



## **Assessing the Changing Rationale of the Fisher Youth in Climate Change Hotspots of Kerala**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author SSS designed the study, developed the protocol, performed the analysis and wrote the final draft of the manuscript. Author HEJ managed the write up and analyses of the study. Authors AMS, NRA and RXS managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

The Indian fisheries and aquaculture statistics seems fail largely to capture the youth and children working in the sector. A detailed study in the area related to the rising interest of fishermen, especially the younger generation to move out of fisheries in search of new opportunities in other fields and the reasons for the same has not been carried out. Taking this into consideration, to throw insights into the changing rationale of fisher youth, and their preferences in the context of climate change and depletion in fish catch over the years, a study was conducted in three coastal villages of Ernakulam district with the objectives of assessing the socio-economic profile of the fishermen community, younger generations interest in choosing fisheries as a livelihood option, generational shift in fishing operations and reasons for the disinterest of the younger generation in choosing fisheries as an occupation. Low status job, low profit and income, poor working conditions, high capital investment and operating cost and seasonal nature of occupation was

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reported as the five major reasons because of which the younger generation is not interested in choosing fisheries as an occupation and a considerable generational shift in social, economic and professional status was observed.

*Keywords: Fishermen; next generation; aquaculture; fish depletion; climate change.*

## 1. INTRODUCTION

The fisheries sector in India constitutes about 6.3% of the global fish production and contributes to 1.1% of the GDP and 5.15% of the agricultural GDP. The total fish production of 10.07 million metric tonnes presently has nearly 65% contribution from the inland sector and rest by the marine sector. The marine fisheries sector is a labour-intensive sector, with multiple craft and gear combinations, each of these combinations provides employment ranging from two to three people per craft to thirty people per craft [1]. Amidst technological and societal developments, the social standards assessment studies of the fishers in the country across the sectors indicated that there exist a huge demand and supply gap in the availability of trained manpower in the harvest and post-harvest sector [2]. With innate inertia prevalent among youngsters to venture into fisheries allied fields, the fisheries sector is in a state of "Employment imbalance" [3].

India is a land of youth. The "demographic dividend" accounts for India having the world's youngest workforce with a median age way below that of China and OECD Countries [2]. Thus, the "demographic dividend" in India needs to be exploited not only to expand the production possibility frontier but also to meet the skilled manpower requirements of India. To reap the benefits of the demographic dividend, India has to take some special measures that are aimed at economic development and better living standards [4].

India being an agricultural economy heavily depends on its rural youth for the growth of agriculture as well as the general economy. The Indian agriculture sector accounts for 18 per cent of India's gross domestic product (GDP) and employs 50% of the countries workforce. In India, around 70% of the population earns its livelihood from agriculture. With growing urbanization, the farmers and their younger generations are interested in moving out of the agriculture sector, in search of jobs that earn them more and provides them with the social status that they reckon.

A large number of rural youth in the 14-18 year age group, about 42%, were working irrespective of their school enrolment status and among these, 79% were employed in the agriculture sector, showed the Annual Status of Education Report (ASER) [5] released by the non-profit Pratham. This means about a third of the over 30,000 rural youth from 28 states who were surveyed worked in the agriculture sector, mostly in their family farms (72% of those who were working). However, the survey also showed that just 1.2% aspired to be a farmer. While 18% of the boys wanted to join the army or the police, 12% wanted to be engineers. Young girls preferred teaching (25%) or working as a doctor or a nurse (18%). About 13% of the boys and 9% of the girls surveyed also said that 'any government job' is preferable.

A 2014 survey released by the Delhi-based Centre for the Study of Developing Societies also showed that about 60% of farmers were ready to quit farming for a better job in the city (source). "When asked whether they would like to see their children engaging in farming only 18% responded positively" In addition to negative appraisals of the fishery coming from their family and the education system, media coverage of the hardships and conflicts in the industry and the dominant political discourse on the need to rationalize the industry ("too many fish harvesters chasing too few fish") may have the effect of discouraging intergenerational succession [6].

In India, a study in this area related to the rising interest of fishermen, especially the younger generation to move out of fisheries in search of new opportunities in other fields and the reasons for the same has not been carried out. Fisheries and aquaculture statistics largely fail to capture the youth and children working in the sector, and the limited data available are rarely disaggregated by gender [7]. Taking this into consideration, to throw insights into the changing rationale of fisher youth, a study was conducted in three coastal villages of Ernakulam district with the objectives of assessing the socio-economic profile of the fishermen, younger generations interest in choosing fisheries as a livelihood option [8], generational shift in fishing operations

and reasons for the disinterest of the younger generation in choosing fisheries as an occupation [9].

