



Assessment of Chank Fishing as Livelihood in Therespuram, Tuticorin

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ABSTRACT

Chank fishing is one of the oldest professions carried out through traditional diving methods in coastal waters of Tamil Nadu. From generations, fishers have progressed from stone and rope to scuba equipment and other locally designed contraptions for diving into waters. Current study had been carried out to assess the role of chank fishery in fisher's livelihood of Therespuram fishing village, Tuticorin. Primary data was collected from purposively selected forty fishers by using structured interview schedule. Results of this study reveals that 45 % of middle aged (35-45 years) fisher's were found to be engaged in chank diving. Fishers below 35 years of age were found to be educated but could earn less than their counter parts of middle aged ones. Fisher's physical fitness and chank collection skills are essential traits for chank diving. Chank fishing was reported as the primary source of income for these fisher's and their average net income was estimated as ₹ 12 lakhs/annum/boat. They spend majorily (65%) on food items followed by individual health care and children education. Due to prolonged underwater exposure, health problems followed by debt were reported as major constraints by the fishers. By performing a skilled job like chank fishing, fisher's had to face several occupational hazards in coastal waters. Thus, appropriate onshore medical facility in case of emergency, adequate training towards scientific diving, uses of improved diving equipment and alternative employment during off season are utmost important to enhance fisher's livelihood in Therespuram village.

Keywords: Chank fishing, Skin diving, Occupational hazards, Socio-economics, Cost & returns

INTRODUCTION

Chank (Gastropod) fishery was carried out as early as 1800 years under Pandian Rulers and its collection was practised through skin diving in coastal waters by holding one's breath. Skin diving is practised throughout the world for different purposes, like sport fishing, sponge

fishing, oyster fishing and seaweed collection. In India, mainly pearl oysters and chanks were collected through this diving practice. An experienced diver can remain underwater up to two minutes and he may manage to go down occasionally to a depth of 66 feet but cannot go beyond that.

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A diver can collect zero to eight shells per dive, accounted an average yield of 100 shells /day with the frequent descents. Conversely, a trained diver with regulated air cylinder called as Scuba (Self Contained under Water Breathing Apparatus) could descent up to 60 feet depth in three minutes and could remain underwater for about two hours at planned intervals. Nayar (1967) and Mahadevan (1972) reported that, only few (approx. 1,000 fishers) prefer this as a profession as their livelihood along the south-east coast of India. In later years, many fishers were reported to be involved in chank diving for profits turning into primary professional chank fishers.

Origin of pearl and chank collection including its trade is well documented by travellers like Megasthenes, some others of Periplus, Sangam literature and archaeological excavations. In the Gulf of Mannar (GOM) region, pearl and chank collection are practised by fishers due to the presence of more fishable pearl and chank beds. Since 1960s, pearls collection was stopped due to overexploitation of fishable oyster (*Pinctada fucata*) population in these beds. Meanwhile, chank collection continued with the traditional breath holding (skin diving) method. *Turbinella pyrum* is a commercial catch collected by chank fishers and is commonly known as Sacred or Vishnu chank. Chank fishing would be mostly carried out when coastal waters have less turbidity and its season lasts from June to August in the Palk Bay and October to May in the Gulf of Mannar (Athiyaman & Rajan, 2004, Rajamani, & Manickaraja, 1991).

Tuticorin, popularly known as 'Pearl City,' and located in Gulf of Mannar region is one of the main coastal districts of Tamil

Nadu. District contributes 12% share in total marine fish production of the state and occupies third position in marine fish production. Around 20,000 fishers were reported to be actively engaged in fishing and 8% (1600 fishers) of them were involved in motorised fishing in Therespuram fishing village (District Hand Book of Statistics 2015-16 & DAHDF-2015). Among the motorised fishers, 22 % of fishers were reported to be licensed chank divers/fishers. Therefore, an effort has been made to assess chank fishing as a livelihood of coastal fishers Therespuram fishing village, Tuticorin which covers the historical documentation of Chank diving practices, socio-economics status of chank fishers and their livelihood, economic analysis of chank fishing and their constraints.

