

Types of fishing gear in Salah Nama Island, Musi River South Sumatra

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Abstract. The estuary of Musi River and the swamps at Salah Nama Island are fishing areas for local fishers from Banyuasin Regency, South Sumatra. The fishers are well adapted to fish habitat complexities and fish biodiversity by operating various types of fishing gear. Description of fishing gear is a type of information needed for fisheries management. This study aims to make an inventory of fishing gear operated by the local fishers and assess the conformity of the fishing gear with existing regulations. Field surveys and interviews were carried out from March to May 2023 involving fishers around the island. As expected, their catches were dominated by estuarine fishes. This study identified three categories of fishing gear, namely traps (sengkirai, traps for shrimps), gillnets (seluang nets, driftnets, tangkul, and cast nets), and hooks in the form of longlines. The specifications of all fishing gear complied with the existing regulations.

1 Introduction

The inland fisheries resources in South Sumatra region are characterized by high biodiversity and various habitats that are potential fishing grounds. According to [1], the aquatic habitats in the region consists of lakes, swamps, rivers, and other water bodies. One area among these habitats are the swamp areas at Salah Nama Island, located in Banyuasin Regency where Musi River passes through. The island is located at the intersection of boat traffic. According to [4, 5], the island is surrounded by the river and regularly flooded. Flooded swamps are commonly fertile areas because received nutrients from various sources, including agriculture and animal husbandry, also decomposed natural vegetation or aquatic plants [6], cultivated fish and plants [7, 8]. Swamp areas are important habitats for various freshwater fishes as their feeding grounds, spawning grounds, and nursery grounds [9, 10, 11, 12].

Salah Island has been used by local communities for agriculture and fisheries activities [4, 13]. During low tide or the dry season, the swamp areas will be utilized as gardens or growing crops during low tide or the dry season. In the dry season, fish will leave the swamp areas – return to the Musi River through an inlet [4]. During wet season when the swamp areas are flooded by waters from the river, the nearby residents from Mariana Ilir District, Banyuasin Regency, will operate their fishing gear in the areas everyday [15].

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Description of fishing gear, including its specification, is one of the important information types required for fisheries management carried out by the Government of Banyuasin Regency (GBR). Therefore, an inventory of fishing gear operated in the area is needed. The inventory will enable the fisheries management body to determine conformity of the current use of fishing gear with the regulation on fishing gear specification and location of fishing areas, i.e. Ministerial Regulation of Marine Affairs and Fisheries No. 18 of 2021 (MR18/2021) on Placement of Fishing Gear and Auxiliary Machinery in Indonesia Waters and Arrangement of Inter-Province Fishers.

2 Method

This study consisted of field data collection through 2 surveys (in March and May 2023) in Salah Nama Island, Mariana Ilir District, Banyuasin Regency, South Sumatra (Figure 1). Types of data include designs and materials of fishing gear, fishing methods, and types of catch. These data were collected by direct observations and interviewing respondents as many as 30% of the total number of fishers in the area.

