

Bay of Bengal Programme

Development of Small-Scale Fisheries

TRADITIONAL MARINE FISHING CRAFT
AND GEAR OF ORISSA.

BOBP/WP/24



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TRADITIONAL MARINE FISHING CRAFT
AND GEAR OF ORISSA

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In August and September 1980, a survey was carried out in the Balasore, Cuttack, Puri and Ganjam districts of Orissa, to obtain information on the type of traditional fishing craft and gear, their methods of operation, cost, and possibilities for improvement and introduction of new prototypes and innovations. All the important villages engaged in marine fisheries were visited.

This working paper presents the results of the survey. A brief summary of the types of fishing craft and gear is followed by detailed data on materials and construction of craft and gear. The document may serve as a guide for specific extension work among small-scale fishermen and also provide a basis for experiments to improve fishing craft and gear.

The survey and this paper are an activity of the Project for Small-Scale Fisheries Development of the Bay of Bengal Programme. The project is funded by the Swedish International Development Authority (SIDA) and executed by the Food and Agriculture Organization of the United Nations (FAO). The main goal of the project is to develop, demonstrate and promote technologies and methodologies to improve the conditions of small-scale fisherfolk in five countries that border the Bay of Bengal — Bangladesh, India, Malaysia, Sri Lanka and Thailand.

The project and the FAO express their gratitude to the Orissa Government for making available the services of Mr. P. Mohapatra, Additional Director of Fisheries, to carry out the survey.

The views expressed in the paper are those of the author and do not necessarily represent the official views of the Government of Orissa or the FAO.

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1. PRINCIPAL TYPES OF FISHING CRAFT AND GEAR

Fishing along the 480 km coastline of Orissa is mostly small-scale.

Marine fish production has shown a steady increase, mainly due to the introduction of mechanized boats, yet the traditional marine fishing craft and gear are still responsible for the major part of the present annual catch.

The continental shelf off the southern coastline of Orissa is narrow; there are broad sandy beaches and open surf-beaten shores. The northern coastline is much shallower—with a broad shelf, a gradual slope and a greater tidal range.

The rivers along the northern coastline covering Babasore and North Cuttack districts provide sufficient shelter and deep enough water to allow the operation of plank-built displacement boats. The most common craft north of Hansua in Cuttack district are the Danga and the Dhingy—the former clinker-built, the latter carvel-built. Other types include the Sabti, Chhoat, Patia and Sabado.

The Patia, the Danga and the Dhingy are made of sabwood (*Shorea robusta*), have a nearly vertical stem and stern and a full midship section. Patia and Danga are clinker-built while Dhingy is carvel-built. The names Patia and Danga are sometimes used synonymously. Their lengths range from 6 m to 9 m. They operate mainly from August—September to March—April, though occasional trips are made in Balasore district even in June and July if the weather is favourable. The main fishing gears used are polyamide or polyethylene pelagic driftnets of 95 mm to 120 mm stretched mesh, 600 to 1000 m in length.

The Salti boats are also made of sabwood and have more rounded bilges with extended and raised ends, the length being 7 m to 10 m. These boats are less seaworthy, being used only in calm weather. Driftnets similar to those above and shore seines are mostly used.

The Chhoat, a carvel-built boat with raised stem and slightly over-hanging stern, has an average length of 10.4 m. This boat is also constructed of salwood. It is used mostly in north Babasore. It is used for fishing with driftnets and shore seines as well as encircling nets.

On the coastline further south i.e. South Cuttack, Puri and Ganjam districts, log rafts or kattumarams operate from the beach. They are locally known as Teppa. Other boats in the south are the bar boat and the Nava.

The length of the kattumarams ranges from 4.2 m to 8.5 m. They are made of three or four, sometimes even five bogs. The 2-section four-logged Teppas are boat kattumarams and have to be handled by three to four men, whereas the smaller ones are operated by only two. The solid bogs are the only source of buoyancy; wood of low density, such as *Albizia stipulata* and *Brithryna* sp. (the latter locally known as Padhua), is preferred. These crafts are the only solution so far developed for operating off the surf-beaten sandy beaches; they are used almost throughout the year, except during the rough season when the surf is not negotiable during the period April to August.

The main fishing gears are nylon bottom driftnets of 55 mm to 62 mm stretched mesh, measuring up to 400 m. Cotton boat seines and smaller meshed cotton driftnets of 20 to 40 mm stretched mesh for sardines and anchovies are also used.

The bar boat, locally known as Padhua, is made from mango planks (*Mangifera indica*) without frames, lengths ranging from 7 to 9 m. This craft is mainly used for beach seining.

Navas are plank-built boats bought from Andhra Pradesh and operated during the fair season for fishing mainly with driftnets up to 1200 m long.

All the craft, with the exception of the Nava, are built locally with simple tools. They have been developed over the centuries to suit local requirements and conditions.

The predominant fishing method throughout the coastline is drift gillnetting, represented on the northern coastline for example by the driftnet for shad (Phasi Jab and Ilishi Jab), the small-meshed driftnet (Bhasani Jab), the gillnet for prawn and small fish (Behendi Jab), the large-meshed shallow water gillnet (Nakuda Jab), the inshore seine-cum-gillnet (Khia Bada Jab) and the inshore encircling gillnet (Gheri Jab). Other nets in the north are shore seine (Sarini Jab), encircling net (Jangal Jab), and tidal wallnet (Mabo Jab).

In the south, there are such gillnets as the high-depth bottom-set gillnet for shrimps (Jagawala), bottom-set gillnets for shrimps (Kilumala or Silkiwala) and driftnets for sardines, anchovy and white bait (Katlala). Other fishing gears in the south are the boat seine (brrgali), handlines (Burdu and Kata), small bonglines (Suti), and beach seines (Bada Jab); two-man hand seines (Khadi Jab) are occasionally used by coastal fishermen.

All the traditional craft are non-motorized and their range of operation is limited to a coastal belt up to 15 to 20 fathoms. Some crafts using gillnets in the north and Navas using gillnets in the south usually operate overnight, leaving for the fishing grounds in the evening and returning the next morning. The others undertake day trips only, leaving early in the morning and banding the same afternoon.

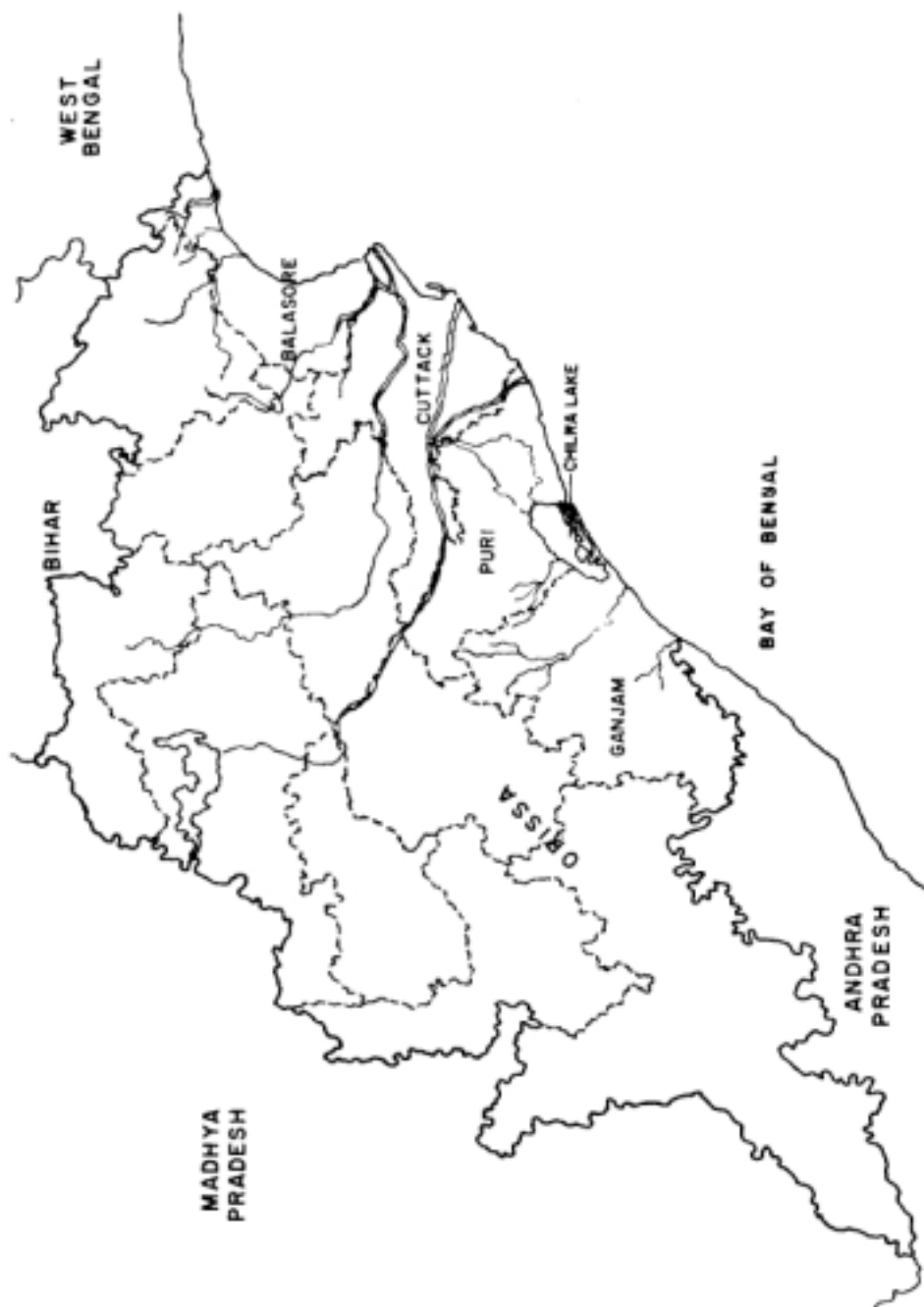
Technical improvement of the existing craft and gear can help improve the earnings and working conditions of the fishermen. Documenting details of craft and gear is essential to identify specific deficiencies and problems so that recommendations can be made regarding possible improvements and innovations.

This working paper summarizes the results of a study of the different types of craft and gear in use in the four coastal districts of Orissa.

The fishing gears are grouped firstly according to their technical name and secondly according to their local name.

While classifying the fishing gears, it was found that the same technical type of gear (for example a bottom driftnet), with only slight modifications in depth and mesh size, is called by different Oriya or Telugu names in different regions. Further, it was found that even the gears bearing the same Oriya or Telugu name differ from village to village as far as details of design, material and accessories are concerned. *Therefore the gears described in this paper should not be regarded as standard designs but just as examples.*

COASTAL DISTRICTS OF ORISSA



2. THE FISHING CRAFT

2.1 Displacement crafts of north Orissa

2.1.1 Chhoat

Wood	<i>Shorea robusta</i> , sal
LOA range	10 m to 11 m
Typical dimensions	10.4 m x 2.41 m x 1.51 m
Construction	: Carvel planked, transverse framed
Planking	: 35 mm
Fender	: 30 mm x 50 mm deep
Frames	: Transverse 50x80 mm
Floor timbers	55 mm x 80 mm deep, each 50 mm in front of frames. Stepping block between 8th and 9th planks.
Thwarts	5, 160 mm x 50 mm thick. Ends slotted through planking.
Decks	: Fore deck 800 mm from stem, deck planking 25 mm with 110 mm x 40 mm deck beams. Aft deck 2.26 m from stern deck, planking similar to fore deck. Loose planks fitted to provide a temporary platform.
Sheer and bilge clamps	Sheer clamp 20 mm x 85 mm. Bilge stringer 20 mm x 50 mm, 500 mm below sheer clamp.
Mooring bits and thole pins	: 4th frame extended 360 mm above sheer as mooring bit, 760 mm x 50 mm thick thole pins 190 mm above sheer, two on either side.
Rowing oars	: Blade 900 mm x 140mm x 25 mm; bamboo shaft 3.66 m x 50 mm dia.
Steering oars	: Blade 2.3 m x 150 mm x 50 mm. Shaft 4 m x 180 m.
Mast	: 8.6 m x 200 m dia, wood.
Preservation	: Coal tar
Sail	: Rectangular, 6.4 m x 6 m, cotton.
Fishing area	: North Balasore, up to 25 km offshore.
Fishing season	September-October to March-April
Cost	: Rs. 9,000
Annual maintenance	: Rs. 900
Life	: 15 years

2.1.6 Sabado

Wood	<i>Shorea robusta</i> , sal
LOA range	9.75 m to 13.5 m
Typical dimensions	13.41 m x 2.41 m x 0.97 m.
Construction	Carvel, more sheer aft
Planking	67 mm, keel 200 mm wide, 67 mm thick, 75 mm in middle.
Fender and sheer clamp	2.25 mm x 75 mm.
Frames	62 mm x 62 mm
Floor timbers	62 mm x 75 mm thick, 100 mm at centre
Thwarts	15, 130—150 mmx30 mm thick.
Thole pins and mooring	200 mm above sheer, 4 on either side, abaft pair for mooring.
Rowing oars	6, one piece wood, 3.20 m x 70 mm thick x 200 mm width but 75 mm of upper end, shaft 120 mm dia bamboo, extends 1 m beyond blade.
Steering oar	One piece wood, 3.50 m x 75 mm thick and 250 mm wide.
Mast	5.75 m x 160 mm dia. bamboo.
Preservation	Coal tar
Sail	4.5 m head x 4.3 m foot x 5.5 m buff x 3 m leech, sides reinforced with 6 mm PA rope; corners with extra 8 mm PA rope.
Fishing area	South Babasore and north Cuttack within 10 km and 25 m depth.
Fishing season	October to February
Cost	Rs. 9,000
Annual maintenance	Rs. 900
Life	15 years

2.1.7 Flat—bottom Danga

Wood	Shorea robusta, sal
LOA range	10m to 11m.
Typical dimensions	10.67 m x 1.05m x 1.07m.
Construction	Clinker.
Planking	: 25 mm, keel plank 100 mm thick.
Fender	: 20mmx20mm
Thwarts	: 8, 200 mm x 40—50 mm thick, below gunwale ends slotted through planking. Each thwart supported by two vertical pieces above floor timber and another transverse piece. Also two additional transverse pieces below thwart level.
Gunwale	: 125 mm wide x 60 mm deep, forms platform at aft.
Thole pins	: 4 to 6 places on both sides.
Rowing oar	: Blade 1.60 m x 130 mm x 50 mm thick in middle and 12 mm at sides. Shaft 1.70 m x 68 mm dia.
Steering oar	: Blade 1.30 m x 350 mm x 30 mm thick. Shaft 3.20 m x 350 mm dia.
Mast	5mx200mflldia.
Sail	: Thick cloth, rectangular 4 mx3 m.
Fishing area	: North Cuttack, inshore area within 5 km.
Fishing season	: November to March
Cost	: Rs. 8,000
Annual maintenance	Rs. 800
Life	: 10 years
Remarks	Primarily estuarine, adopted for sea by a few fishermen.