MATERIALS AND METHODS

To assess chank diving practices and their socio-economic status, primary data was collected from the purposively selected forty fishers by using structured interview schedule during October to November, 2016 and analysed using descriptive analysis. Chank diving practices included information on crafts and gear used for chank collection, diving methods followed by fishers and its effect. Socio-economic parameters included, information on age, education, experience, family details, asset holding, income and expenditure, and saving & debts details. Costs and return analysis had been done to estimate their net income from chank fishing as their livelihood and Rank Based Quotient (RBQ) analysis attempted to identify problems and constraints faced by chank divers while fishing in coastal waters.

$$R.B.Q = \frac{\sum fi(n+1-i)}{N \times n} \times 100$$

Where, f_i = Number of respondents reporting a particular problem under i^{th} rank, N= Sample size, n= Number of identified problems

RESULTS AND DISCUSSIONS

Chank Diving Practices

In Therespuram fishing village, chank collection was practised primarily with locally designed surface air supplying equipment, and

the divers spent longer duration under the water. This diving was facilitated by an air compressor customarily used to fill the air in car tires which are fitted onboard the vessel. The divers held the regulator in their mouth

and dived with a long hose of length around 100 m. Their target was to collect dead sacred chanks (Paal Sangu), *Turbinella pyrum* by digging the ground up to 2 m with a pair of scrappers. Similar findings were reported by Raj et al., (2015).

During 2014, SCUBA diving, a modified equipment was introduced for secured chank collection, but still these divers prefer locally customised method due to less operational timings, nearly 1.5 hrs, even though this apparatus is available to them with 75% subsidised price. Whereas, divers can remain underwater for 2.5 to 3 hrs through surface air supplying equipment.

Athiyaman (2004) and Rajamani (1991) reported that approximately 28,440 skin divers were involved in this operation during the 1990s. Chank fishing was carried out by divers working from canoes with face mask, diving stones and a nylon rope bag which is used to collect chanks. Large stones (pyramid shape with top hole) weighing 7-30 kg were tied at the end of the long rope (30 ft.) and used to hold by the divers to create negative buoyancy while descending. They also used stone shaped like a half-moon, tied around their belly to maintain their feet be free. Progressive divers usually carried an aluminium plate with rubber strap used as flippers, a net made of nylon tied along their waist to accumulate collected shell. They also used country made a mask to cover their eyes and nose and an iron chain (4-5 kg) linked along their waist to facilitate quick descend.

Chank marketing

During 1909, chank fishery was taken over by the State Fisheries Department from the Port Officer (monopoly market), Tuticorin. During the past, once in a year, Tamil Nadu Government sells the entire annual catch of around 40 lakhs shells to the West Bengal Handicrafts Development Corporation Limited. At present, majority of the collected chanks are transported to Kolkata directly by local chank traders.

Socio-economic profile of chank fishers

Among the selected respondents of the study area, 45 % of middle aged (35-45 years)

fishers were found to be engaged in chank diving and 40 % of them had diving experience more than 25 years. Education was the least concerned for them instead their experience mattered most. Fishers below 35 years of age (42.5 %) were reported to have primary education could earn less than their counter parts of middle aged ones. Majority of them (62.5 %) reported to have family size between 4 to 6 and are staying in pucca house subsidised by the state government. Among all, 53 % of them reported to have two-wheelers whereas 25 % of them don't have this asset. Out of all, 95 % of them reported to have more than one electronic gadget received from government at subsidised rate. Only 27.5 % of the respondents owns a boat as majority of them were found to be working as labourers. 95 % of the respondents reported that they had taken loan from boat owners (34 %) and work with the same owner until their debts get repaid and after that it is their willingness to continue or not. Debt is the primary reason to remain in this profession despite of uncertainties. Majority of them reported to have debts between 1-2 lakhs and nearly 75% of them reported their inability to maintain savings. These respondents reported their maximum savings of ₹3,000 (Table 1).

Income and expenditure of the respondents

Among the selected respondents, being the labourers, 42.5% of them had reported their monthly income between ₹10,000 to ₹15,000 and 40% of them between ₹15,000 to ₹20,000. Only 5 % of the fishers, especially those who are boat owners, had reported their income between ₹20,000 to ₹30,000. Nearly 32% of them reported to have their monthly family expenditure between ₹6,000 to ₹8,000 followed by those whose had reported their family expenditure between ₹8,000 to ₹10,000 (28%) and between ₹10,000 to ₹12,000 (30%). Only 3 % of them reported to have monthly family expenditure more than ₹ 12,000. These fishers major expanses was reported for food (65.5%) followed by health (13.9%) and children education (10.9%) (Table 2).

