

Original Article

# Portraying a Vulnerable Fishing Village – A Case Study of Elamkunnapuzha Fishing Village, Kerala

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**Abstract** - The Indian fisheries sector is vibrant enough to provide dependency for over 14.5 million people across the country for their livelihood, with an annual marine fish production of 3.83 million tonnes in 2017. Kerala stood third in the fish-producing states of the country with a contribution of 5.85 lakh tonnes. Nevertheless, of adorning the highest literacy rate in the country, the state of Kerala is having a marginalization hiccup in the case of the fishers community. The fishers of Kerala are marginalized far behind with a comparatively lower literacy rate and educational attainment, limiting them with minimal alternative livelihood options. Along with these, climatic changes also affect the sector and make the fishers' lives more vulnerable. This study examines the effect of climate change on the fishermen families of the Elamkunnapuzha fishing village in Ernakulam district, Kerala. The district possesses around 10% of the fishing villages and 8% of the anglers' families in the state. Elamkunnapuzha village is one of the major fishing villages in India's South West hotspot regions. Even though the village has a century-old fishery culture and a strong emotional attachment to the fishing job, people are not ready to direct their young generation into this sector, indicating the higher level of vulnerability prevailing in the sector. As the first of its kind conducted at one of the most vulnerable marine hotspots of Kerala and explains the problems and prospects of the inhabitants in the sector, the study has its relevance as a basis to develop proper adaptation mitigation strategies for the fisher folks.

**Keywords** - Fisheries, Socioeconomics, Fisherfolks, Vulnerability, Fishing village, Community development, Kerala fisheries, Fishermen community

## I. INTRODUCTION

Millions of people around the globe, including many in developing countries like India, depend upon fisheries for their livelihood. The Indian fisheries sector is vibrant enough to provide dependency for over 14.5 million people across the country for their livelihood, with an annual marine fish production of 3.83 million tonnes in 2017. There are 3,288 marine fishing villages in nine maritime states and two union territories of India, sheltering around four million marine

fisherfolk populations comprising 864,550 families. Among the 3,288 marine fishing villages of the country, seven percent are in Kerala, abiding 14 percent of the total marine fishers households and 15.3 percent of the total marine fisherfolk population of the country (CMFRI Marine Fisheries Census, 2010). Still, the twin problems of unemployment and mal-nourishment in rural India can be simultaneously addressed for efficient utilization of the available resources through the involvement of local people (Datta and Kundu, 2007).

Even though the state of Kerala is rated among the top three maritime states of the country, there are still illiterate/semiliterate and indigent fishers who lack the knowledge of the latest fishery technologies and proper attitude towards fishery development (Chakrabarthy *et al.*, 2005). Proper management policy involves the appropriate choice of inputs that can have a major impact on employment in the fishery, which influences the economy of the concerned locality (Heady, 2000). Nevertheless, of adorning the highest literacy rate in the country, the state of Kerala is having a marginalization hiccup in the case of the fishers community. The fishers of Kerala are marginalized far behind with a comparatively lower literacy rate and educational attainment, limiting them with minimal alternative livelihood options. Shyam *et al.* (2014) reported a low level of awareness of climate change among fisherfolk of Kerala because climate change issues are entangled with other developmental issues; thereby community could not decipher climate change issues in particular. According to the reports of Ridgway (2007a), Cai *et al.* (2005), and Cai (2006), the impacts of climate change are expected to be observed in the southern part of India.

According to the study conducted by Shyam *et al.* (2014), the districts of Thiruvananthapuram and Ernakulam have the highest vulnerable villages in Kerala based on the vulnerability index table formulated using the Patnaik and Narayan method. The district of Ernakulam has a total number of 21 fishing villages casting around 10 percent of the state's total of 222 marine fishing villages, inhabited by around 1,52,159 fisherfolk population, with a nine percent of it (1,30,92) being active marine fishermen (CMFRI Marine



Fisheries Census, 2010; PANFISH book, 2011). The current study attempts to scrutinize the socio-economic profile of the fishing community in the Elamkunnappuzha fishing village of Ernakulam district, Kerala. According to Shyam *et al.* (2016), Elamkunnappuzha is one of the most vulnerable coastal villages with a high value of vulnerability index and lesser adaptive capacity. The village is inhabited by around four percent of the total fishermen families (390), fisherfolk population (1739) as well as the active fishermen (377) of the district (CMFRI Marine Fisheries Census, 2010). Hence, the study draws attention as the first of its kind done at one of the marine hotspots of the country with high exposure to climate-related shocks and stress. The study provides a basis for developing adaptation mitigation strategies for the fisher folks.

