishes. As such the demersal group of fishes were dominated the landings here. Therefore, it is proposed to introduce some gears for catching the pelagic group of fishes, without jeopardising the sustainability of their stocks.

The trends in production of important groups

Croakers form the most important fish in terms of quantity landed. The annual catch of croakers in Orissa on an average was 15,000 tonnes with a maximum of 19555 tones in 1990. The major share of landing of coakers was by mechanized trawl nets often forming more than 35% of the total landing by the gear. A considerable quantity of this group was landed by mechanized gillnetters and other non-mechanized gear also.

Catfish is another important resource of Orissa coast although it showed signs of decline in many southern states. It was landed by gillnetters, trawlers and other non-mechanized gears. More than 13% of the gillnet catch was constituted by catfishes. On an average 4667 tonnes of catfishes were caught in this state with the maximum contribution of 700 tonnes in 1993.

Pomfrets form yet another important fishery in Orisa. Average annual landings of pomfret was 4300 tonnes. It was mainly landed by gillnetters. In Orissa Chinese pomfret form a part of pomfret fishery

Average annual landing of penaeid prawns in Orissa was 2821 tonnes. About 10% of the trawl landing was constituted by prawns.

Sharks, hilsa shad, seerfishes, ribbonfishes, *Stolephorus* and other perches were also landed in appreciable quantities in Orissa state.

Districtwise marine fish landings in Orissa

The southern districts of Orissa, Cuttack and Balasore contributed more than 68% of the total landings whereas Puri and Ganjam landed only 32%. A maximum landings of 25202 tonnes was observed during 1990 in Cuttack district while it was 28899 tonnes (1993) in Balasore.

Districtwise, quarterwise marine fish landings in Orissa during 1985-95 is given in Table 2.

Table No. 2. Districtwise and quarterwise marine fish marine fish landings in Orissa during 1985-1995 (in tonnes)

Year	Districts= > Quarter	Balasore	Cuttack	Puri	Ganjam	Total
1985	1	8013	3699	3522	1681	16915
	2	209	351	1033	966	2559
	3	592	2241	2609	1529	6971
	4	11277	4849	2235	2034	20395
	Total	20091	11140	9399	6210	46840
1986	1	16718	5142	1592	2680	26132
	2	199	32	1631	1690	3552
	3	2089	4535	1248	862	8734
	4	6333	7643	2808	1716	18500
	Total	25339	17352	7279	6948	56918
1987	1	8038	5103	5295	2545	20981
	2	110	697	2625	2264	5696
	3	3029	2091	635	1213	6968
	4	9984	8941	2260	3664	24849
	Total	21161	16832	10815	9686	58494

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1988	1	2052	6111	3426	1149	12738
	2	96	694	525	954	2269
	3	5109	1870	1526	369	8874
	4	11720	6214	2952	1543	22429
	Total	18977	14889	8429	4015	46310
1989	1	1865	2956	6125	1394	12340
	2	215	1815	1038	341	3409
	3	3303	2493	2578	746	9120
	4	7043	10695	3069	1358	22165
	Total	12426	17959	12810	3839	47034
1990	1	8064	10131	5153	2648	25996
	2	156	2037	1548	934	4675
	3	1771	2465	1661	548	6445
	4	9778	10570	5627	1645	27620
	Total	19769	25203	13989	5775	64736
1991	1	3021	5246	4729	2493	15489
	2	167	678	614	618	2077
	3	3379	1622	1200	457	6658
	4	8608	7664	3011	1017	20300
	Total	15175	15210	9554	4585	44524
1992	1	1479	6912	2160	1654	12205
	2	102	1720	557	715	3094
	3	1897	2768	206	713	5584
	4	9479	12540	3762	958	26739
	Total	12957	23940	6685	4040	47622
1993	1	7870	7615	3862	1395	20742
	2	94	1460	151	790	2495
	3	2587	1593	987	890	6057
	4	18348	11196	2188	1255	32987
	Total	28899	21864	7188	4330	62281

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1994	1	5618	3639	2277	1733	13267
	2	64	775	448	290	1577
	3	9806	2816	698	21	13341
	4	11154	5092	3311	3	19560
Total		26642	12322	6734	2047	47745
1995	1	2555	5319	2259	587	10720
	2	307	2978	553	290	4128
	3	2718	2725	291	436	6170
	4	11343	7864	1678	1205	22090
Total		16923	18886	4781	2518	43108

Balasore

Gearwise marine fish landings in Balasore district during 1985-95 is given in Table 3 alongwith effort and CPUE. Trawl catches vary from 7100 tonnes (1989) to 20700 tonnes (1986). The maximum CPUE of this gear was noted during 1995 (302 Kg). In gillnets peak landing of 9347 tonnes was observed in 1994 and the CUPE was maximum (185 kg) in the same year. The quarterwise analysis of the data showed that the maximum landing was in the fourth quarter in all the years except 1986.

