

Status of the Brackish Water Fishery in Anawasala in Kalpitiya Divisional Secretariat, Sri Lanka

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Abstract: - Brackish water fishery is one of the segments of the fishery industry in Sri Lanka. Lagoon environments are the most appropriate areas for brackish water fishery worldwide. Kalpitiya is well known for brackish water fishery based on Puttalam lagoon. Generally, the small-scale fishery has dominant constraints. The objective of the study is to identify the issues associated with small-scale fishery (SSF) in Anaiwasala fishing village. To fulfil the aim of the study questionnaire survey and non-structured interviews based on random sampling method was performed with visual encounter survey for one year to obtain primary data. The available literature on small-scale fishery was studied to get secondary data. MS Excel 2016 version was used to analyse the data and perform the relevant mapping. The results show the SSF in the village has different constraints. *Saccostrea* spp, *Merefricxasta*, *Penaeusindicus*, *Scylla serrata* and *Epinephalu* ssp are the dominant species in the area. 16.6% of Tungusnet usage in the area is illegal. Dragnet and push net are identified illegal fishing methods while few of fishermen used secret illegal fishing methods. 13% of teppam (log raft) generally carried out illegal dragnets. More than 80% of fishermen seasonally engaged in crab harvesting. 80% of residents only have secondary education is a direct threat for the SSF. Unawareness has contributed to destruct associated surface ecosystems and benthic ecosystem. Non-target species catching also existed in the area. Increase of the number of fishermen and inadequate fish species population is also affected to have a standard SSF industry in Anaiwasala. To overcome the issues awareness programmes and enforcement of the legal framework should be applied in Anaiwasala fishing village for the utmost existence of SSF community.

Keywords: Anaiwasala, Brackish water, Ecosystem, Illegal, Small-scale fishery (SSF)

I. INTRODUCTION

Coastal lagoons are the most affected aquatic ecosystems in the world. 13% of small extent belong to the lagoon in worldwide. In Sri Lanka 44 lagoons were identified around coastal belt (Figure1) [8]. Lagoons are the places where brackish water fishery is dominant. Lagoons are very special ecotones as the transition zone of the ocean and fresh water mixing. The environment naturally has a high potential for primary production and create natural habitats for a number of faunal species [7]. Brackish water fishery normally identified as small-scale fisheries. With the population explosion in coastal areas, the economic value of lagoons have dramatically increased at last the degradation of the lagoon ecosystem have also increased. Therefore lagoons are known as highly threatened aquatic environments in the world. Anaiwasala is a fishing village located in North western

province, Kalpitiya belongs to Puttalam Lagoon. Puttalam lagoon is the second largest lagoon which is also known as a basin estuarine in Sri Lanka [9]. Puttalam lagoon was declared as fishery management area by the Minister of fisheries and aquatic resources under the gazette notification no 1665/17 in 4th August 2010. The total extent of the lagoon is 32750ha and connected with three river basins; Kala Oya, MiOya and MoongliAru. Generally, the lagoon system is very shallow. The main source of income in the area is fishing. Brackish water fishery is dominant in the area. Puttalam lagoon divided into eight Fisheries Inspector divisions (FI division); Vanathavilu, Puttalam, Managalaeliya, Baththuluoya, Palakuda, Kandakuliya, Kalpitiya Main Island and Kalpitiya Island. Anaiwasala belongs to the Kalpitiya fisheries inspector area. According to the 2011 statistics [4], both Kalpitiya Island and the mainland have recorded a total of 1002 fishermen under two criteria (Table 1).

TABLE1: NUMBER OF FISHERMEN IN KALPITIYA

FI division	Full time	Part-time	Total
Kalpitiyainland	750	23	773
Kalpitiya island	205	24	229
Total	955	47	1002

Source: Department of Fisheries and Aquatic Resources (2013)

Generally, the operating fishing fleet in the lagoon consisted of non-motorized traditional craft (MTRB boats, log rafts, outrigger canoes) motorizes traditional crafts (MTRB boats log rafts, outrigger canoes powered by outboard motor engines) and fibre reinforced plastic boats (OFRP) powered by outboard motor engines [2]. Kalpitiya fishery inspecting division has recorded a total of 647 fleets (Table 2).

TABLE2: RECORDED FLEETS IN KALPITIYA

FI division	OFRP boats	MTRB boats	NTRB boats	Total
Kalpitiyainland	250	32	265	547
Kalpitiya island	70	03	27	100
Total	320	35	535	647

Source: Department of Fisheries and Aquatic Resources (2013)

Fishermen in the area identified their fleets in other names as vallam (canoes), theppam (log rafts) and oru (outrigger canoes) [3, 6]. Kalpitiya fishing area has identified as rich breeding ground areas of prawns, crab and fish species.

