WorldFish

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COVID-19 impacts and adaptation in aquatic food supply chains in Odisha

One year into the pandemic

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1. Overview

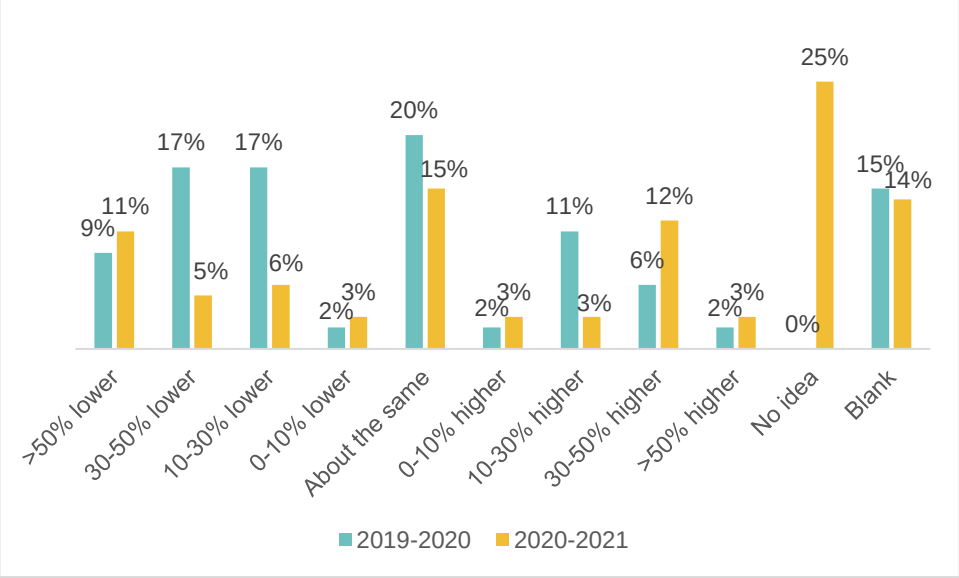
In 2020, we conducted a bi-weekly phone survey with 104 fish supply chain actors in Odisha, India, about their business activity between February and October 2020 to assess the impact of COVID-19 on the availability and price of aquatic foods and production inputs (Shieh *et al* 2020). In 2021, we conducted a follow-up survey and re-surveyed 65 participants, who could be contacted and agreed to be interviewed, regarding their activity between the months of March through May 2021. The sample comprised of the following: fish farmers (21), feed sellers (pellet) (6), feed sellers (non-pellet) (7), fish hatcheries (10), fishers (14), fish processors (1), traders (1), and retailers (5).

Data from 2020 was collected in May, where respondents recalled their activities prior to the onset of the pandemic in Odisha (March through May). The first wave of COVID-19 cases in Odisha peaked in September 2020 (Ritchie *et al* 2020). COVID cases peaked for a second time in May 2021. Data from 2021 was collected in June, where respondents recalled their activities from March through May 2021. This allowed for a comparison between activities prior to and during restrictions and disruptions one year later.

2. Key findings

The sales and operations of surveyed businesses fluctuated widely in 2020, but 2021 data indicates increased stability and adaptation to the conditions of the pandemic. In 2021, all surveyed respondents except one operated their business. The one respondent who stopped operating did this due to the impacts of the COVID-19 pandemic. However, it should also be noted that some business that could not be contacted for resurvey in 2021 may also have stopped operating due to COVID-19.

