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Socioeconomic Impact of Lockdown Associated to COVID-19 Pandemic on Shrimp and Prawn Processing Enterprise in Below Sea Level Location of Kuttanad, Kerala, India

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ABSTRACT

SARS Corona Virus 2 has imparted its impact on each region of existence globally via COVID-19. Lockdown related to COVID-19 made the scenario worse mainly in growing nations like India. It imparted its impact on transportation, supply chains, manufacturing and export of seafood mainly shrimp and prawn and in India especially in coastal states like Kerala fisheries is one of the primary sources of income. Kuttanad in Alappuzha district of Kerala state, India is a geographically special place that lies beneath sea degree and farmers' right here exercise bio saline farming. A survey was performed amongst allied workers of fisheries in the shrimp and prawn enterprise of Kuttanad to consider the impact of COVID-19 associated lockdown on the economy, livelihood activities, job, health reputes and health care. Henry Garrett analyses projected extreme constraints in availability and distribution of prawn and shrimp, seedlings distribution, disruption in transportation, farming, processing, demand disruption, loss of employment and wages for the workers. To minimize and overcome the impact of a pandemic the Kerala state government introduced various schemes of which many respondents of the survey opined that the sole supply of income as cash, was once the aid obtained from welfare pension and relief fund. All registered shrimp and prawn processing enterprise employees had been supplied with relief funds. The eligible worker's social welfare pension increased and the Kerala state Government ensured the regular disbursement of pension. The four-month welfare pension is dispensed as a lump sum in April 2020. Workers additionally opined that the sole supply of livelihood was free or subsidized food grain (government ration) furnished by Kerala government authorities and some of them obtained meals packets from the owners of the shrimp and prawn enterprises. All workers are properly conscious of the 'Break the chain' campaign of the Government of Kerala. Many short-term policies and schemes had been introduced for the people to tide over the scenario of COVID-19.

Key words: Kuttanad, Seafood enterprise, Allied workers in fisheries, COVID-19, Impact assessment, Livelihood activities

The pandemic COVID-19 has hastily unfolded over the world inflicting social, monetary and health effects and it has affected the countrywide and worldwide exchange in the sectors of production, food, agriculture, tourism and transportation. Unexpected lockdown and domestic confinement have created intellectual stress for adolescents and adults. The economic system of a country is critically affected by means of pandemics in phrases of demand and grant [1]. The fisheries area assumes a significant part in Indian monetary development. Seafood export has emerged as India's biggest agricultural export category. The unfold of the outbreak has touched each zone of public existence and health and additionally poses a sizeable threat in the area of availability of simple amenities, food,

manufacturing and distribution sectors [2] due to the closure of all sorts of markets and disruption in countrywide and global change [3]. There was an unexpected exchange in client behavior, giving greater precedence for readymade ingredients and purchase of groceries however the consumption of seafood and vegetables reduced considerably due to some prejudice and concern [4-6]. As per the reviews of the Directorate General of Commercial Intelligence and Statistics [7-8] and Marine Products Development Authority [9], India exported seafood really worth INR 44368.44 crores (USD6.72 billion) in the year 2019, which consists of fish, crustaceans, mollusca and different aquatic invertebrates with a quantity of 13.92 lakh tons. Thousands of people in Kerala rely on fisheries and the allied sectors. Allied people are those persons who are no longer fishermen however engaged in different fishery-associated activities. Kuttanad is a geographically special vicinity that lies beneath the sea stage and spread throughout the Alappuzha, Kottayam and Pathanamthitta districts of Kerala state, India. Food and Agriculture Organization (FAO) declared Kuttanad