## II. MATERIALS AND METHODS

Location: Ernakulam, the commercial capital of Kerala, has 21 fishing villages casting around 10 percent of the state's total of 222 marine fishing villages. Around eight percent of the total fishermen families of the state are residing in the Ernakulam district. The Elamkunnappuzha village is one of the major fishing villages from the southwest hotspot regions of India situated in the Vypin taluk, between 10° 00' N and 76° 15 E, of the Ernakulam district, where fisheries play a predominant role as a major source of livelihood for a vast majority of people.

Data collection: To crowd lawful and dependable data, the course of action is mainly aimed at qualitative information. A pre-tested interview schedule was used to collect information directly from the anglers' families through personal discussions and interviews regarding the various aspects of the socio-economic conditions. The data was collected in 2014 from a total sample of 300 respondents selected from the five coastal wards of the village through a random sampling method. Information about their fishing activity, basic household data, economic and historic and cultural dependence on fishing, gender equity, employment and occupational structure, income distribution, assets, physical capital, financial capital, social capital, exposure, etc., were collected and analyzed. Accordingly, secondary data from CMFRI, fisheries department, census statistics, various research studies, etc., were also considered for the study.

The social status of the fisher folks of Elamkunnappuzha village is presented in table 1.

**Table 1: Social status of the fishermen of Elamkunnappuzha village**  
 Figures in parentheses indicate the percentage of the total. Source: Marine Fisheries Census, 2010.

Total fisherfolk population		1731	
Gender wise population(adults)	Male	867	(49.8)
	Female	872	(50.1)
Total fishermen families		390	
Total traditional fishers' families		378	
Total BPL families		185 (47)	
Literates	Primary	Male	272 (31)
		Female	260 (30)
	Hr. Secondary	Male	287 (33)
		Female	281(32)
	Above Hr. Sec.	Male	69 (7.9)
		Female	50 (5.8)
Number of active fishermen		377(21.8)	
Crafts owned by fisherfolks	Mechanized	31(38)	
	Outboard	58(18)	
	Non-motorized	194(19)	

## III. RESULTS AND DISCUSSION

Among the 300 respondents selected randomly from the area, 82 percent (247 nos) are males, as the data collection was targeted mainly at the head of the households of the fishing community who can give better and more accurate information. Moreover, the particulars of the fishing activity, economic dependence, etc., can only be reported by the male member of the family. Moreover, the study found out gender equity prevails in the community, and about 98 percent of the respondents opined that there are women in leadership roles in the community.

### A. Fishing activity

According to the study, around 95 percent of the respondents of the Elamkunnappuzha village reported fishing as their main occupation. More particulars regarding the intensity of fishing activity are detailed in table 2, which shows the number of days in a week the fisherman engages in fishing.

**Table 2. Fishing Intensity**

Fishing intensity	No. of fishers
Daily	207 (69.0)
3 to 5 days	66 (22.0)
2 to 3 days	16 (5.3)
1 to 2 days	5 (1.7)
Weekly	6 (2.0)

Figures in parentheses indicate the percentage of the total.

The majority of the respondents (69 percent) go for fishing activity daily, whereas an infinitesimally small percent of the fishers are occupied with fishing activity once a week. The average length of the fishing trips analyzed shows that the lion's share of the fishers (77 percent) deals with 3 to 6 hours of fishing trips. In contrast, around 15 percent of the respondents perform the single-day fishing activity. Only one percent or less than that of the respondents is dealing with fishing trips extending more than a day. More details regarding the average length of fishing trips are furnished in table 2.