## 2. DATA COLLECTION AND METHODOLOGY

A pre-tested interview schedule was used for the collection of information on targeted variables directly from the fishermen through personal discussions and interviews. A total sample of 200 respondents was selected from three coastal districts (Puthuvypu, Vypin and Malippuram) of Ernakulam by applying random sampling method. Information gathering was done to collect data on socio-economic and demographic profile of the respondents, level of awareness of fisherfolk about environmental and socio-economic changes over the years, younger generations interest in choosing fishing as an occupation, Alternative livelihood options preferred and its qualities, generational shift in fishing operation and prime reasons for

the disinterest of younger generation in fisheries [10].

Collected data were analyzed using descriptive statistical analysis tools and percentage analysis was done for better understanding. Garrette ranking was carried out to determine the order of preference of the respondents about certain variables.

## 3. RESULTS AND DISCUSSION

The result of the study carried out is discussed in detail under the headings; respondent profile, details of fishing activities, income of fishermen, indebtedness, environmental changes that occurred during the last decade, alternative livelihood options, younger generation and fisheries, and level of satisfaction with the existing plans and policies by the government and other agencies in developing fishing as a main occupation for future generation. This same kind of observation was reported by the Cantanhêde et al. [3] from Brazil.

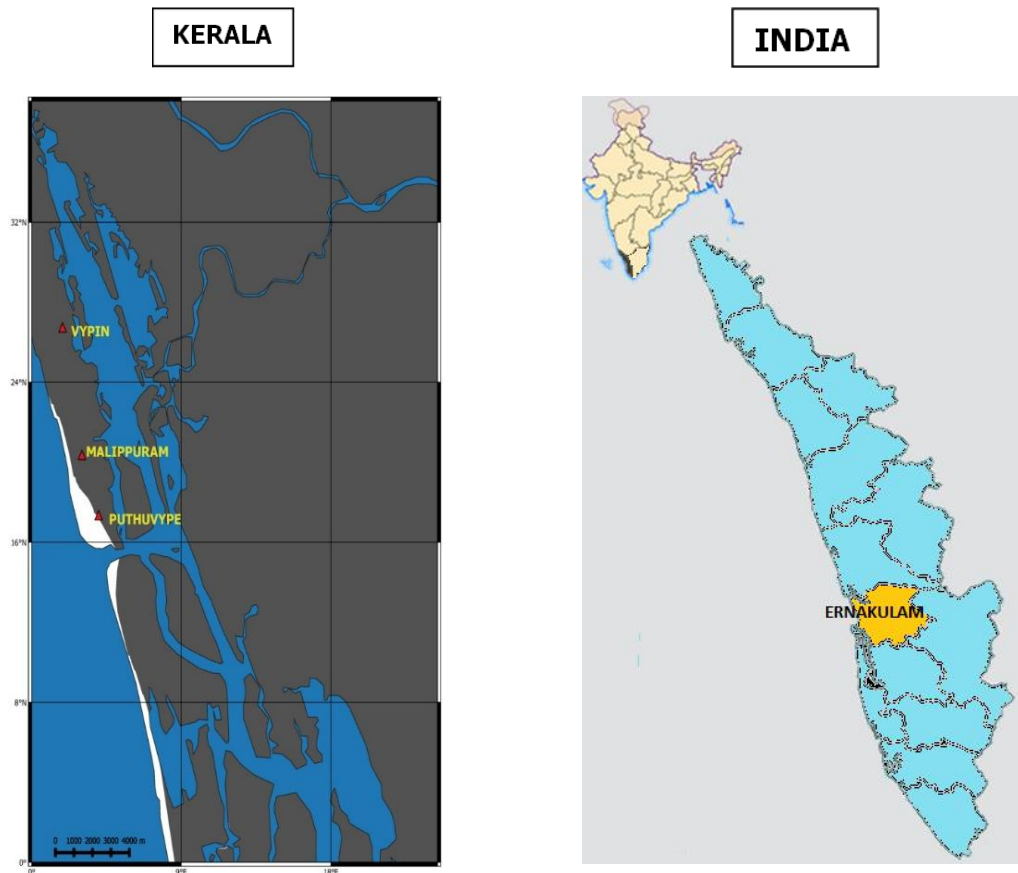
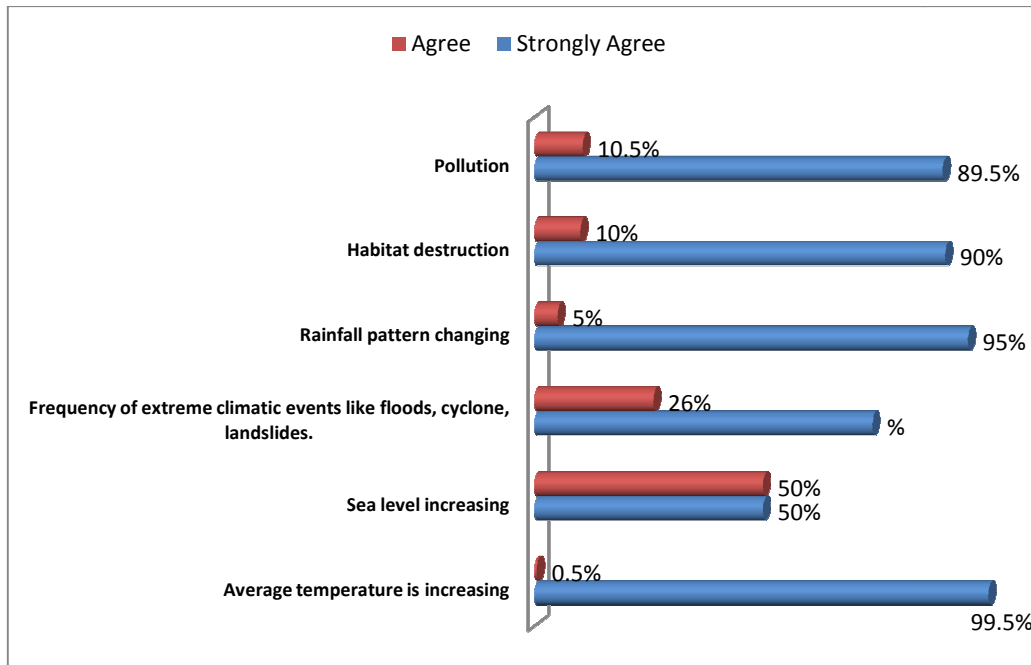
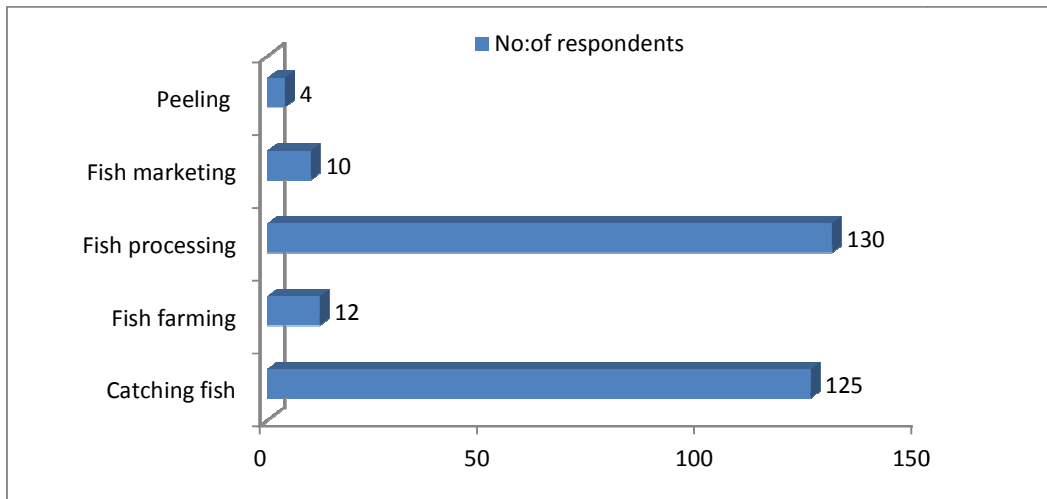


