The Fishing Industry in Munambam

JANAL Team

Summary - *Voices from a fishing port describe the current status of mechanised fishing, and draw attention to the practices and techniques in the transformation of Kerala fisheries.*

JANAL Archive is the Kerala Museum's digital canvas for exhibitions on the history of Kerala. Produced in Kochi, Kerala in partnership with the Geojit Foundation.

A season begins

During the monsoon, trawling is banned annually on the Kerala coast for 52 days. When the JANAL team visited Munambam at the end of July, trawling boats were all docked at the various piers, some locked down, others undergoing spring cleaning. The fisherfolk in the area were getting ready to return to the sea on the 1st of August 2023. Then, early on Aug 1, at 12 am, boats set out on their first trip in weeks. The team reached the Munambam harbour to see the boats leaving. It was almost a race to see who would reach the fishing grounds. Some of the fisherfolk burst crackers on their way out of the harbour. The entire atmosphere was electric and filled with anticipation. One of the boat owners said, “Whoever gets back the earliest with the catch will get to sell to the highest bidder. They are the ones that will make the most profit.”

Figure 1. Trawling boat near Munambam. Image: JANAL archives

Trawling boats have always had a contentious relationship with the media, environmentalists, and traditional fishermen in Kerala and worldwide. Munambam is one of the biggest boat-making centres for trawling boats in Kerala. Munambam boat yards supply boats to Tamilnadu, Karnataka, and occasionally Goa. To understand how a traditional occupation has transformed into an industry in the last few decades, the JANAL team visited Munambam and spoke to boat owners, boat architects, fisherfolk, and accountants working there.

Background

Until the mid-twentieth century in Kerala, fishing was predominantly carried out by small-scale artisanal fishermen who used indigenous fishing craft and gear. The fishing communities lived in villages near the coast, and their access to in-shore or near-shore waters was seen as a collective right.[1] The fishermen primarily focused on catching fish, while the women in the community played a crucial role in processing and trading the catch. Many fishermen worked as crew members on larger boats owned by more affluent individuals within the community. Most households owned small canoes that they used for small-scale fishing. Country crafts–dugout canoes (made of single wood), plank canoes (made of wooden planks sewn by coir), and catamarans (three to five logs tied with a coir)[2] were mainly used for fishing until the mid-twentieth century (Figures 1a, 1b, 1c).

Figure 2. A fishing boat, *vanchi* of traditional fisherfolk. Image: JANAL archives 2023

Women contributed to the fishing process by assisting in the fabrication and repair of nets at home. Additionally, they were

[1] Gopal, N., Hapke, H.M. & Edwin, L. "Technological transformation and changing social relations in the ring seine fishery of Kerala, India." *Maritime Studies* 22, 26 (2023). https://doi.org/10.1007/s40152-023-00313-5

[2] Catamarans, locally *ketta marams*, meaning tied wood. From, Hacker, I.A. *Kerala: The Land of Palms*. London: London Missionary Society, 1912, (p. 32).

responsible for marketing the catch and processing the excess fish through traditional drying and curing techniques. This technique allowed for the preservation of fish, enabling it to be sold later or consumed within the households. These fishing practices and the division of labour within fishing communities represented a sustainable and community-oriented approach to fishing.[3] Fishing was a livelihood to meet the food requirements of the family rather than a profitable trade[4] and there were less than 80,000 active fishermen in the state mid-century.

In the 1940s, in India, as a result of World War II, various famines, and mismanagement by the British, there was an acute food shortage that led to the launching of a Grow More Food Programme.[5] This took on momentum after Independence. A fish sub-committee was formed as part of the policy to institutionalise fishery-related activities and knowledge and to adopt modern fishing techniques used in marine countries in Europe and Scandinavia.

Introduction of Mechanised Boats

The story of the trawling boats and the fishing industry in Munambam can only be understood if we go back around seven decades. In 1953, the Indo-Norwegian Project was set up as a tripartite agreement between the Government of India, the Government of Norway, and the United Nations.[6]

The main objective of the Indo-Norwegian Project was to modernise the fishing industry in India with inputs from Norway. Norway was looking to share its learnings in the fishing industry with less developed countries and India was chosen as a pilot project.[7] The original project was started in the villages of Sakthikulangara, Neendakara, and Puthenthura in Kollam.

At first, motors were mounted on canoes (*valloms*) that were already in use and later motorboats were constructed. Fishermen were given training for six months and more than 60 boats were built taking into account the breakers at the Kollam beach.

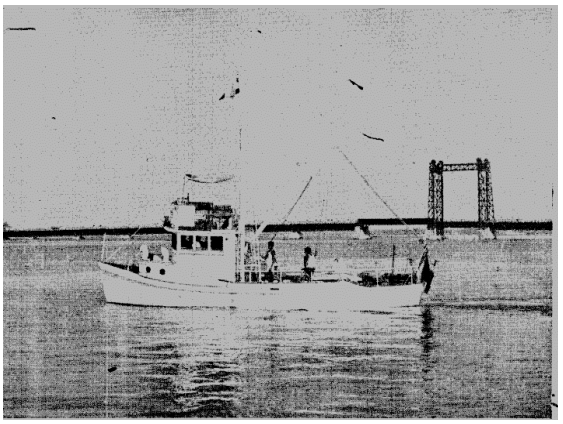

Figure 3. A fishing trawler of the Indo-Norwegian Project. Image: INP 1958

Shortly afterward, mechanised boats were built, and new methods of fishing began to be used in the area. Mechanised boats had engines fitted inside the hull of the boat. Net hauling was also modernised and allowed for offshore fishing. These new types of boats had to be operated

[3] Gopal et al., 2023.