The study indicates that commendable changes are happening in the fishermen's catches. Major details furnished in table 4 imply that only a three percent of the respondents attained a catch higher than one ton this year, whereas almost seven percent of them had achieved a better catch before. Around 91 percent of the respondents opined that the availability of the most important species targeted by them for commercial purposes had changed beyond belief. Also, it is reported that the average distance traveled by the fishers for fishing from the coast has increased much, according to 93 percent of the respondents.

**Table 3: Average length of a fishing trip**

The average length of a fishing trip	No of fishers
Less than one hour	2 (0.7)
1 -3 hours	13 (4.3)
3 -6 hours	231 (77.0)
1 day	46 (15.3)
2 days	1 (0.3)
1 week	4 (1.3)
More than 1 week	3 (1.0)

Figures in parentheses indicate the percentage of the total.

**Table 4. Details of the best catch**

Weight (in tons)	Best catch ever	Best catch this year
Less than one	104 (35.0)	93 (31)
1 to 5	20 (6.7)	7 (2.3)
5 to 10	0 (0)	0 (0)
10 to 15	3 (1.0)	2 (0.7)

Figures in parentheses indicate the percentage to total

### B. Basic household details

Fishermen's livelihood can be restricted as something literally under the mercy of the seasons as there is much variation found in the household income during the pre-monsoon/monsoon/post-monsoon periods. Almost all of the respondents (97 percent) agreed that there is a deviation in their household income between the summer and winter.

### C. Fishing business

The study revealed that most of the respondents (74 percent) are doing the fishing business on a partnership basis. It was tough to collect the household income details as most respondents were not ready to reveal their monthly turnover. Also, it isn't easy to assess as it fluctuates accordingly. Although the study indicates that more than half of the respondents (63 percent) are earning an approximate monthly income below Rs 5,000, whereas 26 percent earn between Rs 5,000 and Rs 10,000, 11 percent earn between Rs 10,000 and Rs 15,000 monthly.

An evaluation of the income difference collated with the statistical dispersion of the distribution inequality is done using Lorenz Curve and Gini Coefficients. The Lorenz curve is depicted in figure 1, which clearly shows the extent to which the curve sags below the line of equal distribution.

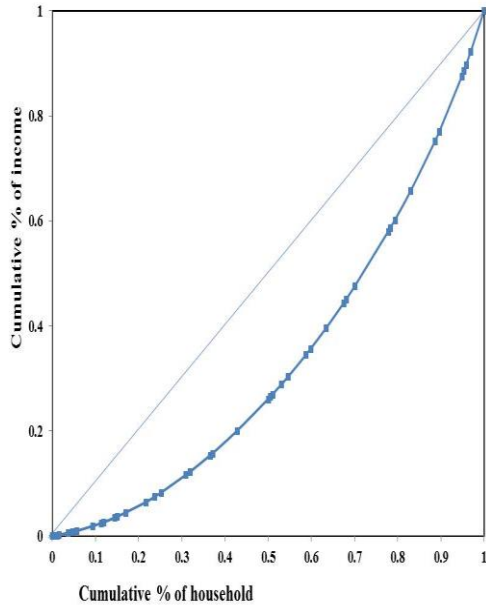


Fig. 1 Lorenz Curve on the income distribution of the fisher households.

Here the deviation of the Lorenz curve from the line of equality indicates the considerable amount of income inequality in the society. This Lorenz curve result can be further corroborated with the Gini coefficient, which is estimated to be 0.33. Since the value of one for the Gini coefficient represents perfect income inequality, and the value of zero represents perfect equality of income, the figured out value of 0.33 in the study implies a noticeable level of income inequality in the fishers community.