Fig. 1. Map showing the study area



**Fig. 2. Environmental changes that occurred during the last decade**

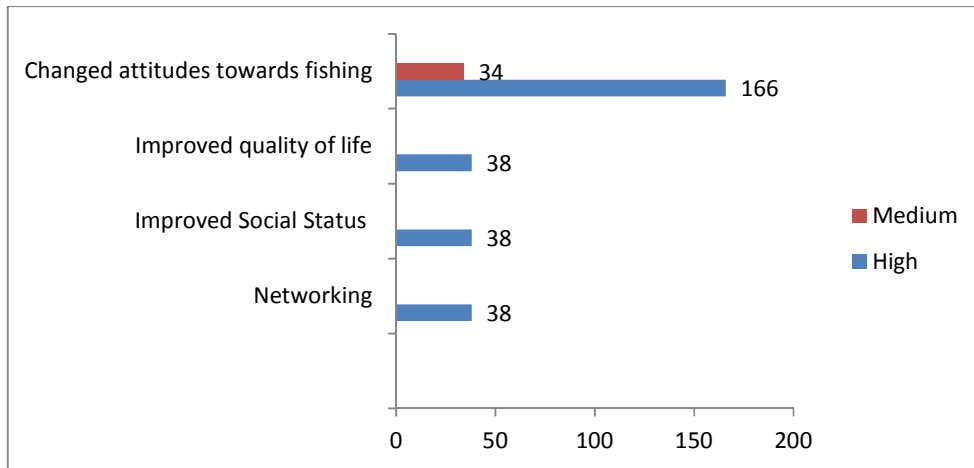


**Fig. 3. Fishing activities**

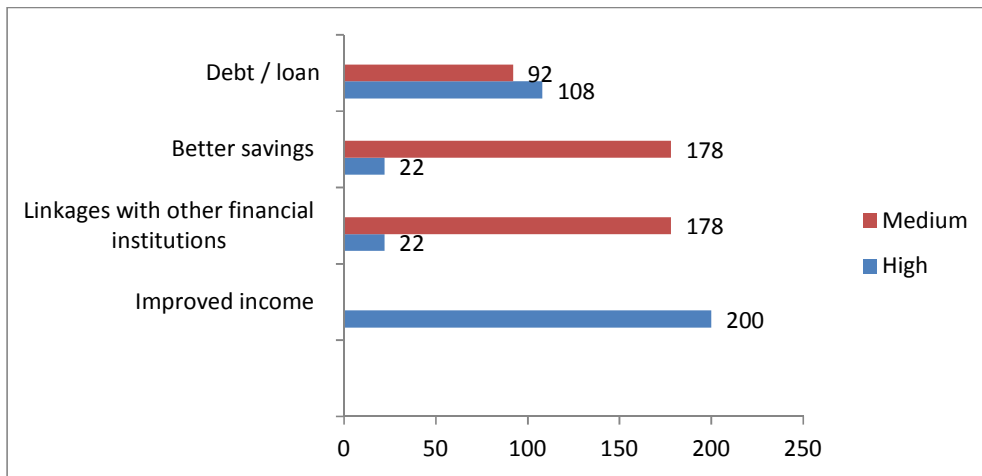
### 3.1 Respondent's Profile

The majority (65%) of the respondents belong to the age category of 21-40, followed by 18.5 per cent in 41-60 and 14.5 per cent in 61-80 categories. 54 % of respondents were males and the majority of the respondents are residents of Puthuvypu coastal village. The religious orientations of the respondents reveal that 46% of them were Hindus followed by 43.5%

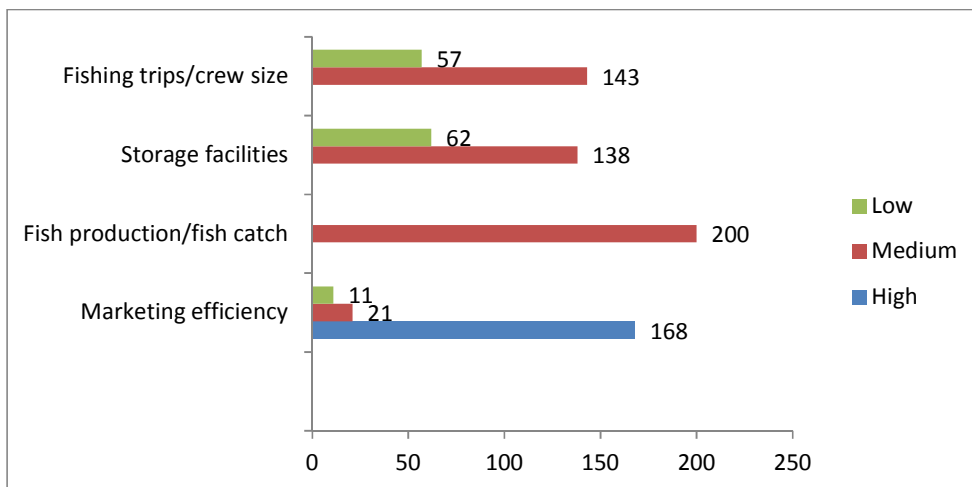
Christians and 10.5% Muslims. Sixty-three per cent of the respondents had LP level education followed by 31.5% with UP level education. Around 5.5% of the respondents were reported to be illiterate. When considering their experience in fishing, the majority (65%) of them had an experience of 21-40 years. Twenty four per cent reported to have an experience of less than 20% and 11 per cent revealed to have a rich experience of 41-60 years (Table 1).



