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Studies on fishing Crafts and Gears in Tandava reservoir, Andhra Pradesh, India

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Abstract

The present study deals with the various types of Crafts and gears operated for exploitation of fishery resources in Tandava reservoir, Visakhapatnam district of Andhra Pradesh. The data collected during 2006-2008 are reported in this communication. Four types of crafts, five types of nets and five types of traps were operated for exploitation of the fishery in Tandava reservoir. It was observed that gill nets made of polyamide monofilament and multifilament are predominantly used . Traps made of split bamboo are used in this reservoir. Stick held drag nets are used in some areas of the reservoir to exploit murrel fish. The design details, fishery and operational methods of gears of Tandava reservoir of Andhra Pradesh state are presented in this communication

Keywords: Gill net, Trap, polyamide monofilament, multifilament.

Introduction

India has played an important role in global fisheries as the second largest producer of fish in the world. Inland fishing is gaining importance in view of significant contribution to the fish production of the country. Andhra Pradesh is the fifth largest state in India and is endowed with vast area of inland aquatic resources. Krishna, Godavari, Pennar and Tungabhadra are the main rivers, which are responsible for the vast fresh water area for capture fisheries in the state. Andhra Pradesh has 98 small reservoirs, 2800 tanks, 32 medium reservoir and 7 large reservoirs with a total surface water area of 4,58 507 ha[1]. Although the main purpose of reservoirs are irrigation and Hydro electricity, fisheries also forms an integral part as a natural resource. Harvesting methods are varied in different inland water bodies depending on topography, ecology and habitat of the fishery resources. Indigenous technologies are eco friendly and efficient in operation. Better management measures are required for improving the production from the reservoir. Studies on the existing harvest systems are very much essential for further improvement and sustainable development of the fishery sector.

Tandava reservoir is a manmade impoundment constructed in late sixtees. The reservoir is situated in the Visakhapatnam district of Andhra Pradesh and is located between $17^0$30' and $17^0$45' North latitude and $82^0$15'and $82^0$30' East longitude. Tandava reservoir comes under medium reservoir category which has catchment area of 448 km and water spread area of 1689 hectares is shown in figure-1. There are 14 villages around the reservoir with 500 registered fisher-folk who depend mainly on fisheries for their livelihood. Types of Crafts and gears and their operation in reservoirs from india[2-8] and Andhra Pradesh[9-10] have been reported by earlier authors. Indigenous Technological Knowledge (ITK) of Reservoirs of Andhra Pradesh are not documented. This study is an attempt to document the indigenous Crafts and Gears presently used by Tandava reservoir fishermen of Andhra Pradesh.

Material and Methods

A detailed survey on the craft and gears operated in the Tandava reservoir has been under taken during 2006-09 was presented. The data pertaining to the technical specifications of the crafts, design details of the gear and the mode of operation were recorded by physical examination of the units at landing centres. The gear specifications such as type of material, mesh size, twine size, constructional details, hanging ratio, floats and sinkers were collected as per the standards[11]. Details were collected from the landing centres of Salika mallavaram ,Jalaripet , Golugonda, Jogumpet, pappusettypalem, Ammapeta, Kotturu, Ram nagar, K.mallam peta, Gadam palem, Venkatapuram, pogachetlapalem and other surrounding villages. Data on catch details has been collected daily by supplying data sheets to the fishermen.

Results and Discussion

To exploit the fishery resources local fishermen are being using traditional crafts and gears since ages. Based on the local area topography and behavior of fish the designs of craft and gears are varying. The craft and gears are constructed by using locally available materials. The major fishery of the reservoir was *Labeo rohita, Catla catla, Cirrhinus mrigala, Channa striatus, Channa gauchua, Clarius batrachus, wallago attu, Notopterus spp., Mystus spp., Heteropneustes fossilis, Ompok spp, Tilapia spp., Macrobrachium rosenbergii.* Traditional fishermen of Tandava are using four types of crafts, five types of traps and

five types of gears for exploitation of reservoir fishery.

Types of Crafts: Coracle: Coracle is a major craft used in the reservoir. It is a wide mouthed circular flat bottomed basket of 2 m diameter made of split bamboo frame. The bottom is flat and covered with sheets of plastic, in order to make them waterproof. Some areas the bottom of the craft is tarred to make it waterproof showed in figure- 2 Coracles are an effective fishing vessel, steered and propelled using a single paddle. Gill nets and traps are operated from this vessel and usually one or two persons will be operating this craft.

Canoe: It is made by hallowing out of a single palm tree of varying sizes of 6-10m long and 2ft wide. One end of this is bulbous and wide and the other end is narrow given in figure-3. It is propelled by Oar. Traps, cast nets, gill nets are operated from these canoes with a crew of one person in the reservoir.

Wooden Plank build boats: Boats made with planks are widely used in the reservoirs. They are keel or keel fewer boats with shallow draft. It is a narrow flat bottom boat measuring 12-13 ft length and 3-4 ft width showed in figure-4. It is propelled by Oar and used for operation of traps, gill net, cast net and hook and line.