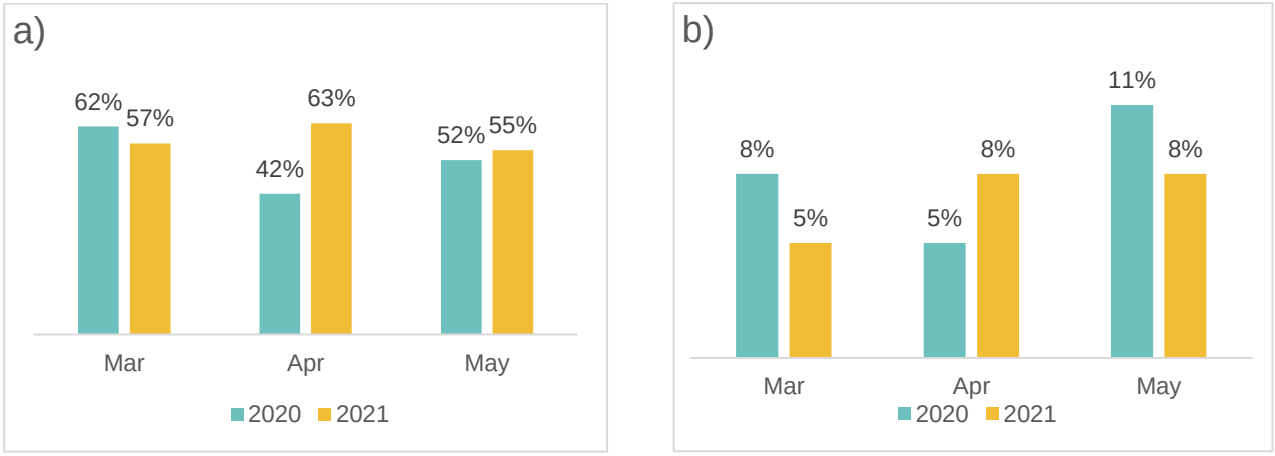
Figure 1. Change in value of sales from 2019 to 2020 (actual reported) and from 2020 to 2021 (anticipated)



In 2020, a larger portion of farmers reported a decrease in sales than an increase in sales (45% vs 21% respectively), whereas in 2021, more farmers predicted an increase in sales than a decrease in sales (60% and 25%, respectively) indicating an overall recovery and adaptation after a year of the pandemic (Figure 1). In 2021, 11% of respondents predicted sales more than 50% lower than in 2020 however, and 25% of the respondents did not know and in both periods many respondents did not respond to this question (15% and 14% respectively).

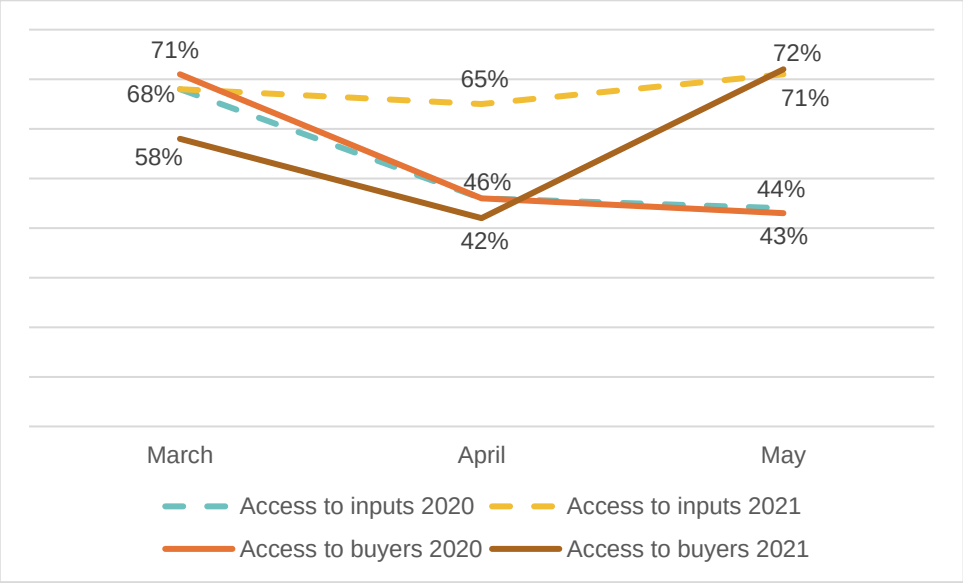
The share of respondents who hired male daily labourers remained relatively stable in 2021 (Figure 2a). On average, 58% of the respondents hired male labour in 2021, while the percentage of respondents who hired male labour fluctuated in 2020. This indicates increased operational stability in the second year. In March 2020, 62% hired male labour, which declined by 20% in April, before it increased again to 52%, in May. Overall, fewer respondents hired female labour in both years (Figure 2.b). The percentage of respondents who hired female labour was slightly higher in March 2020 than in 2021, 8% and 5%, respectively. This reversed in April, with 5% in 2020 and 8% in 2021. In May 2020 the percentage increased to 11%, while it remained at 8% in 2021.

Figure 2 Percentage of respondents hiring male (a) and female (b) for daily labour.