2.1.8 South Balasore Danga

Wood	: Shorea robusta, sal
LOA range	: 9m 10m
Typical dimensions	: 9.45 m x 2.03 m x 0.75 m
Construction	: Carvel
Planking	33 mm, keel 75 mm x 75 mm
Frames	: 40—45 mm
Floor timbers	40 mm x 100 mm deep, 50 mm behind frames.
Wash strake	: 200 mm above planking.
Sail	: Triangular
Mast	5.19 mx90 mm dia. bamboo.
Fishing area	: South Balasore, within 10 km offshore.
Fishing season	: October to February
Cost	: Rs. 7,000
Annual maintenance	: Rs. 700
Life	: 15 years

2.1.9 North Cuttack Dhingy

Wood	<i>Shorea robusta</i> , sal
LOA range	6m to 7m.
Typical dimensions	6.85 m x 1.54 m x 0.48 m.
Construction	Carved
Planking	25 mm, keel: 90 mm width.
Fender	25 mm x 25 mm.
Frames	50 mm x 37 mm deep.
Floor timbers	50 mm x 37 mm deep, thicker in middle.
Thwarts	9, 300—400 mm x 30 mm, hole for mast in No. 4.
Decks	Fore deck, aft deck.
Wash strake	150 mm above sheer
Bilge clamp	18 mm x 75 mm deep.
Sail	Triangular, 7 m x 5 m x 5 m.
Fishing area	North Cuttack, within 2 km from estuary.
Fishing season	November to March
Cost	Rs. 3,000
Annual maintenance	Rs. 300
Life	8 years

2.2 Log rafts, bar boats and navas of south Orissa

2.2.1 2-section boat kattumaram or teppa (four bogs)

Wood material	: <i>Abyssia stipulata</i>
LOA range	: 6 m to 8.5 m.
Dimensions	: 8.3 m x 1.5 m x 0.54 m.
Construction	: Two halves. Each half comprising of two bogs with a wash strake. Both halves are lashed together with a crossbeam for additional stiffness.
Rowing oars & Steering oar	: 2.5 m x 90 mm x 50 mm, 30 mm at sides.
Sail	: Lateen about 8 m ²
Fishing area	: Southern coastline, from Paradeep southwards, up to 15 km offshore.
Fishing season	: Almost all the year round, except during bad weather.
Cost	: Rs. 5,000
Annual maintenance	: Rs. 300
Life	: 4 to 5 years.

2.2.2 3-bog kattumaram

Wood material	<i>Erythrina indica</i> (alt <i>A/byzzia stipulata</i>)
LOA range	4.2m to 5m.
Dimensions	4.2 m x 0.76 m x 0.42 m.
Construction	Three bogs lashed and pegged. Outer 250 mm wide, centre bog 200 mm wide but deeper.
Rowing oars & steering oar	1.7 m x 70 mm (40 mm at the edges) x 25 mm thick.
Mast	4 m x 30 mm dia. bamboo.
Sail	Lateen rig
Fishing area	Up to 8 km offshore in the southern coastline.
Fishing season	Almost throughout the year, whenever surf is negotiable.
Cost	Rs. 3,000
Annual maintenance	Rs. 200
Life	3 years

2.2.3 4-bog kattumaram

Wood	<i>Erythrina indica</i> (alt <i>A/byzzia stipu/ata</i>)
LOA range	4.5 m to 5.5 m
Dimensions	4.8 m x 0.75 m x 0.40 m.
Construction	Four bogs lashed and pegged. Inner logs 140 mm wide, outer logs 230 mm wide.
Rowing oars & steering oar	1.8 m x 70 mm (35 mm at the edges) x 25 mm thick.
Mast	4.5 m x 35 mm dia. bamboo.
Sail	Lateen rig
Fishing area	Up to 8 km offshore in the southern coastline.
Fishing season	Almost throughout the year, whenever surf is negotiable.
Cost	Rs. 1,200
Life	3 years

2.2.4 Bar boat/Padhva

Wood material	<i>Mangifera indica</i>
LOA range	7m to 8.3m
Dimensions	7.42 m x 2.2 m x 1.14 m.
Construction	Planks stitched to each other by coir ropes with straw caulking. No frames
Planking	25 mm
Thwarts	6, 1 m to 2.2 m, the 4th largest.

2.1.2 Patia

Wood	<i>Shorea robusta</i> , sal
LOA range	8.5 m to 10.5 m
Typical dimensions	8.95 m x 1.81 m x 1.32 m
Construction	Clinker, chine type, stem and stern nearly vertical.
Frames	3, 85 mm x 120 mm
Thwarts	9, 70 mm to 115 mm wide x 25 mm to 50 mm thick, excepting ninth, 270 mm wide.
Thole pins and mooring bits	Thole pins 4 on each side, 80 mm x 80 mm protruding 250 mm above sheer. One mooring bit 100 mm x 80 mm and 200 mm above sheer.
Rowing oars	Blade 800 mm x 130 mm x 25 mm, convex on one side, bamboo shaft 3.60 m x 50 mm dia.
Steering oar	Blade 2.20 m x 150 mm x 50 mm. Shaft 3.80 m x 175 mm dia.
Mast	8 m x 200 mm dia.
Preservation	Coal tar
Sail	Rectangular, 6.4 m x 6 m, cotton.
Fishing area	North Balasore up to 20 km.
Fishing season	September/October to March/April, also July and August when weather permits.
Cost	Rs. 8,000
Annual maintenance	Rs. 800
Life	14 years.
Ownership and financing	Individual, self-finance, sometimes from money lenders.

2.1.3 Dhingy

Wood	<i>Shorea robusta</i> , sal
LOA range	6m to 7m
Typical dimensions	6.5 m x 1.63 m x 0.97 m
Construction	Carvel
Planking	17 mm, 9 each side of keel, keel 80 mm wide, 80 mm deep
Gunwale	110 mm x 30 mm
Sheer clamp	120 mm x 20 mm
Frames	60 mm x 60 to 80 mm
Floor timbers	65 mm x 70 mm
Thwarts	5 nos 100 mm to 175 mm wide x 25 mm to 35 mm thick. Excepting 3rd, 230 mm wide with mast hole.
Thole pins	2 on either side 150 mm above sheer.
Rowing oars	Blade 1.01 m x 200 mm x 10 mm. Shaft to 4.5 m x 160 mm dia.
Steering oar	Blade 780 mm x 210 mm x 10 mm. Shaft 4.5 m x 45 mm dia.
Mast	4.57 m x 50 mm dia.
Preservation	Coal tar
Sail	Rectangular 6.4 m x 5.9 m, cotton, bamboo sprit 6.4 m x 30 mm dia.
Fishing area	Balasore, up to 10 km.
Fishing season	September/October to February/March.
Cost	Rs. 4,000
Annual maintenance	Rs. 400
Life	12 years
Ownership and financing	Individual and self-finance, also from banks with government subsidy.

2.1.4 Danga

Wood	<i>Shorea robusta</i> , sal
LOA range	7.5m to 9m
Typical dimensions	8.3 m x 1.91 m x 1.26 m.
Construction	Clinker, chine type, near vertical stem and stern, maximum beam forward of midship.
Planking	25 mm. Plank overlaps by 60—70 mm. Keel 150 mm wide, 25 mm deep and 45 mm in middle.
Fender	25 mm x 25 mm.
Frames	80 mm x 135 mm
Thwarts	8, fixed below sheer. 116 mm—140 mm wide x 30 mm deep. First and eighth are smaller and larger respectively. Thwarts protrude outside planking.
Thole pins and mooring	4 pins on either side 200 mm above sheer and extending up to one plank below chine, 1 mooring bit 250 mm from sheer on port side.
Rowing oars	Blade 750 mm x 120 mm x 25 mm convex on one side, Shaft 2.75 m x 50 mm dia.
Steering oar	Blade 750 mm x 150 mm x 37 mm. Shaft 2.75 m x 160 mm dia.
Mast	7 m x 200 mm dia. bamboo.
Preservation	Coal tar
Sail	Rectangular cloth 5.5 m x 5 m, sides reinforced with 4 to 6 mm dia. PA rope.
Fishing areas	Balasore, up to 20 km offshore.
Fishing season	September to March/April, also July and August when weather permits.
Cost	Rs. 7,000
Annual maintenance	Rs. 700
Life	15 years

2.1.5 Salti

Wood	: <i>Shorea robusta</i> , sal
LOA range	7 m to 10 m
Typical dimensions	: 9.78 m x 2.08 m x 1 m.
Construction	Carvel
Planking	25 mm, keel 100 mm
Wash strake	wide, 25 mm thick, 60 mm in middle. : 150 mm above gunwale.
Fender and sheer clamp	: 15 mm x 50mm on both sides of wash strake and planking.
Frames	50 mm x 50 mm.
Floor timbers	: 19, 50 mm x 65 mm thick, 80 mm at centre.
Thwarts	: 9, 130—140 mm x 25 mm thick, excepting no. 4.
Decks	170 mmx60 mm with mast hole. Fore deck 1.07 m from stem with transverse support. Aft deck 1.95 m from stern with similar support.
Thole pins and mooring	: 200 mm above shear, 4 on either side, abaft pair for mooring.
Rowing oars	: 6, one piece wood 2.96 m x 68 mm thick x 175 mm width, but 75 mm at upper end, shaft 100 mm dia extends 1 m beyond blade.
Steering oar	: One piece wood, 3 m long x 75 mm thick x 225 mm wide
Mast	: 5.19 m length x 90 mm dia. bamboo.
Preservation	Coat tar
Sail	: 4.1 m head x 4 m foot x 5.09 m luff x 2.8 m leech. Sides reinforced with 6 mm PA rope; corners with extra 8 mm PP rope.
Fishing area	: Balasore and north Cuttack up to 10 km.
Fishing season	: October to February.
Cost	: Rs. 5,000—Rs. 8,000
Annual maintenance	Rs. 500—Rs. 800
Life	: 15 years