[4] The total marine fish production in India was about 500 thousand tonnes in 1950 (as opposed to 826 thousand tonnes in Kerala in 2022). From Gopal, T.K. Srinivasa, and Leela Edwin. 'Development of Fishing Industry in India'. *Journal of Aquatic Biology & Fisheries* 1, no. 1 & 2 (2013): 38–53.

[5] Khan, Danish Mand. 'Explained: What Was The Grow More Food Campaign'. News. *India Times/Explainers*, 21 January 2023. https://www.indiatimes.com/explainers/news/the-grow-more-food-campaign-590745.html#:~:text=The%20campaign%20after%20independence.-AFP%2FRepresentational%20Image&text=The%20Government%20of%20India%20decided,to%20increase%20domestic%20food%20production.

[6] Gerhardsen, G.M. 'The Indo-Norwegian Project'. Fisheries of the West Coast of India. Calicut: Central Marine Fisheries Research Station, 1 October 1958. http://eprints.cmfri.org.in/5574/1/21.pdf.

[7] Larssen, Kare. 'Indo-Norwegian Project Develops Indian West Coast Fisheries'. *Fishing News International* 5, no. 3 (March 1966). https://web.archive.org/web/20150412105735/http://karelarssen.com/art1.pdf.

from small harbours or estuaries, unlike earlier canoes that took off from the beach and through breakers.[8]

The Indo-Norwegian Project did not stop with knowledge transfer on fishing and boat-making, they also helped with:

- Boat Yards and Workshops — Boats up to 40 ft were being made in 1958. The yards were also used to repair boats.
- Refrigeration Plants — These consisted of ice production and storage units, cold storage for fish, and deep-freezing units. Additionally, insulated vans were arranged for transportation of fish.
- Health Centres — To improve the health and sanitary condition of the fisherfolk and their families.
- Pipe Factory—To improve the water supply to the houses of the fisherfolk, a pipe factory started and pipelines were laid.

As seen in Figure 3, the trawling boat is different from the canoes that were in use until then. There is a cabin and a structure for the net behind the cabin. This basic structure underwent a lot of change over the following decades.

In 1955, the Indo-Norwegian Project started a branch in Cochin (Kochi). One of the ideas was to balance out the project by having part of it operate from a location with a harbour and to start marine research in collaboration with the Central Marine Fisheries Research Institute—seven offshore fishing vessels operated in Kochi by 1958 (Gerhardsen 1958).

The Indo-Norwegian Project tried to introduce a system of fishing cooperatives in Kollam, but it was unsuccessful. Another problem at the time in Kollam was with the initial fishermen trainees belonging to the Araya community and the Latin Catholic community. According to scholars, the Araya community found it difficult to alter their attitude towards the changed process of fishing.[9] They were reluctant to abandon the subsistence-based fishing practice they had traditionally followed. Later, scholars have connected this reluctance to the larger question of lack of access to education and schooling. The training that fisherfolk received with the Project was related to fishing techniques. It was not connected to the other facets of fishing and did not prepare them to deal with the new profit-based system, aspects of saving money, etc. Therefore, most Araya fishermen sold or rented their mechanised boats to the Catholic fishermen within a few years. Additionally, there were conflicts with traditional fish merchants, fishermen using canoes, and communal tension between the Nairs holding administrative positions and the Latin Catholic fishermen.

The wooden boats used to leave right before sunrise (around five am) and return by sunset. The modified boats could depart for fishing at all times of the day after they had restocked and refuelled. These variable departure timings became possible due to the advances in storage and boat-making technology with the entry of the Indo-Norwegian Project. Scholars point to the schedule change as one of the other reasons that kept away the Araya community from shifting over to new methods of fishing, and they continued traditional modes, practices, and timings. The story of boat-making changed when the Project moved to Kochi—a melting pot of various cultural, religious, and social influences.

[8] Larssen, 1966.

[9] Klausen, Arne Martin. 'Technical Assistance and Social Conflict: A Case Study from the Indo-Norwegian Fishing Project in Kerala, South India'. *Sage Publications, Ltd* 1, no. 1 (1964): 5–18.

Munambam Harbour

The development of technology and infrastructure introduced by the Indo-Norwegian Project progressed in leaps and bounds in Kochi. Munambam emerged as a significant trawling boat-making centre and harbour on the West Coast. As of 2020, around 350 trawlers were operating in Munambam, and 28% of the trawlers in Kerala operate from Ernakulam.[10] Boat-making yards are concentrated in Munambam and nearby Maliankara on both sides of the river Periyar in the Munambam area. Corresponding to this, other technologies connected to fishing, like refrigeration, engine shops, repair yards, shops selling fishing paraphernalia, net-making factories, etc., emerged in Munambam. According to Saijan, owner of several boats, "Boat-making technology advanced based on the needs of the times."[11]

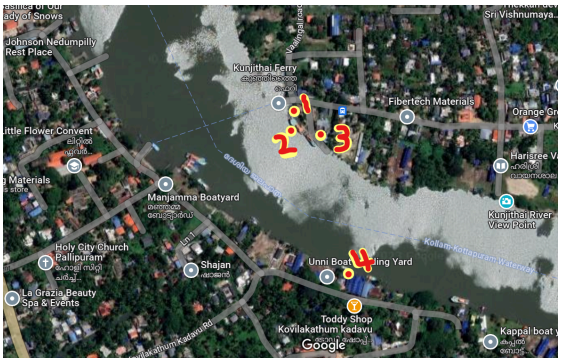

Figure 4. 1. An Indian Oil pump 2. Location of RAJAS on the quay 3. Ice factory in Kunjithai and 4. Boat-making yard, Pallipuram near Munambam. Image: Google Maps, 2023.

