

Studies on the Gill Nets of Andhra Pradesh

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Artisanal fishing still plays an important role, in spite of domination by trawlers in small-scale fisheries sector. Gill net fishing is one of the popular fishing methods along the east coast of India. However, there are regional variations in their construction and operation. This paper deals with design details of gill nets operated from Srikakulam district to Nellore district of Andhra Pradesh. Polyamide monofilament netting of 0.16 mm to 0.32 mm diameter twine were generally used for construction of gill nets throughout the coast. Polyamide multifilament netting of 210D/1/3 to 210D/6/3 of 20-40 mm mesh size were used for capture of smaller sized fish. Polyamide multifilament netting used in construction of large mesh gill nets targeted at large pelagic fishes, are being replaced by high density polyethylene netting.

Key words: Gill nets, netting material, artisanal fisheries, Andhra Pradesh.

Andhra Pradesh, having a coast line of about 974 km, contributes nearly 1.5×10^5 t of fish from marine sector in India. About 8.7×10^5 fishermen are engaged in fishing and allied sectors in Andhra Pradesh. Among them 2.7×10^5 fishermen depend on capture fishery and are operating indigenous gears. Indigenous gears operated by the coastal fishermen contribute to about 65% of marine fish catch of our country (Luther, 1988). The design and construction of indigenous gears vary from one region to another.

About 91,000 gill nets are being operated along the coast off Andhra Pradesh. Different types of gill nets operated on east and west coast have been described by Anon (1981), Joseph & Sebastian (1964), Luther (1988 & 1994), Rajan *et al.* (1991), Narayanappa *et al.* (1991), Panicker *et al.* (1978), Radhalekshmi *et al.* (1986), Kunjipalu *et al.* (1991), Vijayan *et al.* (1991), and Pravin *et al.* (2000).

Detailed information on gear systems is essential for their improvement in terms of efficiency and cost-effectiveness, and for management of fisheries. The present paper deals with the design and operational details and catch details of various types of gill nets

prevalent in different maritime districts of Andhra Pradesh.

Materials and Methods

The data pertaining to the design, construction and operation of gill nets were collected from the major landing centres of Srikakulam, Visakhapatnam, East and West Godavari, Krishna, Guntur, Nellore and Prakasam districts of Andhra Pradesh, by examination of representative samples from each category of gill nets. Information on species caught by different types of gill nets was collected from landing centres.

Results and Discussion

District-wise distribution of gill nets of Andhra Pradesh is given in Table 1. Design and construction details of gill nets are given in Table 2. Gill net fishing in Andhra coast is carried out from catamarans, stitched boats, plank-built boats and fiberglass boats. At Srikakulam and Visakhapatnam districts, motorized and non-motorized catamarans and stitched boats are widely used. In East Godavari, West Godavari, Guntur, Nellore and Prakasam districts, plank-built boats fitted with inboard engines are used in addition

Table 1. District-wise distribution of gill nets off Andhra Pradesh coast

District	Number of Gill Nets
Srikakulam	3969
Vizianagaram	47
Visakhapatnam	18254
East Godavari	19311
West Godavari	2896
Krishna	3334
Guntur	15015
Prakasam	2297
Nellore	6005
Chittoor	133
Kumool	796
Kammam	3328
Warangal	3618
Karimnagar	1706
Adilabad	596
Ranga Reddy	1068
Medak	1178
Mahaboob Nagar	642
Nalgonda	4934
Nizambad	1644
TOTAL	90771

Source : Andhra Pradesh fisheries Statistics 1998

to catamarans. Fiberglass boats are commonly used in all districts of Andhra Pradesh for gill net operation.

The results of the survey indicated that synthetic netting and ropes were the most common materials used for the fabrication of gill nets (Table 2). Machine-made polyamide and high density polyethylene (HDPE) were mostly used for fabrication of gill nets. Based on materials used for fabrication, gill nets of Andhra Pradesh can be grouped into three categories, viz., (i) polyamide monofilament gill nets, (ii) polyamide multifilament gill nets and (iii) HDPE twisted monofilament gill nets.

