Brief Communication

A case study on the harvesting of dead *Turbinella pyrum* along Thoothukudi coast

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Turbinella pyrum (Linnaeus, 1767), commonly known as the sacred chank (family Turbinellidae) holds cultural and religious significance, as well as used in handicrafts industries of South Asia. *T. pyrum* is considered endemic to the Indian subcontinent, distributed across the Gulf of Mannar, Palk Bay, and the Southeastern Arabian Sea and slightly, to the Sri Lankan waters. *T. pyrum* is ecologically significant and has been commercially harvested from the Gulf of Mannar region because of its ornamental shells and juicy meat (Hornell, 1914). It is generally distributed in sandy bottoms between 10 and 27 m in depth (Hornell, 1922; Nayar and Mahadevan, 1974). The dead chank refers to the empty white shell of *T. pyrum*, which has lost both its soft tissues and periostracum, and remains buried in the seabed.

The dead chank resources were accidentally explored by fishermen during the deepening of the Harbour by V.O. Chidambaranar Port Trust in Thoothukudi. In 2009, dead chanks were exploited by skin diving. From 2011, the fishermen started diving using air compressors onwards for breathing to exploit this resource, allowing them to stay longer (average of 2-3 hours), with a maximum of 4 hours in the water at a depth of up to 18 m. Collection was

performed using aluminium scrapers/flippers worn on their legs to dig deeper using their legs at the sea bottom up to 2.0 m. The chank divers from the Therespuram coastal village of the Thoothukudi coast have started using water jet pumps for chank collection from the sea bottom, since 2023.

a) Live chank b) Dead chank

In the Thoothukudi region, the major dead chank exploitation centre is the Therespuram coastal fishing village, while a limited number of boats are also involved in dead chank exploitation in the New Harbour Beach and Vembar coastal fishing villages of Thoothukudi District. In the Therespuram region, 2,250 divers and 1,350 helpers were involved in dead chank exploitation. In total, 450 motorised boats, including 430 "Vallam", a wooden plank-built boat and 20 FRP (Fibre-Reinforced Plastic) boats, were engaged in dead chank exploitation. The vallams had an overall length of 12-20 m and were fitted with a 40-80 hp engine. An FRP boat with an overall length of 10-15 m was fitted with a 20-40 hp(Horsepower) engine.

Equipment and accessories used by chank divers for dead chank exploitation include,

a) Compressor and Compressor hoses: Each craft was fitted with a 15-20 hp locally designed air compressor used to fill the air-storage cylinders with breathable air. Each compressor unit was connected to approximately 6-10 hoses, each 100 m long. The hose is flexible and allows the driver to move freely during the chank exploitation. The hose connected to the air cylinder is part of a breathing air supply system that delivers air directly to the driver.

b) Jet pump motor: Most boats were equipped with a single water jet pump motor, whereas a smaller percentage had two water jet pump motors. The number of water jet pump connections varied between four and ten per boat, with an average of six connections in most cases.

c) Water intake suction line: Water intake is part of the jet pump that draws water from the surrounding area. This water is then pumped through the system at high pressure.

d) Discharge hose: The discharge hose or outlet line carries high-pressure water from the pump to the nozzle of the pump. The length of the hose is 30 m.

e) Water jet pump: A water jet pump, made of galvanised iron and approximately 1.2 meters in length, is a key accessory used to dislodge sand from the seabed during chank exploitation.

f) Regulator: The regulator, placed in the diver's mouth, ensures that the diver receives breathable air from the cylinder

g) Mask: It provides clear underwater vision and allows divers to breathe through a regulator.

h) Collection bag: A locally known kaccha net is used to store the collected underwater chank.

i) Iron rod: An iron rod (1.5–2 m) is used to anchor the diver in place during exploitation.

Water jet pump in use for dead chank exploitation

The dead chank collection process uses a water jet pump to dig into the seabed and collect the chanks buried in the sand. Divers tie a safety rope around their waist, connected to a boat on the surface for safety and communication. During the digging operation, a force of water from a water jet pump is used to excavate the seabed thereby allowing the chanks to be picked. The vertical digging process lasted between 1 and 2 minutes for a single dig, whereas the horizontal dig lasted between 4 and 5 minutes. After completing the chank collection, the process is repeated continuously for 3–4 hours during the first dive. Multiple digging and collection cycles contributed to the overall chank catch during this period. The water jet pump can dig down to 1.5 to 2 meters deep. After digging, the pits slowly start to close due to water movement and currents. Vertical digging creates round pits about 0.45 to 1 m wide and 0.3 to 0.7 m deep. Horizontal digging creates U-shaped pits about 1 to 3 m long and 0.5 to 1 m deep.

Although dead chanks have been collected since 2009, after the introduction of advancements in diving equipment such as compressors, the dead chank collection was 200t in 2013. In recent years, the exploitation of dead *T. pyrum* has increased to 420t by 2021, reaching a maximum of 1050t by 2023 on the Thoothukudi coast. Dead chank landings have substantially increased since the introduction of water jet pumps for dead chank collection. This modification increased the catch by more than fivefold, reaching a peak of 4,032t in 2024, with an estimated catch per unit effort (CPUE) of 62.5 kg/unit and 12.5 kg/person. The number of chanks collected by divers varies with age and the younger divers tend to collect more chanks, possibly due to greater physical strength and stamina. Divers in the 18–35 age group collect between 15 to 60 chanks (average 30). Those aged 35–50, collect around 10 to 40 chanks (average 25). Divers in the 50–70 age group collect fewer chanks, between 5 to 30 (average 17).

Dead chank exploitation by the water jet pump method

Dead chank landed from water jet pump operations

In the trading of dead chank in Thoothukudi region, the prices of chanks are determined by their size, quality, and condition. Currently, approximately 72 traders are actively engaged within this district and commonly traders are providing advance payments to boat owners to secure a steady supply of chanks. Most harvested chanks are now transported directly to Kolkata by local traders, where they are processed and used to make trumpets, bangles, and other shell crafts.

Table 1. Grades and pricing of dead chank shells

Shell diameter (mm)	Cost (₹)
65 to 70	50 -100
70 to 80	200-300
80-90	400-500
90-100	600-800
100-110	800-1000
>110	1000-1500

Chank divers often take medication before diving to manage the physical strain and challenges associated with prolonged underwater work. Many of them use acid reflux tablets to prevent stomach discomfort, which is likely triggered by pressure variations and extended durations of working underwater. A few divers also take energy tablets to boost their stamina and strength before diving. Use of pain-relief tablets are common to manage body pain or muscle strain. Use of energy drinks are also common. Often, dead-chank divers / collectors face severe health and safety issues due to unsafe diving practices. They rely on air compressors connected to long hoses for breathing, which poses a serious risk to their lives in the event of equipment malfunction. Most of the equipment they use does not follow safety standards. Recently, with the introduction of water jet pumps, inexperienced divers have started participating in dead chank collection. Lacking proper skin-diving skills, they are unable to save themselves in the event of a compressor malfunction, putting their lives at serious risk. Divers, both young and old, suffer from joint pain, breathing problems and nerve-related issues. These health problems are likely caused by breathing in polluted air, skipping decompression steps, and doing heavy work underwater for prolonged period. One of the most dangerous problems is Decompression Sickness (DCS), which happens when gas bubbles form in the body during a fast rise to the surface. Every year, a few casualties occur during dead chank collection.

a) Bangles b) Rings c) Engraved shell

Ornaments from *Turbinella pyrum* and whole shell craft