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Impact of COVID-19 on Dry fish Production and Marketing from India

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Abstract

Drying is one of the oldest known techniques for preservation of fishes. Dry fish is a commodity which has demand both within and outside India. Indian dry fish exports contribute 7.45% to the total marine product exports valued at USD 156.94 million during 2020-21. The COVID-19 imposed lockdown led to disruptions in several segments of the economy and dry fish sector was no exception. The dry fish production is carried out as a small-scale activity along the coastal belt of the country providing source of livelihood for thousands of fisherfolk especially women. The dry fish value chain involves many players starting from fresh fish supplier, dry fish processor, dry fish agent, wholesaler, retailers and consumers. Owing to the outbreak of COVID-19 and the subsequent lockdown enforced from 24th March 2020, small scale dry fish processors suffered losses which have been estimated to the tune of Rs.0.5 to 1 lakh per month depending on the capacity of the unit. Women involved in household drying of fish experienced losses amounting to Rs.10,000 to Rs.12,000 per month. The dry fish exports from India, although seasonal has also registered a decline during the first three months of the pandemic and ensuing lockdown period. This paper presents an assessment of the impacts on the dry fish sector in the country.

Keywords: COVID-19, dry fish, economic loss

Introduction

Fish is an important, highly perishable and nutritious food commodity which is consumed both in wet and dry form. The fisheries sector contributes around 1.03% of India's GDP (2017–2018), with the export worth $7.1 billion, and employs (directly and indirectly) more than 15.23 lakh workforce in fishing and allied activities and their families in 3477 marine fishing villages across the seventy coastal districts of the country (Anon, 2018). Out of the total fish produced in the country, 75.07% of the fish is marketed fresh, 13.80% is frozen mainly for export, and only 4.20% is utilized for drying (Anon, 2020a). Dry fish marketing operates through a vast network in the country and Kerala, Tamil Nadu, Andhra Pradesh, Maharashtra and Gujarat are prominent dry fish producing states in the country, which is marketed throughout India. The Jagi Road fish market located at Assam is the largest dry fish market in Asia and transactions worth more than 40 crore take place annually in this market (Anon, 2002) and tonnes of dry fish especially from Andhra Pradesh arrive at Jagi Road market daily (Anon., 2002).

Among the dry fish producing states, Andhra Pradesh in the East and Gujarat in the West coast are major states. Nakapalli which is located at Visakhapatnam in Andhra Pradesh is a dominant dry fish trading centre (Das et al., 2013). Fisherfolk of this region earn good income through distribution of hygienically manufactured dry fish to supermarkets all over India and also to Gulf countries (Das et al., 2013). Gujarat coast is another major hub where dry fish gets processed in large quantities. Apart from Bombay duck, croaker, grouper, cobia, ribbon fish, shrimp, cat fish, leather jacket, silver bellies, anchovies, soles and horse mackerel are processed as dry fish in Gujarat (Fofandi et al., 2020). The state accounts for about 80 percent of total dried fish exports from India per season.

Tuticorin district of Tamil Nadu is another important region for dry fish production and marketing and fifty percent of total dry fish produced

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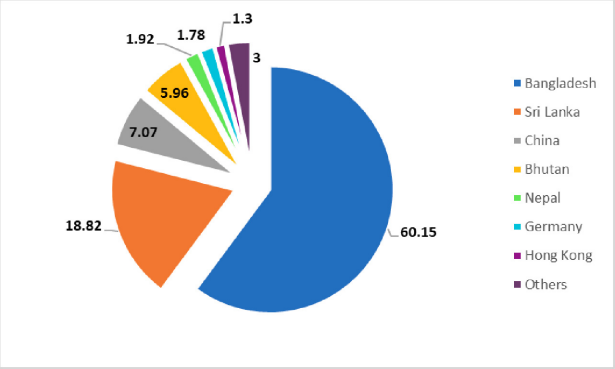
comprises sardines and anchovies, though premium prices are realized for seer fish and carangids (Madan et al., 2018). The fish processing industry, with largely private investments caters to an established export market. The major markets for dried fish items in terms of volume from India are Bangladesh, Sri Lanka, China, Bhutan and other countries like Nepal, Hong Kong, Maldives and Middle East (Fig. 1). A small quantity of dry fish is routed to EU countries which have very stringent quality standards though the value realized in these countries is high compared to other countries like China.