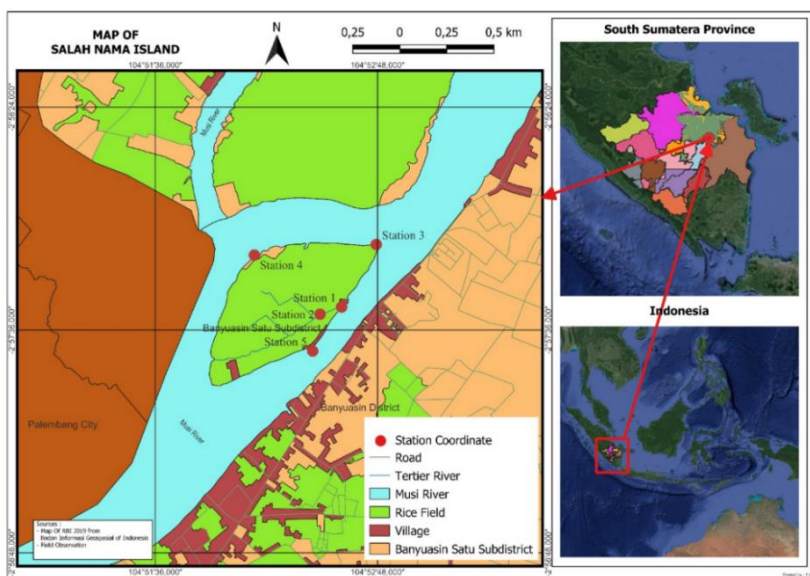


Fig. 1. Location of Salah Nama Island, South Sumatra and five sites of data collection

3 Results and Discussion

3.1 Results

This research only describes the types of fishing gear found Salah Nama Island and assess the conformity of each fishing gear to the fishing gear regulation from its specification. In general, the local community operate fishing gear of simple technology, less productivity and assembled locally. These gears are locally called seluang nets, fixed gillnets, bubu or shrimp sengkirai (shrimp traps), *jala* (cast nets), *tangkal*, and *rawai pendam* (bottom longlines).

3.1.1 Seluang nets

The shape of seluang net is rectangular, made of nets of uniform mesh size of $\frac{3}{4}$ inch. The height of the net is one meter and the total length is 100 m. The net is equipped with a float line and sinker line (Figure 2.A). The net was deployed to intercept swimming direction of a fish called seluang (*Rasbora sp.*). According to MR18/2021, the seluang nets can be categorised as *jaring insang* or gillnet.

3.1.2 Fixed gillnet

This fishing gear is a type of gillnet that are deployed by spreading net in the water at the same position. The net is oriented to intercept the swimming direction of the fish in shallow waters, swamp bushes, rice fields, river banks, or tributaries. (Figure 2.B). The mesh size varies from $\frac{3}{4}$ inch to even 8-inch mesh size according to the size of the fish and the type of fish being targeted. The catches include juaro fish (*Pangasius sp.*), coli (*Albulichthys albuloides*), lumajang (*Cyclocheilichthys enoplos*), lampam (*Barbonymus schwanenfeldii*), pantau janggut (*Esomus metallicus*), and tilan (*Mastacembelus erythrotaenia*). According to MR18/2021, the gillnet can be categorized as *jaring insang tetap* or fixed gillnet.

3.1.3 Sengkirai for shrimps

Sengkirai is a box-shaped type of trap to capture fish or crustaceans; local people often call it bubu. The name of sengkirai shrimps indicate that the gear is operated with targets of shrimps. The construction of the sengkirai is made of bamboo blades that are woven with rattan. The size of this fishing gear is about 60 cm long, 40 cm wide and 20 cm high. The shrimps are attracted by baits of coconut flakes; they enter the sengkirai through a horizontal entrance (Figure 2.C). The sengkirai is placed in the river bank and connected to a bamboo or wooden pole with nylon rope. According to MR18/2021, the sengkirang for shrimps can be categorised as *bubu* or traps.



Fig. 2. Seluang net (A), fixed gillnet (B), and sengkirai for shrimps (C)

3.1.4 Cast net

Cast net is made of nylon thread/multi-filament with mesh sizes that decrease from the top to the bottom part of the net. The cast net is large cone-shaped with horizontal length of 4-5

meters. A rope made of kuralon of 4-5 m length is attached to hold the net after casting. At the bottom edge of the net there are sinkers in the form of a chain of metals (Figure 2.A). The gear is thrown by fishers over fish detected from the water surface. The net forms a circle when touches the water surface then sinks and fish is expected to be gilled or entangled by net meshes. The catch includes lampam (*Barbonymus schwanenfeldii*), juaro (*Pangasius polyuranodon*), baung (*Mystus* sp.), and freshwater shrimps (*Macrobranchum* sp.). According to MR18/2021, the gear can be categorised as *jaring tebar*.