Polyamide monofilament gill nets were generally made of 0.16-0.32 mm dia twine. The mesh size and hanging coefficient of these gill nets were 50-130 mm and 0.4-0.5, respectively. These nets are known as *naram vala* in vernacular. The average dimension of the net was 1260 m in length and 10 m in depth. Nets with 50 mm mesh size were used for capture of mackerel and ribbonfish,

60-80 mm mesh for seer fish and 80-130 mm mesh for pomfrets. Netting of light green colour was widely used.

The second group consisted of polyamide multifilament gill nets of thin twine and thick twine constructions, and trammel nets. Polyamide multifilament gill nets of thin twine construction were made of 210D/1/2 to 210D/1/3 twine, 20-40 mm mesh size netting and usually had a hanging coefficient of 0.5 to 0.55. These nets were widely used for catching sardines and anchovies. The average length of the unit was 360 m and depth, 9 m. Two to four units were tied together for operations. Gill nets under this category having fleet dimensions of 750-1500 m length and 12 m depth are known as *joga vala* in vernacular.

Polyamide multifilament gill nets of thick twine construction were made of 210D/6/3 to 210D/10/3 and 210D/12/3 twine, with a hanging coefficient of 0.53 and overall dimensions of 45 m length and 5.5 m depth. They were used for catching seer, catfishes and pomfrets. 10-30 units were joined end to end for operations.

Trammel nets consisted of a middle layer made of polyamide multifilament netting of 210D/1/2 twine, 50 mm mesh size and hanging coefficient of 0.50 and two outer layers made of polyamide multifilament netting of 210D/3/3 twine, 250 mm mesh size and hanging coefficient of 0.7. Trammel nets, known as *disco net* in vernacular, were used mainly for catching prawns and were operated as bottom set nets.

Gill nets made of HDPE netting of 2 mm twine and 130-200 mm mesh size and overall dimensions 26 m length and 7.8 m depth, formed the third group. 15 to 20 units were joined end to end for operations. HDPE gill nets were mainly targeted at larger fishes like sea bass, catfishes and seer fish.

The survey has shown that operation is carried out as bottom set gill nets, mid-water gill nets and surface drift nets. Bottom set

Table 2. Details of gill nets operated off Andhra Pradesh coast

District Village/ Harbour	Craft	Dimensions of gear		Material	Twine size	Mesh size (mm)	Hanging coefficient	No. of units operated	Target species	
		Length (m)	Depth (m)							
Srikakulam										
Bandaruvanipalem	Catamaran & Stitched boat	720	7	PA monofilament	0.23 mmØ	40	0.55	2	Sardines	