Following the Norwegian model, today in Munambam, the ice factories and fuelling stations are often found quite close to quays where the trawlers are moored. In Figure 4, we can see the location of a fuelling station, ice factory, and quay at Kunjithai and a boat-making yard at Pallipuram are located close to each other near Munambam.

Trawling boats built in Munambam have become as long as 120 ft (around 36.5 m). Figure 1 shows a trawler operating near Munambam in 2023. There is an elaborate winch mechanism that can be seen in the photo and is used to haul in the trawling net. The net may be as long as 81 m. P.D. Sunil, a shopkeeper at Munambam, mentioned that the length of the net and the size of the eye depend on the fish variety being caught.[12] The boat is painted blue, which is the colour used for trawling boats in Kerala. Karnataka boats are painted red and Tamilnadu boats are painted green.

Trawling boats are required to have a licence number, much like terrestrial vehicles. According to Saijan, the licence is renewed annually for a fee paid to the government. The licence number would have details of the district, like in the case of land vehicles.

Trawler Design and Construction

The *mesthri* (architect) of the boat, Unnikrishnan K.K., told us that trawling boats made at Munambam use steel frames and MS steel sheets for the hull.[13] The practice of using steel started around 25 years ago. The change in building material from wood to steel has brought about a lot of change in how fishing is done. Steel boats do not get damaged the way wooden vessels do. They are sturdier when the weather is rough. The use of steel led to the use of more robust engines. The boats themselves became

[10] Aswathy, N, and R. Narayanakumar. 'Economic and Environmental Implications of Trawl Fishing: An Analysis in Munambam Fishing Harbour on the South West Coast of India'. *Current Journal of Applied Science and Technology* 39, no. 13 (2020): 89–93.

[11] Interview with P.R. Saijan on 7 February 2023.

[12] Interview with P.D. Sunil at Munambam on 20 February 2023.
Also see, Sayana, K.A., M.P. Remesan, V.R. Madhu, P Pravin, and Leela Edwin. 'Appraisal of Trawl Designs Operated Along Kerala Coast'. *Fishery Technology* 53 (2016): 30–36.

[13] Interview with Unnikrishnan K.K. at Pallipuram on 7 February 2023.

bigger. So, they could carry more fish and more crew members, mentioned Saijan.

The *mesthri* envisages the plan for the boat. Senior boatbuilders hand down the technique or art of boatbuilding to juniors. The transfer of knowledge is not kept within families at present. Each mesthri would have his own idea about how to build a boat and it is developed over decades. Though we asked to see the plan, and Unnikrishnan said he would show us a blueprint, he never finally showed it to us. The plan for the boat may be considered insider knowledge. Figure 5 shows the JANAL team's drawing with inputs from a few other boat owners who sat through the informal interview.

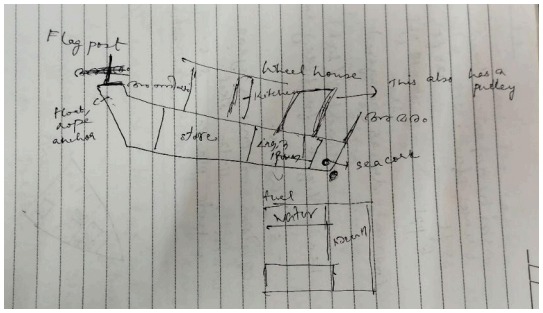

Figure 5. Drawing of the basic parts of a trawling boat. Image: JANAL Archives 2023

The cabin is placed a little towards the front of the boat and the storage area is right below it. This is different from the boat in Figure 5, where the cabin is towards the back. Boat architects make minor adjustments to the plan based on the specifications suggested by the boat owner(s) and the *syrang* (captain).

Refrigeration

Initially, fishermen used to go fishing for 1–3 days. This was because they did not have the means to preserve the catch for longer. Creating access on board boats for storing catch during voyages was a significant development. This required cold storage on board a trawler, ice-making and refrigeration plants, and refrigerated vans for transporting the catch on land.

The technological development in storage, refrigeration, and ice-making contributed considerably to the change in trawling methods. Now, the boats can fish anywhere from 10–25 days. They even go as far as Goa and Kanyakumari.[14] The filling up of on board storage with ice is the final step before a boat sets out on a fishing expedition.

Boat Operations on a Trawler

The wheel allows the *syrang* (captain) or a helmsman to control the boat's direction or turn the vessel. It's located in the boat's control centre or wheelhouse, called the cabin (Figure 8), by the fisherfolk at Munambam. The boat's steering mechanism comprises the wheel connected to the rudder and propellers (Figure 9), which are movable and located at the ship's rear. The rudder controls the boat's direction, and the propellers move the boat.