Respondents earnings based on age and education (₹/month)

As age and chank fishing experience mattered most to get their monthly earnings instead of their education, therefore age wise categorization of educational level and their income level has been studied. Younger fishers, who were below 35 years were reported to be educated at different levels could earn less than their counter parts (₹ 14,983), Fishers belonging to the age group between 35 – 45 years received their an average monthly income of ₹ 16,350 whereas those who belonging to 45- 55 years received their an average monthly income ₹17,884. Fishers more than 55 years of age get to receive an average monthly income of ₹ 12,111 as they are ones whose health gets affected due to fishing under waters in their earlier age (Table 3).

Health problems faced by chank fishers

Most of the chank fishers uses artificial air supplier to maintain prolonged exposure underwater maximum of 2 to 3 hrs with use of 100 m seamless pipe to supply air from the surface . When divers come out of the water, due to nitrous oxide forms endogenous gas bubbles in the bloodstream due to sudden pressure difference in air and water. These gas bubbles may damages their internal organs and this disease is called ‘de-compression’ sickness or caisson disease (DCS), which occurs due to prolonged underwater exposure. Raj, 2015 and Arockiyaraj, 2016-ToI also reported same in their related study. Initial symptom of this illness is joint pain, which needs immediate medical aid. Awareness about proper diving theory/mechanism would help them to care about the said health problems. Which can be brought among fishers by using a diving mechanisms of taking gap while descending and reliving in and out of the water, and resting out of water for every 30 minutes of diving.

Among these selected fishers 30 % of them reported that they are facing more than two health issues such as joint pains, headache along with vomiting sensation due to consistent diving. Whereas 17.5 % of them

reported to have both joint & back pains and breathing difficulties. Among all, only 2.5 % of them reported that they are not facing any health problems since they practice the traditional skin diving without using any artificial support for breathing, moreover this method works as an exercise in day to day life for them. Mostly elder fishers were reported to follow traditional method (fig: 1).

Availability and access to a health facility

Among all 82.5 % of the respondent had reported that they prefer to visit private clinic for the medical check-up on regular basis due to close proximity. whereas 15 % of them prefers to visit both private and public hospital, and only one fisher reported to go to a public hospital (8 to 10 km away from seashore).Among the selected respondent 55 % of them go for regular medical check-up every week to regain the energy loss due to higher physical activity and to go next day work (Table 4).

Training received by fishers

Among the selected respondent, only 22.5 % of the respondent received training from CMFRI, Tuticorin about safe diving practices/theory and use of SCUBA diving method. Also, Suganthi Devadason Marine Research Institute (SDMRI) - Tuticorin, conducts regular training programs for chank collectors of Tuticorin coast on ‘the conservation of the marine environment and improvement of basic knowledge and skills of safe diving’ during 2014. SCUBA is a safety diving device which helps the divers to overcome from “decompression sickness.” Therefore, the mandatory use of SCUBA with substantial knowledge about diving skills among fishers should be implemented by continuous training.

Fishing details

Chank fishing season at Tuticorin coast is from October to May every year as rest of the period, water would be turbid and unsuitable for chank collection. Fishers go up to a distance of 15 to 25 km with a depth of 25 to 90 ft for chank fishing and an average of 5 to 7 crew members can travel in a boat for fishing. Among all the respondent 30 % of chank

fishers are also involved in fish catch along with chank collection and on an average of 2 to 3 Kg of fish by using small gears and arrows. Most of them (67 %) preferred the caught fish for household consumption, and the rest of them sell in the market. Fishers collect on an average of 25 chanks (Sacred Chank) per fishing trip which fetches from Rs 25 to ₹ 800 per piece according to the size.

Chank size measurement (*Turbinella pyrum*)

Size of chanks varies from 40 mm in diameter to 110 mm and its grading have been executed based on its size measurement and mentioned in the following Table 5. Merchant selling price starts from ₹ 5 to a maximum of ₹800 per piece.

Economic analysis of Chank Fishing

For chank fishing, the share of expenditure in variable cost consumed by fuel (66 %), followed by food (25 %). Net revenue per year is calculated around ₹ 11.9 lakhs and equal share of revenue disbursed among labours, including boat share which goes to the boat owner. Benefit-cost ratio, of chank

fishing is found to be 1.02, indicating that, only marginal revenue received by fishes over the cost (Table 6).