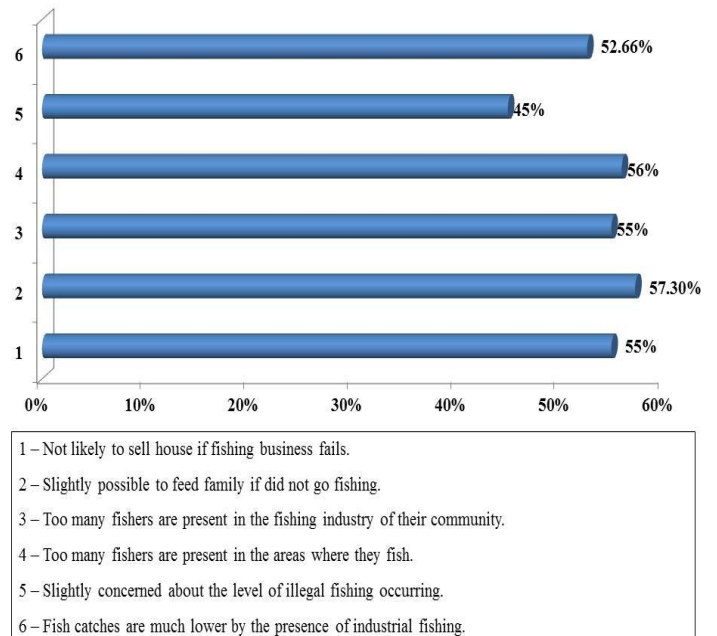
More than half of the respondents (55 percent) depend on their fellow workers for day-to-day resources to go fishing. In contrast, the entire respondents are interested in interacting with other anglers rather than marine reserve managers, scientists, safety authorities, etc., when going fishing. This indicates the flaw of the authorities and marine reserve managers in winning the trust of the fisher folks.

**D. Economic dependence on fishing**

The food consumption and the economic dependence on fishing and other resources have been analyzed, which indicates that around 41 percent of the respondents are consuming fresh marine food and fresh vegetable products daily, and about 61 percent are eating fish from their catch.

Around 81 percent of the respondents opined that the most important food source for their households is met through a portion of their fish catch. An infinitesimally small percentage of respondents have a plantation or kitchen garden (15 percent) and livestock (13 percent) at home. A greater number of them (81 percent) buy the vegetable products in the local shop.

The investigation about the economic dependence of the fisherfolks on fishing revealed much important information, as furnished in figure 2.



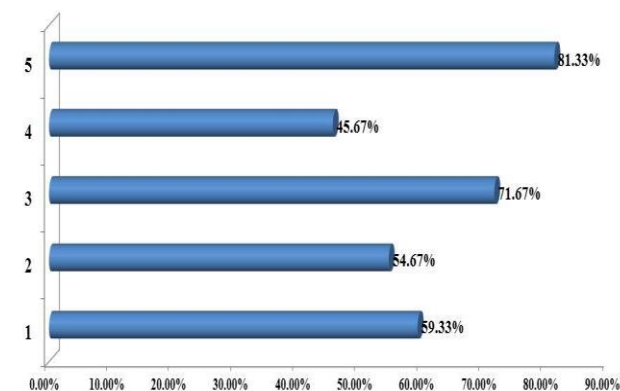
- 1 – Not likely to sell house if fishing business fails.
- 2 – Slightly possible to feed family if did not go fishing.
- 3 – Too many fishers are present in the fishing industry of their community.
- 4 – Too many fishers are present in the areas where they fish.
- 5 – Slightly concerned about the level of illegal fishing occurring.
- 6 – Fish catches are much lower by the presence of industrial fishing.

Fig. 2 Economic dependence on fishing.

**E. Historical and Cultural dependence on fishing**

The statistics regarding the historical and cultural involvement collected from the fisher folks reveal some relevant facts about the fishing community in the study area. In the vicinity, 71 percent of the respondents believe that the fishery in the study area has a tradition of 100 years, and 81 percent opined that their ancestors were fishers. About 64 percent of the respondents proudly describe their family as having a fishing identity or culture. The respondents were found to have an average experience of 34 years as fishers, ranging from five years to 64 years.

The education details of the ancestors of the respondents show that around 50 percent of the respondents have parents with at least primary education. About 68 percent of the parents had their own house, and around 29 percent had their boat.