Figure 7. The Wheel in RAJAS. Image: JANAL Archives 2023

In pre mechanised fishing times, Earlier, knowledge about boat-making, fish, currents, stars, etc. was handed down from generation to generation. The *vadakkunokiyantram* (compass) was an important instrument used by fishermen.

[14] P.R. Saijan, 2023.

This is in contrast to the current fishing techniques that are heavily reliant on equipment like echo sounders, satellite phones, GPS, and wireless transmitters. The echo sounder shows shoals of fish and underwater structures (Figure 10). We spoke to Antony, syrang of a boat named 'Friends', about the current gadgets and equipment.

Figure 8. Echo sounder mounted on the wheel house ceiling. Image: JANAL Archives 2023.

The satellite phone, called a sea phone by the fishermen, is a relatively new entrant on the list of gadgets used onboard, along with the wireless set or sea-phone and speaker. Once the boats move away from the shore, mobile phones are out of range. The wireless equipment works only if other boats within range use the same frequency. This makes sea phones, each with a unique number like a mobile phone, are the only reliable means of communication with other boats and land.

Syrang Antony said, "When we find a huge shoal of fish, we would call *koottuboat* (boats belonging to friends or under common ownership) and relay the GPS location of the catch. When the wireless was being used, anyone could listen in."[15] Hence, sea phones have not only increased connectivity to land and other boats but have also changed the way fishing networks function.

[15] Interview with Antony at Munambam on 20 February 2023.

The GPS location coordinates are saved in the instrument memory and this allows them to return to the location at a later date. The GPS location of the Munambam harbour is known to all the fishermen; when they need to meet at the port, they send out "ten-ten", the Munambam location. Hence, the progress in technology has changed how fishermen identify a location.

Different companies manufacture echo locators, satellite phones, GPS, and wireless sets; each set or model has unique features. The syrang decides on the make and model of the electronics. Normally, syrangs choose models and technology they have previously used and are comfortable with.

Other than the four electronic equipment mentioned here, two others are optional—AIF and SART.[16] AIF (Automatic Identification System) is necessary for all fishing vessels longer than 20 m for identification and prevention of collision in the ocean. SART (Search and Rescue Transponder) is an automatic transmitter and receiver that is used at sea during an emergency.

Engine

The main part of the boat, according to the boat owners, is the engine. Figure 9 is the photo of the engine inside the hull of RAJAS. Over the years, the horsepower of the engines has increased. From 140 hp used in the wooden boats, the power has increased to 600 hp in the newer trawling boats (The first prawn trawler had a 10 hp engine[17]). The powerful engines help turn the winch mechanism for the net.

[16] Government of Kerala. 'Fisheries and Ports (B) Department: Notification. O. (P) No. 18/2018/F&PD'. *Kerala Gazette: Extraordinary*, 1 September 2018.
[17] Inwati, Lalima, M.P. Remesan, P.H. Dhiju Das, B. Manoj Kumar, Mathew Sebastian, Amrutha R. Krishnan, and Leela Edwin. 'Status of Mechanised Trawl Fishing Fleet of Cochin, Kerala'. *Fishery Technology* 59 (2022): 165–70.

Figure 9. The engine inside the hull. The metal ladder down to the engine room is visible. Image: JANAL archives 2023

A powered winch is used to pull up the net. The winch rope is made of steel of 11–12 gauge. It has a plastic coating to stop corrosion. Earlier, the rope had no plastic coating. Then it was greased to stop rusting. The winch rope itself costs around ₹2.5–3.5 lakhs.

Other than the engine, the trawling boats would also have a generator for less power-intensive operations like switching on lights if they are using fishing rods (large fishing rods with 50–100 hooks) at night and a backup inverter. Therefore, from a single motor that was installed on the canoes in the 1950s, current trawling boats have three different power sources. Each power source is used for a different purpose and the idea is to conserve as much fuel as possible due to rising diesel charges.

Life Aboard a Trawler

As a secure covered space, another function of the cabin or wheelhouse is to house the crew. Figure 10 shows the inside of the cabin towards the back with a bunk-like structure. The fishermen sleep above and below this space.

Figure 10. The living space in the back of the cabin of a trawling boat with the galley behind. Image: JANAL archives

In this figure towards the back, the kitchen or galley is visible. From a canoe that did not even have a roof, to just the basic wheelhouse, trawling boats have advanced to have a galley area and toilet. The toilet, not visible in this picture, is towards the back of the galley with an entrance on the starboard side (right). In Kerala, trawling boats are not given licences if no toilet is onboard. The other southern states for which boats are made at Munambam do not have this rule. Therefore, the Karnataka boat that was being constructed, which the JANAL team visited, did not have a toilet. Also, the location of the galley and the bathroom changed from boat to boat.

There are plug points to power crew gadgets, including mobile phones. On the upper left side is the DVD system. Most boats now have a television, DVD, and a music system. There are also many plug points around the cabin to power various equipment and personal devices. The crew would bring along the latest movies with them, either on DVDs or pen drives.

On Board Storage

The technique of refrigeration on board was started after the switch to the steel

frame according to sources in Munambam. The front part of the boat, inside the hull, is given over almost entirely to storage. A special compartment is made within the hull. This compartment is covered in an insulating material called 'puff'. The puff is made from a combination of chemicals that are poured into a narrow space or structure built around the storage area. The mixing and pouring of the puff are not done by the workers at the boat-making yard, rather it is done by another team that specialises in this technology. After the puff has set, ice is filled inside the main compartment area which is made of fibreglass. Not all boats use fibreglass for the storage area and the preference for the inside of the boat varies from boat owner to mesthri.