Market demand for chanks

Turbinella pyrum is known as the sacred chank because of its importance in both Hindu and Buddhist religions, where it is used as a ceremonial trumpet. It is being also used for making bangles in West Bengal. And, has a significant contribution to the funeral ceremony as well. A diver, who is fortunate enough to find a 'Valampuri' chank (right helical) is guaranteed 1000 times more value than the standard rate. One gram weight fetches around ₹8, 000.

Constraints faced by chank divers

Health issues due to occupational hazards such as joint pains and breathing difficulties were the significant constraints faced by fishers followed by lack of on-shore medical assistance, declining chank resources, lack of training towards scientific diving, lack of alternative employment during off seasons and less use of SCUBA (Table 7).

Table 1: Socio-economic profile of chank fishers

S. No.	Category	Frequency (%)	%
1	Age		
	<35	15	37.5
	35-55	18	45.0
	>55	7	17.5
2	Education		
	Illiterate	10	25.0
	Primary	17	42.5
	High school	10	25.0
	Higher secondary	3	7.5
3	Family Size		
	Below 4	7	17.5
	4 to 6	25	62.5
	Above 6	8	20
4	Years of Experience		
	Below 5	9	22.5
	5 to 10	6	15.0
	10 to 15	2	5.0
	15 to 20	3	7.5
	20 to 25	4	10.0
	Above 25	16	40.0
5	House details		
	Pucca	24	60.0
	Semi Pucca	11	27.0
	Kuccha	5	13.0
6	Asset details		
	Only cycle	5	12.0
	Only two wheeler	21	53.0
	Both	4	10.0
	None	10	25.0

	(a) Electronic gadgets		
	Only TV	2	5.0
	More than one facility (Including TV, Fridge, and Mobile)	38	95.0
	(b) Fishing assets		
	Fishing boat	11	27.5
	None	39	72.5
7	The debt of the respondent		
	Having debts	38	95.0
	Not having debts	2	5.0
	(a) Sources of debts		
	Friends/relatives	2	5.3
	Money Lenders	6	15.8
	Boat owners	12	31.6
	Commercial bank	5	13.2
	More than one sources	13	34.2
	(b) Debts range of the respondent (₹)		
	Below 10,000	1	2.6
	10,000 -30,000	6	15.8
	30,001 -50,000	6	15.8
	50,001 -1,00,000	7	18.4
	1,00,001 -2,00,000	12	31.6
	Above 2,00,000	6	15.8
	(c) Debts repayment of the respondents		
	Able to repay	10	25.0
	Unable to repay	28	75.0
8	Savings of the respondents		
	Able to save	10	25.0
	Not able to save	30	75.0
	Saving range of the respondent (₹)		
	Below 1,000	3	30.0
	1,001 to 3,000	3	30.0
	3,001 to 5,000	2	20.0
	Above to 5,000	2	20.0

Table 2: Income and expenditure of the respondents

1	Monthly income (₹)		
	Below 10,000	12	7.5
	10,001 to 15,000	16	42.5
	15,001 to 20,000	10	40.0
	20,001 to 25,000	1	2.5
	25,001 to 30,000	1	2.5
2	Monthly Family Expenditure (in ₹)		
	Below 6,000	3	7.0
	6001 to 8,000	13	32.0
	8001 to 10,000	11	28.0
	10,001 to 12,000	12	30.0
	Above 12,000	1	3.0
	Particulars (Share of Expenditure in %)		
	Food		65.5
	Education		10.9
	Medical Expenses		13.9
	Other expenditure		9.7

Table 3: Respondents earnings based on age and education (₹/month)

Age	Level of Education				Average Earnings (Group-wise)
Group	Illiterate	Primary	Secondary	Higher Secondary	
Below 35	-	14,250	15,200	15,000	14,983
35 to 45	19,000	17,400	17,000	12,000	16,350
46 to 55	17,000	16,667	20,000	-	17,884
Above 55	12,333	15,000	9,000	-	12,111
Average Earnings (Level of Education)	16,111	15,829	15,300	13,750	

Table 4: Availability and access to a health facility

Category	Frequency
Health facility	
Government hospital	1 (2.5)
Private clinic	33 (82.5)
Government hospital and private clinic	6 (15)
The frequency of medical checkup	
Weekly	22 (55)
Monthly	11 (27)
Yearly	7 (18)

Value in parenthesis represents percentage (%)

Table 5: Chank size measurement (*Turbinella pyrum*)

Size (in mm)	Grade	Price (in ₹)
110	3 O	800
105	3 O	800
100	2 O	700
95	O	600
90	1	500
85	2	400
80	3	300
75	4	250
70	5	150
65	6	100
60	7	40
55	Tap	10
50	Kulli	7
40	Vinni	5