*Source: Trade statistics from Ministry of Commerce and Industry

Fig. 1. Dry fish exports (%) from India to various countries

As a result of the lockdown, the wild capture for fish from the sea came to a standstill for a few weeks till the Centre exempted Marine fisheries operations and related activities from the lockdown restrictions (Anon., 2020b; MHA, 2020). Apart from fishermen and fish processors, the fish vendors and stakeholders involved in allied activities like transporting, repair of nets, regular maintenance of boat and engine also suffered economic losses.

The foremost impact of the pandemic on dry fish sector was closure of fishing and fish markets which resulted in nonavailability of fish for drying. The dry fish which was already processed was also not able to be marketed. The production segment was affected for at least two months in several parts of the country and the reduced trade transactions between India and the rest of the world affected the exports. This paper presents the results of a preliminary investigation carried out to estimate the economic loss due to the COVID-19 pandemic related lockdown and restrictions to the dry fish sector and its stakeholders in selected major dry fish producing states. The changes in the exports of dry fish during the period was also investigated and the results has been presented.

Materials and Methods

The study was conducted among small scale processing units from five states. Based on secondary sources, major dry fish processing centres from five states *viz.,* Gujarat, Kerala, Maharashtra, Tamil Nadu, Andhra Pradesh were selected representing adequately the East and West coast of the country. Structured questionnaire was designed to collect details on dry fish production and marketing covering aspects on species processed, annual dry fish production, number of working days lost during the pandemic period and lockdown restrictions through telephonic interview. From each state, telephonic survey was conducted during April to June 2020, when the restrictions were most stringent to check the spread of the pandemic, covering respondents working as labour, small scale dry fish processors, dry fish agents/wholesalers, retailers in the dry fish sector. Veraval, Umargam, Ernakulam, Kozhikode, Mumbai, Tuticorin, Chennai and Visakhapatnam, were the dry fish processing and marketing hubs covered from the selected states. Purposive sampling was adopted within the centres for selecting the respondents from these eight centres. The computations of economic loss due to the COVID 19 pandemic related lockdown and restrictions were done separately for 50 days for each state and arrived at using standard methodology for weighted estimation (Cochran, 1963) and taking into consideration the number of fishers involved in dry fish sector and installed capacity for dry fish production. The timeseries on monthly dry fish exports was analysed using LOESS decomposition method (Cleveland et al., 1990). Telephonic survey was conducted using a structured schedule covering wholesalers traders, fish vendors, small scale drying yards, women processors and labour engaged in fish drying activity at the selected centres.

Results and Discussion

Kerala is a hub for dry fish production and marketing. Dry fish is both processed at household level, under organized Self Help Groups (SHG) by coastal fisherwomen and at small-scale industry level. Dry fish is a commodity which has demand

throughout the year and has longer shelf life than fresh fish. It is also having high preference among Keralites. Available both in retail fish markets, roadside fish markets and super markets, the commodity is traded in huge volumes within the state as well as outside states. Ernakulam has seven dry fish (wholesale) markets. Demand for dry fish is more in land locked areas and high range area where fresh fish is not available. Small scale dry fish processors all over Kerala amount to 1,300 who process 30,000 to 50,000 tonnes a year. Kerala, in addition to producing dried fish also imports large quantity of dried fish from other states like Tamil Nadu. There are eight registered dry fish processors under Marine Products Exports Authority (MPEDA), with a capacity to process 5.02 MT per day.

The study revealed that lockdown due to COVID has not affected wholesale agents as demand has risen during the season. The price has also gone up 50% compensating for the decrease in volume of stock arriving. Fishes like silver croaker, sole, ribbon fish, mackerel, shark in dry and salted form which arrived from Gujarat got traded during the period compensating for the deficit in local supply.