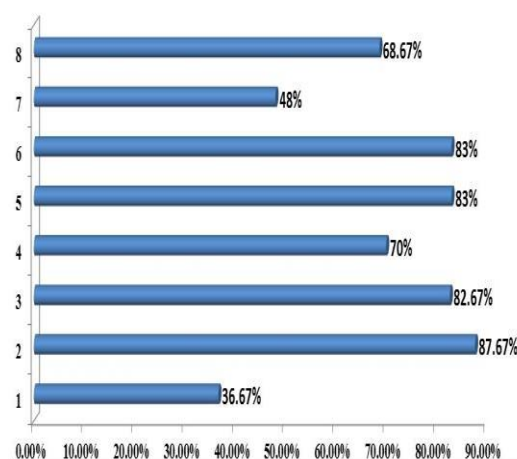
1 - Local knowledge about fishing is slightly included in local natural resource management plans  
 2 - Not at all concerned about the lack of young people entering the fishing industry in the area.  
 3 - Knows quite a lot about the environment in which they fish.  
 4 - Its important to pass on local knowledge about fishing to younger generations.  
 5 - Local knowledge about fishing is partly lost in the community.

**Fig. 3 Cultural importance and local ecological knowledge of fishing.**

Information collected regarding the cultural importance of fishing and the fishers' local ecological knowledge is furnished in figure 3. The fishers know much about the environment in which they fish and believe that the local knowledge about fishing is slightly included in local natural resource management plans. Meanwhile, they dint think it is important to pass on local knowledge about fishing to younger generations. They are not concerned about the lack of young people entering the fishing industry in the area. This pinpoints the bad impression the community is having regarding the future of the fishing business.

**F. Institutional flexibility**

An analysis of the institutional flexibility helped throw light on the adaptive capacity of the fisher folks in the study area. It was found that there are three major markets in the area where fish and vegetables can be bought, according to the majority of the respondents (62 percent). A greater number of fishers (89 percent) are selling their fish through intermediaries or go-betweens in the major markets of the area. It was also found that the fish price has not been relatively stable in the past three years. The entire respondents supported the same and also believed that the middleman's power dictates the price of the fish in the local markets.



1 - Illegal fishing occurs in the community.  
 2 - A few people obey the rules in the community.  
 3 - A few people break the fishing rules.  
 4 - Fishing rules applied in the area are enforced a little.  
 5 - Conflicts are not very common between fishers in the area.  
 6 - There are a few government safety nets in case disaster strikes fishing activities in the community.  
 7 - The government departments and/or academic institutions to receive up to date information about fishing are slightly linked only.  
 8 - Only a little help from govt to overcome challenges the community faces in relation to marine resources

**Fig. 4 Institutional flexibility**

More details regarding the fishing compliance and conflict and access to institutional safety nets & information are in figure 4, indicating the seriousness of illegal fishing prevailing in the area. The absence of proper community linkage with government departments and/or academic institutions affects the availability of up-to-date information about fishing.

**G. Resource management institutions**

While analyzing the adaptive capacity of the fisherfolks, it is relevant to gather information about the resource management institutions; accordingly, 83 percent of the respondents confirmed the presence of marine resource management institutions of traditional management; managed by chiefs/customs in their locality. About 81 percent of the respondents reported changing the rules and practices in response to environmental changes.

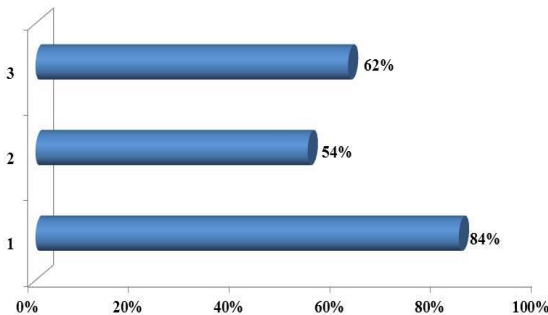
**H. Social dependence**

Analyses involved the details regarding the attachment of the fisherfolks to their place, which showed that around 76 percent of the respondents strongly believe that they belong

to their community and place. The survey found a strong emotional attachment of the fisherfolks to their place, and along with that, more than half of them (78 percent) consider friendships and relationships as very important in their place. Around 69 percent of the respondents opined that they fish for pleasure rather than a living, and 60 percent believe they can think of few other jobs than fishing. More than half of the respondents (55 percent) believe that fishing is a lifestyle rather than a job. The majority (70 percent) viewpoint is that being independent is the best thing about being an angler, and they are very proud to introduce themselves as fishers. Still, the irony exists that 79 percent of them are not interested in diverting their children into the fishing profession. This is an important fact that pinpoints the vulnerable situation faced by the fisherfolks. The scarcity of resources and the uncertainty of the job are the major reasons which make the fishers turn away from their coming generations to some other fields.

