Traditional fishing crafts and gears used by the Nicobari tribes in Car Nicobar

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The Nicobari tribes are the predominant tribes in Andaman and Nicobar Islands, whose livelihood options are based on plantation crops and fishing. The study was conducted to review the traditional fishing practices of the Nicobari tribes in Car Nicobar, the capital of Nicobar District and to document their Indigenous Technical Knowledge (ITK) with respect to the fishing crafts and gears. Data were collected through different participatory research tools like key informant survey, group discussion, semi-structured interview schedule, personal observation and also from secondary sources. The investigation showed that Hodi, an outrigger dugout canoe is the traditional fishing craft commonly used by the Nicobarese and the traditional fishing gears used by them include spears, hook and line, trolling line and bow and arrow. It was observed that these tribes also use a few modern fishing gears. The study elucidates the design and operation of the traditional fishing crafts and gears used by Nicobarese and also the traditional practice of stupefying the fishes with an indigenous plant extract.

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Andaman and Nicobar Islands (ANI), having an aggregate coastline of 1,962 km, are located in the south east of Bay of Bengal in the form of a chain. They account for 30% of India’s Exclusive Economic Zone and occupy an area of 8,293 km². Nicobar is one of the three administrative districts of the Union Territory (UT) of ANI, comprising of 22 islands, of which 10 are inhabited by two aboriginal tribes viz, Nicobarese and Shompens. The Nicobarese, who constitute over 97% of the total tribal population of ANI, live in 156 tribal villages of Nicobar group¹,².

The tribes have acquired knowledge and gained skills to maintain their sustainable existence³ and to protect landscapes, ecosystems and species traditionally with the course of development⁴. Indigenous traditional knowledge (ITK) is the community-based knowledge which is passed by generations over many centuries. The important material which are connected with the ITK are the traditional seed, medicines and pesticide collected from the plants and animals, the tools used in livelihood such as crafts and gears in fishing⁵. The saying- necessity is the mother of invention is well reflected in fishing crafts and gears invented by the fishers⁶. The study of ITK is a gateway to learn their native life style, which may be technical, social, organizational or cultural. The design and choice of fishing crafts and gear depend on the topography, ecology and habitat of the resource available. Traditional crafts and gears in vogue among the tribes in North India⁷,⁸ and along the West and East coast of India⁹ have been well documented. Fishing is the major livelihood opportunity for the Nicobarese and fish a major source of protein for them, thus accounting for their nutritional security. The technical aspects of the crafts and gears of the Nicobarese have not been documented comprehensively and the current study aims at bridging this gap.

Methodology

An exploratory study was conducted during 2010-11 in Car Nicobar Island, the capital of Nicobar district, stretching between 9°00’ and 9°20’N latitude and 92°30’ and 92°50’ E longitude. The island, exclusively inhabited by Nicobarese, has a total population of 20,292, who live as a joint family called tuhet. Each tuhet includes many families and is lead by a tuhet head man. The Marine Fishing Regulation Act (2009) of the Union Territory recognizes all the Nicobarese as fishermen. These tribes in Car Nicobar

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possess a total of 79 traditional crafts (Hodi) and 14 motorized fishing boats.

Detailed information about the fishing crafts and gears used by the Nicobari tribes was collected from 52 fishers inhabiting in 12 different villages of Car Nicobar viz., Perka (headquarters), Malacca, Tamaloo, Kenyuka, Chuckchucha, Big Lapathy, Small Lapathy, Kinmai, Mus, Sawai, Tee Top and Sawai (Fig. 1) through different participatory research tools like key informant survey, group discussion, semi-structured interview schedule and personal observation. (Figs 2-7). The Prior Information Content was taken from the tribal council secretary and from each of the fishers who provided the information individually.

Results

Fishing crafts of Nicobares

The traditional fishing boat of Car Nicobar, Hodi is operated in the near shore waters. These boats cannot be operated in the high seas due to small size, lack of mechanization and sophisticated equipments and poor endurance, stability and storing capacity. They are propelled by means of oar and outriggers which are slender poles secured at their inner ends by being passed through the holes on the sides of dugout canoe close to the edge. The main purpose of the outrigger is to give buoyancy to the craft.