However, the small-scale dry fish processors who form a part of the unorganized sector have been affected during this period. Processors faced a loss of Rs.0.5 to Rs 1 lakh depending on the capacity of the unit. Total loss for Kerala due to small-scale dry fish processing sector was put at Rs.7.5 crore to 13.2 crores. Apart from losses from industry perspective, the coastal fisher women of Kerala involved in dry fish processing have lost their livelihood too. A total of 8174 women were involved in dry fish processing the state according to the marine fishing census. The women who were able to realize Rs. 10,000 to Rs.15,000 through household drying lost their income due to the lockdown and related restrictions.

Tamil Nadu All along the Tamil Nadu coast, drying fish is carried out as a cottage industry. Fish drying is undertaken on a larger scale in Kanyakumari and Ramanathapuram districts and Chennai is a major hub for dry fish marketing. Around 28% of the total marine fish landings from Tamil Nadu, are salted and dried. Small fishes like anchovies, silver bellies and white sardines are sun-dried directly on the beach, without the addition of salt. Large-sized fishes like shark, rock cod, skates, rays and perches are salted and sun-dried on either cement platforms or on mats or on sand in the open beaches. Shark fins are collected at the landing centres and are sun-dried with or without application of a little lime and salt on the cut portions where the flesh is exposed. Fish maws are prepared from the swim-bladders of jewfish, catfish and eels and sun-dried (BOBP, 1983).

In the fishing villages on Tamil Nadu coast, small scale fish drying takes place in front of homes, roofs, and terraces. Kasimedu Fishing Harbour, a major landing centre at Chennai, has infrastructure for the preparation of dried fish in the form of raised cemented platforms along the beach. Over 150 fisherwomen are involved in the laborious process of dry fish processing throughout the year in Kasimedu fishing harbour alone.

The total lockdown enforced in the harbours and the landing centres of Tamil Nadu from 24th March 2020 onwards affected the fisher-folks' day-to-day earnings in all coastal districts. While the lockdown exemptions announced by the government after the end of the first phase (from 15 April) covered the fisheries sector, the absence of key inputs such as ice and labourers kept fishermen from setting out to sea. In Tamil Nadu, women dominate in almost all areas of fishing allied activities such as marketing of fish (93%), peeling (89%) and curing/processing (87%). There are around 8330 women engaged in dry fish vending whereas 5900 women are engaged in drying/curing activities. Women fish processors who procure fish from landing centres and fish markets for drying could not pursue their livelihood during the lockdown and the subsequent days, as there was no fishing activity and, in some places, only limited boats were fishing. As such there was no transportation facility available during the lockdown period which due to which the women were not able to reach the fishing harbour. The low catch which was brought to the landing centre was having high demand. Even when few women managed to purchase affordable quantity of fish from the landing centre for drying, due to the pandemic, there was no trade taking place through the usual channels. Wholesale traders in dry fish sector opined that large scale buying happens when people from other states come with bulk orders. The revenue through dry fish trade further reduced as there was also monsoon ban from 15th April till May 2020.

The fishermen in coastal districts in Tamil Nadu, who venture into the sea, harvest superior quality fish, meant exclusively for exports. Almost 20 to 25%

of this produce is purchased by the exporters, who process and export them as dry fish to Sri Lanka and other countries. Sri Lanka was importing dry fish from India in large quantities compared other countries. Since November 2020, Sri Lanka has imposed ban on dry fish exports from India which has further affected the fishermen as well as the export industry at Tuticorin district of Tamil Nadu.

About 22% of country's total coastline lies in Gujarat, and the state provides largest share to India's total marine fish production. Gujarat produced 7 lakh metric tonnes from marine fishing and 1.4 lakh metric tonnes from inland fishing during 2018-19 (Anon, 2020a). The state accounts for 80% of the total dry fish exports from India. Dried fish processing is a common practice of Gujarat coastal region which engages women in large scale as labour. About 20% of the fish harvest is being processed for dry fish regularly for domestic and overseas consumption. Veraval, Okha, Jafrabad, Navabandar and Porbandar are big landing centres for dry fish species in Gujarat. Bombay Duck, a small pelagic fish landed in bulk is abundant along Gujarat coast accounts for 88% of the total landings. More than 90% of the landings of Bombay Duck is processed as dry fish. The Bombay duck fishery serves as livelihood for millions of fishermen and fisherwomen along the coast. The major landing centres for Bombay Duck are Umargam, Jaffarabad, Rajpara, Navabandar located in Gujarat state and Vanakbara, Diu. 90% of the Bombay Duck processed from Saurashtra coast as dry fish is distributed through Mumbai to dry fish markets located as far as Goa, Tamil Nadu and the North East. Less than 8% (around 400 to 600 tonnes) of the dry Bombay Duck processed in drying yards in the coastal fishing villages get exported to Sri Lanka, Mauritius, Bangladesh, UAE and Seychelles.