Deck

Rowing oars

Steering oar

Mast

Preservation

Sail

Variation

Fishing area

Fishing season

Cost

Annual maintenance

Life

2.2.5 Nava

Wood

LOA range

Typical dimensions

Construction

Planking

Frames

Clamp

Thwart

Decks

Rowing oars

Steering oar

Mast

Preservation

Sail

Fishing area

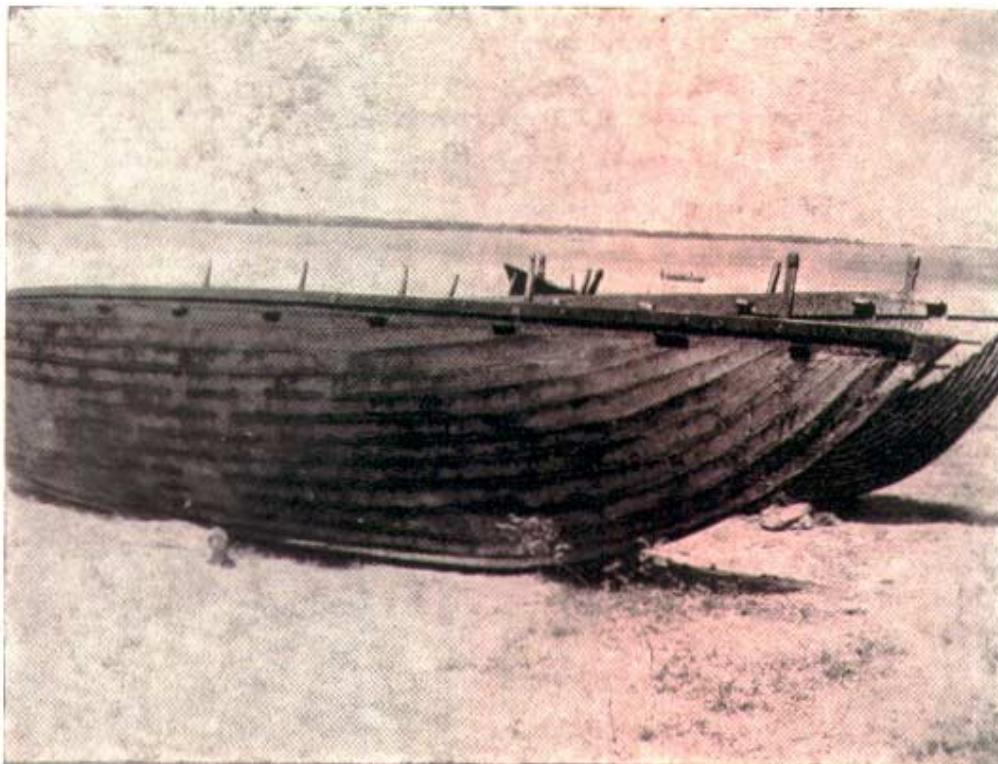
Fishing season

Cost

Annual maintenance

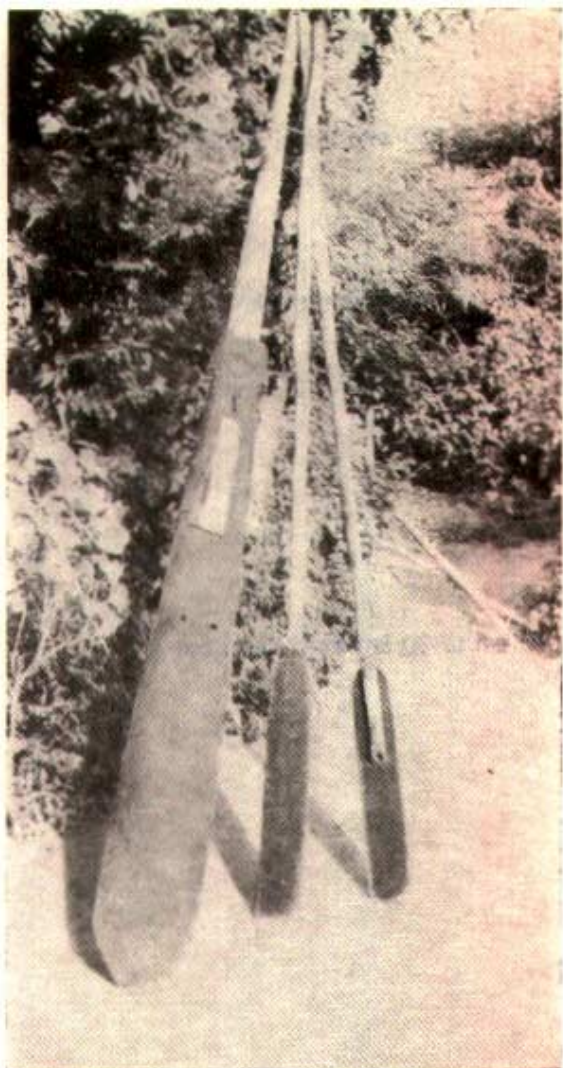
Life

ORISSA'S FISHING CRAFT IN PICTURES

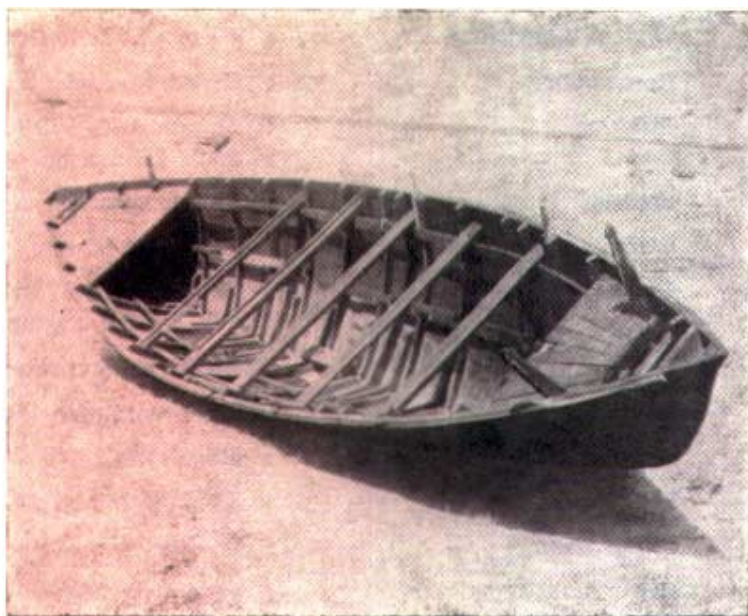


Chhoat – side view

Steering oar and rowing oars



Chhoat





Left: Patia—
inner view

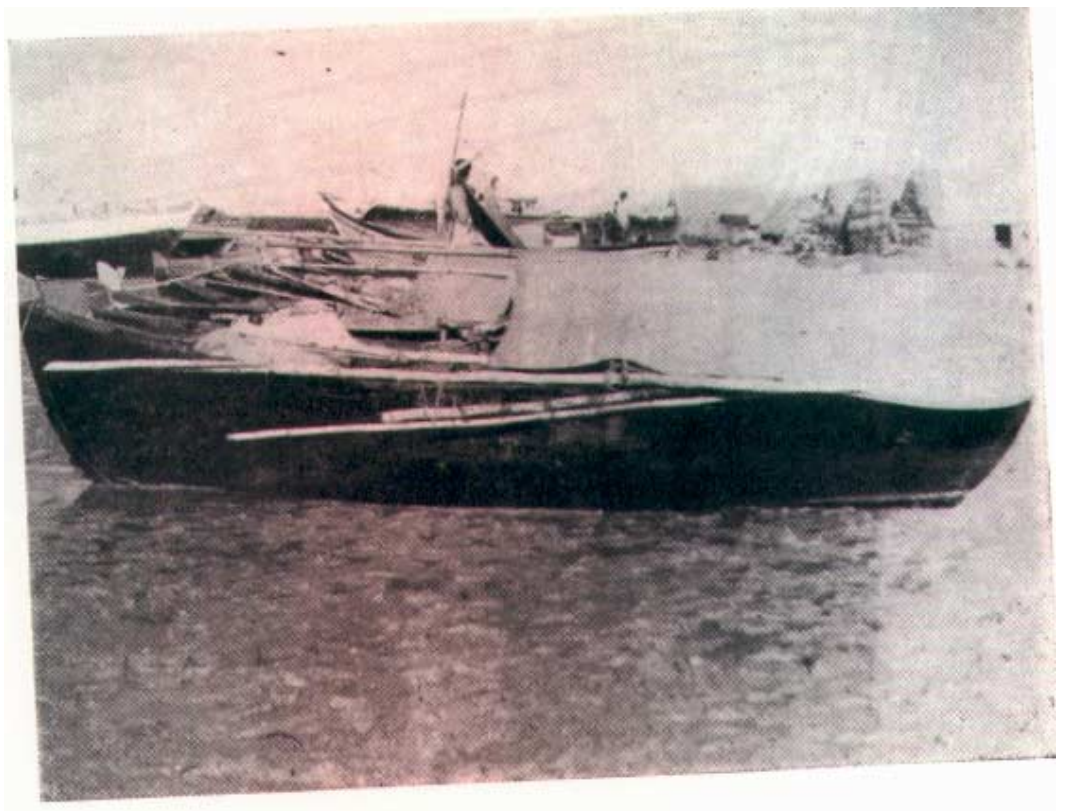
Below: patia—
side view





Dhingy: inner view

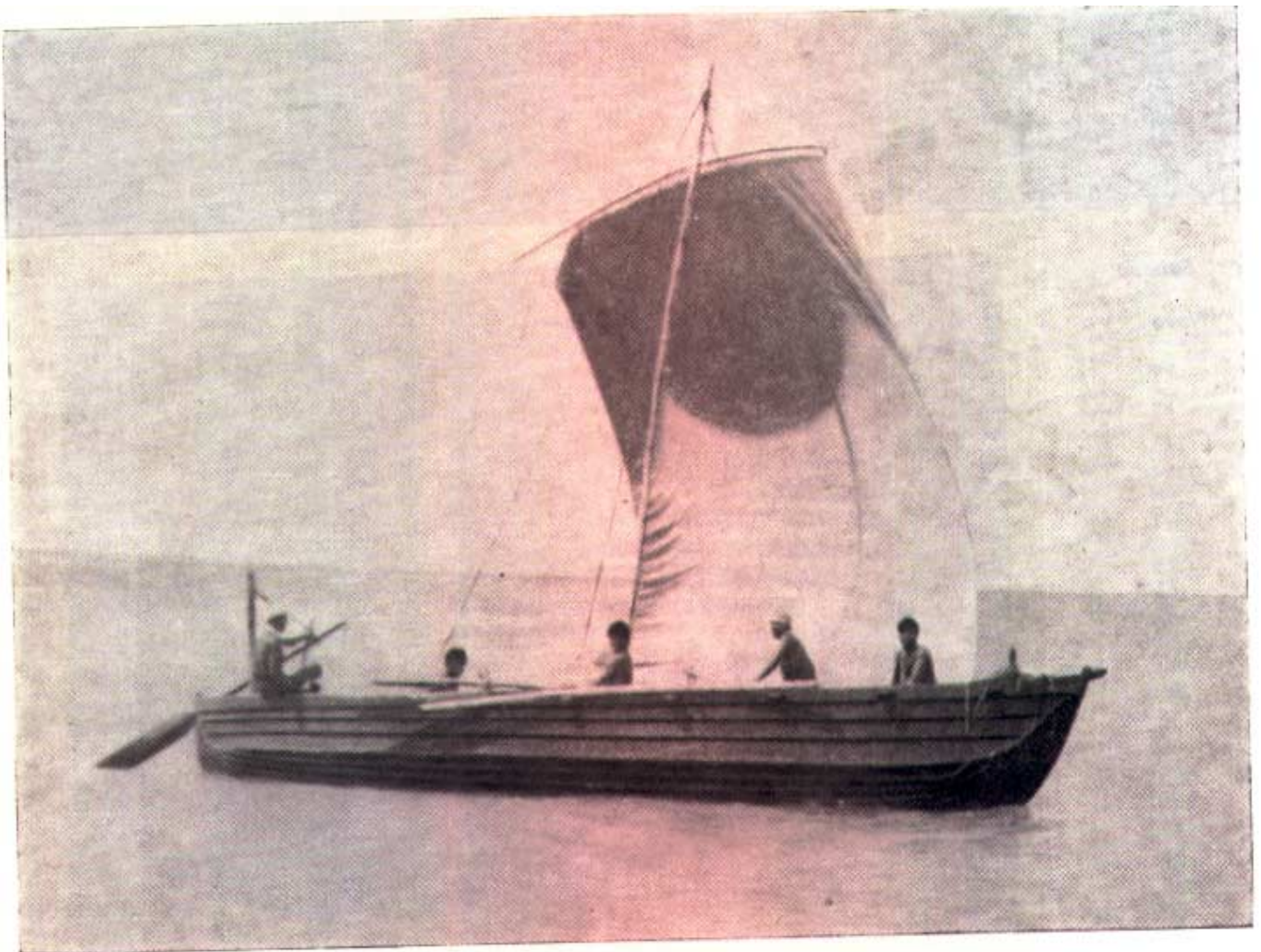
A row of dhingies beached





Above: Danga—inner view.

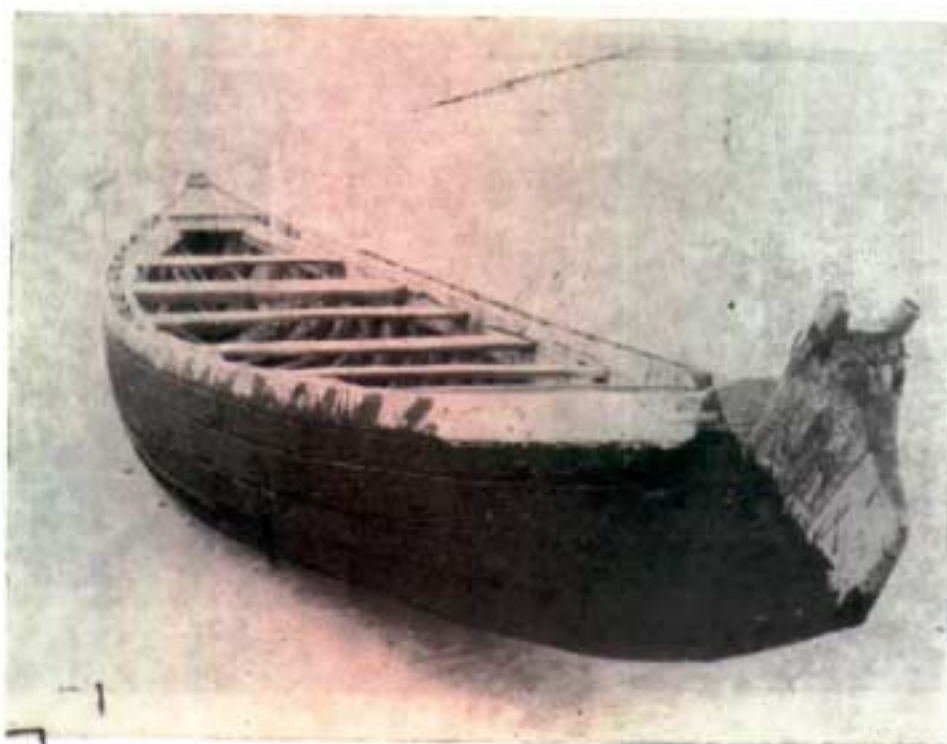
Below: Dang4a with sail.





Above: Sabada

Right: Nava





Above: Padhva bar boat (side view).



Left: Safti

Two-logged kattumaram



3. THE FISHING GEARS

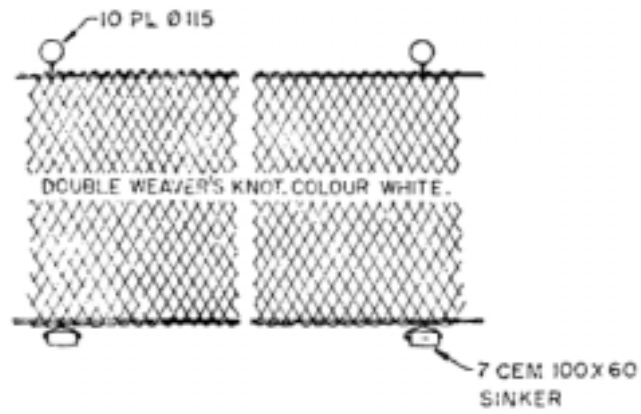
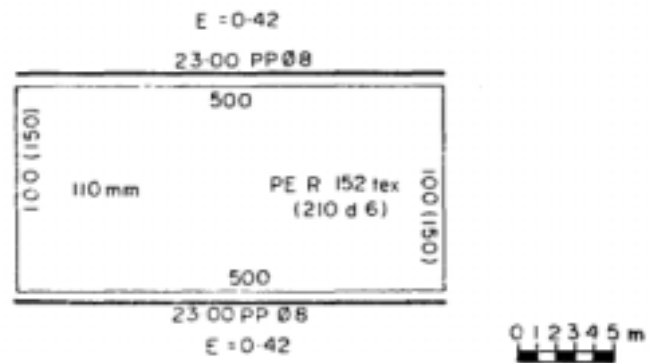
3.1 The fishing gears of north Orissa

3.1.1 *Medium-to-large-mesh surface driftnets*

3.1.1.1 Phasi Jab

Netting material	PE multifilament (white)
Length	500 meshes
Depth	100 meshes (150 meshes)
Mesh size	110mm (100 mm) stretched
Twine size	(PER 152 tex) (210d6)
Float line	PP 8 mm dia
Sinker line	PP 8 mm dia
Floats	PE hollow spherical, 115 mm dia/tied to float line, 10 a piece, one every 2.30 m.
Sinkers	Cement, 100 x 60 mm, fastened with short pendant lines 7 in a piece.
Hanging ratio	0.42, webbing fastened to framing line every 1.85 m (40 meshes).
Number of nets	30 in fleet, carried in a Donga or Patia or Chhoat, nets joined by float line and sinker line and loose lacing of adjoining nets.
Mode of operation	Surface driftnet operated from one boat.
Fishing time	Net set in the evening till next morning, occasional day fishing when shoals are available.
Fishing area	Off Balasore coast up to 20 km from shore in good weather.
Fishing season	July to March, peak period October to February.
Main species caught	Shad, also white pomfret, black pomfret, croaker, seer-fish, horse-mackerel, silver bar fish and catfish.
Average catch	20 kg/day for the fleet of nets, valued at Rs. 50.
Estimated cost	Rs. 300
Annual maintenance	Rs. 100
Life of gear	2to 3 years
Crew	Four

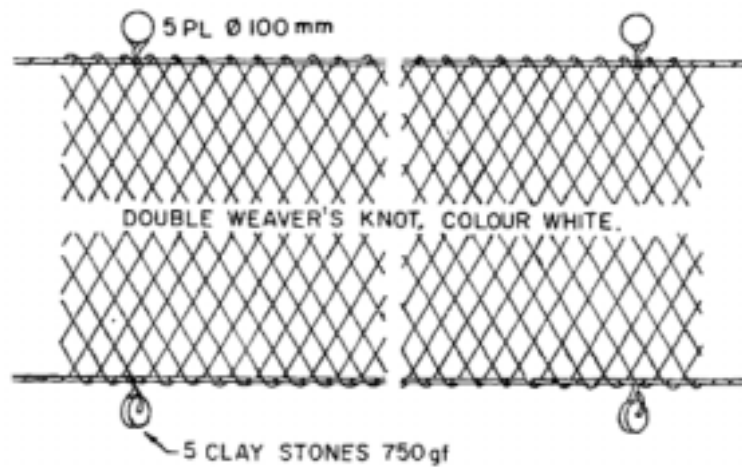
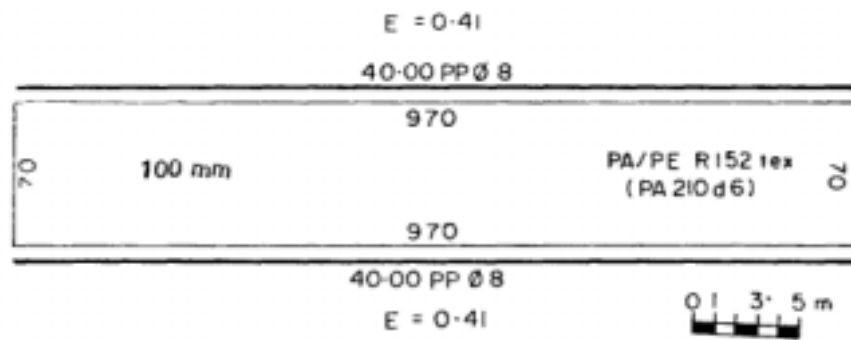
PHASI JALO