Table No. 3. Gearwise marine fish landings in Balasore district 1985-1995 (in tonnes).

Year Gear	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Trawl net											
Catch	16673	20699	16269	15111	7100	14668	9491	10113	19627	14420	11438
Effort	40594	32851	59348	55451	55549	54943	48530	52528	74015	58897	37884
CPU	410	630	274	270	128	267	196	193	265	245	302
Gillnet											
Catch	2216	1946	2690	3119	936	4100	3789	2167	7106	9347	4070
Effort	28004	15894	40607	23073	12404	43741	30751	26074	42471	50642	29352
CPU	79	122	66	135	75	94	123	83	167	185	139
Non Mech											
Catch	1202	2694	2202	747	4390	1001	1895	677	2166	2875	1415
Efort	25222	66422	70469	30722	62081	36848	58376	34304	49249	74633	33004

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CPU	48	40	31	24	71	27	32	20	4	39	43
Total Catch	20091	25339	21161	18977	12426	19769	15175	12957	28899	26642	16923

The contribution of croakers in trawl landings vary from 50% in 1986 to 83% in 1988. Catfish and polrets are major fishery in this district, landed mostly by gillnetters. The contribution of the latter in gillnet landings vary from 36% to 49%. The pelagic and demersal landings in Balasore district (1985-95) are given below.

Group	Pelagic	Demersal
1985	3745	16346
1986	10546	14793
1987	2688	18473
1988	1480	17497
1989	2117	10309
1990	3091	16678
1991	3209	11966
1992	1934	11023
1993	5364	23535
1994	5876	20766
1995	3090	13833

It can be seen that the demersal group of fishes were more in Balasore district than the pelagic group.

Cuttack

Cuttack district accounts for more than 26% of the marine fish landings in Orissa. Maximum landings of 25203 tonnes was observed during 1990. The quarterwise analysis of data shows that maximum landing was noticed during the fourth quarter in all the years and the least in second quarter. The major share of marine fish landings in Cuttack district was by mechanized trawlers and gillnetters. The CPUE for trawlers varied from 322 kg in 1994 to 445 kg in 1990, whereas in gillnetters it varied between 60 kg (1995) and 302 kg (1986) (Table 4) There is an

increasing trend in the effort of gillnetters over the years.

Table 4. Gearwise marine fish landings in CUTTACK district during 1985-95 (in tonnes)

Gear \ year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Trawl-net											
Catch	8731	7752	9891	7909	9848	17051	9266	14048	13285	7403	12782
Effort	23406	20239	23080	20886	23612	38288	26363	33000	37671	23009	35979
CPU	373	383	428	378	417	445	351	426	353	322	355
Gillnet											
Catch	0	2252	2066	2497	1694	3829	5268	8730	7159	4284	5299
Effort	0	7469	13413	31353	8260	20263	48468	69397	64930	58161	88537
CPU	0	302	154	80	205	189	109	126	111	74	60
Other mechanized											
Catch	0	0	0	0	0	0	118	1054	1420	226	696
Effort	0	0	0	0	0	0	5388	6374	9748	2133	6837
CPU	0	0	0	0	0	0	22	165	146	106	102
Non-mechanized											
Catch	2409	7348	4875	4483	6417	4323	558	108	0	409	109
Effort	28375	79494	51777	38099	54658	47756	11138	2341	0	9947	3058
CPU	85	92	94	118	117	91	50	46	0	41	36
Total catch	11140	17352	16832	14889	17959	25203	15210	23940	21864	12322	18886

Pelagic and demersal fish landings in Cuttack district during 1985-95 are given below.

Group	Pelagic	Demersal
year		
1985	2426	8714
1986	3333	14019
1987	4005	12827
1988	4292	10597

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1989	4748	13211
1990	6073	19130
1991	4754	10456
1992	7355	16585
1993	5313	16551
1994	4731	7591
1995	7431	11455

In Cuttack the demersal fishes formed the predominant group. Croakers form the most important fishery in Cuttack, chiefly by trawlers. On an average more than 20% of the total landings in this district was contributed by this group of fishes. Catfish is yet another major group of fish landed by gillnetters in Cuttack.

Puri

Puri district accounts for more than 11% of the marine fish landings from Orissa. Maximum landing was observed during 1990 (13989 t). The quarterwise analysis of the data shows that the maximum landing was during the first quarter in most of the years followed by fourth quarter. Major share of the landings in Puri district was by non-mechanized gears. The CPUE of different gears are shown in Table 5.

