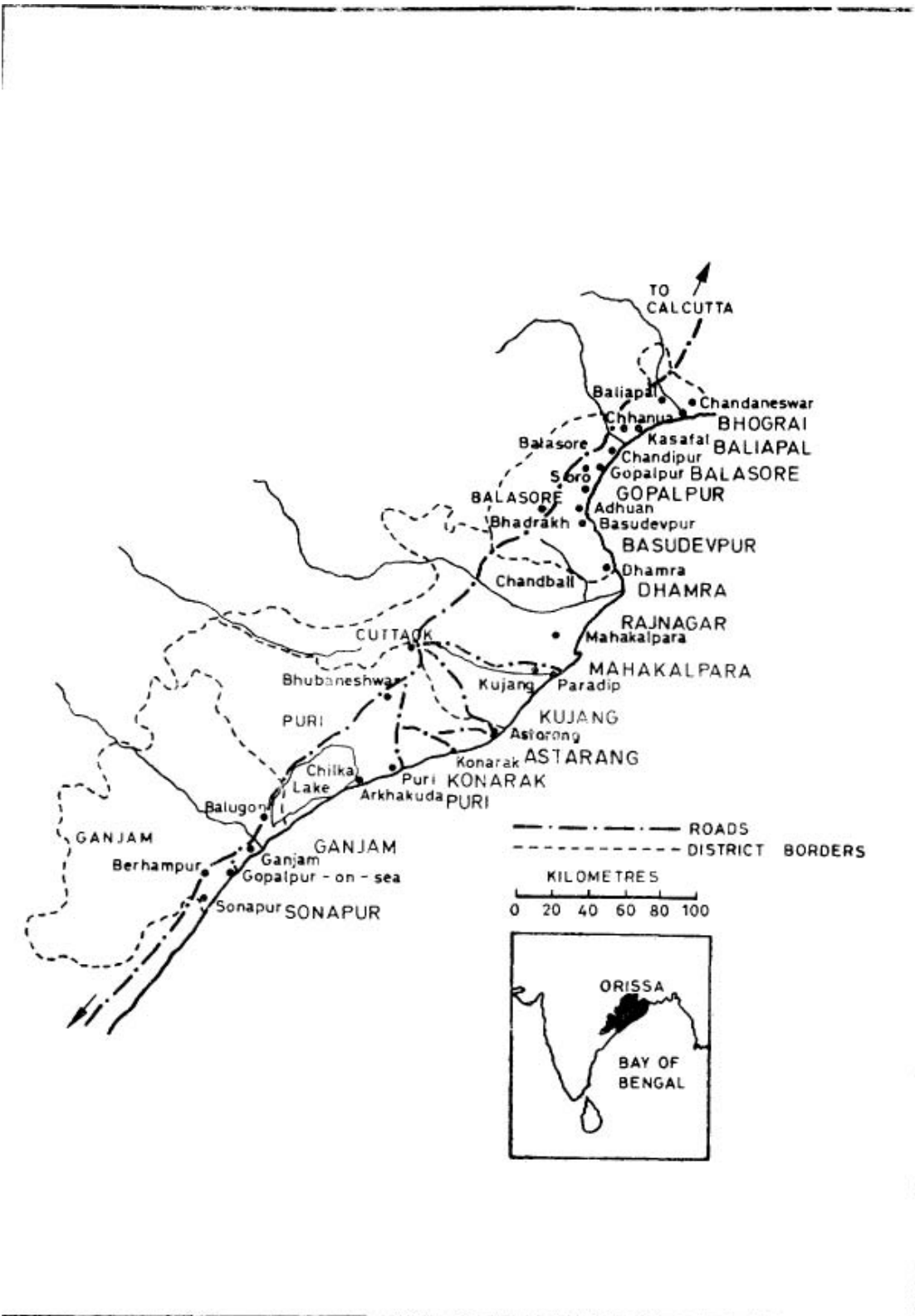


Appendix 1
 LOCATION OF MARINE FISHERIES EXTENSION CENTRES



Appendix 1 (contd.)**List of Marine Extension Centres and Extension Officers**

<i>Marine Extension Centre</i>	<i>Extension Officer/Dep. Superintendent of Fisheries</i>
Marine Extension Unit Rajnagar 754 225 Cuttack district	Mr. D. K. Panda
Marine Extension Centre At/PO Kujang 754 141 Cuttack district	Mr. A. Dash
Marine Extension Centre Mahakalpara Cuttack district	Mr. H. Naik
Marine Extension Centre At/PO Gopalpur-on-Sea Ganjam district	Mr. G. S. P. Mishra
Marine Extension Centre At/PO Sonapur Ganjam district	Mr. S. C. Sahoo
Marine Extension Centre At/PO Ganjam 761 026 Ganjam district	Mr. B. S. Durgaya
Marine Extension Unit At Junei Bazar PO Junei (Konarak) Pun district	Mr. P. C. Padhy
Marine Extension Centre Kumuti Sahi At/PO Pun Pun district	Mr. F. K. Sahoo
Marine Extension Unit At/PO Astrang Pun district	Mr. F. B. Roy
Marine Extension Centre At/PO Chandaneswar Balasore district	Mr. R. K. Das
Marine Extension Centre At/PO Gopalpur Balasore district	Mr. S. R. Das
Marine Extension Centre Dharma Fishing Harbour PO Narasinghpur Hat Balasore district	Mr. P. K. Mohanty

Marine Extension Centre
Chanua
Via Haldipada
Balasore district

Mr. A. N. Sethy

Marine Extension Centre
At/PO Baliapal
Balasore district

Mr. Md. Zafar Akhtar

Marine Extension Centre
At/PD Adhuan
Balasore district

Mr. R. P. Nanda

Appendix 2
LIST OF FISHING VILLAGES

District	Jurisdiction	Block	Village
Ganjam	Sonapun	Chikiti	1 Sonapur
			2 Kotturu
			3 Dayanithipentha
			4 Eksinghi
			5 Patisonapur