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as Globally Important Agricultural Heritage System (GIAHS). The locale is notable for its biodiversity, under sea stage cultivation, water bodies and fisheries. Kerala Fishery Well Fare Fund Board registered 28849 allied employees in the Alappuzha district [10]. In Kuttanad majority of these employees relies upon the shrimp and prawn enterprise both in the manufacturing or processing sector. COVID -19 and associated lockdown adversely affect the livelihood of allied workers. The extended lockdown and related disruptions in supply chains severely affect seafood export in India. Thus, the current study was led to dissect the effect of COVID -19 in shrimp and prawn enterprises and furthermore to comprehend the vocation of laborers in the light of Coronavirus

MATERIALS AND METHODS

Study context

Geographically Kerala is at the southernmost phase of India and is a coastal state. It is blessed with rivers, estuaries, mountains, plains and the Arabian Sea on the Western side covering a length of about 590Km. In addition to the continental shelf location of 39139 square kilometers, the Exclusive Economic Zone (EEZ) extends up to 200 nautical miles a long way past the continental shelf and covers a location of 218536 square km. India holds the second position in inland fish catch and production. In the year 2018-19 India produces 13.75 million Metric Tons (MMT) of fish, of which 9.58 MMT is contributed by the inland area and 4.15 MMT from the marine sector. In Kerala the total fish production in the year 2019-20 is 6.8 lakh metric tons of this 4.75 lakh metric tons is contributed by the marine sector and 2.05 lakh metric tons from the inland sector. Based on the survey of the Central Institute of Brackishwater Aquaculture, in Kerala farmers have suffered a loss of INR 3.08 billion (USD 41.2 million, EUR 34.6 million) due to lockdown orders to contain the spread of the COVID -19 [11]. Thus, there was a critical decrease in shrimp and prawn manufacturing in the state to around 500 metric tons (MT) and this resulted in unemployment amongst people engaged in the seafood enterprises.

Study area

Kuttanad wetland environment reached out in three areas (Alappuzha, Kottayam and Pathanamthitta) of Kerala, the southernmost province of India. The directions of Kuttanad are 9°25'30"N 76°27'50"E. The Lower Kuttanad region (Alappuzha) is underneath ocean level and is the conversion of waterways viz. Meenachal, Manimala, Achencovil and Pampa. Topographically Kuttanad lies beneath ocean level, where cultivation is done in 1.2 to 3 meters i.e., 4 to 10 ft. underneath ocean level and the main locale of low altitude in India. The second biggest Ramsar site, Vembanad wetland in India, after Sundarbans wetlands is situated in Kuttanad. Bio saline cultivation is effectively practiced by farmers of Kuttanad. Lower Kuttanad was chosen for the study because of its uniqueness in topography, cultivating rehearses and the number of allied laborers in the fishery area. Kuttanad is the main inland fish delivering locale. Consequently, this locale was intentionally chosen and aimed to contact the occupants of this area to understand their wellbeing status, work, challenges and adaptive conduct during COVID -19 pandemic.

Research design

Quantitative analysis

In this study mixed model approach was used, the data were collected from workers of the shrimp and prawn processing enterprises through a questionnaire (quantitative)

and Focus Group Discussion (FGD) (qualitative). The data about the livelihood and healthcare challenges and adaptation strategies experienced by the workers of the shrimp and prawn processing industry during the COVID-19 pandemic was gathered through a questionnaire and this provides quantitative data [12-13]. The number of allied workers in fisheries was high in the Alappuzha district and it is 28849 according to the Fisheries handbook, published by the Government of Kerala, 2020. Based on this number of allied workers in Lower Kuttanad (Alappuzha) a sample size of 150 was fixed based on a 95% confidence level and 8% sampling error [14]. The survey was conducted as a personal interview using the questionnaire.