Table 5 Gearwise marine fish landings in Puri district during 1985-95

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Gear											
Trawlnet											
Catch	1590	1431	224	2610	1292	1712	1071	-	-	97	289
Effort	4083	3614	288	5003	3905	4663	2901	-	-	119	2015
CPU	390	400	380	520	330	367	369	-	-	815	143
Gillnet											
Catch	-	-	131	479	561	1842	828	2257	834	3581	1520
Effort	-	-	989	2057	4479	19503	9303	20075	19649	105401	56512

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CPU	-	-	130	230	130	94	89	112	42	34	27
Other Mech											
Catch	-	-	-	-	-	182	381	959	452	938	675
Effort	-	-	-	-	-	689	1074	5891	7393	15112	11211
CPU	-	-	-	-	-	264	355	163	61	62	60
Non-mech.											
Catch	7809	5848	10460	5340	10957	10253	7274	3469	5902	2118	2297
Effort	216419	197793	247550	175469	211242	213627	179036	76372	171363	63612	72775
CPU	40	30	40	30	50	48	41	45	34	33	32
Total catch	9399	7279	10815	8429	12810	13989	9554	6685	7188	6734	4781

Note: Catch in tonnes; in unit operation; CPU in Kg.

The pelagic and demersal fish landings 1985-95 in Puri district are given below.

Group	Pelagic	Demersal
Year		
1985	4698	4701
1986	3784	3495
1987	7308	3507
1988	3228	5201
1989	6883	5927
1990	7671	6318
1991	4674	4880
1992	3659	3026
1993	3454	3734
1994	3573	3161
1995	2836	1945

Catfishes, Croakers, ribbonfishes and seerfishes were the most important fishes landed in Puri Coast. On an average 19% of the trawl landing was constituted by croakers and 11% by penaeid prawns.

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Ganjam

During the period 1990-95 an average of 7.5% of the marine fish landings of Orissa was from Ganjam district. A maximum of 5775 tonnes was noticed during 1990. Major share of landing occurs in the first and fourth quarters. The marine fish landing was mainly by non-mechanised gears (Table 6).

Table 6. Gearwise marine fish landings in Ganjam district during 1985-1995

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Gear											
Trawl net											
Catch	-	-	-	38	-	-	5	-	-	-	-
Effort	-	-	-	348	-	-	252	-	-	-	-
CPU	-	-	-	109	-	-	20	-	-	-	-
.....	-	-	-	-	-	-	-	-	-	-	-
Gill net											
Catch	41	14	58	17	24	3	-	-	-	-	-
Effort	71	70	266	50	112	68	-	-	-	-	-
CPU	577	200	218	340	214	44	-	-	-	-	-
.....	-	-	-	-	-	-	-	-	-	-	-
Other mech											
Catch	-	-	-	-	-	-	28	5	-	-	-
Effort	-	-	-	-	-	-	140	167	-	-	-
CPU	-	-	-	-	-	-	200	30	-	-	-
Non-mech											
Catch	6169	6934	9628	3960	3815	5772	4552	4035	4330	2047	2518
Effort	740962	267263	381197	276103	312737	289508	199769	211143	194690	90126	115493
CPU	8	26	25	14	12	20	23	19	22	23	22
Total catch	6210	6948	9686	4015	3839	5775	4585	4040	4330	2047	2518

Note: Catch in tonnes, Effort in unit operation CPU in kg.

Pelagic and demersal fish landings in Ganjam district during 1985-95 are given below.

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Group-	Pelagic	Demersal
1985	4656	1554
1986	5320	1628
1987	8091	1595
1988	3346	669
1989	3354	485
1990	5084	691
1991	3516	1069
1992	3537	503
1993	3660	670
1994	1611	436
1995	1953	565

It can be seen that the landings of pelagic fishes were more in this district. lesser sardines form the most important group of fish in non-mechanized gears (55% of marine fish landings by the gears).

Conclusion

It was observed that there was an increasing trend in the marine fish landings in Orissa during 1985 to 1987. The maximum landings was in 1995. The fourth quarter was the most productive period for marine fish landings in the state. About 68% of the marine fish landed in this state was by machanized gears. There was a decreasing trend in the landings of mechanized gears during the period 1993-95. The trawlnet contributed more towards the marine fish landings with the peak in the fourth quarter. The non-mechanized efforts showed a declining trend over the years. The demersal fishes were more in Orissa than the pelagic group. Croakers are the most important fish in terms of quantity. The maximum marine fish landing was in Cuttack followed by Balasore and the least was recorded in Ganjam district.