The share of respondents who were able to access inputs and buyers decreased by over 20% over the 2020 period (Figure 3). In 2021, access to inputs was fairly stable and access to buyers increased slightly. Increased stability and access to inputs and buyers in 2021 indicates adaptation to the conditions of the pandemic. Access to transport for purchasing inputs and supplying buyers followed similar trends across the study period. Online sales were not important in this region, as less than 13% of respondents used online sales regardless of the time period.

Figure 3 Percentage of respondents able to access inputs and able to access transport to buy inputs.



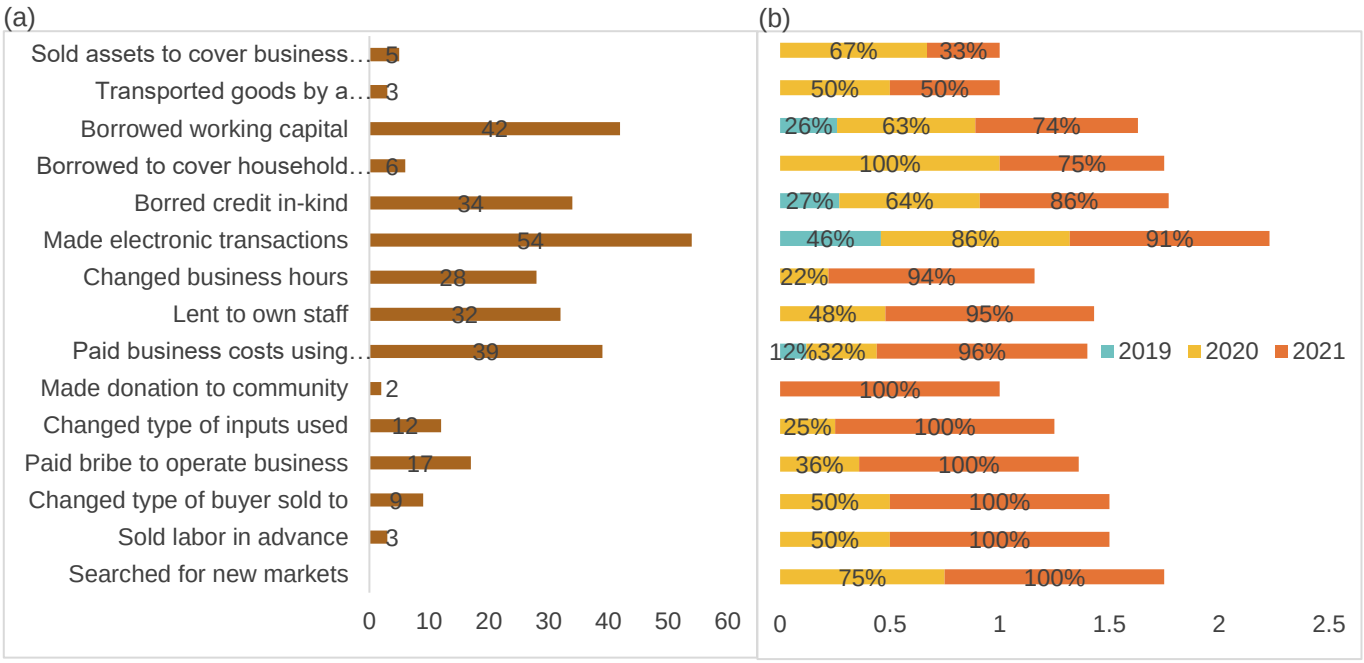
The respondents who had sufficient weekly income dropped from 43% in May 2020, to 34% in March 2021 and remained at that level for the following two months (38% and 32%, respectively). Most respondents (over 93%) did not receive economic assistance in either time period. Notably, no data was available for almost a third of respondents.

While 52% of respondents reported a 'lower than usual' quantity of purchased food in May 2020, the majority of respondents reported no change in quantity of purchased food in March (74%), April (65%), and May (70%) 2021, a further indication of stabilization in 2021. The other respondents in 2021 reported mostly a 'lower than usual quantity of purchased food. It is unclear from the data whether this resulted in reduced food intake or whether they were accessing food from other sources, such as their own production.