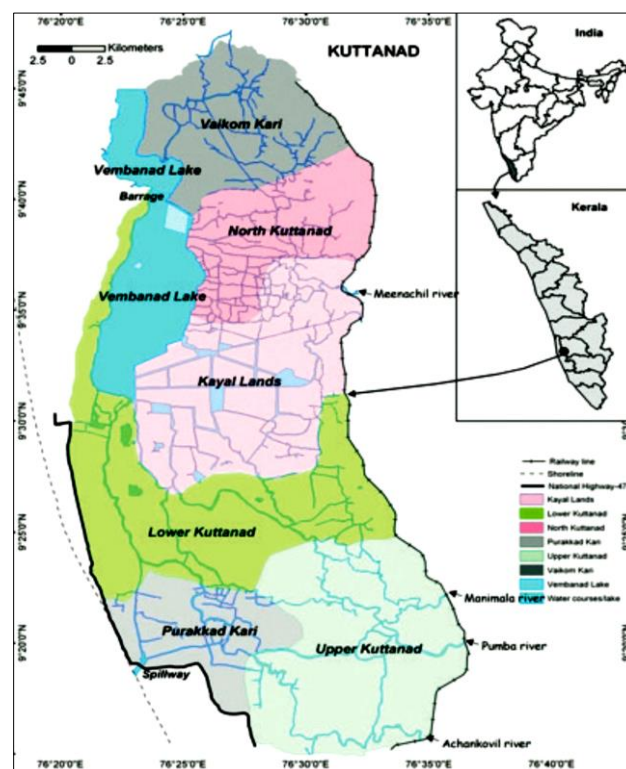


Fig 1 Study area

Qualitative analysis

The qualitative data is obtained from FGD which helps to generate ideas to rationalize the worker's adaptive behavior through an in-depth inquiry [15]. Surveys using questionnaires cannot completely uncover many underlying reasons of struggle in their livelihood and also health care issues. This is complemented by FGDs where workers were directly asked about their activities and experiences during the COVID-19 pandemic [16-17]. A total of 50 allied workers was grouped into 5 focal groups of 10 members. Workers from all sectors of the shrimp and prawn processing industry participated and they were invited to explain the impact of the pandemic on their health status, health care and livelihood. To understand the overall effect of COVID-19 all responses from the questionnaire and FGDs were compared and analyzed.

Procedure

Questionnaire survey

A detailed questionnaire in the local language Malayalam and English was prepared for the survey. The questionnaire was divided into five major sections: the first part consists of questions about the personal and family background (Socio demography), the second section questions targeted on shrimp and prawn enterprise and job opportunity, the third area was about personal sufferings of livelihood due to lockdown, the fourth section focused on health care and health status of

workers and fifth section questions were about central, state and local self-government intervention to mitigate the difficulties due to COVID - 19 pandemic. The significance of the survey was explained to allied workers of fisheries and their oral consent for participating in the survey was obtained. The interview and survey were conducted between January 2021 to March 2021 under strict COVID -19 protocol.