Tin boats: It is made by tin material, the sheet is carved in boat shape and edges are mounted by locally available wooden planks. Below the sheet a wooden keel is fixed and internally wooden ribs are arranged. It is a deep bottom boat measuring 12-15ft length and 4-5 ft wide and 2-3ft depth showed in figure-5. It is propelled by oar. Gill nets, cast nets, traps and lines are operated from this boat.

Traps: Prawn trap: Traditionally box type traps are used in reservoirs to catch fresh water prawns. This tarp is square in shape, fabricated with split bamboo. This trap bears a length of 50 cm, breadth of 43 cm and height of 38 cm. The trap has a vertical inlet at both sides. The inlet structure is 'V" shaped and the sticks from either end touch together at the middle resembling spines, thereby preventing the trapped prawns from moving out was showed in figure-6. Fresh coconut kernels are used as bait to lure the prawn to the trap. Once attracted to the bait the prawn easily enters the trap from the 'V" shaped entrance, but very difficult to come out. These traps are mainly used during the months of September to January. Each trap yielded 1-4kg of prawn, immersion time of the trap is 8-12 hours.

Fish Trap: It is a box shaped rectangular trap made of split bamboo for exploitation of fish. The length x depth x height of the trap is 36cm x25cmx30cm. The inlet structure is 'V" shaped like prawn trap was showed in figure-7. Cooked broken rice was used as bait to attract fish. These traps are used to catch Catla, rohu and mrigal fish.

Eel Trap: These traditional traps are used in reservoirs and tanks to catch fresh water eels. This tarp is cylindrical in shape, made of split bamboo. This trap bears a length 120 cm, diameter of 36 cm. The trap has a 30cm length funnel in the inner side of the cylindrical part. The narrow part of the funnel is tied with 4cm dia tubular nylon cloth. The inner funnel of the trap leads eel fish to enter into the trap and pass through the narrow part and enter to the inner chamber. The narrow nylon tubular cloth prevents the trapped fishes from moving out was showed in figure-8. Fresh smaller size prawns are used as bait to lure the eel to the trap. Once attracted to the bait the eel fish easily enters the trap from the funnel entrance, but very difficult to come out. These traps are mainly used during the months of April to August.

Conical Trap: It is a conical shaped trap made of bamboo splits. The bamboo splits are tied by locally available plant fibre. The diameter of the bottom circular mouth is 50cm. The Height of the trap is 62cm. The diameter of the conical tip of the trap is 12cm was given in figure-9. This trap is mainly used to trap prawn, murrels, mastocembalus spp., etc. during summer season. It is operated in shallow waters by putting the trap on mud. The fish traped inside the conical trap are removed by putting the hand in the upper tip of the narrow part.

Murrel Trap: This trap is bag shape and fabricated with long plastic strips. The length x diameter is of 45cm X 20cm. Around 10-12 plastic strips of 10mm dia. and 45cm length are tied in conical shape. Around 10-15 strips tied vertically at 3cm intervals was showed in figure 10. This trap tied to the shrubs in the reservoirs in horizontal position. The murrels enters in to this trap voluntarily and the fishermen are harvesting the fish by removing the trap from the shrub.

Types of Gears: PA Multi filament Gillnet: Polyamide multifilament and monofilament gill nets are mainly used in the reservoir. Depending on the type of fish to be caught, the length, depth and mesh sizes are varying. The mesh size varied from 30mm to 250mm. Nets are fabricated from 210/1/3 and 210/2/3 nylon polyamide multifilament webbing. Length of the net ranges from 300-750 m and depth is 6-7m. 20-30 units of 20-30m length each were joined together to make a single net. The head rope used for mounting the net was usually 210/18/3 nylon polyamide multifilament twine. The hanging ratio of the net is ranging from 27.7-70%. Thermo coal floats were tied on head rope. There is no foot rope for the pelagic gill nets. The nets were operated as pelagic drift gill nets. The nets were set in the evening, left over night and lifted in the early morning. Design details of Polyamide multifilament is given in table-1

PA Monofilament Gill nets: Polyamide monofilament gill nets are predominantly used in the reservoir. The length of the net ranges from 100-800m and depth 2.5-10.5m. The mesh sizes ranges from 25-150mm fabricated with 0.16-0.38 mm dia. polyamide monofilament twine. The head rope used for mounting the net was 2mm HDPE rope and 210/16/3 polyamide multifilament twine. The hanging ratio of the net is 37-70%. Thermo coal floats were tied to the head rope. The technical and design details are given in table-2.