Accordingly the use of illegal fishing methods also high in the area. The fishing village Anaiwasala have a considerable number of population and 90% of residents are engaged in fishing activities [5]. In addition, the area is also identified for illegal fishing methods. Some illegal methods are not revealed to the public but the identified all illegal method has a direct impact on the fish production in the area. The education level is very poor as 80% of recorded residents only have secondary education [5] which negatively affect for the environment quality of the area.

II. OBJECTIVE

The objective of the study is to identify the issues associated with the small-scale fishery in the Anaiwasala fishing village. In order to fulfil the aim of the study, the following sub-objectives were achieved.

1. Identify the unreported illegal fishing methods
2. Identify the impact of fishery toward ecosystem

III. METHODOLOGY

3.1 Data collection

The study was mainly based on primary data. Questionnaire survey and non-structured interviews were carried out in Anaiwasala (Figure 2) to obtain primary data. Primary data collection was based on random sampling method as the language act as a limitation to have oral data collection. The sample size is 30. Also, direct observation was carried out for one year based on the Visual Encounter Survey (VIS) to identify the illegal fishing methods and fish species in the area.

3.2 Data analysis

The MS excel 2016 version was used to analyse the data. Based on the information gained from fishermen, distribution of fish resources was mapped.

IV. RESULTS AND DISCUSSIONS

The trend is to become a fisherman in the area comes through the generation. Therefore the community of fishermen in the village increased rapidly. Some of the fishermen have been started their fishing life as a child or at the age of thirteen. Some of these child fishermen do not possess a fleet but obtain a theppam or vallam for rent and go fishing. The situation emerged with the income problems in their families; finally, their education is limited only to secondary education. Fishermen in the area catch different types of species; finfish, prawns, crabs, gastropods and molluscs. Crabs are the highest valuable species in the area. The price of crabs ranges from 3000- 8000 rupees' respect for the weight of crabs (Figure 3a and 3b) which was also supported by the literature [1].

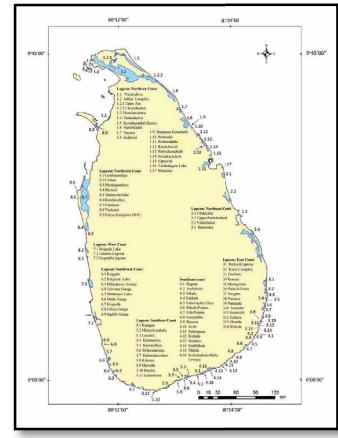


Figure 1: Lagoons in Sri Lanka
Source: Silva *et al*, 2013

Therefore some fishermen in the area used to catch crabs by cut off mangrove roots and dig around mangroves as crab species are inhabited around mangroves. This is a harmful method which is quite difficult to identify as it carries in the night. Generally, the crab net is used in the area only for crab harvesting which is about 83.3%. (Chart 1). Seasonally more than 80% of fishermen engaged in crab harvesting in the area.



Figure 2: Study area
Source: Google satellite image 2016



a)



b)

Figure 3: Black crab (a) and White crab (b) caught in Anaiwasala.

Source: Taken by the researcher at fish collecting centre in Anaiwasala

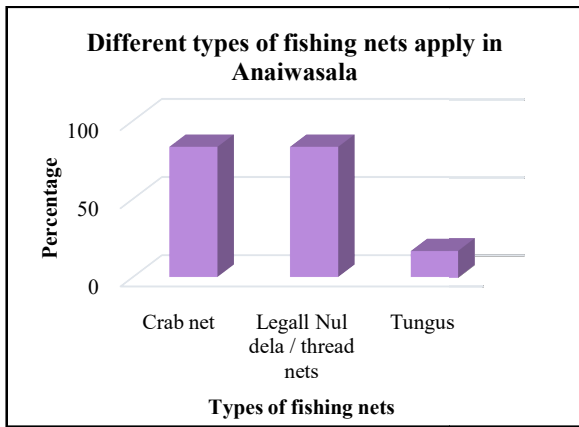


Chart1: Different types of fishing nets used in Anaiwasala

Source: Based on the primary data

83.3% of fishermen used legal fishing nets known as *Nul del* in common usage. Illegal Tungus net usage also reported as about 16.6% in Anaiwasla. Some of the illegal nets are used during the night time or away from the mainland but in the islands. According to the data Navy force trap those who are using illegal fishing methods specially Tungus nets. But still few of fishermen are using the Tungus net as it is potential for catching all size of species along with non-target species (Figure4). But with the usage of Tungus, the fish population in the area try to shift their habitat as those nets make an unusual boom sound under the water making species scared. Theppam most of the times carry gill nets, trammel nets and drag nets for fishing. Dragnets also are known as Kadippudeal or Pull nets is an illegal and harmful method of fishing.



Figure4: Illegal fishing net usage in Anaiwasala

Source: Weragodathenna, 2011

These nets damage the lagoon bed and benthic fauna and flora and catch all size of fish and shell species. Push nets used in shallow water have the same impact as dragnet which is also an illegal harmful fishing method in the area. Another method of fishing is added poisonous oil around fish habitats which is an illegal method of fishing but quite difficult to trap those fishermen into the legal authority. Mainly three types of fleets were identified in the area. 13% of them are (Log raft) theppam, 27% are vallam while 60% of them are OFRP boats (Chart2). OFRP boats used outboard kerosene fuelled engines.