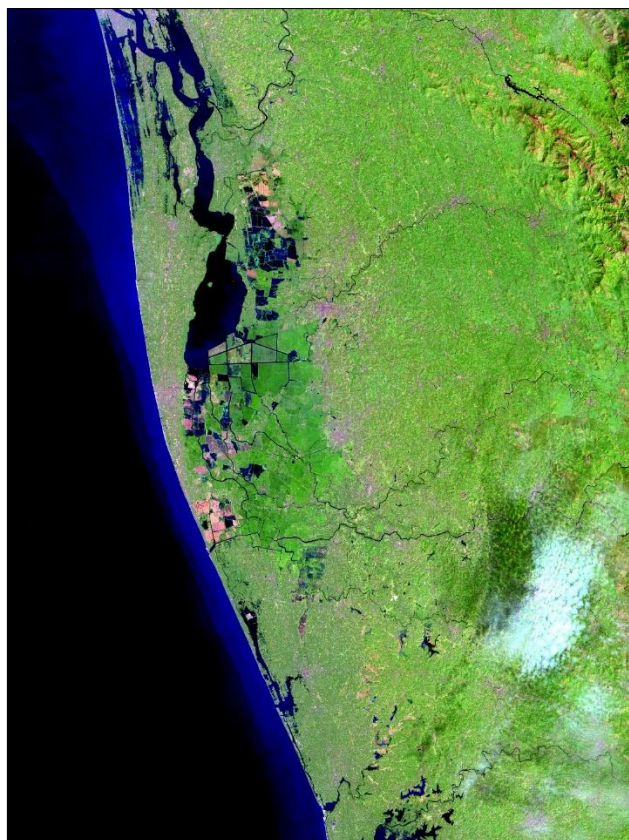


Fig 2 Satellite images of the Kuttanad region

Source: Earth Observatory, NASA, available at <https://earthobservatory.nasa.gov/images/92669/before-and-after-the-kerala-floods>.

Note: The Operational Land Imager (OLI) on the Landsat 8 satellite acquired the left image (bands 6-5-3) on February 6, 2018

Focus group discussions (FGDs)

To understand deeply, problems faced and adaptive measures adopted by the allied workers in fisheries in the Lower Kuttanad during COVID -19 lockdown FGDs were carried out by maintaining strict COVID -19 protocol. Five focal groups were consisting of 10 members in each group. The members were allowed to communicate freely about their issues of livelihood, health care and adaptive measures taken to overcome the pandemic situation. The FGDs were carried out during April 2021. The discussions had been carried out in Malayalam and it offers workers a feeling of confidence. The participants express their views in their natural way so it was very useful in understanding their feelings and perceptions. FGDs were recorded for further analysis.

Ethical issues

In the questionnaire survey and FGDs, the participant's anonymity was maintained. Oral consent was received from the participants before the questionnaire survey and FGDs. The participants were informed about the research purpose of the survey and gave assurance about the confidentiality of their information gathered.

Statistical analysis

The survey data were subjected to qualitative descriptive data analysis technique. The data obtained from the survey was analyzed through percentage analyses and it was supported by the analysis result of FGD. Nonparametric tests using IBM SPSS v27 were also done, where ever necessary. Henry Garrett ranking analysis was used for areas most affected in shrimp and prawn processing enterprises [18].

RESULTS AND DISCUSSION

Socio-demographic characteristics

The socio-demographic characteristics of allied workers of the shrimp and prawn enterprise of Lower Kuttanad were analyzed to understand the social status of workers of this area since it is a geographically unique area below sea level. The socio-demographic characteristics of 150 allied workers are depicted in (Table 1).

Table 1 Analysis of Socio-demography of allied workers in shrimp and prawn industry of Kuttanad (N=150)

Parameter	Number	Mean	Standard deviation
Sex			
Male	16 (10.7)		
Female	134 (89.3)		
Age in years			
Less than 35	28 (18.7)	49.32	13.38
36-50	54 (36)	30.29	3.81
51-65	41 (27.3)	43.35	4.78
Greater than 66	27 (18)	58.27	4.49
Educational qualification			
Primary	28 (18.7)		
High school	56 (37.3)		
Higher secondary and above	66 (44)		

Figures in parenthesis indicate percentage

The male and female percentage of allied workers in the shrimp and prawn industry is 10.7% and 89.3% respectively. The majority of workers in this field are females. The range of age of respondents is 20 to 72 years and the average age of allied workers in the shrimp and prawn industry is 49.32 ± 1.09 years. All participants of the survey were literate. 44% of allied workers of the shrimp and prawn industry surveyed are having higher secondary or higher education. The age-wise educational status is presented in (Fig 3).