**Fig. 4. Generational shift in social parameters**



**Fig. 5. Generational shift in economical parameters**



**Fig. 6. Generational shift in professional parameters**

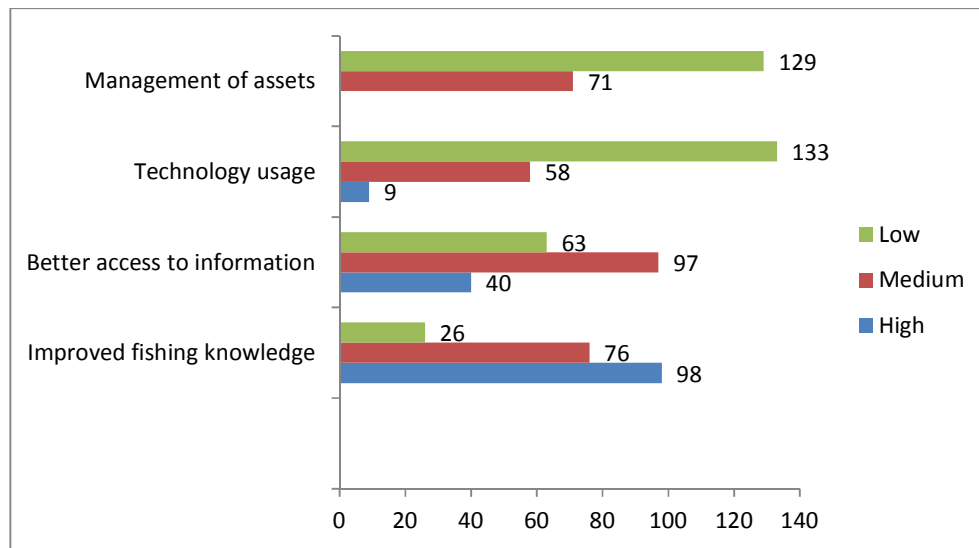


Fig. 7. Generational shift in skills

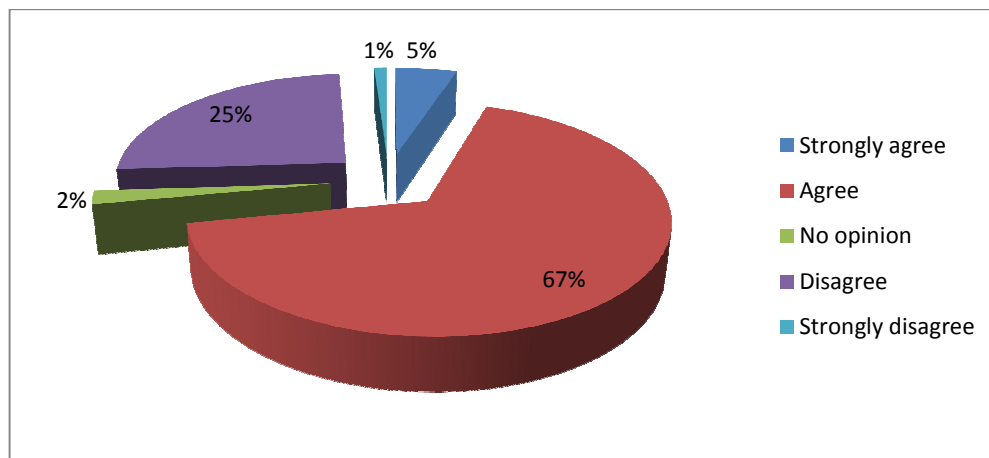


Fig. 8. Percentage of agreement in choosing fishing as a livelihood option

### 3.2 Details of Fishing Activities

#### 3.2.1 Generations of family/community involved in fisheries

Around 46% of the respondents reported that only one generation of their family/community has been involved in fisheries and 28% each reported to have 2 and 3 generations of them respectively to have been involved in fisheries.

#### 3.2.2 Reason for entry into fishing

Fishing as an occupation is usually a hereditary (ancestral) choice made by the people well

acquainted with the coastal areas and the sea. The reason for choosing fishing as a livelihood option may vary from person to person. The seasonal nature, risks and uncertainties associated with the occupation makes it a choice to choose fishing from out of occupational interest. An interesting result of the study revealed that the reason for the choice of fishing as their main occupation option of majority (42.5%) of the respondents' to be because they were born into the fishing family. 'Interest' was the driving force for 36.5 per cent of the respondents' followed by 21% opting it as a choice of occupation to meet their livelihoods.