		6 Ramayyapatna	
		7 Anantharaipur	
		Rangaikunda	1 Golabandha
			2 Nuagolabandha
			3 Markondi
	Chatrapur		1 Gopalpur
			1 Raikotturu
		2 Sonanjupalli	
		3 Badarjupalli	
		4 Bander	
	Ganjam	Ganjam	5 Sonanolia
			6 Badanolia
			7 Kotutru
			Knishnaprasad
2 Digipur			
3 Boxipalli			
4 New Boxipalli			
Pun		Purl	1 Gokurkuda
			2 Kantigada
	3 Kalarabadi		
	4 Prayagi		
	1 Sonapatna		
Cuttack	Konanak Astarang	Municipal area Pun town	2 Ramalanka
			3 Arakhakuda
			1 Chakrathirtha Road
		Brahmagiri	2 Guudawadasahian
			3 Punibalinoliasahi
			4 Penthakota
	Kujang	Nuabazar Kunja	1 Moto
			2 Sciandi
			3 Khirisahi
			1 Nuliasahi
			1 Sahan
			2 Anakana
			3 Jalaghai
4 Gundalaba			
5 Balbadizapur			
6 Sadhikeehar			
7 Ainsinia			
8 Kota			
1 Nuabazaar			
1 Sandhakud			

District	Jurisdiction	Block	Village
Ba lasore	Mahakalpara	Mahakalpara	1 Jamboo 2 Kharnasi 3 Koalpatia
	Rajnagar	Rajnagar	1 Keredagada 2 Talchua
	Dhamra	Chandbali	1 Rabindranagar 2 Gobindapur 3 Kuannikanthi 4 Bidiyutprasia 5 Pradyutnagar 6 Sabidni sarai 7 Paiksahi 8 Biyayapatana 9 Karanpalli 10 Kuamana 11 Purnaprasad 12 Taladia 13 Karanga 14 Amarnagar 15 Narendrapur 16 Karanjamal 17 Guansul 18 Genapur 19 Begunia 20 Orasahi 21 Sandhagada 22 Bajarapur 23 Charadia 24 Baliapal 25 Neduali 26 Dhankuta 27 Baincha 28 Dosinga 29 Gajagini 30 Singiti 31 Subhadia
		Tibidi	1 Hanipur 2 Chanibruti 3 Nandakandip 4 Bansia 5 Madhapur 6 Bahalpur 7 Kankamara 8 Sankarpur 9 Birabarpur
	Basudevpur	Basudevpur	1 Podhuan 2 Kumarpur 3 Sarvknishnapur 4 Kismat Knishnapur 5 Radhanathpun 6 Jaganathpur 7 Eram 8 Balinagan 9 Suan