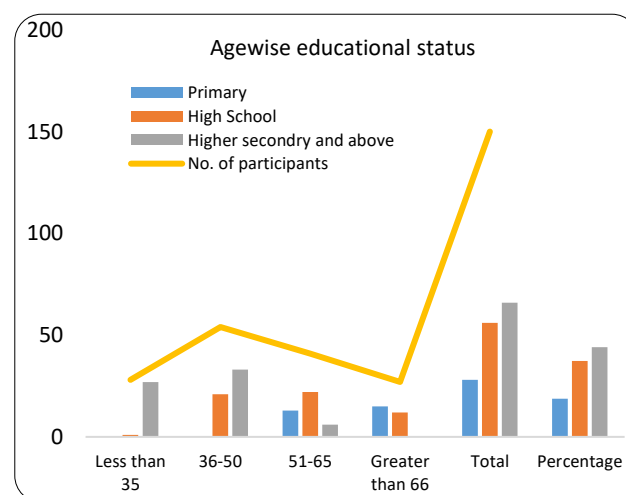


Fig 3 Age-wise educational status of allied worked in shrimp and prawn industry of Kuttanad(N=150)

Effect on shrimp and prawn processing enterprise and job opportunity

From the survey, it is found that the main problem faced by the shrimp and prawn processing enterprise during the lockdown was the transportation facility. Excess requirement of shrimp and prawn in addition to local self-production was acquired from the neighboring states of Tamil Nadu and Andhra Pradesh, so due to lockdown shrimp and prawn become unavailable to the processing units. All processing units were shut down due to lock down and the shrimp and prawn industry became standstill. No wages were paid to workers in lockdown days. There is no movement for the workers and the product also. After the lockdown even the transportation restarted, fish processing was not in its full potential. It is because of the reduction in shrimp and prawn demand, delay in exporting since seafood is a highly perishable commodity. The freshness of the

seafood was reduced due to the delay in exporting which cause a loss of demand for the product. The price of seafood and its value-added products gets reduced to 10%. Fail in Shrimp and prawn exportation results in loss to the exporters, processing units, and farming had faced the high loss. All this leads to a decrease in employment opportunities and economic loss. The main reasons for the economic impact on the seafood processing enterprises are due to demand disruption, supply chain disruption, labor disruption, production disruption and also unavailability of shrimp and prawn seedlings on these days. So, no raw material is available for processing.

The factors affected in the shrimp and prawn processing industry of Kuttanad after lockdown were analyzed from the survey using Henry Garrett analysis with ranking is presented in (Table 2).

Table 2 Henry Garrett analysis of factors most affected in shrimp and prawn processing enterprise of Kuttanad after lockdown (N=150)

Particulars	Garrett score					Percent position	Garrett value
	Availability of shrimp and prawn	Quality of shrimp and prawn	Market price	Processing charge	Export		
1	5625	1050	75	0	750	10	75
2	840	2220	900	60	2040	30	60
3	400	1900	750	300	1600	50	50
4	117	390	2067	546	780	70	39
5	0	24	384	1896	96	90	24
Total score	6982	5584	4176	2802	5266		
Average score	69.82	55.84	41.76	28.02	52.66		
Rank	1	2	4	5	3		

The above table reveals that the most affected factor in the seafood industry after the lockdown is the availability of the prawn. It gets an average score of 69.82 on Henry Garrett analysis. The second most affected factor is the quality of the prawn, it gets a score of 55.84. The third most affected factor is export, which gets a score of 52.66. The fourth affected factor is the market price, it gets a score of 41.76. The fifth affected factor is the processing charge, it gets a score of 28.02.

Personal sufferings

The study revealed that the COVID-19 made the life of allied workers in the shrimp and prawn processing enterprise much harder. 100% of workers lost their job for a minimum of 140 days due to the complete lockdown in Kerala from March to July 2020. Most of the workers depend on this job for more than about 10 years. This job is their sole supply of earnings generation. Shrimp and prawn processing is a labor-intensive process and most of the workers are females. They were fully deprived of salary. In many families this worker may be the only earning member, such families faced an unanticipated financial crisis. The unexpected financial crisis and mental stress during lockdown lead to much domestic violence, which eventually leads to many health issues.

Health issues

The survey amongst the allied employees of shrimp and prawn processing enterprise confirmed that many people had been already struggling from lifestyle ailments like diabetes, hypertension, coronary heart disorder, etc. Many hospitals, especially in the government sector, were converted for COVID patients, this again aggravated the sufferings of the workers.