Hodi/Outrigger dugout canoe

The traditional boat of this island is locally called as ‘hodi’, which is an outrigger dug-out canoe by design. The hodi is made out of jack fruit tree (Artocarpus heterophyllus) locally called as To-kavo-ka (Fig. 2a). A single wooden log is used for constructing this type of craft. The length and width of the tree is selected based on the required size of the hodi and desired number of crew members to be accommodated. The length of these hodis usually varies from 3 to 9 m, breadth 0.30 to 1.0 m and depth from 0.40 to 1.0 m. The tree with slight bend in the trunk is traditionally recognized as ideal for construction of the hodi. The stages of construction and the final hodi are depicted in Fig. 2. The bark and skin of the trunk is shaved to facilitate maximum exposure to sun and air which is then dried for a period from one week to a month before shaping into hodi. The trunk is scooped with axes (Fig. 2b) of different sizes (Titiloinyo) to make the dugout canoe.

Once the shape is attained, it is fired using dried coconut leaves from the top, bottom, inside and outside of the canoe in order to reduce moisture, make the hodi stronger, harder and lighter (Fig. 2c). Firing also aids to check insects and borers attack. Then, cross woods are fixed for widening the mouth of the canoe (Fig. 2d). Slight firing at this stage increases the opening of the canoe and facilitates proper fixing of the cross wood. After reshaping, bamboo poles are fixed along either sides of the canoe (Fig. 2e) to which the cross planks are tied to form the deck of the canoe.

Finally wooden outriggers with stalks are fixed in the hodi to increase the buoyancy and stability in sea. Areca nut (Tisa-a) tree trunk is generally used as outrigger (Tamreh). Finally the hodi is taken into the intertidal area of the sea for testing of water leakage and adjustment of the outriggers for better stability and buoyancy (Fig. 2f).

A tribal fisher of this island has coated his hodi with Fibreglass Reinforced Plastic (FRP) along with liquid chemicals in specific proportion so as to increase its life span, enhance rot resistance and reduce cost of maintenance (Fig. 3). However, this modification has not been adopted by any other member of the tribal community.

Fishing gears of Nicobares

The traditional fishing gears employed by the tribal fishers include spears, harpoon, bow and arrow, hook and line and trolling line. In addition, gill net, cast net and long lines are also used by the tribes. The use of

Fig. 1—Map of the study area: Car Nicobar Island and its villages
shore seines has been discontinued post-tsunami as dead and broken corals washed ashore along the coast line hinder their operation.

Linrech/Chok (Spears)
Spearing is a primitive traditional fishing method still popular among the Nicobarese for catching fishes (Fig. 4a). The spears are made up of wood (bamboo) with metal (iron) and metal (iron) with a single pointed barbed end (Fig. 4b). The length of spears varies from 2 to 6 feet and they are made of a single or two detachable parts. The Nicobarese attach a rubber string to the spear which is used to power the spear (Fig. 4c). Spears are usually operated during calm season and low tides in shallow near shore waters with a few meters depth where fishes are known to aggregate. The target fish is aimed at and the rubber string is released on which the spear pierces the fish. Octopus and bigger fishes like tuna, barracuda, travely/caranx, seer fishes, grouper and sharks are caught by this method. Spear fishing demands precision and experience as with the tribes of these islands and the same is passed across the generations over time.

Hand lines
Hand line is one of the most popular fishing methods of the tribes. It consists of 3 to 20 m long monofilament line having one or more barbed hooks (Fig. 6a) of size ranging between 1 and 20. The Nicobarese use the thin steel rods for making their own hooks of different sizes. Some tribes use a reel and weight made of dead corals, stones or lead. Weights are not used when the gear is operated from the shore or jetty. Artificial bait (Fig. 6b), live earthworm or dead baits viz., fish, squid, cuttle fish flesh, hermit crab flesh, etc (Fig. 6c) are commonly used for attracting the fishes. While operation, one end of the line is held in hand and the hook with bait is allowed in the water (Fig. 6d). The sudden jerk felt on the line indicates that the fish has been caught.

Trolling line (Inruon thakuaha)
Trolling is a very common fishing method among the tribes. It consists of 2-4 m long movable fishing lines, which are towed from the outrigger pole from behind or side of the hodi. Live, dead or artificial baits are used for attracting the fishes. The lines attached in the outrigger vary with the boat/hodi. Imported plastic lures or locally made lures, which are generally bright red in colour and can rotate in their own axis as the boat moves are used. Chicken feathers and red colour cloths, cart boards, hermit crab and fishes are also used as lures. The troll lines are operated in different depths by the tribes. This method is mainly employed to catch the fast swimming pelagic carnivorous fishes like seer fish, tuna, barracuda, caranx/travelly and mackerals.

Bow and Arrow
Bow and arrows generally used by the tribes are made up of bamboo and are operated in shallow and calm waters to catch the slow moving fishes. The arrow pierces the flesh of the prey when shot from the bow. This age old practice is getting obsolete and not being followed commonly at present among the tribes.