3.1.5 Tangkul

Tangkal is a type of liftnet that let the fish to gather above the submerged square nets. Each of the four corner tip of the net is connected to a bamboo pole. The mesh size at the centre part is 0.3 cm while at the edge of the net were 1-1.5 cm (Figure 2.B). A small-size lift net (size of 1.0 m x 1.5 m) consists of two (2) types of webs, those with small mesh size are operated to catch small-sized fish while those with larger sizes (3/4 -1.5 inches) to catch larger fish [17]. Tangkul is operated at the river banks during water tide from January to April. The small lift nets are usually operated by fisherwomen or wives of fishers while the large ones are operated by male fishers. The catch includes seluang (*Rasbora* sp.) and lampam (*Barbonymus schwanenfeldii*). According to MR18/2021, the gear can be categorized as *anco* or lift net.

3.1.6 Rawai pendam

Rawai pendam is a type of longline with a kuralon mainline of 50-100 m and branch lines of 30 cm where 100-150 baited hooks of numbers 7-12 are attached (16). The mainline can be deployed in the river bank, at middle or the edge of the river; both ends of the mainline are tied to wooden logs on the river bank (Figure 2.C). The fish baits include live shrimps, worms and snails. The longline is usually set in the afternoon and hauled in the following morning. The catch includes sembilang (*Plotosius canius*), patin (*Pangasius* sp.), lumajang (*Cyclocheilichthys enoplos*), baung (*Mystus nemurus*), tilan (*Mastacemelus erythrotaenia*), pari (*Dasyatis Bleeker* sp.) and dukang (*Hexanematichthys sagor*). According to MR18/2021, the rawai pendam can be categorised as *rawai dasar* or bottom longline.

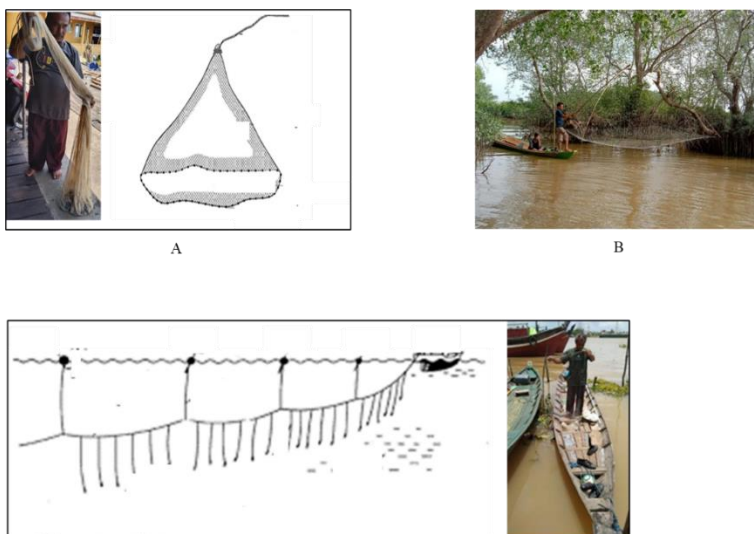


Fig. 3. Cast net (A), tangkul (B), and rawai pendam (C)

3.1.7 Fishes

The waters around Salah Nama Island, a part of the downstream area of Musi River, has been recognised as one of prospective fishing areas in South Sumatera [20]. Such popularity may increase fishing activities which promote fishing pressure that may harmful to the fish resources. Signs of degraded fish resources include low fish diversity.

Some fishes caught around Salah Nama Island include Aro fish (*Osteochilus melanoplaura*), kepiat (*Barbonymus schwanenfeldii*), seluang (*Rasbora* sp.), lampam (*Osteochilus harrisoni*), pantau janggut (*Esomus metallicus*), mujair (*Oreochromis mossambicus*), dukang (*Hexanematchthys sagor*), tilan (*Mastacembulus erythrotaenia*), freshwater shrimps (*Macrobranchium rosenbergii*), and coli (*Cycloheilichthys enoplos*). Figure 4 shows some pictures of fish capture in Musi River. Fewer number of fish species may indicate less diversity in the fish community. Degradation in fish diversity may be due to the use of destructive fishing gear or method, such as the use of electrical fishing methods, poisonous materials, and unfriendly trawls.