Many workers suffered from fever, cough and corona-related symptoms. They were properly screened and only one person is identified as COVID positive and was sent to COVID hospitals or COVID -19 First Line Treatment Centers (CFLTC). In a later period, home quarantine was also permitted and 2 persons were advised for home quarantine.

Government intervention to mitigate the difficulties

The survey and FGD data revealed that the allied workers in shrimp and prawn processing enterprise sole supply of livelihood was free or subsidized food grain (government ration) supply done by the Kerala state government and some of them received food packets from the shrimp and prawn processing company owners. The state government policy, during the lockdown, was ensuring the people with a free supply of food materials and no one is going hungry. Community kitchens were organized through local self-Government. A free supply of cooked meals was supplied during the lockdown period. A grocery kit with 8- 17 items was provided to all ration card-holding households in the State. The grocery kit contains food items that include cooking oil, spices, pulses, gram, salt, etc. required for daily domestic use in addition to the food grain is supplied through monthly ration (subsidized or free) regularly.

The majority of respondents reported that the only source of income as cash was the support received from welfare pension and relief funds. All registered shrimp and prawn process industry workers were provided with INR 1,000 (USD 13.47) as a relief fund. The eligible worker's social welfare pension increased to INR 1,400 (USD 18.86) per month and the state government ensured the regular disbursement of pension. The

four-month welfare pension is distributed as a lump sum during April 2020.

The survey found that all allied shrimp and prawn processing workers were aware of Covid-19 and the “Break the Chain” campaign. Some organizations have supplied sanitizer for their use. The moratorium for bank loan repayments was helpful to tide over the lockdown periods.

Among rural coastal people, seafood industries are the key supply of employability and are additionally one of the main nutritious components of the world food chain. India has 6.56% of the global production of fish products and stands second among fish producing countries in the world [10]. The closure of intrastate and state borders and the announcement of lockdown induced the unanticipated disaster in the existence and health of laborers associated with the fish industry. The same crisis has been reflected in inland fisheries and wetland fisheries [19]. Various regulatory measures were adopted by the government to contained COVID -19 spread such as closing public spaces, educational institutions, travel restrictions, restricting goods transportation, etc. [20-21]. These management/regulatory systems had directly influenced the life of people as well as the environment [22-25]. The covid-19 impact is very severe in India and long lasting because of the medium economic status of India. The pandemic has impacted the backbone of this sector that includes integration of the production of seafood, supply chain, export and marketing, employment and consumption. To study the economic impacts due to COVID-19 in Kerala, India, we conducted a survey and received 150 survey responses from the workers of the shrimp and prawn processing enterprise in Kuttanad, Kerala.

Alappuzha is a densely populated district in Kerala. The population density of Alappuzha is 1504 people per square kilometer compared to Kerala's population density of 860 people per square kilometer [26]. There are about 92,124 the number of allied workers in fisheries in Kerala during 2019-20 of which 80 percent were women [26]. In the present study also, we could see that male allied workers in the shrimp and prawn enterprise in Kuttanad, Alappuzha is only 10.7%. Almost around 90% are female workers. The literacy rate is very high in this district with 97.9% male and 94.8% female. Age-wise distribution of people is 0-14 years (21%), 15-59 years (63.8%) and 60+ years (15.2%) [26]. The same trend is reflected in our study with no illiterate workers in the industry and the average age of allied workers in the shrimp and prawn industry is 49.32 ± 1.09 years. A good percentage of laborers in the shrimp and prawn industry of Kuttanad had higher secondary or higher education. This comes to about 44%.