3. Business adaptations to COVID-19

Many respondents changed their behaviour and/or adapted to the specific circumstance due to COVID-19, particularly in 2021 after the Odisha region had experienced two peaks (Figure 4). Most of the respondents changed from cash to electronic transactions, especially in 2021 (91%) and to a lower extent in 2020 (86%). Moreover, over half of the respondents borrowed working capital, with numbers increasing between 2019 and 2020 (26% and 63%, respectively). 38% of the respondents used their savings to pay for business costs, especially in 2021 (96%). A high number of respondents also borrowed credit in-kind (34%) and lent to their own staff (32%). In 2021, all respondents made donations to their community, compared to none in the previous years. These data indicate financial stress that may have been alleviated by a strong social cohesion and social capital. These factors may have supported respondents' resilience in the face of COVID-19 related stressors.

Figure 4 Percentage of respondents who have shown the respective behaviours in (a) any year and (b) by year over the past three years (2019-2021).



4. Impacts by value chain segment

The following subsections detail changes in business operation occurring between March-May 2020 and March-May 2021, for surveyed businesses in seven segments of the aquatic food supply chain in Odisha.

4.1 Fish farmers

In both years, a high number of respondents operated their business, though more businesses were in operation in 2021. In the first two months in 2020, 76% of the businesses were operated, increasing to 100% in May. In comparison, 95% operated their business in March and April 2021, which slightly declined to 90% in May.

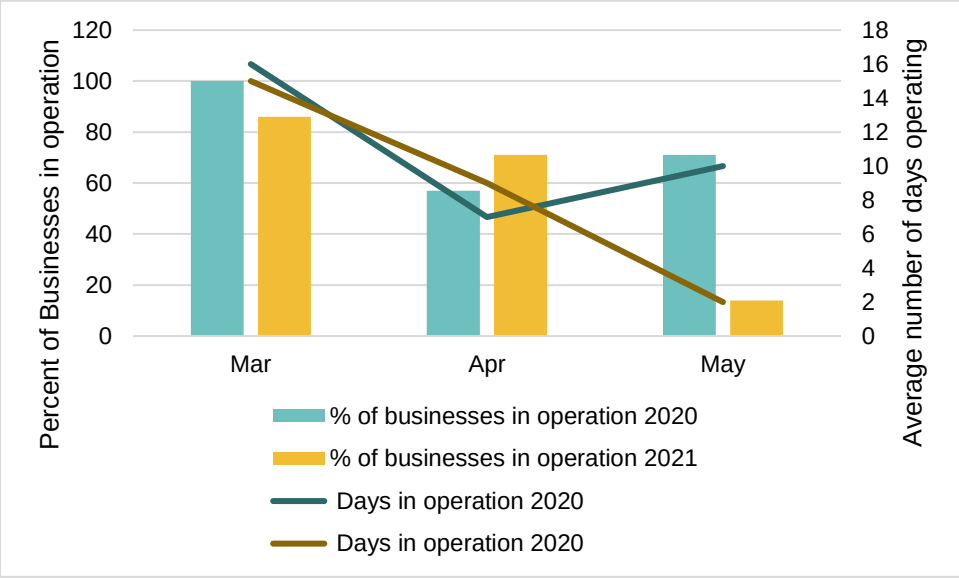
While the average procurement price per ton was higher in 2021, the price increased between March and May in both years. In 2020, the price increased from USD 261 per ton in March to USD 392 per ton in May, whereas in 2021, it rose from USD 252 per ton in March to USD 450 per ton in May. The average sales value for fish was stable across all three months and was similar between 2020 and 2021 (USD 1.9 and USD 1.82 per kg, respectively).

4.2 Feed Sellers (non-pellet)

In March 2020, all respondents operated their business (Figure 5). This percentage declined to 57% in April and increased to 71% in May. In comparison, in March 2021, 86% of the businesses were operated, declining to 71% in April, before dropping to 14% in May. Connected to the percentage of operating businesses are the average number of days, which were 16 days in March 2020, 7 days in April, and 10 days in May. In 2021, the business operated 15 days in March, 9 days in April, and 2 days in May. The low percentage