Use of Icthyotoxic agent
The seeds of an indigenous plant, Kinyaw (Barringtonia asiatica) (Fig. 7a) is used as fish stupefying agent. The seeds are dried and cut open and then rubbed against the spiny surface of the stump of the indigenous tree kunial (Fig. 7 b-e). The seed shavings are directly sprayed over the sea water during the low tide in shallow and calm areas. Some of the tribes mix the seed shavings with wheat flour or any dust so as to make the water turbid. This method is used to catch small and slowly moving fishes.

Apart from the traditional fishing gears, the tribes have also adopted the modern fishing gears like gill net (Inhal), cast net (Kinval) and shore seine net (Hanak inhal kak). The use of shore seines has been abandoned post-tsunami due to settlement of coral debris along the coasts where they were operated till tsunami. The tribes are known to indigenize every possible aspect of the modern fishing gears based on their need and local requirements. The cast net used by the Nicobarese in Car Nicobar are without closing string but with pockets all along the bottom margin of the net which are used for holding the fish. The tribes make the sinkers (purum) for the cast net on their own by melting damaged lead sinkers of various sizes at high temperature and pouring into the iron mould of the required shape (Fig. 5 a-d).

Navigational practices of Nicobari tribes
The Nicobarese navigate into sea mainly based on the wind direction, light house, light of the houses located in the island and trees for locating their fishing grounds. They find the time at sea based on the position of sun, moon, morning star (sanim peuheu) and evening star (sanim piouoi). During the peak fishing period from November to April, the
Fig. 2-7—(2a) Hodi construction. The tree used for construction Trunk scooped with axe; (2b) smoking the wood; (2c) fixing of cross woods and deck plank; (2d) Insertion of bamboo support on deck; (2e) Hodi in sea; (2f) Hodi coated with FRP; (4a) A Nicobari tribe holding a spear; (4b) Barbed end of the spear; (4c) A tribe snorkeling with the spear; (5a) Making lead sinkers. Melting the lead sinkers; (5b) Molten lead being poured into the mould; (5c) Removing sinker; (5d) A lead sinker made by the tribes; (6a) Barbed hooks used in the hook and line; (6b) artificial bait; (6c) live bait; (6d) tribes operating the hook and line from the jetty; (7a) The Kinyav tree; (7b) fruit; (7c) seed inside the fruit; (7d) seed cut open and (7e) making seed powder.
tradiotional tribal fishers venture up to a maximum distance of 6 nmi while in the lean season they fish in the near shore area. The Nicobarese plan their fishing based on the tides and waves. They do not venture into sea during the first seven days after full moon and new moon day as the wave height during that period will be more thus rendering the operation of the outrigger canoe (Hodi) unsafe.

Discussion
Indigenous technical knowledge plays an important role in every tribal culture, which has a set of ideas for defining issues for their betterment. Their knowledge in fishing methods, vessel design, propulsion and processing has been effectively used to overcome specific localized problems and to enable the use of local resources in sustainable way. The design and operation of the fishing crafts and gears used by the Nicobarese are different from that of other tribes in Andaman. The Andamanese use small dugouts with an outrigger, while the Nicobarese use outriggers which are better built, more elegant in form and never possess more than two booms. The dugouts with outriggers used by the Shompens greatly resemble that of Nicobarese, but are smaller in size than other tribal canoes. The Jarawas neither make nor use dugouts canoes or outriggers; instead they use a raft made of bamboo or tree trunks\textsuperscript{10}.

Conclusion
The mainstay of livelihood for the nicobari tribes is plantation crops and fishing. Fishing in open sea demands specific skills and the Nicobarese have acquired them from their ancestors. They deem their expertise as an indispensable treasure for their sustainable existence. The dissemination of knowledge and development of recent times have enabled indigenous people to adapt to introduced societies, cultures and technologies and the economic consequences are shrinkage of tribal habitat and over exploitation of natural resources\textsuperscript{11}. Education and development has not dithered the Nicobarese from conserving their inherited wisdom and indigenous knowledge. The very fact that these aboriginal tribes still practice most of their traditional fishing methods is a testimony to the value of the treasure which has not lost their relevance over time. The ancient system of fishing using traditional devices is a sustainable method of harvesting fish without damaging the environment of corals, mangroves, wetlands, seagrass beds\textsuperscript{12} and hence there is a need to preserve and promote such practices prevalent among the indigenous tribes in one of the remotest localities of our vast country.

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