3.1.1.2 Ilishi Jab

Netting material	PA multifilament (PE also used) (white).
Length	970 meshes. This is a variation of Phasi Jab but longer with less depth.
Depth	70 meshes
Mesh size	85 to 110 mm stretched.
Twine size	PA-PE R 152 tex (210 d6)
Float line	PP8mmdia.
Sinker line	PP6mmdia.
Floats	PE hollow spherical 100 mm dia tied to fboatline one every 7.62 m.
Sinkers	Clay (circular 100 mm dia) 750 g, fastened with small pendent lines or clay, circular 150 mm dia, one kg, one every 8 m.
Hanging ratio	0.41
Number of nets	18 to 21 in fleet, carried in a dinghy or salti, nets joined by fboatlines and ground-lines or loosely lacing adjoining nets.
Mode of operation	Surface driftnet operated from one boat.
Fishing time	Net set in the evening till next morning, occasional day fishing when shoals are present.
Fishing area	Off Balasore coast up to 20 km from shore.
Fishing season	July to March, peak period October to February.
Main species caught	Shad, also white and black pomfret, croakers, seer fish, silver bar fish, catfish, threadfin, horse-mackerel and ox eye herring.
Average catch	30 kg/day valued at Rs. 75 for the fleet of nets.
Estimated cost	As. 450
Annual maintenance cost	Rs.150
Life of gear	3 years
Crew	Three or four

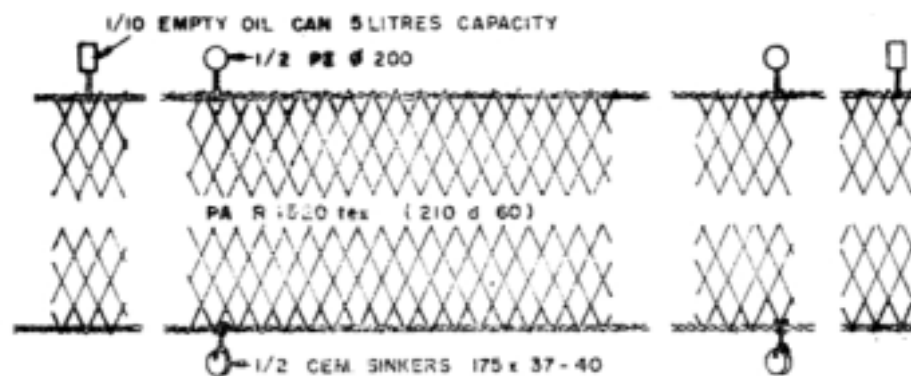
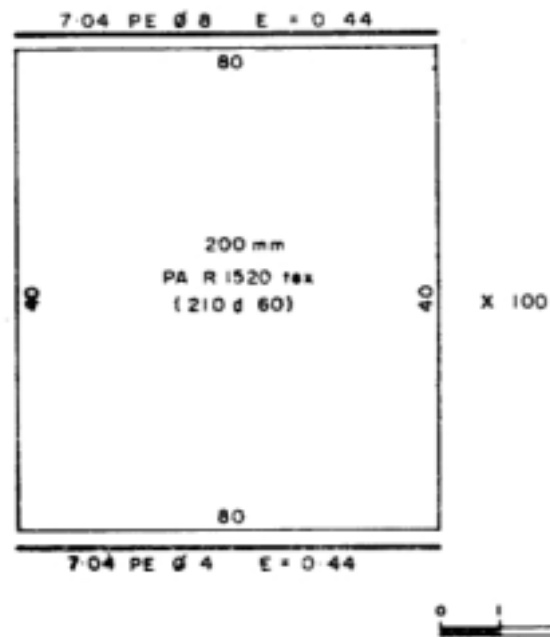
ILISHI JALO



3.1.1.3 Nakuda Jab

Netting materials	PA multifilament
Length	80 meshes (730 in single unit)
Depth	40 meshes (61 meshes)
Mesh size	200 mm stretched (210 mm stretched)
Twine size	PA 210 d 60 (PA R 1520 tex) PA210d72 (PA R 1822 tex)
Float line	PE 8 mm dia (PE 10 mm dia)
Sinker line	PE 4 mm dia (PE 6 mm dia)
Floats	PE 200 mm dia (PE 300 mm dia) every 2 nets and one empty 5 litre oil can every 10 nets.
Sinkers	Cem 175 mm dia x 37—40 mm (Cern 250 mm dia x 50 mm) every 2 nets.
Hanging ratio	0.44
Number of nets	100 nets in a set (one unit of 10 nets contributed equally by 10 fishermen).
Mode of operation	Shallow water drift net, one end attached to a Danga, the webbing covers entire depth, the sinker line grazing the bottom.
Fishing time	During spring and early summer, small mangrove shrubs bordering the coastline are in bloom, and these are locally believed to attract large threadfins and such other fish towards the coast.
Fishing area	Off central Balasore district in shallow waters between 5 m and 10 m depth.
Fishing season	February to April
Main species caught	Threadfin, also large croakers and saw fish
Average annual catch	50 kg per day in a set valued at Rs. 150
Estimated cost	Rs. 300 for each net
Annual maintenance cost	Rs. 10 per net
Life of gear	3 to 4 years
Crew	10
Ownership and financing	Individual ownership and self financing

NAKUDA JALO

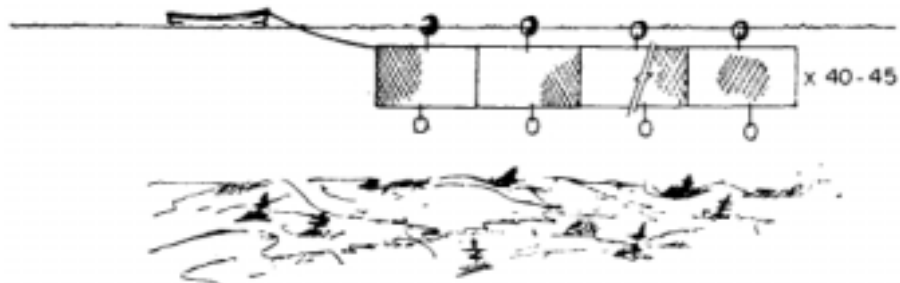
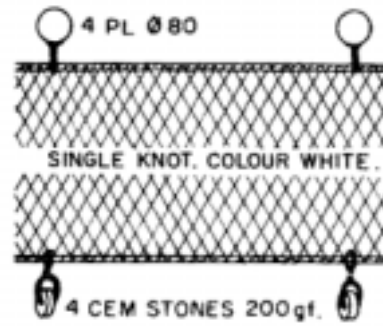
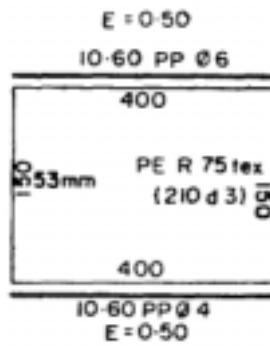


3.1.2 *Small-to-medium-mesh surface driftnets*

3.1.2.1 **Behendi Jab**

Netting material	PE (white)
Length	400 meshes
Depth	150 meshes (140 meshes for 70 mm mesh stretched nets)
Mesh size	53 to 70 mm stretched, single knot
Twine size	PE 210 d3 (PE R 75 tex).
Float line	PE 6 mm dia.
Sinker line	PE 5 mm dia.
Floats	PE spherical, 80 mm dia.
Sinkers	Cement 200 g
Hanging ratio	0.50
Number of nets	40 to 45 in a unit.
Mode of operation	Surface driftnet, operated from one boat.
Fishing time	Early morning till noon.
Fishing area	Off south Balasore coast within 5 km from shore.
Fishing season	September to February
Main species caught	Small clupeids, jew fish and prawns.
Average catch	10kg a day valued at Rs. 25.
Estimated cost	Rs. 200
Annual maintenance cost	Rs.60
Life of gear	3 years
Crew	Four

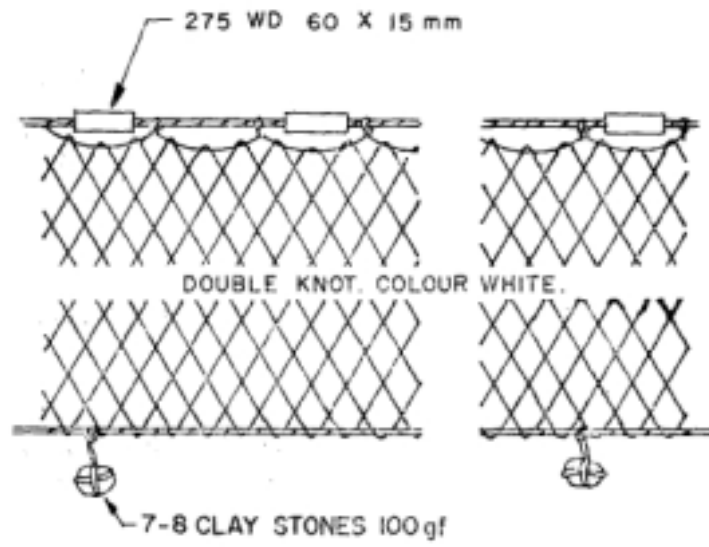
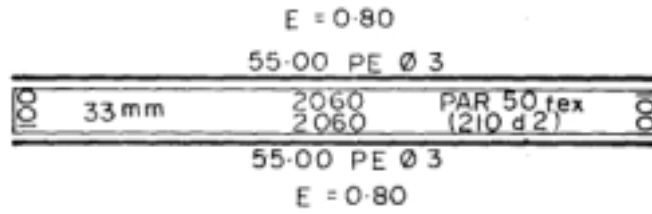
(BEHENDI JALO)



3.1.2.2 Bhasani Jab

Netting material	PA (multifilament) (white)
Length	2060 meshes
Depth	100 meshes
Mesh size	33 mm stretched
Twine size	(PAR50tex) (210d2).
Float line	PE3mmdia
Sinker line	PE3mmdia.
Floats	Cylindrical wooden, 60 mm x 15 mm dia, species is (Calotropis procera), with central hole, one float every 200 mm.
Sinkers	Clay 100 g, one every 7.85 m
Hanging ratio	0.80
Number of nets	6 to 8 nets in a fleet in a Patia.
Mode of operation	Surface driftnet operated from one boat.
Fishing time	Early morning to noon.
Fishing area	Off north Balasore coast up to 10 km from the shore.
Fishing season	January to June, also at other times during favourable conditions.
Main species caught	Small clupeids, catfish, ribbon fish, small perches and jewfish.
Estimated cost	Rs. 400
Annual maintenance	Rs. 150
Life of gear	3 years
Crew	Three or four

BHASANI JALO

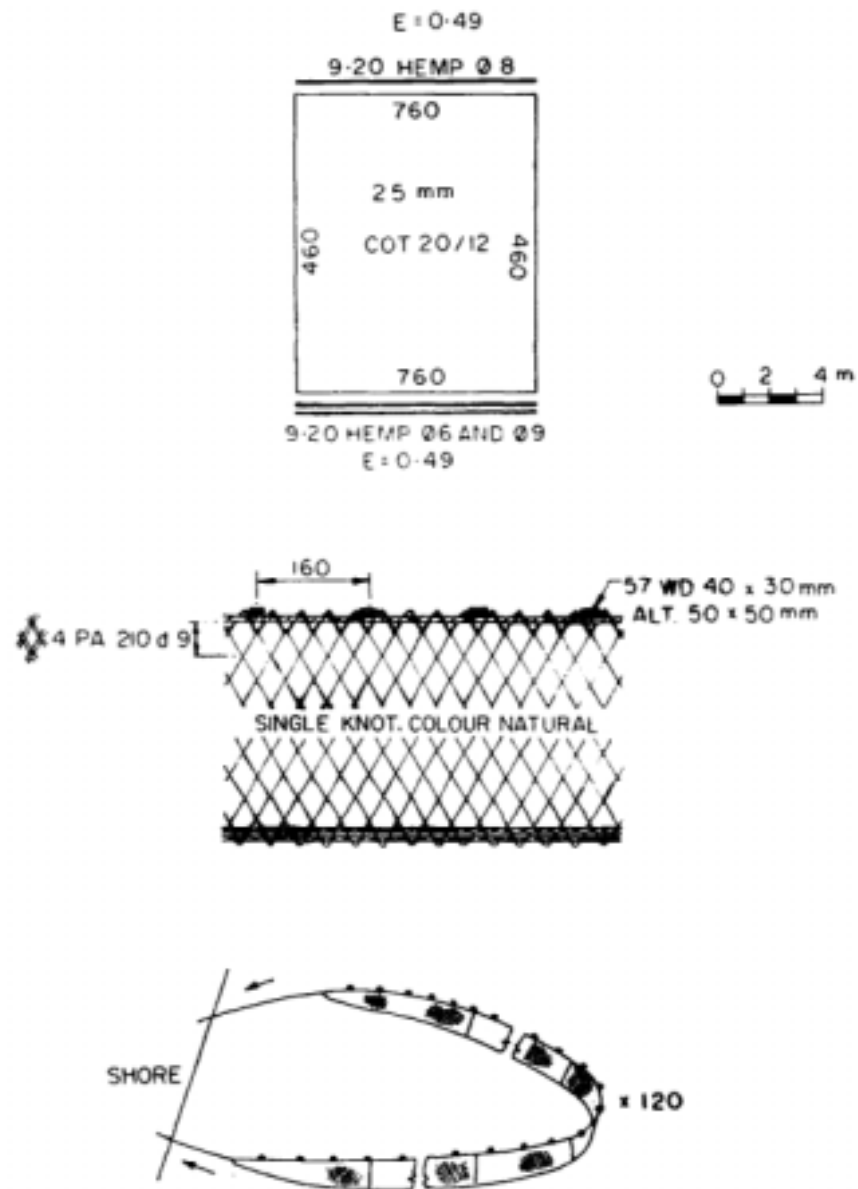


3.1.3 *Encircling nets, inshore seines*

3.1.3.1 **Sarini Jab**

Netting material	Cotton (4 meshes selvages PA)
Length	760 meshes
Depth	460 meshes
Mesh size	25 mm stretched
Twine size	Cot 20/12 (PA 2TOd 9, for selvages).
Float line	Hemp 8 mm dia.
Ground line	Hemp, one 9 mm dia, along with a second 6 mm dia.
Floats	Cylindrical wooden 40 mm x 30 mm (alt 50 mm x 50 mm).
Sinkers	No sinkers
Hanging ratio	0.49
Number of nets	120 in an unit, total length being 600 fathoms
Mode of operation	Shallow beach shore seine used from 2 saltis, or sometimes used for inshore seining with 3 sabis further off the beach. 3 nets are contributed each by 30 participating fishermen.
Fishing time	Early morning till afternoon
Fishing area	Off north Balasore coast within 2 to 3 km from the shore line.
Fishing season	July to April.
Main species caught	Clupeids, jew fish, perch, cock-up, threadfin, ray, also grey mullet (when fishing close to river mouths).
Estimated cost	Rs. 450
Annual maintenance cost	Rs.50
Life of gear	3 years
Crew	30