**I. Occupational flexibility**

To assess the capacity of the respondents to anticipate changes and develop response strategies, particulars concerning occupational flexibility were collected and analyzed. The stats represented in figure 5 show that a better part of the respondents (84 percent) surmised fishing as an important economic activity. The information regarding occupational mobility presented in the figure reveals that 54 percent of the respondents got employed sometimes in more than one job per year. About 37 percent of the respondents are not ready to move to a bigger town or community for work if necessary.



- 1 – Fishing is very important as an economic activity in this community.
- 2 – They are employed in more than one job per year.
- 3 – Not at all to move to a bigger town or community for work if necessary.

Fig. 5 Occupational flexibility

**J. Human capital**

To assess the community's social capital, details regarding gender equity, health, education, skills, and knowledge were collected and analyzed.

**a). health:**

The particulars regarding health status collected indicate that 93 percent of the respondents do not have anyone in their house who are infirm or has needed assistance to undertake daily chores for the past 12 months. Also, around 94 percent of them do not have anyone chronically ill to do even normal activities in their family.

**b). Education, Skills, and Knowledge:**

Around 72 percent of the respondents have only a primary level school education, whereas 24 percent have a high school education. All respondents reported that they have basic skills in at least any other fields like gardening/horticulture, welding, mechanics, electronics, etc. Also, the fishers' basic knowledge in various areas was enumerated and presented in figure 6.

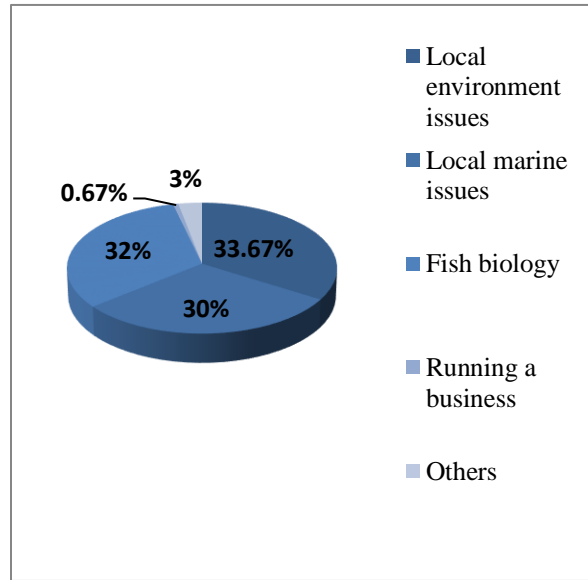


Fig. 6 Basic knowledge in various areas.

**K. Financial capital**

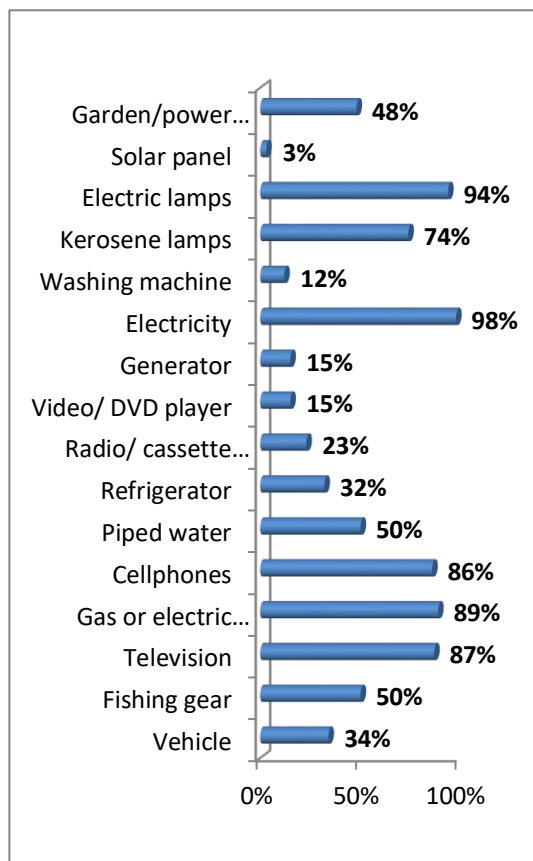
Even though most of the respondents (78 percent) do not have any savings or money put aside for emergencies, almost all of them (98 percent) believe that they can gather money in an emergency. About 42 percent of the respondents are found owing money to someone, whereas around 98 percent hadn't loaned money to anyone in the last year. While 43 percent of the respondents seek financial help from their friends and family, many people prefer banks. Almost half of the respondents (48 percent) have a mortgage on their house