"While earlier boats used to be made by a single team, the trawling boats of today are made by groups specialised in each kind of work and material," mentioned Saijan.

There are shelves within the storage compartment. The provisions for the crew are kept in the front part of the storage. The rest of the shelves are used to store the catch. The provisions would include what the fishermen called ration (rice, spices, vegetables, fruits, and meat) and bakery items (cakes and so on). The fishermen are given cash from the tharakam to buy food items that they like. The boat owners mentioned jokingly that the crew actually gets to eat the freshest fish.

Filtered or mineral water is used for drinking and cooking and taken along with food supplies. Tanker water, for washing purposes, is filled in another compartment. This water is stored in a compartment near the engine room.

The Crew

The *syrang*, or captain, is the most important position within the trawling boat. The *edasyrang* is the assistant captain who takes over if the main syrang has to be away for some reason. The boat also has an engine driver, who takes care of the engine, generator, and inverter (charged from the engine). Then, there is a net specialist (maintenance and storage) and a designated cook. Ten to eighteen workers can stay on a boat and are part of the general crew. The engine driver and the sheer number of workers on the trawling boats came about as a result of mechanisation.

Where do the sailors come from

With access to higher education, the younger generation from fishing families is reluctant to enter the field. Many have taken up other jobs and others have taken up administrative jobs, middlemen-like jobs, exporting business, or financing of boats within the industry.[18] The boat owners and syrangs we met said that there were very few Malayalis ready to go on the trawling boats. Saijan mentioned that this was because trawling expeditions are of longer duration than traditional fishing trips. The younger generation does not want to be offshore for that long. There is also the cultural aspect of the lower status and income associated with being a fisherman.

Due to this dearth of workers from Kerala in the recent past, most of the workers on the boats are people from Tamilnadu. Cholachel, originally part of the princely state of Travancore, is where many of the fishermen in Munambam come from.

[18] The government of Kerala offers courses like Fish Boat Mechanic and Fish & Seafood Processing Technician through its Vocational and Higher Secondary Schools. For more information see, https://vhscap.kerala.gov.in/vhse_cms/index.php accessed on 31 May 2023. To see the syllabus of the Fish Boat Mechanic Course visit: https://scert.kerala.gov.in/wp-content/uploads/2021/12/09_FISHING-BOAT-MECHANIC.pdf accessed on 31 May 2023.

There is even a daily van service that goes from Munambam to Colachel and back. Currently, with the increase in access to higher education in Tamilnadu, there are fewer fishermen coming from there. The Munambam area is getting workers from West Bengal, Orissa, Andhra Pradesh, etc. Most of the fishermen or workers the JANAL team met on the various boats in Munambam were from the Hindi-speaking belt. The syrangs of most of the boats are from Tamilnadu now. These are people who had joined the crew as fishermen, learnt the trade from the Malayali syrangs and have now been promoted. Earlier, there used to be many syrangs, but now their numbers have reduced as there are more boats than before.

The syrang has a very important position in the niche fishing network that he occupies. The owners of Friends are getting a new boat built and Antony will be the syrang of that boat. The current assistant, the *edasyrang* will become the syrang of Friends when the new boat is launched. Antony has been chosen because he has been with Friends for 12 years and with the tharakam for 13 years. He is from Cholachel in Tamilnadu. Antony added that he has been working in Kerala for 40 years. His children are studying in various colleges and will not join the fishing trade. He has built a two-storey house in Colachel with his share of the fishing business. The profits are shared among the boat owners and the crew.

Sunil mentioned that it is the syrang who decides which net to use and what to fish for. Everyone takes part in the sorting and storing of fish, including the syrang, except if he is driving the boat, added Antony. Even though there has happened a division of work in terms of specialisations, there is also a sense of equality when it comes to the main business of fishing, sorting, and storing among this group of fisherfolk.

Women's Place in the Industry

One of the things that struck the JANAL team was the near absence of women in public spaces near the Mini-Harbour in Munambam. There are two harbours in Munambam, the main harbour and the Mini-Harbour, which is located towards Pallipuram. Within the fishing industry, women are mostly found as accountants taking care of the bookkeeping aspects of the job or running small eateries around the Mini-Harbour. There were only four women in the Munambam Mini-Harbour area when the team visited at first. Two were bookkeepers and two were running a small eatery catering to the fishermen, boat owners, etc. Paradoxically, women accountants, Sini and Soumya, told us, "The number of women working in the accounting section of shops or tharakams has increased in the past 4–5 years."[19] The women were recruited since the boat owners required people to man the offices after the auction hours (that start at four am) since they would be tired to take care of the business after mid-morning.

When the accountants were asked if there was any difference in working in such a male-oriented industry, they replied that they did not feel any difference from their earlier workplaces. Sini, one of the first accountants to join the tharakam belonging to Saijan, said, "When I first joined, I would dress carefully. I wouldn't come to work without a dupatta. But now that I'm comfortable at the office, I dress in ordinary clothes." Though she stays close by, she has had no other contact with this part of the island. Not many women come to this area.