Table 6: Economic analysis of Chank Fishing (₹/annum/boat)

Fixed Cost	Rs	% share
Interest on Fixed capital	60000	49.86
Depreciation	53333.33	44.32
Repair and Maintenance	2500	2.08
License fee	3750	3.12
Total Fixed Cost (A)	120333.3	100.00
Variable Cost	₹	% share
Fuel	435421.9	66.40
Lubricant	2681.875	0.41
Food	166250	25.35
Variable cost	604353.8	92.17
Interest on Working Capital	51370.07	7.83
TVC (B)	655723.8	100.00
The share of Fisher (C)	1042804	
TC (A+B+C)	1818861	
Total Gross Revenue	1847500	
Total Net Revenue (GR-TVC)	1191776	
BCR	1.02	

Table 7: Constraints faced by chank divers

Problems identified	RBQ	Rank
Health problems	88.75	1
Declining chank resources due to chank bed destruction by trawling	80.83	2
Lack of medical assistance (first aid)	77.67	3
Lack of alternative employment opportunity during offseason	42.08	4
Lack of training about dive theory	39.58	5
Lack of SCUBA apparatus	31.67	6

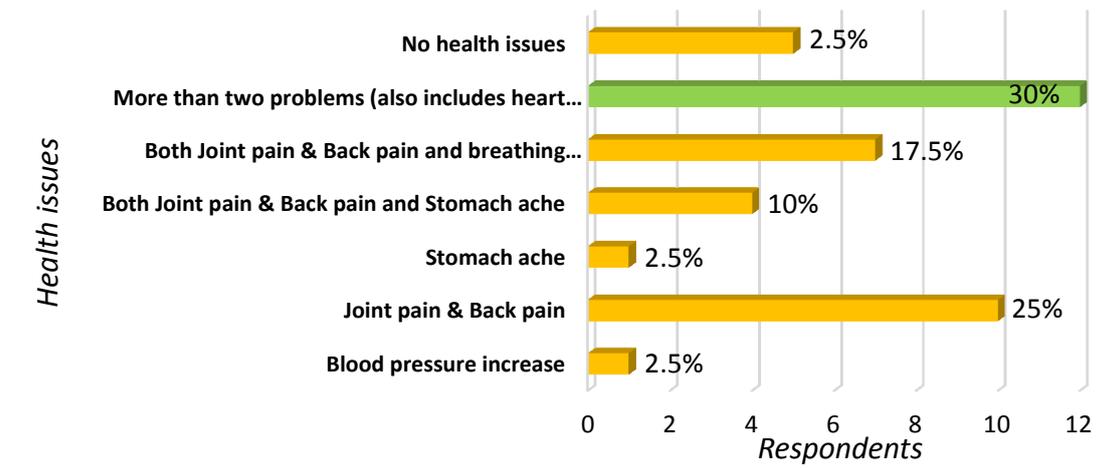


Fig. 1: Health issues faced by chank fishers



Fig. 2: Collection of chanks by traders from fishers



Fig. 3: Measuring gauge



Fig. 4: *Turbinella pyrum* (Sacred Chank)

CONCLUSION

This study concludes that chank fishing experience matters most rather than their educational level, which is witnessed by, middle age fishers who are less educated but are experienced could earn more than their counter parts. Though the chank fishing seems to be lucrative profession, but are facing multiple occupational hazards. Since fishers get physical acclimatisation towards this occupation they no longer can switch to other occupation to sustain their livelihood. Moreover, after food expenses a significant proportion of their earnings are used for medical assistance (14 %) to overcome difficulties faced due to prolonged exposure under water. Higher in debt by fishers is also one of the obvious reason, which restrict the fishers to come out of this occupation. Therefore, co-operative society and SHG can help these fishers in provision of loans would sort out their debt burdens. There can be more training by government organisation about scientific dive theories, use of SCUBA for effective and safe diving, which intern increase the fishing output. Awareness about chank resources and coastal bed management among divers need to be improved. Regulating maximum depth and duration of diving can reduce health risks. In addition to that, establishment of a recompression chamber (instant O₂ supply) on-shore helps divers at the time of emergency to overcome “decompression sickness.” Alternative employment opportunity, related to chank marketing and producing ornaments during off-season (June – September) could also help the fishers to sustain their livelihood.

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