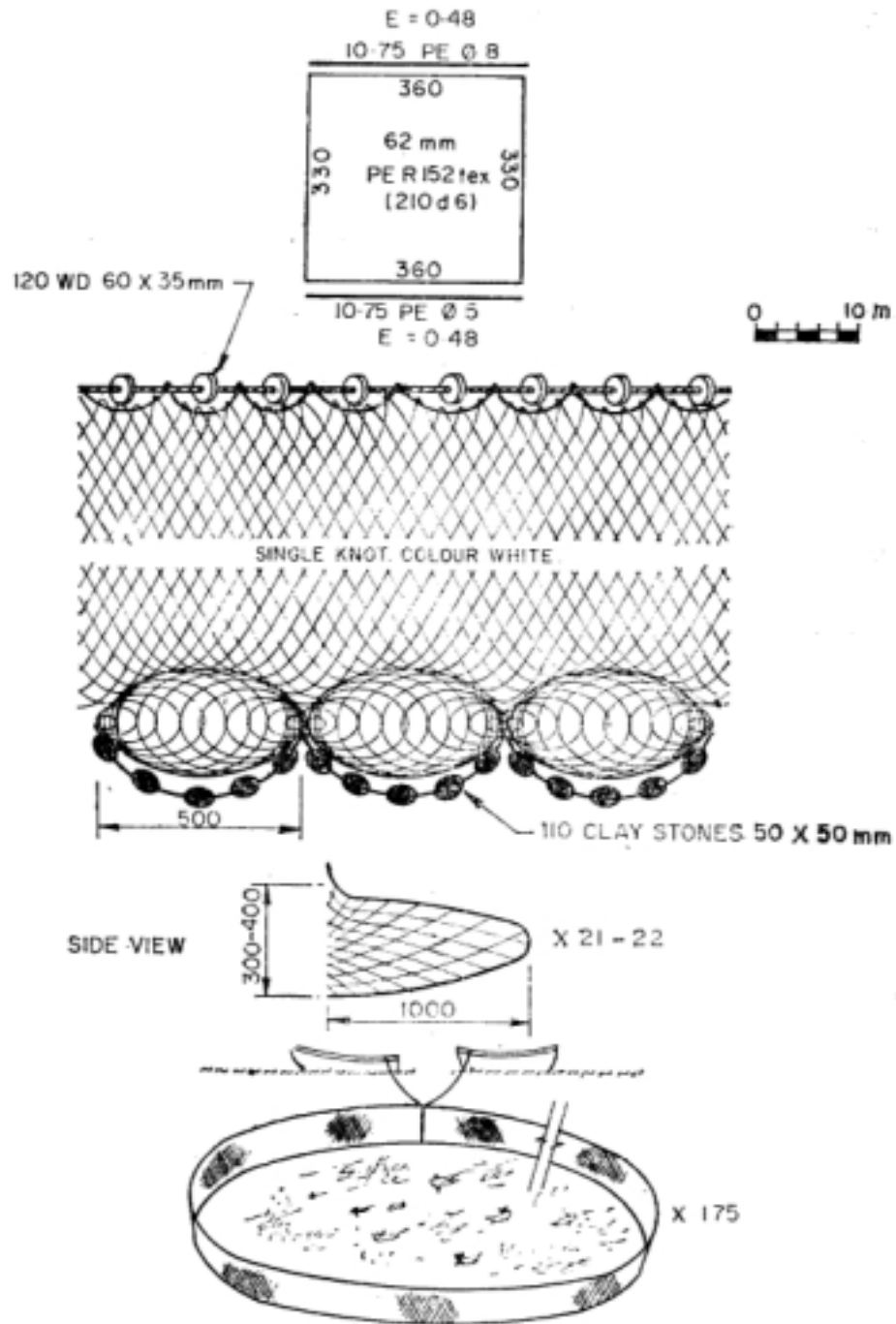
SARINI JALO



3.1.3.2 Jangal Jab

Netting material	PE multifilament
Length	360 meshes
Depth	330 meshes
Mesh size	62 mm stretched (single knot).
Twine size	(PER 152 tex) (210d 6)
Float line	PE8mmdia.
Sinker line	PE 5 mm dia, additional line with ground rope for sinkers. Sinker line joined at intervals to the main net forming pouches.
Floats	Cylindrical, wooden, 60 mm dia x 35 mm, alt 80 mm dia x 50 mm.
Sinkers	Clay 50 mm dia.
Hanging ratio	0.48
Number of nets	175 nets in a unit.
Mode of operation	35 persons each contributes 5 nets to the Jangal net unit, 5 boats (all chhoats or 3 chhoats and 2 patias) participate in the fishing operation, the two biggest carrying the gear to the fishing areas. The net is deployed in a circle by two big boats around a certain area (usually after locating shoals). The three smaller boats remain within the encircled area to beat the water with empty tins and oars to scare the fish; small ones are gilled, the larger ones trapped in the pouches above the sinker line, which touches the sea floor.
Fishing time	Usually mornings
Fishing area	Off north Balasore coast normally within 10—15 m depth.
Fishing season	August to February.
Main species caught	Shad, croaker, threadfin, catfish and perch.
Estimated cost	Rs. 250
Annual maintenance cost	Rs.80
Life of gear	5 years
Crew	35

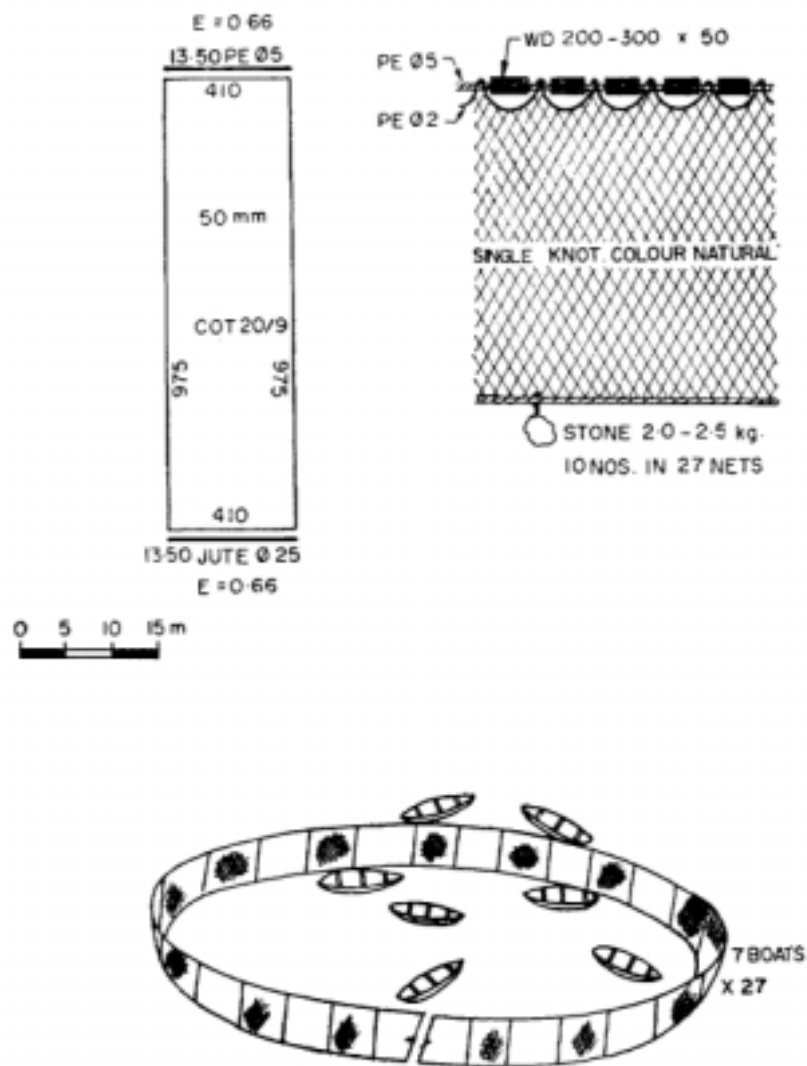
JANGAL JALO



3.1.3.3 Sabado Jab

Netting material	Cotton
Length	410 meshes
Depth	975 meshes
Mesh size	50 mm stretched excepting middle net (40 mm stretched).
Twine size	Cot 20/9, excepting middle net (serving as bunt, cot 20/27).
Float line	PE 5 mm dia, another PE 3 mm dia. rope below, to which webbing are hung.
Sinker fine	Jute 25 mm dia.
Floats	Cylindrical, wooden 200/300 x 50 dia threaded on to line with 25 mm gaps in between for tying to 5 mm rope.
Sinkers	Stone 2—2.5 kg, 10 in number for whole unit consisting of 27 nets.
Hanging ratio	0.66
Number of nets	27 nets in one unit, one middle piece and 13 pieces on either side.
Mode of operation	Inshore encircling net touching bottom, operated within 24 m depth. Seven Sabado fishing boats operate jointly in inshore areas: the larger two carry the net, and on locating a shad, shoal, share the net between themselves and encircle an area, releasing the net as they go; the five other sabado boats scare and drive the fish into the area from a distance by beating empty tins. The sinker-line which touches the bottom is pulled and forms something like a purse where the shad and other fish are trapped. The float line remains in its original encircled position, and fishes are kept alive in the net and harvested gradually over three or four days to avoid bulk landings.
Fishing time	As and when opportunities occur during the shad season.
Fishing area	Off Balasore and north Cuttack districts.
Fishing season	Four months approximately, October/November to January/February.
Main species caught	Shad
Estimated cost	Rs. 600 (Rs. 1,200 middle piece). Total unit costs, Rs. 15,000.
Annual maintenance cost	Rs. 2,000
Life of gear	Two years
Crew	16
Remarks	Though operated on a limited scale by a few people, the method is paying. Switching from cotton to polyethylene would enable quicker handling due to less weight of material. Perhaps better catches might be taken by having additional sinker line, with rings to work like a purse seine, in waters deeper than 24 m.

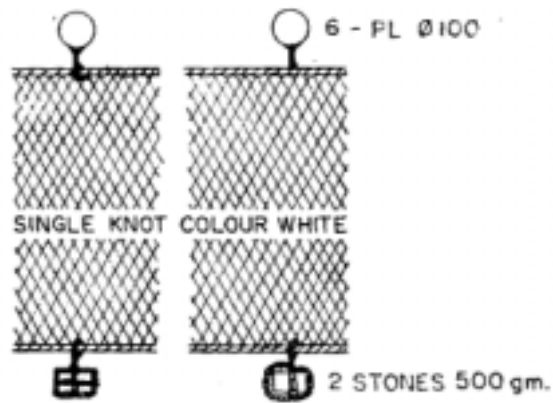
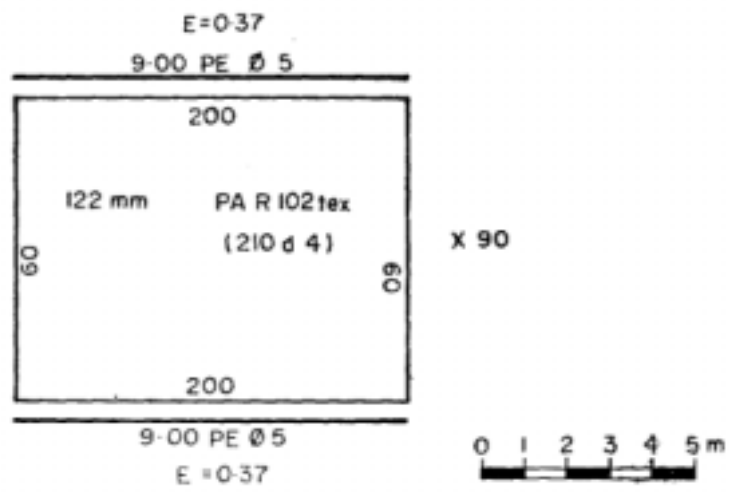
SABADO JALO



3.1.3.4 Khia-Badia Jab

Netting material	PA multifilament (white)
Length	200 meshes
Depth	60 meshes
Mesh size	122 mm stretched
Twine size	(PAR102tex) (210d4)
Float line	PE5mmdia
Sinker line	PE5mmdia
Floats	PE 100 mm dia spherical.
Sinkers	Stone 500 g (2 in a net, one sinker for three floats).
Hanging ratio	0.37
Number of nets	90 in a fleet (180 when two boats work together).
Mode of operation	Inshore seine-cum-gillnet, operated from a Danga (flat bottom). The headropes remain at the surface, but as the net is mainly operated in shallow depths less than the depth of the net, the sinker line touches the bottom. The net is laid in a circle. During hauling the fish are scared into the enclosure by beating the water with oars and empty tins, the two ends are drawn together enveloping the larger fish that are not gilled.
Fishing times	Early morning till noon.
Fishing area	Northern Cuttack district in inshore waters, off Hukitola bay and Hansua river.
Fishing season	November to March
Main species caught	Shad, other clupeids, threadfins and croakers.
Estimated cost	Rs. 200 per net.
Annual maintenance cost	Rs.30
Life of gear	Four years
Crew	: 14 (for two boats when 180 pieces are operated together).
Remarks	The 500 g stone sinkers may perhaps be replaced by smaller cement or clay sinkers with less weight evenly distributed in the sinker line, so as to make the net operation more even. Blue and other coloured PA twine might be tried.