The women accountants have not come to the Munambam area in the early morning. Their work time is from 10 am–5

[19] Interviews with Sini Joby and Soumya at Palliport on 20 February 2023.

pm. They believed that the women who used to work in the harbour earlier would have been the fisherwomen (*arayathimar*), the ones that would carry their baskets on their heads and sell fish from house to house. Now that educational levels have gone up, fewer women would be interested in doing such work. There is also a difference between where the accountants live and where the fisherwomen live. Sini told us that they live towards Pallipuram, while the fisherwomen stay towards the Munambam area. This could also be one of the reasons there were not many women around the Mini-Harbour.

Figure 11. Mini-Harbour at Munambam towards mid-morning. Image: JANAL Archives 2023

As Figure 11 shows there are no women in the Mini-Harbour area towards midmorning. This is the location where the auction takes place from four am. Saijan mentioned that women have stopped arriving here to buy fish during the auction since three to four years. When we asked the other boat owners, they also responded that lately there have been fewer women coming to the harbour to buy fish. They said that the reasons could be:

- Earlier the women used to be from poor families. Now, the financial situation of the families has improved. So, women do not have to sell fish to provide for their family members.
- Since the family members of many of the women are now educated, they do not want to be part of the fishing industry.
- The government has instituted the Mahatma Gandhi National Rural Employment Guarantee Act 2005 (MNREGA). Therefore, women from poor families have steady work for around 15 days a month. Because there is a guaranteed job available, the women do not have to depend on selling fish.

In the past, women were part of the processing and sale of the fish as mentioned earlier. Now, most of the processing has been taken over by companies. It seems as if the change in the class composition of the women is influenced by access to education of both the women accountants/bookkeepers and family members of the fisherwomen.

Tharakams — Middlemen of Mechanised Fishing

The Mini-Harbour in Munambam is a privately owned harbour. Munambam Mini Fisheries Harbour Tharak Agents Private Limited owns the harbour. It is a non-governmental company. Saijan and the other boat owners we talked to belong to this organisation. Sini said, “The cash transactions at the office are settled at the main *tharakam* office (the Mini-Harbour Tharak Agents) daily by afternoon.”

Tharakanmar [middlemen (plural) with a monopoly or business contract with the boat owner] buy and sell the fish from the fishing boats. Saijan is also a tharakan. If someone wants to get the business (tharak) from a boat owner, they will pay some money in advance, and there would be an agreement. Then, only

the tharakan with whom the owner has the deal is allowed to buy from the boat. The money and the contract are given even as a boat is being built. Here the percentage of money given is key. The *tharakan* is a commission agent. The *tharakan* would take the fish and sell it, keep a percentage (say 5%) of the profits, and hand over the money to the boat owner. The *tharakan* sells it at the market to local fisherfolk, shopkeepers, and exporters. The auction of the fish happens right at the harbour. There are two ways the fish is transported. If the export firm is big, their vehicle would transport the fish straight to their plant where the cleaning and allied work is done. Some agents would get the fish cleaned by local cleaning people and hand over the fish to the exporting companies.

The concept of *tharak/*tharakam/tharakan seems to have evolved from both the middlemen that existed and the cooperative structure that came in later, after the Indo-Norwegian Project.

According to the Marine Fisheries Census of 2010,[20] the maximum number of fisherfolk with memberships in fisheries cooperatives was in Tamilnadu (43.9%), followed by Kerala (21.6%) and Maharashtra (9.8%). Fishing cooperatives were in existence in Kerala in the early 20th century. However, they started functioning successfully only in the 1960s.

Ecological Effects of Trawling

Fifty years after mechanised fishing with bottom trawling boats started, various kinds of ocean life were caught in their nets. From sea floor damage to exploitative fishing, practices like throwing back into the water excess or unwanted catch like non-target species including endangered species has put aquatic life at risk. Research has shown that when high-value fish is caught, the low-value catch is thrown overboard to make way for the former.[21] These bycatch and low-value catch thrown back into the ocean are either dead or injured and are a serious ecological issue and pollutant.

Trawling nets catch migratory shoals, eggs, and juvenile fishes disrupting the replenishment cycle. Juvenile fishes and low-value components of other fishes are also considered as bycatch. Trawling has led to the destruction of coral reefs, seagrass beds, and other ecologically sensitive regions close to the shore. The destruction of the non-target species, which is around 214 in Kerala,[22] has disrupted the food chain and life supporting systems. Currently, bycatch is used in the fish drying, curing, and fishmeal industry.

Advancements in fishing technology and the increase in the number of highly mechanised fishing boats have resulted in overfishing. Scientists mention that there has been almost an 80% decline in certain varieties of fish as a result of trawling on the Kerala coast.[23]

[20] 'Marine Fisheries Census 2010, India'. New Delhi & Kochi: Ministry of Agriculture and Central Marine Fisheries Research Institute, 2010. http://eprints.cmfri.org.in/8998/1/India_report_full.pdf.

[21] Gibinkumar, T.R., S. Sabu, P Pravin, and M.R. Boopendranath. 'Trawling Systems Operated off Quilon, Kerala, India'. In *Sustain Fish*, edited by B.M. Kurup and K. Ravindran. Kochi: School of Industrial Fisheries, CUSAT, 2006. https://www.researchgate.net/publication/280687314_Trawling_systems_operated_off_Quilon_Kerala.

[22] Kurup, B. Madhusoodana, P. Premlal, Joice V. Thomas, and Vijay Anand. 'Bottom Trawl Discards Along Kerala Coast: A Case Study'. *Journal of the Marine Biological Association of India* 45, no. 1 (2003): 99–107.