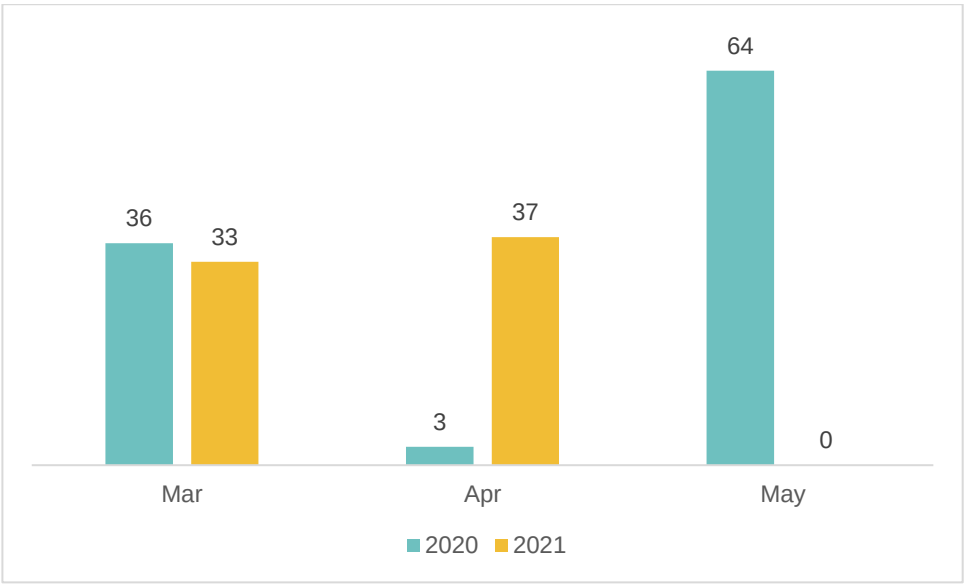
of businesses in operation in May 2021 may be a result of temporary business suspensions due to the government mandated lockdown during that month.

Figure 5 Percent of businesses in operation and average number of days operating in 2020 and 2021.



The average sales values of feed were relatively stable in 2020 and March and April 2021, whereas in May 2021 no sales had been made, likely due to COVID-related lockdown mandates. In 2020, the sales value of feed was on average USD 430 per ton, which was slightly less compared to March and April 2021, with USD 476 per ton. The quantity sold in 2020 dipped in April compare to other months, while the quantities in 2021 were stable for the first two months (33 tons and 37 tons, respectively) (Figure 6). In 2020, the quantity dropped from 36 tons in March to 3 tons in April and then jumped to 64 tons in May.

Figure 6 Total quantity of feed sold in tons, in 2020 and 2021.

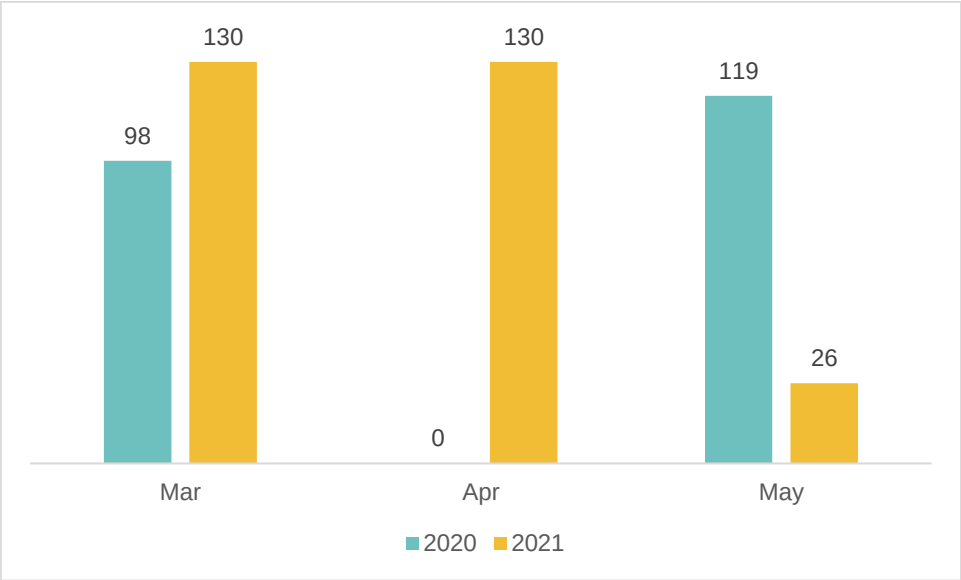


4.3 Feed Seller (pellet)

In 2020, the percentage of respondents who operated their business and the average days they operated respective businesses dipped in April but recovered in May, while in 2021 the values gradually declined, likely in response to their second wave. In March 2020, 83% of the respondents operated their business for an average number of 16 days. This declined to 50% and an average of 6 days in April, before it increased to 100% and an average of 16 days in May. In 2021, the percentage decreased from 67% in March to 17% in May and from 13 days to 2 days, respectively. Decreasing operations in 2021 were likely due to impacts from the second wave of the pandemic.