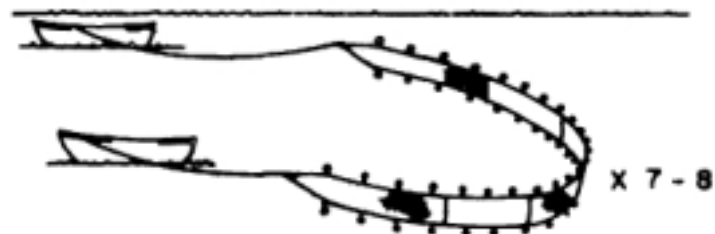
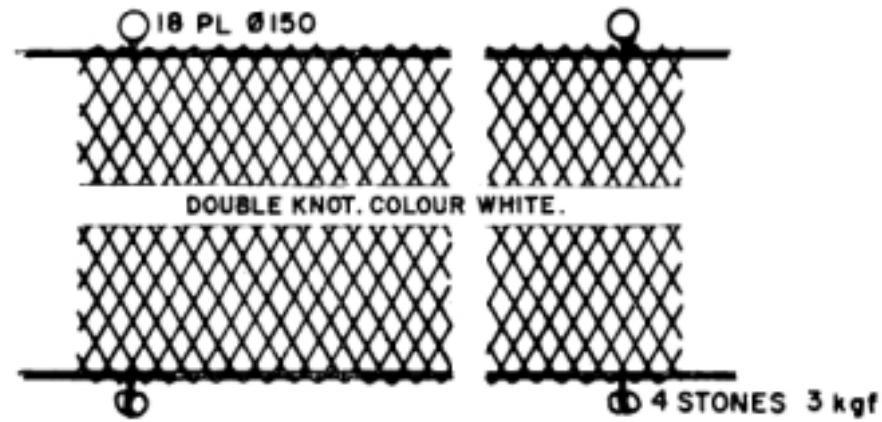
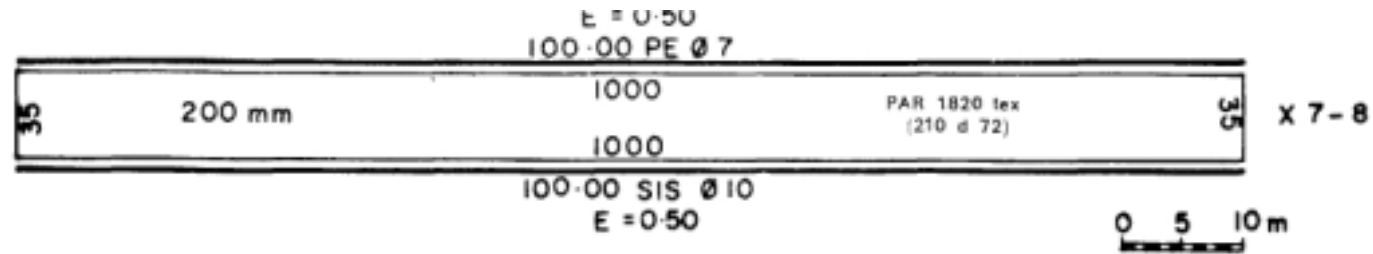
KHIA BADIA JALO



3.1.3.5 Gheri Jab

Netting material	PA multifilament (white)
Length	1000 meshes
Depth	35 meshes
Mesh size	200 mm stretched
Twine size	(PA R 1820 tex) (210 d 72)
Float line	PE7mmdia.
Sinker line	Sis 10mm dia
Floats	PE 152 mm dia spherical
Sinkers	Stone, 3 kg (app.).
Hanging ratio	0.50.
Number of nets	Seven nets in a fleet, sometimes eight.
Mode of operation	Encircling gillnet, operated in inshore waters, dragged by two flat bottomed Dargas at both ends or alternatively one end in boat, the other near the shore. In the latter case, the shore-side rope is usually 600 m, and the boat side 100—200 m, the rope touches the bottom and the larger fish not gilled are enveloped in the enclosure during hauling.
Fishing time	Operated from early hours till afternoon, but fishing normally continues at a stretch for seven to eight days, usually three days before full moon or new moon to three days after. During this period the catches are sent to market in separate boats.
Fishing area	North Cuttack district, in inshore waters off Hansua river mouth.
Fishing season	October to March
Main species caught	Cock-up, croakers and threadfins.
Estimated cost	Rs. 900
Annual maintenance cost	Rs.90
Life of gear	4 years
Crew	Seven or eight.

GHERI JALO



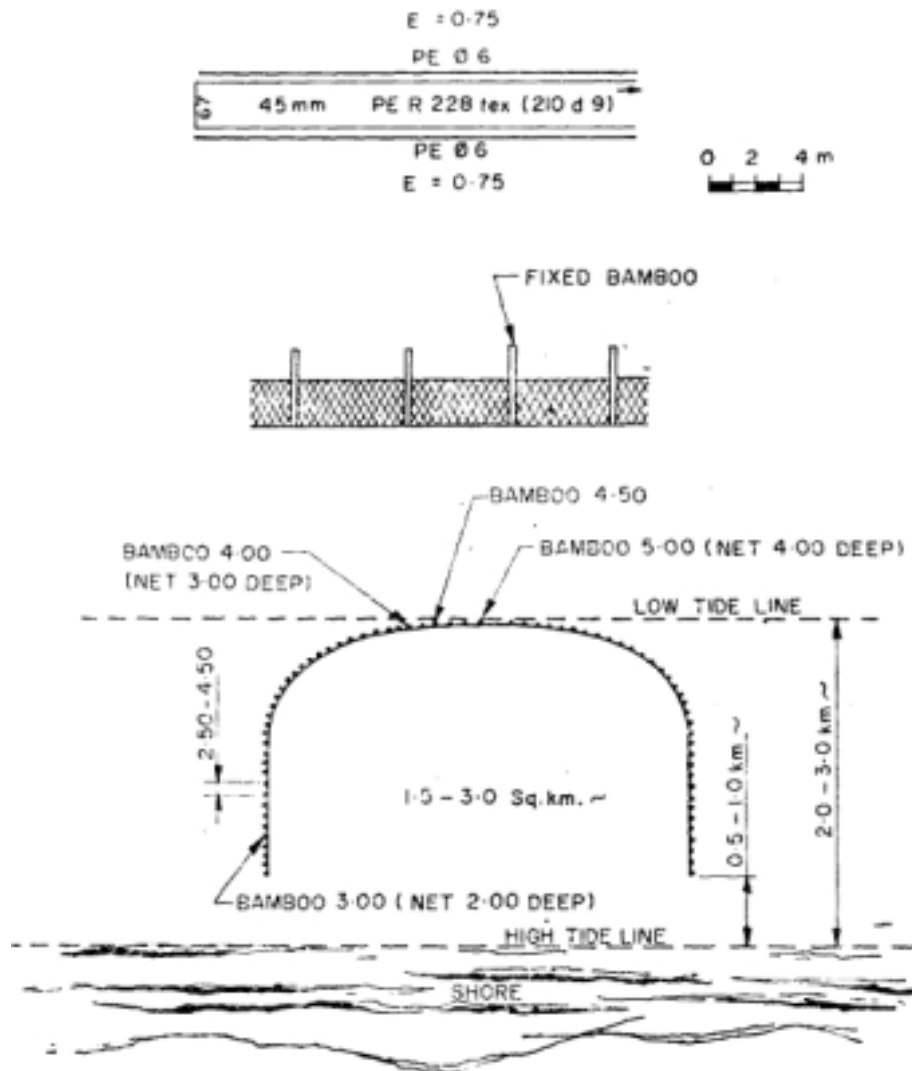
3.1.4 Wall Nets

3.1.4.1 Mabo Jalo*

Netting material	PE (light blue and white)
Length	Length of net pieces not constant, webbings normally extended when area encircled is large.
Depth	67 meshes (140 meshes at middle portion where fishes are collected).
Mesh size	45 mm (40—50 mm) stretched.
Twine size	(PE R 228 tex) (210 d 9).
Head line	PE6mmdia.
Ground line	PE6mmdia.
Floats	Not used
Sinkers	Not used
Hanging ratio	0.75
Number of nets	Not fixed, extensive encircling a large area.
Mode of operation, fishing area and time	<p>Tidal wall net tied with bamboo stakes at intervals from 2.8 m to 4.4 m, length of the bamboos being about 50 per cent more than the depth of webbings. Net fixed during low tide on the flat gradual beaches of Central Balasore district, where the distance between high tide line and low water line is from 2 to 4km. The gear is set continually for 7 to 8 days at a stretch, i.e., 3 or 4 days before or after new moon and full moon.</p> <p>The area is leased to a group of about 10 fishermen for As. 8,000. Scoop nets of 8.80 to 10 m dia, iron hoops with small mesh netting are used to collect the fish at low tide from the central portion where the mesh size is slightly smaller and the depth greater than elsewhere. Fish passing over at high tide are trapped in the enclosure and harvested at low tide.</p>
Fishing season	All the year round
Main species caught	Clupeid, jew fish and miscellaneous fish.
Estimated cost	Rs. 5,000 (Cost of net webbings and bamboos for a set).
Annual maintenance cost	Rs. 500
Life of gear	2 years
Operators	10 fishermen
Remarks	<p>Fish passing over the fixed tidal wall net get into the enclosed area, while those running into the net from the sea side may turn back.</p> <p>Modification of the gear is therefore desirable to let the fish pass by automatic lifting of the ground line and lowering of the net while the tide is gathering with the net operating as at present during ebb tide. The modifications may cost an additional 10 to 20 per cent in first cost, but the return is expected to increase more than proportionately.</p>

* In other areas this net is known as 'Bedha' net.

MALO JALO

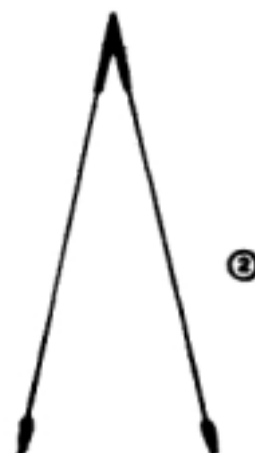
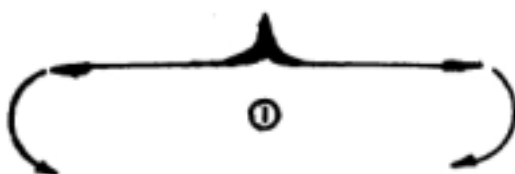


3.2 Fishing Gears of south Orissa

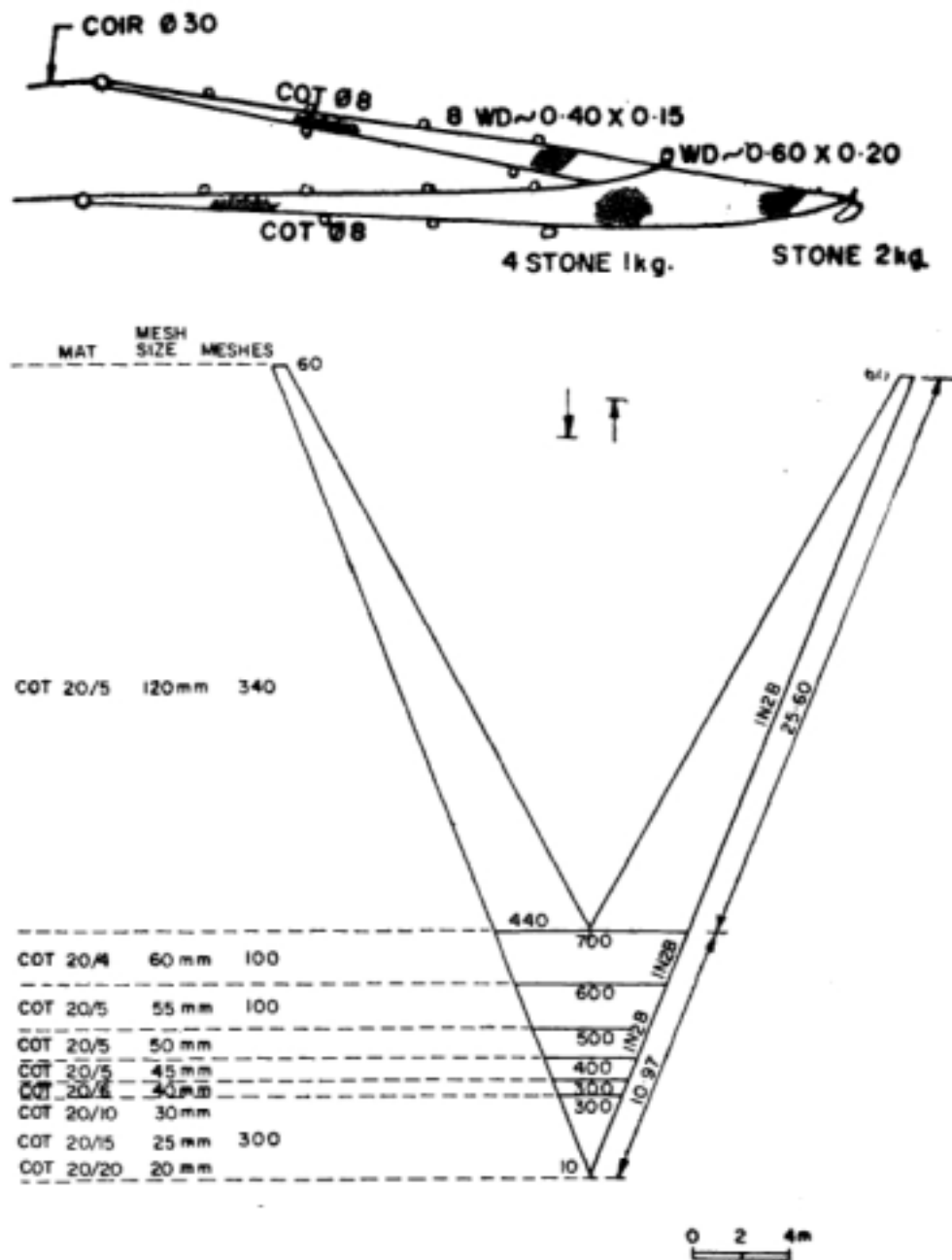
3.2.1 Boat seines

3.2.1.1 Irragali

Netting material	Cotton
Mesh size	Ranging from 20 mm stretched in cod end to 120 mm stretched in wings.
Twine size	Ranging from Cot 20/4 to Cot 20/20.
Float line	Cotton 8 mm dia.
Sinker line	Cotton 8 mm dia.
Floats	Wooden, approximate 400x150 mm, middle 600 mmx 200 mm.
Sinkers	5 stone.
Mode of operation	Boat seine, mouth kept stretched by two kattumarams sailing/rowing on a parallel course, each with two men. One of the kattumarams carries the net. On reaching the ground, both come together, the net is stretched, the boats move almost directly away from each other, laying out the net and 60 m coir ropes (25 mm) on each side; when fully released the craft turn at right angles and move on parallel courses. Usually dragged with the current.
Fishing time	Early morning till noon.
Fishing area	Southern coast within 5 km from shore.
Fishing season	February to August
Main species	Jew fish, ribbon fish, clupeids, small threadfins, silver bellies and shrimp.
Estimated cost	Rs. 1,000
Annual maintenance cost	Rs. 200
Life of gear	3 years
Preservation	Nets darned; bark from plant <i>Acacia fishtu/a</i> mostly used for catch, usually 2 kg bark, pounded into bits, placed in 9 litres water, extraction done overnight at ordinary or boiling temperature. Two immersions done. Nets treated quarterly.
Crew	Four
Remarks	Changing the net material from cotton to PA, wooden floats to PE/PVC, and larger stone sinkers to cement! clay of smaller sizes are ways in which this important gear might be improved.