[23] Viju, B. 'Problems Plaguing Kerala's Once-Thriving Fishing Industry'. *The Economic Times*, 26 February 2012. https://economictimes.indiatimes.com/news/company/corporate-trends/problems-plaguing-keralas-once-thriving-fishing-industry/articleshow/12034928.cms?from=mdr.

The export of seafood that took off with the Indo-Norwegian Project increased the demand for certain kinds of sea products like prawns, crabs, lobsters, etc. Both Unnikrishnan and Saijan mentioned that cuttlefish fetched ₹20000 per container and octopus also fetched high prices. Both these seafood items are not sold locally.[24] The increase in the seafood export sector has, therefore, taken away Keralites' access to certain kinds of fish. The focus of the mechanised fishing industry has moved from food production to trade and now, foreign exchange, at the state and corporate levels.

Impact on Traditional Fishing

The introduction of mechanisation and trawling techniques has impacted traditional fishing and fisherfolk in a major way. However, the impact is felt differently in different parts of Kerala. The JANAL team met a group of fishermen working with nets around Puthuvype during the monsoon. Due to the trawling ban and adverse weather conditions, they were trying their luck fishing in the mangroves around Puthuvype. Purushan, one of the fishermen, was removing the old, frayed net from the rope to which it was attached.[25] He said, "I usually go fishing on the vallom. There would be around 60 of us, including three *ammamar* (fishermen who do the cooking and are playfully called thus) and the carrier boat. The carrier boat would have 4-5 people in it. The carrier boat would take the net around the shoal of fish. We usually leave around four am and return whenever we have a good catch."

Figure 12. A carrier boat (R) with a small trawler (L) under construction at Vypin. Image: JANAL Archives 2023

He goes fishing on a ring seine fishing boat. These account for nearly 51% of the fish landings in Kerala coast.[26] When asked about the impact trawling has had on their earnings, he said, "We do not really have a problem with the big trawling boats. Earlier they used to use the pelagic (bottom trawling huge nets) nets that were not good for the fish. The small fish and unwanted fish would be caught in that net. There would be a lot of waste. Catching the small fish affected the replenishment of the fish. But, with the trawling ban in monsoon that has reduced. They do not fish near the shore, but in the deep sea. So, we do not see them."

Ernest, a retired fisherman, said, "Sometimes when the big trawlers do fish near the shore, they get caught and are fined ₹2-3 lakhs." Ernest said he had worked in the boat of a Sheikh in the Gulf. The boat was a luxury vessel on which the Sheikh used to entertain guests. He had to do the fishing on this boat when they required it. He mentioned that the boat had the latest in technology including autopilot, double steering, and the option to feed in the destination in the GPS.

[24] Unnikrishnan and Saijan, 2023.
[25] Interview with Purushan on 19 July 2023.

[26] Abdussamad, E.M., U. Ganga, K.P. Said Koya, D. Prakasan, and R. Gireesh. 'Ring Seine Fishery of Kerala: An Overview'. Central Marine Fisheries Research Institute, 2015. http://eprints.cmfri.org.in/10956/1/225-1.pdf.

One of the auto rickshaw drivers works in a smaller trawl boat during the fishing season. Since there was a ban in place that month, he was driving an auto. He did not want to disclose his name, but mentioned that the boat he worked on went fishing for 1-3 days. They would make around ₹40,000-50,000 per trip. The valloms made around ₹1-2 lakhs per trip.

When Purushan had started fishing, they used to go in a *vanchi*, a small wooden boat. There would be only 4-5 people on board. They also used cotton thread nets, unlike the tungies (local name for a kind of strong nylon thread) nets he uses now. He said that they get to catch fish only in the newer nets. The old cotton net does not trap the fish now.

Technology has changed not just the nets, but their boats also. Currently, most traditional fisherfolk use boats made of iron (not steel according to this group of fishermen). The joinings are made of brass, they said. The carrier boat has a Yamaha engine of 50 hp and their larger boat can be near 500 hp. There is a cabin-like structure on the boat, but only around 11-12 people can stand under it. The vallom uses an echolocator and GPS like the trawlers.

Figure 13. A vallom together with its carrier boat. Image: JANAL archives

Cleetus, a traditional fisherman near Thiruvananthapuram, said that, unlike the trawling boats, the traditional fisherfolk have seen a reduction in the catch closer to the shore.[27] And this has been blamed on overfishing by mechanised boats. Traditional fishermen's earnings have reduced since the development of fishing technology. They are forced to go to the deep sea for fishing. Johnson, another fisherman, mentioned that they were more afraid of the trawling boats than the sea.[28] Not only do the trawlers cause damage to their net, but they can also overturn the traditional crafts if they get too close. Arguments between traditional fisherfolk and trawling boats are common.

Traditional fishermen and those working outside the fishing cooperatives sell their catch on the beach or at the nearest market. Purushan and the other fisherfolk at Vypin said that they sell their catch at the market at Kalamukku. Before the advent of the fishing cooperatives, the catch was sold to middlemen involving interaction at different levels of the community. The fishermen sometimes had to pay an auctioneer to sell the fish.[29] The middlemen ran the market and could make arbitrary deductions. Cycle peddlers and fisherwomen were an intrinsic part of this economy.