	Catamaran & Stitched boat	1260	10	PA monofilament	0.23 mmØ	120	0.5	5-6	Wolf herring and pomfrets	
Kalingapatanam	Catamaran & Stitched boat	720	7.5	PA multifilament	210D/1/3	60	0.55	2-3	Seer and ribbon fish	
	Catamaran & Stitched boat	360	7.5	PA multifilament	210D/6/3	200	0.50	2	Wolf herring, pomfrets and catfishes	
Iskalapalem	Catamaran & Stitched boat	540	10	PA monofilament	0.23 mmØ	130	0.55	5-6	Pomfrets	
Visakhapatnam										
Fishing harbour	Catamaran & Stitched boat	360	10	PA multifilament	210D/1/2	30	0.50	2	Ribbon fish	
Lawson's Bay	Catamaran	120	9	PA monofilament	0.16 mmØ	50	0.55	6	Clupeids and mackerel	
	Catamaran	90	10	PA monofilament	0.16 mmØ	30	0.55	5-6	Sardines	
Bhimunipatanam	Catamaran	90	7	PA multifilament	210D/1/3	50	0.55	5-6	Mackerel, mullet and ribbon fish	
	Catamaran	80	3	Trammel net	210D/1/2(I)	50(I)	0.50(I)	4	Prawns	
Pentakota				PA multifilament	210D/3/3(O)	250(O)				
	Catamaran	26	3.5	PA multifilament	210D/1/2	20	0.50	10	Sardines and anchovies	
	Catamaran	140	8	PA monofilament	0.16 mmØ	50	0.44	10-20	Anchovies and mackerel	
	Catamaran	46	3.5	Trammel net	210D/1/2(I)	50(I)	0.50(I)	5-10	Prawns	
				PA multifilament	210D/2/3(O)	250(O)	0.70(O)			
East Godawari										
Dummula Peta	Catamaran & Nava	53	3	PA monofilament	0.16 mmØ	30	0.41	15	Sardines and anchovies	
Dummula Peta	Nava	58	3.5	PA monofilament	0.32 mmØ	50	0.45	25	Polynemids, mullets and anchovies	
Bhiravapalem	Nava	28	9.6	PA monofilament	1.50 mmØ	120	0.44	12-15	Pomfrets and seer	
	Nava	45	5.5	PA multifilament	210D/12/3	190	0.53	30	Pomfrets and seer	
	Nava	110	3.2	PA multifilament	210D/10/3	400	0.53	10	Skates and rays	
	Nava	38	5.5	PA monofilament	0.16 mmØ	100	0.37	30	Pomfrets and sciaenids	
Vasalthipa	Nava	17.6	3	PA monofilament	0.16 mmØ	25	0.44	30	Prawns and anchovies	
	Catamaran	60	6.25	PA monofilament	0.14 mmØ	50	0.52	20	Anchovies and sciaenids	
Nakkarameswaram	Catamaran & Nava	62	6	PA monofilament	0.23 mmØ	110	0.53	20	Pomfrets and seer	
	Nava	60	8	PA multifilament	210D/2/3	40	0.54	15	Sardines and anchovies	
Vodalarevu	Nava	58	7.8	PA multifilament	210D/2/3	120	0.56	16	Pomfrets and rays	
	Nava	26	7.8	HDPE	2.00 mmØ	140	0.51	15	Seer and sea bass	
Seetaram puram	Nava	72	7.6	PA monofilament	0.16 mmØ	80	0.52	25	Seer and sciaenids	
	Catamaran	56	7.8	PA monofilament	0.16 mmØ	50	0.51	20	Carangids and seer	
Antharvedi palem	Catamaran	64	6	PA monofilament	0.16 mmØ	60	0.48	20	Carangids and seer	
	Nava	64	8.4	PA monofilament	0.23 mmØ	140	0.53	25	Pomfrets and seer	
	Nava	73	9.6	PA monofilament	0.32 mmØ	60	0.54	20	Carangids and seer	
	Nava	27	11.4	HDPE	2.00 mmØ	150	0.51	20	Pomfrets and seer	