IRRAGALI

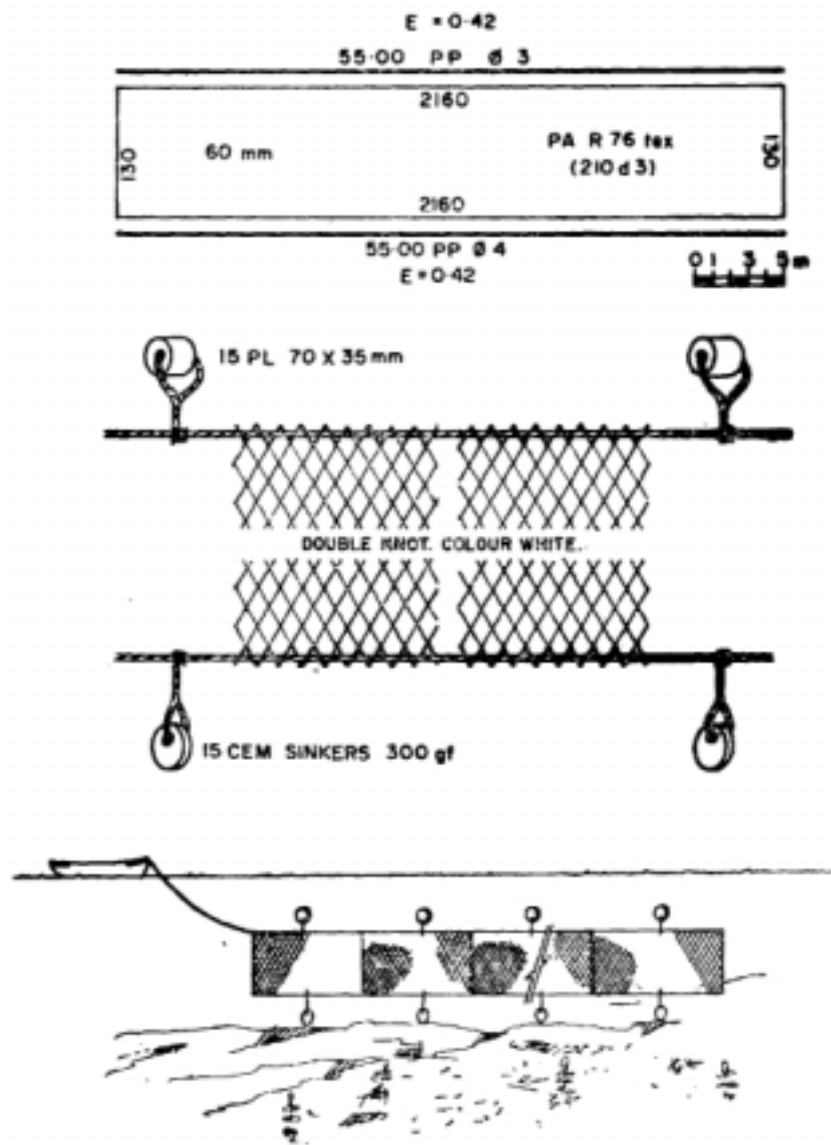


3.2.2 *Bottom driftnets*

3.2.2.1 Jagawala

Netting material	PA multifilament (white)
Length	1500—2160 meshes
Depth	120—130 meshes
Mesh size	60—70 mm stretched
Twine size	PA 3—4 mm dia.
Sinker line	PP 4—5 mm dia.
Floats	PVC cylindrical 70 x 35 mm
Sinkers	Cern 300 g
Hanging ratio	0.42
Number of nets	10 to 12 nets in a unit.
Mode of operation	Bottom driftnetting, operated from one boat.
Fishing time	Early morning till afternoon.
Fishing area	Up to 10km from the shore in the southern coastline.
Fishing season	March/April to July/August.
Main species caught	Prawns, also croakers, pomfret and ribbon fish.
Estimated cost	Rs. 800 per net
Annual maintenance	Rs. 200 per net
Life of gear	3 years
Crew	Five or six
Remarks	These gillnets for prawns are made of white PA multifilament twine. Blue and other coloured twine might also be tried.

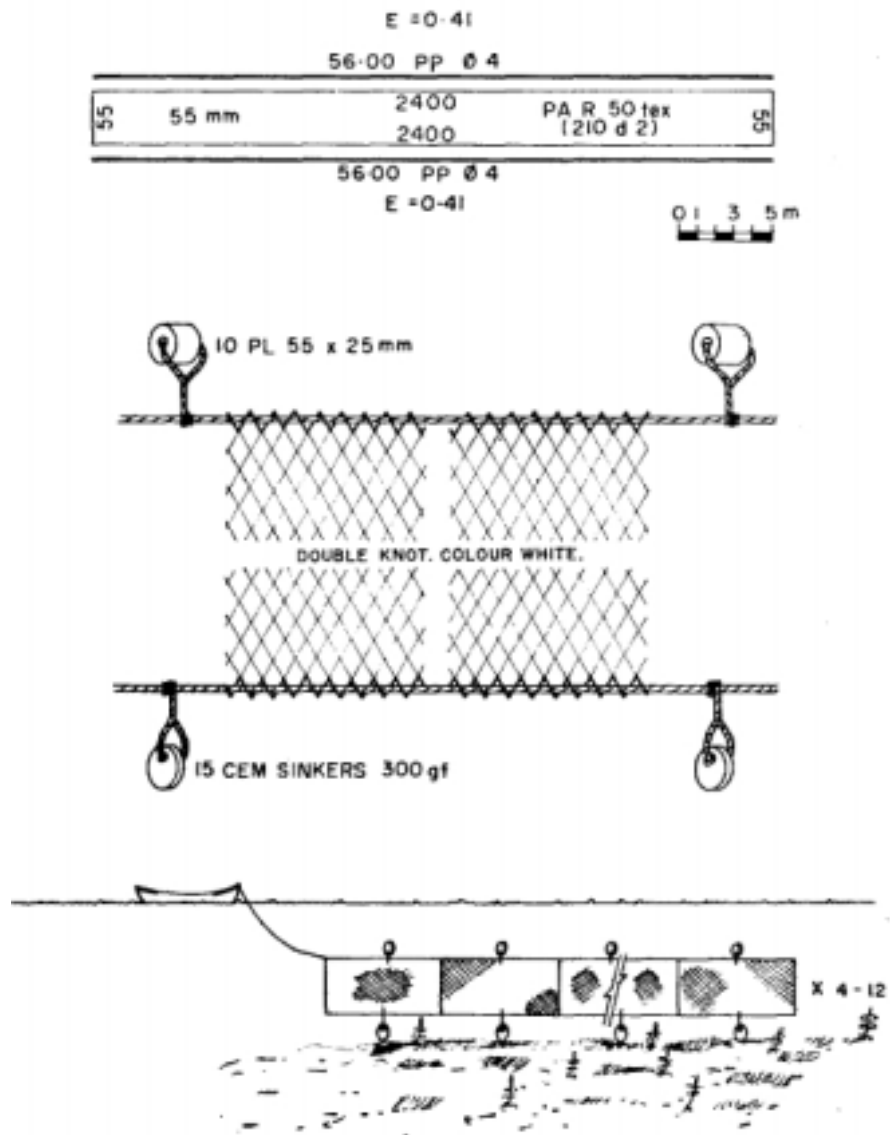
JAGAWALA



3.2.2.2. Kibumala (also called Silkiwala)

Netting material	PA multifilament (white)
Length	2400 meshes
Depth	55 meshes
Mesh size	40 mm to 60 mm stretched
Twine size	PAR 50tex (210 d2)
Float line	PP4mmdia.
Sinker line	PP4mmdia.
Floats	PVC 57 x 26 mm cylindrical.
Sinkers	Cern 300 g
Hanging ratio	0.41
Number of nets	4 nets in a small kattumaram (up to 12 nets in a large kattumaram)
Mode of operation	Bottom driftnet
Fishing time	Early morning till afternoon up to 6 km from the shore in the southern coastline.
Fishing season	All year round
Main species caught	Prawn, also ribbon fish, croaker, jew fish, pomfret.
Average catch	10 kg to 25 kg in an unit.
Estimated cost	Rs. 300 per net
Annual maintenance cost	As. 100
Life of gear	3 years
Crew	Two

KILUMALA

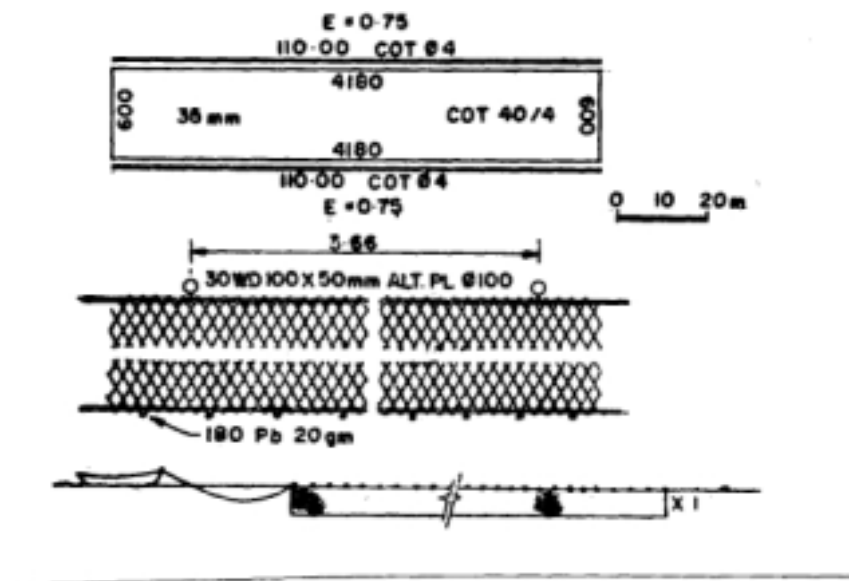


3.2.3 Surface driftnets

3.2.3.1 Katlala (Sardines)

Netting material	Cotton
Length	4180 meshes
Depth	600 meshes (700 meshes)
Mesh size	(25 mm to 40 mm stretched).
Twine size	(Cot 40/3 to 40/5) or equivalent.
Float line	Cotton 4 mm dia
Sinker line	Cotton 4 mm dia
Floats	Cylindrical, wooden, 100 mmx50 mm (alt cork or PE 90—100 dia).
Sinkers	Lead 20 g.
Hanging ratio	0.75
Number of nets	1
Mode of operation	Surface driftnet
Fishing time	Early morning till noon.
Fishing area	Within 5 km from the shore in the southern coastline.
Fishing season	November to April
Main species caught	Sardines
Estimated cost	Rs. 2,500
Annual maintenance cost	Rs. 200
Preservation	Treated with fermented gruel (rice water).
Life of gear	2 years
Crew	Two
Remarks	Nets made of PA could replace the cotton nets, but the fishermen have not adopted nylon, though they have adopted it for the Kilumala which was previously made of cotton. Some fishermen feel nylon nets will spoil most of the sardines and earnings will, therefore, be less. However, the gear would have a longer life and the gilling efficiency would be greater. Careful handling of the catch when taking sardines out of the net might not result in as much spoilage as feared. PE/PVC floats could replace wooden floats.

SARDINE GILLNET (KATLALA)

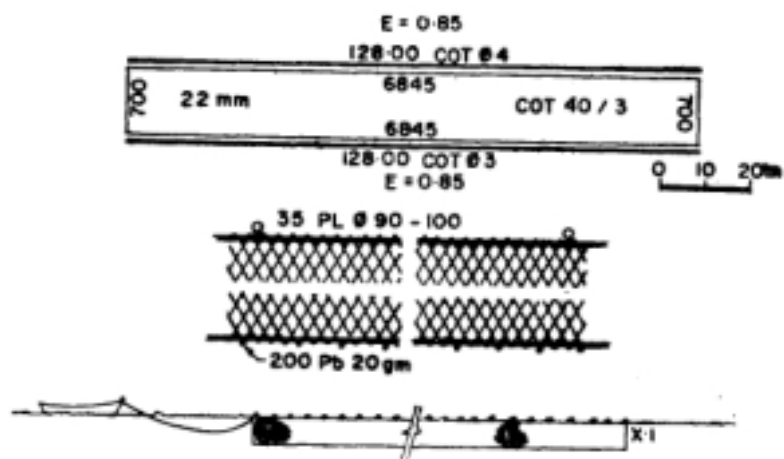


3.2.3.2 Katlala (Anchovies)

Netting material	Cotton
Length	6845 meshes
Depth	700 meshes
Mesh size	From 12 mm to 25 mm stretched.
Twine size	Cot 40/3 (sometimes 40/4).
Float line	Cotton 4 mm dia.
Sinker line	Cotton 3 mm dia.
Floats	PE dia 90—1 00 mm (alt cork)
Sinkers	Lead 20 g
Hanging ratio	0.85
Number of nets	One
Mode of operation	Surface driftnet for anchovies, small sardines and white bait.
Fishing times	Early morning till noon.
Fishing area	Within 3 km from the shore in the southern coastline.
Fishing season	November to March
Main species caught	Anchovies and white bait.
Average catch	10/20 kg valued at Rs. 10 to 20.

Estimated cost	Rs. 2,500
Annual maintenance cost	Rs. 200
Preservation	Treated with fermented gruel (rice water).
Life of gear	2 years
Crew	Two
Remarks	Same as previous sub-chapter.

ANCHOVY GILLNET (KATLALA)

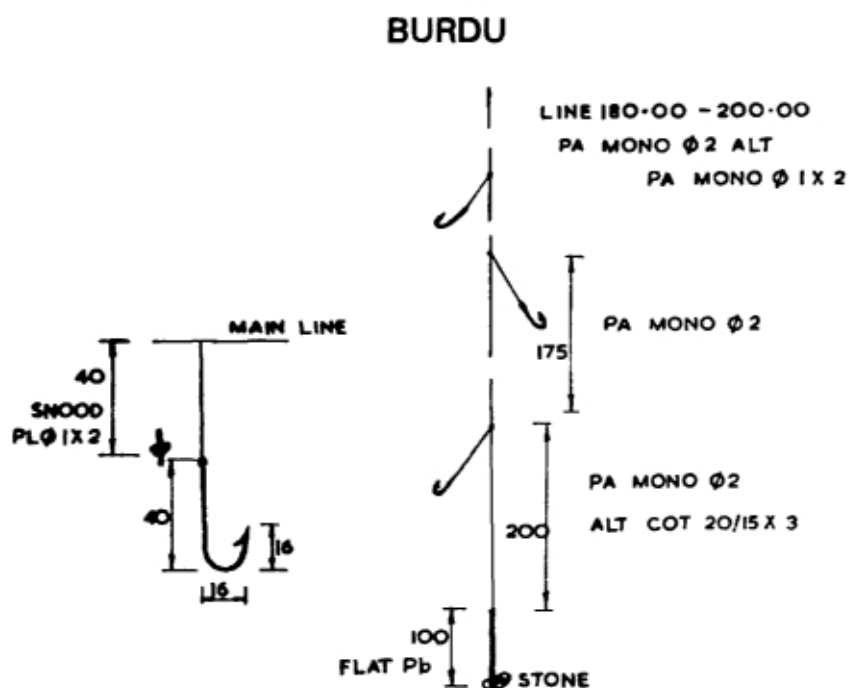


3.2.4 Hook and line/longline

3.2.4.1 Burdu

Line material	PA mono
Line size	2 mm dia alt 1 mm dia x 2
Line length	180 m—200 m.
No. of hooks	2 to 4
Weight used	100 mm to 140 mm long flat lead pieces followed by a small stone below.
Distance between weight and lowest hook	200mm
Hook size	40mm stemx16 mm bend x16 mm end with barb.
Snood length	40mm

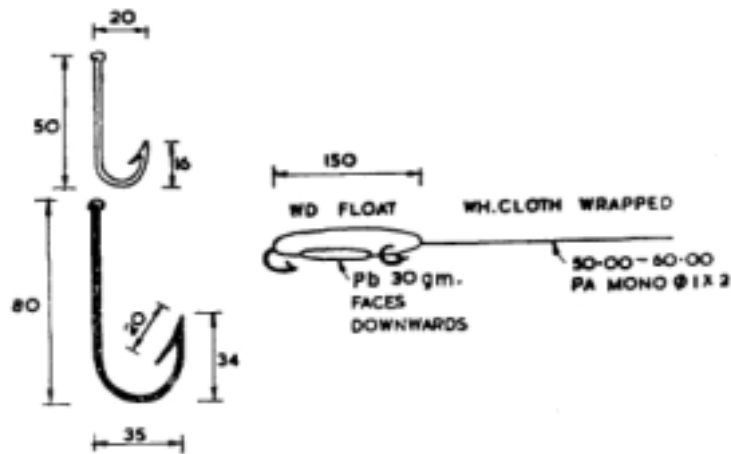
Snood size	P11 mm x
Distance between each hook	175mm
Mode of operation	Hooks baited with small fish and shrimps and lowered into the water close to the bottom and jerked at intervals.
Fishing time	Usually early morning
Fishing area	Within 3 km from shore only in the southern coastline during the operation of other gears from kattumarams (only an occasional gear).
Fishing season	Not specific
Main species caught	Dogfish, catfish and peith
Estimated cost	: Rs. 20
Annual maintenance cost	: Rs. 5
Life of gear	: 2 years
Operator	: One
Remarks	: Hand reel for line operation may be possible but only from a suitable craft. Jiggers and artificial baits should be tried. Fishermen have adopted stronger PA monofilament which has replaced the 3 mm to 4 mm dia cotton twine (20s/14) used a decade ago.