The sales value for feed was higher in 2021 compared to 2020. In 2021, the value increased from USD 911 per ton in March to USD 1099 per ton. Likely due to reduced business activities in April 2020, no sales occurred; however, in March the sales value was USD 653 per ton and USD 573 per ton in May. The total quantity of sold feed showed different patterns for 2020 and 2021 (Figure 7). In March and May 2020, 96 and 119 tons had been sold, respectively. Between March and April 2021, no change in the sold quantity occurred (130 tons for both months), however, it dropped to only 26 tons in May.

Figure 7 Total quantity of feed sold in tons, in 2020 and 2021.



4.4 Fish Processors

Only one of the respondents had been a fish processor, and this respondent only operated in April 2020, while in March and May operations had been permanently stopped due to COVID. No information concerning 2021 was provided.

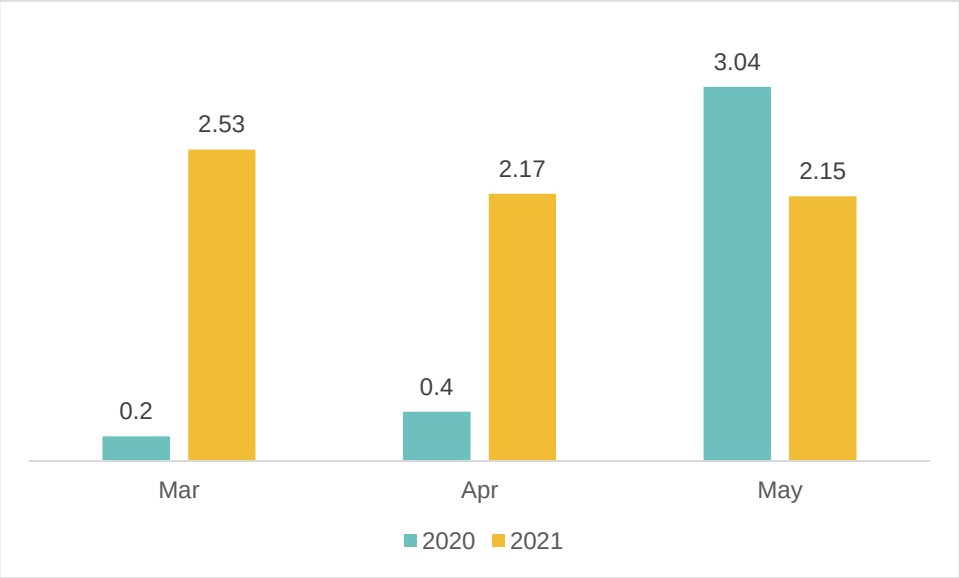
4.5 Fish Retailers

In 2021, 80% of the respondents operated their business in all three months, while in the previous year it was 80% in March, 60% in April, and 75% in May. The average number of days the business operated was 12 days in all three months of 2021, while it was on average

8.7 days in the three months of 2020. The 20% of the respondents who did stop their business in 2021, did this because of permanent closures due to COVID.

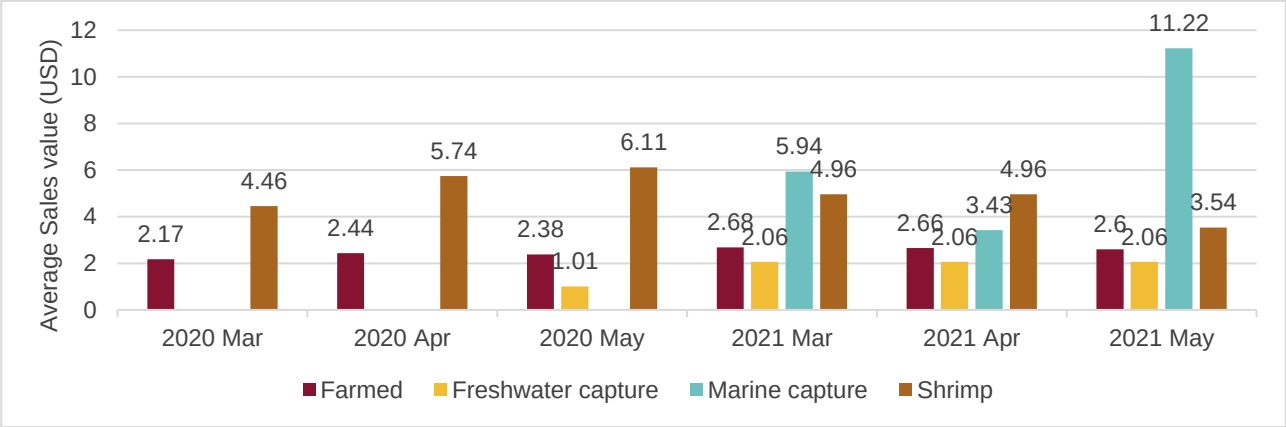
The average sales value of farmed fish was relatively stable in both years, although it was higher in 2021, with USD 2.33 per kg in 2020 and USD 2.65 per kg in 2021. The sold quantity of farmed fish only slightly decreased from March to May 2021 (2.53 tons and 2.15 tons, respectively), whereas 2020 showed a more rapid change (Figure 8). In the first two months, the sold quantity was 0.2 tons and 0.4 tons respectively, which then steeply increased to 3.04 tons in May.