(Contd. on next page)

West Godavari

Mollaparru	Nava	72	7.6	PA monofilament	0.16 mmØ	80	0.50	30	Pomfrets and sciaenids
	Nava	62	6	PA monofilament	0.16 mmØ	100	0.55	25	Pomfrets
Pedanyka vanilanka	Nava	70	8	PA monofilament	0.23 mmØ	120	0.54	30	Pomfrets
	Nava	68	8	PA monofilament	0.16 mmØ	60	0.55	30	Seer and carangids

Krishna

Cambelpet	Nava	70	7	PA monofilament	0.16 mmØ	55	0.51	25	Seer and sharks
	Nava	84	6.5	PA monofilament	0.23 mmØ	115	0.50	20	Pomfrets
	Nava with engine	64	7	PA multifilament	210D/1/2	60	0.60	20	Seer and pomfrets
Chinakarraagraharam	Nava	56	7	PA multifilament	210D/1/3	50	0.50	22	Seer and barracuda
	Nava with engine	86	8	PA multifilament	210D/1/3	100	0.56	20	Pomfrets
	Nava with engine	85	7.5	PA monofilament	0.23 mmØ	120	0.51	25	Pomfrets
Tallapalem	Nava with engine	78	8	PA multifilament	210D/1/3	80	0.65	15	Pomfrets
Satrava Palem	Nava with engine	86	8	PA monofilament	0.23 mmØ	100	0.52	20	Pomfrets and seer
	Nava with engine	88	7.2	PA monofilament	0.23 mmØ	80	0.53	20	Seer and sciaenids
	Nava	80	9	PA multifilament	210D/1/2	80	0.65	20	Seer
Karedu	Nava with engine	25	10	PA monofilament	0.32 mmØ	130	0.52	35	Seer
	Nava with engine	84	6.5	PA monofilament	0.23 mmØ	115	0.50	20	Pomfrets
	Nava with engine	80	9	PA multifilament	210D/1/2	60	0.60	20	Seer and pomfrets
Kanuru	Nava with engine	25	10	PA monofilament	0.32 mmØ	130	0.52	30	Seer
	Nava with engine	22	12	PA monofilament	0.32 mmØ	150	0.51	30	Seer
	Nava with engine	78	9	PA monofilament	0.16 mmØ	60	0.49	30	Catfish and sciaenids
Pedapatnam	FRP boat	78	9	PA multifilament	210D/1/3	60	0.51	30	Seer and catfish
	FRP boat	28	9	HDPE	2.00 mmØ	60	0.51	30	Seer
	FRP boat	88	9	PA multifilament	210D/1/3	100	0.62	20	Seer
Gilakaladindi	FRP boat	91	8.5	PA monofilament	0.23 mmØ	120	0.54	20	Seer and pomfrets
	FRP boat	28	9	HDPE	2.00 mmØ	150	0.52	30	Sea bass and catfish
Mangina Pudi	Nava	88	9	PA monofilament	0.23 mmØ	130	0.50	30	Pomfrets
	Nava	84	7	PA multifilament	210D/1/2	60	0.60	20	Catfish
	Nava	26.5	190	HDPE	2.00 mmØ	150	0.51	30	Seer and catfish
Guntur									
Nizampatnam	Nava	32	9	PA monofilament	0.16 mmØ	80	0.55	20	Seer and pomfrets
	Nava	45	9	HDPE	2.00 mmØ	150	0.50	20	Sea bass and seer
Suryalanka	Nava	100	7	PA monofilament	0.16 mmØ	60	0.46	20	Ribbon fish and sardines
Vodarevu	Nava	70	6	PA monofilament	0.32 mmØ	50	0.50	8	Mackerel and sciaenids
Prakasam									
Kothapatnam	Nava	70	7	PA monofilament	0.16 mmØ	60	0.50	15	Mackerel and ribbon fish
Nellore									
Mypadu	Nava	800	9.6	PA monofilament	0.16 mmØ	40	0.50	10	Mackerel and sardines
Krishnapatnam	Nava	800	9.6	PA monofilament	0.16 mmØ	60	0.50	1	Sciaenids and seer

I : Inner; O : Outer

gill nets employed sufficient sinkers to keep the lead line on the seabed. The buoyancy provided by the thermocole floats maintained the orientation of the netting panel under water. Lines from float line and lead line at each end of the fleet were connected to anchors. Marker buoys were attached at either end, for identifying location of the gear. In the case of mid-water gill nets, the depth of operation of the fleet was adjusted by the buoy lines. Floats and sinkers were adjusted in such a way as to obtain slightly negative buoyancy for the netting unit, and the net suspended from the buoy lines. In drift netting, one end of the fleet was secured to a buoy and the other end was tethered to the vessel.

The study has shown that different types of gill nets were operated for different target species. Polyamide monofilament gill nets of 0.16-0.23 mm dia twines and polyamide multifilament gill nets of 210D/1/2 twine of mesh size 20-40 mm were especially used for catching sardines and were locally known as *kavala vala*. Polyamide monofilament gill nets of 0.23-0.32 mm dia twine and polyamide multifilament gill nets of 210D/1/2 twine with 50-60 mm mesh size, known as *kanagarthala vala* in vernacular, were mainly used for mackerels. Gill nets with similar twine specifications but larger mesh size (80-100 mm), known as *vanjaram vala* in vernacular, were used for seer fish. Polyamide monofilament of 0.23-0.32 mm dia twine and polyamide multifilament gill nets of 210D/10/3 and 210D/12/3 twine with 120-150 mm mesh size were especially used for pomfrets and these nets were locally known as *chandua vala*.

It was observed that the use of polyamide multifilament gill nets of small mesh size (25-30 mm) in commercial fisheries resulted in landing large quantities of juvenile sardines. Luther (1994) has reported 94% and 73% of juvenile sardines in the catch of gill nets with 25 and 28 mm mesh sizes,

respectively. Mesh sizes of trammel nets operated along Visakhapatnam coast have drastically reduced from 50 mm to 20 mm for the inner netting and from 250 mm to 100 mm for the outer netting. Effect of this reduction in mesh size on shrimp stocks and fishing mortality of juveniles need to be studied. Polyamide multifilament gill nets of thick twine construction and 150-400 mm mesh size used for catching large fishes such as sea bass and seer are being slowly replaced by HDPE gill nets.

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