District	Jurisdiction	Block	Village
			10 Adhuan
			11 Chudamani
			12 Balibindha
			13 Sudarsanpur
			14 Uhad
	Gopalpur	Bahanaga	1 Bishnapur
			2 Madnapur
		Sono	1 Tentai
			2 Solagaon
			3 Mulkaida
			4 Pakhar
			5 Balang
			6 Purushothampur
		Remuna	1 Sanatalapada
			2 Badatalpada
		Bahanga	1 Banipada
			2 Arunabad
			3 Rupkhanda
			4 Osanga
			5 Balrampur
			6 Khenanga
			7 Avana
			8 Barajdeuli
			9 Dehendrapur
			10 Attarpur
	11 Maharudrapur		
	12 Nuapur		
	13 Janhipur		
	14 Kochikakoil		
	15 Kanthigadia		
	16 Arada		
	17 Villa		
	18 Dwanika		
	Balasore	Sadar	1 Kasafal
			2 Juan
			3 Alumeda
			4 Kalbur
			5 Bagda
			6 Solpata
			7 Koelisahi
			8 Silda
			9 Dublagadi
			10 Sartha
			11 Panchpada
			12 Sandhanadi
			13 Badadhanadi
	14 Bahabalpur		
	15 Chanua		
	16 Sarthabendha		
	17 Nankundi		
	18 Kayakadala		
	19 Parkhi		
	20 Gopinathpur		
	21 Demuria		

District	Jurisdiction	Block	Village
			22 Belda
			23 Nischimpur
			24 Pakharabad
			25 Ragunathpur
			26 Chaksindhia
			27 Tulsipada
			28 Balaramgudi
			29 Snikono
			30 Ransahi
			31 Bankeswar
			32 Gudupahi
			33 Hidigan
			34 Kuanrpur
			35 Chachina
			36 Bhimpur
			37 Jaydebkasba
			38 Jaydebkasbapahi
			39 Nidhipada
			40 Bardhaupur
			41 Sasanga
			42 Saipur
			43 Inchirdiha
			44 Padmapur
		Remuna	1 Inchudi
			2 Khadu
			3 Kantarda
			4 Balichounria
			5 Tundura
	Baliapal	Baliapal	1 Kenduadite
			2 Palpade
			3 Dentuda
			4 Jugudhha
			5 Dagara
			6 Madhupuna
			7 Sandi
			8 Badkhanpur
			9 Nayabali
			10 Kalanuan
			11 Panchuruan
			12 Chaumukh
			13 Bishnapur
			14 Kankadasal
			15 Narayanpun
			16 Balang
			17 Balital
			18 Jamatikula
			19 Badatapada
			20 Jambiral
			21 Dumachak
			22 Paljamjuda
			23 Balagadia
			24 Sunderuali
			25 Katramahal
			26 Sankanpur

District	Jurisdiction	Block	Village
	Bhograi	Basta Bhograi	1 Churmara 1 Uluda 2 Choudhury 3 Kanadipimpal 4 Fulbani 5 Pathareswar 6 Nafrai 7 Thakunbhoury 8 Gitkala 9 Bichitnapur 10 Gambhania 11 Ranasinghpur 12 Sahabanipur 13 Knishnanagar 14 Bindhapur-padmapur 15 Udayapur 16 Sunadhar Basan 17 Kintania 18 Ranakotha 19 Nanayan Mohanty Padia 20 Bhognai 21 Patharaghala 22 Baunsakhana 23 Khalabadia 24 Kulha 25 Pantei
	Total no. of villages in Ganjam district	29	
	Total no. of villages in Pun district	16	
	Total no. of villages in Cuttack district	7	
	Total no. of villages in Balasone district	184	
	Total no. of villages	236	

Appendix 3
CENSUS SCHEDULE

A. Household Schedule

1. Name of head of family
2. Total number of family members, sex, age, occupational/educational status
3. Number and type of craft owned by households, average age
4. Number and type of gear owned, in pieces or operational units, average age of gear
5. Significance of fishing as occupation:
Major time, minor time, single old people (retired, not living with sons or daughters family)

B. Village Schedule

1. Communication links
2. Schooling
3. Health
4. Water
5. Electricity
6. **Housing**

Appendix 4
VILLAGEWISE COMPILATION SHEET

A. PRESENTATION SHEET FOR TECHNO-DEMOGRAPHIC DATA AT VILLAGE LEVEL

Village location

Name of village

Block

District:

1. (a) Total number of households:
- (b) Average size of households:
- (c) Number of major time fisherfolk households:
- (d) Number of minor time fisherfolk households:
- (e) Number of single-old-people households:
- (f) Number of active fishermen:

- | 2. (a) Type of craft | Number | (b) Type of gear | Number |
|----------------------|--------|------------------|--------|
| 1. | | 1. | |
| 2. | | 2. | |
| 3. | | 3. | |
| 4. | | 4. | |
| | | 5. | |
| | | 6. | |
| | | 7. | |

2. (c) Average age of craft:
 - Type 1:
 - Type 2:
 - Type 3:
 - Type 4:

2. (d) Average age of gear:
 - Type 1:
 - Type 2:
 - Type 3:
 - Type 4:
 - Type 5:
 - Type 6:
 - Type 7:

2. (e) % of households with no boat:
- (f) % of households with one boat:
- (g) % of households with two and more boats:
- (h) % of households with no nets:
- (i) % of households with one net:
- (j) % of households with two nets:
- (k) % of households with three and more nets:

3. – Communication links:
 - Schooling:
 - Health:
 - Water:
 - Electricity:
 - Housing:

Appendix 5
CATCH STATISTICS FROM 1976 TO 1981

Sl. No.	Name of Fish	1976	1977	1978	1979	1980	1981
1.	Elasmobranchs	2,974	1,658	3,386	4,331	3,772	3,210
2.	Eels	1	—	3	2	—	24
3.	Catfishes	1,988	1,035	1,794	1,308	2,198	6,084
4.	Chirocentrus	517	752	1,073	1,644	1,460	1,281
5.	(a) Oil sardine	—	—	—	—	—	—
	(b) Lesser sardines	1,657	1,227	2,514	2,687	1,891	4,535
	(c) <i>H/Isa ilisha</i>	5,477	2,948	7,737	9,969	5,091	2,085
	(d) Other <i>H/Isa</i>	129	492	848	359	46	353
	(e) <i>Anchoviella</i>	339	486	1,169	505	270	86
	(f) <i>Thrissocles</i>	106	197	175	295	333	322
	(g) Other clupeoids	772	778	1,330	1,431	2,576	2,093
6.	(a) <i>Harpodon nehereus</i>	87	86	314	449	378	73
	(b) Saunida Er Saurus	1	5	5	50	189	108
7.	Hemirhamphus & Belone	1	—	13	28	46	2
8.	Flying fish	—	—	4	4	17	—
9.	Perches	31	55	173	151	341	122
10.	Red mullets	1	1	2	2	296	104
11.	Polynemids	244	406	1,287	1,491	1,126	566
12.	Sciaenids	333	312	5,198	5,351	2,864	2,133
13.	Ribbon fish	130	174	336	616	928	995
14.	(a) Caranx	147	103	68	326	607	165
	(b) Choninemus	237	386	815	716	567	196
	(c) Trachynotus	—	—	—	—	—	—
	(d) Other carangids	—	—	—	—	—	150
	(e) Coryphaena	2	1	—	1	—	—
	(f) Elacate	—	9	3	1	—	—
15.	(a) Leiognathus	378	233	256	1,108	704	—
	(b) Gazza	1	—	—	—	3	—
16.	L, jctcrius	1	18	12	5	65	49
17.	Pomfnets	10,699	1,018	5,714	10,109	9,072	3,685
18.	Mackerel	425	195	196	306	265	823
19.	Seer fish	940	672	1,059	2,444	1,542	2,540
20.	Tunnies	84	37	609	31	34	250
21.	Sphyraena	1	3	4	5	8	9
22.	<i>Mug/I</i>	5	—	3	22	1	—
23.	Bregmaceros	—	—	—	—	—	—
24.	Soles	6	72	103	125	69	47
25.	(a) Peaeid prawns	688	802	2,599	2,983	1,074	1,328
	(b) Non-penaeid prawns	100	17	12	34	30	55
	(c) Lobsters	—	—	—	—	—	3
	(d) Other crustaceans	23	6	4	6	359	292
26.	Cephalopods	27	—	4	14	98	57
27.	Miscellaneous	1,271	888	848	2,899	1,055	1,097
	Total	29,823	15,072	39,670	51,808	39,375	35,655

(source CMFRI)

Appendix 6 CATEGORIES, CLASSIFICATIONS

The following classifications/definitions have been applied while collecting and compiling the census data.