According to Prasetyo [18] and Yori [19], the fish production from in terrestrial or inland waters is largely determined by the seasonal pattern of the climate. If dry season is longer than usual or rainy season is shorter than usual, fishing activities in the area will decrease. In the absence of destructive fishing gear among the fishers from Salah Nama Island, the fish resources may be far from being overexploited. However, there is a possibility of being over-exploited if fishing activities are intensified during the short rainy season.

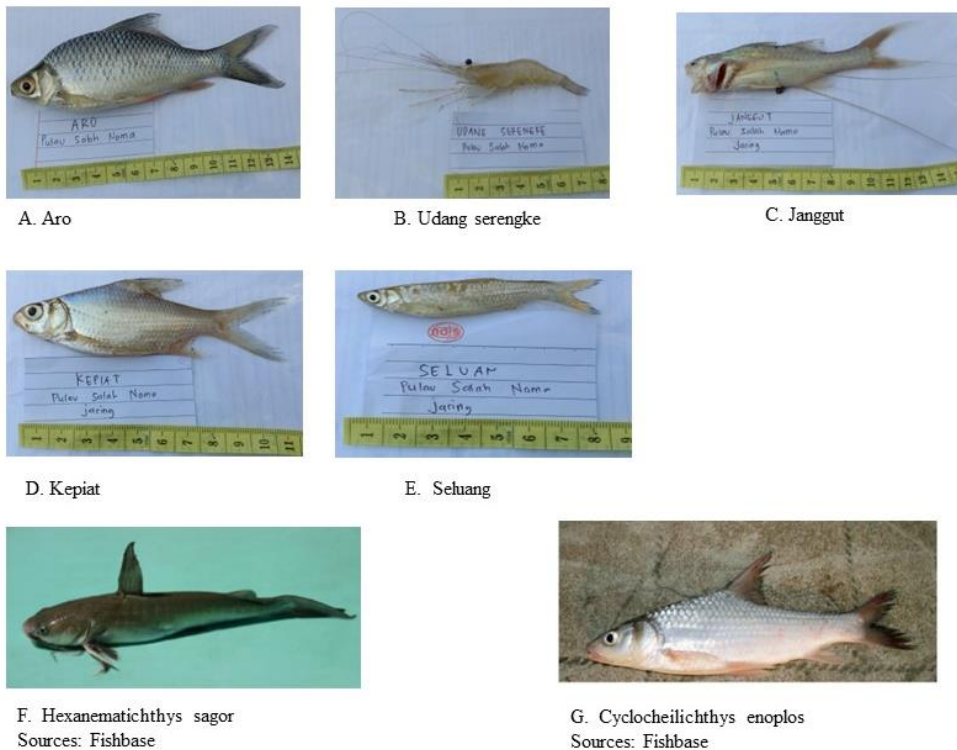


Fig. 4. Some fishes caught in Musi River

3.2 Discussion

The fishing gear operated by fishers from Salah Nama Island can be considered simple in technology perspective. The dimension of each gear is relatively small, fishers can easily manage and operated it. The fishing areas are very limited – just in the swamps, tributaries, and surrounding waters. Fishers are well adapted with the condition of fishing areas. They are able to choose some technological options that are suitable for dynamics of the aquatic environment.

All the fishing gear identified in this study are categorise legal. Types and dimensions are in compliance with the existing regulation. However, the use of such gear still needs to be monitors, especially when local communities are attracted to catch more fish. Therefore, surveillance unit is needed to ensure that the fishing fleets are operated within limits of tolerance.

4 Conclusion

The fishing gear used on Salah Nama Island is fishing gear that is specifically made to catch certain types of fish and there is also fishing gear that is used for all types of fish. The six types of fishing gear can be distinguished into 3 groups, namely traps (sengkirai), gillnets (fixed nets, seluang nets), liftnets (cast nets), and bottom longline (rawai pendam). The specifications of the gear comply with the current regulation. All gear can be considered environmentally friendly fishing gear. However, monitoring on the use of fishing gear needs to be monitored to avoid excessive fishing pressures.