The impact of COVID-19 on Gujarat fisheries was severe for the fisherfolk, as the capture fisheries was halted. This had a direct impact on the income of local fisherfolk. Although the restrictions to do fishing was eased later, full-fledged fishing operations could not take place as the migrant labour employed by the industry had left for their native places and were not able to reach back owing to lack of transportation. Therefore, regular fishing operations came to a standstill from March to May 2020, depriving the dryfish sector with the raw material. The fishing operations further continued to be impeded due to monsoon ban from June to May 2020.

Andhra Pradesh is one of the leading dry fish producing states in the country with a production of five lakh tonnes in a year. Bulk of dry fish produce is transported to Assam, West Bengal and North eastern states and some tribal pockets in Malkangiri in Odisha and Chhattisgarh. Around 10 per cent of the produce is consumed locally – mostly in tribal areas.

Around 13,697 women are involved in dry fish processing in Andhra Pradesh state (Anon, 2020a). Thousands of women fisherfolk from Visakhapatnam, earn their living by drying ribbonfish, lizard fish, sliver bellies, anchovies, croaker, ray, finned fish, goatfish, sardines and other pelagic fish. Apart from exporting the dry fish produced from the state to Sri Lanka, Thailand, China and Bangladesh, its also sent to other States such as Kerala. Everyday, three

Table 1. Economic loss due to COVID 19

State	Number of fishers involved in curing/ processing of fish**		Installed dry fish processing capacity (TPD)*	Economic losses incurred (Rs. Crores)		
	Total	Women		Work force	Industry	Labour
Kerala	8506	8174	5.02	51.00	9.20	21.00
Tamil Nadu	6783	5903	102.05	40.69	25.51	620.26
Gujarat	1491	870	93.73	10.94	23.43	813.76
Andhra Pradesh	14,736	13,697	778.03	88.41	194.50	1627.76
Maharashtra	6202	6010	171	37.21	42.75	572.42

*Registered with MPEDA

**Source – Marine Fishing Census 2016

to four tonnes of dry fish is produced on average in the region, which is enough for local consumption. During the season, the production goes up to 10 tonnes per day. During the lockdown and ensuing restriction period, women fish processors who were organized under SHGs faced difficulties like shortage of funds, raw material and transportation. Lakhs worth of dry fish which were to be exported to different destinations like Kerala, Karnataka and other states through rail transport were stuck at railway station and got spoilt.

In Mumbai due to reduced demand and supply, the transportation cost of getting fish from the landing centres was very high during the period of lockdown. Before the lockdown restrictions, traders showed up at the wholesale markets, bought fish from the fishing communities, and in an hour or two the fish would reach other wholesale markets in Thane, Panvel, Dombivili, Kalyan and Palghar. From there, the locals procure fish and use for drying. The rapid spread of coronavirus has brought about these restrictions and it spelt an adverse impact on the fish business.

As it has been with the work force in other professions, in dry fish sector too, the women suffered dearly due to the pandemic. Maharashtra's women dry fish sellers at Sewri fish market, were struggling to survive. The working hours at markets was reduced drastically for the dry fish vendors as they were asked to wind up business by noon. Around 62% of the women interviewed had to mortgage their jewellery in order to tide over the corona crisis.

The economic losses suffered by workforce *i.e.* women involved in curing/processing and labour employed by the dry fish sector is summarised below (Table 1) for the five states covered by the study. Andhra Pradesh incurred total loss of Rs.1909 crores being a major dry fish producing state employing thousands of labour in the sector. The economic loss suffered by the labour force in the five states studied ranged from Rs.21 crores to Rs.1627.76 crores.