### 3.2.3 Type of fishing

Three different types of crafts namely mechanized, motorized and non-motorized are used by fishermen for fishing operations. The mechanized sector includes trawlers, gill-netters and inboard vessels. Most of the crafts in the mechanized sector use machines for both propulsion and operation of the gear. The motorized sector exclusively consists of crafts fitted with outboard engines. The non-motorized sector consists of traditional vessels made up of wood, fibreglass, thermo coal etc. and do not use any machine power either for propulsion or for the operation of the gear.

**Table 1. Socio-economic profile of the fishermen in the study area**

Sl. no.	Parameters	Percentage
<b>A. Age particulars</b>		
(i)	≤20	1 (2)
(ii)	21-40	65 (130)
(iii)	41-60	18.5 (37)
(iv)	61-80	14.5 (29)
(iv)	81-100	1 (2)
<b>B. Gender distribution</b>		
(i)	Male	54 (108)
(ii)	Female	46 (92)
<b>C. The locale of the respondents</b>		
(i)	Malappuram	7.5 (15)
(ii)	Vypin	33 (66)
(iii)	Puthuvypu	59.5 (119)
<b>D. Religious orientation</b>		
(i)	Hindu	46 (92)
(ii)	Christian	43.5 (87)
(iii)	Muslim	10.5 (21)
<b>F. Literacy level</b>		
(i)	Illiterate	5.5 (11)
(ii)	Lower Primary (LP)	63 (126)
(iii)	Upper Primary (UP)	31.5 (63)
<b>G. Experience in fishing (years)</b>		
(i)	≤20	24 (48)
(ii)	21-40	65 (130)
(iii)	41-60	11 (22)

Greater part (67.5%) of the respondents were using non-mechanised crafts for fishing followed by 21% using motorised and 11.5% using the mechanized craft for fishing. The result revealed the huge dependence of our respondents on the traditional sector rather than the general fishing population heavily dependent on the mechanized sector.

### 3.2.4 Details of fishing operations

Most (40%) of the respondents go for fishing for greater than six days a week followed by 33 per cent going for 5-6 days of fishing. Around 64 per cent of the respondents reported taking 2-4 persons for a single trip followed by 21% taking greater than 4 and 15.5% less than 2 persons.

**Table 2. Preferred ALO's**

ALOs	Garrette ranking	
	Score	Rank
Daily wage labour	76.34	1
Masonry/ Carpentry	68.22	2
Small scale industry	57.27	3
SHGs	54.23	4
Animal Husbandry	51.99	5
Agriculture	48.79	6
Hospitality	47.19	7
Service industry	37.85	8
Aquaculture	36.13	9
Tourism	22.03	10

### 3.3 Income of Fishermen

The income category of 91.21% of the respondents was found to be ≤20,000 followed by 6.59% with income in the range of 20,001-40,000. The income categories of 40,001-60,000 and 60,001-80,000 were occupied by only 1.10% per cent of the respondents each.

### 3.4 Indebtedness

The majority (76.66%) of the respondents reported having taken a loan amount of Rupees <500000 followed by 19.16% taking a loan in the range of 500000-1000000. Around 4% of the respondents reported having taken enormous amounts greater than 1000000. All the respondents have taken loans from either banks or co-operatives. Around 71 per cent of them has taken loans from banks followed by 28.70 per cent taking a loan from co-operatives. Sixty-seven per cent of the respondents have taken the loan for meeting the expenditures of marriages of their sons/daughters. Approximately 33 per cent each have taken the loan for purchase and maintenance of engines and net making respectively. It is a matter of great concern that around 67 per cent of them have been able to repay only an amount of Rs. < 50000 followed by 16.66 per cent each able to pay an amount ranging from Rs 50000-100000 and Rs 100001-200000 respectively.

### 3.5 Environmental Changes that Occurred During the Last Decade

Weather factors are an intrinsic part of the fishing environment. Changes in weather patterns due to climate change may affect the fishing environment and fishing safety. Climate change and associated changes in the environment is an imperative factor in the life of fishermen as their sole source of livelihood is dependent on the sea, which is immensely affected by even the slightest change in the climate. When enquired about their take on the changes in environment that has happened during last 5-10 years, the respondents mentioned increase in average temperature, rise in sea level, increased frequency of extreme climatic events like floods, cyclone, landslides, erratic rainfall pattern, habitat destruction and pollution as the major changes that they have observed. When asked to range their opinion in terms of their magnitude of agreement or disagreement with the fact, all of them either 'strongly agreed' or 'agreed' with the opinion. The percentage of people who 'strongly agreed' and 'agreed' with the above-mentioned changes are given below in the figure.