References

1. E. S. Kartamihardja, K. Purnomo, C. Umar, *Jurnal Kebijakan Perikanan Indonesia* **1**, 1 (2009)
2. A. Samsyir, S. Haris, M. Taufik. Depdiknas, Kanwil Sumsel. Palembang (1998) (in Indonesian)
3. Muslim, *Types of traditional fishing equipment in the waters of the Penukal River, Muara Enim Regency, South Sumatra*, in Proceedings of the 1st Indonesian Inland Water Forum National Seminar, 27-29 July 2004, Palembang, Indonesia (2004)
4. M. Dwirastina (Master Theses, Universitas Terbuka, 2017) (in Indonesian)
5. M. Dwirastina, A. P. Sudarmo, *Sainmatika: Jurnal Ilmiah Matematika dan Ilmu Pengetahuan Alam*, **16**, 2 (2019)
6. Ministry of Marine Affairs and Fisheries (DKP Provinsi Sumatera Selatan, Palembang 2002) (in Indonesian)
7. D. Muthmainnah, Z. Dahlan, R. H. Susanto, A. K. Gaffar, D. P. Priadi. *The distribution of fishes in Lebak Pampangan Swamp South Sumatra Province*, in Proceeding of the 1st International Seminar Indonesian Ichthyological Society, 12-13 June, 2012, Indonesia (2012)
8. D. Muthmainnah, Z. Dahlan, R. H. Susanto, A. K. Gaffar, D. P. Priadi. *Utilization of lowlands swamp for rice field in accordance with fisheries and animal husbandry (case study in Pampangan, South Sumatra Province, Indonesia)*, in Proceeding of the International Workshop on Sustainable Management of Lowland for Rice Production, 27-28 September, 2012, Indonesia (2012)
9. Samuel, S. Adji, Z. Nasution, *Jurnal Penelitian Perikanan Indonesia* **8**,1 (2002)
10. Samuel, *Jurnal Ilmu-Ilmu Perikanan dan Budidaya Perairan* **1** (2003)
11. A. D. Utomo, Asyari, *Jurnal Penelitian Perikanan Indonesia* **3**, 2 (1999)
12. Khairul, *International Journal of Applied Biology* **4**, 1 (2020)

13. D. Muthmainnah, A. K. Gaffar, *Indonesia Journal of Environmental Management and Sustainability* **1**, 1 (2017)
14. J. A. Ammar, M. M. Kamal, Sulistiono, *Fish diversity in Lake Cala, Musi Banyuasin Regency, South Sumatra*, in *Prosiding Seminar Nasional Ikan Ke-8*, 13-14 July 2014, Bogor, Indonesia (2014)
15. M. Dwirastina, E. Riani. *Sainmatika: Jurnal Ilmiah Matematika dan Ilmu Pengetahuan Alam* **16**, 1 (2019)
16. Ministry of Marine Affairs and Fisheries, *Laporan teknis (KKP, 2006)* (in Indonesian)
17. N. Widarmanto, A. S. N. Krismono, A. Nurfiarini, *Characteristics of fishing gear in Teluk Jambi Lake*, in *Prosiding Seminar Nasional Ikan IV*, 29-30 Agustus 2006, Jatiluhur, Indonesia (2006)
18. D. Prasetyo, *Status of capture fisheries in the central waters of the Musi River, Musi Banyuasin Regency*, in *Prosiding Seminar Nasional V*, 26 July, 2008, Yogyakarta, Indonesia (2008)
19. R. A. Yori, *Composition and abundance of non fish catches with splint nets in The Mangrove Area of Pulau Payung, Banyuasin Regency*, Undergraduate Theses (Sriwijaya University, 2022)
20. E. Prianto, S. Kaban, S. Aprianti, R. Jhonnerie. *Jurnal Kebijakan Perikanan Indonesia* **2**, 1 (2010)