Cleetus mentioned that one of the greatest difficulties that they faced was going to the sea braving the waves in their traditional boats.[30] He added that earlier they used to start at four am in the morning and return at night. Now, because of the presence of outboard engines, they start between two to four in the afternoon and return at six am the next day. Their losses and gains are between ₹40,000–50,000 per trip. Some

[27] Cleetus, 2021.
[28] Viju, 2012.
[29] Kumar, K.G. 'Organising Fisherfolk Cooperatives in Kerala'. *Economic and Political Weekly* 23, no. 12 (19 March 1988): 578–81.
[30] Cleetus. *A Feature Story on CIFT- ICAR, and their Research and Extension Activities for Traditional Fishermen*. YouTube. KissanKerala. Adimalathura, 2021. https://www.youtube.com/watch?v=1swyYxyNO24.

of the reasons for the increased cost of fishing are the use of newer boats made of plywood, thinner nylon nets, the use of fuel to run the outboard motor, etc. The boats themselves cost anywhere between ₹15,00,000–20,00,000. Thus, traditional fishing has also seen advancements in terms of technology. Cleetus' village has around 2000 traditional fishing boats. Many of them go to the deep sea for fishing but return the same day or the next, unlike trawlers.

Baiju, another fisherman, said that the lack of adequate facilities for drying smaller fish was an issue that they faced.[31] Drying fish is an ancillary activity. He was pointing out the lack of development or research in certain areas. Earlier, the drying and related activity was by and large done by the fisherwomen. Some of this activity has been taken over by the bigger factories and cooperatives as mentioned earlier. Traditional fisherfolk do not have the same access to marketing and networks that corporate firms have. They also lack access to adequate storage facilities, modernised fishing harbours, and port roads.

In the lean months, the monsoon period, the boats are beached. When the traditional fisherfolk take out the boats after three months, there are expensive repairs to be done. Their nets are sometimes destroyed by dolphins, whales, etc. They are also destroyed by the bigger fishing boats that fish close to the shore and run over the nets left in place by the traditional fishermen. So, the nets also have to be replaced, usually within three years, Cleetus stated. Deep sea fishing and natural disasters like cyclones are constant threats to their lives.

When mechanisation started on a large scale in Kerala, the people who gained from it were middlemen and businessmen who could afford to buy the boats. They took control of the mechanised fishing industry. Traditional fishermen started forming cooperatives of their own or with the help of the government or the church in the late 1970s. The cooperatives enabled them to take loans to buy fishing boats and gear, market and process the catch, and raise their voices against the unfair fishing practices followed by trawling boats. One of the reasons for the annual trawling ban in monsoon was the pressure exerted on the government by traditional fisherfolk cooperatives.

Conclusion

This article chose the Mini-Harbour in Munambam, the fishing and allied activities around the location, to understand how formal education and advances in technology have directly or indirectly influenced a traditional occupation and a location associated with that activity. This was done through semi-structured interviews with people working in the area.

The boat owners, boat builders, fisherfolk, bookkeepers, and allied staff mentioned that there are changes in fishing practices, the technology used onboard, gender constituency of the location, places from where the workers are drawn, knowledge transfer about fishing and boat-making, and the presence of younger Malayali fisherfolk among the crew on trawling boats.

The shops and industries around the Mini-Harbour were fishing-related, from the hardware shop, boat repair yard, ice-making factories, boat-making yards, tharakam offices, and engine repair shops to net-making shops. However, no traditional fishing boats can be seen near

[31] Benance, Baiju. *A Feature Story on CIFT-ICAR, and their Research and Extension Activities for Traditional Fishermen*. YouTube. KissanKerala. Adimalathura, 2021. https://www.youtube.com/watch?v=1swyYxyNO24.

the Mini-Harbour area of Munambam. Though most people living in the area are connected to fishing and allied activities, none are directly involved in traditional or artisanal fishing activities.

Except one, all the interviewees were descendants of fisherfolk. The Malayalis among the interviewees had moved on to jobs that could be described as white-collar jobs. Indirectly or directly, all the changes were connected to access to higher education among family members of the traditional fisherfolk and advances in fishing-related technology. The Indo-Norwegian Project initiated the advances in technology. The initial technology was further developed by the mesthiris over the years. In addition, the people working in the fishing industry around Munambam are not shy about embracing new technology.

The advancement of technology has also impacted traditional fisherfolk. They have seen a reduction in fish wealth while using improved boats, motors, nets, and techniques in fishing, storing, and transporting. They do have access to cooperatives and subsidies from the government. Still, the trawling boats and allied activities are much more organised and financially secure than the traditional fishing sector and fisherfolk in Kerala.

Trawling has brought about ecological changes in coastal Kerala. While the trawling boat owners did not mention the change in the availability and variety of fish, many studies have been done on its adverse impact on fish availability and the ocean. The total trawling ban during the monsoon in Kerala was brought about when the traditional fisherfolk managed to organise under various cooperatives and with help from political parties, religious leaders, and others.

With the introduction of the fishing cooperatives and mechanisation of the entire fishing industry from fishing to processing and marketing, there was a reduction in the volume or percentage of sales in the open market. This could also have been one of the reasons that there are fewer fisherwomen in Munambam today.

Access to higher education is taking away the younger generation from their traditional occupations, which is common in Munambam. In that sense, Munambam seems to reflect a pan-Kerala phenomenon where, earlier Tamil migrants and now, people from north India have moved in to do the so-called blue-collar jobs.

The interviews showed that a traditional occupation has changed into an industry that depends on various new technologies and players. The changes were catalysed by the Indo-Norwegian project and access to education coupled with an openness to embrace change.

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