### 3.6 Alternative Livelihood Options

Fishing and allied livelihood options are associated with a great range of uncertainties. The seasonal nature of the occupation, disaster and other safety risks, and low status associated with the job make it an unattractive choice of livelihood option. People directly or indirectly dependent on the fisheries sector are always in constant search for other dependable livelihood options during the off season as well as an alternative livelihood option to fall back on during a crisis.

#### 3.6.1 Preferred alternative avocations

A large (84.34%) per cent of the respondents preferred to have a new occupation. This highlights the interest of the existing fisheries sector workforce to shift to a newer occupation, thus bringing forth the dissatisfaction of the fishermen in their existing occupation.

#### 3.6.2 Extent of interest for alternative livelihood options

The preferred Alternative Livelihood Options (ALOs) as reported by the respondents are given in their order of preference in the table. Daily

wage labour, Masonry/ Carpentry, Small scale industry Self Help Groups SHGs and Animal Husbandry were the top five ALOs chosen by the respondents.

**Table 3. Features of new job**

Garrette ranking		
Feature	Score	Rank
Fixed income	72.38	1
Social status	69.02	2
Low risk	64.04	3
Flexibility	52.72	4
Experienced field	45.08	5
Part-time options	42.14	6
Locality	35.49	7
Others	20.13	8

#### 3.6.3 Features that a new job must possess

Fixed income, social status, low risk, flexibility and experienced field were the features that they expect in their new occupation. This may point to the fact that their old job lacked many of these features or they expect their new job to possess these features to a greater degree.

#### 3.6.4 Job or skill training received

The majority (85.71%) of the respondents reported having received no job or skill training in the past. They received training in the field of ornamental, navy, fish drying, coast guard and peeling. Only 14.28% of the respondents had the chance to attend the training mentioned below in Table 4.

**Table 4. Training received**

Parameters	Percentage
<b>Received any job or skill training</b>	
Yes	85.71 (171)
No	14.28 (29)
<b>Training received</b>	
Ornamental	20.00 (34)
Navy	20.00 (34)
Fish drying	20.00 (34)
Coast Guard	20.00 (34)
Peeling	20.00 (34)

### 3.7 Younger Generation and Fisheries

Fisheries and allied activities, especially fishing is not a sought-after job/livelihood option among the younger generation. Society in Kerala, a



state is known for its high literacy and graduate enrolment rate aspire for urban service sector jobs rather than the low-status rural sector jobs. Even though the fisheries sector is accorded a low status by the Keralite society, a substantial amount of the coastal population is dependent on the fisheries and allied sector for its livelihood. Besides providing a livelihood for the coastal communities, fisheries sector also ensures the nutritional security of the growing population of India and thus demands greater importance and attention from the younger generation.

### **3.7.1 Younger generations' involvement in fishing activities as a means of livelihood**

Sixty per cent of the respondents reported that their son/daughter is currently involved in any of the fishing activities as a means of livelihood. Forty per cent of the respondents reported that their son/daughter is engaged in activities not related to fisheries for meeting their livelihood needs.

### **3.7.2 Type of fishing activities the younger generation is involved in**

Around 130 and 125 of the respondents reported having their son/daughter engaged in fish processing and catching fish activities respectively as a means of their livelihood. Other activities related to fisheries that the younger generation reported to have been engaged in include fish farming, fish marketing and peeling.

### **3.7.3 Generational shift in fishing operations**

The generational shift in fishing operations is the change or enhancement in the social, economic, professional and skill system of the younger generation when compared to the older generation. By trying to quantify the generational shift from the perspective of the fishermen itself, we will be able to have a clear-cut idea about the shifts/gaps in various aspects between the younger and older generations who are part of the fisheries sector.

#### **3.7.3.1 Social**

When considering the changes/shifts in social aspects of the fishermen generations, 166, 38, 38, 38 respondents reported a high level of shift in changed attitudes towards fishing, improved

quality of life, improved social status and networking respectively. Also, thirty-four respondents mentioned a medium shift in changed attitudes towards fishing among the younger generation when compared to the older generation.

#### **3.7.3.2 Economical**

A high level of change in the economical aspects such as debt/loan, better savings, linkages with other financial institutions and improved income were reported by 108, 22, 22 and 200 respondents respectively. In the case of debt/loan, better savings and linkages with other financial institutions 92, 178 and 178 respondents reported a medium level of shift or change.