- Fisherfolk household* : A household where at least one member is engaged in sea fishing, at least part time.
- Active fishermen'* : Those household members who sail out into the sea to catch fish.
- Marine fishing villages* : A village where at least three marine fisherfolk households live.
- Major time fishing households* : A household, the working members of which spend the major part of their time in fishing or a household where the major part of the income is earned by fishing.
- Minor time fishing households* : A household, the working members of which spend the minor part of their time in fishing or a household where the minor part of the income is earned by fishing.
- Fishing craft* The craft categories have been chosen in accordance with P. Mohapatna's paper *Traditional Marine Fishing Craft and Gear of Orissa*. However, some modifications and one addition have been made. The Botali boat has been described as Patia boat in Mohapatra's paper. Motorized gillnetters which are not mentioned there are operated in Cuttack and Balasore district. They are 32' to 42' long with a horse power of 26 and more. River boats which are not suitable for use in the sea such as Huh and Kathua (small dinghy) have not been included. Large and small kattumarams have been listed separately only in the case of Ganjam district, due to a misunderstanding in the collection of data.
- Fishing gear* The gear categories have been again chosen in accordance with P. Mohapatra's paper *Traditional Marine Fishing Craft and Gear of Orissa*. The following additions have been made. Set bagnets which are actually operated in river mouths and not in the sea, have been included because of their relative importance for marine resource exploitation and their potential use in the sea. Under tidal wall nets, a smaller type of Malo, locally called Bedha, has been included. Furthermore, it was found that the dimensions of tidal wall nets vary a lot between different areas.

It has to be mentioned here as a major shortcoming of the census that those household members (mainly women) who are engaged in processing and marketing of fish as well as in net making and repairing have not been covered.

Under 'large mesh driftnets' a 10 cm mesh size gillnet locally called Padasihkiwala and operated by Telugu speaking fishermen in Cuttack district has been included.

Under 'very large mesh driftnets' a 15-20 cm mesh size Bhekti net, which again was not mentioned in P. Mohapatra's paper, has also been included.

The unit in which the number of fishing gear is calculated has been determined as the average operational amount of gear. As described in P. Mohapatra's paper, an operational unit or fleet of nets comprises usually several net pieces which are joined together. Only in the case of small-mesh gillnets is a single net piece equal to a minimum operational unit. In other cases, for example, in the case of encircling gillnets such as the Jangal Jab, the number of net pieces that is required to form one operational unit can be as much as 175.

The following operational units have been assumed for gillnets. In Ganjam district 1.5 pieces in the case of small mesh gillnets and 65 pieces in the case of medium mesh pieces. In Pun district the figures are 1.5 and 13 respectively. In Cuttack the same number of units as in Pun have been assumed. Furthermore, for large mesh and very large mesh nets, 1000 feet has been assumed as the average operational unit. For all gillnets in Balasore, 2000 feet has been assumed as average operational unit. Tidal wall nets, set bagnets, beach and shone seines, boat seines, encircling gillnets and lift nets have been counted as operational units as per the description given in Mohapatra's paper, even though considerable regional variations have been observed.

The following gear types have been excluded because they are meant exclusively for river and estuary fishing:

encircling gillnets	: Masani
wall/stake nets	: Kuntala, Nodipi, Ghananodipi
small mesh gillnets	: Tarania, Doundi, Jaleri, Badapar jal, Sanparjal
liftnets	: Chanra
set bagnets	: Been, Binti
handseines/dragnets	: Kathi, Tiki, Bhidi, Ghajal.

In order to classify gear observed during the census, to compare dimensions of pieces and operational units and for the purpose of standardization, length and depth of net pieces-given in number of meshes, have been converted into metres.

Furthermore, the total length of twine used in a panel of gillnets has been calculated for comparison.

The following formulas have been used:

(a) Parameters	
ms (m)	-- mesh size, in metres
E	-- hanging ratio
l (m)	-- length of panel (in metres)
d (m)	-- depth of panel (in metres)
l_t	-- length of twine, in metres
nm_h	-- number of meshes, horizontally
nm_v	-- number of meshes, vertically

(b) length of net

$$l \text{ (m)} = ms \text{ (m)} \times nm_h \times E$$

(c) depth of net

$$d \text{ (m)} = ms \text{ (m)} \times nm_v \times \sqrt{1 - E^2}$$

(d) length of twine in panel

$$l_t = \frac{2 \times l \text{ (m)} \times d \text{ (m)}}{ms \text{ (m)} \times E \times \sqrt{1 - E^2}} + 5\% - 15\% \text{ for knots}$$

Infrastructural facilities

Communication

Type of communication : motorable road (tar road), jeepable road, footpath, river, etc.; distance in km

Period of use : Rainy seasons, dry seasons

Availability of public transport : bus, train

Schooling

Type of school and distance : lower primary, upper primary, secondary, high school and college.

Health

Type of facility and distance : dispensary, clinic, primary health centre, hospital.

Water

Type of facility : piped water, tube well, open well, river, pond.