3.2.4.2 Kata

Line material	: PA mono
Line size	: 1 mm dia. x 2
Line length	: 50.0 m to 60.0 m.
No. of hooks	: Two
Design	: 150 mm wood to which is attached a 30 g lead piece, wrapped in a white cloth to look like a fish. At the time of operation the lead side remains below the wood, facing downwards, the wood floating on the surface. The hooks are wrapped along with the lead, both point downwards. The wood is normally grooved to fit the stems of the attached hooks.
Hook size	: Larger hook 80 mm stem x 35 mm bend x 34 mm end with 20 mm barb, and the smaller hook, 50 mm stem x 20mm bend x 16 mm end with barb. (Larger hooks up to 320 mm stem are also used.)
Mode of operation	Surface handline or 'spinning' line thrown beyond the breakers or waves by the operator.
Fishing time	Usually early morning or evening, only close to the shore.
Fishing area	The operators stand on the shore near the surf line or mouth of the estuary.
Fishing season	Not specific
Main species caught	Threadfin, perch and cock-up.
Estimated cost	Rs.20
Annual maintenance cost	Rs.5
Life of gear	2 years
Operator	One
Remarks	Artificial baits like rubber worm baits and shiny metallic jiggers could be tried along with hand reel where practicable.

KATA



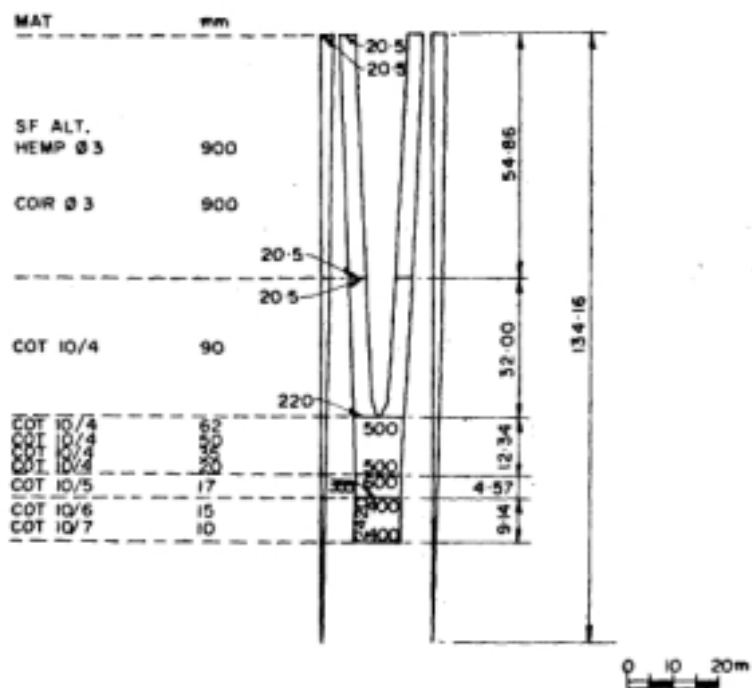
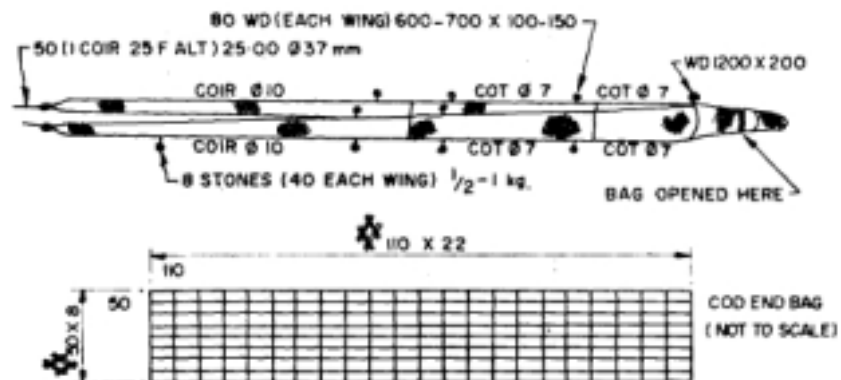
3.2.5 Beach seines

3.2.5.1 Bada Jab

Netting material	Cotton
Length	: Each wing 224 m and bag 26 m.
Depth	: 9 m at mouth.
Mesh size	'10 mm stretched at cod end extreme, increasing to 15 mm stretched and 17 mm stretched where the cod end is laced to the belly part for opening and taking out the fish, the belly portion 20 mm stretched where it meets the cod end increasing to 62 mm stretched at the mouth where the wings are attached. The cotton portion of the wings 90 mm stretched, the coir wings (middle) 900 mm stretched and the SF alt hemp (outer) wings 900 mm stretched.
Twine size	Cot 10/7 at cod end extremity decreasing to Cot 10/5 where cod end is laced to belly, the belly Cot 10/4, throughout, the first part of wings also Cot 10/4, the coir rope portion of wings 3 mm dia and hemp or SF portion 3 mm dia.
Float line	: Coir 10 mm die from top of wing to 137.16 m, followed by cotton 7 mm die where it joins belly.
Sinker line	: Same as floatline.
Floats	: Wood (Erythrina SP) 600—700 mm x 100—150 mm, 80 nos. (in some nets 3 floats together at the junction of belly to wings) besides floats of 75 mm x 75 mm at 0.40 to 0.50 m intervals on ropes.

Sinkers	Stone ½ kg to 1 kg, 80 nos. opposite to each float.
Cod end of bag	Upper half and lower half made up by joining 8 square pieces across and 22 square pieces length-wise, each square being 50 meshes across x 110 meshes length-wise. (In some nets there are 400 square pieces 25 length-wise x 50 meshes across, first 23 longitudinal rows of cotton and the last two cod end tip rows made up of thick hemp instead of cotton with 8 mm mesh stretched).
Belly portion of bag	12.34 mm length, 500 meshes each half, the edge joining the cod end is much narrower, the mesh size being 20 mm stretched compared to the 62 mm stretched near the wing. (Belly portion of some nets made of 4 upper and 4 lower parts joined longitudinally). The two outer pieces of upper half and lower half similar, with same mesh (75 mm stretched at wing and 25 mm stretched at cod end). The two inner portions of lower half and upper half are also similar.
Wings	Each wing 3 pieces, the belly end made of cotton, the upper and lower halves of each wing being 220 meshes across, the middle portion made of coir, having 41 meshes in both upper and lower halves, and the rope end made up of hemp or SF also having 41 meshes and the length being 32 m, 54.86 m and 137.16 m respectively. (In some nets, the outer coir portions extend from top of wings to belly, to which are attached the inner cotton portions, both of which converge to the belly where there are 3—5 mesh selvages.)
Towing warps	A single rope is 22.50 m length x 37 mm dia. 2 hemp/SF ropes, and 1 coir rope are joined in series. This is repeated until there are 30 ropes connected to one end of net (the shore side) and 50 ropes connected to other end of net (the sea side). In some nets, a single hemp rope and a coir rope are attached alternately.
Mode of operation	Beach seine, loaded on a bar boat, leaving the extremity of the shore side warp on the beach. The ropes are laid out till one wing of the seine is reached; the net is then laid and after the cod end bag is released, the boat moves in a semi-circle to bring the end of the sea side ropes to the shore, after which the two warps are dragged by 10 or 12 men on each side, moving nearer to one another as the net comes closer, two or three more remaining in the water and guiding the seine to the shore.
Fishing time	Early morning till noon.
Fishing area	Within 2/3 km from the shore, in Pun and Ganjam districts.
Fishing season	October/November to March/April.
Main species caught	Anchovies, sardines and silver bellies.
Cost	Rs. 8,000—14,000
Life of gear	2 to 3 years
Crew	25 approximately.

.BADA JALO

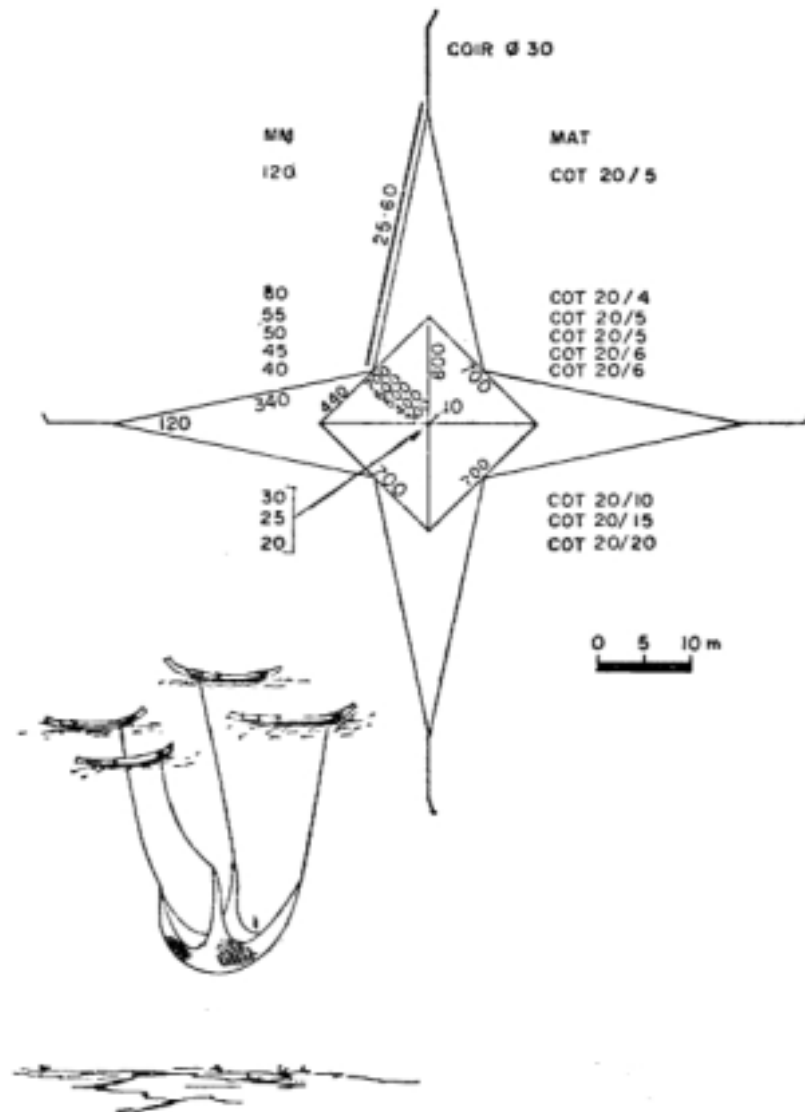


3.2.6 *Lift net*

3.2.6.1 Marala

Netting material	Cotton
Dimensions	Wing sides 25.60 m of four cornered net, fabricated by side-wise joining of 2 boat seine nets.
Mesh size	20 mm stretched in middle of bunt to 60 mm stretched in mouth of belly and 120 mm stretched at wings.
Twine size	Cot 20/20 at bunt to Cot 20/4 at mouth of belly and wings Cot 20/5.
Sinkers	1 kg stones used sometimes at the 4 interjunctions of the wings.
Rope	Cotton 8 mm dia. rope at the wing edges, to the corners of which are attached 60 m x 25 mm dia. coir rope warps.
Mode of operation	The net is worked by four kattumarams, which drop the net to the sea bottom and lift it up after sometime, when fish seem to be over it.
Fishing time	Early hours till noon.
Fishing area	Off Ganjam district.
Fishing season	February to April, occasionally at other times.
Main species caught	Anchovies, other clupeid, Jew fish, silver bellies and shrimp.
Estimated cost	Rs. 2,000
Annual maintenance cost	Rs. 400
Life of gear	3 years
Crew	Eight

LIFT NET (MARALA)



Publications of the Bay of Bengal Programme (BOBP)

The BOBP brings out six types of publications:

Reports (BOBP/REP/...) describe and analyze completed activities such as seminars, annual meetings of BOBP's Advisory Committee, and projects in member-countries for which BOBP inputs have ended.

Working Papers (BOBP/WP/...) are progress reports that discuss the findings of ongoing BOBP work.

Miscellaneous Papers (BOBP/MIS/...) concern work not originated by BOBP staff or consultants — but which is relevant to the Programme's objectives.

Newsletters (*Bay of Bengal News*), issued quarterly, contain illustrated articles and features in a technical style on BOBP work and related subjects.

Information Documents (BOBP/INF...) are bibliographies and descriptive documents on the fisheries of member-countries in the region.

Manuals and Guides (BOBP/MAGJ...) are instructional documents for specific audiences.

A list of publications follows.

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2. Report of the Second Meeting of the Advisory Committee. Madras, India, 29–30 June 1977. (Published as Appendix 2 of IOFCJDEV/78/44.1, FAO, Rome, 1978)
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20. Coastal Aquaculture Project for Shrimp and Finfish in Ban Merbok, Kedah, Malaysia. Madras, India, December 1984.
21. Income-Earning Activities for Women from Fishing Communities in Sri Lanka. Edeltraud Drewes. Madras, India, September 1985.
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18. Review of Brackishwater Aquaculture Development in Tamil Nadu. Kasemsant Chalayondeja and Anant Saraya of the Department of Fisheries, Thailand. Madras, India, September 1982.
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