Figure 8 Total quantity of sold farmed fish, in tons in 2020 and 2021.



Compared to farmed fish, the sold quantity of freshwater fish was low, with 0.04 tons in March 2021, increasing to 0.06 tons in April and 0.10 tons in May. However, the quantity of marine capture fish was higher than that for farmed fish in 2021. In March, 10 tons had been sold, 9 tons in April, which then jumped to 124 tons in May. Little information regarding freshwater and marine capture fish was available for 2020. Shrimp sales showed a gradual decline from March to May in 2021. The sold quantity declined from 2.2 tons in March to 0.43 tons in May. Information for March 2020 was available, and a much higher quantity of shrimp had been sold, compared to 2021 (9.3 tons). The average sales values were generally stable, except for shrimp prices which peaked in March and April 2021 (Figure 9)

Figure 9 Average sales value of fish in USD in 2020 and 2021.

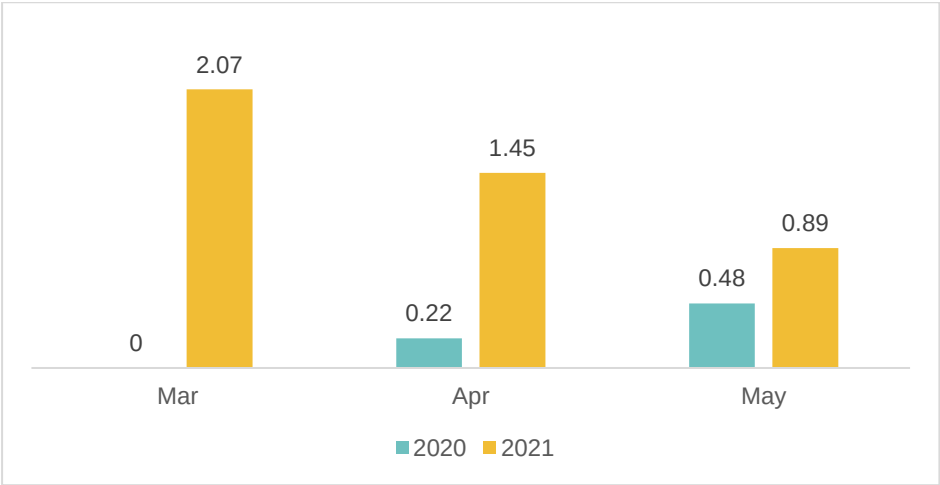


4.6 Fish traders

Fish trading operations remained relatively unaffected in both years. All respondents operated their business in all three months of 2020 and 2021 and the average number of days these businesses operated was the same across all months (11 to 12 days). Respondents reported some temporary business suspension and transport restrictions due to COVID.

The average sales value of farmed fish remained at a similar level in the months of 2021 (on average USD 2.35 per kg). In 2020, the sales value increased from USD 1.89 per kg in April to USD 2.45 per kg in May (no data was available for March). Even though the sales value remained stable in 2021, the quantity of sold farmed fish declined between March and May 2021, whereas it increased between April and May 2020 (Figure 10). In March 2021, 2.07 tons had been sold, 1.45 tons in April and 0.89 tons in May. The quantity was lower in 2020, with 0.22 tons in April and 0.48 tons in May.