#### **3.7.3.3 Professional**

Marketing efficiency, fish production/fish catch, storage facilities and fishing trips/crew size were the professional aspects selected for studying the generational shift in fishing operations. A high level of the shift was reported by 168 respondents in the marketing efficiency aspect between the younger and older generation of fishermen. A medium level of the shift was recorded by 143, 138, 200 and 21 respondents in the fishing trips/crew size, storage facilities, fish production/fish catch and marketing efficiency respectively. A low level of the shift was reported by 57, 62 and 11 respondents in fishing trips/crew size, storage facilities and marketing efficiency.

#### **3.7.3.4 Skills**

In the case of skill shift, improved fishing knowledge, better access to information, technology usage and management of assets were the selected aspects for determining the generational shift. A high level of the shift was reported in improved fishing knowledge, better access to information and technology usage by 98, 40 and 9 respondents. Medium level of the shift was recorded in improved fishing knowledge, better access to information, technology usage and management of assets by 76, 97, 58 and 71 respondents. A low level of the shift was observed in the management of assets, technology usage, better access to information and improved fishing knowledge by 129, 133, 63 and 26 respondents.

**3.7.4 Opinion about the next generation choosing fishing as a means of livelihood**

The respondents' opinions about their son/daughter choosing fishing as a means of livelihood were graded from 'strongly agree' to 'strongly disagree'. Sixty-seven per cent of the 'agreed' to their son/daughter choosing fishing as a means of livelihood whereas 25 per cent 'disagreed' with the same. Five per cent of the respondents 'strongly agreed' to their son/daughter choosing fishing as a means of livelihood and only a negligible 1per cent 'strongly disagreed' with the same. This shows that a substantial percentage of the older generation is keen about the younger generation choosing fishing as a means of livelihood.

**3.7.5 Younger generations interest in choosing fishing as an occupation/ livelihood**

During the survey, the younger generation of the visited households was enquired about their interest in choosing as an occupation/ livelihood. Around 48 per cent of the respondents 'agreed' that they are least interested in choosing fishing as an occupation/ livelihood, whereas 26 per cent disagreed with the same. 'Strong agreement' was reported by 17.5 per cent towards the statement and 'strong disagreement' by 3.5 per cent.

**3.7.6 Reasons for the disinterest of the younger generation in choosing fisheries as an occupation**

Reasons for the disinterest of the younger generation in choosing fisheries as an occupation was ranked according to their order of preference. Low-status job, low profit and income, poor working conditions, high capital investment and operating cost and seasonal nature of occupation were reported as the five major reasons because of which the younger generation is not interested in choosing fisheries as an occupation. The result reveals the importance accorded by the younger generation to the 'acceptance of the society'. They prefer occupations which provide them with high social and economic status. The younger generations think that fisheries are a 'low status' job with low profit and income.

**Table 5. Reasons for disinterest**

Garrette ranking		
Reasons	Score	Rank
Low-status job	78.34	1
Low profit and income	66.06	2
Poor working conditions	64.11	3
High capital investment and operating cost	57.27	4
Seasonal nature of the occupation	53.92	5
Lack of technical skills	47.32	6
Lack of awareness about fishing activities	44.14	7
Less education and experience in fishing	38.03	8
Better opportunities in other sectors	32.44	9
Others	18.00	10

**3.8 Level of Satisfaction with the Existing Plans and Policies by the Government and Other Agencies in Developing Fishing as the Main Occupation for the Future Generation**

Seventy-eight per cent of the respondents reported being dissatisfied with the existing plans and policies by the government and other agencies in developing fishing as the main occupation for the future generation. Only 22% reported being satisfied with the existing plans and policies by the government and other agencies in developing fishing as the main occupation for the future generation.

**4. CONCLUSION**

Youth represent the next wave of change and sustainability for the growing fisheries sector and now is the time to educate and include them. If youth are to benefit from an inclusive financial sector, political commitment is required, in addition to coordinating efforts among different regulatory bodies (ministries of education, agriculture, youth, finance, employment and trade), producers' organizations and other youth stakeholders and youth themselves. The younger generation considers fisheries and allied activities to be low-status jobs with low profit and income. Thus a social, economic and political upliftment of the fisher community is a necessity for attracting and retaining youth in the fisheries sector. Intergenerational equity should be the basis for the development of a sustainable plan to transform the generational shift/gap in the

fisheries sector to a platform of cooperation and integration.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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