People have poor access to the markets due to the stringent measures and lockdown adopted to control COVID-19 spread. Many seafood restaurants which are the main hub for fish products were closed. This also resulted in a decrease in fish consumption patterns. There was a false notion that the virus has spread from the Wuhan seafood market which was not a seafood market exclusively but a wet market where wild animals were being traded. So many people are reluctant to consume seafood assuming it to be a potent source of a novel coronavirus, but COVID-19 has been shown to not affect fish [27]. As indicated in our study all processing units were shut down and the whole shrimp and prawn enterprise became standstill, there was no movement of workers and products. Even after the lockdown, situations were not favorable due to delays in the export of shrimp and prawns and the demand for these commodities falls tremendously. So that the workers are almost deprived of money due to job loss and salary. FAO recently reported that fishermen are burrowing money for their

daily livelihood and treatment from sources like moneylenders, whose interest rate is exorbitantly high [28-30]. There is confusion and complexity in the supply chain of the fish processing sector. Due to the bottlenecks in transportation and logistics in several cases, many seafood merchandises are caught at the factories. The closure of international boundaries had disrupted the seafood trade. The previous year export pattern has been analyzed from April to June 2019 to understand the anticipated loss on fish trade due to COVID-19 and found out that the export during this period was 2856.34 lakh tons which are 23% of total export in the year 2019 and received INR 9766.48 crores (USD 1315.8 million) (22% of total value). It is anticipated that there would be around a 50% reduction in the export due to the COVID-19 outbreak followed by countrywide lockdown and supply disruptions, then the estimated loss will be INR 4883.24 crores (USD 657.9 million) [31]. The Indian fisheries sector employs nearly 15 million people in processing industries, 65% of total workers are women [32]. The unexpected situation of COVID -19 has affected public life seriously and cause many adverse effects on human lives [33-34]. Many workers of our survey were suffering from various lifestyle diseases like heart disease, diabetes, hypertension in addition to joint pains, headache, cough, body pain, etc. Due to strict regulations to prevent the spread of COVID-19 many hospitals in government sectors had become COVID treatment centers and this affected workers who are deprived of salary and jobs and this, in turn, affected their mental health. Reports are suggesting the impact of the pandemic on public health particularly affecting marginalized people [28-30], [35].

In the pandemic period, there is the sudden ceasing of fishing activities or the shutdown of processing plants. In both cases, they are losing jobs or reduced salary as maximum processing and fishing firms are self-financed, and the owners are unable to continue the daily wages of workers, the scenery is quite the same globally. Ban of fishing in the country during the initial stages of the lockdown resulted in the non-availability of raw materials for processing. During the later stages of lockdown fishing and fisheries, activities have been exempted from the restrictions and remain operational but the adverse situations aroused, like the unavailability of fishing accessories had made the sector difficult to thrive. To ensure social distancing and proper safety measures, capture fisheries is significantly halted, which might positively affect fish stock and negatively affect the industry. The COVID-19 has created an unexpected challenge globally for the human race affecting the life and livelihood of people from young to old and urbanites in metro cities and the people in the forests by imparting effects on their social, economic, health and mental status [36-38].

CONCLUSION

In India, COVID-19 has created an unprecedented situation as well as financial destitution for the allied shrimp and prawn workers of Kuttanad. Their livelihoods have been affected, resulting in increased stress, anxiety, and financial instability in their lives. The present finding revealed that the COVID-19 associated lockdown and subsequent disruptions in the supply chain and the movement of counter-trades have influenced activities in the field of shrimp and prawn enterprises. The factors affected in the shrimp and prawn processing enterprise of Kuttanad after lockdown were availability of shrimp and prawn, its quality, problems in export and market price. The enterprise could not revert even after the withdrawal of lockdown and allied workers were badly

affected. All workers involved in seafood processing and related fields need to be protected from health and economic damage during and after the lockdown. To recover from the effects of the pandemic, farmers and allied workers should be provided with financial assistance by lending loans and extending the repayment period. Moreover, a separate financial package with detailed guidelines must be developed for seafood enterprises. This will protect the sector

and the population from the sufferings of the pandemic as well as assist farmers of the sector in recovering from the COVID - 19 effect.

Declaration of competing interest

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