for an average of Rs 3.4 lakhs ranging from Rs 30,000 to Rs 15 lakhs. It was found that around 41 percent of the respondents have life insurance, and nearly ten percent have their house and boat insured.

**L. Physical capital**

The physical capital analysis involved assessing the fishers' various asset particulars and living conditions, including household assets, freshwater supply, energy source, waste management, etc.

According to the study, almost all of the respondents (98 percent) live in their own houses, which are an average of 20 years old, ranging from six months to 75 years, and about 48 percent of them believe that their house needs much renovation and maintenance. Around 12 percent of the respondents possess outboard motorboats, eight percent have dugout canoes, four percent own fiber canoes, whereas 75 percent don't own a boat.



**Fig. 7 Household assets**

The statistics of the household assets also include various other particulars like whether the respondent has the vehicle, fishing gear, television, gas or electric stove, cell phones,

piped water, refrigerator, radio/cassette player, video/DVD player, generator, electricity, washing machine, kerosene lamps, electric lamps, solar panel, and garden/power tools as depicted in figure7.

Only 21 percent of the respondents have water tanks, and a majority of the people (44 percent) depend on the public system as the main source of drinking water. About 21 percent of the respondents have their own well/borehole. The entire respondents have their mains connected as the main source of energy. Around 53 percent of the respondents use firewood as the cooking fuel, while 46 percent use cooking gas. All respondents have their toilets, and around 52 percent are doing nothing to manage the wastewater. Around 68 percent of the respondents follow the open burning method to get rid of the rubbish.

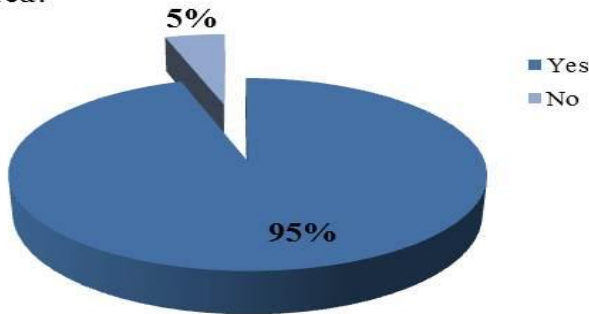
**M. Exposure**

The particulars amassed to assess the exposure of the fishers include personal exposure to storms, floods, cyclones, droughts, and shoreline changes that occurred in the area. The details show that about 14 percent of the respondents live in areas prone to flooding, and around 55 percent feel that their main occupation is somewhat dangerous in climatic exposure. According to the respondents, there haven't been any large storms, cyclones, or droughts reported.

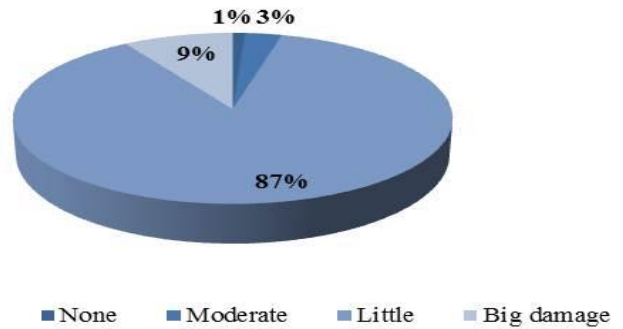
Four percent of the respondents experienced a flood in their area in the last five years, while around 31 percent get their water source dirty during heavy rains or flooding. About 43 percent of them believe that the households have taken action to prevent flood damage. The briefing of the data portrayed in figure 7 can provide a better picture of the shoreline changes that happened in the study area, which was found to have serious effects on the livelihood of the fishers' household.