Figure 10 Total quantity of sold farmed fish, in tons in 2020 and 2021.



The quantity of sold fish from freshwater capture fluctuated between 0.50 tons and 1 ton in 2021, although the sales value was stable at USD 1.65 per kg.

4.7 Fishers

The majority of fishers own a boat (93%) and a large proportion has an engine boat (71 %) with only 21% having a manual boat. In March 2021, 86% of the respondents went fishing, which declined to 79% in April and increased to 86% in May. On average, fishers spent 13 days fishing, for an average of 7 hours per day. No fishing activities occurred in 2020.

The sold quantity remained at the same level across all three months in 2021, with 6.48 tons in March, 5.83 tons in April, and 4.4 tons in May.

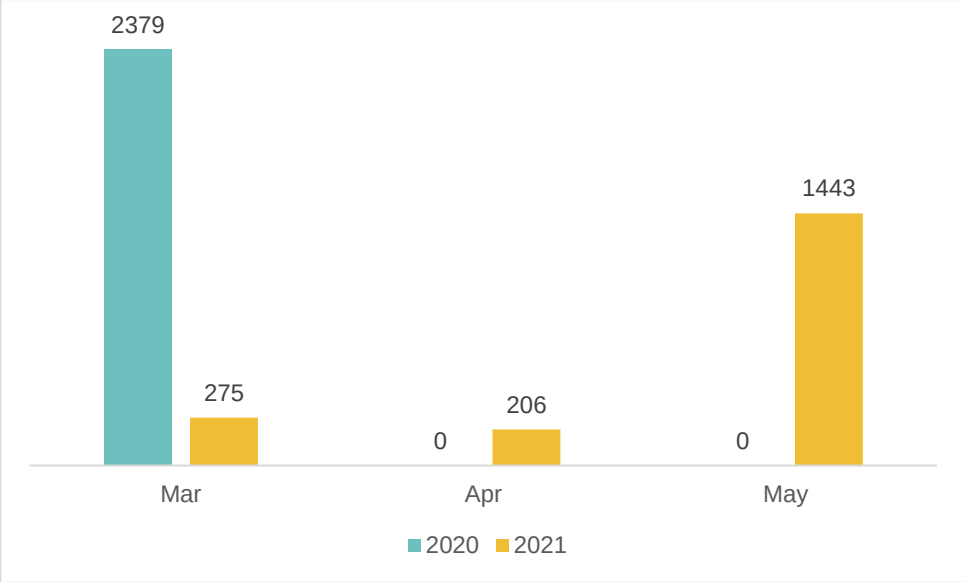
While all respondents consumed their own catch, the average quantity of fish consumed declined between March and April from 35.71 kg to 22.36 kg per household. In May, 25.29 kg were consumed.

4.8 Fish Hatcheries

The percentage of respondents operating their business displayed different patterns for 2020 and 2021. In 2020, it halved between March (80%) and April (40%) and then further declined in May (30%). On the contrary, in 2021, the value doubled from 30% in March to 70% in April, before it decreased to 60% in May. In March 2020, the businesses were open for an average of 15 days versus only 4 days in April and May. In 2021, the average number of operating days increased from 5 days in March to 11 days in May. The main barrier to operating in 2021 was attributed to bad weather.

No information regarding the value of sold hatchlings was available for April and May 2020 (Figure 11). The sold quantity in March 2020 was considerably higher than in 2021, with USD 2379 compared to USD 275 of sold hatchlings. In April 2021, the value was USD 206, which jumped to USD 1443 in May.

Figure 11 Total value of sold hatchlings in USD in 2020 and 2021.



Recommendations

1. While operations and business activities were impacted by the pandemic, there is evidence of resilience along the fish production value-chain in Odisha, shown by increasing activity and stable prices through the second wave of the pandemic. Social capital (networks, loan schemes, donations) and adaptations (changing target markets and business models) that enabled this resilience should be supported.
2. Closures due to the pandemic indicate a need for business support schemes that help businesses re-open post-lockdown.
3. Fishers were less resilient than other groups in this study and may require more support. Reduced fish consumption among fishers, likely a response to decreased fishing activities from decreased mobility during lockdowns, may threaten this groups food security. This could be alleviated by subsidy or food stamp schemes focused on fish and/or other nutrient-dense or nutrient-fortified food products.

List of figures

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