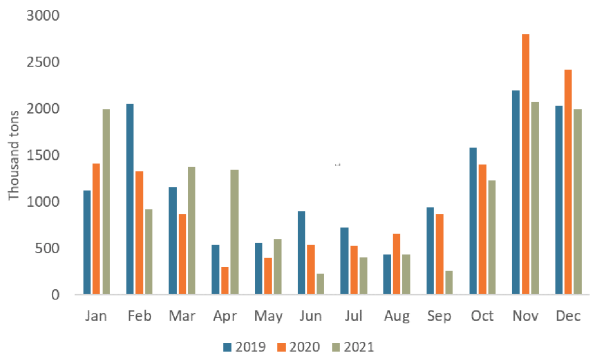


Fig. 2. Dry fish exports from India

A look at the month wise dry fish exports from India suggests that the exports follow a distinct pattern, with the exports being high during October to about April and then falling during the monsoon period.

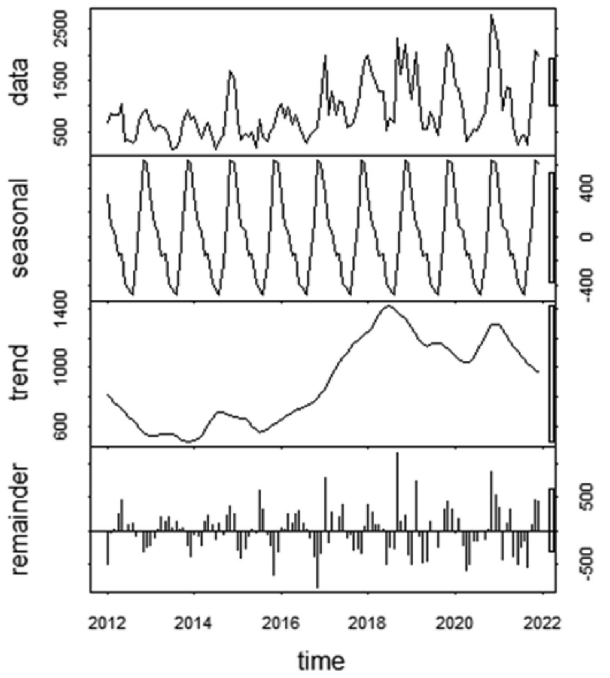


Fig. 3. Seasonal and trend decomposition time series on dry fish exports from India

The dry fish exports have declined compared to the previous years during the initial three-month phase of the lockdown due to the pandemic. However, during the subsequent months, the exports have picked up peaking (2797.59 thousand MT) during November month of year 2020 (Fig.2), probably because once the lockdown restrictions eased bulk consignments could move to destinations. In fact, the dry fish export during this month was maximum during the 10-year period from 2012 to 2021.

Further, when the timeseries on monthly exports of dry fish from India was examined using LOESS decomposition, a seasonal trend was observed and due to 19% to 49% fall in dry fish exports during

first quarter of 2022 a decreasing trend was seen (Fig. 3). Dry fish exports from April to September tend to be low during each year probably due to lean season of fishing followed by trawl ban. However, the increasing trend which was observed till the beginning of year 2020 had fallen due to the pandemic and ensuing lockdown which improved from November onwards (Fig. 3).

In general, the workforce behind the dry fish produced from the country were women (37 to 49%). They pursue this activity for their livelihood and most of them are in the unorganized sector. The above discussion points out the vulnerability of the women work force involved in dry fish processing when the options for livelihood gets closed due to uncontrollable factors like the pandemic and the curbing measures taken by the policy makers. Bigger players in the sector were safeguarded like in the case of exporters where the dry fish procured can be stored and consignments sent after the restrictions were eased. However, the labour employed by small scale fish processors and fisherwomen in dry fish production and marketing lost their livelihood during those few months of lockdown which was followed by strict restrictions on movement and business. Appropriate measures like group insurance or livelihood assurance schemes will protect the interest of the women work force in the sector who are the strong links and the ones behind ensuring the nutritional security of population.

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