Fig. 7(a) Shoreline changes.

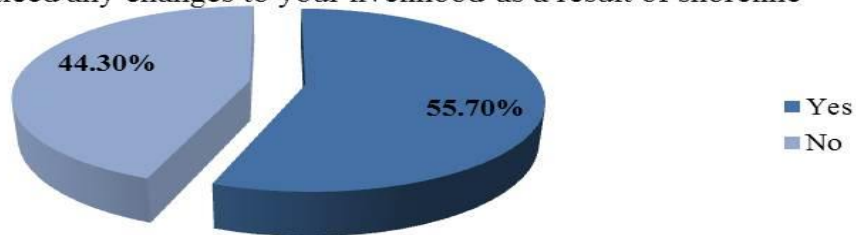
Has there been shoreline changes in your area?



How much of the beach has eroded in the last 5 years?



Have you noticed any changes to your livelihood as a result of shoreline erosion?



#### IV. CONCLUSION

The study examined the socio-economic profile of the fisherfolks in the Elamkunnappuzha fishing village of Ernakulam district, Kerala. By analyzing the data collected from the 300 fishers selected randomly from the village, a clear picture of the socio-economic status of the fishers is obtained. Fishing is the major economic activity of the village, and the whole population is the fisher. Even though the village has a century-old fishery culture, people are not ready to direct their young generation into this field which indicates the vulnerability prevailing in the sector. The fishers know much about the environment in which they still fish. They don't think it is important to pass on local knowledge about fishing to younger generations. They are not concerned about the lack of young people entering the fishing industry in the area. Even though the majority (70 percent) viewpoint is that being independent is the best thing about being a fisher, and they are very proud to introduce themselves as fishers. Still, the irony exists that 79 percent of them are not interested in diverting their children into the fishing profession. The study reveals the scarcity of resources and the level of uncertainty prevailing in the community.

Commendable changes are found happening in the availability of catches that seriously affect the livelihood of fishers. For around 81 percent of the respondents, the most

important food source for their households is met through a portion of their fish catch. About 91 percent of the respondents opined that the availability of the most important species targeted by them for commercial purposes had changed beyond belief. Also, it is reported that the average distance traveled by the fishers for fishing from the coast has increased much. An evaluation of the income difference collated with the statistical dispersion of the inequality in distribution done by using the Lorenz Curve and Gini Coefficients revealed that there is income inequality in the area, with a Gini coefficient valued at 0.33. Half of the respondents are found to be earning less than Rs 5000 per month, which is an average amount only and can't be taken seriously as the people were not interested in revealing their income details. Moreover, the community never earns a fixed income monthly. Even though none of the respondents have any savings, they are confident enough that they can procure money in case of emergencies.

The drastic decrease in the availability of fish and the increased efforts in fishing activities have greatly affected the livelihood of fishers. Similar results were also pointed out in the studies conducted by Shyam *et al.* (2014). A climate change perspective of the vulnerability assessment of the



fishers of Kerala is done. Over the years, many changes have been visible in the fishing activity regarding the availability of species, fishing grounds, etc. The personal exposure and environmental changes as part of the current changes in the climatic conditions can be considered one of the major reasons for the scarcity of resources, uncertainty of the job, and other vulnerable conditions affecting the livelihood of the fisher's household in the study area. Regarding occupational flexibility, all of the respondents have basic skills in at least any of the other fields like gardening/horticulture, welding, mechanics, electronics, etc.

Proper awareness campaigns have to be carried out to protect the locality. It is found that many of the respondents are interested in learning new ways to improve their business skills which indicate the ample scope of training campaigns and provision of proper knowledge about the improved fishing and fish culture practices on a scientific basis in the locality to uplift the community and thereby the living status of the fishers. Further work must be done to weave suitable policy measures for the fishers' households to cope with and adapt to the changing scenario.

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