Purpose : Washing, cleaning, drinking

Seasonal water shortage, salinity, contamination.

Electricity

Availability, distance, purpose of utilization

Housing

Size of compound, house, type of floor, type of wall and roof, ownership of land.

Appendix 7 DATA COMPILATION AND AGGREGATION

Villagewise compilation:

The villagewise compilation of data has been done according to a format which is shown in Appendix 4. Besides totals and averages (arithmetic means), percentages have been calculated and in the case of infrastructure, qualitative descriptions have been prepared.

Formulas used:

Arithmetic mean

$$x = \frac{\sum_{i=1}^n x_i}{n}$$

where n is the total number of observations (for example: number of fisherfolk households) and x is the respective variable or single observation (for example: size of household).

Percentage/ratio

$$F = \frac{a}{n} \times 100$$

where n is the total number of observations (for example: all fisherfolk households) and a is the subgroup (for example, those who do not own a net).

Total

$$T = \sum_{i=1}^n x_i$$

where x is a single observation.

Data aggregation at jurisdiction level:

For aggregation of craft and gear by jurisdiction, the villagewise figures have been totalled.

In the case of demographic data, the following indicators have been compiled in addition to totalling the villagewise figures and aggregating the percentages in case of distribution of assets.

- Averages/arithmetic means: Average number of fisherfolk households per village, average size of household in jurisdiction, average number of major time fisherfolk households per village, average number of minor time fisherfolk households per village, and average number of single old people households in the village.
- Standard deviation: for all arithmetic means.
- Average and deviation mentioned above have been compiled to compare 'average villages' of different jurisdictions as well as the intervillage variations.

The following formulas have been used:

Aggregation of percentages:

$$P_A = \sum_{i=1}^n \frac{n_i}{n} x_i$$

where P_A is the aggregated percentage at jurisdiction level, x_i is the percentage in village i , n_i the number of fisherfolk households in village i , and n the total number of fisherfolk households in jurisdiction.

Aggregated arithmetic means (weighted arithmetic mean)

$$\bar{x}_A = \sum_{i=1}^n \frac{n_i}{n} \bar{x}_i$$

where \bar{x}_A is arithmetic mean (average) at jurisdiction level (aggregated arithmetic mean), \bar{x}_i is the arithmetic mean in village i (for example, the average size of households), n_i the number of fisherfolk households in village i , and n the total number of fisherfolk households in the jurisdiction.

Standard deviation

$$SD = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

Where SD is the standard deviation, \bar{x} is the arithmetic mean at jurisdiction level (for example =average number of major time fishing households), x_i is the single observation on village level (for example: number of major time fisherfolk households in village i) and n is the total number of villages in the jurisdiction.

Data aggregation at district level:

As district level totals, averages and percentages have been further aggregated using the formulas described above. The standard variation has not been aggregated further because it was felt that the district level is too abstract for meaningful interpretation of inter-village variations. Furthermore interjurisdiction and intra-jurisdiction variation might have a greater impact than interdistrict variation, a possibility which can be examined only with the help of variance analysis which again is considered too sophisticated to be operated by a marine extension service.

Appendix 8
LANDING SITES, NUMBER AND TYPES OF MECHANIZED BOATS

No.	Name/location of landing site	Number and type of vessels	Ownership	Availability of shore facilities such as jetty, slipway
1.	Talasari, Kirtania Balasore district	61 trawlers 2 gillnetters	Cooperative: 23 trawlers Er 2 gillnetters Private: 38 trawlers	No
2.	Chudamani, Balasone district	42 gillnetters	All private	No
3.	Kasafal, Balasore district	100 gillnetters	All private	No
4.	Bidaipur, Balasore district	2 gillnetters	All private	No
5.	Chandinipal, Balasone district	7 gillnetters	All private	No
6.	Chandipur, Balasore district	125 gillnetters 40 trawlers	Fish. Dept.: 5 gillnetters Coop.: 40 gillnetters Private: 80 gillnetters 40 trawlers	Jetty
7.	Dhamara, Balasore district	19 trawlers	Coop.: 16 Fisheries Dept.: 3	Jetty Shipway
8.	Talchua, Cuttack district	18 trawlers	All private	No
9.	Paradeep, Cuttack district	185 trawlers	Private: 181 Fish. Dept.: 4	No
10.	Astarang, Pun district	70 trawlers	Private: 50 Cooperative: 20	No
11.	Rushikuliya, Ganjam district	2 trawlers	Fisheries Dept.	No