Five to eight family members generally can be seen in one family of the fishing community. Therefore, some families possess one or two OFRP boats and vallam or teppam.

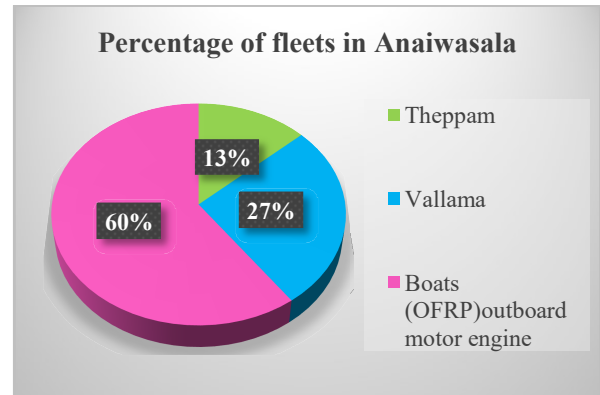


Chart2: Different types of fleets in Anaiwasala

Source: Based on the primary data

The non-target species; ray fish species and juveniles catching can be seen in the area because of the unawareness of fishermen (Figure6). Also, the impact of fisheries activities has destroyed the quality of benthic ecosystems. Especially dead seagrass can be seen as a thick layer along the shoreline. The destruction of associated ecosystems directly affects the decrease in fish species population relevant to the destruction of the lagoon food web. In the past, there were few fishermen in the village but today the number of fishermen has engaged in the lagoon fishery.

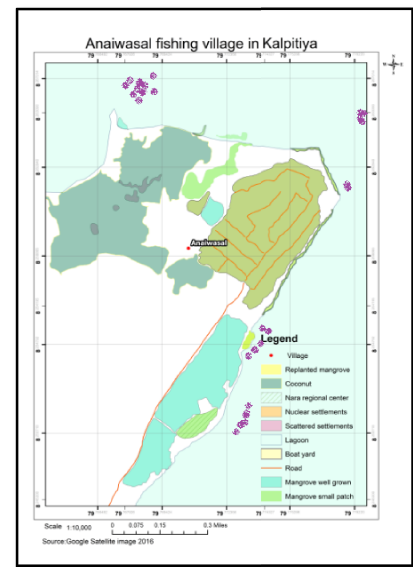


Figure5: Prawn habitats in Anaiwasala (Purple points)

Source: Based on the obtained information

The unawareness of fishermen has dramatically decreased their incomes. Sometimes some of the fishermen unable to catch fish species even for their daily expense. Illegal crab collecting methods have destroyed the mangroves. Mangroves

are the well-nourished area for prawns and molluscs (Figure5). The mangrove belt along the periphery of the coast is a restored mangrove area to create breeding grounds for prawn, fish and molluscs species. But fishermen themselves destroy the ecosystem directly influence their income.

Oysters and shellfish collection also dominant in the area. Oysters or kawatti (*Saccostrea* spp) are inhabited on prop roots of *Rhizophora* species and in the benthic level. Matti belongs to bivalves under the molluscan family also collected in the area. Two types of matti can be identified in the area as *Geloinacoaxans* (S. Matti) and *Merefrixcasta* (S. Matti). Prawn species catching in the area are Kiriissa (*Penaeus indicus*), Bandiissa (*Macrobrachium rosenbergii*) and Kara aduissa (*Penaeus monodon*). Among crab species, *Scylla serrata* (Kalapukakuluwa) and *Portunus pelagicus* (Sinakkali) can be seen. Kossa (*Epinephalus* sp), Vekkaya (*Chanoschanos*) and Moda (*Latescalcarifer*) are dominant fish species in Anaiwasala.



Figure6: non – targeted species

Source: Taken by the researcher at Anaiwasala fleet

The harvested dead oyster and gastropod shells can be seen along the coast of the village making an unpleasant environment. The empty shells are well-breeding grounds for mosquitoes. As a result, environmental degradation and pollution occur in the area.

V. CONCLUSION

Anaiwasala is a post-war populated fishing village. The area is identified as illegal fishing method area where prawn, crab and bivalve species are spread largely. But the illegal methods have decreased the fish harvesting and quality of the lagoon in the area. To overcome the constraints the legal framework has to be strong and day and night patrols targeting illegal fishing methods have to be expanded by legal authorities. Awareness programmes should be applied in the area to protect the small-scale fishery industry in the area. Otherwise, fish resources will deplete dramatically. Consequently, the loss of occupation directly breakdown the income and lead them to poverty. Concerning the more than 15 years of experience of fishermen in the area, the small-scale fishery should be promoted with the international or regional collaboration.

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