Table-1
Design details of Polyamide multifilament Gill nets

Type of gear	Area of operation	Type of operation	Material	Material size	Mesh size (mm)	Length of net (m)	Depth (m)	Hanging ratio (%)
Gill net	Salika mallavaram	Surface drift	PA multi filament	210/2/3	250	750	6.25	45
Gill net	Salika mallavaram	Surface drift	PA multi filament	210/1/3	150	500	6.75	37
Gill net	-	-	-	210/1/3	140	500-600	7.0	50
Gill net	=	-	-	210/1/3	120	500	6.0	27.7
Gill net	Jalaripet	-	-	210/1/3	80	500	6.4	50
Gill net				210/1/3	50	500	6.0	50
Gill net				210/1/3	30	500	6.0	70
Gill net	Ammapeta		PA multi filament	210/2/3	140	300-500	6.0	40
Gill net	Ammapet		PA multi filament	210/1/3	60	300-500	6.0	50

Table-2
Design details of PA monofilament Gill nets

Type of gear	**Area of operation**	**Type of operation**	**Material**	**Material Size(mm)**	**Mesh size mm**	**Length of net m**	**Depth m**	**Hanging ratio %**
Gill net	Salika mallavaram	Surface drift	PA onofilament	0.38	140	500	7.5	50
Gill net	Salika mallavaram	Surface drift	PA onofilament	0.23	60	450	7.5	37
Gill net	-	Surface drift	PA onofilament	0.28	150	800	10.5	53
Gill net	-	Surface drift	PA onofilament	0.26	120	500	9.6	42
Gillnet	-	Sueface drift	PA onofilament	0.26	60	100	6.0	64
Gill net	-	Surface drift	PA onofilament	0.16	25	500	2.5	70
Gill net	Golugonda	Surface drift net	PA onofilament	0.38	140	500	7.5	50
Gill net	Golukonda	Surface drift net	PA onofilament	0.16	60	500	7.5	50
Gill net	Ammapeta	Surface drift net	PA onofilament	0.23	100	300-600	8.0	50

Stick held drag net: The net is fabricated with 210/2/3 PA multifilament webbing of 25mm mesh size. It is generally of 15-20m length and 3m depth. The webbing is fixed to 13-20 bamboo sticks of 3 feet length at intervals of 0.8-1.0m with 50% hanging ratio**.** Selvedge of one mesh of 210/16/3 PA multifilament of 50mm mesh size is mounted on 4mm PP head rope and 4 meshes of 210/12/3 PA multifilament of 25mm was mounted on 4mm PP foot rope. On both the edges of the net 32 double 210/16/3 PA multifilament meshes of 50mm is tied to 210/12/3 PA multifilament of 15 meshes of 25mm on both the sides of the net. 3m depth of the webbing is tied to the 3ft bamboo stick shown in figure-11. This net is operated in muddy locations. This net is operated by 3-5 persons. Both the ends and middle of the net was held by 3-5 people and they press the bottom sticks and bottom webbing with legs and drag the entire area. The mud dwelling fish like murrels and weed fishes will enter in to this net.

Cast net: Cast net locally known as esuru vala. Two types of cast nets are used i.e net with stings and without stings. It is conical in shape and is fabricated with 210/2/2 PA multi filament of 200 meshes of 20mm mesh size at top and 2000 meshes of 15mm mesh size at bottom. Iron beads weighing 3-5kg are tied on 210/20/3 nylon twine for each 3 meshes. Sting nets have 12-15 vertical stings/ribs shown in figure-12. This net is used to catch prawns and small size fish like ompok, puntius, mystis etc.

Trammel nets: These nets are operated in Jalaripet, lnner wall of webbing is made with PA multifilament 210/2/2 of 50mm mesh size. The outer two walls of webbing is fabricated with 210/2/3 PA multifilament of 250mm mesh size. These nets are used from November to January to catch Macrobrachium spp.

Long lines: This gear has a main line of 6mm PP rope and branch line of 1m length made of Poly amide 0.7mm dia attached to every 2 meters interval. Around 100-150 hooks are used to exploit predatory fish in reservoirs. To catch the murrel fish 7-9 number hooks are used.

Figure-1
Satellite image of Tandava reservoir

Figure-2
Coracle

Figure-3
Canoe

Figure-4
Plank built boat

Figure-5
Tin boat

Figure-6
Prawn trap

Figure-7
Fish trap

Figure-8
Eel trap

Figure-9
Conical trap

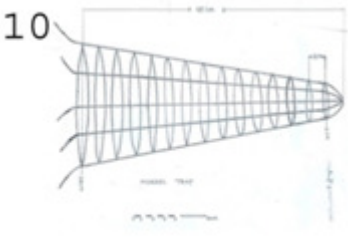

Figure-10
Murrel trap

Figrue-11
Stick held drag net

Figure-12
Cast net

Conclusion

The traditional fishing gears are eco friendly and low energy gears made from locally available materials. Polyamide multifilament and monofilaments gill nets and bamboo traps are predominantly used in all villages of reservoir. Stick held drag nets are mainly used in Pappusetty palem and salikamallavaram villages for exploitation of murrels. Entangling trammel nets are used in Jalari pet. Entangling gill nets are used to catch big size fish . Proper selection of mesh size, hanging ratio of the net will help in judicial exploitation and management of fishery resources. Improved and durable material for traps and gears and new designs will enhance the durability and selectivity.

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